Report No. : SQETMR704204

# LM-80 Test Report

## NFSL757G-V1

| | | | |
|---|---|---|---|
| **Issue Date:** | June 4, 2018 | **Revision Date:** | January 10, 2019 |
| **Test Initiation Date:** | April 6, 2017 | **Test Completion Date:** | - |
| **Test Duration:** | 10,000 hours | **Report Number:** | SQETMR704204 |

**Customer Information:**

Company Name: Nichia Corporation
Address: 491-100, Oka, Kaminaka-cho, Anan-shi, Tokushima, 774-8601, JAPAN

**Description of Test Samples:**

Manufacturer's Name: Nichia Corporation
Classification: LED Package
Model Name: Warm White LED
Model Number: NFSL757G-V1
Nominal CCT: 2700 K

**Test Summary:**

| Data Set | Case Temperature [°C] | Ambient Temperature [°C] | Drive Current [mA] | Lumen Maintenance at 10k hours [%] | Chromaticity Shift (Δu'v') at 10k hours | TM-21 Projection L70(10k) [hours] | TM-21 Projection L80(10k) [hours] | TM-21 Projection L90(10k) [hours] |
|---|---|---|---|---|---|---|---|---|
| 1 | 55 | > 50 | 80 | 100.1 | 0.0013 | > 60000 | > 60000 | > 60000 |
| 2 | 55 | > 50 | 125 | 99.9 | 0.0015 | > 60000 | > 60000 | > 60000 |
| 3 | 55 | > 50 | 150 | 99.9 | 0.0015 | > 60000 | > 60000 | > 60000 |
| 4 | 55 | > 50 | 180 | 99.8 | 0.0016 | > 60000 | > 60000 | > 60000 |
| 5 | 85 | > 80 | 80 | 99.4 | 0.0014 | > 60000 | > 60000 | > 60000 |
| 6 | 85 | > 80 | 125 | 99.0 | 0.0017 | > 60000 | > 60000 | > 60000 |
| 7 | 85 | > 80 | 150 | 98.8 | 0.0019 | > 60000 | > 60000 | > 60000 |
| 8 | 85 | > 80 | 180 | 98.7 | 0.0018 | > 60000 | > 60000 | > 60000 |
| 9 | 105 | > 100 | 80 | 98.1 | 0.0023 | > 60000 | > 60000 | > 60000 |
| 10 | 105 | > 100 | 125 | 97.7 | 0.0023 | > 60000 | > 60000 | > 60000 |
| 11 | 105 | > 100 | 150 | 97.4 | 0.0024 | > 60000 | > 60000 | > 60000 |
| 12 | 105 | > 100 | 180 | 96.9 | 0.0022 | > 60000 | > 60000 | > 60000 |

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Approved Signatory:

H. Hashimoto

Hiroyuki HASHIMOTO, Lab Manager

**Nichia Corporation LED Testing Laboratory**

1-1,Tatsumi-Cho, Anan-Shi, TOKUSHIMA 774-0001, JAPAN

**Applicable Model Numbers:**

**This LM-80 test report applies to the following models:**

| Series | Model Number | Case Temperature [°C] | Forward Current [mA] | Nominal CCT * [K] | Data Set Number |
|---|---|---|---|---|---|
| 757 | NFSL757G-V1<br>NFSL757GT-V1 | 55 | 80 | ≥ 2200 | 1 |
| | | 55 | 125 | ≥ 2200 | 2 |
| | | 55 | 150 | ≥ 2200 | 3 |
| | | 55 | 180 | ≥ 2200 | 4 |
| | | 85 | 80 | ≥ 2200 | 5 |
| | | 85 | 125 | ≥ 2200 | 6 |
| | | 85 | 150 | ≥ 2200 | 7 |
| | | 85 | 180 | ≥ 2200 | 8 |
| | | 105 | 80 | ≥ 2200 | 9 |
| | | 105 | 125 | ≥ 2200 | 10 |
| | | 105 | 150 | ≥ 2200 | 11 |
| | | 105 | 180 | ≥ 2200 | 12 |
| 757 | NFSW757G-V1<br>NFSW757GT-V1 | 55 | 80 | ≥ 5000 | 1 |
| | | 55 | 125 | ≥ 5000 | 2 |
| | | 55 | 150 | ≥ 5000 | 3 |
| | | 55 | 180 | ≥ 5000 | 4 |
| | | 85 | 80 | ≥ 5000 | 5 |
| | | 85 | 125 | ≥ 5000 | 6 |
| | | 85 | 150 | ≥ 5000 | 7 |
| | | 85 | 180 | ≥ 5000 | 8 |
| | | 105 | 80 | ≥ 5000 | 9 |
| | | 105 | 125 | ≥ 5000 | 10 |
| | | 105 | 150 | ≥ 5000 | 11 |
| | | 105 | 180 | ≥ 5000 | 12 |

* The Nominal CCT category in this document refers ENERGY STAR® Requirements for the Use of LM-80 Data.

**Applicable Model Numbers:**

**This LM-80 test report applies to the following models:**

| Series | Model Number | Case Temperature [°C] | Forward Current [mA] | Nominal CCT * [K] | Data Set Number |
|---|---|---|---|---|---|
| 757 | NFSW757G-V2<br>NFSW757GT-V2 | 55 | 80 | ≥ 2200 | 1 |
| | | 55 | 125 | ≥ 2200 | 2 |
| | | 55 | 150 | ≥ 2200 | 3 |
| | | 55 | 180 | ≥ 2200 | 4 |
| | | 85 | 80 | ≥ 2200 | 5 |
| | | 85 | 125 | ≥ 2200 | 6 |
| | | 85 | 150 | ≥ 2200 | 7 |
| | | 85 | 180 | ≥ 2200 | 8 |
| | | 105 | 80 | ≥ 2200 | 9 |
| | | 105 | 125 | ≥ 2200 | 10 |
| | | 105 | 150 | ≥ 2200 | 11 |
| | | 105 | 180 | ≥ 2200 | 12 |
| 757 | NFSW757G-V3<br>NFSW757GT-V3 | 55 | 80 | ≥ 2200 | 1 |
| | | 55 | 125 | ≥ 2200 | 2 |
| | | 55 | 150 | ≥ 2200 | 3 |
| | | 55 | 180 | ≥ 2200 | 4 |
| | | 85 | 80 | ≥ 2200 | 5 |
| | | 85 | 125 | ≥ 2200 | 6 |
| | | 85 | 150 | ≥ 2200 | 7 |
| | | 85 | 180 | ≥ 2200 | 8 |
| | | 105 | 80 | ≥ 2200 | 9 |
| | | 105 | 125 | ≥ 2200 | 10 |
| | | 105 | 150 | ≥ 2200 | 11 |
| | | 105 | 180 | ≥ 2200 | 12 |

* The Nominal CCT category in this document refers ENERGY STAR® Requirements for the Use of LM-80 Data.

**IES LM-80 Test Report Requirement :**

| | |
|---|---|
| **1. Number of LED light sources tested** | See tables |
| **2. Description of LED light sources** | See Description of Test Samples |
| **3. Description of auxiliary equipment** | |
| Active cooling life test system | Consisting of small boxes, in which each box contains a reliability test board, and a water-cooled heat sink or a heater to control device temperature |
| LED Tester | Consisting of an integrating sphere, a programmable current-source meter, and a spectroradiometer |
| **4. Operating cycle** | Constant direct current (DC) |
| **5. Ambient conditions** | |
| Ambient Temperature ($T_A$) | See tables<br>Ambient temperature is the temperature of the air at a distance of 1.5 mm above the reliability test board |
| Air flow | < 0.1 m/s |
| Relative Humidity | < 65 % |
| **6. Case temperature (Test point temperature)** | See tables<br>For the case temperature ($T_S$) measurement point, see the figure 1 |

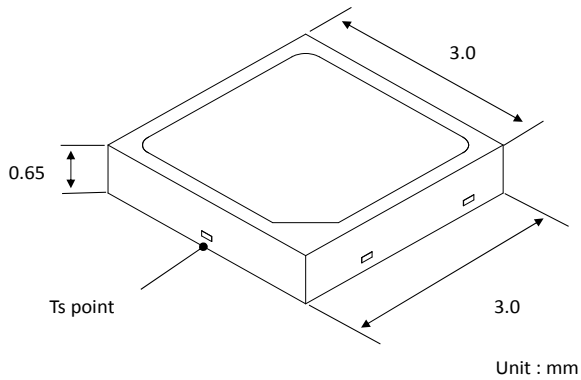



Figure 1: The case temperature (Ts) measurement point

| | |
|---|---|
| **7. Drive current of the LED light sources during lifetime test** | See tables |
| **8. Initial luminous flux,forward voltage and chromaticity coordinates** | See tables |
| **9. Lumen maintenance data for each individual LED light source along with average value,median value, standard deviation, minimum and maximum lumen maintenance value for all of the LED light sources** | See tables |
| **10. Observation of LED light sources failures including the failure conditions and time of failure** | No failure observed |
| **11. LED light source monitoring interval** | See tables |
| **12. Photometric measurement uncertainty** | |
| Flux measurement | 2.4 % ($k$ =2) |
| Lumen maintenance | 1.8 % ($k$ =2) |
| **13. Chromaticity shift reported over the measurement time** | See tables |
| **14. Photometric and electrical measurements** | |
| Measurement point temperature | 25°C ± 2°C |
| Temperature measurement point location | Sphere ambient air temperature monitor |
| Measurement method | See LM-85-14 section 5.3 |

# ENERGY STAR® LM-80 Cover Sheet

## Administrative Information

| | |
|---|---|
| Tested subcomponent series : | Warm White LED |
| Tested subcomponent model number : | NFSL757G-V1 |
| Report issue date : | June 4, 2018 |
| Report revision date : | January 10, 2019 |
| Testing start date : | April 6, 2017 |
| Testing completion date : | - |
| LED sampling method : | Comply with LM-80 |
| LED sample size : | 25 Packages |

## LED Identification

| | |
|---|---|
| LED manufacturer's name : | Nichia Corporation |
| LED model number : | NFSL757G-V1 |
| Description of LED : | LED Package |

## LED Characteristics

Total input power (W) :

Average current density per LED die (mA/mm$^2$):

Average power density per LED die (W/mm$^2$):

| Case Temperature [°C] | Drive Current [mA] | Total Input Power [W] | Average Current density per LED die [mA/mm$^2$] | Average Power density per LED die [W/mm$^2$] |
|---|---|---|---|---|
| 55 | 80 | 0.23 | 189 | 0.55 |
| 55 | 125 | 0.38 | 296 | 0.91 |
| 55 | 150 | 0.47 | 355 | 1.11 |
| 55 | 180 | 0.58 | 426 | 1.37 |
| 85 | 80 | 0.23 | 189 | 0.55 |
| 85 | 125 | 0.38 | 296 | 0.91 |
| 85 | 150 | 0.47 | 355 | 1.11 |
| 85 | 180 | 0.58 | 426 | 1.37 |
| 105 | 80 | 0.23 | 189 | 0.55 |
| 105 | 125 | 0.38 | 296 | 0.91 |
| 105 | 150 | 0.47 | 355 | 1.11 |
| 105 | 180 | 0.58 | 426 | 1.37 |

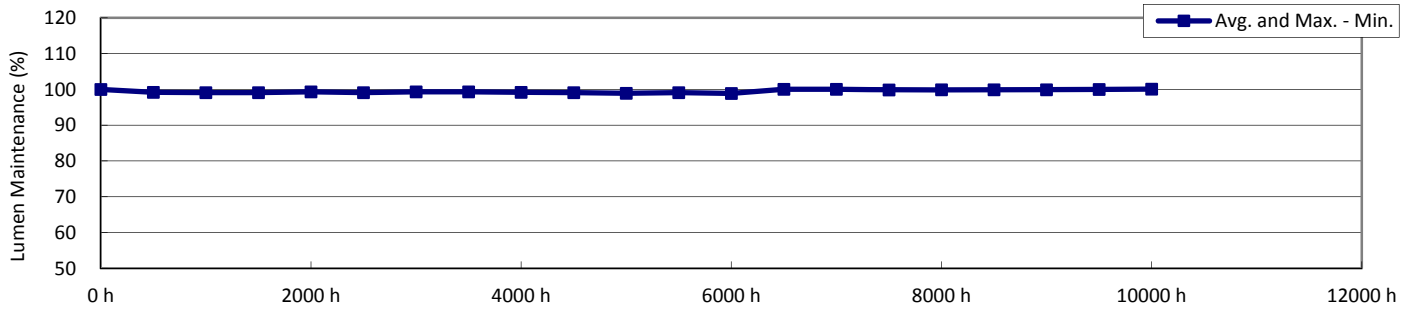
Representative CRI (Ra) of the tested sample set : Ra = 82.4

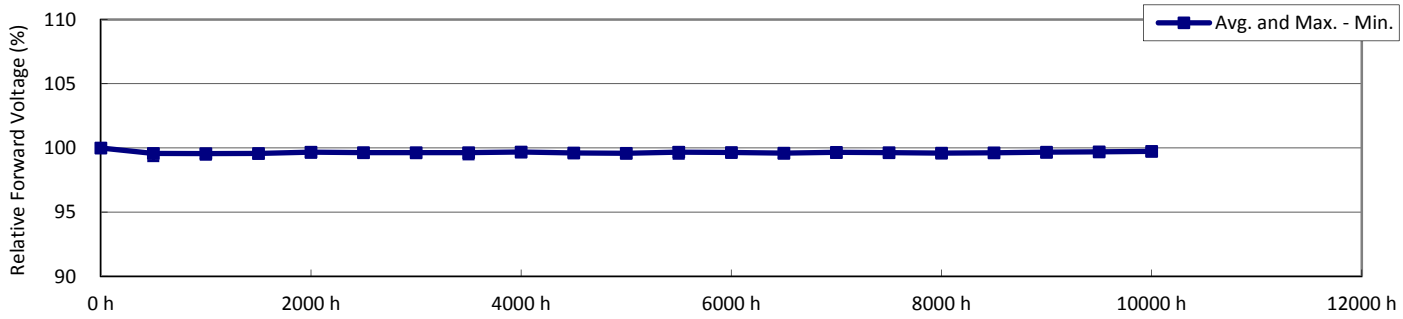
Minimum die edge to die edge spacing : N/A

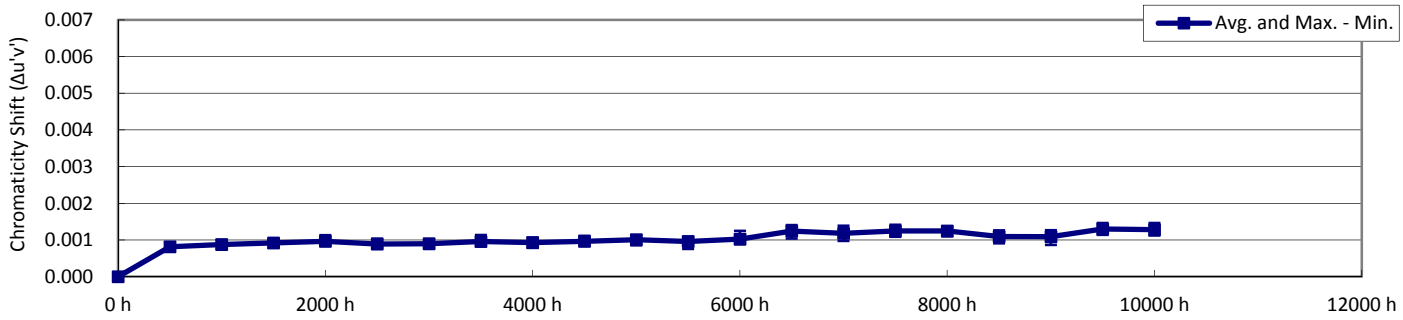
## Data Set 1 : 55 °C, 80 mA

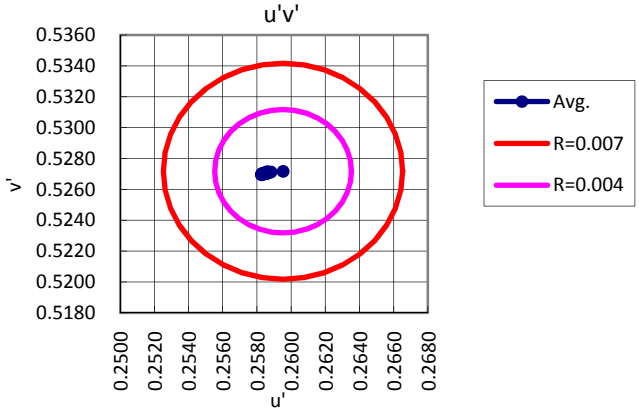
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-1**
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\Phi_V$ [lm] | $V_F$ [V] | $T_{CP}$ [K] | P [W] | x | y | u' | v' | | | | |
| 1 | 37.6 | 2.92 | 2757 | 0.23 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |
| 2 | 37.5 | 2.92 | 2761 | 0.23 | 0.458 | 0.414 | 0.259 | 0.528 | | | | |
| 3 | 37.5 | 2.92 | 2746 | 0.23 | 0.457 | 0.411 | 0.260 | 0.527 | | | | |
| 4 | 37.5 | 2.93 | 2753 | 0.23 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 5 | 37.4 | 2.92 | 2770 | 0.23 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 6 | 37.6 | 2.92 | 2773 | 0.23 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 7 | 37.5 | 2.93 | 2766 | 0.23 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 8 | 37.5 | 2.93 | 2787 | 0.23 | 0.453 | 0.410 | 0.259 | 0.526 | | | | |
| 9 | 37.5 | 2.92 | 2772 | 0.23 | 0.455 | 0.410 | 0.259 | 0.527 | | | | |
| 10 | 37.6 | 2.93 | 2738 | 0.23 | 0.459 | 0.414 | 0.260 | 0.529 | | | | |
| 11 | 37.5 | 2.92 | 2744 | 0.23 | 0.456 | 0.409 | 0.261 | 0.526 | | | | |
| 12 | 37.4 | 2.92 | 2725 | 0.23 | 0.461 | 0.416 | 0.261 | 0.530 | | | | |
| 13 | 37.5 | 2.92 | 2783 | 0.23 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 14 | 37.5 | 2.92 | 2736 | 0.23 | 0.458 | 0.412 | 0.261 | 0.528 | | | | |
| 15 | 37.7 | 2.92 | 2768 | 0.23 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 16 | 37.5 | 2.92 | 2786 | 0.23 | 0.454 | 0.411 | 0.259 | 0.526 | | | | |
| 17 | 37.6 | 2.92 | 2740 | 0.23 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 18 | 37.5 | 2.93 | 2779 | 0.23 | 0.453 | 0.408 | 0.259 | 0.525 | | | | |
| 19 | 37.6 | 2.92 | 2712 | 0.23 | 0.461 | 0.414 | 0.262 | 0.529 | | | | |
| 20 | 37.6 | 2.92 | 2789 | 0.23 | 0.454 | 0.411 | 0.258 | 0.526 | | | | |
| 21 | 37.7 | 2.92 | 2749 | 0.23 | 0.459 | 0.415 | 0.260 | 0.529 | | | | |
| 22 | 37.6 | 2.92 | 2787 | 0.23 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 23 | 37.5 | 2.92 | 2763 | 0.23 | 0.455 | 0.411 | 0.260 | 0.527 | | | | |
| 24 | 37.4 | 2.92 | 2782 | 0.23 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 25 | 37.5 | 2.92 | 2786 | 0.23 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 37.5 | 2.92 | 2762 | 0.23 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| Med. | 37.5 | 2.92 | 2766 | 0.23 | 0.456 | 0.411 | 0.259 | 0.527 | | | | |
| σ | 0.08 | 0.003 | 21.5 | 0.000 | 0.0025 | 0.0023 | 0.0008 | 0.0012 | | | | |
| Min. | 37.4 | 2.92 | 2712 | 0.23 | 0.453 | 0.408 | 0.258 | 0.525 | | | | |
| Max. | 37.7 | 2.93 | 2789 | 0.23 | 0.461 | 0.416 | 0.262 | 0.530 | | | | |

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# Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.1 | 99.1 | 98.9 | 99.2 | 99.0 | 99.2 | 99.2 | 99.1 | 98.9 | 98.8 | 99.0 | 98.7 | 99.9 | 99.9 | 99.7 |
| 2 | 100.0 | 99.4 | 99.4 | 99.2 | 99.5 | 99.3 | 99.5 | 99.5 | 99.4 | 99.2 | 99.1 | 99.3 | 99.0 | 100.3 | 100.2 | 100.1 |
| 3 | 100.0 | 99.2 | 99.2 | 99.0 | 99.3 | 99.1 | 99.3 | 99.3 | 99.2 | 99.0 | 98.8 | 99.0 | 98.8 | 100.0 | 99.9 | 99.8 |
| 4 | 100.0 | 99.4 | 99.3 | 99.2 | 99.4 | 99.2 | 99.4 | 99.4 | 99.3 | 99.3 | 99.0 | 99.2 | 98.9 | 100.2 | 100.1 | 100.1 |
| 5 | 100.0 | 99.5 | 99.4 | 99.3 | 99.6 | 99.2 | 99.5 | 99.6 | 99.4 | 99.4 | 98.9 | 99.4 | 99.2 | 100.3 | 100.2 | 100.1 |
| 6 | 100.0 | 99.1 | 99.0 | 98.9 | 99.1 | 99.0 | 99.1 | 99.2 | 99.0 | 99.0 | 98.8 | 99.0 | 98.7 | 99.9 | 99.9 | 99.8 |
| 7 | 100.0 | 99.2 | 99.0 | 99.0 | 99.2 | 99.0 | 99.2 | 99.2 | 99.1 | 99.0 | 98.8 | 99.0 | 98.8 | 100.0 | 99.9 | 99.8 |
| 8 | 100.0 | 99.2 | 98.9 | 99.0 | 99.3 | 99.0 | 99.2 | 99.2 | 99.2 | 99.0 | 98.8 | 99.0 | 98.8 | 100.0 | 100.0 | 99.8 |
| 9 | 100.0 | 99.1 | 98.9 | 98.9 | 99.1 | 98.9 | 99.1 | 99.2 | 99.1 | 98.9 | 98.8 | 98.9 | 98.8 | 99.9 | 99.9 | 99.7 |
| 10 | 100.0 | 99.2 | 99.0 | 99.0 | 99.3 | 99.1 | 99.2 | 99.2 | 99.2 | 99.0 | 98.8 | 99.0 | 98.8 | 99.9 | 99.9 | 99.8 |
| 11 | 100.0 | 99.0 | 99.0 | 99.0 | 99.3 | 99.0 | 99.1 | 99.2 | 99.1 | 99.0 | 98.8 | 99.0 | 98.9 | 99.9 | 100.0 | 99.9 |
| 12 | 100.0 | 99.2 | 99.0 | 99.1 | 99.3 | 99.1 | 99.3 | 99.3 | 99.3 | 99.1 | 99.0 | 99.1 | 99.0 | 100.1 | 100.2 | 100.0 |
| 13 | 100.0 | 99.4 | 99.3 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.1 | 99.1 | 99.2 | 99.0 | 100.2 | 100.2 | 100.1 |
| 14 | 100.0 | 99.1 | 99.1 | 99.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.2 | 98.9 | 98.8 | 99.0 | 98.8 | 100.0 | 99.9 | 99.7 |
| 15 | 100.0 | 99.0 | 98.9 | 98.9 | 99.1 | 99.0 | 99.2 | 99.2 | 99.1 | 98.8 | 98.8 | 98.9 | 98.8 | 100.0 | 99.9 | 99.7 |
| 16 | 100.0 | 99.1 | 99.0 | 99.0 | 99.2 | 99.2 | 99.3 | 99.4 | 99.3 | 98.9 | 98.9 | 99.0 | 98.9 | 100.1 | 99.9 | 99.8 |
| 17 | 100.0 | 99.1 | 99.0 | 99.1 | 99.2 | 99.2 | 99.4 | 99.3 | 99.3 | 99.1 | 98.9 | 99.0 | 98.9 | 100.1 | 100.0 | 99.8 |
| 18 | 100.0 | 99.0 | 98.9 | 98.9 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 98.8 | 98.8 | 98.9 | 98.8 | 99.9 | 99.8 | 99.7 |
| 19 | 100.0 | 99.1 | 99.0 | 99.1 | 99.1 | 99.1 | 99.3 | 99.3 | 99.1 | 99.0 | 98.9 | 99.0 | 98.8 | 99.9 | 99.9 | 99.7 |
| 20 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.7 | 99.6 | 99.5 | 99.4 | 99.4 | 99.4 | 99.2 | 100.3 | 100.3 | 100.1 |
| 21 | 100.0 | 99.1 | 98.9 | 99.0 | 99.2 | 99.1 | 99.2 | 99.2 | 99.0 | 98.9 | 98.9 | 99.0 | 98.8 | 99.9 | 99.9 | 99.8 |
| 22 | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.5 | 99.4 | 99.4 | 99.3 | 99.2 | 99.3 | 99.0 | 100.1 | 100.2 | 100.0 |
| 23 | 100.0 | 99.2 | 99.0 | 99.2 | 99.3 | 99.2 | 99.3 | 99.3 | 99.2 | 99.1 | 99.0 | 99.1 | 98.8 | 100.0 | 100.0 | 99.9 |
| 24 | 100.0 | 99.3 | 99.2 | 99.3 | 99.3 | 99.3 | 99.6 | 99.5 | 99.4 | 99.3 | 99.2 | 99.3 | 99.2 | 100.3 | 100.3 | 100.1 |
| 25 | 100.0 | 99.3 | 99.1 | 99.1 | 99.3 | 99.2 | 99.3 | 99.3 | 99.3 | 99.0 | 99.0 | 99.1 | 98.8 | 100.1 | 100.1 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.2 | 99.1 | 99.1 | 99.3 | 99.1 | 99.3 | 99.3 | 99.2 | 99.1 | 98.9 | 99.1 | 98.9 | 100.1 | 100.0 | 99.9 |
| Med. | 100.0 | 99.2 | 99.0 | 99.0 | 99.3 | 99.1 | 99.3 | 99.3 | 99.2 | 99.0 | 98.9 | 99.0 | 98.8 | 100.0 | 100.0 | 99.8 |
| σ | 0.00 | 0.15 | 0.17 | 0.15 | 0.14 | 0.14 | 0.17 | 0.13 | 0.15 | 0.17 | 0.16 | 0.15 | 0.15 | 0.14 | 0.15 | 0.15 |
| Min. | 100.0 | 99.0 | 98.9 | 98.9 | 99.1 | 98.9 | 99.1 | 99.2 | 99.0 | 98.8 | 98.8 | 98.9 | 98.7 | 99.9 | 99.8 | 99.7 |
| Max. | 100.0 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 | 99.7 | 99.6 | 99.5 | 99.4 | 99.4 | 99.4 | 99.2 | 100.3 | 100.3 | 100.1 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0111 | -0.0090 | -0.0112 | 0.0005 | 0.0002 | -0.0013 | -0.0012 | -0.0010 | -0.0010 | 0.0000 | 0.0010 | | | | | |

| Test duration used | 5000 h to 10000 h |
|---|---|
| B | 0.980 |
| α | -2.23E-06 |
| $R^2$ | 0.594 |
| Calculated $L_{70}$ (10K) | N/A hours |
| Reported $L_{70}$ (10K) | > 60000 hours |
| Calculated $L_{80}$ (10K) | N/A hours |
| Reported $L_{80}$ (10K) | > 60000 hours |
| Calculated $L_{90}$ (10K) | N/A hours |
| Reported $L_{90}$ (10K) | > 60000 hours |

Curve-fit equation:
$\Phi(t)=B\exp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=\ln(B/0.7)/\alpha$

$L_{80}=\ln(B/0.8)/\alpha$

$L_{90}=\ln(B/0.9)/\alpha$

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.7 | 99.8 | 99.7 | 99.9 | 100.0 | | | | | | | | | | | |
| 2 | 100.1 | 100.1 | 100.0 | 100.3 | 100.4 | | | | | | | | | | | |
| 3 | 99.8 | 100.0 | 99.8 | 99.9 | 100.1 | | | | | | | | | | | |
| 4 | 100.0 | 100.1 | 100.0 | 100.2 | 100.4 | | | | | | | | | | | |
| 5 | 100.0 | 99.8 | 99.9 | 100.1 | 100.3 | | | | | | | | | | | |
| 6 | 99.7 | 99.8 | 99.6 | 99.9 | 100.1 | | | | | | | | | | | |
| 7 | 99.7 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 8 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 9 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 10 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 11 | 99.9 | 99.5 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | |
| 12 | 100.0 | 100.1 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| 13 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | |
| 14 | 99.8 | 99.9 | 99.7 | 99.9 | 100.0 | | | | | | | | | | | |
| 15 | 99.7 | 99.8 | 99.7 | 99.9 | 100.0 | | | | | | | | | | | |
| 16 | 99.9 | 99.8 | 99.7 | 99.9 | 100.0 | | | | | | | | | | | |
| 17 | 99.8 | 99.6 | 99.7 | 99.8 | 99.9 | | | | | | | | | | | |
| 18 | 99.7 | 99.8 | 99.7 | 99.9 | 99.9 | | | | | | | | | | | |
| 19 | 99.7 | 99.8 | 99.7 | 99.9 | 99.9 | | | | | | | | | | | |
| 20 | 100.2 | 100.2 | 100.1 | 100.3 | 100.3 | | | | | | | | | | | |
| 21 | 99.8 | 99.9 | 99.8 | 100.0 | 100.0 | | | | | | | | | | | |
| 22 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | |
| 23 | 100.0 | 99.6 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 24 | 100.2 | 100.3 | 100.2 | 100.3 | 100.4 | | | | | | | | | | | |
| 25 | 99.8 | 99.9 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.9 | 99.9 | 99.9 | 100.0 | 100.1 | | | | | | | | | | | |
| Med. | 99.8 | 99.9 | 99.8 | 99.9 | 100.0 | | | | | | | | | | | |
| σ | 0.17 | 0.19 | 0.16 | 0.16 | 0.18 | | | | | | | | | | | |
| Min. | 99.7 | 99.5 | 99.6 | 99.8 | 99.8 | | | | | | | | | | | |
| Max. | 100.2 | 100.3 | 100.2 | 100.3 | 100.4 | | | | | | | | | | | |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.8 | 99.6 | 99.6 | 99.8 | 99.5 | 99.5 | 99.7 | 99.5 | 99.6 | 99.6 | 99.8 | 99.8 | 99.5 | 99.6 | 99.7 |
| 2 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.7 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.5 |
| 3 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 100.0 | 99.7 | 99.8 | 100.0 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.9 |
| 4 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.5 | 99.5 | 99.6 | 99.7 | 99.5 | 99.5 | 99.5 |
| 5 | 100.0 | 99.0 | 99.1 | 99.2 | 99.3 | 99.4 | 99.2 | 99.1 | 99.4 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.2 | 99.3 |
| 6 | 100.0 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.9 | 99.9 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 |
| 7 | 100.0 | 99.5 | 99.3 | 99.4 | 99.6 | 99.3 | 99.5 | 99.5 | 99.3 | 99.4 | 99.5 | 99.4 | 99.5 | 99.4 | 99.5 | 99.4 |
| 8 | 100.0 | 99.5 | 99.4 | 99.5 | 99.7 | 99.6 | 99.5 | 99.6 | 99.8 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.7 | 99.6 |
| 9 | 100.0 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 |
| 10 | 100.0 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.4 | 99.8 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.7 | 99.6 |
| 11 | 100.0 | 99.8 | 99.9 | 99.6 | 99.9 | 100.0 | 99.9 | 99.7 | 100.0 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 12 | 100.0 | 99.6 | 99.7 | 99.7 | 99.9 | 99.6 | 99.7 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 13 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.7 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 |
| 14 | 100.0 | 99.7 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 |
| 15 | 100.0 | 99.8 | 99.7 | 99.7 | 100.0 | 99.8 | 99.9 | 99.9 | 100.0 | 99.8 | 99.7 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 |
| 16 | 100.0 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.8 | 99.6 | 99.5 | 99.7 | 99.5 | 99.6 | 99.6 | 99.6 |
| 17 | 100.0 | 99.6 | 99.5 | 99.6 | 99.8 | 99.5 | 99.6 | 99.7 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| 18 | 100.0 | 99.5 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.5 | 99.5 | 99.4 | 99.7 | 99.8 | 99.6 | 99.8 | 99.6 |
| 19 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.9 | 99.7 | 99.7 | 99.9 | 99.8 | 99.8 | 99.7 | 99.7 |
| 20 | 100.0 | 99.4 | 99.4 | 99.4 | 99.3 | 99.6 | 99.4 | 99.4 | 99.4 | 99.6 | 99.5 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 |
| 21 | 100.0 | 99.9 | 99.8 | 99.8 | 99.9 | 99.7 | 99.7 | 100.0 | 99.8 | 99.8 | 99.9 | 100.1 | 100.0 | 99.8 | 99.9 | 99.8 |
| 22 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 |
| 23 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.7 | 99.8 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 |
| 24 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.8 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 |
| 25 | 100.0 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| Med. | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| σ | 0.00 | 0.18 | 0.17 | 0.14 | 0.19 | 0.17 | 0.16 | 0.18 | 0.20 | 0.13 | 0.16 | 0.19 | 0.15 | 0.16 | 0.16 | 0.16 |
| Min. | 100.0 | 99.0 | 99.1 | 99.2 | 99.3 | 99.3 | 99.2 | 99.1 | 99.3 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.2 | 99.3 |
| Max. | 100.0 | 99.9 | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 99.8 | 99.9 | 100.1 | 100.0 | 99.8 | 99.9 | 99.9 |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.5 | 99.7 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 2 | 99.4 | 99.5 | 99.5 | 99.5 | 99.7 | | | | | | | | | | | |
| 3 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | |
| 4 | 99.4 | 99.6 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 5 | 99.3 | 99.3 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| 6 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 7 | 99.5 | 99.4 | 99.5 | 99.5 | 99.6 | | | | | | | | | | | |
| 8 | 99.5 | 99.6 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 9 | 99.4 | 99.4 | 99.6 | 99.4 | 99.6 | | | | | | | | | | | |
| 10 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| 11 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 12 | 99.6 | 99.7 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | |
| 13 | 99.5 | 99.5 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| 14 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 15 | 99.7 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 16 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 17 | 99.7 | 99.6 | 99.7 | 99.6 | 99.8 | | | | | | | | | | | |
| 18 | 99.8 | 99.7 | 99.6 | 99.7 | 99.8 | | | | | | | | | | | |
| 19 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 20 | 99.5 | 99.5 | 99.5 | 99.6 | 99.7 | | | | | | | | | | | |
| 21 | 99.8 | 99.8 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 22 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | | | | | | | | | | | |
| 23 | 99.6 | 99.7 | 99.8 | 99.6 | 99.7 | | | | | | | | | | | |
| 24 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 25 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| Med. | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| σ | 0.15 | 0.16 | 0.16 | 0.16 | 0.14 | | | | | | | | | | | |
| Min. | 99.3 | 99.3 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| Max. | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0008 | 0.0008 | 0.0010 | 0.0010 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0011 | 0.0013 |
| 2 | 0.0000 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 |
| 3 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0011 | 0.0010 | 0.0010 | 0.0013 | 0.0011 | 0.0012 |
| 4 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0011 | 0.0013 |
| 5 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0010 | 0.0011 |
| 6 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 7 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0010 | 0.0010 | 0.0010 | 0.0013 | 0.0012 | 0.0013 |
| 8 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0012 | 0.0013 |
| 9 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0012 | 0.0011 | 0.0012 |
| 10 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 11 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0013 | 0.0012 | 0.0013 |
| 12 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0012 |
| 13 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0013 |
| 14 | 0.0000 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0013 |
| 15 | 0.0000 | 0.0008 | 0.0008 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0014 | 0.0013 | 0.0013 |
| 16 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 17 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| 18 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0011 | 0.0012 |
| 19 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0011 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 20 | 0.0000 | 0.0007 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0013 | 0.0011 | 0.0012 |
| 21 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0008 | 0.0009 | 0.0012 | 0.0011 | 0.0011 |
| 22 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0012 | 0.0012 |
| 23 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0011 |
| 24 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| 25 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0012 | 0.0012 | 0.0012 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| Med. | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0011 |
| Max. | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0013 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 2 | 0.0012 | 0.0011 | 0.0011 | 0.0014 | 0.0012 | | | | | | | | | | | |
| 3 | 0.0013 | 0.0012 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 4 | 0.0013 | 0.0012 | 0.0011 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 5 | 0.0012 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | | | | | | | | | | | |
| 6 | 0.0012 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 7 | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | | | | | | | | | | | |
| 8 | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 9 | 0.0012 | 0.0010 | 0.0009 | 0.0012 | 0.0012 | | | | | | | | | | | |
| 10 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 11 | 0.0013 | 0.0011 | 0.0010 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 12 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 13 | 0.0014 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 14 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 15 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 16 | 0.0014 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 17 | 0.0012 | 0.0010 | 0.0010 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 18 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | | | | | | | | | | | |
| 19 | 0.0013 | 0.0013 | 0.0012 | 0.0015 | 0.0014 | | | | | | | | | | | |
| 20 | 0.0012 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 21 | 0.0011 | 0.0009 | 0.0009 | 0.0012 | 0.0012 | | | | | | | | | | | |
| 22 | 0.0012 | 0.0010 | 0.0010 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 23 | 0.0011 | 0.0009 | 0.0010 | 0.0011 | 0.0012 | | | | | | | | | | | |
| 24 | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 25 | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| Med. | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0011 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Max. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2599 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2590 | 0.2590 | 0.2587 | 0.2588 | 0.2586 |
| 2 | 0.2597 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2587 | 0.2587 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2585 | 0.2586 |
| 3 | 0.2606 | 0.2598 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2598 | 0.2597 | 0.2596 | 0.2597 | 0.2595 | 0.2596 | 0.2595 | 0.2593 | 0.2595 | 0.2594 |
| 4 | 0.2606 | 0.2598 | 0.2596 | 0.2596 | 0.2597 | 0.2596 | 0.2597 | 0.2596 | 0.2596 | 0.2596 | 0.2595 | 0.2596 | 0.2595 | 0.2592 | 0.2595 | 0.2593 |
| 5 | 0.2618 | 0.2610 | 0.2610 | 0.2609 | 0.2609 | 0.2610 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2609 | 0.2607 | 0.2608 | 0.2607 |
| 6 | 0.2600 | 0.2591 | 0.2591 | 0.2589 | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2590 | 0.2589 | 0.2590 | 0.2589 | 0.2587 | 0.2587 | 0.2587 |
| 7 | 0.2594 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2581 | 0.2582 | 0.2581 |
| 8 | 0.2589 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2579 | 0.2580 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2577 |
| 9 | 0.2595 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2583 | 0.2584 | 0.2583 |
| 10 | 0.2612 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2601 | 0.2602 | 0.2600 | 0.2601 | 0.2601 | 0.2601 | 0.2601 | 0.2599 | 0.2598 | 0.2598 | 0.2598 |
| 11 | 0.2633 | 0.2624 | 0.2624 | 0.2623 | 0.2623 | 0.2624 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2620 | 0.2621 | 0.2620 |
| 12 | 0.2617 | 0.2609 | 0.2607 | 0.2606 | 0.2606 | 0.2607 | 0.2608 | 0.2607 | 0.2608 | 0.2606 | 0.2607 | 0.2607 | 0.2606 | 0.2604 | 0.2605 | 0.2604 |
| 13 | 0.2589 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2581 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2577 | 0.2577 | 0.2576 |
| 14 | 0.2609 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2600 | 0.2599 | 0.2600 | 0.2600 | 0.2598 | 0.2599 | 0.2598 | 0.2596 | 0.2597 | 0.2596 |
| 15 | 0.2598 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2588 | 0.2587 | 0.2588 | 0.2586 | 0.2584 | 0.2584 | 0.2585 |
| 16 | 0.2594 | 0.2585 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2583 | 0.2583 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2581 |
| 17 | 0.2630 | 0.2621 | 0.2621 | 0.2620 | 0.2621 | 0.2622 | 0.2621 | 0.2621 | 0.2620 | 0.2621 | 0.2620 | 0.2620 | 0.2621 | 0.2618 | 0.2618 | 0.2618 |
| 18 | 0.2598 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2586 |
| 19 | 0.2619 | 0.2611 | 0.2610 | 0.2609 | 0.2609 | 0.2610 | 0.2610 | 0.2609 | 0.2609 | 0.2610 | 0.2609 | 0.2608 | 0.2608 | 0.2606 | 0.2606 | 0.2606 |
| 20 | 0.2587 | 0.2580 | 0.2578 | 0.2578 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2575 | 0.2576 | 0.2576 |
| 21 | 0.2601 | 0.2593 | 0.2594 | 0.2593 | 0.2593 | 0.2594 | 0.2593 | 0.2593 | 0.2594 | 0.2593 | 0.2592 | 0.2594 | 0.2592 | 0.2590 | 0.2591 | 0.2591 |
| 22 | 0.2594 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2582 |
| 23 | 0.2621 | 0.2613 | 0.2613 | 0.2613 | 0.2613 | 0.2613 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2613 | 0.2613 | 0.2611 | 0.2611 | 0.2610 |
| 24 | 0.2598 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2590 | 0.2588 | 0.2589 | 0.2588 | 0.2586 | 0.2587 | 0.2586 |
| 25 | 0.2590 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | 0.2581 | 0.2579 | 0.2578 | 0.2578 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2604 | 0.2596 | 0.2595 | 0.2595 | 0.2594 | 0.2595 | 0.2595 | 0.2594 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2592 | 0.2592 | 0.2591 |
| Med. | 0.2599 | 0.2591 | 0.2591 | 0.2589 | 0.2589 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2590 | 0.2589 | 0.2587 | 0.2587 | 0.2586 |
| σ | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| Min. | 0.2587 | 0.2580 | 0.2578 | 0.2578 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2575 | 0.2576 | 0.2576 |
| Max. | 0.2633 | 0.2624 | 0.2624 | 0.2623 | 0.2623 | 0.2624 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2620 | 0.2621 | 0.2620 |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2587 | 0.2588 | 0.2587 | 0.2586 | 0.2587 | | | | | | | | | | | |
| 2 | 0.2585 | 0.2586 | 0.2587 | 0.2583 | 0.2585 | | | | | | | | | | | |
| 3 | 0.2593 | 0.2594 | 0.2595 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 4 | 0.2593 | 0.2594 | 0.2595 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 5 | 0.2607 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | | | | | | | | | | | |
| 6 | 0.2587 | 0.2588 | 0.2588 | 0.2586 | 0.2587 | | | | | | | | | | | |
| 7 | 0.2581 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | | | | | | | | | | | |
| 8 | 0.2577 | 0.2578 | 0.2578 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 9 | 0.2583 | 0.2585 | 0.2586 | 0.2584 | 0.2584 | | | | | | | | | | | |
| 10 | 0.2600 | 0.2601 | 0.2601 | 0.2600 | 0.2599 | | | | | | | | | | | |
| 11 | 0.2620 | 0.2623 | 0.2623 | 0.2620 | 0.2620 | | | | | | | | | | | |
| 12 | 0.2604 | 0.2606 | 0.2606 | 0.2604 | 0.2604 | | | | | | | | | | | |
| 13 | 0.2576 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | | | | | | | | | | | |
| 14 | 0.2596 | 0.2597 | 0.2597 | 0.2595 | 0.2594 | | | | | | | | | | | |
| 15 | 0.2584 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | | | | | | | | | | | |
| 16 | 0.2580 | 0.2582 | 0.2581 | 0.2580 | 0.2579 | | | | | | | | | | | |
| 17 | 0.2618 | 0.2620 | 0.2620 | 0.2618 | 0.2617 | | | | | | | | | | | |
| 18 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2586 | | | | | | | | | | | |
| 19 | 0.2606 | 0.2607 | 0.2607 | 0.2605 | 0.2605 | | | | | | | | | | | |
| 20 | 0.2576 | 0.2577 | 0.2577 | 0.2574 | 0.2575 | | | | | | | | | | | |
| 21 | 0.2590 | 0.2592 | 0.2593 | 0.2590 | 0.2590 | | | | | | | | | | | |
| 22 | 0.2582 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | | | | | | | | | | | |
| 23 | 0.2611 | 0.2613 | 0.2612 | 0.2610 | 0.2610 | | | | | | | | | | | |
| 24 | 0.2586 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | | | | | | | | | | | |
| 25 | 0.2578 | 0.2579 | 0.2580 | 0.2578 | 0.2578 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2591 | 0.2593 | 0.2593 | 0.2591 | 0.2591 | | | | | | | | | | | |
| Med. | 0.2587 | 0.2588 | 0.2588 | 0.2586 | 0.2587 | | | | | | | | | | | |
| σ | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | | | | | | | | | | | |
| Min. | 0.2576 | 0.2577 | 0.2577 | 0.2574 | 0.2575 | | | | | | | | | | | |
| Max. | 0.2620 | 0.2623 | 0.2623 | 0.2620 | 0.2620 | | | | | | | | | | | |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 1-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | 0.5285 |
| 2 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5281 | 0.5281 | 0.5282 |
| 3 | 0.5272 | 0.5271 | 0.5272 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5269 | 0.5269 | 0.5270 |
| 4 | 0.5286 | 0.5285 | 0.5286 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5284 |
| 5 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5279 |
| 6 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5266 | 0.5268 | 0.5268 |
| 7 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5281 |
| 8 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5259 | 0.5258 | 0.5259 | 0.5258 |
| 9 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 |
| 10 | 0.5286 | 0.5285 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5284 |
| 11 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 12 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5296 | 0.5297 | 0.5297 |
| 13 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| 14 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 |
| 15 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5269 | 0.5267 | 0.5269 | 0.5268 |
| 16 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 |
| 17 | 0.5291 | 0.5290 | 0.5291 | 0.5291 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5291 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5289 |
| 18 | 0.5254 | 0.5253 | 0.5254 | 0.5254 | 0.5253 | 0.5253 | 0.5253 | 0.5253 | 0.5254 | 0.5253 | 0.5253 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5252 |
| 19 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | 0.5286 |
| 20 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 |
| 21 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5286 | 0.5287 | 0.5287 |
| 22 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5255 | 0.5256 | 0.5256 |
| 23 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 |
| 24 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5255 | 0.5256 | 0.5257 |
| 25 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5255 | 0.5254 | 0.5253 | 0.5254 | 0.5254 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 |
| Med. | 0.5272 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5270 | 0.5270 | 0.5270 |
| σ | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| Min. | 0.5254 | 0.5253 | 0.5254 | 0.5254 | 0.5253 | 0.5253 | 0.5253 | 0.5253 | 0.5254 | 0.5253 | 0.5253 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5252 |
| Max. | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5296 | 0.5297 | 0.5297 |

## Data Set 1 : 55 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 55.2 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

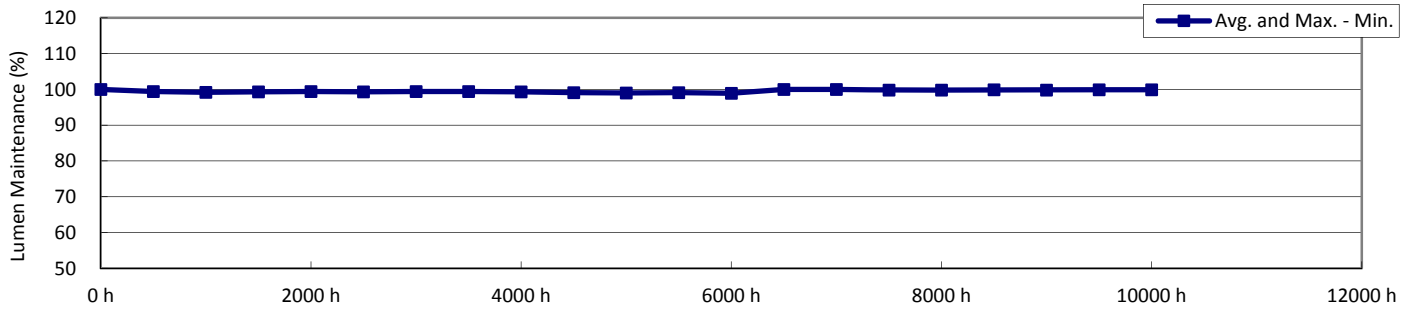
**TABLE 1-6 (Continued)**
Chromaticity

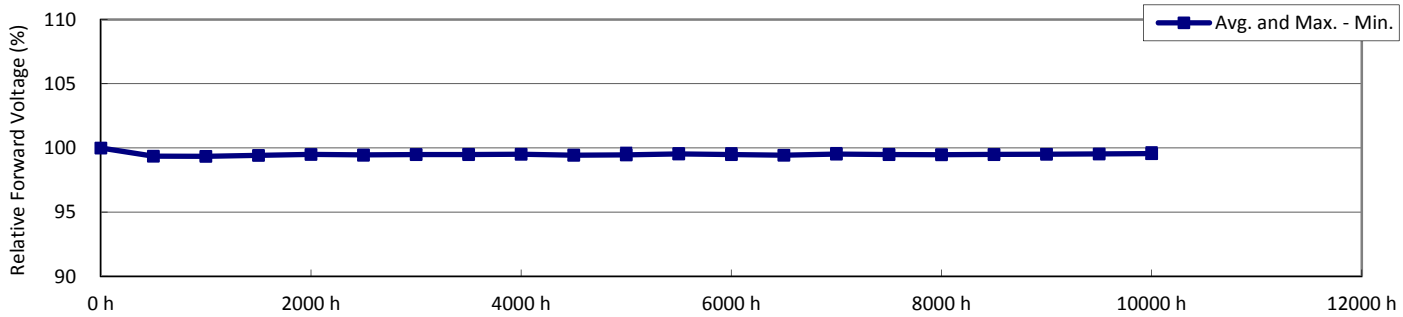
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5286 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 2 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 3 | 0.5270 | 0.5271 | 0.5270 | 0.5269 | 0.5270 | | | | | | | | | | | |
| 4 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | | | | | | | | | | | |
| 5 | 0.5279 | 0.5279 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 6 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 7 | 0.5281 | 0.5282 | 0.5282 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 8 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | | | | | | | | | | | |
| 9 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 10 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 11 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 12 | 0.5297 | 0.5298 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |
| 13 | 0.5268 | 0.5267 | 0.5268 | 0.5266 | 0.5266 | | | | | | | | | | | |
| 14 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| 15 | 0.5268 | 0.5269 | 0.5268 | 0.5267 | 0.5268 | | | | | | | | | | | |
| 16 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | | | | | | | | | | | |
| 17 | 0.5289 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | | | | | | | | | | | |
| 18 | 0.5252 | 0.5253 | 0.5253 | 0.5251 | 0.5252 | | | | | | | | | | | |
| 19 | 0.5286 | 0.5287 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 20 | 0.5259 | 0.5259 | 0.5260 | 0.5258 | 0.5259 | | | | | | | | | | | |
| 21 | 0.5287 | 0.5287 | 0.5288 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 22 | 0.5256 | 0.5256 | 0.5257 | 0.5255 | 0.5256 | | | | | | | | | | | |
| 23 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| 24 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | | | |
| 25 | 0.5254 | 0.5255 | 0.5255 | 0.5253 | 0.5253 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| Med. | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| σ | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | | | | | | | | | | | |
| Min. | 0.5252 | 0.5253 | 0.5253 | 0.5251 | 0.5252 | | | | | | | | | | | |
| Max. | 0.5297 | 0.5298 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |

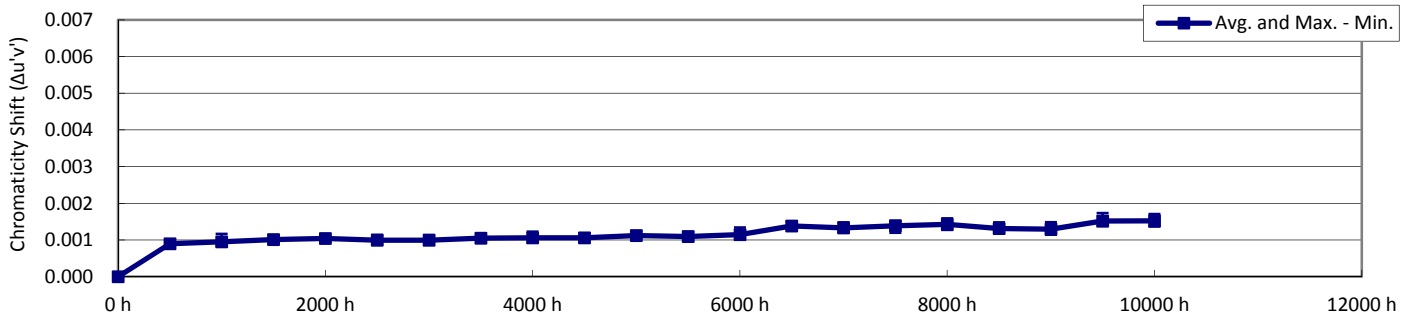
## Data Set 2 : 55 °C, 125 mA

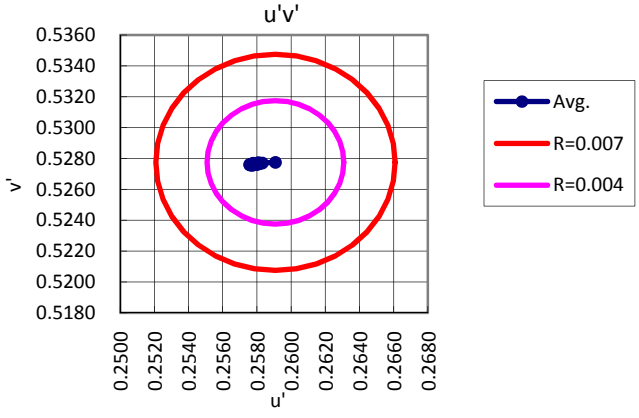
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 56.3 | 3.05 | 2794 | 0.38 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 2 | 56.4 | 3.07 | 2792 | 0.38 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 3 | 56.1 | 3.06 | 2771 | 0.38 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 4 | 56.1 | 3.07 | 2771 | 0.38 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 5 | 56.1 | 3.06 | 2774 | 0.38 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 6 | 56.3 | 3.06 | 2774 | 0.38 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 7 | 56.4 | 3.07 | 2771 | 0.38 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 8 | 56.4 | 3.05 | 2769 | 0.38 | 0.458 | 0.416 | 0.259 | 0.529 | | | | |
| 9 | 56.6 | 3.06 | 2779 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 10 | 56.6 | 3.07 | 2786 | 0.38 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 11 | 56.4 | 3.06 | 2756 | 0.38 | 0.457 | 0.413 | 0.260 | 0.528 | | | | |
| 12 | 56.6 | 3.06 | 2791 | 0.38 | 0.454 | 0.411 | 0.258 | 0.526 | | | | |
| 13 | 56.3 | 3.06 | 2784 | 0.38 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 14 | 56.5 | 3.05 | 2754 | 0.38 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 15 | 56.1 | 3.06 | 2762 | 0.38 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 16 | 56.3 | 3.06 | 2786 | 0.38 | 0.455 | 0.413 | 0.258 | 0.527 | | | | |
| 17 | 56.2 | 3.06 | 2790 | 0.38 | 0.453 | 0.410 | 0.259 | 0.526 | | | | |
| 18 | 56.5 | 3.06 | 2777 | 0.38 | 0.456 | 0.413 | 0.259 | 0.527 | | | | |
| 19 | 56.7 | 3.06 | 2736 | 0.38 | 0.461 | 0.417 | 0.260 | 0.530 | | | | |
| 20 | 56.3 | 3.07 | 2758 | 0.38 | 0.459 | 0.416 | 0.259 | 0.529 | | | | |
| 21 | 56.2 | 3.07 | 2770 | 0.38 | 0.455 | 0.410 | 0.259 | 0.527 | | | | |
| 22 | 56.4 | 3.05 | 2760 | 0.38 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 23 | 56.7 | 3.07 | 2778 | 0.38 | 0.457 | 0.415 | 0.259 | 0.529 | | | | |
| 24 | 56.4 | 3.06 | 2750 | 0.38 | 0.457 | 0.412 | 0.260 | 0.527 | | | | |
| 25 | 56.5 | 3.07 | 2779 | 0.38 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 56.4 | 3.06 | 2772 | 0.38 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 56.4 | 3.06 | 2774 | 0.38 | 0.456 | 0.413 | 0.259 | 0.527 | | | | |
| σ | 0.18 | 0.005 | 14.5 | 0.001 | 0.0017 | 0.0018 | 0.0006 | 0.0009 | | | | |
| Min. | 56.1 | 3.05 | 2736 | 0.38 | 0.453 | 0.410 | 0.258 | 0.526 | | | | |
| Max. | 56.7 | 3.07 | 2794 | 0.38 | 0.461 | 0.417 | 0.260 | 0.530 | | | | |

# Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.3 | 99.3 | 99.2 | 99.4 | 99.2 | 99.4 | 99.4 | 99.4 | 99.1 | 99.0 | 99.1 | 99.0 | 99.9 | 99.8 | 99.7 |
| 2 | 100.0 | 99.3 | 99.2 | 99.1 | 99.3 | 99.2 | 99.4 | 99.2 | 99.3 | 99.0 | 98.9 | 99.0 | 98.8 | 99.8 | 99.8 | 99.6 |
| 3 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | 99.2 | 99.3 | 99.0 | 98.9 | 99.0 | 98.9 | 99.9 | 99.9 | 99.7 |
| 4 | 100.0 | 99.2 | 99.1 | 99.1 | 99.3 | 99.1 | 99.3 | 99.2 | 99.2 | 98.9 | 98.9 | 99.0 | 98.8 | 99.8 | 99.8 | 99.7 |
| 5 | 100.0 | 99.2 | 99.1 | 99.3 | 99.5 | 99.2 | 99.5 | 99.3 | 99.4 | 99.1 | 98.9 | 99.0 | 98.9 | 100.0 | 99.8 | 99.7 |
| 6 | 100.0 | 99.3 | 99.2 | 99.2 | 99.4 | 99.3 | 99.4 | 99.4 | 99.4 | 99.1 | 99.0 | 99.1 | 99.0 | 100.0 | 100.0 | 99.9 |
| 7 | 100.0 | 99.4 | 99.3 | 99.3 | 99.4 | 99.2 | 99.3 | 99.3 | 99.3 | 99.1 | 98.9 | 99.1 | 98.8 | 99.9 | 99.9 | 99.8 |
| 8 | 100.0 | 99.6 | 99.4 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.3 | 99.2 | 99.4 | 99.1 | 100.2 | 100.2 | 100.1 |
| 9 | 100.0 | 99.3 | 98.8 | 99.0 | 99.3 | 99.1 | 99.1 | 99.3 | 99.2 | 98.9 | 98.8 | 99.0 | 98.7 | 99.9 | 99.8 | 99.7 |
| 10 | 100.0 | 99.3 | 99.2 | 99.3 | 99.5 | 99.3 | 99.3 | 99.3 | 99.3 | 99.1 | 99.0 | 99.2 | 98.9 | 100.1 | 100.0 | 99.9 |
| 11 | 100.0 | 99.4 | 99.2 | 99.4 | 99.6 | 99.2 | 99.4 | 99.3 | 99.4 | 99.1 | 99.0 | 99.2 | 98.9 | 100.1 | 100.0 | 99.9 |
| 12 | 100.0 | 99.5 | 99.3 | 99.4 | 99.6 | 99.4 | 99.5 | 99.6 | 99.5 | 99.3 | 99.2 | 99.3 | 99.1 | 100.2 | 100.2 | 100.1 |
| 13 | 100.0 | 99.4 | 99.3 | 99.3 | 99.5 | 99.3 | 99.4 | 99.5 | 99.4 | 99.2 | 99.1 | 99.2 | 99.0 | 100.1 | 100.2 | 99.9 |
| 14 | 100.0 | 99.4 | 99.2 | 99.2 | 99.4 | 99.2 | 99.2 | 99.3 | 99.3 | 99.0 | 98.8 | 99.0 | 98.7 | 99.8 | 99.9 | 99.6 |
| 15 | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.4 | 99.3 | 99.1 | 99.0 | 99.2 | 98.9 | 99.9 | 100.0 | 99.8 |
| 16 | 100.0 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.2 | 99.3 | 99.2 | 99.0 | 98.9 | 99.0 | 98.7 | 99.8 | 99.9 | 99.6 |
| 17 | 100.0 | 99.3 | 99.3 | 99.3 | 99.6 | 99.5 | 99.4 | 99.6 | 99.6 | 99.2 | 99.1 | 99.4 | 99.1 | 100.0 | 100.2 | 99.9 |
| 18 | 100.0 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.4 | 99.2 | 99.4 | 99.2 | 100.2 | 100.3 | 100.1 |
| 19 | 100.0 | 99.5 | 99.3 | 99.3 | 99.5 | 99.3 | 99.5 | 99.5 | 99.4 | 99.1 | 99.1 | 99.2 | 99.0 | 100.1 | 100.3 | 100.0 |
| 20 | 100.0 | 99.3 | 99.2 | 99.2 | 99.3 | 99.2 | 99.2 | 99.3 | 99.2 | 98.9 | 98.8 | 98.8 | 98.8 | 99.9 | 99.9 | 99.7 |
| 21 | 100.0 | 99.5 | 99.3 | 99.4 | 99.5 | 99.3 | 99.5 | 99.5 | 99.4 | 99.1 | 99.0 | 99.0 | 98.9 | 100.0 | 100.1 | 99.9 |
| 22 | 100.0 | 99.6 | 99.4 | 99.5 | 99.6 | 99.4 | 99.6 | 99.6 | 99.4 | 99.2 | 99.0 | 99.2 | 99.0 | 100.2 | 100.2 | 99.9 |
| 23 | 100.0 | 99.2 | 99.0 | 99.3 | 99.5 | 99.1 | 99.4 | 99.5 | 99.2 | 99.0 | 98.9 | 99.0 | 98.9 | 99.9 | 100.1 | 99.7 |
| 24 | 100.0 | 99.3 | 99.2 | 99.0 | 99.3 | 99.2 | 99.4 | 99.4 | 99.2 | 99.0 | 98.9 | 99.0 | 98.9 | 100.0 | 100.1 | 99.8 |
| 25 | 100.0 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.3 | 99.4 | 99.2 | 99.0 | 98.9 | 99.0 | 98.8 | 99.9 | 99.9 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.4 | 99.2 | 99.3 | 99.4 | 99.3 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.9 | 100.0 | 100.0 | 99.8 |
| Med. | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.2 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.9 | 100.0 | 100.0 | 99.8 |
| σ | 0.00 | 0.12 | 0.13 | 0.13 | 0.11 | 0.12 | 0.12 | 0.14 | 0.13 | 0.13 | 0.12 | 0.15 | 0.13 | 0.13 | 0.17 | 0.15 |
| Min. | 100.0 | 99.2 | 98.8 | 99.0 | 99.3 | 99.1 | 99.1 | 99.2 | 99.2 | 98.9 | 98.8 | 98.8 | 98.7 | 99.8 | 99.8 | 99.6 |
| Max. | 100.0 | 99.6 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.4 | 99.2 | 99.4 | 99.2 | 100.2 | 100.3 | 100.1 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0101 | -0.0090 | -0.0109 | -0.0002 | 0.0001 | -0.0018 | -0.0018 | -0.0010 | -0.0020 | -0.0010 | -0.0010 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.983 | |
| α | -1.83E-06 | |
| $R^2$ | 0.514 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | | | | | | | | | | | |
| 2 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | | | | | | | | | | | |
| 3 | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 4 | 99.7 | 99.9 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | |
| 5 | 99.7 | 99.5 | 99.4 | 99.6 | 99.7 | | | | | | | | | | | |
| 6 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| 7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | |
| 8 | 100.1 | 100.1 | 100.0 | 100.2 | 100.1 | | | | | | | | | | | |
| 9 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | |
| 10 | 99.9 | 99.8 | 99.8 | 100.0 | 99.9 | | | | | | | | | | | |
| 11 | 100.0 | 99.5 | 99.6 | 99.8 | 99.7 | | | | | | | | | | | |
| 12 | 100.1 | 100.0 | 100.0 | 100.2 | 100.0 | | | | | | | | | | | |
| 13 | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 14 | 99.5 | 99.8 | 99.6 | 99.7 | 99.8 | | | | | | | | | | | |
| 15 | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 16 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 17 | 100.1 | 99.8 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 18 | 100.1 | 100.2 | 100.2 | 100.3 | 100.3 | | | | | | | | | | | |
| 19 | 100.0 | 100.2 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | |
| 20 | 99.7 | 99.9 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | |
| 21 | 99.8 | 100.0 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 22 | 99.9 | 100.1 | 99.9 | 100.1 | 100.0 | | | | | | | | | | | |
| 23 | 99.7 | 99.6 | 99.6 | 99.8 | 99.7 | | | | | | | | | | | |
| 24 | 99.8 | 100.0 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 25 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| Med. | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| σ | 0.17 | 0.19 | 0.18 | 0.18 | 0.16 | | | | | | | | | | | |
| Min. | 99.5 | 99.5 | 99.4 | 99.6 | 99.7 | | | | | | | | | | | |
| Max. | 100.1 | 100.2 | 100.2 | 100.3 | 100.3 | | | | | | | | | | | |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.4 | 99.5 | 99.4 | 99.2 | 99.2 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 |
| 2 | 100.0 | 99.2 | 99.2 | 99.2 | 99.2 | 99.4 | 99.4 | 99.5 | 99.2 | 99.2 | 99.3 | 99.4 | 99.4 | 99.3 | 99.2 | 99.4 |
| 3 | 100.0 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 99.2 | 99.2 | 99.2 | 99.1 | 99.1 | 99.2 | 99.2 | 99.1 | 99.2 | 99.1 |
| 4 | 100.0 | 99.3 | 99.4 | 99.3 | 99.6 | 99.5 | 99.4 | 99.3 | 99.4 | 99.5 | 99.4 | 99.6 | 99.6 | 99.4 | 99.4 | 99.5 |
| 5 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.9 | 99.9 | 99.7 | 99.7 | 99.9 | 100.0 | 99.8 | 99.7 | 99.8 |
| 6 | 100.0 | 99.5 | 99.5 | 99.6 | 99.6 | 99.4 | 99.7 | 99.5 | 99.7 | 99.6 | 99.6 | 99.7 | 99.5 | 99.5 | 99.6 | 99.6 |
| 7 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.3 | 99.3 | 99.2 | 99.3 | 99.4 | 99.4 | 99.5 | 99.2 | 99.2 | 99.5 | 99.3 |
| 8 | 100.0 | 99.4 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.5 | 99.7 | 99.6 | 99.5 | 99.6 | 99.6 |
| 9 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.8 | 99.9 | 99.7 | 99.9 | 99.8 | 100.0 | 100.0 | 99.8 | 99.8 | 100.0 | 99.9 |
| 10 | 100.0 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.8 | 99.6 | 99.6 | 99.5 | 99.7 | 99.6 | 99.8 | 99.6 | 99.6 | 99.5 |
| 11 | 100.0 | 99.4 | 99.3 | 99.4 | 99.6 | 99.5 | 99.6 | 99.5 | 99.6 | 99.3 | 99.4 | 99.8 | 99.5 | 99.5 | 99.7 | 99.5 |
| 12 | 100.0 | 99.1 | 99.3 | 99.3 | 99.4 | 99.2 | 99.4 | 99.3 | 99.4 | 99.2 | 99.5 | 99.4 | 99.4 | 99.3 | 99.4 | 99.3 |
| 13 | 100.0 | 99.3 | 99.3 | 99.5 | 99.6 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 |
| 14 | 100.0 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.5 | 99.3 | 99.4 | 99.3 | 99.5 | 99.4 | 99.5 | 99.4 |
| 15 | 100.0 | 99.0 | 99.1 | 99.2 | 99.3 | 99.0 | 99.3 | 99.2 | 99.4 | 99.2 | 99.1 | 99.2 | 99.2 | 99.2 | 99.2 | 99.2 |
| 16 | 100.0 | 99.5 | 99.4 | 99.6 | 99.7 | 99.8 | 99.4 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.5 | 99.6 | 99.6 | 99.7 |
| 17 | 100.0 | 99.5 | 99.3 | 99.4 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.4 | 99.5 | 99.3 | 99.4 | 99.5 | 99.5 |
| 18 | 100.0 | 99.2 | 99.3 | 99.3 | 99.3 | 99.3 | 99.3 | 99.4 | 99.5 | 99.3 | 99.2 | 99.4 | 99.1 | 99.3 | 99.3 | 99.4 |
| 19 | 100.0 | 99.5 | 99.5 | 99.7 | 99.4 | 99.7 | 99.4 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 |
| 20 | 100.0 | 99.3 | 99.3 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.4 | 99.4 | 99.5 | 99.4 | 99.4 | 99.6 | 99.4 |
| 21 | 100.0 | 99.2 | 99.2 | 99.3 | 99.3 | 99.2 | 99.4 | 99.4 | 99.4 | 99.4 | 99.3 | 99.2 | 99.4 | 99.2 | 99.4 | 99.4 |
| 22 | 100.0 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.6 | 99.5 | 99.7 | 99.5 | 99.5 | 99.6 | 99.5 |
| 23 | 100.0 | 99.6 | 99.3 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.5 | 99.6 | 99.6 |
| 24 | 100.0 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.4 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 |
| 25 | 100.0 | 99.2 | 99.2 | 99.3 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.3 | 99.5 | 99.4 | 99.5 | 99.3 | 99.5 | 99.4 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.4 | 99.3 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 |
| Med. | 100.0 | 99.4 | 99.3 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 |
| σ | 0.00 | 0.19 | 0.15 | 0.17 | 0.16 | 0.20 | 0.17 | 0.16 | 0.17 | 0.19 | 0.20 | 0.21 | 0.20 | 0.17 | 0.18 | 0.18 |
| Min. | 100.0 | 99.0 | 99.1 | 99.1 | 99.2 | 99.0 | 99.2 | 99.2 | 99.2 | 99.1 | 99.1 | 99.2 | 99.1 | 99.1 | 99.2 | 99.1 |
| Max. | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | 99.8 | 100.0 | 99.9 |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.3 | 99.3 | 99.4 | 99.4 | 99.5 | | | | | | | | | | | |
| 2 | 99.3 | 99.2 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| 3 | 99.2 | 99.1 | 99.2 | 99.2 | 99.2 | | | | | | | | | | | |
| 4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | | | | | | | | | | | |
| 5 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| 7 | 99.3 | 99.2 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 8 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | |
| 9 | 99.8 | 99.8 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 10 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| 11 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | | | | | | | | | | | |
| 12 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| 13 | 99.6 | 99.6 | 99.5 | 99.5 | 99.8 | | | | | | | | | | | |
| 14 | 99.4 | 99.4 | 99.4 | 99.4 | 99.7 | | | | | | | | | | | |
| 15 | 99.2 | 99.2 | 99.2 | 99.2 | 99.3 | | | | | | | | | | | |
| 16 | 99.6 | 99.7 | 99.7 | 99.8 | 99.6 | | | | | | | | | | | |
| 17 | 99.4 | 99.6 | 99.5 | 99.4 | 99.5 | | | | | | | | | | | |
| 18 | 99.3 | 99.4 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| 19 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | |
| 20 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | | | | | | | | | | | |
| 21 | 99.3 | 99.5 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| 22 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 23 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | |
| 24 | 99.6 | 99.7 | 99.8 | 99.8 | 99.7 | | | | | | | | | | | |
| 25 | 99.5 | 99.3 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | | | | | | | | | | | |
| Med. | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | | | | | | | | | | | |
| σ | 0.18 | 0.20 | 0.18 | 0.18 | 0.20 | | | | | | | | | | | |
| Min. | 99.2 | 99.1 | 99.2 | 99.2 | 99.2 | | | | | | | | | | | |
| Max. | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0014 | 0.0013 | 0.0015 |
| 2 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0014 | 0.0015 |
| 3 | 0.0000 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0013 | 0.0015 |
| 4 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0013 |
| 5 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| 6 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 7 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0015 | 0.0014 | 0.0015 |
| 8 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0014 | 0.0014 |
| 9 | 0.0000 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 10 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0012 | 0.0013 |
| 11 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| 12 | 0.0000 | 0.0010 | 0.0008 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| 13 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| 14 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 |
| 15 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 16 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0010 | 0.0013 | 0.0013 | 0.0013 |
| 17 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0013 | 0.0013 |
| 18 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 19 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0013 |
| 20 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0014 | 0.0013 | 0.0013 |
| 21 | 0.0000 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 22 | 0.0000 | 0.0008 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 23 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0014 | 0.0012 | 0.0012 |
| 24 | 0.0000 | 0.0008 | 0.0008 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0013 | 0.0012 | 0.0012 |
| 25 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| Med. | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0013 | 0.0012 | 0.0012 |
| Max. | 0.0000 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 2 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 3 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 4 | 0.0014 | 0.0013 | 0.0012 | 0.0015 | 0.0014 | | | | | | | | | | | |
| 5 | 0.0015 | 0.0013 | 0.0012 | 0.0016 | 0.0015 | | | | | | | | | | | |
| 6 | 0.0014 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 7 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 8 | 0.0014 | 0.0013 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 9 | 0.0015 | 0.0014 | 0.0014 | 0.0017 | 0.0016 | | | | | | | | | | | |
| 10 | 0.0014 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 11 | 0.0014 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 12 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 13 | 0.0014 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 14 | 0.0016 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 15 | 0.0015 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 16 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 17 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 18 | 0.0014 | 0.0012 | 0.0012 | 0.0015 | 0.0014 | | | | | | | | | | | |
| 19 | 0.0015 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 20 | 0.0015 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | | | | | | | | | | | |
| 21 | 0.0014 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 22 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 23 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 24 | 0.0013 | 0.0012 | 0.0011 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 25 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| Med. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0013 | 0.0012 | 0.0011 | 0.0014 | 0.0014 | | | | | | | | | | | |
| Max. | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2585 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | 0.2572 | 0.2572 | 0.2570 |
| 2 | 0.2586 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2572 | 0.2572 | 0.2572 |
| 3 | 0.2592 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2577 |
| 4 | 0.2598 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2586 | 0.2585 |
| 5 | 0.2617 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2607 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2606 | 0.2606 | 0.2604 | 0.2604 | 0.2603 |
| 6 | 0.2597 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 |
| 7 | 0.2596 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2582 | 0.2581 | 0.2582 | 0.2581 |
| 8 | 0.2591 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2577 |
| 9 | 0.2593 | 0.2583 | 0.2581 | 0.2581 | 0.2582 | 0.2582 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2582 | 0.2581 | 0.2579 | 0.2579 | 0.2578 |
| 10 | 0.2590 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2579 | 0.2580 | 0.2580 | 0.2576 | 0.2578 | 0.2577 |
| 11 | 0.2623 | 0.2614 | 0.2613 | 0.2613 | 0.2613 | 0.2613 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2612 | 0.2613 | 0.2611 | 0.2609 | 0.2610 | 0.2609 |
| 12 | 0.2591 | 0.2582 | 0.2583 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2577 | 0.2578 | 0.2577 |
| 13 | 0.2587 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2575 | 0.2573 | 0.2573 | 0.2573 |
| 14 | 0.2600 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2585 |
| 15 | 0.2597 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | 0.2587 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2583 | 0.2583 | 0.2583 |
| 16 | 0.2591 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | 0.2581 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | 0.2578 |
| 17 | 0.2613 | 0.2604 | 0.2603 | 0.2603 | 0.2603 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2600 | 0.2600 | 0.2601 |
| 18 | 0.2595 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2581 |
| 19 | 0.2606 | 0.2598 | 0.2596 | 0.2597 | 0.2597 | 0.2596 | 0.2597 | 0.2595 | 0.2597 | 0.2596 | 0.2595 | 0.2596 | 0.2596 | 0.2592 | 0.2594 | 0.2593 |
| 20 | 0.2595 | 0.2587 | 0.2586 | 0.2586 | 0.2584 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2581 | 0.2582 | 0.2582 |
| 21 | 0.2596 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2587 | 0.2587 | 0.2585 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2583 | 0.2584 | 0.2583 |
| 22 | 0.2604 | 0.2595 | 0.2594 | 0.2593 | 0.2593 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2589 | 0.2589 | 0.2590 |
| 23 | 0.2627 | 0.2619 | 0.2619 | 0.2618 | 0.2617 | 0.2618 | 0.2617 | 0.2617 | 0.2616 | 0.2617 | 0.2616 | 0.2617 | 0.2616 | 0.2613 | 0.2615 | 0.2615 |
| 24 | 0.2592 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | 0.2580 |
| 25 | 0.2590 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | 0.2575 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2598 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2584 | 0.2585 | 0.2584 |
| Med. | 0.2595 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2583 | 0.2581 | 0.2582 | 0.2581 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 |
| Min. | 0.2585 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2573 | 0.2572 | 0.2572 | 0.2570 |
| Max. | 0.2627 | 0.2619 | 0.2619 | 0.2618 | 0.2617 | 0.2618 | 0.2617 | 0.2617 | 0.2616 | 0.2617 | 0.2616 | 0.2617 | 0.2616 | 0.2613 | 0.2615 | 0.2615 |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2571 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | | | | | | | | | | | |
| 2 | 0.2571 | 0.2573 | 0.2572 | 0.2570 | 0.2571 | | | | | | | | | | | |
| 3 | 0.2578 | 0.2579 | 0.2579 | 0.2578 | 0.2577 | | | | | | | | | | | |
| 4 | 0.2585 | 0.2585 | 0.2586 | 0.2583 | 0.2584 | | | | | | | | | | | |
| 5 | 0.2603 | 0.2604 | 0.2605 | 0.2601 | 0.2602 | | | | | | | | | | | |
| 6 | 0.2583 | 0.2584 | 0.2585 | 0.2583 | 0.2582 | | | | | | | | | | | |
| 7 | 0.2580 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 8 | 0.2577 | 0.2578 | 0.2579 | 0.2577 | 0.2577 | | | | | | | | | | | |
| 9 | 0.2578 | 0.2579 | 0.2579 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 10 | 0.2577 | 0.2578 | 0.2578 | 0.2576 | 0.2575 | | | | | | | | | | | |
| 11 | 0.2608 | 0.2610 | 0.2610 | 0.2608 | 0.2607 | | | | | | | | | | | |
| 12 | 0.2577 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | | | | | | | | | | | |
| 13 | 0.2573 | 0.2574 | 0.2574 | 0.2571 | 0.2571 | | | | | | | | | | | |
| 14 | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2583 | | | | | | | | | | | |
| 15 | 0.2583 | 0.2584 | 0.2585 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 16 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | | | | | | | | | | | |
| 17 | 0.2600 | 0.2601 | 0.2601 | 0.2600 | 0.2599 | | | | | | | | | | | |
| 18 | 0.2581 | 0.2582 | 0.2583 | 0.2580 | 0.2581 | | | | | | | | | | | |
| 19 | 0.2592 | 0.2593 | 0.2593 | 0.2591 | 0.2591 | | | | | | | | | | | |
| 20 | 0.2580 | 0.2582 | 0.2582 | 0.2580 | 0.2581 | | | | | | | | | | | |
| 21 | 0.2582 | 0.2583 | 0.2584 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 22 | 0.2589 | 0.2590 | 0.2590 | 0.2588 | 0.2588 | | | | | | | | | | | |
| 23 | 0.2614 | 0.2614 | 0.2615 | 0.2613 | 0.2612 | | | | | | | | | | | |
| 24 | 0.2580 | 0.2581 | 0.2581 | 0.2578 | 0.2578 | | | | | | | | | | | |
| 25 | 0.2575 | 0.2575 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2583 | | | | | | | | | | | |
| Med. | 0.2580 | 0.2582 | 0.2582 | 0.2580 | 0.2581 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.2571 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | | | | | | | | | | | |
| Max. | 0.2614 | 0.2614 | 0.2615 | 0.2613 | 0.2612 | | | | | | | | | | | |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 2-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5264 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5264 |
| 2 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5262 | 0.5263 | 0.5262 |
| 3 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5281 |
| 4 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5282 |
| 5 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5280 | 0.5280 | 0.5281 |
| 6 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 |
| 7 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 |
| 8 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5287 | 0.5286 | 0.5286 | 0.5285 | 0.5286 | 0.5286 |
| 9 | 0.5267 | 0.5266 | 0.5265 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5265 |
| 10 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5274 |
| 11 | 0.5288 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5287 | 0.5286 |
| 12 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 |
| 13 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5278 |
| 14 | 0.5282 | 0.5283 | 0.5283 | 0.5284 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 |
| 15 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5274 | 0.5275 | 0.5274 |
| 16 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5274 |
| 17 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 |
| 18 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5275 | 0.5273 | 0.5274 | 0.5274 |
| 19 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 |
| 20 | 0.5291 | 0.5290 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5289 | 0.5290 | 0.5289 |
| 21 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5262 | 0.5263 | 0.5263 |
| 22 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5271 | 0.5272 | 0.5272 |
| 23 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5285 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5286 |
| 24 | 0.5286 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5284 |
| 25 | 0.5275 | 0.5273 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 |
| Med. | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5274 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 |
| Min. | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5262 | 0.5263 | 0.5262 |
| Max. | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 |

## Data Set 2 : 55 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.3 °C |
| Actual Ambient Temperature [$T_A$] | 55.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

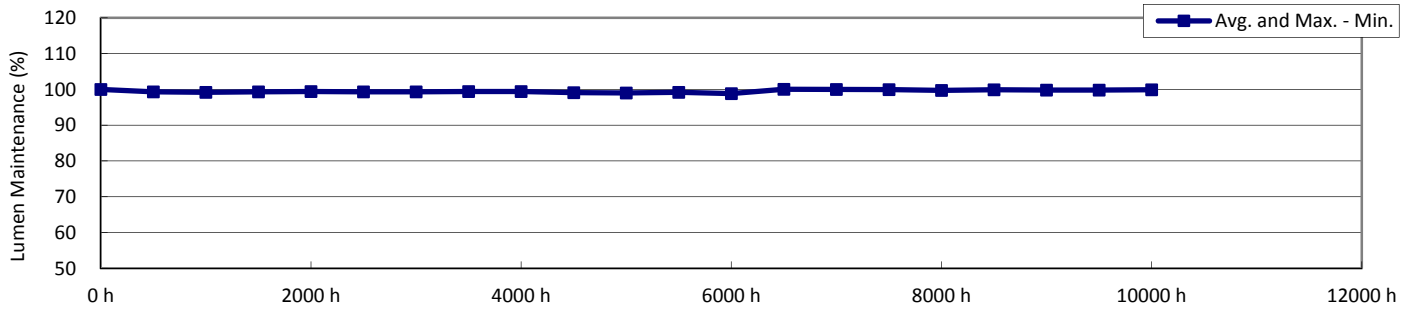
**TABLE 2-6 (Continued)**
Chromaticity

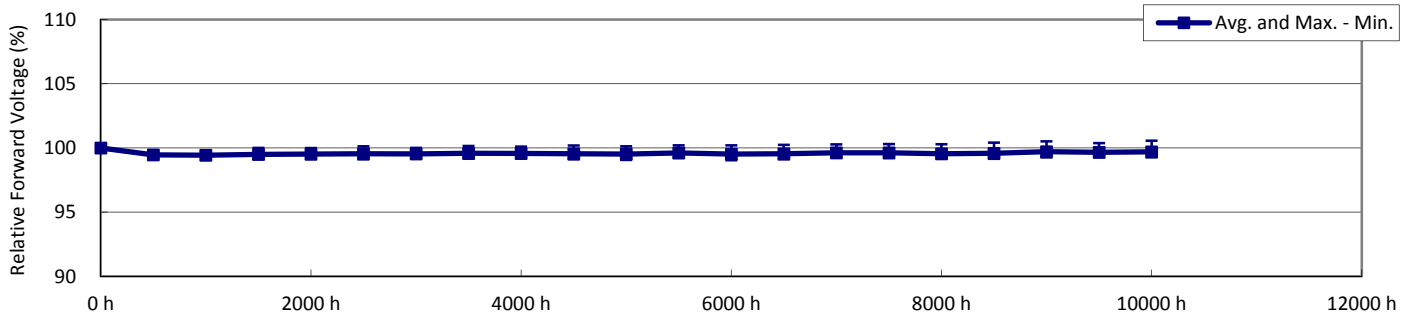
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 2 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 3 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | | | | | | | | | | | |
| 4 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | | | | | | | | | | | |
| 5 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | | | | | | | | | | | |
| 6 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | | | | | | | | | | | |
| 7 | 0.5269 | 0.5270 | 0.5271 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 8 | 0.5286 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | | | | | | | | | | | |
| 9 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | | | | | | | | | | | |
| 10 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 11 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 12 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | | | | | | | | | | | |
| 13 | 0.5278 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 14 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | | | | | | | | | | | |
| 15 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| 16 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 17 | 0.5270 | 0.5270 | 0.5271 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 18 | 0.5274 | 0.5275 | 0.5275 | 0.5273 | 0.5274 | | | | | | | | | | | |
| 19 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | | | | | | | | | | | |
| 20 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | | | | | | | | | | | |
| 21 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 22 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 23 | 0.5285 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 24 | 0.5284 | 0.5286 | 0.5285 | 0.5284 | 0.5284 | | | | | | | | | | | |
| 25 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5272 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| Med. | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | | | | | | | | | | | |
| Min. | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | |
| Max. | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | | | | | | | | | | | |

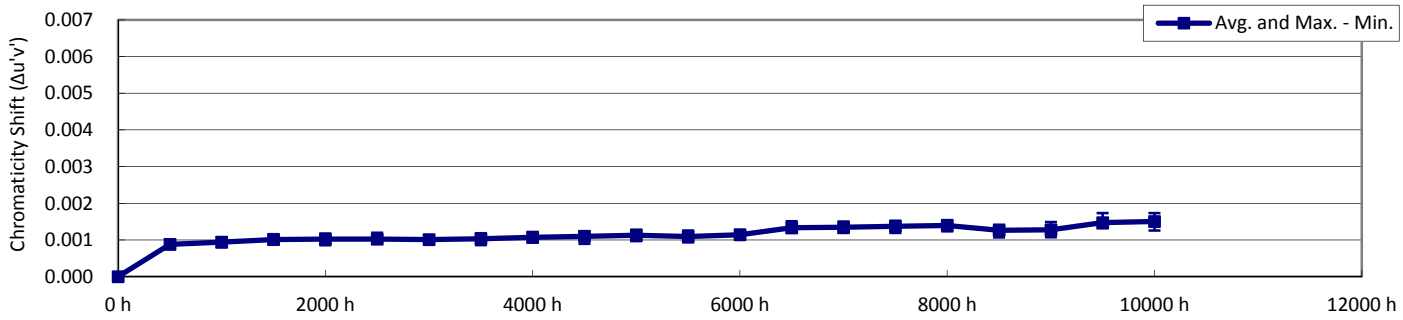
## Data Set 3 : 55 °C, 150 mA

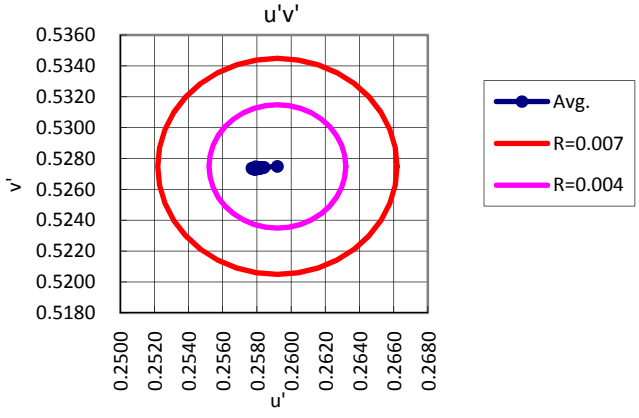
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 66.1 | 3.13 | 2746 | 0.47 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 2 | 66.3 | 3.13 | 2762 | 0.47 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 3 | 66.5 | 3.14 | 2789 | 0.47 | 0.455 | 0.413 | 0.258 | 0.527 | | | | |
| 4 | 66.6 | 3.14 | 2787 | 0.47 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 5 | 65.9 | 3.13 | 2778 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 6 | 66.1 | 3.14 | 2772 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 7 | 66.4 | 3.13 | 2782 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 8 | 66.3 | 3.13 | 2743 | 0.47 | 0.459 | 0.414 | 0.260 | 0.528 | | | | |
| 9 | 66.5 | 3.14 | 2754 | 0.47 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 10 | 66.6 | 3.14 | 2783 | 0.47 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 11 | 66.1 | 3.14 | 2769 | 0.47 | 0.454 | 0.409 | 0.260 | 0.526 | | | | |
| 12 | 66.4 | 3.13 | 2779 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 13 | 66.4 | 3.11 | 2763 | 0.47 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 14 | 66.1 | 3.12 | 2769 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 15 | 66.3 | 3.14 | 2775 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 16 | 66.2 | 3.14 | 2783 | 0.47 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 17 | 66.3 | 3.14 | 2775 | 0.47 | 0.457 | 0.415 | 0.259 | 0.528 | | | | |
| 18 | 66.4 | 3.13 | 2779 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 19 | 66.1 | 3.13 | 2750 | 0.47 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 20 | 66.3 | 3.13 | 2766 | 0.47 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 21 | 66.3 | 3.13 | 2783 | 0.47 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 22 | 66.4 | 3.13 | 2778 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 23 | 66.5 | 3.13 | 2779 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 24 | 66.4 | 3.12 | 2764 | 0.47 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 25 | 66.4 | 3.14 | 2768 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 66.3 | 3.13 | 2771 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 66.3 | 3.13 | 2775 | 0.47 | 0.456 | 0.413 | 0.259 | 0.527 | | | | |
| σ | 0.17 | 0.007 | 12.6 | 0.001 | 0.0016 | 0.0017 | 0.0005 | 0.0008 | | | | |
| Min. | 65.9 | 3.11 | 2743 | 0.47 | 0.454 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 66.6 | 3.14 | 2789 | 0.47 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.4 | 99.3 | 99.3 | 99.5 | 99.3 | 99.3 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.9 | 100.1 | 100.0 | 99.9 |
| 2 | 100.0 | 99.4 | 99.4 | 99.3 | 99.5 | 99.3 | 99.3 | 99.3 | 99.3 | 99.0 | 98.9 | 99.0 | 98.8 | 100.0 | 99.9 | 99.8 |
| 3 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.6 | 99.6 | 99.3 | 99.1 | 99.3 | 99.1 | 100.3 | 100.2 | 100.1 |
| 4 | 100.0 | 99.3 | 99.3 | 99.3 | 99.5 | 99.2 | 99.3 | 99.4 | 99.5 | 99.2 | 99.0 | 99.2 | 98.9 | 100.1 | 100.0 | 100.0 |
| 5 | 100.0 | 99.1 | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | 99.2 | 99.3 | 99.2 | 98.8 | 99.1 | 98.7 | 99.8 | 99.8 | 99.9 |
| 6 | 100.0 | 99.4 | 99.3 | 99.3 | 99.5 | 99.4 | 99.4 | 99.4 | 99.4 | 99.2 | 99.0 | 99.1 | 98.9 | 100.1 | 100.0 | 100.0 |
| 7 | 100.0 | 99.3 | 99.2 | 99.2 | 99.3 | 99.3 | 99.2 | 99.4 | 99.2 | 98.9 | 98.8 | 99.0 | 98.6 | 99.8 | 99.8 | 99.6 |
| 8 | 100.0 | 99.5 | 99.3 | 99.3 | 99.4 | 99.4 | 99.3 | 99.5 | 99.4 | 99.1 | 99.0 | 99.2 | 98.8 | 100.1 | 100.0 | 99.9 |
| 9 | 100.0 | 99.3 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 | 99.1 | 99.0 | 99.2 | 98.8 | 100.0 | 99.9 | 99.9 |
| 10 | 100.0 | 99.5 | 99.3 | 99.3 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.2 | 99.1 | 99.3 | 98.9 | 100.1 | 100.0 | 100.0 |
| 11 | 100.0 | 99.2 | 99.1 | 99.3 | 99.2 | 99.3 | 99.5 | 99.4 | 99.4 | 99.1 | 99.1 | 99.3 | 98.8 | 100.0 | 100.0 | 100.2 |
| 12 | 100.0 | 99.4 | 99.2 | 99.3 | 99.4 | 99.3 | 99.4 | 99.6 | 99.5 | 99.2 | 99.1 | 99.3 | 98.9 | 100.2 | 100.2 | 100.0 |
| 13 | 100.0 | 99.1 | 99.0 | 99.1 | 99.3 | 99.0 | 99.0 | 99.3 | 99.1 | 99.0 | 98.8 | 99.0 | 98.6 | 99.8 | 99.8 | 99.8 |
| 14 | 100.0 | 99.4 | 99.3 | 99.3 | 99.3 | 99.2 | 99.2 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.8 | 100.0 | 99.8 | 99.8 |
| 15 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.4 | 99.7 | 99.7 | 99.4 | 99.3 | 99.4 | 99.1 | 100.3 | 100.2 | 100.2 |
| 16 | 100.0 | 99.4 | 99.4 | 99.5 | 99.6 | 99.4 | 99.4 | 99.6 | 99.6 | 99.4 | 99.2 | 99.5 | 99.1 | 100.3 | 100.3 | 100.2 |
| 17 | 100.0 | 99.1 | 99.1 | 99.5 | 99.5 | 99.2 | 99.1 | 99.3 | 99.3 | 99.1 | 98.9 | 99.0 | 98.6 | 99.8 | 99.9 | 99.8 |
| 18 | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.2 | 99.3 | 99.5 | 99.4 | 99.2 | 99.0 | 99.2 | 98.8 | 100.0 | 100.0 | 100.0 |
| 19 | 100.0 | 99.3 | 99.3 | 99.3 | 99.5 | 99.4 | 99.4 | 99.5 | 99.4 | 99.2 | 99.1 | 99.2 | 99.0 | 100.2 | 100.1 | 100.0 |
| 20 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.1 | 99.0 | 99.0 | 98.8 | 100.0 | 100.0 | 99.8 |
| 21 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.2 | 99.2 | 99.3 | 99.3 | 99.0 | 98.9 | 99.0 | 98.7 | 99.8 | 99.7 | 99.6 |
| 22 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.3 | 99.2 | 99.4 | 99.4 | 99.0 | 98.9 | 99.0 | 98.9 | 100.1 | 100.1 | 100.0 |
| 23 | 100.0 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 | 99.0 | 99.0 | 99.0 | 98.9 | 100.1 | 100.1 | 99.9 |
| 24 | 100.0 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.2 | 99.1 | 99.2 | 99.0 | 100.3 | 100.2 | 100.1 |
| 25 | 100.0 | 99.3 | 99.1 | 99.2 | 99.3 | 99.2 | 99.2 | 99.4 | 99.2 | 99.1 | 98.9 | 99.1 | 98.8 | 99.8 | 99.9 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.4 | 99.4 | 99.1 | 99.0 | 99.2 | 98.8 | 100.0 | 100.0 | 99.9 |
| Med. | 100.0 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.4 | 99.4 | 99.1 | 99.0 | 99.1 | 98.8 | 100.1 | 100.0 | 99.9 |
| σ | 0.00 | 0.13 | 0.14 | 0.11 | 0.12 | 0.11 | 0.12 | 0.11 | 0.14 | 0.12 | 0.12 | 0.14 | 0.14 | 0.17 | 0.15 | 0.16 |
| Min. | 100.0 | 99.1 | 99.0 | 99.1 | 99.2 | 99.0 | 99.0 | 99.2 | 99.1 | 98.9 | 98.8 | 99.0 | 98.6 | 99.8 | 99.7 | 99.6 |
| Max. | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.7 | 99.7 | 99.4 | 99.3 | 99.5 | 99.1 | 100.3 | 100.3 | 100.2 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0101 | -0.0080 | -0.0116 | 0.0004 | 0.0000 | -0.0007 | -0.0026 | -0.0010 | -0.0020 | -0.0020 | -0.0010 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.984 | |
| α | -1.68E-06 | |
| $R^2$ | 0.430 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 2 | 99.7 | 99.9 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | |
| 3 | 99.9 | 100.1 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | |
| 4 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| 5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.4 | | | | | | | | | | | |
| 6 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 7 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | |
| 8 | 99.7 | 99.8 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 9 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 10 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | | | | | | | | | | | |
| 11 | 99.7 | 99.7 | 99.6 | 99.5 | 99.7 | | | | | | | | | | | |
| 12 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 13 | 99.6 | 99.8 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 14 | 99.7 | 99.9 | 99.9 | 99.8 | 99.9 | | | | | | | | | | | |
| 15 | 100.0 | 100.3 | 100.2 | 100.2 | 100.1 | | | | | | | | | | | |
| 16 | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 17 | 99.7 | 99.8 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | |
| 18 | 99.8 | 100.1 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 19 | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 20 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 21 | 99.2 | 99.4 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| 22 | 99.7 | 100.0 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 23 | 99.6 | 99.8 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 24 | 99.8 | 100.1 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 25 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| Med. | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| σ | 0.17 | 0.20 | 0.19 | 0.20 | 0.20 | | | | | | | | | | | |
| Min. | 99.2 | 99.4 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| Max. | 100.0 | 100.3 | 100.2 | 100.2 | 100.1 | | | | | | | | | | | |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.6 | 99.7 | 99.6 | 99.8 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 |
| 2 | 100.0 | 99.7 | 99.8 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 |
| 3 | 100.0 | 99.2 | 99.2 | 99.2 | 99.1 | 99.4 | 99.3 | 99.2 | 99.3 | 99.2 | 99.2 | 99.2 | 99.3 | 99.2 | 99.4 | 99.3 |
| 4 | 100.0 | 99.6 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 5 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.6 | 99.7 | 99.8 | 99.7 |
| 6 | 100.0 | 99.1 | 99.2 | 99.2 | 99.4 | 99.2 | 99.2 | 99.3 | 99.2 | 99.1 | 99.1 | 99.2 | 99.1 | 99.1 | 99.2 | 99.2 |
| 7 | 100.0 | 99.6 | 99.5 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.7 | 99.9 | 99.8 |
| 8 | 100.0 | 99.7 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.8 | 99.7 | 99.6 | 99.7 | 99.7 | 99.5 | 99.6 | 99.8 | 99.7 |
| 9 | 100.0 | 99.7 | 99.5 | 99.6 | 99.7 | 99.9 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 |
| 10 | 100.0 | 99.4 | 99.4 | 99.3 | 99.2 | 99.3 | 99.4 | 99.5 | 99.5 | 99.3 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.6 |
| 11 | 100.0 | 99.7 | 99.4 | 99.6 | 99.7 | 99.8 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 |
| 12 | 100.0 | 99.7 | 99.5 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.8 | 99.6 | 99.7 | 99.8 | 99.8 |
| 13 | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.4 | 99.6 | 99.6 | 99.5 | 99.4 | 99.5 | 99.4 | 99.4 | 99.5 | 99.4 |
| 14 | 100.0 | 99.4 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.7 | 99.5 | 99.5 | 99.3 | 99.4 | 99.4 | 99.4 | 99.5 | 99.6 |
| 15 | 100.0 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.3 | 99.4 | 99.5 | 99.5 |
| 16 | 100.0 | 99.1 | 99.2 | 99.3 | 99.3 | 99.1 | 99.3 | 99.3 | 99.3 | 99.5 | 99.4 | 99.4 | 99.3 | 99.3 | 99.4 | 99.4 |
| 17 | 100.0 | 99.6 | 99.4 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 18 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 |
| 19 | 100.0 | 99.2 | 99.1 | 99.1 | 99.3 | 99.3 | 99.3 | 99.3 | 99.2 | 99.2 | 99.1 | 99.4 | 99.0 | 99.3 | 99.3 | 99.3 |
| 20 | 100.0 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.7 | 99.6 | 99.4 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 21 | 100.0 | 99.4 | 99.4 | 99.4 | 99.4 | 99.3 | 99.4 | 99.6 | 99.4 | 99.5 | 99.4 | 99.6 | 99.4 | 99.5 | 99.5 | 99.5 |
| 22 | 100.0 | 99.7 | 99.7 | 99.8 | 99.9 | 100.1 | 99.8 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 23 | 100.0 | 99.4 | 99.2 | 99.3 | 99.2 | 99.3 | 99.3 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 |
| 24 | 100.0 | 99.3 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.6 | 99.5 | 99.4 | 99.5 | 99.4 |
| 25 | 100.0 | 99.2 | 99.3 | 99.3 | 99.4 | 99.3 | 99.4 | 99.5 | 99.6 | 99.5 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.4 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| Med. | 100.0 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| σ | 0.00 | 0.20 | 0.19 | 0.22 | 0.23 | 0.25 | 0.20 | 0.23 | 0.23 | 0.23 | 0.25 | 0.23 | 0.25 | 0.24 | 0.23 | 0.24 |
| Min. | 100.0 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 99.2 | 99.2 | 99.1 | 99.1 | 99.2 | 99.0 | 99.1 | 99.2 | 99.2 |
| Max. | 100.0 | 99.7 | 99.8 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 2 | 100.3 | 100.4 | 100.5 | 100.4 | 100.6 | | | | | | | | | | | |
| 3 | 99.3 | 99.3 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| 4 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 5 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 6 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 7 | 99.8 | 99.8 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 8 | 99.6 | 99.6 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 9 | 99.7 | 99.7 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 10 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| 11 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 12 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 13 | 99.4 | 99.5 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 14 | 99.5 | 99.5 | 99.7 | 99.7 | 99.6 | | | | | | | | | | | |
| 15 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| 16 | 99.4 | 99.4 | 99.6 | 99.5 | 99.6 | | | | | | | | | | | |
| 17 | 99.5 | 99.5 | 99.7 | 99.5 | 99.6 | | | | | | | | | | | |
| 18 | 99.6 | 99.6 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 19 | 99.2 | 99.2 | 99.3 | 99.3 | 99.4 | | | | | | | | | | | |
| 20 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 21 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | | | | | | | | | | | |
| 22 | 99.8 | 99.9 | 100.1 | 99.9 | 99.9 | | | | | | | | | | | |
| 23 | 99.3 | 99.2 | 99.4 | 99.3 | 99.4 | | | | | | | | | | | |
| 24 | 99.4 | 99.4 | 99.6 | 99.5 | 99.6 | | | | | | | | | | | |
| 25 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| Med. | 99.5 | 99.5 | 99.7 | 99.7 | 99.6 | | | | | | | | | | | |
| σ | 0.25 | 0.27 | 0.26 | 0.25 | 0.27 | | | | | | | | | | | |
| Min. | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| Max. | 100.3 | 100.4 | 100.5 | 100.4 | 100.6 | | | | | | | | | | | |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0014 |
| 2 | 0.0000 | 0.0010 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0013 | 0.0014 | 0.0015 | 0.0015 |
| 3 | 0.0000 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0013 |
| 4 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0011 | 0.0012 | 0.0013 | 0.0014 |
| 5 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | 0.0014 |
| 6 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |
| 7 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0012 | 0.0015 | 0.0015 | 0.0014 |
| 8 | 0.0000 | 0.0009 | 0.0009 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0015 | 0.0014 | 0.0014 |
| 9 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 10 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 |
| 11 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 12 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0014 | 0.0013 | 0.0014 |
| 13 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 |
| 14 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 15 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 |
| 16 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0013 |
| 17 | 0.0000 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 18 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0012 |
| 19 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 20 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| 21 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 22 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0014 |
| 23 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 24 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0014 |
| 25 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0014 | 0.0013 | 0.0013 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| Med. | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 |
| Max. | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0015 | 0.0013 | 0.0012 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 2 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 3 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 4 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 5 | 0.0015 | 0.0014 | 0.0013 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 6 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 7 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 8 | 0.0015 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 9 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 10 | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 11 | 0.0014 | 0.0013 | 0.0012 | 0.0014 | 0.0016 | | | | | | | | | | | |
| 12 | 0.0014 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 13 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 14 | 0.0014 | 0.0013 | 0.0012 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 15 | 0.0015 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 16 | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 17 | 0.0014 | 0.0012 | 0.0011 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 18 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 19 | 0.0015 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 20 | 0.0013 | 0.0011 | 0.0012 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 21 | 0.0013 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 22 | 0.0014 | 0.0012 | 0.0012 | 0.0015 | 0.0014 | | | | | | | | | | | |
| 23 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 24 | 0.0014 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 25 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| Med. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| Max. | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2601 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2588 | 0.2589 | 0.2588 |
| 2 | 0.2597 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2586 | 0.2584 | 0.2583 | 0.2582 | 0.2582 |
| 3 | 0.2585 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2574 | 0.2575 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2571 |
| 4 | 0.2590 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2581 | 0.2580 | 0.2579 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2577 | 0.2576 |
| 5 | 0.2616 | 0.2607 | 0.2606 | 0.2606 | 0.2605 | 0.2605 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2605 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2602 |
| 6 | 0.2599 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2588 | 0.2589 | 0.2589 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 |
| 7 | 0.2590 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | 0.2576 |
| 8 | 0.2604 | 0.2595 | 0.2595 | 0.2593 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2593 | 0.2589 | 0.2590 | 0.2590 |
| 9 | 0.2600 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2590 | 0.2588 | 0.2589 | 0.2587 | 0.2587 | 0.2587 |
| 10 | 0.2593 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2581 | 0.2580 | 0.2580 |
| 11 | 0.2621 | 0.2612 | 0.2612 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2608 | 0.2608 | 0.2606 |
| 12 | 0.2594 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2580 | 0.2581 | 0.2580 |
| 13 | 0.2597 | 0.2589 | 0.2587 | 0.2587 | 0.2586 | 0.2587 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 |
| 14 | 0.2593 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2579 |
| 15 | 0.2594 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2579 |
| 16 | 0.2595 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2583 | 0.2584 | 0.2583 |
| 17 | 0.2611 | 0.2602 | 0.2602 | 0.2600 | 0.2600 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2600 | 0.2600 | 0.2600 | 0.2598 | 0.2598 | 0.2597 |
| 18 | 0.2593 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2585 | 0.2583 | 0.2583 | 0.2583 | 0.2584 | 0.2582 | 0.2581 | 0.2580 | 0.2581 |
| 19 | 0.2603 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 |
| 20 | 0.2594 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2583 | 0.2584 | 0.2584 | 0.2581 | 0.2581 | 0.2582 |
| 21 | 0.2587 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | 0.2573 |
| 22 | 0.2596 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2587 | 0.2586 | 0.2585 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2583 |
| 23 | 0.2612 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2601 | 0.2601 | 0.2601 | 0.2601 | 0.2601 | 0.2599 | 0.2601 | 0.2599 | 0.2598 | 0.2598 | 0.2597 |
| 24 | 0.2599 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2589 | 0.2588 | 0.2586 | 0.2587 | 0.2586 |
| 25 | 0.2597 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2587 | 0.2586 | 0.2583 | 0.2584 | 0.2584 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2598 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2585 | 0.2585 | 0.2585 |
| Med. | 0.2597 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2583 | 0.2584 | 0.2583 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 |
| Min. | 0.2585 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2574 | 0.2575 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2571 |
| Max. | 0.2621 | 0.2612 | 0.2612 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2608 | 0.2608 | 0.2606 |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2587 | 0.2589 | 0.2589 | 0.2586 | 0.2587 | | | | | | | | | | | |
| 2 | 0.2582 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | | | | | | | | | | | |
| 3 | 0.2571 | 0.2572 | 0.2572 | 0.2570 | 0.2569 | | | | | | | | | | | |
| 4 | 0.2577 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | | | | | | | | | | | |
| 5 | 0.2601 | 0.2602 | 0.2603 | 0.2600 | 0.2600 | | | | | | | | | | | |
| 6 | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2584 | | | | | | | | | | | |
| 7 | 0.2576 | 0.2576 | 0.2576 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 8 | 0.2589 | 0.2591 | 0.2590 | 0.2589 | 0.2588 | | | | | | | | | | | |
| 9 | 0.2586 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | | | | | | | | | | | |
| 10 | 0.2581 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | | | | | | | | | | | |
| 11 | 0.2607 | 0.2608 | 0.2609 | 0.2607 | 0.2605 | | | | | | | | | | | |
| 12 | 0.2580 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | | | | | | | | | | | |
| 13 | 0.2583 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | | | | | | | | | | | |
| 14 | 0.2579 | 0.2580 | 0.2581 | 0.2578 | 0.2578 | | | | | | | | | | | |
| 15 | 0.2580 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 16 | 0.2583 | 0.2585 | 0.2585 | 0.2582 | 0.2583 | | | | | | | | | | | |
| 17 | 0.2597 | 0.2599 | 0.2600 | 0.2597 | 0.2597 | | | | | | | | | | | |
| 18 | 0.2580 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 19 | 0.2588 | 0.2590 | 0.2590 | 0.2588 | 0.2587 | | | | | | | | | | | |
| 20 | 0.2581 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | | | | | | | | | | | |
| 21 | 0.2574 | 0.2575 | 0.2574 | 0.2573 | 0.2572 | | | | | | | | | | | |
| 22 | 0.2582 | 0.2584 | 0.2584 | 0.2581 | 0.2582 | | | | | | | | | | | |
| 23 | 0.2598 | 0.2599 | 0.2599 | 0.2597 | 0.2596 | | | | | | | | | | | |
| 24 | 0.2585 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | | | | | | | | | | | |
| 25 | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2585 | 0.2586 | 0.2586 | 0.2584 | 0.2583 | | | | | | | | | | | |
| Med. | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | | | | | | | | | | | |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | | | | | | | | | | | |
| Min. | 0.2571 | 0.2572 | 0.2572 | 0.2570 | 0.2569 | | | | | | | | | | | |
| Max. | 0.2607 | 0.2608 | 0.2609 | 0.2607 | 0.2605 | | | | | | | | | | | |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 3-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5294 | 0.5294 |
| 2 | 0.5273 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 3 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5271 |
| 4 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 |
| 5 | 0.5278 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5275 | 0.5276 | 0.5276 |
| 6 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 |
| 7 | 0.5266 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5265 | 0.5264 |
| 8 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 |
| 9 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 |
| 10 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| 11 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 |
| 12 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 13 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| 14 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 |
| 15 | 0.5266 | 0.5265 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 |
| 16 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 |
| 17 | 0.5295 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5293 | 0.5293 |
| 18 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| 19 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 |
| 20 | 0.5281 | 0.5280 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 |
| 21 | 0.5279 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5278 |
| 22 | 0.5271 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 |
| 23 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5283 |
| 24 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 |
| 25 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| Med. | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 |
| σ | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0009 | 0.0008 | 0.0008 | 0.0008 | 0.0008 |
| Min. | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 |
| Max. | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5294 | 0.5294 |

## Data Set 3 : 55 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 55.9 °C |
| Actual Ambient Temperature [$T_A$] | 54.8 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

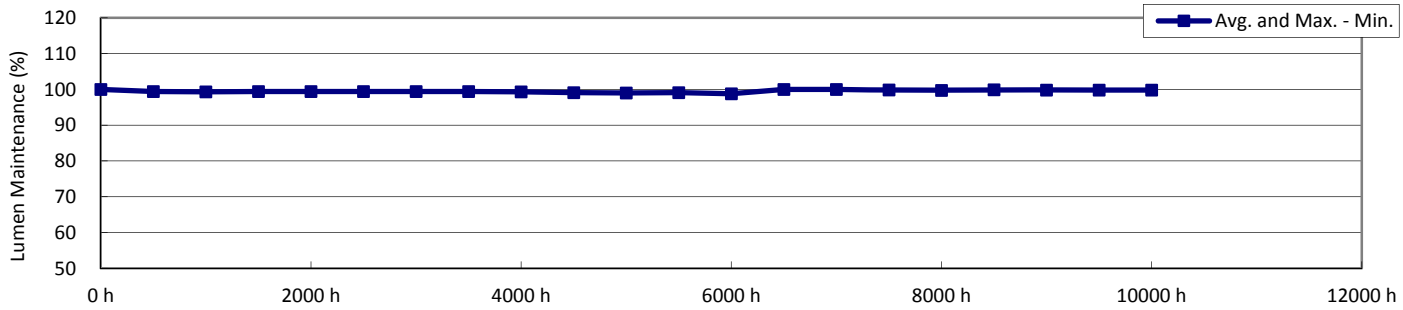
**TABLE 3-6 (Continued)**
Chromaticity

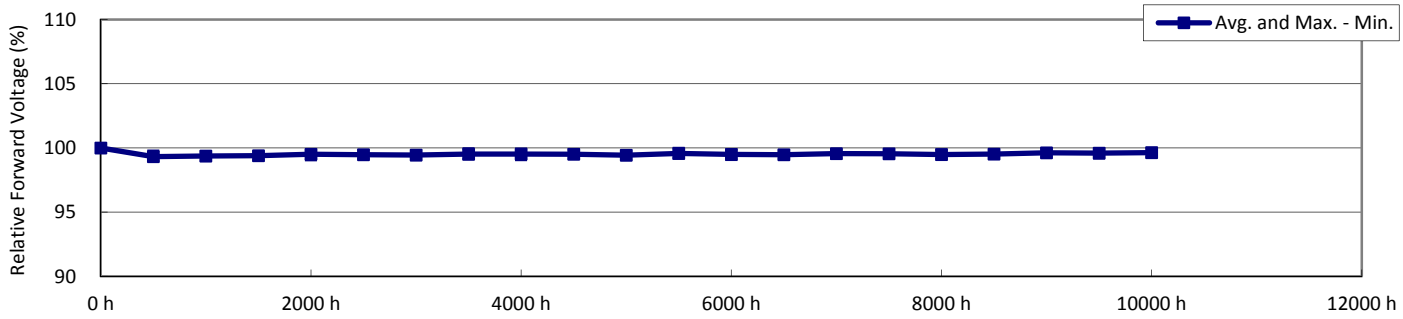
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | | | | | | | | | | | |
| 2 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 3 | 0.5270 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 4 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | | | | | | | | | | | |
| 5 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 6 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 7 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | | | | | | | | | | | |
| 8 | 0.5281 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 9 | 0.5282 | 0.5282 | 0.5283 | 0.5281 | 0.5282 | | | | | | | | | | | |
| 10 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 11 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5269 | | | | | | | | | | | |
| 12 | 0.5270 | 0.5271 | 0.5272 | 0.5270 | 0.5271 | | | | | | | | | | | |
| 13 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| 14 | 0.5269 | 0.5270 | 0.5271 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 15 | 0.5264 | 0.5265 | 0.5266 | 0.5264 | 0.5265 | | | | | | | | | | | |
| 16 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| 17 | 0.5293 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | | | | | | | | | | | |
| 18 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | | | | | | | | | | | |
| 19 | 0.5281 | 0.5282 | 0.5283 | 0.5281 | 0.5282 | | | | | | | | | | | |
| 20 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 21 | 0.5278 | 0.5279 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 22 | 0.5269 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 23 | 0.5283 | 0.5283 | 0.5284 | 0.5283 | 0.5284 | | | | | | | | | | | |
| 24 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 25 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| Med. | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | | | | | | | | | | | |
| σ | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | | | | | | | | | | | |
| Min. | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| Max. | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | | | | | | | | | | | |

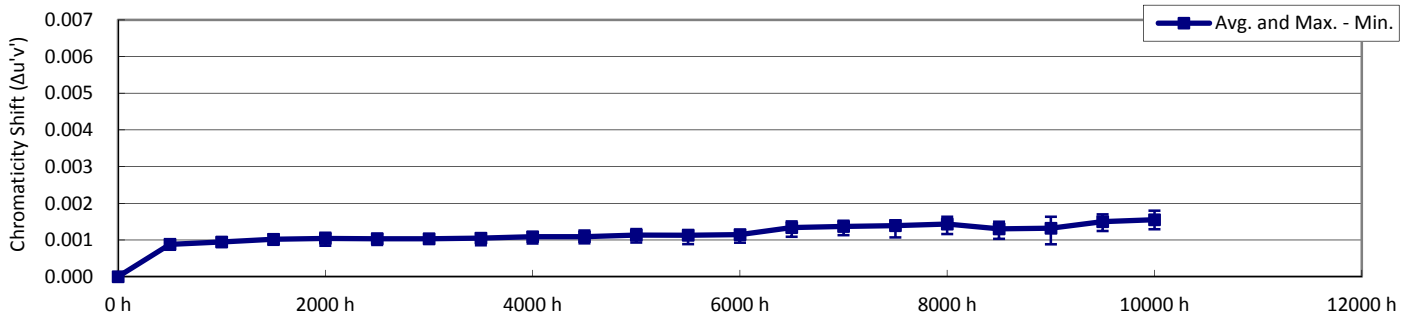
## Data Set 4 : 55 °C, 180 mA

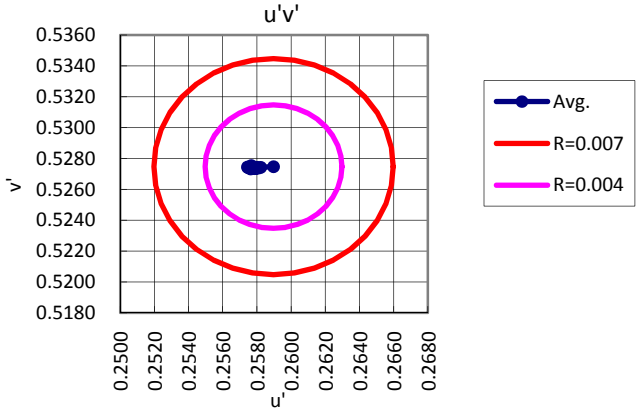
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 78.2 | 3.22 | 2789 | 0.58 | 0.454 | 0.411 | 0.258 | 0.526 | | | | |
| 2 | 77.6 | 3.22 | 2754 | 0.58 | 0.457 | 0.412 | 0.260 | 0.527 | | | | |
| 3 | 78.2 | 3.22 | 2784 | 0.58 | 0.455 | 0.413 | 0.259 | 0.527 | | | | |
| 4 | 78.3 | 3.22 | 2794 | 0.58 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| 5 | 78.0 | 3.23 | 2762 | 0.58 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 6 | 78.0 | 3.23 | 2772 | 0.58 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 7 | 78.1 | 3.22 | 2789 | 0.58 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 8 | 77.8 | 3.21 | 2780 | 0.58 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 9 | 77.9 | 3.22 | 2793 | 0.58 | 0.454 | 0.412 | 0.258 | 0.527 | | | | |
| 10 | 77.2 | 3.20 | 2792 | 0.58 | 0.454 | 0.412 | 0.258 | 0.527 | | | | |
| 11 | 77.6 | 3.22 | 2763 | 0.58 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 12 | 78.3 | 3.23 | 2798 | 0.58 | 0.454 | 0.412 | 0.258 | 0.527 | | | | |
| 13 | 77.4 | 3.21 | 2758 | 0.58 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 14 | 77.8 | 3.21 | 2743 | 0.58 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 15 | 77.7 | 3.22 | 2772 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 16 | 78.2 | 3.21 | 2764 | 0.58 | 0.458 | 0.416 | 0.259 | 0.529 | | | | |
| 17 | 77.0 | 3.22 | 2726 | 0.58 | 0.460 | 0.415 | 0.261 | 0.529 | | | | |
| 18 | 77.8 | 3.21 | 2774 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 19 | 77.7 | 3.22 | 2798 | 0.58 | 0.453 | 0.411 | 0.258 | 0.526 | | | | |
| 20 | 78.2 | 3.23 | 2782 | 0.58 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 21 | 77.6 | 3.21 | 2773 | 0.58 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 22 | 77.9 | 3.23 | 2777 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 23 | 78.6 | 3.22 | 2776 | 0.58 | 0.457 | 0.416 | 0.259 | 0.529 | | | | |
| 24 | 78.0 | 3.22 | 2777 | 0.58 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 25 | 78.1 | 3.22 | 2742 | 0.58 | 0.459 | 0.414 | 0.260 | 0.528 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 77.9 | 3.22 | 2773 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 77.9 | 3.22 | 2776 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| σ | 0.37 | 0.008 | 18.4 | 0.001 | 0.0020 | 0.0018 | 0.0007 | 0.0010 | | | | |
| Min. | 77.0 | 3.20 | 2726 | 0.58 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 78.6 | 3.23 | 2798 | 0.58 | 0.460 | 0.416 | 0.261 | 0.529 | | | | |

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# Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.4 | 99.2 | 99.1 | 99.2 | 98.9 | 100.1 | 100.1 | 99.9 |
| 2 | 100.0 | 99.3 | 99.4 | 99.3 | 99.4 | 99.3 | 99.3 | 99.3 | 99.2 | 99.0 | 98.8 | 99.1 | 98.8 | 99.8 | 99.9 | 99.7 |
| 3 | 100.0 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.4 | 99.3 | 99.1 | 99.3 | 98.9 | 100.1 | 100.1 | 100.1 |
| 4 | 100.0 | 99.1 | 99.2 | 99.1 | 99.2 | 99.2 | 99.1 | 99.2 | 99.1 | 98.8 | 98.6 | 98.8 | 98.5 | 99.5 | 99.6 | 99.4 |
| 5 | 100.0 | 99.3 | 99.3 | 99.4 | 99.5 | 99.4 | 99.2 | 99.4 | 99.3 | 99.0 | 98.9 | 99.3 | 98.9 | 100.0 | 100.0 | 99.9 |
| 6 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.3 | 99.1 | 99.3 | 98.9 | 100.1 | 100.1 | 100.0 |
| 7 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | 99.3 | 99.1 | 99.3 | 99.0 | 100.1 | 100.2 | 100.0 |
| 8 | 100.0 | 99.5 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.5 | 99.3 | 99.2 | 99.0 | 99.2 | 98.8 | 100.0 | 100.0 | 99.9 |
| 9 | 100.0 | 99.2 | 99.2 | 99.1 | 99.2 | 99.3 | 99.1 | 99.3 | 99.1 | 98.9 | 98.8 | 99.0 | 98.7 | 99.8 | 99.8 | 99.7 |
| 10 | 100.0 | 99.3 | 99.3 | 99.3 | 99.4 | 99.4 | 99.3 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.8 | 100.0 | 99.9 | 99.9 |
| 11 | 100.0 | 98.9 | 98.9 | 99.0 | 99.0 | 99.0 | 99.1 | 99.0 | 99.0 | 98.8 | 98.6 | 98.8 | 98.3 | 99.6 | 99.6 | 99.5 |
| 12 | 100.0 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.3 | 99.2 | 99.3 | 99.0 | 100.2 | 100.1 | 100.0 |
| 13 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.3 | 99.0 | 98.9 | 99.0 | 98.7 | 100.0 | 99.9 | 99.8 |
| 14 | 100.0 | 99.5 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.5 | 99.3 | 99.1 | 99.0 | 99.2 | 98.8 | 100.1 | 100.0 | 99.9 |
| 15 | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.4 | 99.5 | 99.3 | 99.1 | 99.0 | 99.1 | 98.8 | 100.1 | 100.1 | 99.9 |
| 16 | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.3 | 99.2 | 99.1 | 99.2 | 98.9 | 100.1 | 100.1 | 99.9 |
| 17 | 100.0 | 99.3 | 99.3 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.7 | 100.1 | 100.1 | 100.0 |
| 18 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.2 | 99.2 | 99.3 | 98.9 | 100.2 | 100.2 | 100.0 |
| 19 | 100.0 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.2 | 98.9 | 100.0 | 100.0 | 99.8 |
| 20 | 100.0 | 99.4 | 99.3 | 99.4 | 99.4 | 99.3 | 99.2 | 99.3 | 99.2 | 99.0 | 98.9 | 99.0 | 98.7 | 99.9 | 99.9 | 99.7 |
| 21 | 100.0 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.4 | 99.3 | 99.2 | 98.9 | 99.1 | 98.9 | 100.1 | 100.0 | 99.9 |
| 22 | 100.0 | 99.2 | 99.1 | 99.2 | 99.3 | 99.4 | 99.2 | 99.2 | 99.2 | 99.0 | 98.8 | 99.0 | 98.7 | 99.9 | 99.9 | 99.7 |
| 23 | 100.0 | 99.4 | 99.4 | 99.6 | 99.5 | 99.5 | 99.4 | 99.2 | 99.3 | 99.3 | 98.9 | 99.2 | 98.8 | 100.0 | 100.0 | 99.9 |
| 24 | 100.0 | 99.6 | 99.4 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.4 | 99.3 | 99.1 | 99.3 | 99.0 | 100.1 | 100.1 | 99.9 |
| 25 | 100.0 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 | 99.3 | 99.4 | 99.3 | 99.1 | 98.9 | 99.0 | 98.8 | 100.0 | 99.9 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.4 | 99.3 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.1 | 98.8 | 100.0 | 100.0 | 99.8 |
| Med. | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.4 | 99.4 | 99.3 | 99.1 | 99.0 | 99.2 | 98.8 | 100.0 | 100.0 | 99.9 |
| σ | 0.00 | 0.16 | 0.14 | 0.15 | 0.14 | 0.13 | 0.13 | 0.15 | 0.12 | 0.15 | 0.16 | 0.15 | 0.16 | 0.17 | 0.15 | 0.16 |
| Min. | 100.0 | 98.9 | 98.9 | 99.0 | 99.0 | 99.0 | 99.1 | 99.0 | 99.0 | 98.8 | 98.6 | 98.8 | 98.3 | 99.5 | 99.6 | 99.4 |
| Max. | 100.0 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | 99.3 | 99.2 | 99.3 | 99.0 | 100.2 | 100.2 | 100.1 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0101 | -0.0090 | -0.0120 | 0.0000 | -0.0002 | -0.0015 | -0.0028 | -0.0010 | -0.0020 | -0.0020 | -0.0020 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.983 | |
| α | -1.70E-06 | |
| $R^2$ | 0.433 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=B\exp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=\ln(B/0.7)/\alpha$

$L_{80}=\ln(B/0.8)/\alpha$

$L_{90}=\ln(B/0.9)/\alpha$

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 2 | 99.6 | 99.9 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 3 | 99.9 | 100.1 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 4 | 99.3 | 99.4 | 99.3 | 99.3 | 99.2 | | | | | | | | | | | |
| 5 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 6 | 99.8 | 100.0 | 100.0 | 99.9 | 99.9 | | | | | | | | | | | |
| 7 | 99.8 | 100.1 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 8 | 99.7 | 100.0 | 99.8 | 99.7 | 99.9 | | | | | | | | | | | |
| 9 | 99.5 | 99.7 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 10 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 11 | 99.3 | 99.6 | 99.3 | 99.4 | 99.5 | | | | | | | | | | | |
| 12 | 99.8 | 100.1 | 99.9 | 100.1 | 100.1 | | | | | | | | | | | |
| 13 | 99.7 | 99.8 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 14 | 99.6 | 99.8 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | |
| 15 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 16 | 99.6 | 99.8 | 99.5 | 99.5 | 99.6 | | | | | | | | | | | |
| 17 | 99.7 | 99.9 | 100.0 | 99.8 | 99.8 | | | | | | | | | | | |
| 18 | 99.9 | 100.1 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | |
| 19 | 99.8 | 99.9 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | |
| 20 | 99.6 | 99.8 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | |
| 21 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| 22 | 99.7 | 99.9 | 99.7 | 99.9 | 99.8 | | | | | | | | | | | |
| 23 | 100.0 | 99.6 | 99.8 | 99.9 | 99.7 | | | | | | | | | | | |
| 24 | 99.9 | 100.1 | 100.0 | 100.0 | 99.9 | | | | | | | | | | | |
| 25 | 99.7 | 100.0 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| Med. | 99.7 | 99.9 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| σ | 0.17 | 0.18 | 0.20 | 0.19 | 0.19 | | | | | | | | | | | |
| Min. | 99.3 | 99.4 | 99.3 | 99.3 | 99.2 | | | | | | | | | | | |
| Max. | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.2 | 99.3 | 99.4 | 99.3 | 99.4 | 99.4 | 99.4 | 99.4 | 99.4 | 99.3 | 99.5 | 99.3 | 99.4 | 99.5 | 99.4 |
| 2 | 100.0 | 99.4 | 99.6 | 99.5 | 99.6 | 99.7 | 99.7 | 99.7 | 99.5 | 99.8 | 99.6 | 99.6 | 99.7 | 99.6 | 99.8 | 99.7 |
| 3 | 100.0 | 99.1 | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | 99.3 | 99.2 | 99.4 | 99.4 | 99.3 | 99.3 | 99.2 | 99.3 | 99.3 |
| 4 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.9 | 99.7 | 99.8 | 100.0 | 99.9 | 99.8 | 99.9 | 99.9 |
| 5 | 100.0 | 99.5 | 99.6 | 99.6 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 |
| 6 | 100.0 | 99.0 | 99.1 | 99.2 | 99.3 | 99.3 | 99.3 | 99.3 | 99.3 | 99.4 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | 99.4 |
| 7 | 100.0 | 99.2 | 99.2 | 99.2 | 99.2 | 99.2 | 99.3 | 99.4 | 99.3 | 99.2 | 99.3 | 99.3 | 99.4 | 99.2 | 99.4 | 99.3 |
| 8 | 100.0 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 99.2 | 99.3 | 99.1 | 99.2 | 99.1 | 99.2 | 99.1 | 99.1 | 99.3 | 99.2 |
| 9 | 100.0 | 99.5 | 99.5 | 99.6 | 99.7 | 99.7 | 99.6 | 99.8 | 99.7 | 99.8 | 99.6 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 |
| 10 | 100.0 | 99.5 | 99.6 | 99.6 | 99.8 | 99.7 | 99.6 | 100.0 | 99.9 | 99.9 | 99.7 | 99.9 | 99.6 | 99.8 | 99.9 | 99.8 |
| 11 | 100.0 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.6 | 100.0 | 99.8 | 99.8 | 99.8 | 99.9 |
| 12 | 100.0 | 99.1 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | 99.5 | 99.4 | 99.2 | 99.3 | 99.6 | 99.2 | 99.3 | 99.5 | 99.5 |
| 13 | 100.0 | 99.3 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 |
| 14 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.5 | 99.6 | 99.6 | 99.8 | 99.4 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 |
| 15 | 100.0 | 99.4 | 99.4 | 99.5 | 99.8 | 99.8 | 99.6 | 99.7 | 99.6 | 99.5 | 99.5 | 99.7 | 99.4 | 99.6 | 99.7 | 99.6 |
| 16 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.7 | 99.4 | 99.5 | 99.6 | 99.6 |
| 17 | 100.0 | 99.0 | 99.0 | 99.0 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 99.2 | 99.1 | 99.2 | 99.1 | 99.2 | 99.2 | 99.2 |
| 18 | 100.0 | 99.3 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.4 | 99.4 | 99.4 |
| 19 | 100.0 | 99.2 | 99.3 | 99.3 | 99.6 | 99.4 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 |
| 20 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.6 | 99.8 | 99.7 |
| 21 | 100.0 | 99.0 | 99.1 | 99.1 | 99.3 | 99.1 | 99.2 | 99.1 | 99.2 | 99.2 | 99.1 | 99.3 | 99.2 | 99.2 | 99.2 | 99.3 |
| 22 | 100.0 | 99.4 | 99.6 | 99.5 | 99.8 | 99.5 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 |
| 23 | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.3 | 99.4 | 99.7 | 99.5 | 99.5 | 99.6 |
| 24 | 100.0 | 99.4 | 99.4 | 99.4 | 99.6 | 99.6 | 99.4 | 99.7 | 99.7 | 99.4 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 25 | 100.0 | 99.1 | 99.1 | 99.2 | 99.3 | 99.3 | 99.2 | 99.3 | 99.4 | 99.3 | 99.3 | 99.3 | 99.4 | 99.2 | 99.3 | 99.3 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 |
| Med. | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| σ | 0.00 | 0.21 | 0.21 | 0.20 | 0.22 | 0.22 | 0.20 | 0.22 | 0.23 | 0.22 | 0.20 | 0.23 | 0.22 | 0.21 | 0.21 | 0.21 |
| Min. | 100.0 | 99.0 | 99.0 | 99.0 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 99.2 | 99.1 | 99.1 | 99.2 | 99.2 |
| Max. | 100.0 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 100.0 | 99.9 | 99.9 | 99.8 | 100.0 | 99.9 | 99.8 | 99.9 | 99.9 |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| 2 | 99.6 | 99.7 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 3 | 99.3 | 99.3 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| 4 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 5 | 99.8 | 99.7 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 6 | 99.3 | 99.3 | 99.4 | 99.4 | 99.5 | | | | | | | | | | | |
| 7 | 99.2 | 99.4 | 99.5 | 99.3 | 99.4 | | | | | | | | | | | |
| 8 | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | | | | | | | | | | | |
| 9 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 10 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 11 | 99.8 | 99.8 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |
| 12 | 99.3 | 99.3 | 99.5 | 99.4 | 99.5 | | | | | | | | | | | |
| 13 | 99.7 | 99.6 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 14 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 15 | 99.6 | 99.5 | 99.7 | 99.6 | 99.7 | | | | | | | | | | | |
| 16 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | |
| 17 | 99.1 | 99.2 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 18 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | | | | | | | | | | | |
| 19 | 99.5 | 99.4 | 99.5 | 99.4 | 99.5 | | | | | | | | | | | |
| 20 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 21 | 99.1 | 99.2 | 99.3 | 99.3 | 99.5 | | | | | | | | | | | |
| 22 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 23 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | |
| 24 | 99.5 | 99.5 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 25 | 99.3 | 99.3 | 99.4 | 99.5 | 99.4 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | |
| Med. | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | |
| σ | 0.22 | 0.20 | 0.20 | 0.22 | 0.21 | | | | | | | | | | | |
| Min. | 99.1 | 99.2 | 99.3 | 99.2 | 99.3 | | | | | | | | | | | |
| Max. | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | | | | | | | | | | | |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 2 | 0.0000 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | 0.0015 |
| 3 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 4 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0012 |
| 5 | 0.0000 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 6 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 7 | 0.0000 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | 0.0015 |
| 8 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |
| 9 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0014 |
| 10 | 0.0000 | 0.0010 | 0.0009 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 |
| 11 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 |
| 12 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0013 | 0.0012 | 0.0011 |
| 13 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 14 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0014 | 0.0015 | 0.0014 |
| 15 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0014 | 0.0015 |
| 16 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0014 | 0.0013 | 0.0014 |
| 17 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0012 | 0.0011 |
| 18 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0013 | 0.0013 | 0.0014 |
| 19 | 0.0000 | 0.0008 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | 0.0015 |
| 20 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 21 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 22 | 0.0000 | 0.0009 | 0.0010 | 0.0009 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| 23 | 0.0000 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 |
| 24 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0012 |
| 25 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0013 | 0.0015 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0014 |
| Med. | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | 0.0011 |
| Max. | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 2 | 0.0016 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | | | | | | | | | | | |
| 3 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 4 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 5 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 6 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 7 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 8 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |
| 9 | 0.0014 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 10 | 0.0015 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 11 | 0.0012 | 0.0011 | 0.0009 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 12 | 0.0013 | 0.0011 | 0.0011 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 13 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 14 | 0.0014 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 15 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 16 | 0.0014 | 0.0013 | 0.0010 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 17 | 0.0012 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 18 | 0.0014 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 19 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 20 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 21 | 0.0014 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 22 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 23 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 24 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 25 | 0.0015 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | | | | | | | | | | | |
| Med. | 0.0015 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0012 | 0.0010 | 0.0009 | 0.0012 | 0.0013 | | | | | | | | | | | |
| Max. | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2586 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | 0.2575 | 0.2574 | 0.2572 | 0.2572 | 0.2572 |
| 2 | 0.2600 | 0.2591 | 0.2591 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2587 | 0.2587 | 0.2588 | 0.2588 | 0.2585 | 0.2585 | 0.2585 |
| 3 | 0.2588 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2576 | 0.2573 | 0.2574 | 0.2573 |
| 4 | 0.2590 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2580 | 0.2580 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2579 |
| 5 | 0.2616 | 0.2606 | 0.2606 | 0.2606 | 0.2605 | 0.2604 | 0.2606 | 0.2605 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2605 | 0.2603 | 0.2602 | 0.2601 |
| 6 | 0.2600 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2586 |
| 7 | 0.2587 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2573 | 0.2572 | 0.2571 |
| 8 | 0.2591 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2576 | 0.2575 | 0.2575 |
| 9 | 0.2584 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2570 |
| 10 | 0.2589 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2575 | 0.2575 | 0.2575 |
| 11 | 0.2619 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2608 | 0.2608 | 0.2608 |
| 12 | 0.2586 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2578 | 0.2577 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2577 | 0.2577 | 0.2574 | 0.2574 | 0.2575 |
| 13 | 0.2598 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 |
| 14 | 0.2605 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2593 | 0.2593 | 0.2592 | 0.2593 | 0.2593 | 0.2591 | 0.2590 | 0.2591 |
| 15 | 0.2593 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2578 | 0.2578 | 0.2578 |
| 16 | 0.2597 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2583 | 0.2583 | 0.2583 |
| 17 | 0.2633 | 0.2625 | 0.2624 | 0.2623 | 0.2624 | 0.2624 | 0.2623 | 0.2623 | 0.2623 | 0.2623 | 0.2623 | 0.2624 | 0.2623 | 0.2622 | 0.2621 | 0.2622 |
| 18 | 0.2596 | 0.2587 | 0.2587 | 0.2585 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2582 | 0.2583 | 0.2581 |
| 19 | 0.2584 | 0.2575 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2573 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2568 |
| 20 | 0.2587 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2573 | 0.2573 | 0.2572 |
| 21 | 0.2592 | 0.2583 | 0.2582 | 0.2581 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | 0.2578 |
| 22 | 0.2595 | 0.2587 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | 0.2581 |
| 23 | 0.2612 | 0.2602 | 0.2602 | 0.2602 | 0.2600 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2598 | 0.2598 |
| 24 | 0.2592 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2579 | 0.2579 |
| 25 | 0.2605 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2594 | 0.2593 | 0.2591 | 0.2592 | 0.2591 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2597 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2584 | 0.2583 | 0.2583 |
| Med. | 0.2593 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2579 | 0.2579 |
| σ | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| Min. | 0.2584 | 0.2575 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2573 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2568 |
| Max. | 0.2633 | 0.2625 | 0.2624 | 0.2623 | 0.2624 | 0.2624 | 0.2623 | 0.2623 | 0.2623 | 0.2623 | 0.2623 | 0.2624 | 0.2623 | 0.2622 | 0.2621 | 0.2622 |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2571 | 0.2572 | 0.2572 | 0.2571 | 0.2570 | | | | | | | | | | | |
| 2 | 0.2584 | 0.2586 | 0.2585 | 0.2583 | 0.2582 | | | | | | | | | | | |
| 3 | 0.2572 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | | | | | | | | | | | |
| 4 | 0.2578 | 0.2579 | 0.2579 | 0.2577 | 0.2576 | | | | | | | | | | | |
| 5 | 0.2602 | 0.2603 | 0.2604 | 0.2602 | 0.2601 | | | | | | | | | | | |
| 6 | 0.2585 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | | | | | | | | | | | |
| 7 | 0.2571 | 0.2572 | 0.2572 | 0.2570 | 0.2569 | | | | | | | | | | | |
| 8 | 0.2574 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | | | | | | | | | | | |
| 9 | 0.2570 | 0.2572 | 0.2572 | 0.2569 | 0.2569 | | | | | | | | | | | |
| 10 | 0.2574 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 11 | 0.2607 | 0.2608 | 0.2610 | 0.2607 | 0.2606 | | | | | | | | | | | |
| 12 | 0.2574 | 0.2575 | 0.2575 | 0.2572 | 0.2573 | | | | | | | | | | | |
| 13 | 0.2583 | 0.2584 | 0.2583 | 0.2581 | 0.2582 | | | | | | | | | | | |
| 14 | 0.2590 | 0.2592 | 0.2592 | 0.2589 | 0.2590 | | | | | | | | | | | |
| 15 | 0.2578 | 0.2579 | 0.2578 | 0.2577 | 0.2576 | | | | | | | | | | | |
| 16 | 0.2583 | 0.2584 | 0.2587 | 0.2583 | 0.2583 | | | | | | | | | | | |
| 17 | 0.2621 | 0.2623 | 0.2622 | 0.2620 | 0.2620 | | | | | | | | | | | |
| 18 | 0.2582 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 19 | 0.2568 | 0.2569 | 0.2570 | 0.2568 | 0.2567 | | | | | | | | | | | |
| 20 | 0.2573 | 0.2574 | 0.2573 | 0.2571 | 0.2571 | | | | | | | | | | | |
| 21 | 0.2578 | 0.2580 | 0.2579 | 0.2577 | 0.2577 | | | | | | | | | | | |
| 22 | 0.2579 | 0.2581 | 0.2582 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 23 | 0.2597 | 0.2598 | 0.2599 | 0.2597 | 0.2597 | | | | | | | | | | | |
| 24 | 0.2579 | 0.2579 | 0.2580 | 0.2578 | 0.2578 | | | | | | | | | | | |
| 25 | 0.2590 | 0.2592 | 0.2591 | 0.2590 | 0.2590 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2581 | | | | | | | | | | | |
| Med. | 0.2579 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | | | | | | | | | | | |
| σ | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | | | | | | | | | | | |
| Min. | 0.2568 | 0.2569 | 0.2570 | 0.2568 | 0.2567 | | | | | | | | | | | |
| Max. | 0.2621 | 0.2623 | 0.2622 | 0.2620 | 0.2620 | | | | | | | | | | | |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 4-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5263 | 0.5261 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 |
| 2 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5268 | 0.5269 | 0.5269 |
| 3 | 0.5274 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5272 |
| 4 | 0.5258 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5258 | 0.5258 |
| 5 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5292 |
| 6 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5260 |
| 7 | 0.5263 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5262 |
| 8 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 |
| 9 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5267 | 0.5266 |
| 10 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5269 |
| 11 | 0.5287 | 0.5287 | 0.5286 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5287 |
| 12 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 |
| 13 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5280 |
| 14 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5281 | 0.5281 |
| 15 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| 16 | 0.5293 | 0.5292 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5293 | 0.5293 |
| 17 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5299 | 0.5300 | 0.5299 | 0.5299 | 0.5299 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 |
| 18 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5278 | 0.5279 | 0.5279 | 0.5279 |
| 19 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 |
| 20 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 |
| 21 | 0.5281 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 |
| 22 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 |
| 23 | 0.5298 | 0.5297 | 0.5297 | 0.5298 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5296 | 0.5297 | 0.5297 | 0.5297 |
| 24 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5281 | 0.5282 | 0.5282 |
| 25 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 |
| Med. | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 |
| σ | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| Min. | 0.5258 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5258 | 0.5258 |
| Max. | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5299 | 0.5300 | 0.5299 | 0.5299 | 0.5299 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 |

## Data Set 4 : 55 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 56.1 °C |
| Actual Ambient Temperature [$T_A$] | 55.0 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

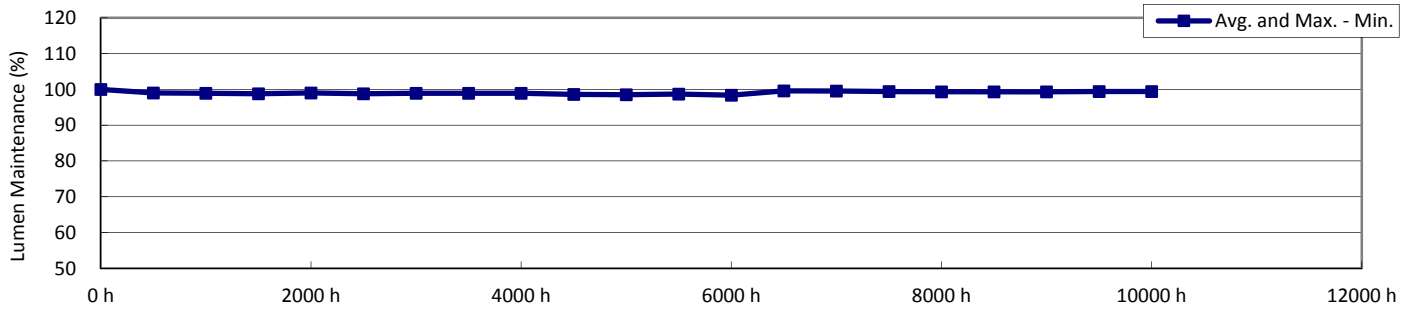
**TABLE 4-6 (Continued)**
Chromaticity

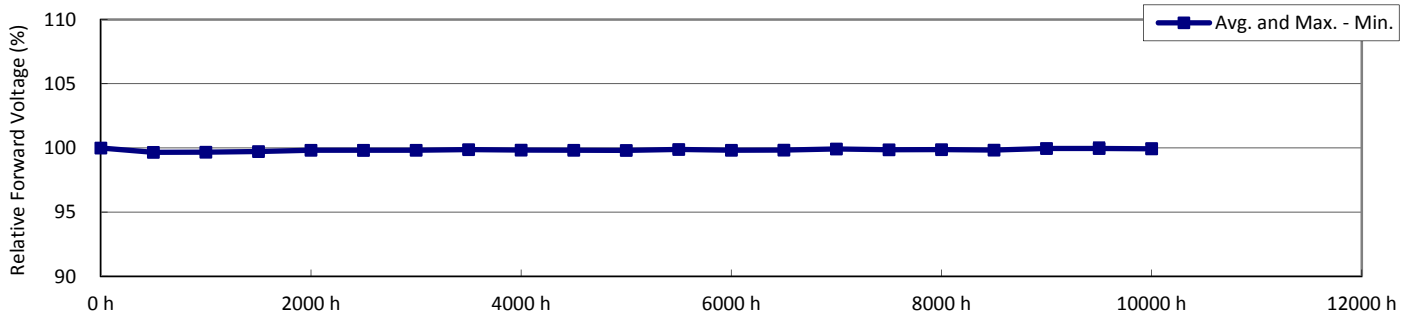
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5262 | 0.5262 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| 2 | 0.5269 | 0.5270 | 0.5271 | 0.5269 | 0.5270 | | | | | | | | | | | |
| 3 | 0.5272 | 0.5273 | 0.5274 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 4 | 0.5259 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | | | | | | | | | | | |
| 5 | 0.5292 | 0.5292 | 0.5293 | 0.5291 | 0.5292 | | | | | | | | | | | |
| 6 | 0.5259 | 0.5260 | 0.5261 | 0.5259 | 0.5260 | | | | | | | | | | | |
| 7 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| 8 | 0.5259 | 0.5260 | 0.5261 | 0.5259 | 0.5260 | | | | | | | | | | | |
| 9 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 10 | 0.5269 | 0.5270 | 0.5271 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 11 | 0.5287 | 0.5287 | 0.5288 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 12 | 0.5269 | 0.5269 | 0.5270 | 0.5268 | 0.5269 | | | | | | | | | | | |
| 13 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 14 | 0.5281 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | | | | | | | | | | | |
| 15 | 0.5275 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 16 | 0.5293 | 0.5294 | 0.5296 | 0.5293 | 0.5295 | | | | | | | | | | | |
| 17 | 0.5300 | 0.5301 | 0.5301 | 0.5300 | 0.5300 | | | | | | | | | | | |
| 18 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 19 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | | | | | | | | | | | |
| 20 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | | | | | | | | | | | |
| 21 | 0.5281 | 0.5281 | 0.5282 | 0.5280 | 0.5281 | | | | | | | | | | | |
| 22 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 23 | 0.5297 | 0.5298 | 0.5299 | 0.5298 | 0.5298 | | | | | | | | | | | |
| 24 | 0.5283 | 0.5283 | 0.5284 | 0.5282 | 0.5283 | | | | | | | | | | | |
| 25 | 0.5282 | 0.5283 | 0.5284 | 0.5282 | 0.5283 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5276 | 0.5276 | 0.5277 | 0.5275 | 0.5276 | | | | | | | | | | | |
| Med. | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| σ | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | | | | | | | | | | | |
| Min. | 0.5259 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | | | | | | | | | | | |
| Max. | 0.5300 | 0.5301 | 0.5301 | 0.5300 | 0.5300 | | | | | | | | | | | |

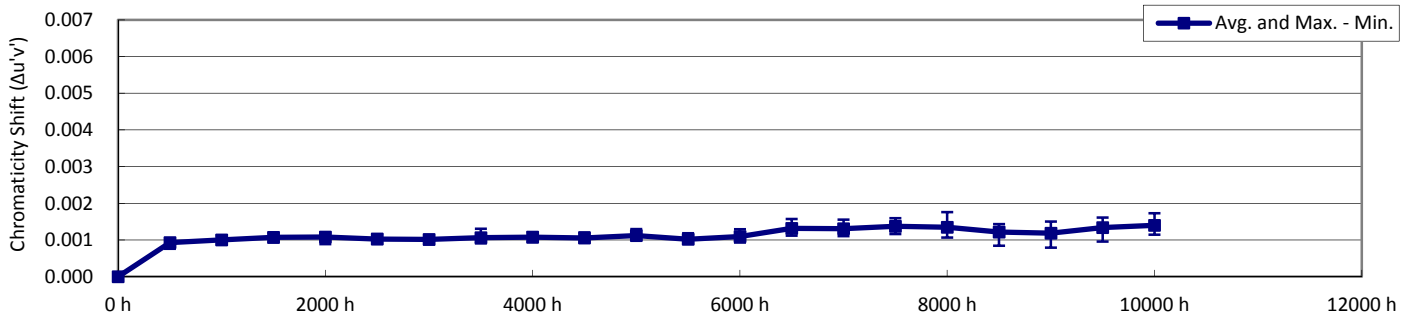
## Data Set 5 : 85 °C, 80 mA

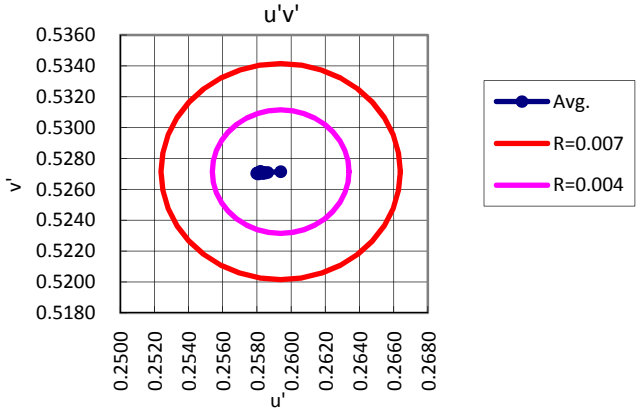
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-1**
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\Phi_V$ [lm] | $V_F$ [V] | $T_{CP}$ [K] | P [W] | x | y | u' | v' | | | | |
| 1 | 37.7 | 2.92 | 2749 | 0.23 | 0.459 | 0.416 | 0.260 | 0.529 | | | | |
| 2 | 37.5 | 2.92 | 2747 | 0.23 | 0.457 | 0.412 | 0.260 | 0.527 | | | | |
| 3 | 37.4 | 2.92 | 2771 | 0.23 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 4 | 37.4 | 2.93 | 2759 | 0.23 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 5 | 37.6 | 2.92 | 2780 | 0.23 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 6 | 37.6 | 2.92 | 2741 | 0.23 | 0.459 | 0.414 | 0.260 | 0.528 | | | | |
| 7 | 37.5 | 2.93 | 2760 | 0.23 | 0.455 | 0.409 | 0.260 | 0.526 | | | | |
| 8 | 37.5 | 2.92 | 2781 | 0.23 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 9 | 37.6 | 2.92 | 2744 | 0.23 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 10 | 37.5 | 2.91 | 2784 | 0.23 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 11 | 37.5 | 2.92 | 2775 | 0.23 | 0.454 | 0.409 | 0.259 | 0.526 | | | | |
| 12 | 37.7 | 2.92 | 2748 | 0.23 | 0.459 | 0.415 | 0.260 | 0.529 | | | | |
| 13 | 37.6 | 2.92 | 2761 | 0.23 | 0.455 | 0.409 | 0.260 | 0.526 | | | | |
| 14 | 37.6 | 2.92 | 2787 | 0.23 | 0.455 | 0.413 | 0.258 | 0.527 | | | | |
| 15 | 37.7 | 2.92 | 2779 | 0.23 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 16 | 37.6 | 2.92 | 2770 | 0.23 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 17 | 37.4 | 2.91 | 2791 | 0.23 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 18 | 37.5 | 2.92 | 2761 | 0.23 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 19 | 37.5 | 2.92 | 2786 | 0.23 | 0.455 | 0.413 | 0.258 | 0.527 | | | | |
| 20 | 37.4 | 2.92 | 2748 | 0.23 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 21 | 37.5 | 2.91 | 2739 | 0.23 | 0.460 | 0.415 | 0.260 | 0.529 | | | | |
| 22 | 37.5 | 2.93 | 2749 | 0.23 | 0.457 | 0.411 | 0.260 | 0.527 | | | | |
| 23 | 37.5 | 2.93 | 2771 | 0.23 | 0.455 | 0.410 | 0.259 | 0.526 | | | | |
| 24 | 37.4 | 2.92 | 2750 | 0.23 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 25 | 37.7 | 2.93 | 2774 | 0.23 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 37.5 | 2.92 | 2764 | 0.23 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| Med. | 37.5 | 2.92 | 2761 | 0.23 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| σ | 0.09 | 0.005 | 16.2 | 0.000 | 0.0020 | 0.0023 | 0.0007 | 0.0012 | | | | |
| Min. | 37.4 | 2.91 | 2739 | 0.23 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 37.7 | 2.93 | 2791 | 0.23 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.1 | 99.0 | 99.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.9 | 98.6 | 98.5 | 98.7 | 98.4 | 99.6 | 99.4 | 99.4 |
| 2 | 100.0 | 99.0 | 98.9 | 98.8 | 98.8 | 98.8 | 98.7 | 98.7 | 98.7 | 98.4 | 98.4 | 98.5 | 98.2 | 99.4 | 99.2 | 99.1 |
| 3 | 100.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.8 | 98.9 | 98.8 | 98.8 | 98.6 | 98.5 | 98.7 | 98.4 | 99.6 | 99.5 | 99.5 |
| 4 | 100.0 | 99.2 | 99.0 | 99.0 | 99.1 | 99.0 | 98.9 | 99.1 | 99.0 | 98.7 | 98.6 | 98.8 | 98.5 | 99.7 | 99.6 | 99.6 |
| 5 | 100.0 | 99.0 | 99.0 | 99.0 | 99.0 | 98.8 | 98.8 | 99.1 | 98.9 | 98.6 | 98.4 | 98.6 | 98.3 | 99.7 | 99.6 | 99.6 |
| 6 | 100.0 | 99.1 | 99.0 | 98.9 | 99.0 | 98.9 | 98.9 | 98.9 | 98.9 | 98.7 | 98.6 | 98.7 | 98.5 | 99.7 | 99.5 | 99.4 |
| 7 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.8 | 98.9 | 98.9 | 98.9 | 98.6 | 98.5 | 98.6 | 98.4 | 99.5 | 99.6 | 99.3 |
| 8 | 100.0 | 99.0 | 98.8 | 98.8 | 99.0 | 98.9 | 99.1 | 99.0 | 99.0 | 98.7 | 98.6 | 98.8 | 98.5 | 99.7 | 99.7 | 99.5 |
| 9 | 100.0 | 98.9 | 98.8 | 98.7 | 98.9 | 98.8 | 98.9 | 98.9 | 98.8 | 98.6 | 98.6 | 98.7 | 98.5 | 99.7 | 99.7 | 99.5 |
| 10 | 100.0 | 98.9 | 98.7 | 98.6 | 98.9 | 98.7 | 98.8 | 98.7 | 98.8 | 98.5 | 98.4 | 98.5 | 98.3 | 99.3 | 99.5 | 99.2 |
| 11 | 100.0 | 98.9 | 98.9 | 98.7 | 99.1 | 98.8 | 98.9 | 98.9 | 98.9 | 98.7 | 98.3 | 98.5 | 98.4 | 99.4 | 99.7 | 99.3 |
| 12 | 100.0 | 98.9 | 98.8 | 98.7 | 98.8 | 98.7 | 98.8 | 98.8 | 98.8 | 98.6 | 98.4 | 98.5 | 98.4 | 99.5 | 99.5 | 99.3 |
| 13 | 100.0 | 98.9 | 98.9 | 98.7 | 98.9 | 98.8 | 98.8 | 98.7 | 98.7 | 98.5 | 98.5 | 98.5 | 98.3 | 99.4 | 99.5 | 99.2 |
| 14 | 100.0 | 99.0 | 98.9 | 98.8 | 99.0 | 98.9 | 98.8 | 99.0 | 98.9 | 98.7 | 98.6 | 98.7 | 98.4 | 99.6 | 99.6 | 99.4 |
| 15 | 100.0 | 99.0 | 98.9 | 98.7 | 99.0 | 98.8 | 98.7 | 98.7 | 98.7 | 98.5 | 98.5 | 98.5 | 98.3 | 99.6 | 99.6 | 99.4 |
| 16 | 100.0 | 99.0 | 99.0 | 98.9 | 99.2 | 99.1 | 99.0 | 99.1 | 99.0 | 98.9 | 98.8 | 98.9 | 98.6 | 99.8 | 99.9 | 99.7 |
| 17 | 100.0 | 98.9 | 99.2 | 98.9 | 99.1 | 98.9 | 99.0 | 98.9 | 98.9 | 98.7 | 98.6 | 98.7 | 98.4 | 99.6 | 99.6 | 99.3 |
| 18 | 100.0 | 98.9 | 98.8 | 98.7 | 98.9 | 98.7 | 98.8 | 98.9 | 98.8 | 98.6 | 98.6 | 98.6 | 98.4 | 99.6 | 99.5 | 99.4 |
| 19 | 100.0 | 99.2 | 99.0 | 99.0 | 99.1 | 98.9 | 99.0 | 99.0 | 98.9 | 98.8 | 98.7 | 98.8 | 98.6 | 99.8 | 99.7 | 99.6 |
| 20 | 100.0 | 99.0 | 98.8 | 98.7 | 98.9 | 98.6 | 98.7 | 98.7 | 98.6 | 98.4 | 98.4 | 98.4 | 98.1 | 99.3 | 99.2 | 99.1 |
| 21 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.8 | 98.8 | 98.8 | 98.7 | 98.6 | 98.5 | 98.6 | 98.3 | 99.5 | 99.5 | 99.3 |
| 22 | 100.0 | 99.1 | 99.0 | 98.8 | 98.9 | 98.6 | 98.7 | 98.7 | 98.7 | 98.5 | 98.4 | 98.6 | 98.3 | 99.5 | 99.5 | 99.3 |
| 23 | 100.0 | 99.2 | 99.2 | 98.9 | 99.1 | 99.0 | 99.0 | 99.1 | 99.2 | 98.8 | 98.7 | 98.9 | 98.5 | 99.8 | 99.7 | 99.5 |
| 24 | 100.0 | 99.0 | 98.9 | 98.8 | 99.0 | 98.8 | 98.8 | 98.8 | 98.8 | 98.6 | 98.5 | 98.6 | 98.3 | 99.6 | 99.5 | 99.4 |
| 25 | 100.0 | 99.1 | 99.0 | 99.0 | 99.1 | 99.0 | 99.1 | 99.1 | 99.0 | 98.7 | 98.8 | 98.9 | 98.6 | 99.9 | 99.8 | 99.6 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.0 | 98.9 | 98.8 | 99.0 | 98.8 | 98.9 | 98.9 | 98.9 | 98.6 | 98.5 | 98.7 | 98.4 | 99.6 | 99.6 | 99.4 |
| Med. | 100.0 | 99.0 | 98.9 | 98.8 | 99.0 | 98.8 | 98.8 | 98.9 | 98.9 | 98.6 | 98.5 | 98.6 | 98.4 | 99.6 | 99.6 | 99.4 |
| σ | 0.00 | 0.10 | 0.12 | 0.12 | 0.10 | 0.12 | 0.12 | 0.15 | 0.13 | 0.12 | 0.13 | 0.14 | 0.12 | 0.16 | 0.16 | 0.16 |
| Min. | 100.0 | 98.9 | 98.7 | 98.6 | 98.8 | 98.6 | 98.7 | 98.7 | 98.6 | 98.4 | 98.3 | 98.4 | 98.1 | 99.3 | 99.2 | 99.1 |
| Max. | 100.0 | 99.2 | 99.2 | 99.0 | 99.2 | 99.1 | 99.1 | 99.1 | 99.2 | 98.9 | 98.8 | 98.9 | 98.6 | 99.9 | 99.9 | 99.7 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0151 | -0.0131 | -0.0162 | -0.0041 | -0.0044 | -0.0061 | -0.0067 | -0.0070 | -0.0070 | -0.0060 | -0.0060 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.979 | |
| α | -1.69E-06 | |
| $R^2$ | 0.427 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=B\exp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=\ln(B/0.7)/\alpha$

$L_{80}=\ln(B/0.8)/\alpha$

$L_{90}=\ln(B/0.9)/\alpha$

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.3 | 99.4 | 99.3 | 99.4 | 99.5 | | | | | | | | | | | |
| 2 | 99.0 | 99.2 | 99.1 | 99.2 | 99.3 | | | | | | | | | | | |
| 3 | 99.3 | 99.6 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 4 | 99.4 | 99.6 | 99.5 | 99.6 | 99.7 | | | | | | | | | | | |
| 5 | 99.2 | 98.9 | 99.0 | 99.2 | 99.0 | | | | | | | | | | | |
| 6 | 99.3 | 99.5 | 99.4 | 99.5 | 99.6 | | | | | | | | | | | |
| 7 | 99.4 | 99.5 | 99.4 | 99.5 | 99.4 | | | | | | | | | | | |
| 8 | 99.4 | 99.6 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 9 | 99.5 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 10 | 99.1 | 99.3 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 11 | 99.2 | 98.9 | 99.1 | 99.1 | 99.2 | | | | | | | | | | | |
| 12 | 99.3 | 99.3 | 99.4 | 99.4 | 99.3 | | | | | | | | | | | |
| 13 | 99.2 | 99.3 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 14 | 99.3 | 99.2 | 99.2 | 99.2 | 99.3 | | | | | | | | | | | |
| 15 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | | | | | | | | | | | |
| 16 | 99.7 | 99.6 | 99.6 | 99.7 | 99.8 | | | | | | | | | | | |
| 17 | 99.5 | 98.9 | 99.1 | 99.0 | 99.1 | | | | | | | | | | | |
| 18 | 99.4 | 99.3 | 99.4 | 99.4 | 99.3 | | | | | | | | | | | |
| 19 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | |
| 20 | 99.0 | 99.0 | 99.1 | 99.2 | 99.1 | | | | | | | | | | | |
| 21 | 99.3 | 99.4 | 99.3 | 99.5 | 99.4 | | | | | | | | | | | |
| 22 | 99.2 | 99.1 | 99.2 | 99.3 | 99.3 | | | | | | | | | | | |
| 23 | 99.4 | 99.2 | 99.4 | 99.5 | 99.5 | | | | | | | | | | | |
| 24 | 99.3 | 99.3 | 99.3 | 99.4 | 99.3 | | | | | | | | | | | |
| 25 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.3 | 99.3 | 99.3 | 99.4 | 99.4 | | | | | | | | | | | |
| Med. | 99.3 | 99.3 | 99.4 | 99.4 | 99.4 | | | | | | | | | | | |
| σ | 0.17 | 0.24 | 0.18 | 0.20 | 0.21 | | | | | | | | | | | |
| Min. | 99.0 | 98.9 | 99.0 | 99.0 | 99.0 | | | | | | | | | | | |
| Max. | 99.7 | 99.6 | 99.7 | 99.7 | 99.8 | | | | | | | | | | | |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.7 | 99.9 | 99.9 | 100.0 | 100.2 | 100.2 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.0 |
| 2 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 | 99.9 | 100.0 | 100.0 |
| 3 | 100.0 | 99.5 | 99.5 | 99.5 | 99.7 | 99.4 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 |
| 4 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.9 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 |
| 5 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.6 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| 6 | 100.0 | 99.7 | 99.7 | 99.7 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 |
| 7 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.9 | 99.7 |
| 8 | 100.0 | 99.7 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 100.0 | 99.8 | 99.7 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 |
| 9 | 100.0 | 99.6 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.7 | 99.9 | 100.0 | 99.9 |
| 10 | 100.0 | 99.8 | 99.7 | 99.8 | 99.9 | 99.9 | 99.8 | 100.1 | 100.0 | 99.8 | 99.9 | 100.0 | 99.9 | 99.8 | 99.9 | 99.8 |
| 11 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.7 | 99.6 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.9 | 99.7 |
| 12 | 100.0 | 99.8 | 99.7 | 99.8 | 100.0 | 100.1 | 99.8 | 100.0 | 99.9 | 100.1 | 100.0 | 100.2 | 100.0 | 100.1 | 100.2 | 100.2 |
| 13 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.9 | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 14 | 100.0 | 99.7 | 99.7 | 99.7 | 99.9 | 99.8 | 99.8 | 100.1 | 99.9 | 99.8 | 99.8 | 99.9 | 99.7 | 99.9 | 100.1 | 99.8 |
| 15 | 100.0 | 99.7 | 99.7 | 99.8 | 100.0 | 100.0 | 99.9 | 100.2 | 99.8 | 99.9 | 100.0 | 100.1 | 99.9 | 100.0 | 100.2 | 100.0 |
| 16 | 100.0 | 99.7 | 99.8 | 99.8 | 99.9 | 100.0 | 99.9 | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 100.1 | 99.9 |
| 17 | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.6 | 99.7 | 99.9 | 99.9 |
| 18 | 100.0 | 99.9 | 99.9 | 100.0 | 100.2 | 100.0 | 100.0 | 100.0 | 100.2 | 100.0 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 |
| 19 | 100.0 | 99.5 | 99.5 | 99.5 | 99.7 | 99.7 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 |
| 20 | 100.0 | 99.8 | 99.8 | 99.8 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 21 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 |
| 22 | 100.0 | 99.6 | 99.6 | 99.5 | 99.8 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 |
| 23 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.9 | 99.7 |
| 24 | 100.0 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 100.0 | 99.9 | 100.1 | 100.0 |
| 25 | 100.0 | 99.5 | 99.5 | 99.6 | 99.7 | 99.7 | 99.5 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.5 | 99.6 | 99.8 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| Med. | 100.0 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| σ | 0.00 | 0.11 | 0.12 | 0.12 | 0.13 | 0.16 | 0.15 | 0.17 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.14 | 0.17 | 0.14 |
| Min. | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.4 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| Max. | 100.0 | 99.9 | 99.9 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.2 | | | | | | | | | | | |
| 2 | 99.9 | 100.0 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| 3 | 99.6 | 99.6 | 99.8 | 99.7 | 99.6 | | | | | | | | | | | |
| 4 | 99.7 | 99.7 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 5 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 6 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | |
| 7 | 99.8 | 99.7 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 8 | 99.8 | 99.9 | 100.0 | 100.0 | 99.8 | | | | | | | | | | | |
| 9 | 99.9 | 100.0 | 100.1 | 100.1 | 100.0 | | | | | | | | | | | |
| 10 | 99.9 | 99.8 | 99.8 | 99.8 | 100.0 | | | | | | | | | | | |
| 11 | 99.9 | 99.7 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 12 | 100.2 | 100.1 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | |
| 13 | 99.8 | 100.0 | 99.9 | 99.9 | 100.0 | | | | | | | | | | | |
| 14 | 100.0 | 99.9 | 100.1 | 100.0 | 99.9 | | | | | | | | | | | |
| 15 | 100.1 | 99.9 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | |
| 16 | 100.0 | 99.8 | 100.1 | 100.1 | 100.0 | | | | | | | | | | | |
| 17 | 99.9 | 99.7 | 100.0 | 99.9 | 99.9 | | | | | | | | | | | |
| 18 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | |
| 19 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| 20 | 99.8 | 99.8 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | |
| 21 | 99.7 | 99.7 | 99.9 | 99.7 | 99.7 | | | | | | | | | | | |
| 22 | 99.6 | 99.6 | 99.8 | 99.7 | 99.8 | | | | | | | | | | | |
| 23 | 100.0 | 99.7 | 100.0 | 100.1 | 99.8 | | | | | | | | | | | |
| 24 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | |
| 25 | 99.7 | 99.6 | 99.8 | 99.9 | 99.6 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | | | | | | | | | | | |
| Med. | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | | | | | | | | | | | |
| σ | 0.16 | 0.17 | 0.16 | 0.18 | 0.20 | | | | | | | | | | | |
| Min. | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | |
| Max. | 100.2 | 100.1 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0012 | 0.0011 | 0.0014 |
| 2 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0016 | 0.0015 | 0.0016 |
| 3 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0013 |
| 4 | 0.0000 | 0.0010 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0014 |
| 5 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0016 | 0.0014 | 0.0016 |
| 6 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0013 | 0.0012 | 0.0013 |
| 7 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 8 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 |
| 9 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | 0.0012 |
| 10 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0010 | 0.0012 | 0.0013 | 0.0013 | 0.0014 |
| 11 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | 0.0014 |
| 12 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0013 | 0.0014 |
| 13 | 0.0000 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0015 | 0.0014 | 0.0014 |
| 14 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0013 | 0.0013 | 0.0013 |
| 15 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0012 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0009 | 0.0010 | 0.0013 | 0.0013 | 0.0013 |
| 16 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0013 | 0.0013 | 0.0014 |
| 17 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0013 |
| 18 | 0.0000 | 0.0009 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0014 | 0.0014 | 0.0015 |
| 19 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0009 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| 20 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0015 |
| 21 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0009 | 0.0010 | 0.0013 | 0.0012 | 0.0014 |
| 22 | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0016 | 0.0014 |
| 23 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0013 |
| 24 | 0.0000 | 0.0009 | 0.0009 | 0.0009 | 0.0011 | 0.0009 | 0.0010 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0013 | 0.0013 | 0.0013 |
| 25 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0013 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| Med. | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0011 | 0.0011 | 0.0012 |
| Max. | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0013 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 2 | 0.0018 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 3 | 0.0013 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | | | | | | | | | | | |
| 4 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 5 | 0.0016 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 6 | 0.0013 | 0.0012 | 0.0011 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 7 | 0.0014 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 8 | 0.0013 | 0.0012 | 0.0011 | 0.0014 | 0.0013 | | | | | | | | | | | |
| 9 | 0.0011 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | | | | | | | | | | | |
| 10 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 11 | 0.0014 | 0.0013 | 0.0012 | 0.0013 | 0.0016 | | | | | | | | | | | |
| 12 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | | | | | | | | | | | |
| 13 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | | | | | | | | | | | |
| 14 | 0.0012 | 0.0008 | 0.0008 | 0.0010 | 0.0014 | | | | | | | | | | | |
| 15 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 16 | 0.0014 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 17 | 0.0012 | 0.0011 | 0.0010 | 0.0012 | 0.0013 | | | | | | | | | | | |
| 18 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | | | | | | | | | | | |
| 19 | 0.0014 | 0.0013 | 0.0011 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 20 | 0.0015 | 0.0014 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 21 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 22 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 23 | 0.0013 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | | | | | | | | | | | |
| 24 | 0.0014 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| 25 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| Med. | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0011 | 0.0008 | 0.0008 | 0.0010 | 0.0011 | | | | | | | | | | | |
| Max. | 0.0018 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | | | | | | | | | | | |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2602 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2593 | 0.2591 | 0.2589 | 0.2590 | 0.2588 |
| 2 | 0.2606 | 0.2597 | 0.2597 | 0.2595 | 0.2596 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2595 | 0.2593 | 0.2594 | 0.2593 | 0.2591 | 0.2592 | 0.2590 |
| 3 | 0.2595 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2583 | 0.2583 |
| 4 | 0.2606 | 0.2596 | 0.2596 | 0.2594 | 0.2595 | 0.2595 | 0.2596 | 0.2595 | 0.2595 | 0.2596 | 0.2595 | 0.2596 | 0.2595 | 0.2593 | 0.2594 | 0.2592 |
| 5 | 0.2618 | 0.2608 | 0.2607 | 0.2606 | 0.2606 | 0.2606 | 0.2607 | 0.2605 | 0.2606 | 0.2606 | 0.2605 | 0.2606 | 0.2605 | 0.2602 | 0.2603 | 0.2602 |
| 6 | 0.2613 | 0.2603 | 0.2603 | 0.2602 | 0.2603 | 0.2604 | 0.2604 | 0.2602 | 0.2603 | 0.2603 | 0.2602 | 0.2604 | 0.2603 | 0.2600 | 0.2601 | 0.2600 |
| 7 | 0.2602 | 0.2592 | 0.2592 | 0.2591 | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2590 | 0.2588 | 0.2588 | 0.2588 |
| 8 | 0.2593 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | 0.2582 | 0.2580 | 0.2579 | 0.2580 |
| 9 | 0.2602 | 0.2595 | 0.2594 | 0.2592 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2593 | 0.2593 | 0.2591 | 0.2591 | 0.2591 |
| 10 | 0.2596 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2582 |
| 11 | 0.2618 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2607 | 0.2606 | 0.2607 | 0.2606 | 0.2604 | 0.2603 | 0.2604 |
| 12 | 0.2606 | 0.2597 | 0.2596 | 0.2595 | 0.2596 | 0.2597 | 0.2596 | 0.2597 | 0.2596 | 0.2595 | 0.2596 | 0.2596 | 0.2596 | 0.2594 | 0.2593 | 0.2592 |
| 13 | 0.2604 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2592 | 0.2592 | 0.2590 | 0.2590 | 0.2590 |
| 14 | 0.2586 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2577 | 0.2575 | 0.2574 | 0.2573 | 0.2573 |
| 15 | 0.2589 | 0.2580 | 0.2579 | 0.2579 | 0.2577 | 0.2579 | 0.2579 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2580 | 0.2579 | 0.2576 | 0.2577 | 0.2576 |
| 16 | 0.2597 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2587 | 0.2587 | 0.2584 | 0.2584 | 0.2583 |
| 17 | 0.2609 | 0.2601 | 0.2600 | 0.2599 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2599 | 0.2599 | 0.2597 | 0.2597 | 0.2596 |
| 18 | 0.2604 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2593 | 0.2592 | 0.2593 | 0.2594 | 0.2592 | 0.2593 | 0.2593 | 0.2591 | 0.2590 | 0.2589 |
| 19 | 0.2588 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2577 | 0.2579 | 0.2577 | 0.2575 | 0.2575 | 0.2574 |
| 20 | 0.2603 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2592 | 0.2591 | 0.2592 | 0.2591 | 0.2589 | 0.2589 | 0.2588 |
| 21 | 0.2605 | 0.2597 | 0.2595 | 0.2595 | 0.2594 | 0.2595 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2595 | 0.2596 | 0.2595 | 0.2592 | 0.2593 | 0.2592 |
| 22 | 0.2609 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2595 | 0.2593 | 0.2594 |
| 23 | 0.2618 | 0.2608 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2607 | 0.2608 | 0.2608 | 0.2608 | 0.2608 | 0.2606 | 0.2605 | 0.2605 |
| 24 | 0.2609 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2598 | 0.2598 | 0.2599 | 0.2598 | 0.2596 | 0.2596 | 0.2595 |
| 25 | 0.2593 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2583 | 0.2580 | 0.2580 | 0.2580 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2603 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2593 | 0.2592 | 0.2590 | 0.2590 | 0.2589 |
| Med. | 0.2604 | 0.2595 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2593 | 0.2593 | 0.2591 | 0.2590 | 0.2590 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 |
| Min. | 0.2586 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2577 | 0.2575 | 0.2574 | 0.2573 | 0.2573 |
| Max. | 0.2618 | 0.2608 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2607 | 0.2608 | 0.2608 | 0.2608 | 0.2608 | 0.2606 | 0.2605 | 0.2605 |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2589 | 0.2591 | 0.2590 | 0.2588 | 0.2588 | | | | | | | | | | | |
| 2 | 0.2589 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | | | | | | | | | | | |
| 3 | 0.2582 | 0.2584 | 0.2584 | 0.2582 | 0.2583 | | | | | | | | | | | |
| 4 | 0.2593 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 5 | 0.2602 | 0.2604 | 0.2604 | 0.2603 | 0.2602 | | | | | | | | | | | |
| 6 | 0.2600 | 0.2601 | 0.2602 | 0.2599 | 0.2600 | | | | | | | | | | | |
| 7 | 0.2588 | 0.2589 | 0.2590 | 0.2588 | 0.2587 | | | | | | | | | | | |
| 8 | 0.2579 | 0.2580 | 0.2581 | 0.2578 | 0.2579 | | | | | | | | | | | |
| 9 | 0.2592 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | | | | | | | | | | | |
| 10 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | | | | | | | | | | | |
| 11 | 0.2604 | 0.2605 | 0.2606 | 0.2605 | 0.2602 | | | | | | | | | | | |
| 12 | 0.2593 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 13 | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | | | | | | | | | | | |
| 14 | 0.2574 | 0.2578 | 0.2578 | 0.2577 | 0.2572 | | | | | | | | | | | |
| 15 | 0.2576 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | | | | | | | | | | | |
| 16 | 0.2583 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | | | | | | | | | | | |
| 17 | 0.2597 | 0.2597 | 0.2599 | 0.2597 | 0.2596 | | | | | | | | | | | |
| 18 | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | | | | | | | | | | | |
| 19 | 0.2575 | 0.2575 | 0.2577 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 20 | 0.2588 | 0.2590 | 0.2590 | 0.2588 | 0.2588 | | | | | | | | | | | |
| 21 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2591 | | | | | | | | | | | |
| 22 | 0.2594 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | | | | | | | | | | | |
| 23 | 0.2605 | 0.2606 | 0.2607 | 0.2606 | 0.2604 | | | | | | | | | | | |
| 24 | 0.2595 | 0.2596 | 0.2597 | 0.2595 | 0.2595 | | | | | | | | | | | |
| 25 | 0.2581 | 0.2581 | 0.2582 | 0.2581 | 0.2580 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2589 | 0.2591 | 0.2591 | 0.2589 | 0.2589 | | | | | | | | | | | |
| Med. | 0.2590 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | | | | | | | | | | | |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | | | | | | | | | | | |
| Min. | 0.2574 | 0.2575 | 0.2577 | 0.2575 | 0.2572 | | | | | | | | | | | |
| Max. | 0.2605 | 0.2606 | 0.2607 | 0.2606 | 0.2604 | | | | | | | | | | | |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 5-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | 0.5289 |
| 2 | 0.5272 | 0.5271 | 0.5271 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | 0.5271 |
| 3 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 |
| 4 | 0.5271 | 0.5269 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5269 | 0.5271 | 0.5270 | 0.5270 | 0.5270 |
| 5 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5272 |
| 6 | 0.5285 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 |
| 7 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 |
| 8 | 0.5257 | 0.5255 | 0.5256 | 0.5256 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5256 |
| 9 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | 0.5296 | 0.5296 |
| 10 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5261 | 0.5260 | 0.5259 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5260 | 0.5260 |
| 11 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5268 |
| 12 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5288 | 0.5289 | 0.5289 |
| 13 | 0.5256 | 0.5255 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5256 | 0.5256 |
| 14 | 0.5274 | 0.5272 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5273 |
| 15 | 0.5277 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| 16 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 |
| 17 | 0.5275 | 0.5274 | 0.5275 | 0.5276 | 0.5275 | 0.5274 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| 18 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5266 | 0.5267 | 0.5267 |
| 19 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5272 |
| 20 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5280 | 0.5281 | 0.5280 |
| 21 | 0.5291 | 0.5290 | 0.5290 | 0.5291 | 0.5291 | 0.5291 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5290 |
| 22 | 0.5272 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 |
| 23 | 0.5273 | 0.5273 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5274 | 0.5272 | 0.5273 | 0.5273 |
| 24 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5268 | 0.5269 | 0.5269 |
| 25 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 |
| Med. | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.5256 | 0.5255 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5256 | 0.5256 |
| Max. | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | 0.5296 | 0.5296 |

## Data Set 5 : 85 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.5 °C |
| Actual Ambient Temperature [$T_A$] | 84.3 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

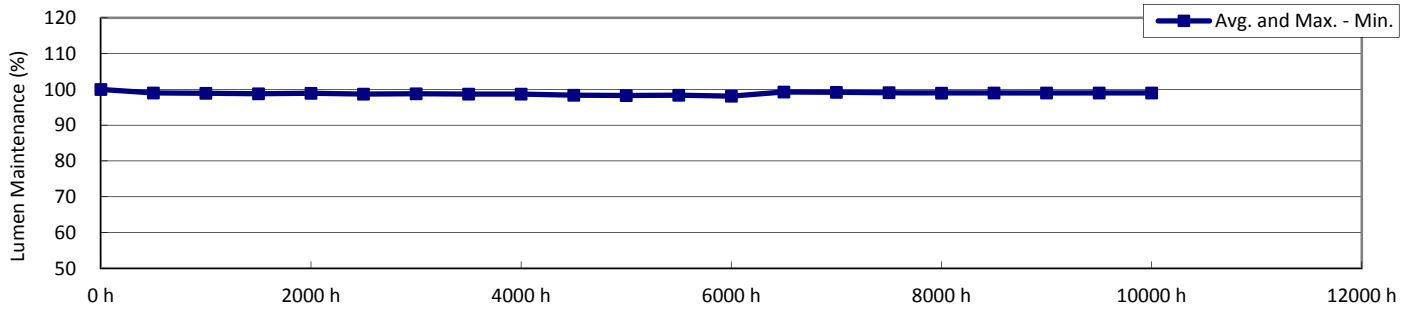
**TABLE 5-6 (Continued)**
Chromaticity

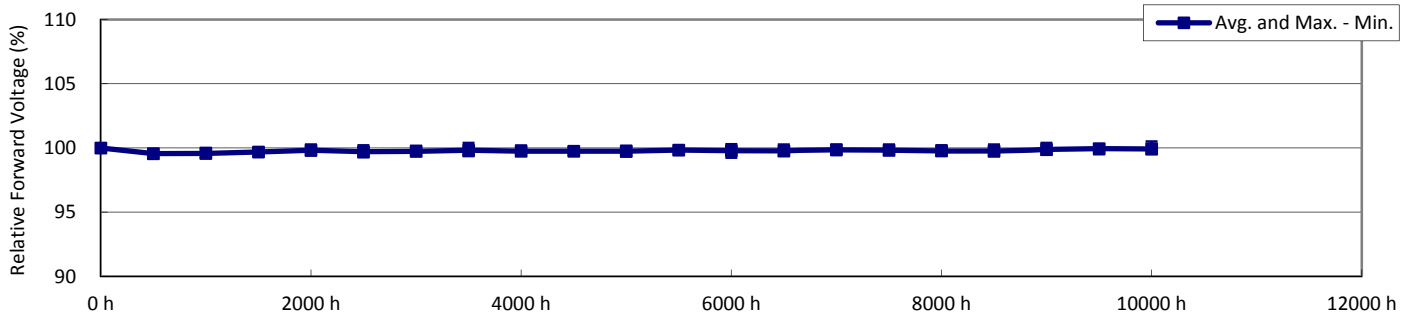
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5289 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | | | | | | | | | | | |
| 2 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 3 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 4 | 0.5270 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 5 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5272 | | | | | | | | | | | |
| 6 | 0.5284 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | | | | | | | | | | | |
| 7 | 0.5256 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | | | | | | | | | | | |
| 8 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5256 | | | | | | | | | | | |
| 9 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |
| 10 | 0.5260 | 0.5260 | 0.5261 | 0.5259 | 0.5259 | | | | | | | | | | | |
| 11 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 12 | 0.5289 | 0.5289 | 0.5290 | 0.5289 | 0.5289 | | | | | | | | | | | |
| 13 | 0.5256 | 0.5256 | 0.5257 | 0.5255 | 0.5255 | | | | | | | | | | | |
| 14 | 0.5273 | 0.5275 | 0.5276 | 0.5275 | 0.5273 | | | | | | | | | | | |
| 15 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 16 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 17 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | | | | | | | | | | | |
| 18 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 19 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 20 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | | | | | | | | | | | |
| 21 | 0.5290 | 0.5290 | 0.5291 | 0.5289 | 0.5289 | | | | | | | | | | | |
| 22 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 23 | 0.5273 | 0.5273 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| 24 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 25 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5275 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5274 | 0.5274 | 0.5275 | 0.5274 | 0.5273 | | | | | | | | | | | |
| Med. | 0.5273 | 0.5273 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.5256 | 0.5256 | 0.5257 | 0.5255 | 0.5255 | | | | | | | | | | | |
| Max. | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |

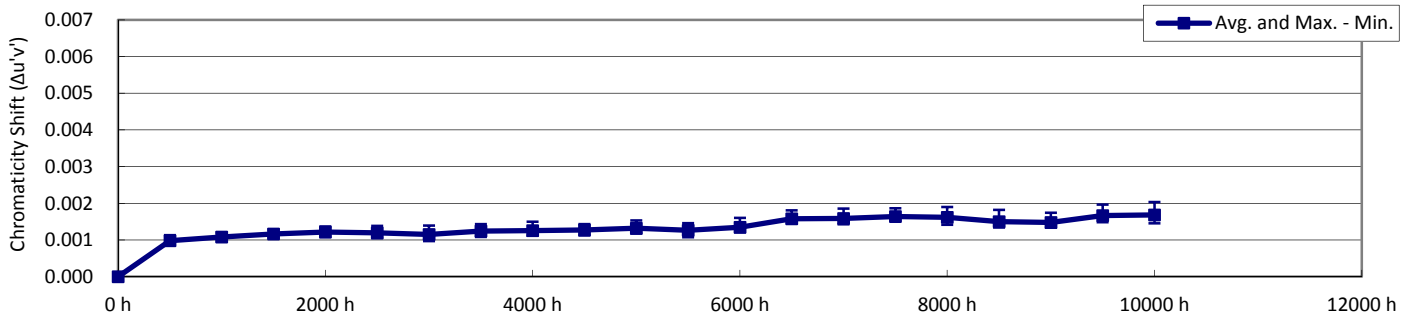
## Data Set 6 : 85 °C, 125 mA

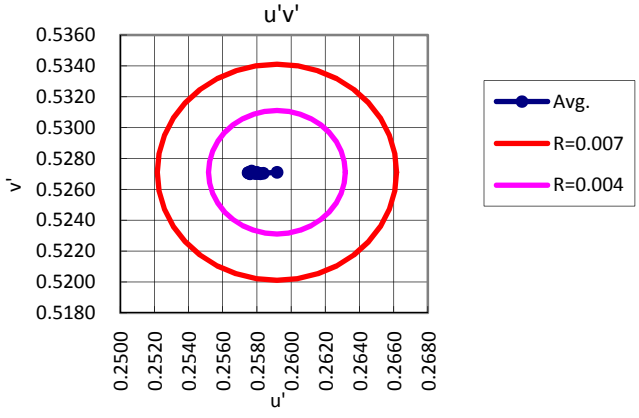
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-1**
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\Phi_V$ [lm] | $V_F$ [V] | $T_{CP}$ [K] | P [W] | x | y | u' | v' | | | | |
| 1 | 56.4 | 3.06 | 2768 | 0.38 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 2 | 56.3 | 3.07 | 2785 | 0.38 | 0.453 | 0.408 | 0.259 | 0.525 | | | | |
| 3 | 56.5 | 3.07 | 2789 | 0.38 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 4 | 56.8 | 3.06 | 2773 | 0.38 | 0.457 | 0.415 | 0.259 | 0.528 | | | | |
| 5 | 56.3 | 3.07 | 2779 | 0.38 | 0.454 | 0.409 | 0.259 | 0.526 | | | | |
| 6 | 56.7 | 3.07 | 2779 | 0.38 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 7 | 56.2 | 3.07 | 2771 | 0.38 | 0.454 | 0.409 | 0.259 | 0.526 | | | | |
| 8 | 56.5 | 3.07 | 2780 | 0.38 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 9 | 56.6 | 3.07 | 2780 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 10 | 56.7 | 3.07 | 2763 | 0.38 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 11 | 56.6 | 3.07 | 2753 | 0.38 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |
| 12 | 55.0 | 3.07 | 2707 | 0.38 | 0.459 | 0.410 | 0.262 | 0.527 | | | | |
| 13 | 56.5 | 3.07 | 2756 | 0.38 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |
| 14 | 56.3 | 3.06 | 2786 | 0.38 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 15 | 56.6 | 3.07 | 2778 | 0.38 | 0.453 | 0.408 | 0.259 | 0.525 | | | | |
| 16 | 56.0 | 3.07 | 2785 | 0.38 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 17 | 56.7 | 3.07 | 2788 | 0.38 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 18 | 56.3 | 3.07 | 2762 | 0.38 | 0.455 | 0.410 | 0.260 | 0.526 | | | | |
| 19 | 56.4 | 3.07 | 2781 | 0.38 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 20 | 56.4 | 3.06 | 2779 | 0.38 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 21 | 56.3 | 3.07 | 2775 | 0.38 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 22 | 56.4 | 3.06 | 2758 | 0.38 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 23 | 56.6 | 3.07 | 2783 | 0.38 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 24 | 56.6 | 3.06 | 2777 | 0.38 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 25 | 56.5 | 3.06 | 2763 | 0.38 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 56.4 | 3.07 | 2772 | 0.38 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| Med. | 56.5 | 3.07 | 2778 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| σ | 0.34 | 0.004 | 17.0 | 0.001 | 0.0016 | 0.0021 | 0.0008 | 0.0010 | | | | |
| Min. | 55.0 | 3.06 | 2707 | 0.38 | 0.453 | 0.408 | 0.258 | 0.525 | | | | |
| Max. | 56.8 | 3.07 | 2789 | 0.38 | 0.459 | 0.415 | 0.262 | 0.529 | | | | |

# Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.0 | 98.8 | 98.7 | 98.8 | 98.6 | 98.7 | 98.6 | 98.6 | 98.4 | 98.3 | 98.3 | 98.1 | 99.1 | 99.0 | 98.9 |
| 2 | 100.0 | 99.0 | 98.7 | 98.6 | 98.7 | 98.5 | 98.6 | 98.5 | 98.4 | 98.2 | 98.1 | 98.2 | 97.7 | 98.9 | 98.8 | 98.8 |
| 3 | 100.0 | 99.2 | 99.1 | 99.0 | 99.1 | 98.9 | 99.0 | 98.9 | 98.9 | 98.7 | 98.6 | 98.7 | 98.4 | 99.5 | 99.4 | 99.4 |
| 4 | 100.0 | 99.1 | 99.0 | 99.0 | 99.1 | 98.9 | 99.1 | 99.0 | 99.1 | 98.8 | 98.8 | 98.8 | 98.6 | 99.6 | 99.6 | 99.6 |
| 5 | 100.0 | 98.8 | 99.0 | 98.6 | 99.0 | 98.6 | 98.8 | 98.6 | 98.6 | 98.5 | 98.2 | 98.3 | 98.1 | 99.2 | 99.2 | 99.3 |
| 6 | 100.0 | 99.0 | 98.9 | 98.7 | 98.9 | 98.8 | 98.9 | 98.7 | 98.7 | 98.5 | 98.4 | 98.5 | 98.2 | 99.3 | 99.2 | 99.2 |
| 7 | 100.0 | 99.0 | 98.8 | 98.7 | 98.8 | 98.6 | 98.6 | 98.6 | 98.5 | 98.3 | 98.2 | 98.2 | 98.0 | 99.2 | 99.0 | 99.0 |
| 8 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.7 | 98.7 | 98.6 | 98.6 | 98.4 | 98.3 | 98.3 | 98.0 | 99.2 | 99.1 | 99.0 |
| 9 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.8 | 98.7 | 98.7 | 98.6 | 98.3 | 98.3 | 98.4 | 98.1 | 99.3 | 99.1 | 99.1 |
| 10 | 100.0 | 98.9 | 98.8 | 98.7 | 98.8 | 98.7 | 98.7 | 98.7 | 98.6 | 98.3 | 98.4 | 98.5 | 98.2 | 99.3 | 99.2 | 99.2 |
| 11 | 100.0 | 98.8 | 98.8 | 98.7 | 98.7 | 98.7 | 98.6 | 98.6 | 98.7 | 98.4 | 98.3 | 98.6 | 98.1 | 99.4 | 99.3 | 99.3 |
| 12 | 100.0 | 98.9 | 98.8 | 98.6 | 98.8 | 98.7 | 98.7 | 98.7 | 98.7 | 98.4 | 98.3 | 98.4 | 98.1 | 99.3 | 99.2 | 99.2 |
| 13 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.8 | 98.7 | 98.6 | 98.4 | 98.3 | 98.5 | 98.2 | 99.3 | 99.2 | 99.0 |
| 14 | 100.0 | 99.1 | 98.8 | 98.8 | 98.9 | 98.7 | 98.9 | 98.7 | 98.7 | 98.4 | 98.4 | 98.4 | 98.2 | 99.4 | 99.3 | 99.0 |
| 15 | 100.0 | 98.7 | 98.5 | 98.5 | 98.6 | 98.3 | 98.4 | 98.3 | 98.3 | 98.0 | 97.9 | 98.0 | 97.8 | 99.0 | 98.8 | 98.7 |
| 16 | 100.0 | 99.0 | 98.7 | 98.7 | 98.7 | 98.5 | 98.6 | 98.6 | 98.5 | 98.3 | 98.3 | 98.4 | 98.1 | 99.3 | 99.1 | 99.0 |
| 17 | 100.0 | 99.4 | 99.4 | 99.2 | 99.5 | 99.1 | 99.1 | 99.2 | 99.0 | 98.9 | 98.8 | 98.8 | 98.5 | 99.5 | 99.5 | 99.7 |
| 18 | 100.0 | 99.0 | 98.8 | 98.7 | 98.7 | 98.5 | 98.5 | 98.4 | 98.3 | 98.2 | 98.1 | 98.1 | 98.0 | 99.0 | 98.9 | 98.7 |
| 19 | 100.0 | 99.1 | 98.9 | 98.9 | 99.0 | 98.8 | 98.9 | 98.8 | 98.7 | 98.5 | 98.4 | 98.5 | 98.2 | 99.4 | 99.3 | 99.1 |
| 20 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.6 | 98.7 | 98.6 | 98.6 | 98.4 | 98.1 | 98.3 | 97.9 | 99.1 | 99.0 | 98.9 |
| 21 | 100.0 | 99.2 | 98.9 | 99.0 | 99.1 | 98.8 | 98.9 | 98.8 | 98.8 | 98.6 | 98.4 | 98.5 | 98.2 | 99.4 | 99.3 | 99.1 |
| 22 | 100.0 | 99.1 | 98.9 | 99.0 | 99.0 | 98.7 | 98.9 | 98.8 | 98.8 | 98.6 | 98.3 | 98.5 | 98.1 | 99.4 | 99.3 | 99.1 |
| 23 | 100.0 | 99.1 | 99.0 | 98.9 | 98.9 | 98.6 | 99.0 | 98.9 | 99.1 | 98.7 | 98.6 | 98.9 | 98.1 | 99.6 | 99.4 | 99.1 |
| 24 | 100.0 | 98.9 | 98.7 | 98.8 | 98.9 | 98.7 | 98.8 | 98.7 | 98.7 | 98.4 | 98.4 | 98.5 | 98.1 | 99.3 | 99.3 | 99.1 |
| 25 | 100.0 | 99.2 | 99.0 | 98.9 | 98.9 | 98.7 | 98.8 | 98.6 | 98.6 | 98.3 | 98.2 | 98.3 | 98.1 | 99.1 | 99.0 | 98.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.7 | 98.8 | 98.7 | 98.7 | 98.4 | 98.3 | 98.4 | 98.1 | 99.3 | 99.2 | 99.1 |
| Med. | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.7 | 98.8 | 98.7 | 98.6 | 98.4 | 98.3 | 98.4 | 98.1 | 99.3 | 99.2 | 99.1 |
| σ | 0.00 | 0.15 | 0.17 | 0.16 | 0.18 | 0.16 | 0.18 | 0.18 | 0.21 | 0.20 | 0.21 | 0.22 | 0.19 | 0.18 | 0.20 | 0.24 |
| Min. | 100.0 | 98.7 | 98.5 | 98.5 | 98.6 | 98.3 | 98.4 | 98.3 | 98.3 | 98.0 | 97.9 | 98.0 | 97.7 | 98.9 | 98.8 | 98.7 |
| Max. | 100.0 | 99.4 | 99.4 | 99.2 | 99.5 | 99.1 | 99.1 | 99.2 | 99.1 | 98.9 | 98.8 | 98.9 | 98.6 | 99.6 | 99.6 | 99.7 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0171 | -0.0161 | -0.0189 | -0.0072 | -0.0082 | -0.0091 | -0.0103 | -0.0101 | -0.0101 | -0.0101 | -0.0101 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.978 | |
| α | -1.40E-06 | |
| $R^2$ | 0.360 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 98.8 | 98.9 | 98.9 | 99.0 | 99.0 | | | | | | | | | | | |
| 2 | 98.6 | 98.8 | 98.7 | 98.7 | 98.8 | | | | | | | | | | | |
| 3 | 99.2 | 99.3 | 99.3 | 99.3 | 99.3 | | | | | | | | | | | |
| 4 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| 5 | 99.2 | 98.5 | 98.8 | 98.8 | 98.7 | | | | | | | | | | | |
| 6 | 98.9 | 99.1 | 99.1 | 99.1 | 99.1 | | | | | | | | | | | |
| 7 | 98.9 | 99.0 | 99.0 | 99.0 | 98.8 | | | | | | | | | | | |
| 8 | 98.9 | 99.0 | 99.0 | 99.0 | 98.9 | | | | | | | | | | | |
| 9 | 98.9 | 98.5 | 98.7 | 98.8 | 98.6 | | | | | | | | | | | |
| 10 | 99.1 | 99.0 | 99.1 | 99.2 | 99.1 | | | | | | | | | | | |
| 11 | 99.0 | 98.9 | 98.9 | 98.9 | 98.9 | | | | | | | | | | | |
| 12 | 99.0 | 99.1 | 99.1 | 99.1 | 99.0 | | | | | | | | | | | |
| 13 | 99.0 | 99.1 | 99.1 | 99.2 | 99.0 | | | | | | | | | | | |
| 14 | 99.0 | 99.1 | 99.1 | 99.2 | 99.1 | | | | | | | | | | | |
| 15 | 98.6 | 98.7 | 98.7 | 98.7 | 98.6 | | | | | | | | | | | |
| 16 | 99.0 | 99.0 | 99.0 | 99.1 | 99.0 | | | | | | | | | | | |
| 17 | 99.4 | 99.1 | 99.3 | 99.2 | 99.1 | | | | | | | | | | | |
| 18 | 98.7 | 98.7 | 98.8 | 98.9 | 98.8 | | | | | | | | | | | |
| 19 | 99.1 | 99.2 | 99.1 | 99.2 | 99.1 | | | | | | | | | | | |
| 20 | 98.8 | 98.9 | 98.8 | 98.9 | 98.8 | | | | | | | | | | | |
| 21 | 99.0 | 99.1 | 99.1 | 99.2 | 99.1 | | | | | | | | | | | |
| 22 | 99.0 | 99.0 | 99.0 | 99.1 | 98.9 | | | | | | | | | | | |
| 23 | 99.0 | 98.9 | 99.1 | 99.0 | 98.9 | | | | | | | | | | | |
| 24 | 99.0 | 99.1 | 99.0 | 99.2 | 99.1 | | | | | | | | | | | |
| 25 | 98.8 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.0 | 99.0 | 99.0 | 99.0 | 99.0 | | | | | | | | | | | |
| Med. | 99.0 | 99.0 | 99.0 | 99.1 | 99.0 | | | | | | | | | | | |
| σ | 0.20 | 0.22 | 0.20 | 0.20 | 0.21 | | | | | | | | | | | |
| Min. | 98.6 | 98.5 | 98.7 | 98.7 | 98.6 | | | | | | | | | | | |
| Max. | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.5 | 99.6 | 99.7 | 99.7 | 99.8 | 99.5 | 99.7 | 99.9 | 99.6 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 |
| 2 | 100.0 | 99.7 | 99.5 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 3 | 100.0 | 99.4 | 99.4 | 99.5 | 99.6 | 99.7 | 99.6 | 99.8 | 99.6 | 99.9 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 |
| 4 | 100.0 | 99.5 | 99.7 | 99.8 | 100.0 | 99.9 | 99.9 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 |
| 5 | 100.0 | 99.5 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.8 | 99.7 | 99.6 | 99.8 | 100.0 | 99.8 | 99.8 | 99.8 | 99.8 |
| 6 | 100.0 | 99.9 | 100.0 | 100.0 | 100.3 | 100.2 | 100.2 | 100.4 | 100.2 | 100.1 | 100.2 | 100.1 | 100.3 | 100.3 | 100.3 | 100.3 |
| 7 | 100.0 | 99.8 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 100.1 | 99.9 |
| 8 | 100.0 | 99.7 | 99.7 | 99.8 | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | 99.8 | 99.9 | 100.0 | 99.9 | 99.9 | 100.1 | 100.0 |
| 9 | 100.0 | 99.4 | 99.6 | 99.7 | 99.9 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.9 | 99.7 | 99.6 | 99.8 | 99.9 | 99.9 |
| 10 | 100.0 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 100.1 | 99.8 | 99.8 | 99.7 | 100.0 | 99.9 | 99.8 | 99.9 | 99.9 |
| 11 | 100.0 | 99.7 | 99.6 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 99.8 | 100.0 | 99.8 | 99.8 | 99.8 | 99.9 | 100.0 | 100.0 |
| 12 | 100.0 | 99.6 | 99.5 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.6 | 99.5 | 99.7 | 99.9 | 99.8 | 99.7 | 99.7 | 99.8 |
| 13 | 100.0 | 99.8 | 99.8 | 99.9 | 100.2 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 |
| 14 | 100.0 | 99.4 | 99.4 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.7 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 |
| 15 | 100.0 | 99.5 | 99.5 | 99.7 | 99.9 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 |
| 16 | 100.0 | 99.2 | 99.3 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.2 | 99.4 | 99.6 | 99.5 |
| 17 | 100.0 | 99.4 | 99.4 | 99.5 | 99.7 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.4 | 99.6 | 99.7 | 99.6 |
| 18 | 100.0 | 99.6 | 99.5 | 99.6 | 99.8 | 99.7 | 99.7 | 99.9 | 99.6 | 99.7 | 99.8 | 99.9 | 100.0 | 99.8 | 100.0 | 99.9 |
| 19 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 20 | 100.0 | 99.3 | 99.3 | 99.4 | 99.7 | 99.3 | 99.4 | 99.6 | 99.4 | 99.5 | 99.3 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 21 | 100.0 | 99.5 | 99.5 | 99.6 | 99.7 | 99.5 | 99.7 | 99.8 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 |
| 22 | 100.0 | 99.7 | 99.7 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 99.9 | 99.8 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 |
| 23 | 100.0 | 99.8 | 99.6 | 99.7 | 99.7 | 99.6 | 99.8 | 99.8 | 99.7 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 |
| 24 | 100.0 | 99.4 | 99.4 | 99.5 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 25 | 100.0 | 99.6 | 99.7 | 99.8 | 99.9 | 99.6 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 100.0 | 99.8 | 99.8 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| Med. | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| σ | 0.00 | 0.17 | 0.17 | 0.17 | 0.19 | 0.21 | 0.19 | 0.21 | 0.17 | 0.17 | 0.20 | 0.17 | 0.23 | 0.19 | 0.18 | 0.18 |
| Min. | 100.0 | 99.2 | 99.3 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 | 99.4 | 99.5 | 99.3 | 99.5 | 99.2 | 99.4 | 99.6 | 99.5 |
| Max. | 100.0 | 99.9 | 100.0 | 100.0 | 100.3 | 100.2 | 100.2 | 100.4 | 100.2 | 100.1 | 100.2 | 100.1 | 100.3 | 100.3 | 100.3 | 100.3 |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | |
| 2 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 3 | 99.7 | 99.8 | 100.0 | 100.1 | 99.9 | | | | | | | | | | | |
| 4 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 5 | 99.8 | 99.8 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| 6 | 100.2 | 100.3 | 100.4 | 100.3 | 100.5 | | | | | | | | | | | |
| 7 | 99.9 | 99.8 | 100.1 | 100.1 | 100.0 | | | | | | | | | | | |
| 8 | 99.9 | 99.9 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | |
| 9 | 99.8 | 99.7 | 99.9 | 100.1 | 99.8 | | | | | | | | | | | |
| 10 | 99.8 | 99.7 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | |
| 11 | 99.9 | 99.9 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | |
| 12 | 99.7 | 99.7 | 99.8 | 100.0 | 99.9 | | | | | | | | | | | |
| 13 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 14 | 99.4 | 99.5 | 99.7 | 99.7 | 99.6 | | | | | | | | | | | |
| 15 | 99.8 | 99.7 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | |
| 16 | 99.4 | 99.3 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| 17 | 99.5 | 99.5 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 18 | 100.0 | 100.0 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | |
| 19 | 99.8 | 99.7 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | |
| 20 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 21 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | |
| 22 | 100.0 | 100.0 | 100.2 | 100.2 | 100.1 | | | | | | | | | | | |
| 23 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 24 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | |
| 25 | 99.7 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| Med. | 99.8 | 99.8 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | |
| σ | 0.18 | 0.20 | 0.20 | 0.19 | 0.21 | | | | | | | | | | | |
| Min. | 99.4 | 99.3 | 99.5 | 99.5 | 99.5 | | | | | | | | | | | |
| Max. | 100.2 | 100.3 | 100.4 | 100.3 | 100.5 | | | | | | | | | | | |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0016 | 0.0016 | 0.0016 |
| 2 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0018 |
| 3 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0016 | 0.0015 | 0.0017 |
| 4 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0016 |
| 5 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0013 | 0.0011 | 0.0012 | 0.0015 | 0.0014 | 0.0015 |
| 6 | 0.0000 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0017 |
| 7 | 0.0000 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0013 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0013 | 0.0012 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |
| 8 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |
| 9 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0015 | 0.0016 |
| 10 | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0017 |
| 11 | 0.0000 | 0.0009 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |
| 12 | 0.0000 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0018 | 0.0019 | 0.0019 |
| 13 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0016 |
| 14 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0016 |
| 15 | 0.0000 | 0.0009 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0016 | 0.0015 | 0.0015 |
| 16 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0015 |
| 17 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0016 |
| 18 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0016 | 0.0017 | 0.0016 |
| 19 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0014 | 0.0016 | 0.0015 | 0.0016 |
| 20 | 0.0000 | 0.0009 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 |
| 21 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0016 |
| 22 | 0.0000 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0015 | 0.0016 | 0.0017 |
| 23 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0016 |
| 24 | 0.0000 | 0.0009 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0016 |
| 25 | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0016 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |
| Med. | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0016 | 0.0016 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0015 | 0.0014 | 0.0015 |
| Max. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0019 |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0017 | 0.0015 | 0.0015 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 2 | 0.0019 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 3 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 4 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 5 | 0.0015 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 6 | 0.0017 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 7 | 0.0017 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |
| 8 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | | | | | | | | | | | |
| 9 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 10 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 11 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 12 | 0.0019 | 0.0018 | 0.0017 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 13 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 14 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 15 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | | | | | | | | | | | |
| 16 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 17 | 0.0016 | 0.0014 | 0.0014 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 18 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | | | | | | | | | | | |
| 19 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 20 | 0.0017 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |
| 21 | 0.0016 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 22 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 23 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | | | | | | | | | | | |
| 24 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 25 | 0.0018 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| Med. | 0.0016 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | | | | | | | | | | | |
| Max. | 0.0019 | 0.0018 | 0.0017 | 0.0020 | 0.0020 | | | | | | | | | | | |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2595 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2583 | 0.2581 | 0.2579 | 0.2579 | 0.2579 |
| 2 | 0.2593 | 0.2582 | 0.2582 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2575 | 0.2576 | 0.2575 |
| 3 | 0.2588 | 0.2578 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | 0.2575 | 0.2574 | 0.2575 | 0.2574 | 0.2571 | 0.2572 | 0.2571 |
| 4 | 0.2596 | 0.2586 | 0.2584 | 0.2583 | 0.2583 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2581 | 0.2582 | 0.2581 |
| 5 | 0.2617 | 0.2608 | 0.2608 | 0.2606 | 0.2606 | 0.2606 | 0.2606 | 0.2606 | 0.2606 | 0.2606 | 0.2605 | 0.2607 | 0.2605 | 0.2602 | 0.2603 | 0.2602 |
| 6 | 0.2595 | 0.2585 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2578 | 0.2578 | 0.2578 |
| 7 | 0.2596 | 0.2586 | 0.2586 | 0.2584 | 0.2584 | 0.2584 | 0.2585 | 0.2584 | 0.2584 | 0.2582 | 0.2583 | 0.2584 | 0.2583 | 0.2581 | 0.2580 | 0.2580 |
| 8 | 0.2590 | 0.2582 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2580 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2578 | 0.2578 | 0.2574 | 0.2575 | 0.2574 |
| 9 | 0.2591 | 0.2581 | 0.2580 | 0.2579 | 0.2578 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2575 | 0.2575 | 0.2574 |
| 10 | 0.2604 | 0.2592 | 0.2592 | 0.2592 | 0.2590 | 0.2591 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2590 | 0.2588 | 0.2588 | 0.2587 |
| 11 | 0.2622 | 0.2613 | 0.2611 | 0.2611 | 0.2610 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2607 | 0.2606 | 0.2606 |
| 12 | 0.2626 | 0.2616 | 0.2615 | 0.2614 | 0.2614 | 0.2613 | 0.2614 | 0.2612 | 0.2613 | 0.2613 | 0.2611 | 0.2612 | 0.2611 | 0.2609 | 0.2608 | 0.2608 |
| 13 | 0.2599 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2586 | 0.2585 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2582 | 0.2583 | 0.2583 |
| 14 | 0.2586 | 0.2577 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2573 | 0.2570 | 0.2569 | 0.2570 |
| 15 | 0.2595 | 0.2586 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2582 | 0.2583 | 0.2583 | 0.2579 | 0.2579 | 0.2579 |
| 16 | 0.2591 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2575 | 0.2576 | 0.2575 |
| 17 | 0.2610 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2597 | 0.2598 | 0.2597 | 0.2595 | 0.2595 | 0.2594 |
| 18 | 0.2604 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2593 | 0.2591 | 0.2592 | 0.2591 | 0.2590 | 0.2591 | 0.2591 | 0.2588 | 0.2587 | 0.2587 |
| 19 | 0.2589 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2578 | 0.2576 | 0.2574 | 0.2574 | 0.2573 |
| 20 | 0.2591 | 0.2582 | 0.2580 | 0.2579 | 0.2578 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2577 | 0.2577 | 0.2575 | 0.2574 | 0.2573 |
| 21 | 0.2589 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2573 | 0.2573 | 0.2574 |
| 22 | 0.2605 | 0.2595 | 0.2594 | 0.2593 | 0.2592 | 0.2593 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2593 | 0.2591 | 0.2590 | 0.2589 | 0.2588 |
| 23 | 0.2612 | 0.2602 | 0.2600 | 0.2599 | 0.2600 | 0.2600 | 0.2601 | 0.2600 | 0.2599 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2597 | 0.2596 | 0.2596 |
| 24 | 0.2593 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2578 | 0.2577 | 0.2577 |
| 25 | 0.2598 | 0.2589 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2581 | 0.2582 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2599 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2583 | 0.2583 | 0.2583 |
| Med. | 0.2595 | 0.2586 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2583 | 0.2583 | 0.2579 | 0.2579 | 0.2579 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.2586 | 0.2577 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2573 | 0.2570 | 0.2569 | 0.2570 |
| Max. | 0.2626 | 0.2616 | 0.2615 | 0.2614 | 0.2614 | 0.2613 | 0.2614 | 0.2612 | 0.2613 | 0.2613 | 0.2611 | 0.2612 | 0.2611 | 0.2609 | 0.2608 | 0.2608 |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2578 | 0.2580 | 0.2580 | 0.2577 | 0.2577 | | | | | | | | | | | |
| 2 | 0.2574 | 0.2576 | 0.2577 | 0.2575 | 0.2575 | | | | | | | | | | | |
| 3 | 0.2571 | 0.2572 | 0.2574 | 0.2572 | 0.2571 | | | | | | | | | | | |
| 4 | 0.2580 | 0.2582 | 0.2582 | 0.2581 | 0.2580 | | | | | | | | | | | |
| 5 | 0.2602 | 0.2604 | 0.2604 | 0.2602 | 0.2602 | | | | | | | | | | | |
| 6 | 0.2578 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | | | | | | | | | | | |
| 7 | 0.2579 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 8 | 0.2574 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 9 | 0.2575 | 0.2577 | 0.2577 | 0.2575 | 0.2576 | | | | | | | | | | | |
| 10 | 0.2588 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | | | | | | | | | | | |
| 11 | 0.2606 | 0.2607 | 0.2608 | 0.2606 | 0.2605 | | | | | | | | | | | |
| 12 | 0.2608 | 0.2608 | 0.2609 | 0.2607 | 0.2606 | | | | | | | | | | | |
| 13 | 0.2582 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 14 | 0.2571 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | | | | | | | | | | | |
| 15 | 0.2580 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 16 | 0.2575 | 0.2577 | 0.2577 | 0.2575 | 0.2575 | | | | | | | | | | | |
| 17 | 0.2594 | 0.2597 | 0.2596 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 18 | 0.2588 | 0.2588 | 0.2588 | 0.2586 | 0.2587 | | | | | | | | | | | |
| 19 | 0.2574 | 0.2574 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 20 | 0.2574 | 0.2575 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 21 | 0.2574 | 0.2575 | 0.2575 | 0.2572 | 0.2572 | | | | | | | | | | | |
| 22 | 0.2589 | 0.2591 | 0.2591 | 0.2589 | 0.2589 | | | | | | | | | | | |
| 23 | 0.2596 | 0.2598 | 0.2599 | 0.2596 | 0.2597 | | | | | | | | | | | |
| 24 | 0.2577 | 0.2578 | 0.2579 | 0.2577 | 0.2576 | | | | | | | | | | | |
| 25 | 0.2580 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | | | | | | | | | | | |
| Med. | 0.2579 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.2571 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | | | | | | | | | | | |
| Max. | 0.2608 | 0.2608 | 0.2609 | 0.2607 | 0.2606 | | | | | | | | | | | |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 6-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 |
| 2 | 0.5253 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 |
| 3 | 0.5266 | 0.5264 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5266 | 0.5266 |
| 4 | 0.5285 | 0.5285 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5287 | 0.5286 | 0.5287 | 0.5287 |
| 5 | 0.5270 | 0.5269 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 6 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 |
| 7 | 0.5258 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5257 | 0.5257 |
| 8 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5263 |
| 9 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 |
| 10 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 |
| 11 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5299 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 |
| 12 | 0.5270 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 |
| 13 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5284 |
| 14 | 0.5274 | 0.5273 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5274 |
| 15 | 0.5251 | 0.5249 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5250 |
| 16 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 |
| 17 | 0.5277 | 0.5275 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 |
| 18 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5262 | 0.5263 | 0.5263 |
| 19 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 |
| 20 | 0.5265 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 |
| 21 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5283 |
| 22 | 0.5275 | 0.5274 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 |
| 23 | 0.5279 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5280 | 0.5279 | 0.5278 | 0.5280 | 0.5280 |
| 24 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 |
| 25 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5272 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5272 |
| Med. | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.5251 | 0.5249 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5250 |
| Max. | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5299 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 |

## Data Set 6 : 85 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.7 °C |
| Actual Ambient Temperature [$T_A$] | 84.1 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

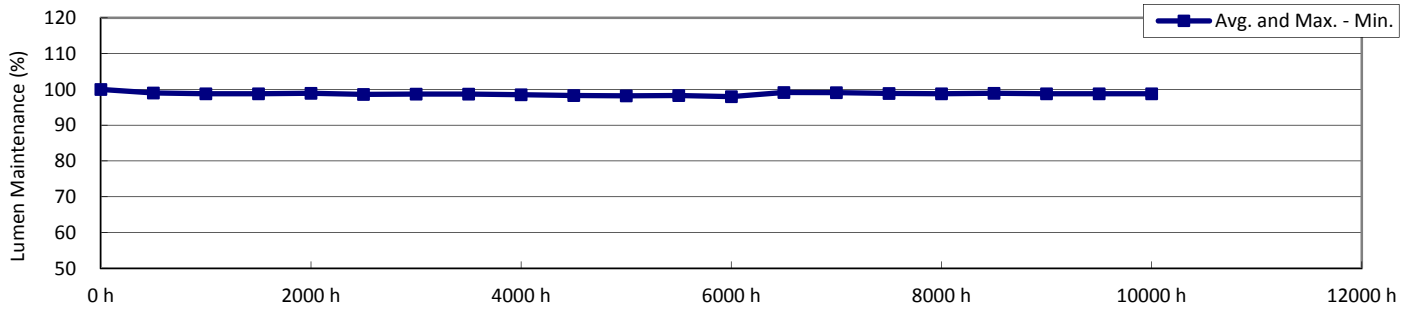
**TABLE 6-6 (Continued)**
Chromaticity

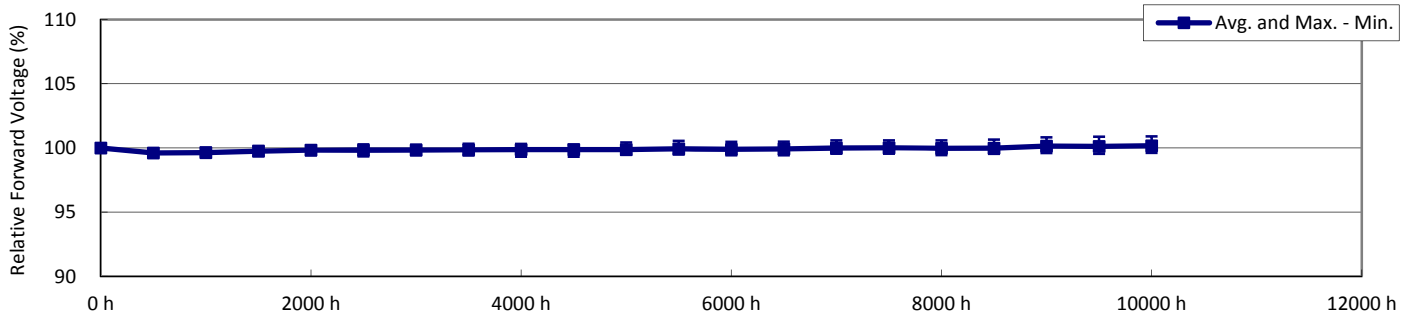
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5276 | 0.5277 | 0.5278 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 2 | 0.5253 | 0.5253 | 0.5253 | 0.5251 | 0.5252 | | | | | | | | | | | |
| 3 | 0.5266 | 0.5266 | 0.5267 | 0.5265 | 0.5266 | | | | | | | | | | | |
| 4 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 5 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 6 | 0.5280 | 0.5282 | 0.5282 | 0.5280 | 0.5281 | | | | | | | | | | | |
| 7 | 0.5257 | 0.5258 | 0.5259 | 0.5258 | 0.5257 | | | | | | | | | | | |
| 8 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 9 | 0.5265 | 0.5266 | 0.5267 | 0.5267 | 0.5266 | | | | | | | | | | | |
| 10 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 11 | 0.5297 | 0.5298 | 0.5299 | 0.5298 | 0.5298 | | | | | | | | | | | |
| 12 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 13 | 0.5284 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 14 | 0.5273 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 15 | 0.5251 | 0.5251 | 0.5252 | 0.5250 | 0.5250 | | | | | | | | | | | |
| 16 | 0.5278 | 0.5278 | 0.5279 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 17 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | | | | | | | | | | | |
| 18 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | | | | | | | | | | | |
| 19 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 20 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 21 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | | | | | | | | | | | |
| 22 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| 23 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 24 | 0.5283 | 0.5283 | 0.5284 | 0.5282 | 0.5283 | | | | | | | | | | | |
| 25 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5272 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| Med. | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.5251 | 0.5251 | 0.5252 | 0.5250 | 0.5250 | | | | | | | | | | | |
| Max. | 0.5297 | 0.5298 | 0.5299 | 0.5298 | 0.5298 | | | | | | | | | | | |

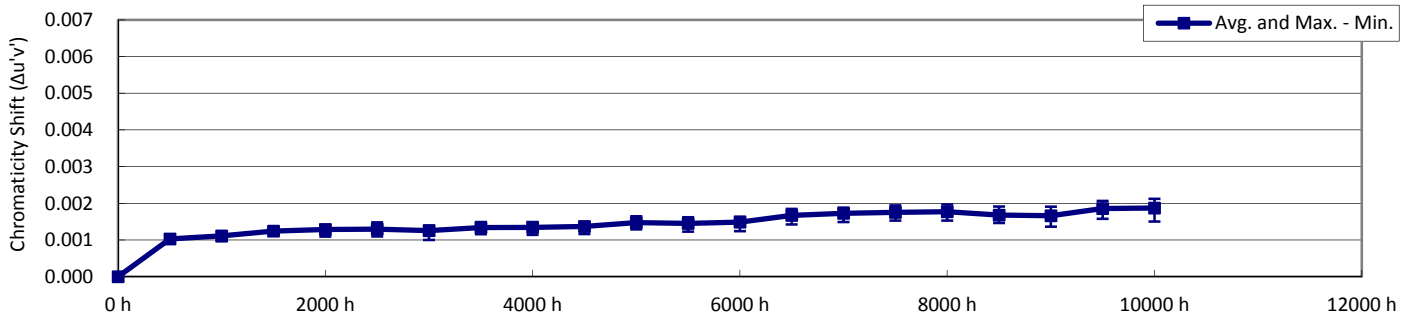
## Data Set 7 : 85 °C, 150 mA

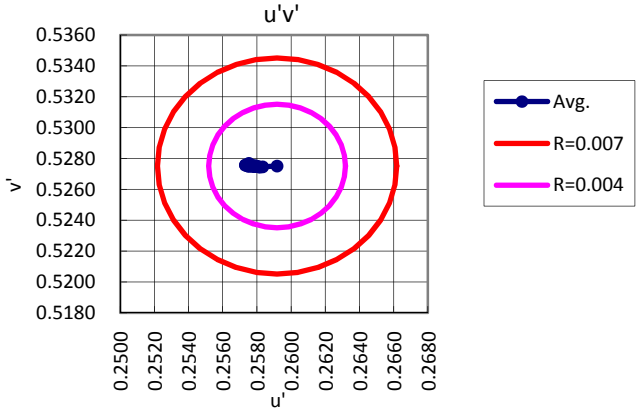
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 66.4 | 3.13 | 2779 | 0.47 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 2 | 66.3 | 3.13 | 2796 | 0.47 | 0.453 | 0.410 | 0.258 | 0.526 | | | | |
| 3 | 66.5 | 3.14 | 2779 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 4 | 66.0 | 3.13 | 2772 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 5 | 66.1 | 3.12 | 2784 | 0.47 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 6 | 66.4 | 3.13 | 2750 | 0.47 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 7 | 66.5 | 3.14 | 2760 | 0.47 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 8 | 66.2 | 3.14 | 2772 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 9 | 66.4 | 3.14 | 2741 | 0.47 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 10 | 66.2 | 3.13 | 2766 | 0.47 | 0.455 | 0.410 | 0.260 | 0.526 | | | | |
| 11 | 66.2 | 3.13 | 2757 | 0.47 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |
| 12 | 66.8 | 3.14 | 2790 | 0.47 | 0.455 | 0.414 | 0.258 | 0.528 | | | | |
| 13 | 66.1 | 3.13 | 2744 | 0.47 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 14 | 66.4 | 3.13 | 2774 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 15 | 66.2 | 3.13 | 2767 | 0.47 | 0.458 | 0.416 | 0.259 | 0.529 | | | | |
| 16 | 66.4 | 3.14 | 2763 | 0.47 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 17 | 66.3 | 3.13 | 2784 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 18 | 66.4 | 3.13 | 2788 | 0.47 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 19 | 66.7 | 3.14 | 2780 | 0.47 | 0.457 | 0.415 | 0.258 | 0.529 | | | | |
| 20 | 66.7 | 3.13 | 2765 | 0.47 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 21 | 66.2 | 3.14 | 2773 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 22 | 66.2 | 3.14 | 2770 | 0.47 | 0.455 | 0.410 | 0.259 | 0.526 | | | | |
| 23 | 66.6 | 3.14 | 2771 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 24 | 66.3 | 3.13 | 2723 | 0.47 | 0.461 | 0.415 | 0.261 | 0.529 | | | | |
| 25 | 66.6 | 3.14 | 2780 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 66.4 | 3.13 | 2769 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 66.4 | 3.13 | 2772 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| σ | 0.21 | 0.006 | 16.5 | 0.001 | 0.0018 | 0.0018 | 0.0007 | 0.0009 | | | | |
| Min. | 66.0 | 3.12 | 2723 | 0.47 | 0.453 | 0.410 | 0.258 | 0.526 | | | | |
| Max. | 66.8 | 3.14 | 2796 | 0.47 | 0.461 | 0.416 | 0.261 | 0.529 | | | | |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.6 | 98.6 | 98.4 | 98.2 | 98.1 | 98.1 | 97.8 | 99.0 | 99.0 | 98.7 |
| 2 | 100.0 | 99.0 | 98.8 | 98.8 | 98.8 | 98.6 | 98.7 | 98.8 | 98.5 | 98.2 | 98.1 | 98.1 | 97.8 | 99.1 | 99.0 | 98.8 |
| 3 | 100.0 | 99.0 | 98.8 | 98.7 | 98.8 | 98.6 | 98.5 | 98.6 | 98.5 | 98.2 | 98.1 | 98.3 | 98.0 | 99.1 | 99.1 | 98.9 |
| 4 | 100.0 | 98.9 | 98.8 | 98.9 | 98.9 | 98.7 | 98.7 | 98.8 | 98.5 | 98.2 | 98.1 | 98.3 | 97.9 | 99.1 | 99.1 | 98.9 |
| 5 | 100.0 | 99.1 | 99.1 | 99.1 | 99.2 | 98.9 | 99.0 | 99.1 | 98.9 | 98.6 | 98.4 | 98.9 | 98.3 | 99.5 | 99.6 | 99.4 |
| 6 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.6 | 98.8 | 98.6 | 98.3 | 98.2 | 98.3 | 97.9 | 99.1 | 99.1 | 98.8 |
| 7 | 100.0 | 98.9 | 98.5 | 98.5 | 98.5 | 98.2 | 98.3 | 98.2 | 98.0 | 97.7 | 97.6 | 97.7 | 97.4 | 98.6 | 98.4 | 98.2 |
| 8 | 100.0 | 99.0 | 98.7 | 98.7 | 98.8 | 98.6 | 98.7 | 98.7 | 98.5 | 98.3 | 98.2 | 98.3 | 98.0 | 99.2 | 99.0 | 98.8 |
| 9 | 100.0 | 98.9 | 98.7 | 98.7 | 98.8 | 98.5 | 98.7 | 98.6 | 98.5 | 98.2 | 98.1 | 98.2 | 98.0 | 99.1 | 99.0 | 98.8 |
| 10 | 100.0 | 98.9 | 98.7 | 98.6 | 98.8 | 98.5 | 98.5 | 98.5 | 98.4 | 98.1 | 98.0 | 98.1 | 97.8 | 98.9 | 98.8 | 98.6 |
| 11 | 100.0 | 98.9 | 98.7 | 98.6 | 98.8 | 98.6 | 98.6 | 98.8 | 98.4 | 98.0 | 98.2 | 98.3 | 98.2 | 99.0 | 99.0 | 98.7 |
| 12 | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.6 | 98.8 | 98.7 | 98.6 | 98.3 | 98.3 | 98.4 | 98.1 | 99.2 | 99.1 | 98.9 |
| 13 | 100.0 | 98.9 | 98.7 | 98.7 | 98.7 | 98.5 | 98.6 | 98.6 | 98.4 | 98.2 | 98.1 | 98.1 | 97.8 | 99.1 | 99.1 | 98.8 |
| 14 | 100.0 | 99.0 | 98.7 | 98.6 | 98.7 | 98.4 | 98.6 | 98.5 | 98.4 | 98.1 | 98.0 | 98.1 | 97.8 | 99.0 | 99.0 | 98.8 |
| 15 | 100.0 | 99.3 | 99.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.9 | 98.7 | 98.5 | 98.4 | 98.5 | 98.2 | 99.5 | 99.4 | 99.3 |
| 16 | 100.0 | 99.1 | 98.9 | 98.8 | 99.0 | 98.8 | 98.8 | 98.8 | 98.7 | 98.5 | 98.3 | 98.4 | 98.1 | 99.3 | 99.3 | 99.1 |
| 17 | 100.0 | 99.1 | 99.0 | 98.8 | 99.0 | 98.6 | 98.7 | 98.7 | 98.8 | 98.4 | 98.1 | 98.3 | 98.0 | 99.1 | 99.4 | 99.0 |
| 18 | 100.0 | 99.1 | 98.8 | 98.6 | 98.8 | 98.6 | 98.7 | 98.7 | 98.5 | 98.3 | 98.1 | 98.2 | 97.9 | 99.0 | 99.1 | 98.9 |
| 19 | 100.0 | 98.9 | 98.7 | 98.7 | 98.9 | 98.6 | 98.8 | 98.7 | 98.5 | 98.3 | 98.1 | 98.2 | 98.0 | 99.1 | 99.0 | 98.8 |
| 20 | 100.0 | 99.1 | 98.8 | 98.8 | 98.9 | 98.7 | 98.9 | 98.8 | 98.7 | 98.4 | 98.3 | 98.3 | 98.0 | 99.2 | 99.1 | 98.9 |
| 21 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.9 | 98.8 | 98.5 | 98.3 | 98.2 | 98.2 | 98.0 | 99.2 | 99.1 | 98.8 |
| 22 | 100.0 | 99.0 | 98.7 | 98.8 | 98.8 | 98.6 | 98.7 | 98.8 | 98.5 | 98.3 | 98.2 | 98.2 | 98.0 | 99.1 | 99.1 | 99.0 |
| 23 | 100.0 | 99.0 | 98.9 | 99.0 | 98.9 | 98.7 | 98.8 | 99.0 | 98.9 | 98.6 | 98.6 | 98.5 | 98.3 | 99.4 | 99.3 | 99.1 |
| 24 | 100.0 | 99.2 | 98.9 | 98.9 | 98.9 | 98.7 | 98.8 | 98.9 | 98.6 | 98.4 | 98.3 | 98.3 | 98.1 | 99.2 | 99.2 | 99.0 |
| 25 | 100.0 | 98.9 | 98.8 | 98.7 | 98.8 | 98.6 | 98.7 | 98.7 | 98.6 | 98.3 | 98.0 | 98.2 | 97.9 | 99.0 | 98.9 | 98.9 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.6 | 98.7 | 98.7 | 98.5 | 98.3 | 98.2 | 98.3 | 98.0 | 99.1 | 99.1 | 98.9 |
| Med. | 100.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.6 | 98.7 | 98.7 | 98.5 | 98.3 | 98.1 | 98.3 | 98.0 | 99.1 | 99.1 | 98.9 |
| σ | 0.00 | 0.11 | 0.13 | 0.14 | 0.13 | 0.14 | 0.15 | 0.18 | 0.19 | 0.19 | 0.18 | 0.21 | 0.19 | 0.19 | 0.22 | 0.23 |
| Min. | 100.0 | 98.9 | 98.5 | 98.5 | 98.5 | 98.2 | 98.3 | 98.2 | 98.0 | 97.7 | 97.6 | 97.7 | 97.4 | 98.6 | 98.4 | 98.2 |
| Max. | 100.0 | 99.3 | 99.1 | 99.1 | 99.2 | 98.9 | 99.0 | 99.1 | 98.9 | 98.6 | 98.6 | 98.9 | 98.3 | 99.5 | 99.6 | 99.4 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0182 | -0.0171 | -0.0205 | -0.0088 | -0.0092 | -0.0113 | -0.0122 | -0.0111 | -0.0121 | -0.0121 | -0.0121 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.978 | |
| α | -1.23E-06 | |
| $R^2$ | 0.298 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 98.7 | 98.8 | 98.7 | 98.7 | 98.5 | | | | | | | | | | | |
| 2 | 98.7 | 98.8 | 98.8 | 98.7 | 98.7 | | | | | | | | | | | |
| 3 | 98.8 | 98.9 | 98.9 | 98.8 | 98.8 | | | | | | | | | | | |
| 4 | 98.8 | 98.8 | 98.9 | 98.8 | 98.8 | | | | | | | | | | | |
| 5 | 99.3 | 99.3 | 99.2 | 99.1 | 99.1 | | | | | | | | | | | |
| 6 | 98.9 | 98.9 | 98.9 | 98.8 | 98.7 | | | | | | | | | | | |
| 7 | 98.1 | 98.2 | 98.2 | 98.3 | 98.2 | | | | | | | | | | | |
| 8 | 98.8 | 98.9 | 98.8 | 98.9 | 98.8 | | | | | | | | | | | |
| 9 | 98.7 | 98.8 | 98.7 | 99.0 | 98.8 | | | | | | | | | | | |
| 10 | 98.6 | 98.6 | 98.5 | 98.7 | 98.5 | | | | | | | | | | | |
| 11 | 98.6 | 98.5 | 98.5 | 98.6 | 98.5 | | | | | | | | | | | |
| 12 | 98.9 | 98.9 | 98.8 | 98.9 | 98.8 | | | | | | | | | | | |
| 13 | 98.7 | 98.8 | 98.8 | 98.9 | 98.8 | | | | | | | | | | | |
| 14 | 98.8 | 98.8 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| 15 | 99.1 | 99.2 | 99.2 | 99.3 | 99.3 | | | | | | | | | | | |
| 16 | 99.0 | 99.1 | 99.0 | 99.0 | 99.0 | | | | | | | | | | | |
| 17 | 98.9 | 99.0 | 98.8 | 98.8 | 98.7 | | | | | | | | | | | |
| 18 | 98.8 | 98.9 | 98.9 | 98.9 | 98.8 | | | | | | | | | | | |
| 19 | 98.6 | 98.8 | 98.7 | 98.7 | 98.8 | | | | | | | | | | | |
| 20 | 98.9 | 99.1 | 99.0 | 99.0 | 99.0 | | | | | | | | | | | |
| 21 | 98.7 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| 22 | 98.7 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| 23 | 99.0 | 98.9 | 98.9 | 98.9 | 98.9 | | | | | | | | | | | |
| 24 | 98.9 | 99.0 | 98.9 | 98.9 | 99.0 | | | | | | | | | | | |
| 25 | 98.7 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 98.8 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| Med. | 98.8 | 98.9 | 98.8 | 98.8 | 98.8 | | | | | | | | | | | |
| σ | 0.22 | 0.22 | 0.21 | 0.18 | 0.22 | | | | | | | | | | | |
| Min. | 98.1 | 98.2 | 98.2 | 98.3 | 98.2 | | | | | | | | | | | |
| Max. | 99.3 | 99.3 | 99.2 | 99.3 | 99.3 | | | | | | | | | | | |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.6 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.3 | 100.2 | 100.2 | 100.3 | 100.3 |
| 2 | 100.0 | 99.5 | 99.6 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.9 | 99.9 |
| 3 | 100.0 | 99.8 | 99.8 | 99.9 | 100.0 | 100.2 | 100.0 | 100.0 | 100.1 | 99.9 | 100.0 | 100.1 | 100.2 | 100.3 | 100.4 | 100.6 |
| 4 | 100.0 | 99.6 | 99.7 | 99.8 | 100.1 | 99.9 | 100.1 | 100.1 | 100.0 | 100.3 | 100.2 | 100.3 | 100.3 | 100.3 | 100.4 | 100.4 |
| 5 | 100.0 | 99.5 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.4 | 99.3 | 99.3 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 6 | 100.0 | 99.6 | 99.6 | 99.8 | 99.7 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| 7 | 100.0 | 99.7 | 99.7 | 99.9 | 99.9 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.0 | 100.1 | 100.3 | 100.2 |
| 8 | 100.0 | 99.6 | 99.5 | 99.7 | 99.8 | 100.0 | 99.8 | 99.9 | 99.8 | 99.9 | 99.7 | 99.7 | 99.7 | 99.8 | 99.9 | 99.9 |
| 9 | 100.0 | 99.6 | 99.6 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 |
| 10 | 100.0 | 99.9 | 100.0 | 100.1 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.2 | 100.4 | 100.5 | 100.5 | 100.5 | 100.6 | 100.5 |
| 11 | 100.0 | 99.3 | 99.4 | 99.5 | 99.6 | 99.3 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 |
| 12 | 100.0 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.6 | 99.7 | 99.8 | 99.7 |
| 13 | 100.0 | 99.5 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 |
| 14 | 100.0 | 99.5 | 99.6 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 |
| 15 | 100.0 | 99.3 | 99.4 | 99.4 | 99.4 | 99.6 | 99.4 | 99.6 | 99.5 | 99.6 | 99.5 | 99.5 | 99.7 | 99.4 | 99.6 | 99.5 |
| 16 | 100.0 | 99.4 | 99.4 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.5 | 99.6 | 99.4 | 99.6 | 99.6 | 99.6 |
| 17 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 99.8 | 100.2 | 100.2 | 100.3 | 100.3 | 100.4 | 100.3 | 100.3 | 100.4 | 100.6 | 100.6 |
| 18 | 100.0 | 99.6 | 99.6 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 100.0 | 100.0 |
| 19 | 100.0 | 99.7 | 99.7 | 99.8 | 100.0 | 99.9 | 100.1 | 100.0 | 99.9 | 100.0 | 99.9 | 100.0 | 99.9 | 100.1 | 100.1 | 100.2 |
| 20 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 99.9 | 99.8 | 99.9 | 100.0 | 99.8 | 100.0 | 100.1 | 100.2 | 99.9 | 100.0 | 100.1 |
| 21 | 100.0 | 99.8 | 99.7 | 99.7 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.1 | 99.9 | 99.9 | 100.0 | 100.0 |
| 22 | 100.0 | 99.7 | 99.7 | 100.0 | 100.0 | 100.0 | 100.1 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 |
| 23 | 100.0 | 99.6 | 99.6 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.2 | 100.2 |
| 24 | 100.0 | 99.8 | 99.7 | 99.7 | 99.9 | 99.9 | 99.7 | 100.0 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 |
| 25 | 100.0 | 99.4 | 99.6 | 99.5 | 99.8 | 99.8 | 99.9 | 99.6 | 99.8 | 99.8 | 99.8 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 |
| Med. | 100.0 | 99.6 | 99.6 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 |
| σ | 0.00 | 0.16 | 0.16 | 0.19 | 0.18 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 | 0.25 | 0.26 | 0.26 | 0.28 | 0.29 | 0.30 |
| Min. | 100.0 | 99.3 | 99.4 | 99.4 | 99.4 | 99.3 | 99.4 | 99.4 | 99.3 | 99.3 | 99.5 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 |
| Max. | 100.0 | 99.9 | 100.0 | 100.1 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 | 100.5 | 100.5 | 100.5 | 100.6 | 100.6 |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.3 | 100.3 | 100.5 | 100.4 | 100.4 | | | | | | | | | | | |
| 2 | 99.9 | 99.9 | 100.1 | 100.0 | 100.0 | | | | | | | | | | | |
| 3 | 100.6 | 100.6 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| 4 | 100.3 | 100.4 | 100.6 | 100.6 | 100.7 | | | | | | | | | | | |
| 5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | | | | | | | | | | | |
| 6 | 99.8 | 99.7 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | |
| 7 | 100.2 | 100.1 | 100.4 | 100.4 | 100.5 | | | | | | | | | | | |
| 8 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 9 | 99.9 | 99.9 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| 10 | 100.6 | 100.6 | 100.8 | 100.9 | 100.9 | | | | | | | | | | | |
| 11 | 99.5 | 99.6 | 99.7 | 99.7 | 99.8 | | | | | | | | | | | |
| 12 | 99.7 | 99.7 | 99.9 | 99.8 | 99.9 | | | | | | | | | | | |
| 13 | 99.8 | 99.7 | 99.8 | 99.8 | 99.9 | | | | | | | | | | | |
| 14 | 99.8 | 99.9 | 100.0 | 99.8 | 100.0 | | | | | | | | | | | |
| 15 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | | | | | | | | | | | |
| 16 | 99.6 | 99.6 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 17 | 100.5 | 100.6 | 100.7 | 100.7 | 100.7 | | | | | | | | | | | |
| 18 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 19 | 100.1 | 100.2 | 100.3 | 100.3 | 100.5 | | | | | | | | | | | |
| 20 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 21 | 99.9 | 99.9 | 100.2 | 100.1 | 100.0 | | | | | | | | | | | |
| 22 | 99.9 | 99.8 | 100.1 | 100.1 | 100.0 | | | | | | | | | | | |
| 23 | 100.2 | 100.3 | 100.4 | 100.4 | 100.5 | | | | | | | | | | | |
| 24 | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 25 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| Med. | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| σ | 0.32 | 0.34 | 0.35 | 0.36 | 0.37 | | | | | | | | | | | |
| Min. | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | | | | | | | | | | | |
| Max. | 100.6 | 100.6 | 100.8 | 100.9 | 100.9 | | | | | | | | | | | |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 |
| 2 | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0018 |
| 3 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0017 |
| 4 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 |
| 5 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0016 |
| 6 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0019 |
| 7 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 8 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0014 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0017 |
| 9 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 |
| 10 | 0.0000 | 0.0011 | 0.0010 | 0.0012 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 |
| 11 | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0017 |
| 12 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0017 |
| 13 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 |
| 14 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 |
| 15 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 |
| 16 | 0.0000 | 0.0010 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 17 | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0017 | 0.0017 |
| 18 | 0.0000 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | 0.0018 |
| 19 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0017 | 0.0017 | 0.0017 |
| 20 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 21 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0017 |
| 22 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | 0.0017 |
| 23 | 0.0000 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0015 |
| 24 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 |
| 25 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0018 | 0.0017 | 0.0017 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0018 |
| Med. | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0017 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0011 | 0.0011 | 0.0010 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0015 |
| Max. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0019 |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0019 | 0.0019 | 0.0018 | 0.0021 | 0.0020 | | | | | | | | | | | |
| 2 | 0.0018 | 0.0017 | 0.0016 | 0.0019 | 0.0019 | | | | | | | | | | | |
| 3 | 0.0018 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 4 | 0.0019 | 0.0018 | 0.0017 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 5 | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | | | | | | | | | | | |
| 6 | 0.0020 | 0.0019 | 0.0018 | 0.0021 | 0.0020 | | | | | | | | | | | |
| 7 | 0.0019 | 0.0017 | 0.0017 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 8 | 0.0018 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | | | | | | | | | | | |
| 9 | 0.0016 | 0.0016 | 0.0015 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 10 | 0.0018 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 11 | 0.0017 | 0.0016 | 0.0015 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 12 | 0.0017 | 0.0016 | 0.0016 | 0.0018 | 0.0017 | | | | | | | | | | | |
| 13 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | | | | | | | | | | | |
| 14 | 0.0019 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 15 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 16 | 0.0019 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | | | | | | | | | | | |
| 17 | 0.0017 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | | | | | | | | | | | |
| 18 | 0.0018 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | | | | | | | | | | | |
| 19 | 0.0017 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | | | | | | | | | | | |
| 20 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | | | | | | | | | | | |
| 21 | 0.0018 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | | | | | | | | | | | |
| 22 | 0.0017 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 23 | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0015 | | | | | | | | | | | |
| 24 | 0.0018 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | | | | | | | | | | | |
| 25 | 0.0019 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0018 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | | | | | | | | | | | |
| Med. | 0.0018 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0015 | | | | | | | | | | | |
| Max. | 0.0020 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | | | | | | | | | | | |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2588 | 0.2578 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2573 | 0.2574 | 0.2573 | 0.2572 | 0.2573 | 0.2572 | 0.2570 | 0.2570 | 0.2569 |
| 2 | 0.2585 | 0.2576 | 0.2575 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2567 | 0.2567 |
| 3 | 0.2591 | 0.2579 | 0.2580 | 0.2578 | 0.2577 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2574 | 0.2573 | 0.2574 |
| 4 | 0.2600 | 0.2590 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2583 | 0.2583 | 0.2583 |
| 5 | 0.2608 | 0.2598 | 0.2598 | 0.2596 | 0.2596 | 0.2595 | 0.2596 | 0.2596 | 0.2596 | 0.2596 | 0.2595 | 0.2594 | 0.2595 | 0.2594 | 0.2593 | 0.2592 |
| 6 | 0.2606 | 0.2595 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2586 |
| 7 | 0.2599 | 0.2589 | 0.2588 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2583 | 0.2584 | 0.2583 | 0.2581 | 0.2582 | 0.2581 |
| 8 | 0.2592 | 0.2582 | 0.2582 | 0.2579 | 0.2579 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2577 | 0.2575 | 0.2574 | 0.2575 |
| 9 | 0.2606 | 0.2597 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2593 | 0.2591 | 0.2590 | 0.2589 | 0.2589 |
| 10 | 0.2602 | 0.2591 | 0.2592 | 0.2590 | 0.2589 | 0.2589 | 0.2590 | 0.2588 | 0.2589 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2584 |
| 11 | 0.2622 | 0.2611 | 0.2610 | 0.2610 | 0.2608 | 0.2609 | 0.2610 | 0.2608 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2604 |
| 12 | 0.2588 | 0.2579 | 0.2578 | 0.2576 | 0.2576 | 0.2574 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2571 | 0.2572 | 0.2571 |
| 13 | 0.2604 | 0.2594 | 0.2594 | 0.2592 | 0.2592 | 0.2591 | 0.2593 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2586 |
| 14 | 0.2593 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2578 | 0.2577 | 0.2576 | 0.2574 | 0.2574 |
| 15 | 0.2592 | 0.2582 | 0.2581 | 0.2579 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2575 |
| 16 | 0.2601 | 0.2592 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 |
| 17 | 0.2611 | 0.2600 | 0.2600 | 0.2599 | 0.2598 | 0.2599 | 0.2598 | 0.2599 | 0.2598 | 0.2599 | 0.2598 | 0.2597 | 0.2598 | 0.2596 | 0.2594 | 0.2594 |
| 18 | 0.2593 | 0.2584 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2580 | 0.2576 | 0.2577 | 0.2575 |
| 19 | 0.2587 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2573 | 0.2571 | 0.2570 | 0.2570 |
| 20 | 0.2596 | 0.2585 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2583 | 0.2581 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | 0.2578 |
| 21 | 0.2593 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2577 | 0.2576 | 0.2576 |
| 22 | 0.2599 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2584 | 0.2585 | 0.2585 | 0.2583 | 0.2582 | 0.2582 |
| 23 | 0.2618 | 0.2608 | 0.2608 | 0.2606 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2606 | 0.2604 | 0.2603 | 0.2603 |
| 24 | 0.2616 | 0.2606 | 0.2606 | 0.2604 | 0.2603 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2603 | 0.2601 | 0.2602 | 0.2602 | 0.2599 | 0.2599 | 0.2598 |
| 25 | 0.2593 | 0.2582 | 0.2581 | 0.2579 | 0.2579 | 0.2579 | 0.2581 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2575 | 0.2575 | 0.2575 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2599 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2583 | 0.2582 | 0.2582 |
| Med. | 0.2599 | 0.2589 | 0.2588 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2583 | 0.2584 | 0.2583 | 0.2581 | 0.2582 | 0.2581 |
| σ | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 |
| Min. | 0.2585 | 0.2576 | 0.2575 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2567 | 0.2567 |
| Max. | 0.2622 | 0.2611 | 0.2610 | 0.2610 | 0.2608 | 0.2609 | 0.2610 | 0.2608 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2604 |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2569 | 0.2569 | 0.2570 | 0.2567 | 0.2567 | | | | | | | | | | | |
| 2 | 0.2568 | 0.2569 | 0.2569 | 0.2566 | 0.2566 | | | | | | | | | | | |
| 3 | 0.2573 | 0.2575 | 0.2574 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 4 | 0.2582 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | | | | | | | | | | | |
| 5 | 0.2593 | 0.2593 | 0.2594 | 0.2592 | 0.2592 | | | | | | | | | | | |
| 6 | 0.2586 | 0.2587 | 0.2588 | 0.2585 | 0.2586 | | | | | | | | | | | |
| 7 | 0.2580 | 0.2582 | 0.2582 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 8 | 0.2574 | 0.2575 | 0.2576 | 0.2574 | 0.2573 | | | | | | | | | | | |
| 9 | 0.2590 | 0.2591 | 0.2591 | 0.2588 | 0.2588 | | | | | | | | | | | |
| 10 | 0.2584 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | | | | | | | | | | | |
| 11 | 0.2605 | 0.2605 | 0.2606 | 0.2603 | 0.2603 | | | | | | | | | | | |
| 12 | 0.2572 | 0.2572 | 0.2573 | 0.2570 | 0.2571 | | | | | | | | | | | |
| 13 | 0.2586 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | | | | | | | | | | | |
| 14 | 0.2574 | 0.2575 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 15 | 0.2576 | 0.2577 | 0.2577 | 0.2575 | 0.2575 | | | | | | | | | | | |
| 16 | 0.2583 | 0.2584 | 0.2585 | 0.2582 | 0.2582 | | | | | | | | | | | |
| 17 | 0.2594 | 0.2594 | 0.2595 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 18 | 0.2576 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | | | | | | | | | | | |
| 19 | 0.2570 | 0.2571 | 0.2571 | 0.2569 | 0.2568 | | | | | | | | | | | |
| 20 | 0.2577 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | | | | | | | | | | | |
| 21 | 0.2575 | 0.2577 | 0.2577 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 22 | 0.2582 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | | | | | | | | | | | |
| 23 | 0.2603 | 0.2603 | 0.2605 | 0.2602 | 0.2603 | | | | | | | | | | | |
| 24 | 0.2598 | 0.2600 | 0.2599 | 0.2598 | 0.2597 | | | | | | | | | | | |
| 25 | 0.2574 | 0.2576 | 0.2575 | 0.2574 | 0.2575 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2582 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | | | | | | | | | | | |
| Med. | 0.2580 | 0.2582 | 0.2582 | 0.2579 | 0.2579 | | | | | | | | | | | |
| σ | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.2568 | 0.2569 | 0.2569 | 0.2566 | 0.2566 | | | | | | | | | | | |
| Max. | 0.2605 | 0.2605 | 0.2606 | 0.2603 | 0.2603 | | | | | | | | | | | |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 7-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 |
| 2 | 0.5260 | 0.5260 | 0.5260 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5262 | 0.5262 |
| 3 | 0.5268 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5268 |
| 4 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 |
| 5 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5292 | 0.5291 | 0.5292 | 0.5291 |
| 6 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5284 |
| 7 | 0.5272 | 0.5272 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5273 | 0.5272 |
| 8 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 |
| 9 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5280 | 0.5279 | 0.5278 | 0.5279 | 0.5279 |
| 10 | 0.5263 | 0.5261 | 0.5262 | 0.5262 | 0.5263 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5263 |
| 11 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5298 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5297 | 0.5297 |
| 12 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 |
| 13 | 0.5283 | 0.5282 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 |
| 14 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 |
| 15 | 0.5292 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5293 | 0.5293 |
| 16 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5268 |
| 17 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5285 |
| 18 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5267 |
| 19 | 0.5286 | 0.5284 | 0.5284 | 0.5285 | 0.5286 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5285 |
| 20 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5280 |
| 21 | 0.5269 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5270 |
| 22 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5264 |
| 23 | 0.5282 | 0.5281 | 0.5281 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5283 |
| 24 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5295 |
| 25 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5269 | 0.5268 | 0.5269 | 0.5269 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| Med. | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 |
| σ | 0.0010 | 0.0011 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 |
| Min. | 0.5260 | 0.5260 | 0.5260 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5262 | 0.5262 |
| Max. | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5298 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5297 | 0.5297 |

## Data Set 7 : 85 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 85.9 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

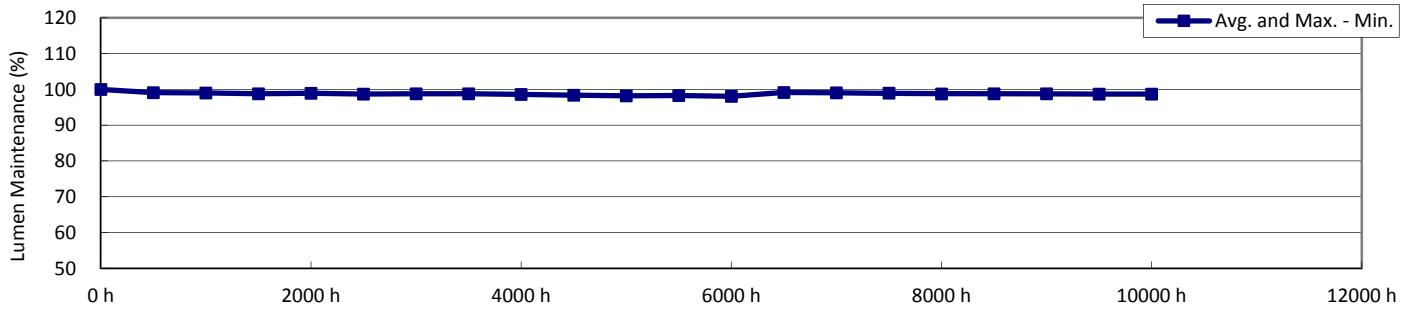
**TABLE 7-6 (Continued)**
Chromaticity

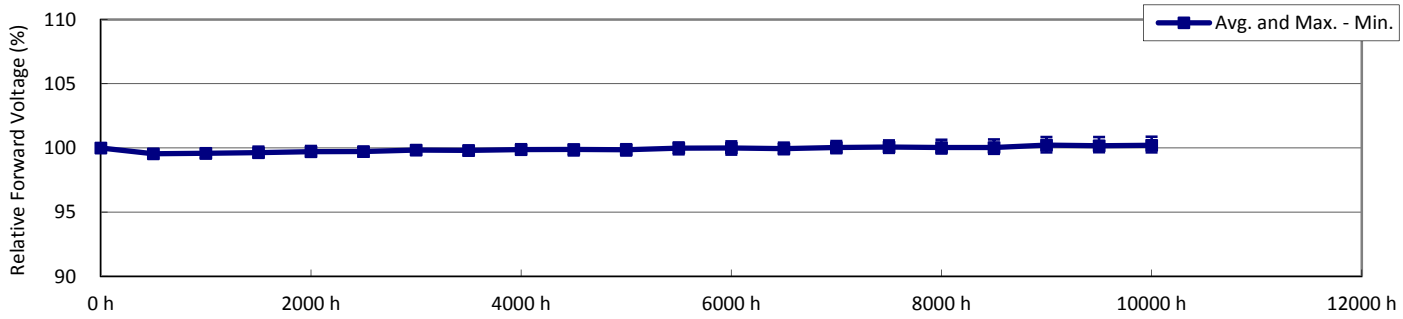
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | | | | | | | | | | | |
| 2 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| 3 | 0.5268 | 0.5268 | 0.5270 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 4 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 5 | 0.5291 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | | | | | | | | | | | |
| 6 | 0.5285 | 0.5285 | 0.5286 | 0.5285 | 0.5284 | | | | | | | | | | | |
| 7 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 8 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | | | | | | | | | | | |
| 9 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 10 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | |
| 11 | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5297 | | | | | | | | | | | |
| 12 | 0.5279 | 0.5279 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 13 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 14 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 15 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | | | | | | | | | | | |
| 16 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | | | | | | | | | | | |
| 17 | 0.5284 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | |
| 18 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 19 | 0.5285 | 0.5286 | 0.5286 | 0.5285 | 0.5286 | | | | | | | | | | | |
| 20 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 21 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5270 | | | | | | | | | | | |
| 22 | 0.5264 | 0.5264 | 0.5266 | 0.5264 | 0.5264 | | | | | | | | | | | |
| 23 | 0.5284 | 0.5284 | 0.5285 | 0.5283 | 0.5283 | | | | | | | | | | | |
| 24 | 0.5295 | 0.5296 | 0.5297 | 0.5295 | 0.5296 | | | | | | | | | | | |
| 25 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5277 | 0.5278 | 0.5279 | 0.5277 | 0.5277 | | | | | | | | | | | |
| Med. | 0.5279 | 0.5279 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| σ | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | | | | | | | | | | | |
| Min. | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | |
| Max. | 0.5297 | 0.5297 | 0.5298 | 0.5297 | 0.5297 | | | | | | | | | | | |

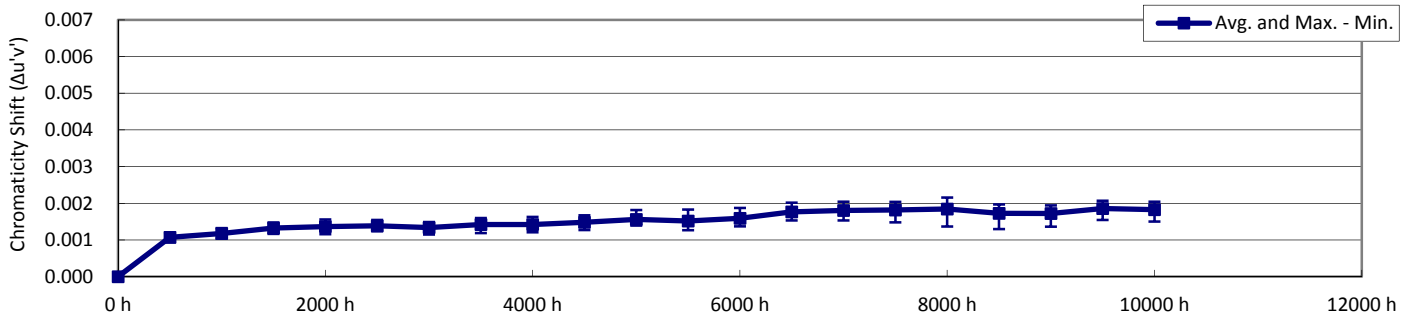
## Data Set 8 : 85 °C, 180 mA

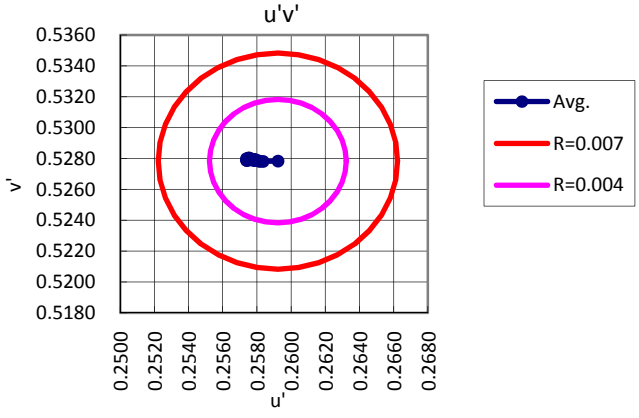
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 77.8 | 3.23 | 2792 | 0.58 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 2 | 77.8 | 3.23 | 2748 | 0.58 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 3 | 78.0 | 3.21 | 2762 | 0.58 | 0.459 | 0.417 | 0.259 | 0.529 | | | | |
| 4 | 78.1 | 3.22 | 2776 | 0.58 | 0.457 | 0.415 | 0.259 | 0.529 | | | | |
| 5 | 78.4 | 3.23 | 2767 | 0.58 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 6 | 77.7 | 3.22 | 2789 | 0.58 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 7 | 77.7 | 3.21 | 2755 | 0.58 | 0.457 | 0.413 | 0.260 | 0.528 | | | | |
| 8 | 78.7 | 3.23 | 2777 | 0.58 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 9 | 77.7 | 3.22 | 2737 | 0.58 | 0.460 | 0.416 | 0.260 | 0.529 | | | | |
| 10 | 77.0 | 3.20 | 2784 | 0.58 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 11 | 77.8 | 3.22 | 2751 | 0.58 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 12 | 78.3 | 3.23 | 2785 | 0.58 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 13 | 77.8 | 3.22 | 2754 | 0.58 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 14 | 78.0 | 3.23 | 2743 | 0.58 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 15 | 78.0 | 3.22 | 2741 | 0.58 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 16 | 77.6 | 3.21 | 2775 | 0.58 | 0.457 | 0.416 | 0.259 | 0.529 | | | | |
| 17 | 77.9 | 3.22 | 2777 | 0.58 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 18 | 77.3 | 3.21 | 2783 | 0.58 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 19 | 77.7 | 3.21 | 2784 | 0.58 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 20 | 78.4 | 3.22 | 2748 | 0.58 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 21 | 78.2 | 3.23 | 2775 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 22 | 77.8 | 3.22 | 2763 | 0.58 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 23 | 78.0 | 3.22 | 2780 | 0.58 | 0.457 | 0.415 | 0.258 | 0.529 | | | | |
| 24 | 77.5 | 3.22 | 2789 | 0.58 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 25 | 77.7 | 3.22 | 2795 | 0.58 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 77.9 | 3.22 | 2769 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 77.8 | 3.22 | 2775 | 0.58 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| σ | 0.36 | 0.008 | 17.7 | 0.001 | 0.0023 | 0.0024 | 0.0007 | 0.0012 | | | | |
| Min. | 77.0 | 3.20 | 2737 | 0.58 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 78.7 | 3.23 | 2795 | 0.58 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.1 | 98.9 | 98.7 | 98.8 | 98.6 | 98.8 | 98.7 | 98.3 | 98.3 | 98.1 | 98.1 | 97.9 | 99.1 | 98.9 | 98.9 |
| 2 | 100.0 | 99.4 | 99.2 | 99.0 | 99.1 | 98.9 | 99.0 | 99.1 | 98.8 | 98.7 | 98.5 | 98.6 | 98.3 | 99.4 | 99.4 | 99.2 |
| 3 | 100.0 | 99.1 | 99.0 | 98.8 | 99.0 | 98.7 | 98.9 | 98.9 | 98.6 | 98.5 | 98.3 | 98.4 | 98.1 | 99.3 | 99.2 | 99.1 |
| 4 | 100.0 | 99.2 | 99.1 | 98.9 | 99.1 | 98.9 | 99.0 | 99.0 | 98.7 | 98.6 | 98.4 | 98.5 | 98.2 | 99.2 | 99.1 | 99.0 |
| 5 | 100.0 | 99.0 | 99.1 | 99.0 | 98.9 | 98.8 | 98.8 | 98.8 | 98.6 | 98.5 | 98.2 | 98.5 | 98.1 | 99.2 | 99.0 | 99.1 |
| 6 | 100.0 | 99.2 | 99.0 | 98.7 | 98.8 | 98.6 | 98.6 | 98.6 | 98.4 | 98.1 | 98.0 | 98.1 | 97.8 | 98.9 | 98.8 | 98.7 |
| 7 | 100.0 | 99.1 | 99.0 | 98.9 | 98.9 | 98.6 | 98.8 | 98.7 | 98.6 | 98.4 | 98.1 | 98.2 | 98.0 | 99.1 | 99.1 | 98.9 |
| 8 | 100.0 | 98.9 | 98.7 | 98.6 | 98.6 | 98.3 | 98.4 | 98.4 | 98.2 | 98.0 | 97.9 | 97.9 | 97.6 | 98.8 | 98.7 | 98.4 |
| 9 | 100.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.5 | 98.7 | 98.7 | 98.5 | 98.4 | 98.2 | 98.2 | 98.0 | 99.1 | 99.0 | 98.8 |
| 10 | 100.0 | 99.2 | 99.1 | 98.9 | 99.0 | 98.7 | 98.9 | 98.9 | 98.7 | 98.4 | 98.3 | 98.4 | 98.1 | 99.2 | 99.2 | 98.9 |
| 11 | 100.0 | 99.2 | 99.2 | 99.1 | 99.2 | 98.8 | 99.1 | 99.2 | 98.9 | 98.7 | 98.6 | 98.7 | 98.4 | 99.3 | 99.6 | 99.3 |
| 12 | 100.0 | 99.3 | 99.0 | 99.0 | 99.1 | 98.8 | 99.0 | 99.0 | 98.8 | 98.6 | 98.5 | 98.5 | 98.3 | 99.3 | 99.3 | 99.2 |
| 13 | 100.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.7 | 98.7 | 98.8 | 98.6 | 98.4 | 98.2 | 98.4 | 98.0 | 99.3 | 99.2 | 99.0 |
| 14 | 100.0 | 99.0 | 98.9 | 98.8 | 98.9 | 98.6 | 98.7 | 98.6 | 98.4 | 98.2 | 98.0 | 98.2 | 97.8 | 99.0 | 98.9 | 98.7 |
| 15 | 100.0 | 99.1 | 99.0 | 98.8 | 98.9 | 98.8 | 98.9 | 98.8 | 98.6 | 98.4 | 98.2 | 98.3 | 98.1 | 99.3 | 99.1 | 98.9 |
| 16 | 100.0 | 99.1 | 99.1 | 98.9 | 99.1 | 98.9 | 99.0 | 99.0 | 98.7 | 98.6 | 98.4 | 98.5 | 98.3 | 99.4 | 99.3 | 99.1 |
| 17 | 100.0 | 99.1 | 99.3 | 98.8 | 99.2 | 98.8 | 99.0 | 99.1 | 98.8 | 98.5 | 98.5 | 98.4 | 98.2 | 99.2 | 99.2 | 99.0 |
| 18 | 100.0 | 99.0 | 98.9 | 98.8 | 99.0 | 98.7 | 98.8 | 98.7 | 98.5 | 98.3 | 98.1 | 98.2 | 97.9 | 99.1 | 98.9 | 98.8 |
| 19 | 100.0 | 99.0 | 98.8 | 98.7 | 98.7 | 98.6 | 98.7 | 98.6 | 98.5 | 98.2 | 98.0 | 98.1 | 97.9 | 98.9 | 98.8 | 98.8 |
| 20 | 100.0 | 99.1 | 99.0 | 98.8 | 98.8 | 98.7 | 98.7 | 98.6 | 98.5 | 98.1 | 98.0 | 98.1 | 97.9 | 98.9 | 98.8 | 98.7 |
| 21 | 100.0 | 99.1 | 98.9 | 98.7 | 98.8 | 98.7 | 98.8 | 98.6 | 98.5 | 98.2 | 98.1 | 98.1 | 97.9 | 98.9 | 98.8 | 98.7 |
| 22 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.9 | 98.8 | 98.6 | 98.4 | 98.2 | 98.3 | 98.0 | 99.1 | 98.9 | 99.0 |
| 23 | 100.0 | 99.3 | 99.2 | 98.9 | 99.1 | 99.0 | 99.2 | 99.1 | 99.0 | 98.7 | 98.5 | 98.7 | 98.3 | 99.5 | 99.3 | 99.4 |
| 24 | 100.0 | 99.2 | 99.1 | 98.9 | 99.0 | 98.8 | 99.0 | 98.9 | 98.8 | 98.5 | 98.3 | 98.5 | 98.2 | 99.3 | 99.1 | 99.1 |
| 25 | 100.0 | 99.0 | 98.8 | 98.6 | 98.7 | 98.6 | 98.7 | 98.6 | 98.3 | 98.2 | 98.1 | 98.2 | 97.9 | 99.0 | 98.9 | 98.9 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.1 | 99.0 | 98.8 | 98.9 | 98.7 | 98.8 | 98.8 | 98.6 | 98.4 | 98.2 | 98.3 | 98.0 | 99.2 | 99.1 | 98.9 |
| Med. | 100.0 | 99.1 | 99.0 | 98.8 | 98.9 | 98.7 | 98.8 | 98.8 | 98.6 | 98.4 | 98.2 | 98.3 | 98.0 | 99.2 | 99.1 | 98.9 |
| σ | 0.00 | 0.12 | 0.14 | 0.12 | 0.16 | 0.15 | 0.18 | 0.21 | 0.19 | 0.20 | 0.19 | 0.21 | 0.20 | 0.19 | 0.22 | 0.22 |
| Min. | 100.0 | 98.9 | 98.7 | 98.6 | 98.6 | 98.3 | 98.4 | 98.4 | 98.2 | 98.0 | 97.9 | 97.9 | 97.6 | 98.8 | 98.7 | 98.4 |
| Max. | 100.0 | 99.4 | 99.3 | 99.1 | 99.2 | 99.0 | 99.2 | 99.2 | 99.0 | 98.7 | 98.6 | 98.7 | 98.4 | 99.5 | 99.6 | 99.4 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0182 | -0.0171 | -0.0197 | -0.0085 | -0.0094 | -0.0106 | -0.0126 | -0.0121 | -0.0121 | -0.0131 | -0.0131 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.980 | |
| α | -9.80E-07 | |
| $R^2$ | 0.206 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 98.6 | 98.8 | 98.7 | 98.6 | 98.6 | | | | | | | | | | | |
| 2 | 99.0 | 99.2 | 99.1 | 99.1 | 99.0 | | | | | | | | | | | |
| 3 | 98.8 | 99.0 | 98.9 | 99.0 | 98.9 | | | | | | | | | | | |
| 4 | 98.5 | 98.8 | 98.7 | 98.6 | 98.6 | | | | | | | | | | | |
| 5 | 98.7 | 98.9 | 98.7 | 98.7 | 98.5 | | | | | | | | | | | |
| 6 | 98.4 | 98.6 | 98.5 | 98.4 | 98.3 | | | | | | | | | | | |
| 7 | 98.7 | 98.7 | 98.8 | 98.6 | 98.7 | | | | | | | | | | | |
| 8 | 98.3 | 98.3 | 98.4 | 98.3 | 98.3 | | | | | | | | | | | |
| 9 | 98.8 | 98.7 | 98.8 | 98.6 | 98.7 | | | | | | | | | | | |
| 10 | 98.9 | 98.7 | 98.7 | 98.6 | 98.6 | | | | | | | | | | | |
| 11 | 99.1 | 98.8 | 99.1 | 98.9 | 98.9 | | | | | | | | | | | |
| 12 | 99.1 | 99.0 | 99.1 | 99.0 | 99.0 | | | | | | | | | | | |
| 13 | 98.9 | 99.0 | 99.0 | 98.9 | 98.7 | | | | | | | | | | | |
| 14 | 98.6 | 98.7 | 98.6 | 98.6 | 98.4 | | | | | | | | | | | |
| 15 | 98.8 | 98.9 | 98.8 | 98.8 | 98.7 | | | | | | | | | | | |
| 16 | 99.0 | 99.1 | 99.0 | 99.0 | 99.0 | | | | | | | | | | | |
| 17 | 98.5 | 98.7 | 98.6 | 98.7 | 98.6 | | | | | | | | | | | |
| 18 | 98.6 | 98.8 | 98.6 | 98.6 | 98.6 | | | | | | | | | | | |
| 19 | 98.6 | 98.8 | 98.6 | 98.6 | 98.5 | | | | | | | | | | | |
| 20 | 98.6 | 98.6 | 98.5 | 98.6 | 98.4 | | | | | | | | | | | |
| 21 | 98.6 | 98.6 | 98.5 | 98.6 | 98.5 | | | | | | | | | | | |
| 22 | 98.8 | 98.8 | 98.7 | 98.7 | 98.6 | | | | | | | | | | | |
| 23 | 99.2 | 99.1 | 98.9 | 98.7 | 98.8 | | | | | | | | | | | |
| 24 | 99.0 | 99.1 | 99.0 | 98.9 | 98.9 | | | | | | | | | | | |
| 25 | 98.7 | 98.8 | 98.8 | 98.7 | 98.7 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 98.8 | 98.8 | 98.8 | 98.7 | 98.7 | | | | | | | | | | | |
| Med. | 98.7 | 98.8 | 98.7 | 98.7 | 98.6 | | | | | | | | | | | |
| σ | 0.23 | 0.20 | 0.21 | 0.19 | 0.21 | | | | | | | | | | | |
| Min. | 98.3 | 98.3 | 98.4 | 98.3 | 98.3 | | | | | | | | | | | |
| Max. | 99.2 | 99.2 | 99.1 | 99.1 | 99.0 | | | | | | | | | | | |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.8 | 99.8 | 99.9 | 100.1 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 |
| 2 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.8 | 99.8 | 99.8 | 99.6 | 99.9 | 100.1 | 99.9 | 100.0 | 100.1 |
| 3 | 100.0 | 99.4 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 |
| 4 | 100.0 | 99.5 | 99.4 | 99.5 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 |
| 5 | 100.0 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | 100.3 | 100.4 | 100.4 |
| 6 | 100.0 | 99.2 | 99.2 | 99.3 | 99.4 | 99.3 | 99.6 | 99.4 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 |
| 7 | 100.0 | 99.5 | 99.5 | 99.6 | 99.9 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.9 | 99.9 | 99.7 | 99.8 | 99.9 |
| 8 | 100.0 | 99.6 | 99.7 | 99.8 | 99.7 | 99.9 | 100.0 | 100.1 | 100.3 | 100.1 | 100.1 | 100.2 | 100.3 | 100.2 | 100.3 | 100.4 |
| 9 | 100.0 | 99.5 | 99.6 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 100.0 | 100.2 | 100.2 | 100.4 | 100.4 | 100.3 | 100.5 | 100.5 |
| 10 | 100.0 | 99.5 | 99.7 | 99.8 | 99.9 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | 100.4 | 100.4 | 100.4 | 100.5 | 100.6 |
| 11 | 100.0 | 99.5 | 99.5 | 99.6 | 99.8 | 99.6 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 100.2 | 100.0 | 100.1 | 100.1 | 100.2 |
| 12 | 100.0 | 99.8 | 99.7 | 99.7 | 99.9 | 99.8 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 |
| 13 | 100.0 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | 100.2 | 100.0 | 100.0 | 100.1 |
| 14 | 100.0 | 99.8 | 99.8 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.1 | 100.2 | 100.3 | 100.4 | 100.5 |
| 15 | 100.0 | 99.2 | 99.2 | 99.3 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.7 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.7 |
| 16 | 100.0 | 99.3 | 99.4 | 99.4 | 99.3 | 99.5 | 99.6 | 99.5 | 99.6 | 99.5 | 99.5 | 99.8 | 99.7 | 99.5 | 99.6 | 99.6 |
| 17 | 100.0 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 |
| 18 | 100.0 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 |
| 19 | 100.0 | 99.6 | 99.8 | 99.7 | 99.8 | 99.8 | 100.0 | 99.9 | 100.0 | 100.0 | 99.9 | 100.1 | 100.2 | 100.0 | 100.1 | 100.0 |
| 20 | 100.0 | 99.8 | 99.9 | 100.0 | 100.2 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.4 | 100.2 | 100.4 | 100.5 | 100.5 |
| 21 | 100.0 | 99.8 | 99.9 | 100.1 | 99.9 | 100.1 | 100.1 | 100.1 | 100.3 | 100.2 | 100.1 | 100.3 | 100.5 | 100.3 | 100.5 | 100.5 |
| 22 | 100.0 | 99.6 | 99.5 | 99.6 | 99.6 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.1 |
| 23 | 100.0 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 |
| 24 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 |
| 25 | 100.0 | 99.5 | 99.4 | 99.4 | 99.6 | 99.5 | 99.6 | 99.4 | 99.6 | 99.6 | 99.7 | 99.9 | 99.8 | 99.7 | 99.7 | 99.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.5 | 99.6 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 |
| Med. | 100.0 | 99.5 | 99.6 | 99.6 | 99.7 | 99.7 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | 100.1 |
| σ | 0.00 | 0.16 | 0.20 | 0.21 | 0.22 | 0.21 | 0.22 | 0.24 | 0.25 | 0.25 | 0.27 | 0.27 | 0.29 | 0.29 | 0.32 | 0.32 |
| Min. | 100.0 | 99.2 | 99.2 | 99.3 | 99.3 | 99.3 | 99.5 | 99.4 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 |
| Max. | 100.0 | 99.8 | 99.9 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.3 | 100.2 | 100.3 | 100.4 | 100.5 | 100.4 | 100.5 | 100.6 |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.1 | 100.1 | 100.4 | 100.3 | 100.3 | | | | | | | | | | | |
| 2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | | | | | | | | | | | |
| 3 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | |
| 4 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | | | | | | | | | | | |
| 5 | 100.4 | 100.5 | 100.6 | 100.5 | 100.6 | | | | | | | | | | | |
| 6 | 99.6 | 99.6 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 7 | 99.8 | 99.8 | 100.0 | 99.9 | 99.9 | | | | | | | | | | | |
| 8 | 100.3 | 100.2 | 100.5 | 100.4 | 100.5 | | | | | | | | | | | |
| 9 | 100.4 | 100.5 | 100.7 | 100.7 | 100.7 | | | | | | | | | | | |
| 10 | 100.5 | 100.7 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| 11 | 100.1 | 100.1 | 100.4 | 100.3 | 100.3 | | | | | | | | | | | |
| 12 | 100.2 | 100.3 | 100.5 | 100.5 | 100.5 | | | | | | | | | | | |
| 13 | 100.0 | 99.9 | 100.1 | 100.0 | 100.1 | | | | | | | | | | | |
| 14 | 100.5 | 100.5 | 100.7 | 100.6 | 100.7 | | | | | | | | | | | |
| 15 | 99.6 | 99.6 | 99.8 | 99.7 | 99.7 | | | | | | | | | | | |
| 16 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| 17 | 99.7 | 99.7 | 99.9 | 99.8 | 99.8 | | | | | | | | | | | |
| 18 | 99.9 | 99.9 | 100.1 | 100.0 | 100.1 | | | | | | | | | | | |
| 19 | 100.1 | 100.0 | 100.2 | 100.1 | 100.2 | | | | | | | | | | | |
| 20 | 100.6 | 100.5 | 100.7 | 100.8 | 100.8 | | | | | | | | | | | |
| 21 | 100.4 | 100.5 | 100.7 | 100.7 | 100.8 | | | | | | | | | | | |
| 22 | 100.0 | 100.0 | 100.2 | 100.1 | 100.2 | | | | | | | | | | | |
| 23 | 99.8 | 99.7 | 99.9 | 99.8 | 99.8 | | | | | | | | | | | |
| 24 | 99.9 | 100.0 | 100.1 | 100.0 | 100.1 | | | | | | | | | | | |
| 25 | 99.8 | 99.9 | 100.0 | 100.0 | 99.9 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | |
| Med. | 100.0 | 100.0 | 100.2 | 100.1 | 100.2 | | | | | | | | | | | |
| σ | 0.33 | 0.35 | 0.36 | 0.39 | 0.40 | | | | | | | | | | | |
| Min. | 99.6 | 99.5 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | |
| Max. | 100.6 | 100.7 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0010 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0013 | 0.0015 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 |
| 2 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 |
| 3 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0019 |
| 4 | 0.0000 | 0.0010 | 0.0010 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0015 |
| 5 | 0.0000 | 0.0010 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | 0.0016 |
| 6 | 0.0000 | 0.0012 | 0.0012 | 0.0015 | 0.0016 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 |
| 7 | 0.0000 | 0.0010 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0020 |
| 8 | 0.0000 | 0.0010 | 0.0011 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0019 |
| 9 | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0013 | 0.0016 | 0.0017 | 0.0017 | 0.0017 |
| 10 | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | 0.0015 | 0.0018 | 0.0019 | 0.0018 |
| 11 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0016 |
| 12 | 0.0000 | 0.0010 | 0.0010 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 13 | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0020 |
| 14 | 0.0000 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 15 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0020 |
| 16 | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 |
| 17 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | 0.0017 |
| 18 | 0.0000 | 0.0009 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0017 |
| 19 | 0.0000 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| 20 | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 |
| 21 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0018 |
| 22 | 0.0000 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0020 |
| 23 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0018 |
| 24 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0020 |
| 25 | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0018 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| Med. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 |
| Max. | 0.0000 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0019 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| 2 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 3 | 0.0019 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | | | | | | | | | | | |
| 4 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| 5 | 0.0017 | 0.0016 | 0.0014 | 0.0016 | 0.0017 | | | | | | | | | | | |
| 6 | 0.0022 | 0.0020 | 0.0019 | 0.0021 | 0.0020 | | | | | | | | | | | |
| 7 | 0.0020 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 8 | 0.0020 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 9 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | | | | | | | | | | | |
| 10 | 0.0020 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| 11 | 0.0016 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 12 | 0.0019 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | | | | | | | | | | | |
| 13 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 14 | 0.0018 | 0.0018 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| 15 | 0.0020 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 16 | 0.0018 | 0.0016 | 0.0016 | 0.0018 | 0.0017 | | | | | | | | | | | |
| 17 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0015 | | | | | | | | | | | |
| 18 | 0.0018 | 0.0017 | 0.0016 | 0.0018 | 0.0017 | | | | | | | | | | | |
| 19 | 0.0019 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | | | | | | | | | | | |
| 20 | 0.0019 | 0.0018 | 0.0018 | 0.0019 | 0.0018 | | | | | | | | | | | |
| 21 | 0.0019 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 22 | 0.0020 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | | | | | | | | | | | |
| 23 | 0.0018 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | | | | | | | | | | | |
| 24 | 0.0021 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 25 | 0.0018 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0018 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| Med. | 0.0019 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | | | | | | | | | | | |
| σ | 0.0002 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | | | | | | | | | | | |
| Max. | 0.0022 | 0.0020 | 0.0019 | 0.0021 | 0.0020 | | | | | | | | | | | |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2584 | 0.2574 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2570 | 0.2570 | 0.2571 | 0.2569 | 0.2569 | 0.2569 | 0.2568 | 0.2566 | 0.2566 | 0.2566 |
| 2 | 0.2603 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 |
| 3 | 0.2594 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2576 | 0.2575 |
| 4 | 0.2593 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2578 | 0.2578 |
| 5 | 0.2617 | 0.2607 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2603 | 0.2603 | 0.2603 | 0.2603 | 0.2601 | 0.2603 | 0.2603 | 0.2601 | 0.2600 | 0.2601 |
| 6 | 0.2594 | 0.2582 | 0.2582 | 0.2579 | 0.2578 | 0.2578 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2573 | 0.2574 |
| 7 | 0.2601 | 0.2591 | 0.2589 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2582 | 0.2582 | 0.2581 |
| 8 | 0.2591 | 0.2581 | 0.2580 | 0.2577 | 0.2577 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2572 | 0.2573 | 0.2573 |
| 9 | 0.2606 | 0.2595 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2593 | 0.2590 | 0.2589 | 0.2589 | 0.2589 |
| 10 | 0.2595 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2578 | 0.2580 | 0.2580 | 0.2577 | 0.2576 | 0.2577 |
| 11 | 0.2618 | 0.2607 | 0.2607 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2606 | 0.2605 | 0.2604 | 0.2605 | 0.2604 | 0.2603 | 0.2601 | 0.2602 |
| 12 | 0.2591 | 0.2581 | 0.2581 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2577 | 0.2575 | 0.2574 | 0.2573 | 0.2573 |
| 13 | 0.2600 | 0.2589 | 0.2588 | 0.2586 | 0.2585 | 0.2585 | 0.2587 | 0.2585 | 0.2584 | 0.2585 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2581 |
| 14 | 0.2605 | 0.2593 | 0.2593 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2590 | 0.2589 | 0.2587 | 0.2587 | 0.2587 |
| 15 | 0.2604 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 |
| 16 | 0.2592 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2576 |
| 17 | 0.2613 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2601 | 0.2601 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2599 | 0.2596 | 0.2596 | 0.2596 |
| 18 | 0.2593 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2577 | 0.2576 | 0.2576 |
| 19 | 0.2590 | 0.2580 | 0.2580 | 0.2577 | 0.2577 | 0.2576 | 0.2577 | 0.2576 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2574 | 0.2572 | 0.2573 | 0.2572 |
| 20 | 0.2600 | 0.2589 | 0.2587 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2581 | 0.2581 |
| 21 | 0.2591 | 0.2580 | 0.2579 | 0.2578 | 0.2577 | 0.2577 | 0.2578 | 0.2577 | 0.2578 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2572 | 0.2573 |
| 22 | 0.2603 | 0.2592 | 0.2591 | 0.2589 | 0.2589 | 0.2589 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 |
| 23 | 0.2607 | 0.2596 | 0.2596 | 0.2594 | 0.2595 | 0.2595 | 0.2595 | 0.2593 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2590 | 0.2590 | 0.2589 |
| 24 | 0.2593 | 0.2581 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2577 | 0.2576 | 0.2574 | 0.2574 | 0.2573 |
| 25 | 0.2585 | 0.2574 | 0.2574 | 0.2573 | 0.2571 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | 0.2570 | 0.2570 | 0.2570 | 0.2569 | 0.2566 | 0.2568 | 0.2567 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2599 | 0.2588 | 0.2587 | 0.2585 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | 0.2580 |
| Med. | 0.2595 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2579 | 0.2580 | 0.2580 | 0.2577 | 0.2578 | 0.2578 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0010 | 0.0009 | 0.0010 |
| Min. | 0.2584 | 0.2574 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2570 | 0.2570 | 0.2571 | 0.2569 | 0.2569 | 0.2569 | 0.2568 | 0.2566 | 0.2566 | 0.2566 |
| Max. | 0.2618 | 0.2607 | 0.2607 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2606 | 0.2605 | 0.2604 | 0.2605 | 0.2604 | 0.2603 | 0.2601 | 0.2602 |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2565 | 0.2567 | 0.2568 | 0.2565 | 0.2566 | | | | | | | | | | | |
| 2 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | | | | | | | | | | | |
| 3 | 0.2575 | 0.2577 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 4 | 0.2579 | 0.2580 | 0.2579 | 0.2577 | 0.2578 | | | | | | | | | | | |
| 5 | 0.2600 | 0.2601 | 0.2603 | 0.2601 | 0.2600 | | | | | | | | | | | |
| 6 | 0.2572 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 7 | 0.2581 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | | | | | | | | | | | |
| 8 | 0.2571 | 0.2573 | 0.2573 | 0.2571 | 0.2572 | | | | | | | | | | | |
| 9 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | | | | | | | | | | | |
| 10 | 0.2575 | 0.2578 | 0.2578 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 11 | 0.2602 | 0.2603 | 0.2604 | 0.2601 | 0.2601 | | | | | | | | | | | |
| 12 | 0.2572 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | | | | | | | | | | | |
| 13 | 0.2581 | 0.2582 | 0.2581 | 0.2580 | 0.2581 | | | | | | | | | | | |
| 14 | 0.2587 | 0.2587 | 0.2588 | 0.2586 | 0.2586 | | | | | | | | | | | |
| 15 | 0.2584 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | | | | | | | | | | | |
| 16 | 0.2575 | 0.2576 | 0.2577 | 0.2575 | 0.2575 | | | | | | | | | | | |
| 17 | 0.2598 | 0.2598 | 0.2599 | 0.2597 | 0.2598 | | | | | | | | | | | |
| 18 | 0.2576 | 0.2576 | 0.2577 | 0.2575 | 0.2576 | | | | | | | | | | | |
| 19 | 0.2572 | 0.2572 | 0.2572 | 0.2571 | 0.2572 | | | | | | | | | | | |
| 20 | 0.2581 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | | | | | | | | | | | |
| 21 | 0.2572 | 0.2574 | 0.2573 | 0.2571 | 0.2572 | | | | | | | | | | | |
| 22 | 0.2584 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | | | | | | | | | | | |
| 23 | 0.2589 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | | | | | | | | | | | |
| 24 | 0.2573 | 0.2574 | 0.2575 | 0.2573 | 0.2574 | | | | | | | | | | | |
| 25 | 0.2566 | 0.2568 | 0.2568 | 0.2567 | 0.2566 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2580 | 0.2581 | 0.2582 | 0.2580 | 0.2580 | | | | | | | | | | | |
| Med. | 0.2579 | 0.2580 | 0.2579 | 0.2577 | 0.2578 | | | | | | | | | | | |
| σ | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0010 | | | | | | | | | | | |
| Min. | 0.2565 | 0.2567 | 0.2568 | 0.2565 | 0.2566 | | | | | | | | | | | |
| Max. | 0.2602 | 0.2603 | 0.2604 | 0.2601 | 0.2601 | | | | | | | | | | | |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 8-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | 0.5274 |
| 2 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5280 |
| 3 | 0.5292 | 0.5293 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 |
| 4 | 0.5286 | 0.5285 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5287 | 0.5287 | 0.5287 | 0.5288 | 0.5287 |
| 5 | 0.5284 | 0.5283 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5285 | 0.5285 |
| 6 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5258 |
| 7 | 0.5276 | 0.5275 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5277 |
| 8 | 0.5267 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 |
| 9 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5294 |
| 10 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 |
| 11 | 0.5305 | 0.5305 | 0.5306 | 0.5306 | 0.5306 | 0.5306 | 0.5306 | 0.5307 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5307 |
| 12 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 |
| 13 | 0.5280 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 |
| 14 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5281 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5281 |
| 15 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5296 | 0.5296 | 0.5297 | 0.5297 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5297 |
| 16 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5290 | 0.5289 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5289 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5290 |
| 17 | 0.5293 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5295 |
| 18 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5271 |
| 19 | 0.5257 | 0.5257 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5258 |
| 20 | 0.5295 | 0.5295 | 0.5295 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 |
| 21 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5279 | 0.5277 | 0.5278 | 0.5278 |
| 22 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5271 | 0.5272 |
| 23 | 0.5295 | 0.5295 | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5297 | 0.5295 | 0.5295 | 0.5295 |
| 24 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5266 |
| 25 | 0.5266 | 0.5265 | 0.5266 | 0.5267 | 0.5266 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5268 | 0.5267 | 0.5266 | 0.5267 | 0.5267 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 |
| Med. | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5280 |
| σ | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0013 |
| Min. | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5258 |
| Max. | 0.5305 | 0.5305 | 0.5306 | 0.5306 | 0.5306 | 0.5306 | 0.5306 | 0.5307 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5307 |

## Data Set 8 : 85 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 86.2 °C |
| Actual Ambient Temperature [$T_A$] | 84.2 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

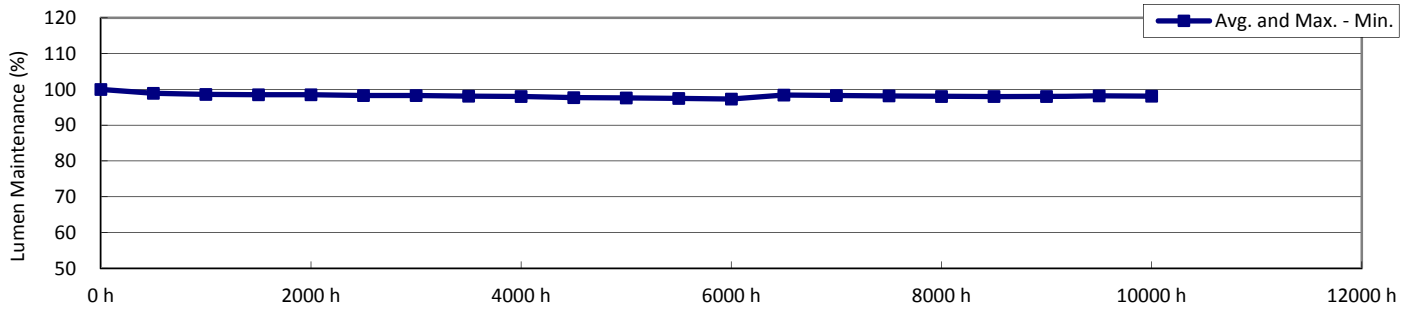
**TABLE 8-6 (Continued)**
Chromaticity

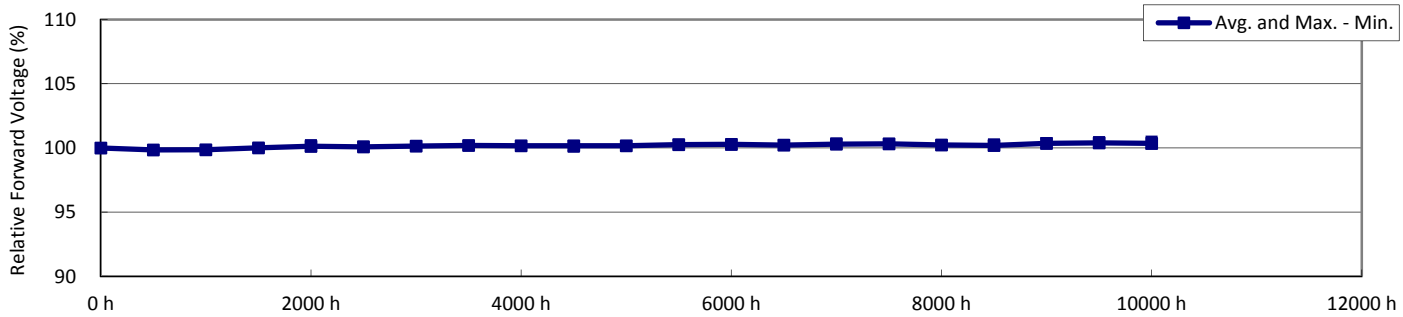
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5275 | 0.5275 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| 2 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 3 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5293 | | | | | | | | | | | |
| 4 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 5 | 0.5285 | 0.5285 | 0.5286 | 0.5284 | 0.5284 | | | | | | | | | | | |
| 6 | 0.5258 | 0.5259 | 0.5259 | 0.5257 | 0.5256 | | | | | | | | | | | |
| 7 | 0.5277 | 0.5277 | 0.5277 | 0.5275 | 0.5275 | | | | | | | | | | | |
| 8 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 9 | 0.5294 | 0.5294 | 0.5295 | 0.5293 | 0.5293 | | | | | | | | | | | |
| 10 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5260 | | | | | | | | | | | |
| 11 | 0.5307 | 0.5308 | 0.5308 | 0.5307 | 0.5307 | | | | | | | | | | | |
| 12 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 13 | 0.5282 | 0.5283 | 0.5283 | 0.5281 | 0.5281 | | | | | | | | | | | |
| 14 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5279 | | | | | | | | | | | |
| 15 | 0.5297 | 0.5297 | 0.5298 | 0.5296 | 0.5296 | | | | | | | | | | | |
| 16 | 0.5290 | 0.5290 | 0.5292 | 0.5290 | 0.5290 | | | | | | | | | | | |
| 17 | 0.5296 | 0.5296 | 0.5296 | 0.5295 | 0.5295 | | | | | | | | | | | |
| 18 | 0.5271 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 19 | 0.5258 | 0.5259 | 0.5259 | 0.5258 | 0.5257 | | | | | | | | | | | |
| 20 | 0.5296 | 0.5297 | 0.5297 | 0.5295 | 0.5295 | | | | | | | | | | | |
| 21 | 0.5278 | 0.5279 | 0.5279 | 0.5277 | 0.5277 | | | | | | | | | | | |
| 22 | 0.5271 | 0.5272 | 0.5272 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 23 | 0.5296 | 0.5296 | 0.5297 | 0.5295 | 0.5295 | | | | | | | | | | | |
| 24 | 0.5266 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | | | | | | | | | | | |
| 25 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5266 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5279 | | | | | | | | | | | |
| Med. | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| σ | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | | | | | | | | | | | |
| Min. | 0.5258 | 0.5259 | 0.5259 | 0.5257 | 0.5256 | | | | | | | | | | | |
| Max. | 0.5307 | 0.5308 | 0.5308 | 0.5307 | 0.5307 | | | | | | | | | | | |

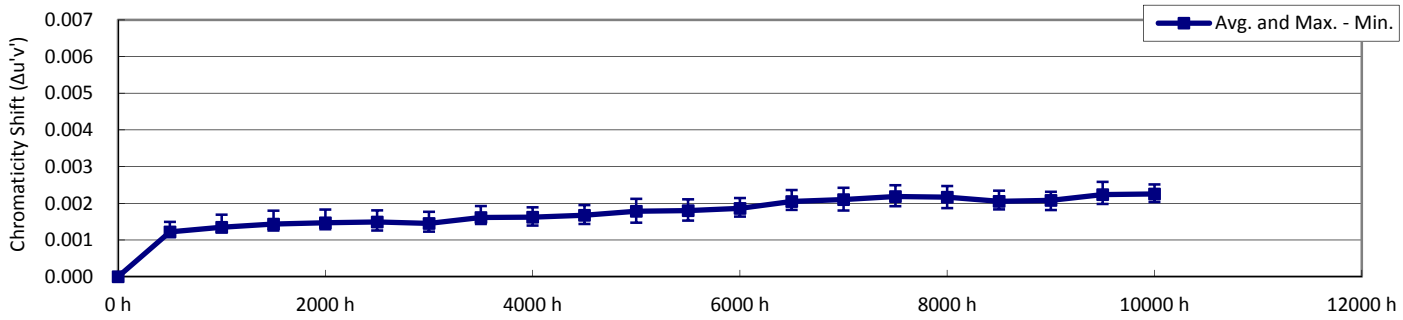
## Data Set 9 : 105 °C, 80 mA

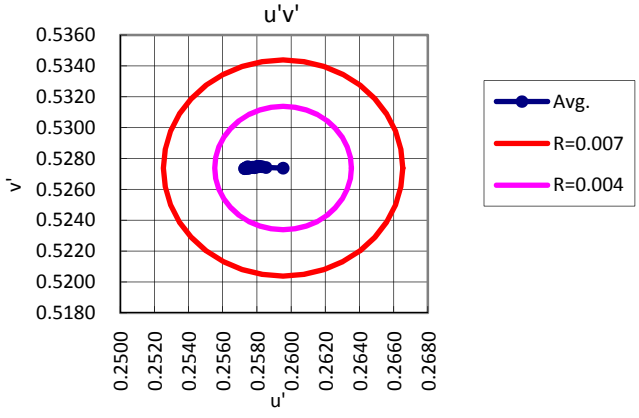
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37.5 | 2.91 | 2788 | 0.23 | 0.455 | 0.412 | 0.258 | 0.527 | | | | |
| 2 | 37.5 | 2.92 | 2746 | 0.23 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 3 | 37.4 | 2.92 | 2763 | 0.23 | 0.455 | 0.410 | 0.260 | 0.526 | | | | |
| 4 | 37.7 | 2.92 | 2746 | 0.23 | 0.459 | 0.415 | 0.260 | 0.529 | | | | |
| 5 | 37.7 | 2.92 | 2773 | 0.23 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 6 | 37.4 | 2.92 | 2741 | 0.23 | 0.458 | 0.412 | 0.261 | 0.527 | | | | |
| 7 | 37.8 | 2.92 | 2740 | 0.23 | 0.459 | 0.415 | 0.260 | 0.529 | | | | |
| 8 | 37.5 | 2.92 | 2756 | 0.23 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 9 | 37.4 | 2.92 | 2731 | 0.23 | 0.458 | 0.411 | 0.261 | 0.527 | | | | |
| 10 | 37.5 | 2.92 | 2790 | 0.23 | 0.454 | 0.411 | 0.258 | 0.527 | | | | |
| 11 | 37.4 | 2.93 | 2760 | 0.23 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 12 | 37.4 | 2.92 | 2747 | 0.23 | 0.460 | 0.416 | 0.260 | 0.529 | | | | |
| 13 | 37.5 | 2.93 | 2771 | 0.23 | 0.455 | 0.410 | 0.259 | 0.526 | | | | |
| 14 | 37.6 | 2.92 | 2745 | 0.23 | 0.458 | 0.413 | 0.260 | 0.528 | | | | |
| 15 | 37.5 | 2.93 | 2781 | 0.23 | 0.452 | 0.407 | 0.259 | 0.525 | | | | |
| 16 | 37.5 | 2.92 | 2773 | 0.23 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 17 | 37.7 | 2.92 | 2783 | 0.23 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 18 | 37.6 | 2.93 | 2761 | 0.23 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 19 | 37.6 | 2.92 | 2771 | 0.23 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 20 | 37.6 | 2.91 | 2729 | 0.23 | 0.461 | 0.416 | 0.261 | 0.530 | | | | |
| 21 | 37.5 | 2.92 | 2767 | 0.23 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 22 | 37.5 | 2.92 | 2766 | 0.23 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 23 | 37.5 | 2.92 | 2785 | 0.23 | 0.453 | 0.410 | 0.259 | 0.526 | | | | |
| 24 | 37.5 | 2.92 | 2746 | 0.23 | 0.459 | 0.414 | 0.260 | 0.529 | | | | |
| 25 | 37.6 | 2.92 | 2775 | 0.23 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 37.5 | 2.92 | 2761 | 0.23 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| Med. | 37.5 | 2.92 | 2763 | 0.23 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| σ | 0.11 | 0.004 | 17.9 | 0.000 | 0.0022 | 0.0022 | 0.0007 | 0.0011 | | | | |
| Min. | 37.4 | 2.91 | 2729 | 0.23 | 0.452 | 0.407 | 0.258 | 0.525 | | | | |
| Max. | 37.8 | 2.93 | 2790 | 0.23 | 0.461 | 0.416 | 0.261 | 0.530 | | | | |

# Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.1 | 98.9 | 98.7 | 98.8 | 98.6 | 98.5 | 98.4 | 98.2 | 98.1 | 97.9 | 97.8 | 97.7 | 98.8 | 98.5 | 98.5 |
| 2 | 100.0 | 98.8 | 98.6 | 98.5 | 98.5 | 98.3 | 98.3 | 98.1 | 98.0 | 97.8 | 97.6 | 97.6 | 97.4 | 98.5 | 98.4 | 98.3 |
| 3 | 100.0 | 98.5 | 98.2 | 98.1 | 98.1 | 97.8 | 97.8 | 97.6 | 97.5 | 97.3 | 97.1 | 97.1 | 96.8 | 97.9 | 97.7 | 97.7 |
| 4 | 100.0 | 98.7 | 98.6 | 98.5 | 98.6 | 98.4 | 98.4 | 98.2 | 98.1 | 97.8 | 97.6 | 97.6 | 97.3 | 98.5 | 98.3 | 98.3 |
| 5 | 100.0 | 98.6 | 98.5 | 98.2 | 98.3 | 98.4 | 98.1 | 97.8 | 97.6 | 97.5 | 97.5 | 97.5 | 97.2 | 98.6 | 98.1 | 98.0 |
| 6 | 100.0 | 99.7 | 99.4 | 99.2 | 99.2 | 99.0 | 98.9 | 98.7 | 98.6 | 98.4 | 98.3 | 98.2 | 98.0 | 99.1 | 98.8 | 98.7 |
| 7 | 100.0 | 99.0 | 98.6 | 98.5 | 98.6 | 98.3 | 98.3 | 98.1 | 98.0 | 97.7 | 97.5 | 97.6 | 97.3 | 98.4 | 98.3 | 98.1 |
| 8 | 100.0 | 99.1 | 98.6 | 98.5 | 98.6 | 98.3 | 98.4 | 98.0 | 98.0 | 97.7 | 97.5 | 97.6 | 97.3 | 98.4 | 98.3 | 98.2 |
| 9 | 100.0 | 99.0 | 98.6 | 98.4 | 98.5 | 98.1 | 98.1 | 98.0 | 97.9 | 97.6 | 97.5 | 97.5 | 97.1 | 98.2 | 98.2 | 98.0 |
| 10 | 100.0 | 98.7 | 98.3 | 98.2 | 98.2 | 97.9 | 98.0 | 97.9 | 97.7 | 97.3 | 97.1 | 97.3 | 97.1 | 98.1 | 98.0 | 98.0 |
| 11 | 100.0 | 99.1 | 98.8 | 98.3 | 98.9 | 98.2 | 98.2 | 98.0 | 97.7 | 97.7 | 97.4 | 97.5 | 97.2 | 98.2 | 98.2 | 98.3 |
| 12 | 100.0 | 98.8 | 98.4 | 98.3 | 98.3 | 98.0 | 98.1 | 98.0 | 97.9 | 97.6 | 97.4 | 97.5 | 97.2 | 98.4 | 98.3 | 98.1 |
| 13 | 100.0 | 99.4 | 99.0 | 99.0 | 98.9 | 98.6 | 98.6 | 98.3 | 98.2 | 97.9 | 97.8 | 97.7 | 97.5 | 98.6 | 98.5 | 98.4 |
| 14 | 100.0 | 99.0 | 98.6 | 98.5 | 98.5 | 98.3 | 98.2 | 98.0 | 97.9 | 97.7 | 97.5 | 97.5 | 97.2 | 98.4 | 98.3 | 98.2 |
| 15 | 100.0 | 98.7 | 98.2 | 98.1 | 98.1 | 97.8 | 97.9 | 97.6 | 97.4 | 97.2 | 97.0 | 97.0 | 96.7 | 97.8 | 97.7 | 97.6 |
| 16 | 100.0 | 98.7 | 98.5 | 98.4 | 98.4 | 98.2 | 98.3 | 98.1 | 97.8 | 97.7 | 97.6 | 97.4 | 97.3 | 98.4 | 98.3 | 98.2 |
| 17 | 100.0 | 99.1 | 98.9 | 98.8 | 98.9 | 98.7 | 98.9 | 98.6 | 98.3 | 98.2 | 98.3 | 97.9 | 98.0 | 98.9 | 98.9 | 98.8 |
| 18 | 100.0 | 99.1 | 98.8 | 98.7 | 98.8 | 98.6 | 98.6 | 98.5 | 98.3 | 98.0 | 98.0 | 97.8 | 97.7 | 98.8 | 98.7 | 98.6 |
| 19 | 100.0 | 98.8 | 98.6 | 98.5 | 98.6 | 98.3 | 98.3 | 98.1 | 98.1 | 97.7 | 97.5 | 97.5 | 97.3 | 98.4 | 98.3 | 98.2 |
| 20 | 100.0 | 98.9 | 98.6 | 98.5 | 98.5 | 98.3 | 98.3 | 98.2 | 98.1 | 97.7 | 97.6 | 97.5 | 97.3 | 98.5 | 98.4 | 98.2 |
| 21 | 100.0 | 98.8 | 98.5 | 98.4 | 98.4 | 98.2 | 98.2 | 97.9 | 97.9 | 97.5 | 97.4 | 97.4 | 97.1 | 98.2 | 98.2 | 97.9 |
| 22 | 100.0 | 98.7 | 98.4 | 98.3 | 98.3 | 97.9 | 98.0 | 97.7 | 97.7 | 97.4 | 97.3 | 97.3 | 97.0 | 98.1 | 98.0 | 97.9 |
| 23 | 100.0 | 98.8 | 98.7 | 98.5 | 98.5 | 98.2 | 98.2 | 98.0 | 97.9 | 97.7 | 97.4 | 97.5 | 97.2 | 98.4 | 98.4 | 98.2 |
| 24 | 100.0 | 98.7 | 98.5 | 98.4 | 98.4 | 98.1 | 98.2 | 98.0 | 97.9 | 97.5 | 97.5 | 97.4 | 97.1 | 98.3 | 98.2 | 97.9 |
| 25 | 100.0 | 99.0 | 98.7 | 98.6 | 98.5 | 98.4 | 98.5 | 98.3 | 98.2 | 97.9 | 97.7 | 97.8 | 97.6 | 98.7 | 98.6 | 98.5 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.9 | 98.6 | 98.5 | 98.5 | 98.3 | 98.3 | 98.1 | 98.0 | 97.7 | 97.6 | 97.5 | 97.3 | 98.4 | 98.3 | 98.2 |
| Med. | 100.0 | 98.8 | 98.6 | 98.5 | 98.5 | 98.3 | 98.3 | 98.0 | 97.9 | 97.7 | 97.5 | 97.5 | 97.3 | 98.4 | 98.3 | 98.2 |
| σ | 0.00 | 0.26 | 0.26 | 0.26 | 0.27 | 0.29 | 0.27 | 0.28 | 0.27 | 0.28 | 0.32 | 0.25 | 0.31 | 0.30 | 0.29 | 0.29 |
| Min. | 100.0 | 98.5 | 98.2 | 98.1 | 98.1 | 97.8 | 97.8 | 97.6 | 97.4 | 97.2 | 97.0 | 97.0 | 96.7 | 97.8 | 97.7 | 97.6 |
| Max. | 100.0 | 99.7 | 99.4 | 99.2 | 99.2 | 99.0 | 98.9 | 98.7 | 98.6 | 98.4 | 98.3 | 98.2 | 98.0 | 99.1 | 98.9 | 98.8 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0243 | -0.0253 | -0.0273 | -0.0159 | -0.0171 | -0.0182 | -0.0201 | -0.0202 | -0.0202 | -0.0182 | -0.0192 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.971 | |
| α | -1.15E-06 | |
| $R^2$ | 0.285 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=B\exp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=\ln(B/0.7)/\alpha$

$L_{80}=\ln(B/0.8)/\alpha$

$L_{90}=\ln(B/0.9)/\alpha$

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 98.4 | 98.6 | 98.4 | 98.6 | 98.5 | | | | | | | | | | | |
| 2 | 98.3 | 98.3 | 98.2 | 98.3 | 98.3 | | | | | | | | | | | |
| 3 | 97.6 | 97.8 | 97.6 | 97.8 | 97.8 | | | | | | | | | | | |
| 4 | 98.2 | 98.2 | 98.1 | 98.3 | 98.3 | | | | | | | | | | | |
| 5 | 97.9 | 97.7 | 97.7 | 98.0 | 98.0 | | | | | | | | | | | |
| 6 | 98.7 | 98.8 | 98.6 | 98.7 | 98.6 | | | | | | | | | | | |
| 7 | 97.9 | 98.1 | 98.0 | 98.1 | 98.1 | | | | | | | | | | | |
| 8 | 98.0 | 98.1 | 98.1 | 98.3 | 98.2 | | | | | | | | | | | |
| 9 | 97.8 | 97.9 | 97.8 | 97.9 | 97.9 | | | | | | | | | | | |
| 10 | 97.7 | 97.7 | 97.7 | 97.9 | 97.8 | | | | | | | | | | | |
| 11 | 97.8 | 97.4 | 97.7 | 97.9 | 97.7 | | | | | | | | | | | |
| 12 | 97.9 | 98.0 | 97.9 | 98.1 | 98.0 | | | | | | | | | | | |
| 13 | 98.3 | 98.3 | 98.3 | 98.5 | 98.4 | | | | | | | | | | | |
| 14 | 98.0 | 98.1 | 98.1 | 98.2 | 98.2 | | | | | | | | | | | |
| 15 | 97.4 | 97.5 | 97.5 | 97.6 | 97.6 | | | | | | | | | | | |
| 16 | 98.0 | 98.0 | 98.0 | 98.2 | 98.1 | | | | | | | | | | | |
| 17 | 98.6 | 98.4 | 98.5 | 98.6 | 98.6 | | | | | | | | | | | |
| 18 | 98.4 | 98.4 | 98.4 | 98.5 | 98.5 | | | | | | | | | | | |
| 19 | 97.9 | 98.0 | 98.2 | 98.2 | 98.2 | | | | | | | | | | | |
| 20 | 98.1 | 98.1 | 98.2 | 98.3 | 98.1 | | | | | | | | | | | |
| 21 | 97.8 | 97.9 | 98.0 | 98.0 | 97.9 | | | | | | | | | | | |
| 22 | 97.7 | 97.7 | 97.8 | 97.9 | 97.8 | | | | | | | | | | | |
| 23 | 97.8 | 97.5 | 97.8 | 97.9 | 97.7 | | | | | | | | | | | |
| 24 | 97.8 | 97.8 | 97.9 | 98.0 | 97.9 | | | | | | | | | | | |
| 25 | 98.3 | 98.4 | 98.4 | 98.5 | 98.5 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 98.0 | 98.0 | 98.0 | 98.2 | 98.1 | | | | | | | | | | | |
| Med. | 97.9 | 98.0 | 98.0 | 98.2 | 98.1 | | | | | | | | | | | |
| σ | 0.32 | 0.35 | 0.30 | 0.29 | 0.30 | | | | | | | | | | | |
| Min. | 97.4 | 97.4 | 97.5 | 97.6 | 97.6 | | | | | | | | | | | |
| Max. | 98.7 | 98.8 | 98.6 | 98.7 | 98.6 | | | | | | | | | | | |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |
| 2 | 100.0 | 99.9 | 99.9 | 100.0 | 100.4 | 100.1 | 100.2 | 100.4 | 100.3 | 100.3 | 100.4 | 100.4 | 100.5 | 100.4 | 100.4 | 100.5 |
| 3 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.1 | 100.3 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 |
| 4 | 100.0 | 100.0 | 100.0 | 100.1 | 100.3 | 100.1 | 100.3 | 100.3 | 100.3 | 100.4 | 100.2 | 100.4 | 100.4 | 100.3 | 100.4 | 100.5 |
| 5 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.1 | 100.1 | 100.3 | 100.2 | 100.3 | 100.4 |
| 6 | 100.0 | 99.9 | 99.8 | 100.1 | 100.3 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.3 | 100.4 |
| 7 | 100.0 | 99.8 | 99.9 | 100.0 | 100.3 | 100.2 | 100.2 | 100.1 | 100.4 | 100.2 | 100.3 | 100.1 | 100.3 | 100.2 | 100.3 | 100.2 |
| 8 | 100.0 | 100.0 | 99.9 | 100.0 | 100.2 | 100.1 | 100.1 | 100.3 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.3 |
| 9 | 100.0 | 99.8 | 99.9 | 100.0 | 100.2 | 100.1 | 100.0 | 100.2 | 100.4 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 |
| 10 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 | 100.1 | 99.9 | 99.9 | 100.0 | 100.0 |
| 11 | 100.0 | 100.0 | 99.9 | 100.1 | 100.3 | 100.0 | 100.2 | 100.3 | 100.0 | 100.2 | 100.2 | 100.3 | 100.3 | 100.2 | 100.3 | 100.4 |
| 12 | 100.0 | 99.6 | 99.6 | 99.8 | 100.0 | 99.8 | 99.8 | 100.0 | 99.9 | 100.1 | 99.8 | 100.1 | 100.1 | 99.9 | 100.0 | 100.0 |
| 13 | 100.0 | 99.9 | 100.0 | 100.0 | 100.2 | 100.3 | 100.3 | 100.5 | 100.2 | 100.3 | 100.4 | 100.4 | 100.5 | 100.4 | 100.5 | 100.5 |
| 14 | 100.0 | 99.8 | 99.9 | 100.0 | 100.3 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.4 | 100.3 | 100.2 | 100.3 | 100.2 |
| 15 | 100.0 | 99.8 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.2 | 100.1 | 100.2 | 100.0 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 |
| 16 | 100.0 | 99.7 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.9 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 |
| 17 | 100.0 | 99.8 | 99.9 | 100.1 | 100.0 | 100.1 | 100.2 | 100.0 | 100.1 | 100.2 | 100.2 | 100.3 | 100.4 | 100.2 | 100.3 | 100.3 |
| 18 | 100.0 | 99.9 | 99.8 | 100.1 | 100.3 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.2 | 99.9 | 100.1 | 100.2 | 100.2 |
| 19 | 100.0 | 100.0 | 100.0 | 100.2 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.2 | 100.4 | 100.3 | 100.5 | 100.4 | 100.5 | 100.4 |
| 20 | 100.0 | 99.7 | 99.6 | 99.8 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 99.9 | 100.0 | 100.0 |
| 21 | 100.0 | 100.0 | 100.0 | 100.2 | 100.1 | 100.3 | 100.3 | 100.4 | 100.3 | 100.5 | 100.5 | 100.6 | 100.6 | 100.6 | 100.7 | 100.7 |
| 22 | 100.0 | 99.9 | 99.8 | 100.0 | 100.1 | 100.0 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.4 | 100.3 | 100.4 | 100.4 | 100.5 |
| 23 | 100.0 | 100.1 | 100.1 | 100.3 | 100.6 | 100.5 | 100.5 | 100.3 | 100.5 | 100.4 | 100.4 | 100.6 | 100.6 | 100.5 | 100.6 | 100.6 |
| 24 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.3 | 100.3 | 100.5 | 100.3 | 100.3 | 100.3 | 100.4 | 100.6 | 100.4 | 100.5 | 100.6 |
| 25 | 100.0 | 99.7 | 99.7 | 99.8 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 99.8 | 100.0 | 100.1 | 99.9 | 100.0 | 100.0 | 100.1 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.8 | 99.9 | 100.0 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.2 | 100.3 | 100.3 |
| Med. | 100.0 | 99.9 | 99.9 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.3 |
| σ | 0.00 | 0.13 | 0.14 | 0.14 | 0.20 | 0.18 | 0.17 | 0.18 | 0.17 | 0.18 | 0.20 | 0.17 | 0.22 | 0.19 | 0.20 | 0.20 |
| Min. | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 |
| Max. | 100.0 | 100.1 | 100.1 | 100.3 | 100.6 | 100.5 | 100.5 | 100.5 | 100.5 | 100.5 | 100.5 | 100.6 | 100.6 | 100.6 | 100.7 | 100.7 |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.3 | 100.2 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| 2 | 100.5 | 100.5 | 100.6 | 100.6 | 100.7 | | | | | | | | | | | |
| 3 | 100.3 | 100.2 | 100.4 | 100.5 | 100.4 | | | | | | | | | | | |
| 4 | 100.4 | 100.4 | 100.5 | 100.5 | 100.5 | | | | | | | | | | | |
| 5 | 100.2 | 100.3 | 100.3 | 100.4 | 100.4 | | | | | | | | | | | |
| 6 | 100.3 | 100.3 | 100.3 | 100.4 | 100.4 | | | | | | | | | | | |
| 7 | 100.2 | 100.2 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | |
| 8 | 100.2 | 100.1 | 100.4 | 100.5 | 100.3 | | | | | | | | | | | |
| 9 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | | | | | | | | | | | |
| 10 | 99.9 | 99.8 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | |
| 11 | 100.2 | 100.2 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | |
| 12 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | |
| 13 | 100.4 | 100.3 | 100.6 | 100.5 | 100.4 | | | | | | | | | | | |
| 14 | 100.2 | 100.1 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | |
| 15 | 100.2 | 100.1 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | |
| 16 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 17 | 100.3 | 100.2 | 100.4 | 100.4 | 100.2 | | | | | | | | | | | |
| 18 | 100.1 | 100.1 | 100.2 | 100.3 | 100.3 | | | | | | | | | | | |
| 19 | 100.4 | 100.3 | 100.4 | 100.6 | 100.6 | | | | | | | | | | | |
| 20 | 100.0 | 99.8 | 100.1 | 100.1 | 100.0 | | | | | | | | | | | |
| 21 | 100.6 | 100.6 | 100.7 | 100.8 | 100.9 | | | | | | | | | | | |
| 22 | 100.4 | 100.5 | 100.6 | 100.7 | 100.6 | | | | | | | | | | | |
| 23 | 100.5 | 100.4 | 100.6 | 100.6 | 100.6 | | | | | | | | | | | |
| 24 | 100.3 | 100.3 | 100.6 | 100.6 | 100.6 | | | | | | | | | | | |
| 25 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.2 | 100.2 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| Med. | 100.2 | 100.2 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | |
| σ | 0.19 | 0.20 | 0.21 | 0.20 | 0.22 | | | | | | | | | | | |
| Min. | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| Max. | 100.6 | 100.6 | 100.7 | 100.8 | 100.9 | | | | | | | | | | | |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0021 |
| 2 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0020 |
| 3 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0022 |
| 4 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 |
| 5 | 0.0000 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0012 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0020 |
| 6 | 0.0000 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0025 |
| 7 | 0.0000 | 0.0013 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0014 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0023 |
| 8 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0021 |
| 9 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0020 | 0.0019 | 0.0022 | 0.0023 | 0.0024 |
| 10 | 0.0000 | 0.0011 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0013 | 0.0016 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0019 | 0.0018 | 0.0019 |
| 11 | 0.0000 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0022 | 0.0024 |
| 12 | 0.0000 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0023 | 0.0024 |
| 13 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0019 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0024 | 0.0024 | 0.0024 |
| 14 | 0.0000 | 0.0012 | 0.0014 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0022 |
| 15 | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0022 |
| 16 | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 |
| 17 | 0.0000 | 0.0011 | 0.0012 | 0.0014 | 0.0013 | 0.0013 | 0.0012 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 |
| 18 | 0.0000 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 |
| 19 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 |
| 20 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0021 | 0.0021 |
| 21 | 0.0000 | 0.0011 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0022 |
| 22 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0023 |
| 23 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0022 |
| 24 | 0.0000 | 0.0013 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0018 | 0.0021 | 0.0022 | 0.0022 |
| 25 | 0.0000 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0021 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0022 |
| Med. | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0001 |
| Min. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0019 |
| Max. | 0.0000 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0024 | 0.0024 | 0.0025 |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0021 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 2 | 0.0021 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | | | | | | | | | | | |
| 3 | 0.0021 | 0.0021 | 0.0020 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 4 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 5 | 0.0020 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | | | | | | | | | | | |
| 6 | 0.0025 | 0.0023 | 0.0023 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 7 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | 0.0025 | | | | | | | | | | | |
| 8 | 0.0022 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 9 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | | | | | | | | | | | |
| 10 | 0.0019 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | | | | | | | | | | | |
| 11 | 0.0023 | 0.0021 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 12 | 0.0024 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | | | | | | | | | | | |
| 13 | 0.0025 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | | | | | | | | | | | |
| 14 | 0.0022 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 15 | 0.0022 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 16 | 0.0020 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | | | | | | | | | | | |
| 17 | 0.0020 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | | | | | | | | | | | |
| 18 | 0.0022 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 19 | 0.0022 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 20 | 0.0022 | 0.0020 | 0.0021 | 0.0022 | 0.0021 | | | | | | | | | | | |
| 21 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 22 | 0.0022 | 0.0020 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 23 | 0.0022 | 0.0020 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 24 | 0.0022 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 25 | 0.0020 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0022 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | |
| Med. | 0.0022 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0019 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | | | | | | | | | | | |
| Max. | 0.0025 | 0.0023 | 0.0023 | 0.0026 | 0.0025 | | | | | | | | | | | |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2588 | 0.2577 | 0.2576 | 0.2576 | 0.2574 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | 0.2572 | 0.2572 | 0.2572 | 0.2572 | 0.2569 | 0.2569 | 0.2568 |
| 2 | 0.2605 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2586 | 0.2586 | 0.2585 |
| 3 | 0.2601 | 0.2590 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | 0.2580 |
| 4 | 0.2609 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2588 | 0.2587 |
| 5 | 0.2617 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2604 | 0.2602 | 0.2603 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2596 | 0.2598 | 0.2597 |
| 6 | 0.2618 | 0.2604 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2601 | 0.2599 | 0.2599 | 0.2599 | 0.2597 | 0.2597 | 0.2597 | 0.2595 | 0.2595 | 0.2593 |
| 7 | 0.2607 | 0.2594 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2592 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2584 |
| 8 | 0.2603 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2585 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2581 |
| 9 | 0.2615 | 0.2602 | 0.2601 | 0.2599 | 0.2600 | 0.2599 | 0.2599 | 0.2597 | 0.2596 | 0.2597 | 0.2595 | 0.2595 | 0.2596 | 0.2593 | 0.2592 | 0.2591 |
| 10 | 0.2592 | 0.2580 | 0.2579 | 0.2577 | 0.2578 | 0.2578 | 0.2578 | 0.2576 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2573 | 0.2574 | 0.2572 |
| 11 | 0.2624 | 0.2612 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2605 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2601 |
| 12 | 0.2607 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2589 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2585 | 0.2584 | 0.2584 |
| 13 | 0.2599 | 0.2586 | 0.2585 | 0.2583 | 0.2583 | 0.2582 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2578 | 0.2579 | 0.2578 | 0.2576 | 0.2575 | 0.2576 |
| 14 | 0.2606 | 0.2594 | 0.2592 | 0.2594 | 0.2591 | 0.2592 | 0.2592 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 |
| 15 | 0.2595 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2581 | 0.2579 | 0.2579 | 0.2578 | 0.2576 | 0.2577 | 0.2576 | 0.2574 | 0.2573 | 0.2573 |
| 16 | 0.2599 | 0.2588 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2586 | 0.2584 | 0.2585 | 0.2584 | 0.2582 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2580 |
| 17 | 0.2612 | 0.2601 | 0.2600 | 0.2599 | 0.2599 | 0.2600 | 0.2600 | 0.2597 | 0.2597 | 0.2597 | 0.2596 | 0.2595 | 0.2596 | 0.2594 | 0.2593 | 0.2592 |
| 18 | 0.2603 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | 0.2585 | 0.2583 | 0.2583 | 0.2583 |
| 19 | 0.2596 | 0.2585 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2582 | 0.2580 | 0.2579 | 0.2580 | 0.2579 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | 0.2575 |
| 20 | 0.2611 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2589 | 0.2589 |
| 21 | 0.2597 | 0.2586 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2575 |
| 22 | 0.2602 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2583 | 0.2584 | 0.2583 | 0.2582 | 0.2581 | 0.2579 |
| 23 | 0.2614 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2596 | 0.2593 | 0.2593 | 0.2592 |
| 24 | 0.2610 | 0.2597 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2595 | 0.2593 | 0.2593 | 0.2594 | 0.2592 | 0.2591 | 0.2592 | 0.2589 | 0.2588 | 0.2588 |
| 25 | 0.2591 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2572 | 0.2571 | 0.2570 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2605 | 0.2593 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2583 |
| Med. | 0.2605 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2589 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 |
| Min. | 0.2588 | 0.2577 | 0.2576 | 0.2576 | 0.2574 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | 0.2572 | 0.2572 | 0.2572 | 0.2572 | 0.2569 | 0.2569 | 0.2568 |
| Max. | 0.2624 | 0.2612 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2605 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2601 |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2568 | 0.2569 | 0.2569 | 0.2568 | 0.2568 | | | | | | | | | | | |
| 2 | 0.2584 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | | | | | | | | | | | |
| 3 | 0.2580 | 0.2581 | 0.2581 | 0.2579 | 0.2578 | | | | | | | | | | | |
| 4 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2585 | | | | | | | | | | | |
| 5 | 0.2597 | 0.2597 | 0.2598 | 0.2596 | 0.2596 | | | | | | | | | | | |
| 6 | 0.2593 | 0.2595 | 0.2595 | 0.2592 | 0.2593 | | | | | | | | | | | |
| 7 | 0.2584 | 0.2586 | 0.2584 | 0.2583 | 0.2582 | | | | | | | | | | | |
| 8 | 0.2581 | 0.2581 | 0.2581 | 0.2579 | 0.2580 | | | | | | | | | | | |
| 9 | 0.2592 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | | | | | | | | | | | |
| 10 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2570 | | | | | | | | | | | |
| 11 | 0.2602 | 0.2603 | 0.2602 | 0.2600 | 0.2601 | | | | | | | | | | | |
| 12 | 0.2584 | 0.2585 | 0.2585 | 0.2582 | 0.2582 | | | | | | | | | | | |
| 13 | 0.2575 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 14 | 0.2584 | 0.2586 | 0.2585 | 0.2583 | 0.2583 | | | | | | | | | | | |
| 15 | 0.2573 | 0.2574 | 0.2574 | 0.2573 | 0.2572 | | | | | | | | | | | |
| 16 | 0.2579 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | | | | | | | | | | | |
| 17 | 0.2593 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | | | | | | | | | | | |
| 18 | 0.2582 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 19 | 0.2574 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 20 | 0.2589 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | | | | | | | | | | | |
| 21 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | | | | | | | | | | | |
| 22 | 0.2580 | 0.2582 | 0.2581 | 0.2579 | 0.2579 | | | | | | | | | | | |
| 23 | 0.2592 | 0.2594 | 0.2594 | 0.2591 | 0.2592 | | | | | | | | | | | |
| 24 | 0.2588 | 0.2589 | 0.2589 | 0.2587 | 0.2588 | | | | | | | | | | | |
| 25 | 0.2571 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2583 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | | | | | | | | | | | |
| Med. | 0.2584 | 0.2585 | 0.2584 | 0.2582 | 0.2582 | | | | | | | | | | | |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | | | | | | | | | | | |
| Min. | 0.2568 | 0.2569 | 0.2569 | 0.2568 | 0.2568 | | | | | | | | | | | |
| Max. | 0.2602 | 0.2603 | 0.2602 | 0.2600 | 0.2601 | | | | | | | | | | | |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 9-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5268 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 |
| 2 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 |
| 3 | 0.5263 | 0.5262 | 0.5262 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5263 |
| 4 | 0.5292 | 0.5292 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5292 |
| 5 | 0.5282 | 0.5283 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5283 | 0.5282 | 0.5283 | 0.5283 |
| 6 | 0.5277 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 |
| 7 | 0.5288 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | 0.5288 | 0.5289 | 0.5289 | 0.5288 | 0.5289 | 0.5289 |
| 8 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5267 | 0.5268 | 0.5268 |
| 9 | 0.5272 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5274 | 0.5272 | 0.5273 | 0.5272 |
| 10 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 |
| 11 | 0.5278 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5278 |
| 12 | 0.5296 | 0.5296 | 0.5295 | 0.5296 | 0.5295 | 0.5296 | 0.5295 | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5295 |
| 13 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5260 |
| 14 | 0.5278 | 0.5279 | 0.5280 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | 0.5281 |
| 15 | 0.5246 | 0.5247 | 0.5247 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5245 | 0.5245 | 0.5244 | 0.5245 | 0.5245 |
| 16 | 0.5272 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5273 |
| 17 | 0.5280 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 |
| 18 | 0.5273 | 0.5273 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5273 |
| 19 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 |
| 20 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5296 | 0.5297 | 0.5297 |
| 21 | 0.5266 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5266 |
| 22 | 0.5276 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 |
| 23 | 0.5270 | 0.5272 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5271 | 0.5270 | 0.5270 | 0.5271 |
| 24 | 0.5287 | 0.5289 | 0.5289 | 0.5289 | 0.5288 | 0.5288 | 0.5289 | 0.5288 | 0.5287 | 0.5287 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 |
| 25 | 0.5278 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5275 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 |
| Med. | 0.5276 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 |
| σ | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 |
| Min. | 0.5246 | 0.5247 | 0.5247 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5245 | 0.5245 | 0.5244 | 0.5245 | 0.5245 |
| Max. | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5297 | 0.5296 | 0.5297 | 0.5297 | 0.5297 | 0.5296 | 0.5297 | 0.5297 |

## Data Set 9 : 105 °C, 80 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.8 °C |
| Actual Ambient Temperature [$T_A$] | 103.7 °C |
| Drive Current [$I_F$] | 80 mA |
| Measurement Current | 80 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

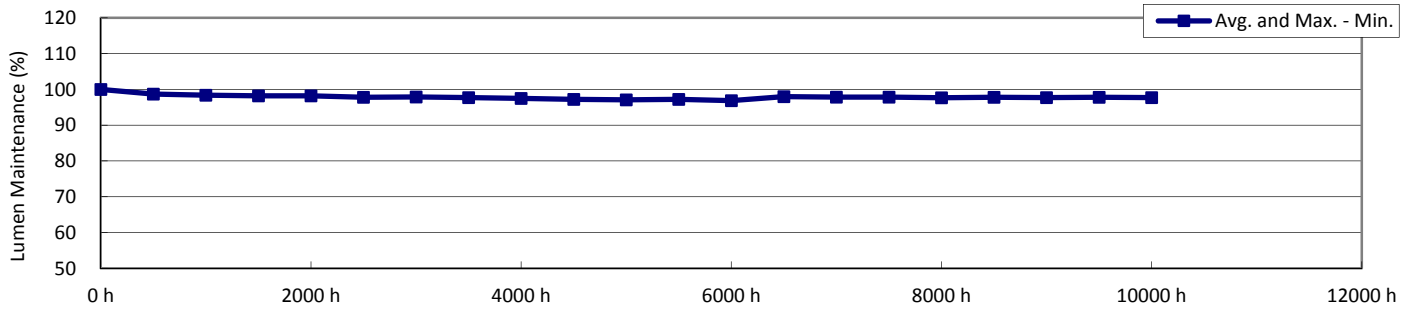
**TABLE 9-6 (Continued)**
Chromaticity

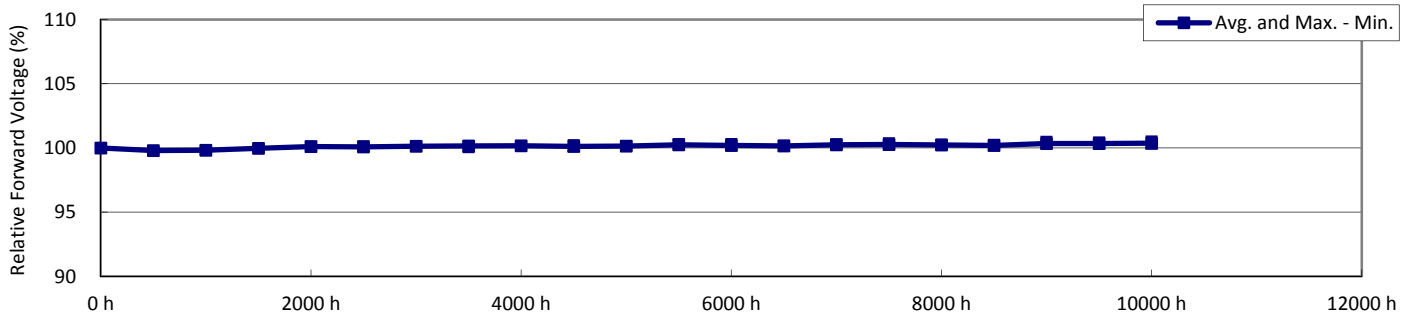
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5268 | 0.5268 | 0.5269 | 0.5267 | 0.5267 | | | | | | | | | | | |
| 2 | 0.5279 | 0.5280 | 0.5281 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 3 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | | | | | | | | | | | |
| 4 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5290 | | | | | | | | | | | |
| 5 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | | | | | | | | | | | |
| 6 | 0.5277 | 0.5277 | 0.5278 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 7 | 0.5288 | 0.5288 | 0.5289 | 0.5287 | 0.5288 | | | | | | | | | | | |
| 8 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | | | | | | | | | | | |
| 9 | 0.5273 | 0.5273 | 0.5274 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 10 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | | | | | | | | | | | |
| 11 | 0.5277 | 0.5278 | 0.5279 | 0.5277 | 0.5277 | | | | | | | | | | | |
| 12 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | | | | | | | | | | | |
| 13 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | | | | | | | | | | | |
| 14 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 15 | 0.5245 | 0.5246 | 0.5245 | 0.5244 | 0.5244 | | | | | | | | | | | |
| 16 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 17 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | | | | | | | | | | | |
| 18 | 0.5273 | 0.5272 | 0.5274 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 19 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 20 | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |
| 21 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | | | | | | | | | | | |
| 22 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 23 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 24 | 0.5286 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | | | | | | | | | | | |
| 25 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | | | |
| Med. | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | | | | | | | | | | | |
| Min. | 0.5245 | 0.5246 | 0.5245 | 0.5244 | 0.5244 | | | | | | | | | | | |
| Max. | 0.5296 | 0.5296 | 0.5297 | 0.5296 | 0.5296 | | | | | | | | | | | |

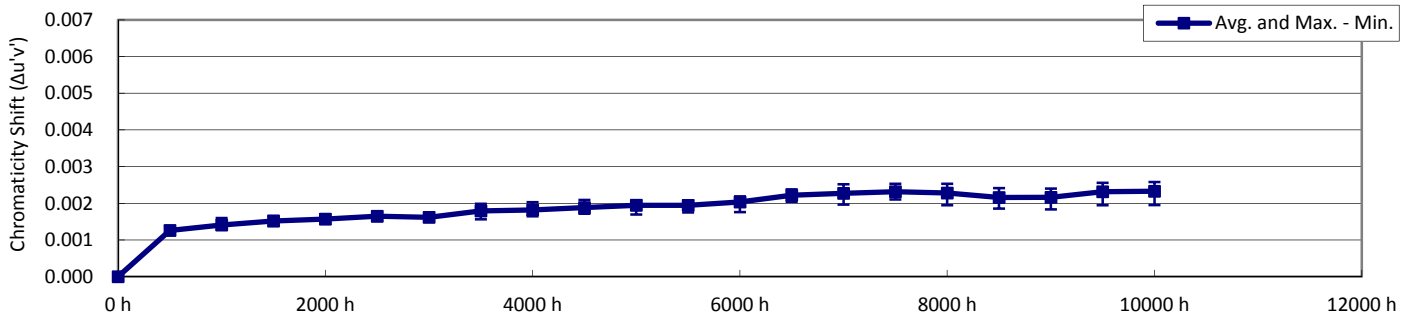
## Data Set 10 : 105 °C, 125 mA

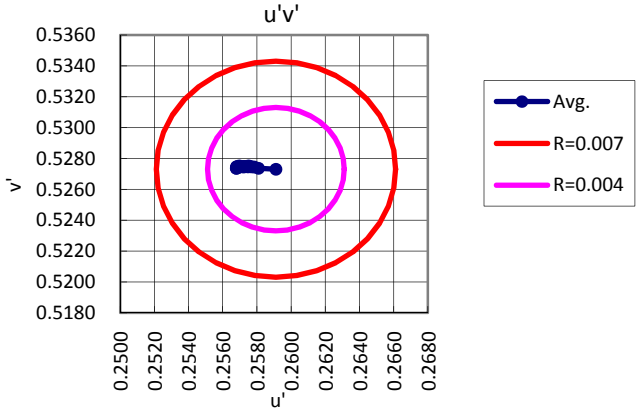
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 56.4 | 3.07 | 2785 | 0.38 | 0.452 | 0.408 | 0.259 | 0.525 | | | | |
| 2 | 56.4 | 3.07 | 2765 | 0.38 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 3 | 56.7 | 3.07 | 2785 | 0.38 | 0.455 | 0.413 | 0.258 | 0.527 | | | | |
| 4 | 56.6 | 3.07 | 2791 | 0.38 | 0.453 | 0.410 | 0.258 | 0.526 | | | | |
| 5 | 56.2 | 3.06 | 2761 | 0.38 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 6 | 56.6 | 3.06 | 2787 | 0.38 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 7 | 56.6 | 3.06 | 2769 | 0.38 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 8 | 56.3 | 3.07 | 2764 | 0.38 | 0.455 | 0.410 | 0.260 | 0.526 | | | | |
| 9 | 56.5 | 3.06 | 2783 | 0.38 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 10 | 56.4 | 3.06 | 2782 | 0.38 | 0.455 | 0.413 | 0.259 | 0.527 | | | | |
| 11 | 56.4 | 3.06 | 2780 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 12 | 56.4 | 3.06 | 2778 | 0.38 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 13 | 56.6 | 3.06 | 2787 | 0.38 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 14 | 56.5 | 3.07 | 2768 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 15 | 56.4 | 3.06 | 2774 | 0.38 | 0.455 | 0.410 | 0.259 | 0.527 | | | | |
| 16 | 56.7 | 3.06 | 2754 | 0.38 | 0.457 | 0.412 | 0.260 | 0.527 | | | | |
| 17 | 56.4 | 3.04 | 2792 | 0.38 | 0.454 | 0.412 | 0.258 | 0.527 | | | | |
| 18 | 56.4 | 3.07 | 2767 | 0.38 | 0.455 | 0.410 | 0.259 | 0.527 | | | | |
| 19 | 56.2 | 3.06 | 2745 | 0.38 | 0.458 | 0.412 | 0.260 | 0.528 | | | | |
| 20 | 56.8 | 3.06 | 2782 | 0.38 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 21 | 56.6 | 3.06 | 2771 | 0.38 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 22 | 56.5 | 3.07 | 2760 | 0.38 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 23 | 56.8 | 3.06 | 2772 | 0.38 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 24 | 56.3 | 3.06 | 2758 | 0.38 | 0.458 | 0.414 | 0.259 | 0.529 | | | | |
| 25 | 56.7 | 3.07 | 2751 | 0.38 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 56.5 | 3.06 | 2773 | 0.38 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| Med. | 56.5 | 3.06 | 2772 | 0.38 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| σ | 0.17 | 0.006 | 13.0 | 0.001 | 0.0015 | 0.0018 | 0.0005 | 0.0009 | | | | |
| Min. | 56.2 | 3.04 | 2745 | 0.38 | 0.452 | 0.408 | 0.258 | 0.525 | | | | |
| Max. | 56.8 | 3.07 | 2792 | 0.38 | 0.458 | 0.415 | 0.260 | 0.529 | | | | |

# Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 98.5 | 98.1 | 98.1 | 98.1 | 97.7 | 97.7 | 97.5 | 97.4 | 97.1 | 97.0 | 97.1 | 96.8 | 97.8 | 97.8 | 97.6 |
| 2 | 100.0 | 98.8 | 98.3 | 98.3 | 98.2 | 97.7 | 97.9 | 97.6 | 97.5 | 97.2 | 97.2 | 97.1 | 96.8 | 97.9 | 97.9 | 97.8 |
| 3 | 100.0 | 98.8 | 98.4 | 98.3 | 98.2 | 97.8 | 97.9 | 97.7 | 97.6 | 97.2 | 97.2 | 97.2 | 97.0 | 98.0 | 97.8 | 97.9 |
| 4 | 100.0 | 98.7 | 98.4 | 98.3 | 98.2 | 97.8 | 97.8 | 97.6 | 97.5 | 97.1 | 97.1 | 97.3 | 97.0 | 97.9 | 97.8 | 97.9 |
| 5 | 100.0 | 98.8 | 98.7 | 98.8 | 98.4 | 98.0 | 98.1 | 98.0 | 98.0 | 97.4 | 97.6 | 97.7 | 97.5 | 98.4 | 98.2 | 98.2 |
| 6 | 100.0 | 98.9 | 98.4 | 98.3 | 98.2 | 97.7 | 97.8 | 97.6 | 97.4 | 97.1 | 97.0 | 97.0 | 96.8 | 97.7 | 97.7 | 97.7 |
| 7 | 100.0 | 98.7 | 98.4 | 98.2 | 98.1 | 97.9 | 98.1 | 97.8 | 97.7 | 97.4 | 97.3 | 97.2 | 97.0 | 98.1 | 97.9 | 97.9 |
| 8 | 100.0 | 98.1 | 97.8 | 97.6 | 97.5 | 97.3 | 97.4 | 97.2 | 97.0 | 96.8 | 96.7 | 96.7 | 96.4 | 97.6 | 97.5 | 97.4 |
| 9 | 100.0 | 98.9 | 98.5 | 98.2 | 98.3 | 98.0 | 98.0 | 97.7 | 97.6 | 97.4 | 97.2 | 97.2 | 96.9 | 98.1 | 97.8 | 97.8 |
| 10 | 100.0 | 98.7 | 98.3 | 98.1 | 98.1 | 97.9 | 98.0 | 97.7 | 97.6 | 97.3 | 97.2 | 97.2 | 96.9 | 98.0 | 97.9 | 97.9 |
| 11 | 100.0 | 98.7 | 98.3 | 98.0 | 97.9 | 97.5 | 97.8 | 97.3 | 97.2 | 97.0 | 96.6 | 97.0 | 96.4 | 97.7 | 97.5 | 97.8 |
| 12 | 100.0 | 98.7 | 98.3 | 98.2 | 98.1 | 97.9 | 98.0 | 97.7 | 97.6 | 97.3 | 97.2 | 97.2 | 96.9 | 98.1 | 97.9 | 97.9 |
| 13 | 100.0 | 98.9 | 98.6 | 98.4 | 98.5 | 98.2 | 98.2 | 97.9 | 97.7 | 97.4 | 97.3 | 97.4 | 97.1 | 98.2 | 98.1 | 98.0 |
| 14 | 100.0 | 98.6 | 98.3 | 98.1 | 98.2 | 97.8 | 97.8 | 97.6 | 97.5 | 97.2 | 97.1 | 97.0 | 96.9 | 98.0 | 97.8 | 97.8 |
| 15 | 100.0 | 98.8 | 98.4 | 98.1 | 98.2 | 97.9 | 97.8 | 97.6 | 97.4 | 97.1 | 97.0 | 97.1 | 96.8 | 98.0 | 97.6 | 97.7 |
| 16 | 100.0 | 98.7 | 98.4 | 98.3 | 98.4 | 98.1 | 98.1 | 97.8 | 97.7 | 97.4 | 97.3 | 97.3 | 97.0 | 98.2 | 98.1 | 98.0 |
| 17 | 100.0 | 98.4 | 98.2 | 97.8 | 97.9 | 97.6 | 97.8 | 97.4 | 97.5 | 97.1 | 96.8 | 97.2 | 96.6 | 97.9 | 97.8 | 97.7 |
| 18 | 100.0 | 98.6 | 98.2 | 98.0 | 98.1 | 97.7 | 97.8 | 97.5 | 97.3 | 96.9 | 96.8 | 96.9 | 96.6 | 97.7 | 97.6 | 97.6 |
| 19 | 100.0 | 98.7 | 98.4 | 98.4 | 98.3 | 97.8 | 97.9 | 97.6 | 97.6 | 97.3 | 97.1 | 97.2 | 96.8 | 97.9 | 98.0 | 97.9 |
| 20 | 100.0 | 98.6 | 98.3 | 98.3 | 98.2 | 97.8 | 97.9 | 97.7 | 97.6 | 97.3 | 97.1 | 97.2 | 96.8 | 98.0 | 97.9 | 97.9 |
| 21 | 100.0 | 98.5 | 98.2 | 98.0 | 98.0 | 97.5 | 97.6 | 97.4 | 97.2 | 97.0 | 96.7 | 96.8 | 96.4 | 97.5 | 97.5 | 97.4 |
| 22 | 100.0 | 98.7 | 98.5 | 98.4 | 98.3 | 98.0 | 98.0 | 97.8 | 97.7 | 97.5 | 97.3 | 97.3 | 96.9 | 98.0 | 98.0 | 98.0 |
| 23 | 100.0 | 98.8 | 98.7 | 98.2 | 98.3 | 98.1 | 98.2 | 97.9 | 97.9 | 97.7 | 97.4 | 97.5 | 97.2 | 98.1 | 98.3 | 98.3 |
| 24 | 100.0 | 98.8 | 98.6 | 98.3 | 98.3 | 97.9 | 98.0 | 97.7 | 97.6 | 97.4 | 97.2 | 97.2 | 96.9 | 97.9 | 97.9 | 97.8 |
| 25 | 100.0 | 99.0 | 98.6 | 98.5 | 98.4 | 98.3 | 98.2 | 98.1 | 97.9 | 97.6 | 97.4 | 97.5 | 97.2 | 98.3 | 98.3 | 98.2 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.7 | 98.4 | 98.2 | 98.2 | 97.8 | 97.9 | 97.7 | 97.5 | 97.2 | 97.1 | 97.2 | 96.9 | 98.0 | 97.9 | 97.8 |
| Med. | 100.0 | 98.7 | 98.4 | 98.2 | 98.2 | 97.8 | 97.9 | 97.7 | 97.6 | 97.3 | 97.2 | 97.2 | 96.9 | 98.0 | 97.9 | 97.9 |
| σ | 0.00 | 0.19 | 0.20 | 0.23 | 0.20 | 0.23 | 0.19 | 0.21 | 0.23 | 0.21 | 0.24 | 0.22 | 0.26 | 0.21 | 0.23 | 0.22 |
| Min. | 100.0 | 98.1 | 97.8 | 97.6 | 97.5 | 97.3 | 97.4 | 97.2 | 97.0 | 96.8 | 96.6 | 96.7 | 96.4 | 97.5 | 97.5 | 97.4 |
| Max. | 100.0 | 99.0 | 98.7 | 98.8 | 98.5 | 98.3 | 98.2 | 98.1 | 98.0 | 97.7 | 97.6 | 97.7 | 97.5 | 98.4 | 98.3 | 98.3 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0294 | -0.0284 | -0.0319 | -0.0206 | -0.0216 | -0.0218 | -0.0234 | -0.0222 | -0.0233 | -0.0222 | -0.0233 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.966 | |
| α | -1.38E-06 | |
| $R^2$ | 0.378 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 97.6 | 97.7 | 97.6 | 97.7 | 97.8 | | | | | | | | | | | |
| 2 | 97.7 | 97.8 | 97.8 | 97.8 | 97.8 | | | | | | | | | | | |
| 3 | 97.8 | 97.9 | 97.9 | 98.0 | 98.0 | | | | | | | | | | | |
| 4 | 97.8 | 97.9 | 97.9 | 98.0 | 98.0 | | | | | | | | | | | |
| 5 | 98.1 | 98.0 | 97.9 | 98.0 | 97.9 | | | | | | | | | | | |
| 6 | 97.6 | 97.6 | 97.5 | 97.6 | 97.5 | | | | | | | | | | | |
| 7 | 97.8 | 97.9 | 97.7 | 97.8 | 97.8 | | | | | | | | | | | |
| 8 | 97.3 | 97.5 | 97.3 | 97.4 | 97.3 | | | | | | | | | | | |
| 9 | 97.7 | 97.8 | 97.6 | 97.7 | 97.7 | | | | | | | | | | | |
| 10 | 97.8 | 97.8 | 97.6 | 97.7 | 97.6 | | | | | | | | | | | |
| 11 | 97.4 | 97.5 | 97.2 | 97.3 | 97.3 | | | | | | | | | | | |
| 12 | 97.8 | 97.8 | 97.7 | 97.8 | 97.7 | | | | | | | | | | | |
| 13 | 97.9 | 98.0 | 98.0 | 98.0 | 98.0 | | | | | | | | | | | |
| 14 | 97.7 | 97.8 | 97.7 | 97.8 | 97.9 | | | | | | | | | | | |
| 15 | 97.6 | 97.7 | 97.6 | 97.7 | 97.6 | | | | | | | | | | | |
| 16 | 97.9 | 98.0 | 97.9 | 97.9 | 97.9 | | | | | | | | | | | |
| 17 | 97.5 | 97.6 | 97.4 | 97.3 | 97.3 | | | | | | | | | | | |
| 18 | 97.5 | 97.6 | 97.6 | 97.6 | 97.5 | | | | | | | | | | | |
| 19 | 97.7 | 97.8 | 97.8 | 98.0 | 97.9 | | | | | | | | | | | |
| 20 | 97.6 | 97.8 | 97.8 | 98.0 | 97.9 | | | | | | | | | | | |
| 21 | 97.2 | 97.3 | 97.3 | 97.4 | 97.3 | | | | | | | | | | | |
| 22 | 97.7 | 97.8 | 97.7 | 97.8 | 97.8 | | | | | | | | | | | |
| 23 | 97.7 | 97.8 | 97.6 | 97.8 | 97.7 | | | | | | | | | | | |
| 24 | 97.6 | 97.7 | 97.7 | 97.8 | 97.7 | | | | | | | | | | | |
| 25 | 98.1 | 98.2 | 98.0 | 98.1 | 98.2 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 97.7 | 97.8 | 97.7 | 97.8 | 97.7 | | | | | | | | | | | |
| Med. | 97.7 | 97.8 | 97.7 | 97.8 | 97.8 | | | | | | | | | | | |
| σ | 0.21 | 0.19 | 0.22 | 0.23 | 0.25 | | | | | | | | | | | |
| Min. | 97.2 | 97.3 | 97.2 | 97.3 | 97.3 | | | | | | | | | | | |
| Max. | 98.1 | 98.2 | 98.0 | 98.1 | 98.2 | | | | | | | | | | | |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.6 | 99.6 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.9 | 99.8 | 99.9 | 100.0 | 100.0 | 99.8 | 99.9 | 100.0 |
| 2 | 100.0 | 99.9 | 99.9 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.0 | 100.0 | 100.3 | 100.2 | 100.2 | 100.1 | 100.2 |
| 3 | 100.0 | 99.9 | 100.0 | 100.1 | 100.3 | 100.4 | 100.2 | 100.4 | 100.4 | 100.0 | 100.3 | 100.2 | 100.4 | 100.2 | 100.2 | 100.3 |
| 4 | 100.0 | 99.6 | 99.7 | 99.7 | 100.0 | 99.9 | 100.0 | 100.0 | 99.8 | 100.0 | 100.0 | 100.1 | 100.2 | 99.9 | 100.0 | 100.1 |
| 5 | 100.0 | 99.6 | 99.7 | 99.8 | 100.1 | 99.9 | 100.0 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 |
| 6 | 100.0 | 99.9 | 99.9 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.3 | 100.3 | 100.2 | 100.3 | 100.4 |
| 7 | 100.0 | 99.7 | 99.9 | 99.9 | 100.2 | 100.0 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 | 100.3 | 100.2 | 100.3 | 100.3 |
| 8 | 100.0 | 99.8 | 99.8 | 99.9 | 100.1 | 100.1 | 100.1 | 100.0 | 99.9 | 100.2 | 100.0 | 100.2 | 100.0 | 100.1 | 100.1 | 100.2 |
| 9 | 100.0 | 99.6 | 99.7 | 99.9 | 99.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.2 |
| 10 | 100.0 | 99.6 | 99.6 | 99.8 | 100.0 | 99.8 | 99.9 | 99.8 | 99.8 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 |
| 11 | 100.0 | 99.8 | 99.9 | 100.1 | 100.1 | 100.1 | 100.2 | 100.4 | 100.4 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.5 | 100.5 |
| 12 | 100.0 | 99.8 | 99.8 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.3 | 100.2 | 100.2 | 100.3 | 100.3 |
| 13 | 100.0 | 99.9 | 99.9 | 100.1 | 100.3 | 100.2 | 100.3 | 100.2 | 100.4 | 100.3 | 100.5 | 100.7 | 100.7 | 100.5 | 100.6 | 100.6 |
| 14 | 100.0 | 99.8 | 100.0 | 100.2 | 100.4 | 100.2 | 100.3 | 100.3 | 100.4 | 100.2 | 100.2 | 100.4 | 100.2 | 100.2 | 100.3 | 100.3 |
| 15 | 100.0 | 99.9 | 99.8 | 100.0 | 100.1 | 100.2 | 100.2 | 100.4 | 100.2 | 100.2 | 100.3 | 100.3 | 100.1 | 100.2 | 100.3 | 100.3 |
| 16 | 100.0 | 100.0 | 100.1 | 100.2 | 100.5 | 100.4 | 100.4 | 100.4 | 100.5 | 100.6 | 100.3 | 100.6 | 100.6 | 100.5 | 100.7 | 100.7 |
| 17 | 100.0 | 99.8 | 99.6 | 99.8 | 100.1 | 99.9 | 100.0 | 99.8 | 99.9 | 99.8 | 100.1 | 100.0 | 99.8 | 100.0 | 100.0 | 100.1 |
| 18 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.3 | 100.2 | 100.1 | 100.2 | 100.2 |
| 19 | 100.0 | 99.7 | 99.8 | 100.0 | 100.1 | 100.0 | 100.1 | 100.3 | 100.1 | 100.2 | 100.1 | 100.3 | 100.1 | 100.2 | 100.3 | 100.2 |
| 20 | 100.0 | 100.0 | 99.9 | 100.1 | 100.3 | 100.2 | 100.2 | 100.4 | 100.4 | 100.2 | 100.3 | 100.3 | 100.2 | 100.2 | 100.4 | 100.4 |
| 21 | 100.0 | 100.0 | 100.0 | 100.1 | 100.3 | 100.1 | 100.3 | 100.3 | 100.4 | 100.3 | 100.3 | 100.4 | 100.4 | 100.3 | 100.5 | 100.4 |
| 22 | 100.0 | 99.7 | 99.8 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.0 | 100.2 | 100.2 |
| 23 | 100.0 | 99.7 | 99.7 | 99.8 | 99.9 | 99.8 | 100.0 | 99.9 | 100.1 | 99.8 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 |
| 24 | 100.0 | 99.8 | 99.8 | 99.8 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.0 | 100.1 | 100.2 | 100.2 |
| 25 | 100.0 | 99.9 | 100.0 | 100.1 | 100.3 | 100.5 | 100.4 | 100.4 | 100.4 | 100.4 | 100.3 | 100.6 | 100.3 | 100.5 | 100.6 | 100.6 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.8 | 99.8 | 100.0 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |
| Med. | 100.0 | 99.8 | 99.8 | 100.0 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.1 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 |
| σ | 0.00 | 0.13 | 0.13 | 0.14 | 0.18 | 0.18 | 0.15 | 0.21 | 0.21 | 0.19 | 0.16 | 0.20 | 0.20 | 0.19 | 0.21 | 0.21 |
| Min. | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| Max. | 100.0 | 100.0 | 100.1 | 100.2 | 100.5 | 100.5 | 100.4 | 100.4 | 100.5 | 100.6 | 100.5 | 100.7 | 100.7 | 100.5 | 100.7 | 100.7 |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 99.9 | 99.8 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | |
| 2 | 100.2 | 100.1 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | |
| 3 | 100.2 | 100.2 | 100.3 | 100.4 | 100.4 | | | | | | | | | | | |
| 4 | 100.0 | 100.0 | 100.0 | 100.2 | 100.1 | | | | | | | | | | | |
| 5 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| 6 | 100.3 | 100.3 | 100.4 | 100.5 | 100.5 | | | | | | | | | | | |
| 7 | 100.3 | 100.3 | 100.3 | 100.4 | 100.5 | | | | | | | | | | | |
| 8 | 100.1 | 100.1 | 100.2 | 100.3 | 100.2 | | | | | | | | | | | |
| 9 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | |
| 10 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| 11 | 100.5 | 100.4 | 100.5 | 100.5 | 100.6 | | | | | | | | | | | |
| 12 | 100.3 | 100.3 | 100.5 | 100.4 | 100.4 | | | | | | | | | | | |
| 13 | 100.6 | 100.6 | 100.8 | 100.6 | 100.7 | | | | | | | | | | | |
| 14 | 100.3 | 100.4 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| 15 | 100.3 | 100.1 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| 16 | 100.6 | 100.5 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| 17 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | |
| 18 | 100.2 | 100.1 | 100.4 | 100.4 | 100.3 | | | | | | | | | | | |
| 19 | 100.4 | 100.3 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| 20 | 100.3 | 100.2 | 100.5 | 100.4 | 100.4 | | | | | | | | | | | |
| 21 | 100.3 | 100.3 | 100.5 | 100.4 | 100.5 | | | | | | | | | | | |
| 22 | 100.1 | 100.3 | 100.3 | 100.2 | 100.2 | | | | | | | | | | | |
| 23 | 100.1 | 100.0 | 100.2 | 100.3 | 100.2 | | | | | | | | | | | |
| 24 | 100.2 | 100.2 | 100.4 | 100.3 | 100.3 | | | | | | | | | | | |
| 25 | 100.6 | 100.6 | 100.7 | 100.7 | 100.7 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.2 | 100.2 | 100.3 | 100.3 | 100.4 | | | | | | | | | | | |
| Med. | 100.2 | 100.2 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| σ | 0.19 | 0.20 | 0.24 | 0.19 | 0.21 | | | | | | | | | | | |
| Min. | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | |
| Max. | 100.6 | 100.6 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0013 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0020 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0024 | 0.0023 | 0.0023 |
| 2 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0023 | 0.0023 | 0.0022 |
| 3 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 |
| 4 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 |
| 5 | 0.0000 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0021 |
| 6 | 0.0000 | 0.0013 | 0.0014 | 0.0017 | 0.0017 | 0.0018 | 0.0017 | 0.0020 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0021 | 0.0023 | 0.0024 | 0.0024 |
| 7 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 |
| 8 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 |
| 9 | 0.0000 | 0.0012 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0022 | 0.0022 | 0.0022 |
| 10 | 0.0000 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | 0.0018 | 0.0016 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0022 | 0.0023 |
| 11 | 0.0000 | 0.0012 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0024 | 0.0023 | 0.0024 |
| 12 | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0022 | 0.0022 | 0.0022 |
| 13 | 0.0000 | 0.0011 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0020 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 |
| 14 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0024 | 0.0025 | 0.0025 |
| 15 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0025 | 0.0025 |
| 16 | 0.0000 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0015 | 0.0018 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0022 | 0.0023 | 0.0023 |
| 17 | 0.0000 | 0.0012 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0018 | 0.0020 | 0.0022 | 0.0022 | 0.0023 |
| 18 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 |
| 19 | 0.0000 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0023 |
| 20 | 0.0000 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0023 | 0.0023 |
| 21 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0024 | 0.0025 |
| 22 | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 |
| 23 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 |
| 24 | 0.0000 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 |
| 25 | 0.0000 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0020 | 0.0021 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0023 | 0.0023 |
| Med. | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0011 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0021 |
| Max. | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0024 | 0.0025 | 0.0025 |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0023 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 2 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | | | | | | | | | | | |
| 3 | 0.0024 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 4 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0022 | | | | | | | | | | | |
| 5 | 0.0019 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | | | | | | | | | | | |
| 6 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 7 | 0.0023 | 0.0021 | 0.0020 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 8 | 0.0022 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 9 | 0.0022 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 10 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0022 | | | | | | | | | | | |
| 11 | 0.0024 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 12 | 0.0022 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 13 | 0.0023 | 0.0022 | 0.0021 | 0.0023 | 0.0024 | | | | | | | | | | | |
| 14 | 0.0025 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | | | | | | | | | | | |
| 15 | 0.0025 | 0.0024 | 0.0023 | 0.0026 | 0.0026 | | | | | | | | | | | |
| 16 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 17 | 0.0022 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 18 | 0.0022 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 19 | 0.0023 | 0.0022 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 20 | 0.0024 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 21 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | | | | | | | | | | | |
| 22 | 0.0022 | 0.0021 | 0.0020 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 23 | 0.0022 | 0.0022 | 0.0020 | 0.0023 | 0.0024 | | | | | | | | | | | |
| 24 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | | | | | | | | | | | |
| 25 | 0.0021 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| Med. | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0019 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | | | | | | | | | | | |
| Max. | 0.0025 | 0.0024 | 0.0024 | 0.0026 | 0.0026 | | | | | | | | | | | |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2594 | 0.2581 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2573 | 0.2572 | 0.2570 | 0.2571 | 0.2571 |
| 2 | 0.2598 | 0.2584 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | 0.2581 | 0.2579 | 0.2580 | 0.2578 | 0.2577 | 0.2578 | 0.2576 | 0.2575 | 0.2575 | 0.2576 |
| 3 | 0.2590 | 0.2577 | 0.2575 | 0.2574 | 0.2573 | 0.2573 | 0.2573 | 0.2571 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2568 | 0.2567 | 0.2567 | 0.2566 |
| 4 | 0.2593 | 0.2580 | 0.2579 | 0.2577 | 0.2578 | 0.2576 | 0.2577 | 0.2575 | 0.2575 | 0.2574 | 0.2573 | 0.2574 | 0.2572 | 0.2571 | 0.2571 | 0.2570 |
| 5 | 0.2622 | 0.2610 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2605 | 0.2605 | 0.2602 | 0.2603 | 0.2601 |
| 6 | 0.2590 | 0.2577 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2571 | 0.2572 | 0.2570 | 0.2570 | 0.2570 | 0.2570 | 0.2567 | 0.2567 | 0.2567 |
| 7 | 0.2597 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2577 | 0.2577 | 0.2575 | 0.2575 | 0.2574 |
| 8 | 0.2600 | 0.2587 | 0.2585 | 0.2584 | 0.2584 | 0.2583 | 0.2585 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2578 | 0.2577 | 0.2577 |
| 9 | 0.2588 | 0.2576 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2571 | 0.2572 | 0.2570 | 0.2570 | 0.2569 | 0.2569 | 0.2569 | 0.2566 | 0.2566 | 0.2566 |
| 10 | 0.2594 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | 0.2576 | 0.2578 | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2571 | 0.2572 | 0.2571 |
| 11 | 0.2614 | 0.2602 | 0.2599 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2590 | 0.2591 | 0.2590 |
| 12 | 0.2601 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2582 | 0.2579 | 0.2579 | 0.2579 |
| 13 | 0.2589 | 0.2578 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2571 | 0.2572 | 0.2570 | 0.2570 | 0.2570 | 0.2568 | 0.2567 | 0.2566 | 0.2566 |
| 14 | 0.2596 | 0.2583 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2572 | 0.2571 | 0.2571 |
| 15 | 0.2595 | 0.2582 | 0.2581 | 0.2579 | 0.2579 | 0.2578 | 0.2579 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2572 | 0.2570 | 0.2570 |
| 16 | 0.2608 | 0.2595 | 0.2592 | 0.2594 | 0.2592 | 0.2591 | 0.2592 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2586 | 0.2585 | 0.2585 |
| 17 | 0.2610 | 0.2597 | 0.2596 | 0.2594 | 0.2593 | 0.2594 | 0.2594 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2592 | 0.2590 | 0.2587 | 0.2587 | 0.2587 |
| 18 | 0.2602 | 0.2591 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2579 |
| 19 | 0.2606 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2585 | 0.2583 | 0.2583 |
| 20 | 0.2589 | 0.2577 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2571 | 0.2571 | 0.2571 | 0.2570 | 0.2570 | 0.2570 | 0.2567 | 0.2566 | 0.2566 |
| 21 | 0.2593 | 0.2581 | 0.2580 | 0.2579 | 0.2577 | 0.2576 | 0.2577 | 0.2575 | 0.2575 | 0.2575 | 0.2573 | 0.2572 | 0.2571 | 0.2571 | 0.2569 | 0.2568 |
| 22 | 0.2604 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2587 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2584 | 0.2582 | 0.2582 | 0.2581 |
| 23 | 0.2615 | 0.2603 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2598 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2593 | 0.2593 | 0.2592 |
| 24 | 0.2603 | 0.2590 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2579 | 0.2579 |
| 25 | 0.2602 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2582 | 0.2582 | 0.2581 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2600 | 0.2587 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2584 | 0.2582 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2577 | 0.2577 |
| Med. | 0.2598 | 0.2584 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | 0.2581 | 0.2579 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2575 | 0.2575 | 0.2576 |
| σ | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 |
| Min. | 0.2588 | 0.2576 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2571 | 0.2571 | 0.2570 | 0.2570 | 0.2569 | 0.2569 | 0.2568 | 0.2566 | 0.2566 | 0.2566 |
| Max. | 0.2622 | 0.2610 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2605 | 0.2605 | 0.2602 | 0.2603 | 0.2601 |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2571 | 0.2573 | 0.2571 | 0.2570 | 0.2570 | | | | | | | | | | | |
| 2 | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 3 | 0.2566 | 0.2567 | 0.2566 | 0.2566 | 0.2565 | | | | | | | | | | | |
| 4 | 0.2570 | 0.2572 | 0.2571 | 0.2570 | 0.2571 | | | | | | | | | | | |
| 5 | 0.2603 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | | | | | | | | | | | |
| 6 | 0.2567 | 0.2568 | 0.2568 | 0.2567 | 0.2568 | | | | | | | | | | | |
| 7 | 0.2574 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 8 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2578 | | | | | | | | | | | |
| 9 | 0.2566 | 0.2568 | 0.2567 | 0.2566 | 0.2565 | | | | | | | | | | | |
| 10 | 0.2571 | 0.2572 | 0.2572 | 0.2571 | 0.2571 | | | | | | | | | | | |
| 11 | 0.2590 | 0.2591 | 0.2592 | 0.2590 | 0.2590 | | | | | | | | | | | |
| 12 | 0.2578 | 0.2581 | 0.2581 | 0.2578 | 0.2579 | | | | | | | | | | | |
| 13 | 0.2566 | 0.2568 | 0.2568 | 0.2566 | 0.2565 | | | | | | | | | | | |
| 14 | 0.2571 | 0.2573 | 0.2572 | 0.2571 | 0.2571 | | | | | | | | | | | |
| 15 | 0.2571 | 0.2571 | 0.2572 | 0.2570 | 0.2570 | | | | | | | | | | | |
| 16 | 0.2584 | 0.2586 | 0.2586 | 0.2584 | 0.2585 | | | | | | | | | | | |
| 17 | 0.2588 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | | | | | | | | | | | |
| 18 | 0.2580 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | | | | | | | | | | | |
| 19 | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2583 | | | | | | | | | | | |
| 20 | 0.2566 | 0.2567 | 0.2567 | 0.2566 | 0.2566 | | | | | | | | | | | |
| 21 | 0.2569 | 0.2570 | 0.2569 | 0.2568 | 0.2568 | | | | | | | | | | | |
| 22 | 0.2582 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | | | | | | | | | | | |
| 23 | 0.2593 | 0.2593 | 0.2595 | 0.2592 | 0.2592 | | | | | | | | | | | |
| 24 | 0.2579 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | | | | | | | | | | | |
| 25 | 0.2581 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2577 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | | | | | | | | | | | |
| Med. | 0.2575 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | | | | | | | | | | | |
| σ | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | | | | | | | | | | | |
| Min. | 0.2566 | 0.2567 | 0.2566 | 0.2566 | 0.2565 | | | | | | | | | | | |
| Max. | 0.2603 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | | | | | | | | | | | |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 10-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5250 | 0.5252 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5253 |
| 2 | 0.5275 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5279 |
| 3 | 0.5272 | 0.5274 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5275 |
| 4 | 0.5262 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 |
| 5 | 0.5290 | 0.5292 | 0.5292 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5293 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5292 |
| 6 | 0.5281 | 0.5283 | 0.5283 | 0.5284 | 0.5284 | 0.5283 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5281 | 0.5281 | 0.5282 |
| 7 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5280 | 0.5281 | 0.5281 |
| 8 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5263 |
| 9 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 |
| 10 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 |
| 11 | 0.5278 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5281 |
| 12 | 0.5259 | 0.5258 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5261 | 0.5260 | 0.5260 | 0.5259 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5260 | 0.5260 |
| 13 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 |
| 14 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 |
| 15 | 0.5264 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5265 |
| 16 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5275 | 0.5277 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 |
| 17 | 0.5279 | 0.5281 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5280 |
| 18 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5267 | 0.5267 | 0.5266 | 0.5267 | 0.5267 |
| 19 | 0.5276 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| 20 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5264 |
| 21 | 0.5278 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5280 | 0.5279 |
| 22 | 0.5272 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 |
| 23 | 0.5293 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 |
| 24 | 0.5285 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5288 | 0.5289 | 0.5288 | 0.5288 | 0.5289 | 0.5288 | 0.5288 | 0.5288 | 0.5288 |
| 25 | 0.5285 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5288 | 0.5289 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5288 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5273 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| Med. | 0.5275 | 0.5277 | 0.5277 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| σ | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 |
| Min. | 0.5250 | 0.5252 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5253 |
| Max. | 0.5293 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 |

## Data Set 10 : 105 °C, 125 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 104.3 °C |
| Drive Current [$I_F$] | 125 mA |
| Measurement Current | 125 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

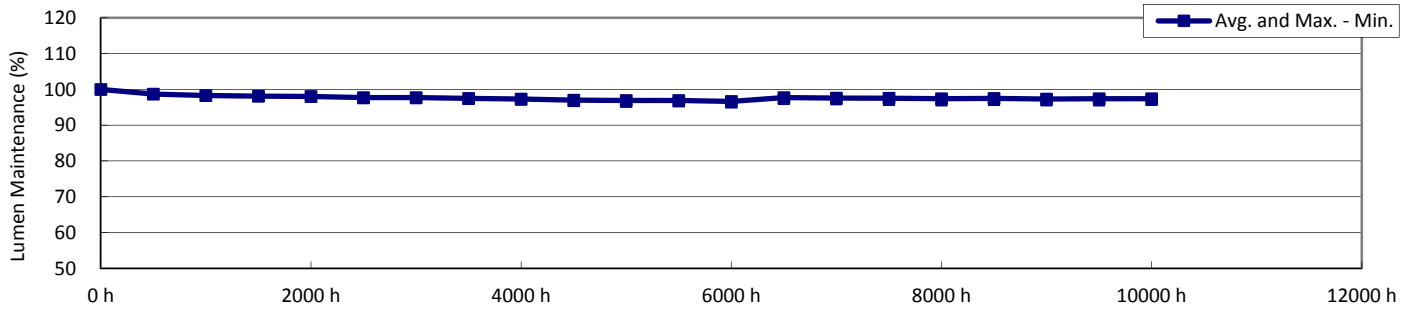
**TABLE 10-6 (Continued)**
Chromaticity

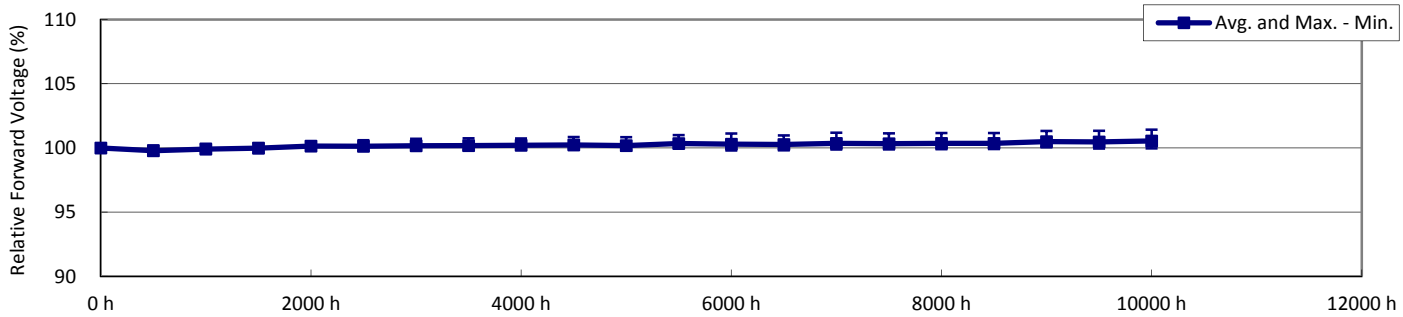
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5253 | 0.5253 | 0.5252 | 0.5251 | 0.5251 | | | | | | | | | | | |
| 2 | 0.5278 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 3 | 0.5275 | 0.5275 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| 4 | 0.5265 | 0.5266 | 0.5266 | 0.5264 | 0.5265 | | | | | | | | | | | |
| 5 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5290 | | | | | | | | | | | |
| 6 | 0.5282 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 7 | 0.5281 | 0.5282 | 0.5281 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 8 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5262 | | | | | | | | | | | |
| 9 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 10 | 0.5278 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 11 | 0.5281 | 0.5281 | 0.5282 | 0.5279 | 0.5280 | | | | | | | | | | | |
| 12 | 0.5260 | 0.5261 | 0.5261 | 0.5259 | 0.5259 | | | | | | | | | | | |
| 13 | 0.5264 | 0.5265 | 0.5265 | 0.5263 | 0.5264 | | | | | | | | | | | |
| 14 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | | | | | | | | | | | |
| 15 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | | | | | | | | | | | |
| 16 | 0.5276 | 0.5276 | 0.5276 | 0.5274 | 0.5275 | | | | | | | | | | | |
| 17 | 0.5280 | 0.5281 | 0.5281 | 0.5278 | 0.5279 | | | | | | | | | | | |
| 18 | 0.5266 | 0.5267 | 0.5267 | 0.5265 | 0.5266 | | | | | | | | | | | |
| 19 | 0.5277 | 0.5278 | 0.5279 | 0.5277 | 0.5277 | | | | | | | | | | | |
| 20 | 0.5263 | 0.5264 | 0.5264 | 0.5262 | 0.5263 | | | | | | | | | | | |
| 21 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 22 | 0.5272 | 0.5272 | 0.5273 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 23 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5293 | | | | | | | | | | | |
| 24 | 0.5288 | 0.5288 | 0.5289 | 0.5288 | 0.5287 | | | | | | | | | | | |
| 25 | 0.5288 | 0.5288 | 0.5288 | 0.5286 | 0.5287 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | | | | | | | | | | | |
| Med. | 0.5277 | 0.5278 | 0.5279 | 0.5277 | 0.5277 | | | | | | | | | | | |
| σ | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.5253 | 0.5253 | 0.5252 | 0.5251 | 0.5251 | | | | | | | | | | | |
| Max. | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5293 | | | | | | | | | | | |

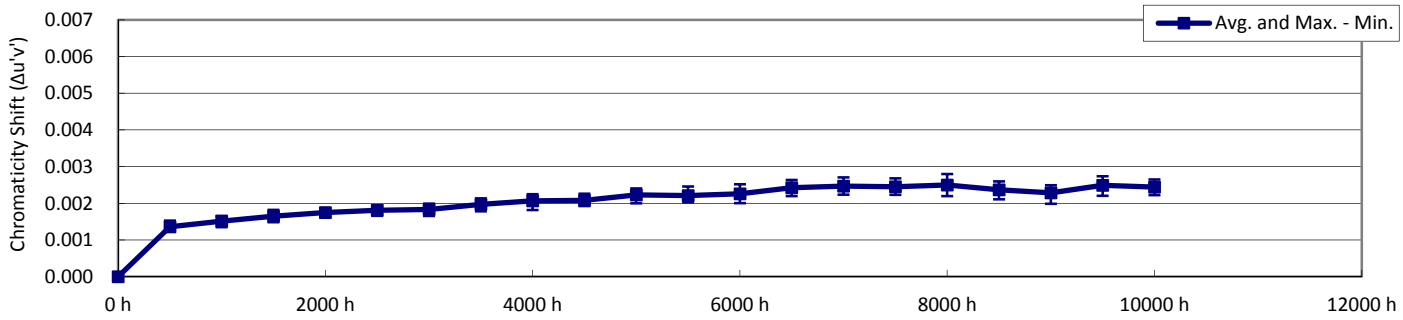
## Data Set 11 : 105 °C, 150 mA

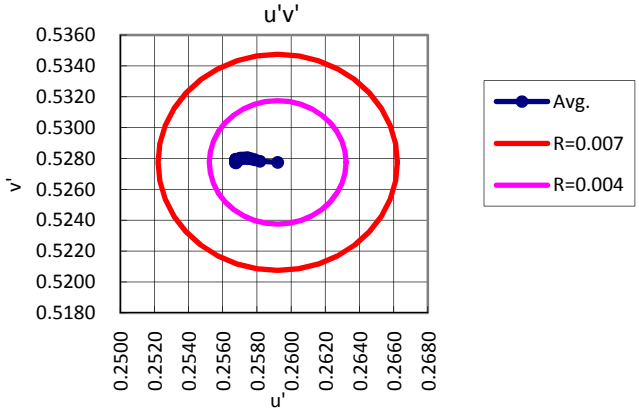
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 66.7 | 3.15 | 2763 | 0.47 | 0.456 | 0.412 | 0.260 | 0.527 | | | | |
| 2 | 66.6 | 3.14 | 2783 | 0.47 | 0.454 | 0.410 | 0.259 | 0.526 | | | | |
| 3 | 66.4 | 3.13 | 2753 | 0.47 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 4 | 66.5 | 3.13 | 2739 | 0.47 | 0.461 | 0.417 | 0.260 | 0.530 | | | | |
| 5 | 66.2 | 3.13 | 2767 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 6 | 66.5 | 3.13 | 2788 | 0.47 | 0.455 | 0.413 | 0.258 | 0.528 | | | | |
| 7 | 66.8 | 3.14 | 2775 | 0.47 | 0.457 | 0.415 | 0.259 | 0.528 | | | | |
| 8 | 66.8 | 3.14 | 2767 | 0.47 | 0.458 | 0.416 | 0.259 | 0.529 | | | | |
| 9 | 66.5 | 3.13 | 2729 | 0.47 | 0.460 | 0.414 | 0.261 | 0.529 | | | | |
| 10 | 66.6 | 3.14 | 2779 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 11 | 66.3 | 3.13 | 2743 | 0.47 | 0.460 | 0.416 | 0.260 | 0.529 | | | | |
| 12 | 66.7 | 3.14 | 2790 | 0.47 | 0.453 | 0.409 | 0.259 | 0.526 | | | | |
| 13 | 66.3 | 3.13 | 2779 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 14 | 66.5 | 3.15 | 2782 | 0.47 | 0.456 | 0.414 | 0.258 | 0.528 | | | | |
| 15 | 66.7 | 3.14 | 2784 | 0.47 | 0.454 | 0.412 | 0.259 | 0.527 | | | | |
| 16 | 66.6 | 3.15 | 2731 | 0.47 | 0.460 | 0.415 | 0.261 | 0.529 | | | | |
| 17 | 66.0 | 3.13 | 2764 | 0.47 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 18 | 67.1 | 3.15 | 2744 | 0.47 | 0.459 | 0.416 | 0.260 | 0.529 | | | | |
| 19 | 66.7 | 3.14 | 2763 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 20 | 66.4 | 3.13 | 2777 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| 21 | 66.6 | 3.14 | 2775 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 22 | 66.6 | 3.14 | 2771 | 0.47 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 23 | 66.7 | 3.15 | 2781 | 0.47 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 24 | 65.9 | 3.14 | 2776 | 0.47 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 25 | 66.3 | 3.14 | 2736 | 0.47 | 0.459 | 0.413 | 0.261 | 0.528 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 66.5 | 3.14 | 2766 | 0.47 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 66.6 | 3.14 | 2771 | 0.47 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| σ | 0.26 | 0.007 | 18.6 | 0.001 | 0.0021 | 0.0019 | 0.0007 | 0.0010 | | | | |
| Min. | 65.9 | 3.13 | 2729 | 0.47 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 67.1 | 3.15 | 2790 | 0.47 | 0.461 | 0.417 | 0.261 | 0.530 | | | | |

# Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 98.5 | 98.1 | 97.8 | 97.7 | 97.4 | 97.4 | 97.2 | 97.0 | 96.6 | 96.6 | 96.7 | 96.4 | 97.5 | 97.3 | 97.2 |
| 2 | 100.0 | 98.8 | 98.5 | 98.2 | 98.1 | 97.7 | 97.8 | 97.6 | 97.4 | 97.1 | 97.0 | 97.0 | 96.8 | 97.9 | 97.8 | 97.7 |
| 3 | 100.0 | 98.8 | 98.3 | 98.1 | 97.9 | 97.6 | 97.7 | 97.4 | 97.3 | 96.9 | 96.8 | 96.8 | 96.5 | 97.7 | 97.5 | 97.4 |
| 4 | 100.0 | 98.9 | 98.6 | 98.3 | 98.2 | 97.9 | 97.9 | 97.8 | 97.6 | 97.2 | 97.1 | 97.1 | 96.8 | 97.9 | 97.8 | 97.7 |
| 5 | 100.0 | 98.8 | 98.3 | 97.9 | 97.7 | 97.4 | 97.3 | 97.2 | 96.9 | 96.5 | 96.4 | 96.5 | 96.5 | 97.4 | 97.3 | 97.5 |
| 6 | 100.0 | 99.0 | 98.5 | 98.2 | 98.1 | 97.7 | 97.8 | 97.5 | 97.4 | 97.0 | 97.0 | 97.0 | 96.7 | 97.8 | 97.6 | 97.6 |
| 7 | 100.0 | 99.0 | 98.6 | 98.4 | 98.4 | 98.2 | 98.1 | 97.9 | 97.8 | 97.5 | 97.4 | 97.5 | 97.2 | 98.3 | 98.2 | 98.1 |
| 8 | 100.0 | 98.7 | 98.2 | 98.0 | 97.9 | 97.6 | 97.5 | 97.4 | 97.2 | 96.9 | 96.7 | 96.8 | 96.5 | 97.6 | 97.5 | 97.5 |
| 9 | 100.0 | 98.8 | 98.3 | 97.9 | 98.0 | 97.7 | 97.5 | 97.3 | 97.2 | 96.9 | 96.8 | 96.8 | 96.5 | 97.6 | 97.5 | 97.4 |
| 10 | 100.0 | 98.6 | 98.4 | 98.0 | 97.9 | 97.7 | 97.5 | 97.2 | 97.2 | 96.9 | 96.8 | 96.7 | 96.5 | 97.5 | 97.4 | 97.3 |
| 11 | 100.0 | 99.1 | 98.7 | 98.2 | 98.3 | 98.0 | 97.9 | 97.7 | 97.8 | 97.4 | 97.3 | 97.1 | 97.0 | 98.0 | 97.7 | 97.7 |
| 12 | 100.0 | 98.9 | 98.4 | 98.1 | 98.1 | 97.9 | 97.8 | 97.6 | 97.6 | 97.3 | 97.1 | 97.2 | 96.9 | 98.0 | 98.0 | 97.9 |
| 13 | 100.0 | 98.8 | 98.3 | 98.0 | 98.0 | 97.5 | 97.7 | 97.4 | 97.2 | 96.8 | 96.6 | 96.7 | 96.3 | 97.7 | 97.5 | 97.3 |
| 14 | 100.0 | 98.7 | 98.3 | 98.1 | 98.1 | 97.7 | 97.8 | 97.7 | 97.5 | 97.2 | 97.0 | 97.1 | 96.9 | 98.1 | 97.9 | 97.8 |
| 15 | 100.0 | 98.7 | 98.3 | 98.1 | 98.2 | 97.8 | 97.9 | 97.7 | 97.4 | 97.0 | 96.9 | 97.0 | 96.7 | 97.8 | 97.6 | 97.6 |
| 16 | 100.0 | 98.6 | 98.2 | 98.1 | 98.0 | 97.6 | 97.7 | 97.4 | 97.1 | 96.9 | 96.7 | 96.7 | 96.5 | 97.6 | 97.4 | 97.3 |
| 17 | 100.0 | 98.6 | 98.3 | 98.3 | 98.2 | 97.9 | 98.1 | 97.8 | 97.9 | 97.2 | 97.1 | 97.0 | 97.0 | 98.0 | 97.7 | 97.7 |
| 18 | 100.0 | 97.8 | 97.1 | 96.8 | 96.8 | 96.2 | 96.2 | 96.0 | 95.8 | 95.4 | 95.2 | 95.3 | 95.0 | 96.0 | 95.9 | 95.7 |
| 19 | 100.0 | 98.7 | 98.4 | 98.2 | 98.1 | 97.7 | 97.9 | 97.7 | 97.5 | 97.1 | 97.1 | 97.1 | 96.8 | 97.9 | 97.8 | 97.7 |
| 20 | 100.0 | 98.5 | 98.1 | 97.9 | 97.8 | 97.5 | 97.6 | 97.4 | 97.3 | 96.9 | 96.8 | 96.8 | 96.6 | 97.6 | 97.5 | 97.4 |
| 21 | 100.0 | 98.6 | 98.3 | 98.1 | 98.1 | 97.8 | 97.9 | 97.8 | 97.5 | 97.1 | 97.0 | 97.0 | 96.8 | 97.8 | 97.7 | 97.6 |
| 22 | 100.0 | 98.8 | 98.4 | 98.3 | 98.1 | 97.8 | 97.9 | 97.7 | 97.4 | 97.1 | 97.1 | 97.0 | 96.8 | 97.9 | 97.8 | 97.7 |
| 23 | 100.0 | 99.0 | 98.5 | 98.4 | 98.5 | 98.1 | 98.1 | 97.9 | 97.6 | 97.3 | 97.5 | 97.3 | 97.1 | 98.0 | 98.0 | 97.7 |
| 24 | 100.0 | 98.6 | 98.3 | 98.1 | 98.0 | 97.7 | 97.8 | 97.6 | 97.4 | 97.1 | 97.0 | 97.0 | 96.7 | 97.8 | 97.8 | 97.6 |
| 25 | 100.0 | 98.8 | 98.4 | 98.2 | 98.1 | 97.8 | 97.9 | 97.7 | 97.6 | 97.2 | 97.0 | 97.0 | 96.8 | 97.8 | 97.7 | 97.6 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.7 | 98.3 | 98.1 | 98.0 | 97.7 | 97.7 | 97.5 | 97.3 | 97.0 | 96.9 | 96.9 | 96.7 | 97.7 | 97.6 | 97.5 |
| Med. | 100.0 | 98.8 | 98.3 | 98.1 | 98.1 | 97.7 | 97.8 | 97.6 | 97.4 | 97.1 | 97.0 | 97.0 | 96.7 | 97.8 | 97.7 | 97.6 |
| σ | 0.00 | 0.25 | 0.29 | 0.31 | 0.32 | 0.36 | 0.38 | 0.38 | 0.40 | 0.40 | 0.43 | 0.40 | 0.41 | 0.42 | 0.42 | 0.43 |
| Min. | 100.0 | 97.8 | 97.1 | 96.8 | 96.8 | 96.2 | 96.2 | 96.0 | 95.8 | 95.4 | 95.2 | 95.3 | 95.0 | 96.0 | 95.9 | 95.7 |
| Max. | 100.0 | 99.1 | 98.7 | 98.4 | 98.5 | 98.2 | 98.1 | 97.9 | 97.9 | 97.5 | 97.5 | 97.5 | 97.2 | 98.3 | 98.2 | 98.1 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0315 | -0.0315 | -0.0341 | -0.0230 | -0.0243 | -0.0252 | -0.0266 | -0.0253 | -0.0274 | -0.0263 | -0.0263 | | | | | |

| Test duration used | 5000 h to 10000 h |
|---|---|
| B | 0.965 |
| α | -1.09E-06 |
| $R^2$ | 0.273 |
| Calculated $L_{70}$ (10K) | N/A hours |
| Reported $L_{70}$ (10K) | > 60000 hours |
| Calculated $L_{80}$ (10K) | N/A hours |
| Reported $L_{80}$ (10K) | > 60000 hours |
| Calculated $L_{90}$ (10K) | N/A hours |
| Reported $L_{90}$ (10K) | > 60000 hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 97.2 | 97.3 | 97.2 | 97.2 | 97.3 | | | | | | | | | | | |
| 2 | 97.6 | 97.7 | 97.7 | 97.6 | 97.7 | | | | | | | | | | | |
| 3 | 97.3 | 97.4 | 97.4 | 97.4 | 97.4 | | | | | | | | | | | |
| 4 | 97.6 | 97.6 | 97.6 | 97.6 | 97.6 | | | | | | | | | | | |
| 5 | 97.1 | 97.2 | 97.2 | 97.2 | 97.3 | | | | | | | | | | | |
| 6 | 97.5 | 97.6 | 97.5 | 97.4 | 97.4 | | | | | | | | | | | |
| 7 | 98.0 | 98.1 | 98.0 | 98.0 | 98.0 | | | | | | | | | | | |
| 8 | 97.3 | 97.4 | 97.3 | 97.4 | 97.4 | | | | | | | | | | | |
| 9 | 97.3 | 97.4 | 97.3 | 97.4 | 97.4 | | | | | | | | | | | |
| 10 | 97.1 | 97.2 | 97.0 | 97.1 | 97.0 | | | | | | | | | | | |
| 11 | 97.4 | 97.6 | 97.3 | 97.4 | 97.4 | | | | | | | | | | | |
| 12 | 97.7 | 97.8 | 97.6 | 97.7 | 97.7 | | | | | | | | | | | |
| 13 | 97.2 | 97.3 | 97.2 | 97.1 | 97.2 | | | | | | | | | | | |
| 14 | 97.6 | 97.8 | 97.6 | 97.7 | 97.7 | | | | | | | | | | | |
| 15 | 97.2 | 97.5 | 97.3 | 97.3 | 97.3 | | | | | | | | | | | |
| 16 | 97.2 | 97.2 | 97.1 | 97.1 | 97.2 | | | | | | | | | | | |
| 17 | 97.6 | 97.7 | 97.4 | 97.6 | 97.7 | | | | | | | | | | | |
| 18 | 95.6 | 95.7 | 95.6 | 95.6 | 95.7 | | | | | | | | | | | |
| 19 | 97.6 | 97.7 | 97.5 | 97.6 | 97.6 | | | | | | | | | | | |
| 20 | 97.3 | 97.4 | 97.3 | 97.4 | 97.4 | | | | | | | | | | | |
| 21 | 97.5 | 97.6 | 97.4 | 97.5 | 97.5 | | | | | | | | | | | |
| 22 | 97.7 | 97.7 | 97.6 | 97.7 | 97.7 | | | | | | | | | | | |
| 23 | 97.7 | 97.7 | 97.4 | 97.6 | 97.5 | | | | | | | | | | | |
| 24 | 97.6 | 97.7 | 97.5 | 97.6 | 97.6 | | | | | | | | | | | |
| 25 | 97.5 | 97.8 | 97.7 | 97.6 | 97.5 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 97.4 | 97.5 | 97.3 | 97.4 | 97.4 | | | | | | | | | | | |
| Med. | 97.5 | 97.6 | 97.4 | 97.4 | 97.4 | | | | | | | | | | | |
| σ | 0.43 | 0.43 | 0.42 | 0.43 | 0.41 | | | | | | | | | | | |
| Min. | 95.6 | 95.7 | 95.6 | 95.6 | 95.7 | | | | | | | | | | | |
| Max. | 98.0 | 98.1 | 98.0 | 98.0 | 98.0 | | | | | | | | | | | |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.8 | 100.0 | 100.1 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.2 | 100.3 | 100.5 | 100.4 | 100.3 | 100.4 | 100.4 |
| 2 | 100.0 | 100.0 | 100.1 | 100.2 | 100.2 | 100.3 | 100.4 | 100.2 | 100.4 | 100.5 | 100.4 | 100.5 | 100.6 | 100.5 | 100.6 | 100.5 |
| 3 | 100.0 | 99.8 | 99.9 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 99.9 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 |
| 4 | 100.0 | 99.7 | 99.8 | 99.8 | 100.1 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 |
| 5 | 100.0 | 99.6 | 99.7 | 99.7 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 |
| 6 | 100.0 | 99.7 | 99.8 | 99.9 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 99.9 | 100.0 | 100.1 | 100.1 |
| 7 | 100.0 | 99.8 | 99.9 | 100.0 | 100.1 | 100.3 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.3 | 100.0 | 100.2 | 100.3 | 100.3 |
| 8 | 100.0 | 100.0 | 100.1 | 100.2 | 100.5 | 100.6 | 100.6 | 100.7 | 100.7 | 100.8 | 100.6 | 100.8 | 101.0 | 100.9 | 101.0 | 100.9 |
| 9 | 100.0 | 99.8 | 99.9 | 100.0 | 100.2 | 100.2 | 100.3 | 100.2 | 100.1 | 100.4 | 100.0 | 100.4 | 100.3 | 100.2 | 100.3 | 100.3 |
| 10 | 100.0 | 99.7 | 99.8 | 99.9 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.4 | 100.1 | 100.2 | 100.2 | 100.3 |
| 11 | 100.0 | 99.8 | 99.9 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.2 | 100.2 | 100.3 | 100.3 |
| 12 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 |
| 13 | 100.0 | 99.6 | 99.8 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.2 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 |
| 14 | 100.0 | 99.6 | 99.7 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | 100.4 | 100.4 | 100.5 | 100.5 |
| 15 | 100.0 | 99.9 | 100.1 | 100.3 | 100.5 | 100.3 | 100.4 | 100.4 | 100.7 | 100.6 | 100.7 | 100.8 | 100.8 | 100.7 | 100.8 | 100.8 |
| 16 | 100.0 | 100.1 | 100.1 | 100.2 | 100.4 | 100.4 | 100.4 | 100.5 | 100.5 | 100.4 | 100.6 | 100.7 | 100.6 | 100.7 | 100.8 | 100.8 |
| 17 | 100.0 | 99.6 | 99.6 | 99.6 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 100.0 | 99.8 | 100.0 | 99.8 | 99.8 | 99.9 | 99.9 |
| 18 | 100.0 | 100.2 | 100.3 | 100.4 | 100.4 | 100.5 | 100.7 | 100.7 | 100.7 | 100.9 | 100.8 | 101.0 | 101.1 | 101.0 | 101.2 | 101.1 |
| 19 | 100.0 | 99.6 | 99.8 | 99.8 | 99.9 | 99.9 | 100.0 | 100.2 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.0 |
| 20 | 100.0 | 99.5 | 99.7 | 99.9 | 100.0 | 99.9 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.4 | 100.1 | 100.2 | 100.3 | 100.3 |
| 21 | 100.0 | 99.9 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.4 | 100.4 | 100.3 | 100.5 | 100.5 |
| 22 | 100.0 | 99.9 | 100.1 | 100.3 | 100.4 | 100.3 | 100.3 | 100.4 | 100.4 | 100.3 | 100.3 | 100.3 | 100.4 | 100.3 | 100.4 | 100.4 |
| 23 | 100.0 | 99.9 | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.1 | 100.2 | 100.3 | 100.2 |
| 24 | 100.0 | 99.4 | 99.7 | 99.6 | 99.8 | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | 99.9 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 |
| 25 | 100.0 | 99.9 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.2 | 100.2 | 100.3 | 100.4 | 100.2 | 100.3 | 100.3 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.8 | 99.9 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.3 | 100.4 | 100.3 |
| Med. | 100.0 | 99.8 | 99.9 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.3 | 100.2 | 100.2 | 100.3 | 100.3 |
| σ | 0.00 | 0.18 | 0.18 | 0.20 | 0.18 | 0.22 | 0.22 | 0.23 | 0.24 | 0.25 | 0.27 | 0.26 | 0.33 | 0.29 | 0.32 | 0.31 |
| Min. | 100.0 | 99.4 | 99.6 | 99.6 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 100.0 | 99.8 | 99.8 | 99.9 | 99.9 |
| Max. | 100.0 | 100.2 | 100.3 | 100.4 | 100.5 | 100.6 | 100.7 | 100.7 | 100.7 | 100.9 | 100.8 | 101.0 | 101.1 | 101.0 | 101.2 | 101.1 |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.4 | 100.4 | 100.5 | 100.5 | 100.6 | | | | | | | | | | | |
| 2 | 100.6 | 100.6 | 100.8 | 100.7 | 100.8 | | | | | | | | | | | |
| 3 | 100.2 | 100.2 | 100.4 | 100.3 | 100.3 | | | | | | | | | | | |
| 4 | 100.0 | 100.0 | 100.2 | 100.1 | 100.2 | | | | | | | | | | | |
| 5 | 100.1 | 100.0 | 100.1 | 100.1 | 100.3 | | | | | | | | | | | |
| 6 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | |
| 7 | 100.3 | 100.3 | 100.4 | 100.3 | 100.5 | | | | | | | | | | | |
| 8 | 100.9 | 101.0 | 101.2 | 101.0 | 101.3 | | | | | | | | | | | |
| 9 | 100.2 | 100.3 | 100.4 | 100.4 | 100.4 | | | | | | | | | | | |
| 10 | 100.2 | 100.2 | 100.4 | 100.3 | 100.4 | | | | | | | | | | | |
| 11 | 100.3 | 100.4 | 100.4 | 100.5 | 100.5 | | | | | | | | | | | |
| 12 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | |
| 13 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | |
| 14 | 100.6 | 100.5 | 100.7 | 100.8 | 100.7 | | | | | | | | | | | |
| 15 | 100.8 | 100.9 | 101.0 | 101.0 | 101.0 | | | | | | | | | | | |
| 16 | 100.8 | 100.9 | 101.0 | 101.0 | 101.1 | | | | | | | | | | | |
| 17 | 99.9 | 99.9 | 100.1 | 99.9 | 100.0 | | | | | | | | | | | |
| 18 | 101.2 | 101.2 | 101.3 | 101.3 | 101.4 | | | | | | | | | | | |
| 19 | 100.1 | 100.1 | 100.1 | 100.2 | 100.3 | | | | | | | | | | | |
| 20 | 100.3 | 100.3 | 100.5 | 100.4 | 100.6 | | | | | | | | | | | |
| 21 | 100.6 | 100.6 | 100.7 | 100.6 | 100.7 | | | | | | | | | | | |
| 22 | 100.4 | 100.3 | 100.5 | 100.5 | 100.5 | | | | | | | | | | | |
| 23 | 100.2 | 100.3 | 100.4 | 100.3 | 100.4 | | | | | | | | | | | |
| 24 | 100.3 | 100.1 | 100.3 | 100.3 | 100.5 | | | | | | | | | | | |
| 25 | 100.3 | 100.4 | 100.4 | 100.4 | 100.5 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.4 | 100.4 | 100.5 | 100.5 | 100.5 | | | | | | | | | | | |
| Med. | 100.3 | 100.3 | 100.4 | 100.4 | 100.5 | | | | | | | | | | | |
| σ | 0.31 | 0.32 | 0.34 | 0.34 | 0.35 | | | | | | | | | | | |
| Min. | 99.9 | 99.9 | 100.1 | 99.9 | 100.0 | | | | | | | | | | | |
| Max. | 101.2 | 101.2 | 101.3 | 101.3 | 101.4 | | | | | | | | | | | |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| 2 | 0.0000 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0025 |
| 3 | 0.0000 | 0.0015 | 0.0015 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0024 | 0.0026 | 0.0026 | 0.0026 |
| 4 | 0.0000 | 0.0014 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0025 |
| 5 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0027 | 0.0027 |
| 6 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0025 | 0.0025 | 0.0025 |
| 7 | 0.0000 | 0.0014 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | 0.0024 |
| 8 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0024 | 0.0026 | 0.0025 | 0.0026 |
| 9 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | 0.0026 | 0.0025 |
| 10 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0026 | 0.0026 | 0.0025 |
| 11 | 0.0000 | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0025 | 0.0025 |
| 12 | 0.0000 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0025 | 0.0025 | 0.0025 |
| 13 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0025 | 0.0023 |
| 14 | 0.0000 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 |
| 15 | 0.0000 | 0.0013 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 |
| 16 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0023 | 0.0022 | 0.0022 | 0.0024 | 0.0025 | 0.0025 |
| 17 | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0022 |
| 18 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0025 |
| 19 | 0.0000 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0025 |
| 20 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0023 | 0.0024 | 0.0023 |
| 21 | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| 22 | 0.0000 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | 0.0024 | 0.0026 | 0.0027 | 0.0026 |
| 23 | 0.0000 | 0.0012 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 |
| 24 | 0.0000 | 0.0012 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0023 |
| 25 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0021 | 0.0019 | 0.0021 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0025 |
| Med. | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0025 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.0000 | 0.0012 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0022 |
| Max. | 0.0000 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0027 | 0.0027 |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0025 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 2 | 0.0026 | 0.0024 | 0.0024 | 0.0026 | 0.0026 | | | | | | | | | | | |
| 3 | 0.0026 | 0.0025 | 0.0025 | 0.0026 | 0.0024 | | | | | | | | | | | |
| 4 | 0.0027 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | | | | | | | | | | | |
| 5 | 0.0028 | 0.0026 | 0.0024 | 0.0027 | 0.0026 | | | | | | | | | | | |
| 6 | 0.0025 | 0.0025 | 0.0024 | 0.0026 | 0.0026 | | | | | | | | | | | |
| 7 | 0.0025 | 0.0022 | 0.0022 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 8 | 0.0026 | 0.0026 | 0.0024 | 0.0027 | 0.0026 | | | | | | | | | | | |
| 9 | 0.0026 | 0.0024 | 0.0024 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 10 | 0.0026 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | | | | | | | | | | | |
| 11 | 0.0025 | 0.0024 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 12 | 0.0025 | 0.0024 | 0.0024 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 13 | 0.0025 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | | | | | | | | | | | |
| 14 | 0.0025 | 0.0023 | 0.0023 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 15 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 16 | 0.0025 | 0.0024 | 0.0022 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 17 | 0.0023 | 0.0022 | 0.0020 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 18 | 0.0025 | 0.0024 | 0.0024 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 19 | 0.0025 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | | | | | | | | | | | |
| 20 | 0.0023 | 0.0022 | 0.0021 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 21 | 0.0025 | 0.0024 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 22 | 0.0026 | 0.0024 | 0.0024 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 23 | 0.0022 | 0.0021 | 0.0020 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 24 | 0.0023 | 0.0022 | 0.0020 | 0.0023 | 0.0022 | | | | | | | | | | | |
| 25 | 0.0025 | 0.0023 | 0.0022 | 0.0025 | 0.0024 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0025 | 0.0024 | 0.0023 | 0.0025 | 0.0024 | | | | | | | | | | | |
| Med. | 0.0025 | 0.0024 | 0.0023 | 0.0025 | 0.0024 | | | | | | | | | | | |
| σ | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | | | | | | | | | | | |
| Min. | 0.0022 | 0.0021 | 0.0020 | 0.0022 | 0.0022 | | | | | | | | | | | |
| Max. | 0.0028 | 0.0026 | 0.0025 | 0.0027 | 0.0026 | | | | | | | | | | | |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2598 | 0.2585 | 0.2583 | 0.2581 | 0.2581 | 0.2579 | 0.2580 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2574 |
| 2 | 0.2591 | 0.2577 | 0.2576 | 0.2574 | 0.2573 | 0.2573 | 0.2572 | 0.2571 | 0.2569 | 0.2569 | 0.2568 | 0.2568 | 0.2568 | 0.2566 | 0.2566 | 0.2566 |
| 3 | 0.2602 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | 0.2580 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2576 | 0.2576 | 0.2576 |
| 4 | 0.2609 | 0.2595 | 0.2593 | 0.2592 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2584 | 0.2584 | 0.2585 |
| 5 | 0.2618 | 0.2605 | 0.2603 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2598 | 0.2596 | 0.2596 | 0.2594 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2591 |
| 6 | 0.2591 | 0.2578 | 0.2576 | 0.2575 | 0.2574 | 0.2573 | 0.2574 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2569 | 0.2569 | 0.2566 | 0.2566 | 0.2566 |
| 7 | 0.2592 | 0.2578 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2572 | 0.2570 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2568 |
| 8 | 0.2593 | 0.2581 | 0.2579 | 0.2578 | 0.2576 | 0.2576 | 0.2575 | 0.2573 | 0.2573 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2568 | 0.2568 | 0.2568 |
| 9 | 0.2612 | 0.2598 | 0.2596 | 0.2595 | 0.2593 | 0.2593 | 0.2593 | 0.2591 | 0.2590 | 0.2590 | 0.2588 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2587 |
| 10 | 0.2596 | 0.2582 | 0.2581 | 0.2579 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2572 | 0.2573 | 0.2573 | 0.2570 | 0.2570 | 0.2570 |
| 11 | 0.2626 | 0.2612 | 0.2611 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2607 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2602 | 0.2602 |
| 12 | 0.2594 | 0.2580 | 0.2579 | 0.2577 | 0.2576 | 0.2575 | 0.2576 | 0.2574 | 0.2574 | 0.2573 | 0.2571 | 0.2572 | 0.2571 | 0.2569 | 0.2569 | 0.2569 |
| 13 | 0.2592 | 0.2579 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2574 | 0.2572 | 0.2571 | 0.2572 | 0.2570 | 0.2570 | 0.2569 | 0.2568 | 0.2567 | 0.2568 |
| 14 | 0.2588 | 0.2574 | 0.2573 | 0.2573 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2569 | 0.2568 | 0.2567 | 0.2567 | 0.2566 | 0.2565 | 0.2564 | 0.2564 |
| 15 | 0.2590 | 0.2577 | 0.2575 | 0.2575 | 0.2573 | 0.2572 | 0.2573 | 0.2571 | 0.2571 | 0.2570 | 0.2568 | 0.2569 | 0.2568 | 0.2567 | 0.2566 | 0.2566 |
| 16 | 0.2614 | 0.2600 | 0.2598 | 0.2597 | 0.2596 | 0.2596 | 0.2596 | 0.2594 | 0.2594 | 0.2593 | 0.2591 | 0.2593 | 0.2592 | 0.2590 | 0.2590 | 0.2589 |
| 17 | 0.2616 | 0.2603 | 0.2602 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2597 | 0.2595 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2593 | 0.2593 | 0.2593 |
| 18 | 0.2608 | 0.2594 | 0.2592 | 0.2592 | 0.2590 | 0.2590 | 0.2590 | 0.2588 | 0.2586 | 0.2587 | 0.2585 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 |
| 19 | 0.2599 | 0.2585 | 0.2583 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | 0.2574 |
| 20 | 0.2590 | 0.2577 | 0.2575 | 0.2574 | 0.2573 | 0.2572 | 0.2574 | 0.2572 | 0.2571 | 0.2570 | 0.2569 | 0.2569 | 0.2569 | 0.2567 | 0.2566 | 0.2567 |
| 21 | 0.2592 | 0.2579 | 0.2578 | 0.2576 | 0.2575 | 0.2573 | 0.2574 | 0.2572 | 0.2571 | 0.2571 | 0.2570 | 0.2570 | 0.2569 | 0.2568 | 0.2568 | 0.2568 |
| 22 | 0.2599 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2577 | 0.2575 | 0.2576 | 0.2575 | 0.2573 | 0.2572 | 0.2573 |
| 23 | 0.2611 | 0.2600 | 0.2598 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2593 | 0.2592 | 0.2593 | 0.2591 | 0.2592 | 0.2591 | 0.2590 | 0.2589 | 0.2589 |
| 24 | 0.2598 | 0.2585 | 0.2584 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2580 | 0.2578 | 0.2578 | 0.2578 | 0.2578 | 0.2576 | 0.2576 | 0.2575 |
| 25 | 0.2610 | 0.2596 | 0.2595 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2589 | 0.2591 | 0.2589 | 0.2589 | 0.2587 | 0.2586 | 0.2586 | 0.2586 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2601 | 0.2588 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2577 |
| Med. | 0.2598 | 0.2585 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2574 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.2588 | 0.2574 | 0.2573 | 0.2573 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2569 | 0.2568 | 0.2567 | 0.2567 | 0.2566 | 0.2565 | 0.2564 | 0.2564 |
| Max. | 0.2626 | 0.2612 | 0.2611 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2607 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2602 | 0.2602 |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2573 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 2 | 0.2565 | 0.2567 | 0.2567 | 0.2565 | 0.2565 | | | | | | | | | | | |
| 3 | 0.2576 | 0.2577 | 0.2578 | 0.2576 | 0.2578 | | | | | | | | | | | |
| 4 | 0.2583 | 0.2585 | 0.2584 | 0.2583 | 0.2584 | | | | | | | | | | | |
| 5 | 0.2590 | 0.2592 | 0.2594 | 0.2591 | 0.2592 | | | | | | | | | | | |
| 6 | 0.2565 | 0.2566 | 0.2567 | 0.2565 | 0.2565 | | | | | | | | | | | |
| 7 | 0.2568 | 0.2570 | 0.2570 | 0.2567 | 0.2568 | | | | | | | | | | | |
| 8 | 0.2567 | 0.2567 | 0.2569 | 0.2566 | 0.2567 | | | | | | | | | | | |
| 9 | 0.2586 | 0.2588 | 0.2588 | 0.2586 | 0.2587 | | | | | | | | | | | |
| 10 | 0.2570 | 0.2571 | 0.2572 | 0.2570 | 0.2569 | | | | | | | | | | | |
| 11 | 0.2602 | 0.2603 | 0.2605 | 0.2603 | 0.2604 | | | | | | | | | | | |
| 12 | 0.2569 | 0.2570 | 0.2570 | 0.2568 | 0.2569 | | | | | | | | | | | |
| 13 | 0.2567 | 0.2569 | 0.2569 | 0.2566 | 0.2567 | | | | | | | | | | | |
| 14 | 0.2563 | 0.2565 | 0.2565 | 0.2563 | 0.2563 | | | | | | | | | | | |
| 15 | 0.2566 | 0.2566 | 0.2567 | 0.2566 | 0.2567 | | | | | | | | | | | |
| 16 | 0.2589 | 0.2591 | 0.2592 | 0.2590 | 0.2591 | | | | | | | | | | | |
| 17 | 0.2593 | 0.2593 | 0.2595 | 0.2593 | 0.2593 | | | | | | | | | | | |
| 18 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | | | | | | | | | | | |
| 19 | 0.2574 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | | | | | | | | | | | |
| 20 | 0.2567 | 0.2568 | 0.2569 | 0.2566 | 0.2567 | | | | | | | | | | | |
| 21 | 0.2567 | 0.2568 | 0.2570 | 0.2567 | 0.2568 | | | | | | | | | | | |
| 22 | 0.2573 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | | | | | | | | | | | |
| 23 | 0.2590 | 0.2591 | 0.2592 | 0.2589 | 0.2589 | | | | | | | | | | | |
| 24 | 0.2575 | 0.2576 | 0.2578 | 0.2575 | 0.2576 | | | | | | | | | | | |
| 25 | 0.2585 | 0.2587 | 0.2588 | 0.2585 | 0.2585 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2576 | 0.2578 | 0.2578 | 0.2576 | 0.2577 | | | | | | | | | | | |
| Med. | 0.2573 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.2563 | 0.2565 | 0.2565 | 0.2563 | 0.2563 | | | | | | | | | | | |
| Max. | 0.2602 | 0.2603 | 0.2605 | 0.2603 | 0.2604 | | | | | | | | | | | |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 11-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5272 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 |
| 2 | 0.5261 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 |
| 3 | 0.5280 | 0.5282 | 0.5283 | 0.5284 | 0.5284 | 0.5282 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5282 |
| 4 | 0.5299 | 0.5300 | 0.5300 | 0.5300 | 0.5301 | 0.5300 | 0.5301 | 0.5301 | 0.5300 | 0.5301 | 0.5300 | 0.5300 | 0.5300 | 0.5299 | 0.5299 | 0.5299 |
| 5 | 0.5287 | 0.5289 | 0.5290 | 0.5290 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5291 |
| 6 | 0.5278 | 0.5281 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 |
| 7 | 0.5282 | 0.5285 | 0.5285 | 0.5285 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | 0.5286 |
| 8 | 0.5288 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5290 | 0.5290 | 0.5290 |
| 9 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5284 |
| 10 | 0.5277 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 |
| 11 | 0.5302 | 0.5304 | 0.5305 | 0.5306 | 0.5306 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5306 | 0.5306 |
| 12 | 0.5258 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5259 | 0.5260 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 |
| 13 | 0.5269 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 |
| 14 | 0.5276 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 |
| 15 | 0.5266 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5267 | 0.5268 | 0.5267 |
| 16 | 0.5290 | 0.5290 | 0.5291 | 0.5291 | 0.5290 | 0.5291 | 0.5291 | 0.5290 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5289 | 0.5289 |
| 17 | 0.5292 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5293 | 0.5294 | 0.5294 |
| 18 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5294 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5293 |
| 19 | 0.5272 | 0.5272 | 0.5272 | 0.5273 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 |
| 20 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 |
| 21 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 |
| 22 | 0.5272 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5274 |
| 23 | 0.5280 | 0.5284 | 0.5283 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5286 | 0.5284 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5284 |
| 24 | 0.5267 | 0.5268 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5269 |
| 25 | 0.5280 | 0.5282 | 0.5282 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5282 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5279 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5281 |
| Med. | 0.5278 | 0.5281 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.5258 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5259 | 0.5260 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 |
| Max. | 0.5302 | 0.5304 | 0.5305 | 0.5306 | 0.5306 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5307 | 0.5306 | 0.5307 | 0.5307 | 0.5306 | 0.5306 | 0.5306 |

## Data Set 11 : 105 °C, 150 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.7 °C |
| Actual Ambient Temperature [$T_A$] | 102.1 °C |
| Drive Current [$I_F$] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

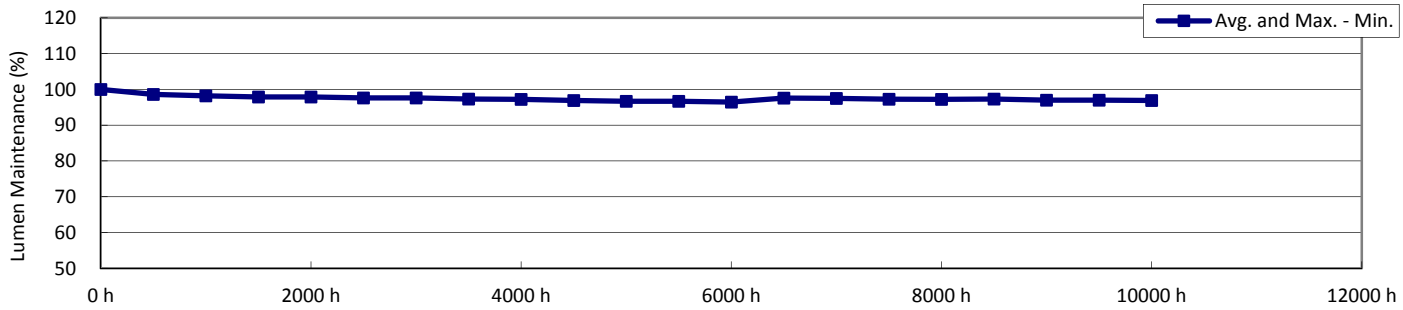
**TABLE 11-6 (Continued)**
Chromaticity

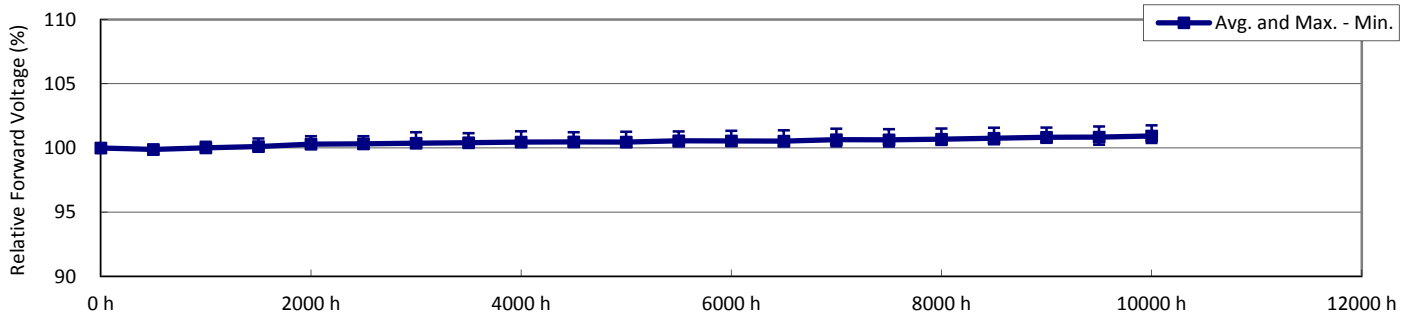
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5273 | 0.5272 | 0.5271 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 2 | 0.5264 | 0.5263 | 0.5263 | 0.5261 | 0.5261 | | | | | | | | | | | |
| 3 | 0.5281 | 0.5282 | 0.5282 | 0.5280 | 0.5280 | | | | | | | | | | | |
| 4 | 0.5299 | 0.5299 | 0.5299 | 0.5297 | 0.5297 | | | | | | | | | | | |
| 5 | 0.5292 | 0.5291 | 0.5292 | 0.5290 | 0.5291 | | | | | | | | | | | |
| 6 | 0.5281 | 0.5281 | 0.5281 | 0.5279 | 0.5279 | | | | | | | | | | | |
| 7 | 0.5286 | 0.5286 | 0.5285 | 0.5284 | 0.5283 | | | | | | | | | | | |
| 8 | 0.5289 | 0.5290 | 0.5290 | 0.5288 | 0.5288 | | | | | | | | | | | |
| 9 | 0.5284 | 0.5284 | 0.5284 | 0.5282 | 0.5281 | | | | | | | | | | | |
| 10 | 0.5280 | 0.5279 | 0.5279 | 0.5277 | 0.5276 | | | | | | | | | | | |
| 11 | 0.5306 | 0.5306 | 0.5306 | 0.5304 | 0.5304 | | | | | | | | | | | |
| 12 | 0.5258 | 0.5258 | 0.5257 | 0.5255 | 0.5256 | | | | | | | | | | | |
| 13 | 0.5269 | 0.5270 | 0.5270 | 0.5268 | 0.5267 | | | | | | | | | | | |
| 14 | 0.5278 | 0.5279 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | |
| 15 | 0.5268 | 0.5267 | 0.5266 | 0.5265 | 0.5264 | | | | | | | | | | | |
| 16 | 0.5289 | 0.5288 | 0.5288 | 0.5286 | 0.5286 | | | | | | | | | | | |
| 17 | 0.5294 | 0.5294 | 0.5294 | 0.5292 | 0.5292 | | | | | | | | | | | |
| 18 | 0.5294 | 0.5294 | 0.5294 | 0.5292 | 0.5292 | | | | | | | | | | | |
| 19 | 0.5273 | 0.5273 | 0.5272 | 0.5271 | 0.5271 | | | | | | | | | | | |
| 20 | 0.5275 | 0.5275 | 0.5274 | 0.5272 | 0.5272 | | | | | | | | | | | |
| 21 | 0.5272 | 0.5273 | 0.5271 | 0.5269 | 0.5270 | | | | | | | | | | | |
| 22 | 0.5275 | 0.5274 | 0.5274 | 0.5273 | 0.5272 | | | | | | | | | | | |
| 23 | 0.5285 | 0.5283 | 0.5283 | 0.5281 | 0.5282 | | | | | | | | | | | |
| 24 | 0.5270 | 0.5270 | 0.5270 | 0.5267 | 0.5268 | | | | | | | | | | | |
| 25 | 0.5282 | 0.5282 | 0.5281 | 0.5280 | 0.5279 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5281 | 0.5280 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| Med. | 0.5281 | 0.5281 | 0.5281 | 0.5279 | 0.5279 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | | | | | | | | | | | |
| Min. | 0.5258 | 0.5258 | 0.5257 | 0.5255 | 0.5256 | | | | | | | | | | | |
| Max. | 0.5306 | 0.5306 | 0.5306 | 0.5304 | 0.5304 | | | | | | | | | | | |

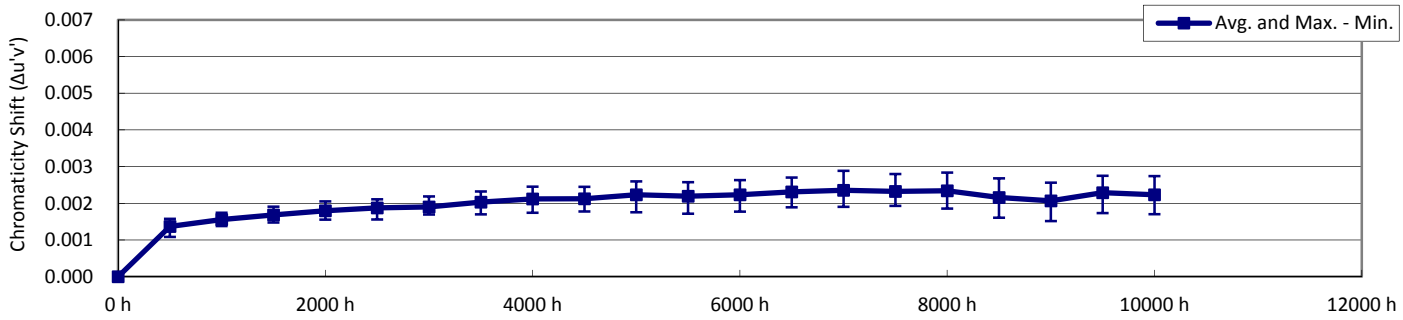
## Data Set 12 : 105 °C, 180 mA

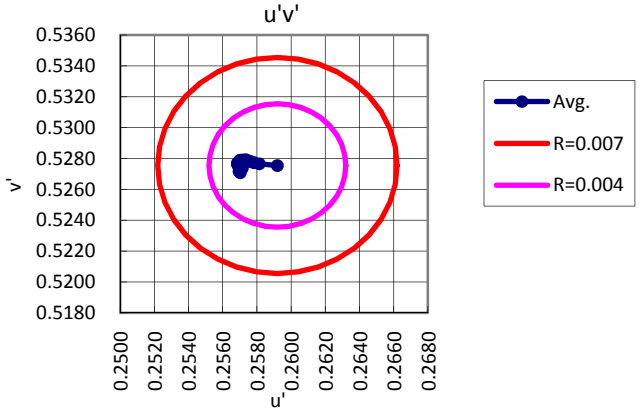
| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0



## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-1**
Initial Characteristics

| LED No. | Luminous flux $\Phi_V$ [lm] | Forward voltage $V_F$ [V] | CCT $T_{CP}$ [K] | Input Power P [W] | CIE1931 x | CIE1931 y | CIE1976 u' | CIE1976 v' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 77.8 | 3.21 | 2782 | 0.58 | 0.454 | 0.411 | 0.259 | 0.527 | | | | |
| 2 | 78.4 | 3.23 | 2771 | 0.58 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 3 | 77.5 | 3.22 | 2745 | 0.58 | 0.460 | 0.417 | 0.260 | 0.530 | | | | |
| 4 | 77.9 | 3.22 | 2753 | 0.58 | 0.457 | 0.413 | 0.260 | 0.528 | | | | |
| 5 | 78.7 | 3.23 | 2779 | 0.58 | 0.456 | 0.414 | 0.259 | 0.528 | | | | |
| 6 | 78.0 | 3.22 | 2777 | 0.58 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 7 | 78.0 | 3.22 | 2778 | 0.58 | 0.454 | 0.409 | 0.259 | 0.526 | | | | |
| 8 | 78.6 | 3.24 | 2785 | 0.58 | 0.453 | 0.410 | 0.259 | 0.526 | | | | |
| 9 | 78.3 | 3.23 | 2784 | 0.58 | 0.456 | 0.413 | 0.258 | 0.528 | | | | |
| 10 | 78.6 | 3.22 | 2791 | 0.58 | 0.455 | 0.412 | 0.258 | 0.527 | | | | |
| 11 | 78.4 | 3.23 | 2757 | 0.58 | 0.458 | 0.414 | 0.260 | 0.528 | | | | |
| 12 | 78.0 | 3.22 | 2765 | 0.58 | 0.457 | 0.414 | 0.259 | 0.528 | | | | |
| 13 | 77.7 | 3.22 | 2759 | 0.58 | 0.456 | 0.411 | 0.260 | 0.527 | | | | |
| 14 | 78.5 | 3.23 | 2788 | 0.58 | 0.454 | 0.412 | 0.258 | 0.527 | | | | |
| 15 | 78.4 | 3.23 | 2764 | 0.58 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 16 | 77.9 | 3.20 | 2725 | 0.58 | 0.460 | 0.415 | 0.261 | 0.529 | | | | |
| 17 | 77.4 | 3.23 | 2770 | 0.58 | 0.455 | 0.411 | 0.259 | 0.527 | | | | |
| 18 | 79.0 | 3.23 | 2774 | 0.58 | 0.457 | 0.415 | 0.259 | 0.529 | | | | |
| 19 | 77.7 | 3.21 | 2773 | 0.58 | 0.457 | 0.415 | 0.259 | 0.528 | | | | |
| 20 | 78.1 | 3.22 | 2733 | 0.58 | 0.459 | 0.414 | 0.261 | 0.529 | | | | |
| 21 | 77.7 | 3.20 | 2733 | 0.58 | 0.459 | 0.414 | 0.261 | 0.529 | | | | |
| 22 | 77.9 | 3.22 | 2776 | 0.58 | 0.455 | 0.412 | 0.259 | 0.527 | | | | |
| 23 | 78.0 | 3.23 | 2762 | 0.58 | 0.457 | 0.413 | 0.259 | 0.528 | | | | |
| 24 | 78.4 | 3.23 | 2771 | 0.58 | 0.456 | 0.412 | 0.259 | 0.527 | | | | |
| 25 | 77.6 | 3.23 | 2766 | 0.58 | 0.458 | 0.416 | 0.259 | 0.529 | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | |
| Avg. | 78.1 | 3.22 | 2766 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| Med. | 78.0 | 3.22 | 2771 | 0.58 | 0.456 | 0.413 | 0.259 | 0.528 | | | | |
| σ | 0.41 | 0.009 | 17.5 | 0.002 | 0.0019 | 0.0018 | 0.0007 | 0.0010 | | | | |
| Min. | 77.4 | 3.20 | 2725 | 0.58 | 0.453 | 0.409 | 0.258 | 0.526 | | | | |
| Max. | 79.0 | 3.24 | 2791 | 0.58 | 0.460 | 0.417 | 0.261 | 0.530 | | | | |

# Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-2**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 98.5 | 98.1 | 97.8 | 97.8 | 97.4 | 97.4 | 97.2 | 97.1 | 96.9 | 96.7 | 96.6 | 96.5 | 97.6 | 97.5 | 97.3 |
| 2 | 100.0 | 98.6 | 98.1 | 97.9 | 97.8 | 97.5 | 97.5 | 97.3 | 97.1 | 96.9 | 96.6 | 96.6 | 96.4 | 97.4 | 97.3 | 97.2 |
| 3 | 100.0 | 98.5 | 98.0 | 97.6 | 97.6 | 97.2 | 97.1 | 97.0 | 96.7 | 96.5 | 96.2 | 96.1 | 96.0 | 97.1 | 96.9 | 96.8 |
| 4 | 100.0 | 98.7 | 98.2 | 97.9 | 98.0 | 97.6 | 97.6 | 97.3 | 97.1 | 96.9 | 96.7 | 96.7 | 96.6 | 97.6 | 97.5 | 97.3 |
| 5 | 100.0 | 98.7 | 98.5 | 98.1 | 98.4 | 97.8 | 97.9 | 97.6 | 97.5 | 97.3 | 96.9 | 96.9 | 96.8 | 97.8 | 97.9 | 97.4 |
| 6 | 100.0 | 98.6 | 98.2 | 98.0 | 97.9 | 97.5 | 97.5 | 97.4 | 97.2 | 97.0 | 96.7 | 96.7 | 96.5 | 97.6 | 97.5 | 97.2 |
| 7 | 100.0 | 98.7 | 98.3 | 98.1 | 98.1 | 97.6 | 97.6 | 97.5 | 97.2 | 96.9 | 96.7 | 96.8 | 96.6 | 97.8 | 97.5 | 97.3 |
| 8 | 100.0 | 98.2 | 97.8 | 97.6 | 97.5 | 97.1 | 97.2 | 97.0 | 96.8 | 96.5 | 96.3 | 96.3 | 96.1 | 97.2 | 97.0 | 96.9 |
| 9 | 100.0 | 98.8 | 98.4 | 98.2 | 98.2 | 97.9 | 97.7 | 97.6 | 97.4 | 97.1 | 96.9 | 96.9 | 96.7 | 97.7 | 97.5 | 97.3 |
| 10 | 100.0 | 98.9 | 98.5 | 98.2 | 98.3 | 97.9 | 98.0 | 97.7 | 97.5 | 97.2 | 97.0 | 97.1 | 96.9 | 98.0 | 97.9 | 97.7 |
| 11 | 100.0 | 98.4 | 98.0 | 97.7 | 98.0 | 97.8 | 98.0 | 97.5 | 97.4 | 97.2 | 96.7 | 96.9 | 96.5 | 97.6 | 97.7 | 97.5 |
| 12 | 100.0 | 98.7 | 98.3 | 98.0 | 98.0 | 97.7 | 97.7 | 97.5 | 97.3 | 97.0 | 96.7 | 96.7 | 96.5 | 97.6 | 97.5 | 97.3 |
| 13 | 100.0 | 98.6 | 98.2 | 97.8 | 97.8 | 97.6 | 97.5 | 97.3 | 97.1 | 96.8 | 96.7 | 96.7 | 96.4 | 97.6 | 97.5 | 97.2 |
| 14 | 100.0 | 98.6 | 98.2 | 97.9 | 97.9 | 97.6 | 97.5 | 97.3 | 97.1 | 96.8 | 96.7 | 96.7 | 96.4 | 97.6 | 97.5 | 97.2 |
| 15 | 100.0 | 98.8 | 98.4 | 98.1 | 98.1 | 97.9 | 97.9 | 97.6 | 97.4 | 97.2 | 97.1 | 97.2 | 96.9 | 98.1 | 98.0 | 97.8 |
| 16 | 100.0 | 98.5 | 98.2 | 97.8 | 97.7 | 97.5 | 97.4 | 97.2 | 96.9 | 96.7 | 96.6 | 96.6 | 96.2 | 97.5 | 97.4 | 97.2 |
| 17 | 100.0 | 98.7 | 98.5 | 98.0 | 98.0 | 97.7 | 97.8 | 97.6 | 97.5 | 97.2 | 96.9 | 97.1 | 96.5 | 98.0 | 97.8 | 97.6 |
| 18 | 100.0 | 98.5 | 98.1 | 97.7 | 97.7 | 97.5 | 97.4 | 97.2 | 97.0 | 96.6 | 96.5 | 96.6 | 96.2 | 97.4 | 97.3 | 97.0 |
| 19 | 100.0 | 98.3 | 97.7 | 97.5 | 97.4 | 97.0 | 97.1 | 96.9 | 96.7 | 96.4 | 96.1 | 96.2 | 95.9 | 97.0 | 97.0 | 96.8 |
| 20 | 100.0 | 98.6 | 98.2 | 97.9 | 97.8 | 97.5 | 97.5 | 97.3 | 97.1 | 96.8 | 96.6 | 96.7 | 96.4 | 97.4 | 97.4 | 97.2 |
| 21 | 100.0 | 98.6 | 98.1 | 97.9 | 97.9 | 97.5 | 97.5 | 97.3 | 97.0 | 96.8 | 96.6 | 96.7 | 96.3 | 97.4 | 97.4 | 97.2 |
| 22 | 100.0 | 98.5 | 98.0 | 97.8 | 97.7 | 97.4 | 97.4 | 97.2 | 97.1 | 96.8 | 96.5 | 96.7 | 96.3 | 97.5 | 97.4 | 97.2 |
| 23 | 100.0 | 98.6 | 98.2 | 98.0 | 98.0 | 97.6 | 97.6 | 97.3 | 97.6 | 97.0 | 96.7 | 96.9 | 96.5 | 97.7 | 97.8 | 97.5 |
| 24 | 100.0 | 98.7 | 98.3 | 98.1 | 98.1 | 97.7 | 97.7 | 97.5 | 97.3 | 97.0 | 96.8 | 96.8 | 96.5 | 97.5 | 97.5 | 97.3 |
| 25 | 100.0 | 98.7 | 98.3 | 98.1 | 98.0 | 97.6 | 97.6 | 97.3 | 97.1 | 96.8 | 96.7 | 96.7 | 96.5 | 97.5 | 97.4 | 97.3 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.6 | 98.2 | 97.9 | 97.9 | 97.6 | 97.6 | 97.3 | 97.2 | 96.9 | 96.7 | 96.7 | 96.4 | 97.6 | 97.5 | 97.3 |
| Med. | 100.0 | 98.6 | 98.2 | 97.9 | 97.9 | 97.6 | 97.5 | 97.3 | 97.1 | 96.9 | 96.7 | 96.7 | 96.5 | 97.6 | 97.5 | 97.3 |
| σ | 0.00 | 0.16 | 0.20 | 0.19 | 0.24 | 0.23 | 0.24 | 0.21 | 0.25 | 0.24 | 0.23 | 0.25 | 0.25 | 0.26 | 0.27 | 0.24 |
| Min. | 100.0 | 98.2 | 97.7 | 97.5 | 97.4 | 97.0 | 97.1 | 96.9 | 96.7 | 96.4 | 96.1 | 96.1 | 95.9 | 97.0 | 96.9 | 96.8 |
| Max. | 100.0 | 98.9 | 98.5 | 98.2 | 98.4 | 97.9 | 98.0 | 97.7 | 97.6 | 97.3 | 97.1 | 97.2 | 96.9 | 98.1 | 98.0 | 97.8 |

**TM-21 Projection**

| Time | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ln(Avg.) | -0.0336 | -0.0336 | -0.0362 | -0.0246 | -0.0255 | -0.0277 | -0.0283 | -0.0274 | -0.0305 | -0.0305 | -0.0315 | | | | | |

| Test duration used | 5000 h to 10000 h | |
|---|---|---|
| B | 0.966 | |
| α | -5.74E-07 | |
| $R^2$ | 0.069 | |
| Calculated $L_{70}$ (10K) | N/A | hours |
| Reported $L_{70}$ (10K) | > 60000 | hours |
| Calculated $L_{80}$ (10K) | N/A | hours |
| Reported $L_{80}$ (10K) | > 60000 | hours |
| Calculated $L_{90}$ (10K) | N/A | hours |
| Reported $L_{90}$ (10K) | > 60000 | hours |

Curve-fit equation:
$\Phi(t)=Bexp(-\alpha t)$

Lumen maintenance life eqation:
$L_{70}=ln(B/0.7)/\alpha$

$L_{80}=ln(B/0.8)/\alpha$

$L_{90}=ln(B/0.9)/\alpha$

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-2 (Continued)**
Lumen Maintenance

| LED No. | Lumen Maintenance % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 97.4 | 97.5 | 97.2 | 97.2 | 97.2 | | | | | | | | | | | |
| 2 | 97.2 | 97.2 | 97.0 | 96.9 | 96.9 | | | | | | | | | | | |
| 3 | 96.8 | 96.8 | 96.6 | 96.6 | 96.6 | | | | | | | | | | | |
| 4 | 97.4 | 97.4 | 97.1 | 97.2 | 97.2 | | | | | | | | | | | |
| 5 | 97.5 | 97.4 | 96.9 | 97.2 | 97.0 | | | | | | | | | | | |
| 6 | 97.3 | 97.3 | 97.0 | 97.0 | 97.0 | | | | | | | | | | | |
| 7 | 97.3 | 97.4 | 97.1 | 97.1 | 97.0 | | | | | | | | | | | |
| 8 | 96.8 | 97.0 | 96.7 | 96.6 | 96.6 | | | | | | | | | | | |
| 9 | 97.3 | 97.4 | 97.0 | 97.0 | 97.0 | | | | | | | | | | | |
| 10 | 97.7 | 97.8 | 97.4 | 97.5 | 97.3 | | | | | | | | | | | |
| 11 | 97.4 | 97.1 | 96.8 | 96.9 | 96.8 | | | | | | | | | | | |
| 12 | 97.2 | 97.3 | 97.0 | 97.0 | 96.8 | | | | | | | | | | | |
| 13 | 97.1 | 97.3 | 97.0 | 97.0 | 96.9 | | | | | | | | | | | |
| 14 | 97.1 | 97.3 | 97.0 | 97.0 | 96.9 | | | | | | | | | | | |
| 15 | 97.7 | 97.8 | 97.5 | 97.6 | 97.5 | | | | | | | | | | | |
| 16 | 97.1 | 97.2 | 96.9 | 96.9 | 96.8 | | | | | | | | | | | |
| 17 | 97.2 | 97.4 | 97.0 | 97.0 | 97.0 | | | | | | | | | | | |
| 18 | 96.9 | 97.0 | 96.7 | 96.8 | 96.6 | | | | | | | | | | | |
| 19 | 96.8 | 96.8 | 96.6 | 96.6 | 96.5 | | | | | | | | | | | |
| 20 | 97.2 | 97.2 | 97.0 | 97.0 | 97.0 | | | | | | | | | | | |
| 21 | 97.2 | 97.3 | 97.0 | 97.0 | 96.9 | | | | | | | | | | | |
| 22 | 97.0 | 97.2 | 96.9 | 97.0 | 96.9 | | | | | | | | | | | |
| 23 | 97.3 | 97.3 | 96.9 | 97.1 | 96.8 | | | | | | | | | | | |
| 24 | 97.2 | 97.2 | 97.0 | 97.0 | 96.8 | | | | | | | | | | | |
| 25 | 97.2 | 97.4 | 97.1 | 97.3 | 97.1 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 97.2 | 97.3 | 97.0 | 97.0 | 96.9 | | | | | | | | | | | |
| Med. | 97.2 | 97.3 | 97.0 | 97.0 | 96.9 | | | | | | | | | | | |
| σ | 0.24 | 0.24 | 0.21 | 0.24 | 0.23 | | | | | | | | | | | |
| Min. | 96.8 | 96.8 | 96.6 | 96.6 | 96.5 | | | | | | | | | | | |
| Max. | 97.7 | 97.8 | 97.5 | 97.6 | 97.5 | | | | | | | | | | | |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-3**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 100.0 | 99.8 | 99.9 | 100.0 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.3 | 100.3 | 100.4 | 100.5 | 100.3 | 100.5 | 100.5 |
| 2 | 100.0 | 99.9 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 | 100.3 |
| 3 | 100.0 | 99.7 | 99.8 | 99.9 | 100.0 | 100.0 | 100.2 | 100.2 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 |
| 4 | 100.0 | 99.7 | 99.9 | 100.0 | 100.1 | 100.1 | 100.1 | 100.3 | 100.2 | 100.1 | 100.2 | 100.5 | 100.3 | 100.3 | 100.4 | 100.4 |
| 5 | 100.0 | 100.0 | 100.0 | 100.2 | 100.3 | 100.4 | 100.3 | 100.4 | 100.5 | 100.4 | 100.5 | 100.5 | 100.6 | 100.5 | 100.5 | 100.5 |
| 6 | 100.0 | 99.9 | 100.0 | 100.1 | 100.3 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.2 | 100.3 | 100.2 | 100.3 | 100.4 | 100.4 |
| 7 | 100.0 | 99.9 | 100.0 | 100.0 | 100.5 | 100.4 | 100.5 | 100.5 | 100.6 | 100.5 | 100.7 | 100.8 | 100.9 | 100.8 | 100.9 | 101.0 |
| 8 | 100.0 | 100.0 | 100.1 | 100.3 | 100.4 | 100.4 | 100.6 | 100.7 | 100.6 | 100.9 | 100.8 | 100.8 | 100.8 | 100.9 | 100.9 | 100.9 |
| 9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.4 | 100.0 | 100.2 | 100.2 | 100.4 | 100.3 | 100.2 | 100.4 | 100.2 | 100.2 | 100.3 | 100.3 |
| 10 | 100.0 | 99.7 | 99.9 | 99.9 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 |
| 11 | 100.0 | 100.0 | 100.2 | 100.4 | 100.5 | 100.5 | 100.7 | 100.7 | 100.8 | 100.8 | 100.9 | 101.1 | 101.0 | 101.0 | 101.1 | 101.1 |
| 12 | 100.0 | 100.2 | 100.5 | 100.7 | 100.9 | 100.9 | 101.2 | 101.1 | 101.3 | 101.2 | 101.3 | 101.3 | 101.3 | 101.4 | 101.5 | 101.5 |
| 13 | 100.0 | 100.0 | 100.0 | 100.1 | 100.4 | 100.4 | 100.3 | 100.4 | 100.4 | 100.5 | 100.5 | 100.6 | 100.6 | 100.6 | 100.7 | 100.8 |
| 14 | 100.0 | 99.9 | 100.1 | 100.3 | 100.1 | 100.2 | 100.2 | 100.4 | 100.3 | 100.4 | 100.3 | 100.5 | 100.4 | 100.3 | 100.5 | 100.4 |
| 15 | 100.0 | 99.8 | 100.2 | 100.2 | 100.5 | 100.6 | 100.5 | 100.7 | 100.8 | 100.8 | 100.7 | 100.9 | 100.8 | 100.8 | 100.9 | 101.0 |
| 16 | 100.0 | 99.9 | 100.0 | 99.9 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.3 | 100.4 |
| 17 | 100.0 | 99.9 | 100.0 | 100.0 | 100.4 | 100.4 | 100.4 | 100.3 | 100.6 | 100.5 | 100.4 | 100.6 | 100.5 | 100.6 | 100.7 | 100.7 |
| 18 | 100.0 | 99.9 | 99.9 | 100.1 | 100.4 | 100.2 | 100.3 | 100.4 | 100.5 | 100.4 | 100.6 | 100.6 | 100.5 | 100.5 | 100.6 | 100.6 |
| 19 | 100.0 | 99.5 | 99.7 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.5 | 100.5 |
| 20 | 100.0 | 100.1 | 100.2 | 100.1 | 100.4 | 100.4 | 100.4 | 100.5 | 100.5 | 100.4 | 100.3 | 100.5 | 100.4 | 100.4 | 100.5 | 100.5 |
| 21 | 100.0 | 99.8 | 100.0 | 100.2 | 100.2 | 100.6 | 100.5 | 100.6 | 100.5 | 100.6 | 100.6 | 100.8 | 100.7 | 100.7 | 100.8 | 100.8 |
| 22 | 100.0 | 99.9 | 100.0 | 100.2 | 100.4 | 100.6 | 100.7 | 100.7 | 100.8 | 100.8 | 100.8 | 101.0 | 100.9 | 100.9 | 101.0 | 101.0 |
| 23 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.2 | 100.4 | 100.3 | 100.4 | 100.4 |
| 24 | 100.0 | 99.9 | 100.1 | 100.1 | 100.3 | 100.6 | 100.5 | 100.5 | 100.6 | 100.7 | 100.8 | 100.8 | 100.9 | 100.9 | 101.1 | 101.1 |
| 25 | 100.0 | 99.8 | 99.9 | 99.9 | 100.2 | 100.2 | 100.1 | 100.3 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.5 | 100.5 | 100.5 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.9 | 100.0 | 100.1 | 100.3 | 100.3 | 100.4 | 100.4 | 100.5 | 100.5 | 100.5 | 100.6 | 100.5 | 100.5 | 100.6 | 100.6 |
| Med. | 100.0 | 99.9 | 100.0 | 100.1 | 100.3 | 100.2 | 100.3 | 100.4 | 100.4 | 100.4 | 100.3 | 100.5 | 100.5 | 100.5 | 100.5 | 100.5 |
| σ | 0.00 | 0.14 | 0.15 | 0.18 | 0.20 | 0.23 | 0.25 | 0.24 | 0.28 | 0.28 | 0.30 | 0.31 | 0.31 | 0.31 | 0.33 | 0.33 |
| Min. | 100.0 | 99.5 | 99.7 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 |
| Max. | 100.0 | 100.2 | 100.5 | 100.7 | 100.9 | 100.9 | 101.2 | 101.1 | 101.3 | 101.2 | 101.3 | 101.3 | 101.3 | 101.4 | 101.5 | 101.5 |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-3 (Continued)**
Forward Voltage

| LED No. | Relative Forward Voltage % ( Normalized to 100 % at 0 hours ) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 100.5 | 100.6 | 100.7 | 100.6 | 100.8 | | | | | | | | | | | |
| 2 | 100.4 | 100.4 | 100.4 | 100.4 | 100.6 | | | | | | | | | | | |
| 3 | 100.2 | 100.3 | 100.4 | 100.2 | 100.4 | | | | | | | | | | | |
| 4 | 100.5 | 100.6 | 100.6 | 100.6 | 100.7 | | | | | | | | | | | |
| 5 | 100.6 | 100.6 | 100.7 | 100.7 | 100.8 | | | | | | | | | | | |
| 6 | 100.4 | 100.5 | 100.6 | 100.6 | 100.6 | | | | | | | | | | | |
| 7 | 101.0 | 101.1 | 101.1 | 101.2 | 101.3 | | | | | | | | | | | |
| 8 | 101.0 | 101.1 | 101.2 | 101.2 | 101.2 | | | | | | | | | | | |
| 9 | 100.3 | 100.4 | 100.5 | 100.6 | 100.6 | | | | | | | | | | | |
| 10 | 100.2 | 100.3 | 100.4 | 100.5 | 100.5 | | | | | | | | | | | |
| 11 | 101.2 | 101.2 | 101.3 | 101.4 | 101.4 | | | | | | | | | | | |
| 12 | 101.5 | 101.6 | 101.6 | 101.7 | 101.8 | | | | | | | | | | | |
| 13 | 100.8 | 100.9 | 100.9 | 100.9 | 101.0 | | | | | | | | | | | |
| 14 | 100.4 | 100.5 | 100.5 | 100.6 | 100.6 | | | | | | | | | | | |
| 15 | 101.0 | 101.2 | 101.2 | 101.2 | 101.3 | | | | | | | | | | | |
| 16 | 100.5 | 100.5 | 100.6 | 100.6 | 100.8 | | | | | | | | | | | |
| 17 | 100.8 | 100.8 | 100.9 | 101.0 | 101.0 | | | | | | | | | | | |
| 18 | 100.6 | 100.6 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| 19 | 100.5 | 100.5 | 100.7 | 100.6 | 100.7 | | | | | | | | | | | |
| 20 | 100.5 | 100.6 | 100.6 | 100.6 | 100.7 | | | | | | | | | | | |
| 21 | 100.8 | 101.0 | 101.1 | 101.0 | 101.1 | | | | | | | | | | | |
| 22 | 101.1 | 101.1 | 101.2 | 101.2 | 101.3 | | | | | | | | | | | |
| 23 | 100.4 | 100.6 | 100.6 | 100.7 | 100.8 | | | | | | | | | | | |
| 24 | 101.1 | 101.3 | 101.3 | 101.4 | 101.4 | | | | | | | | | | | |
| 25 | 100.6 | 100.7 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 100.7 | 100.8 | 100.8 | 100.8 | 100.9 | | | | | | | | | | | |
| Med. | 100.6 | 100.6 | 100.7 | 100.7 | 100.8 | | | | | | | | | | | |
| σ | 0.34 | 0.34 | 0.33 | 0.35 | 0.35 | | | | | | | | | | | |
| Min. | 100.2 | 100.3 | 100.4 | 100.2 | 100.4 | | | | | | | | | | | |
| Max. | 101.5 | 101.6 | 101.6 | 101.7 | 101.8 | | | | | | | | | | | |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-4**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.0000 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 2 | 0.0000 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0022 | 0.0024 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 3 | 0.0000 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0025 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0029 | 0.0028 |
| 4 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0023 |
| 5 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 |
| 6 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0025 | 0.0024 | 0.0024 |
| 7 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0021 | 0.0021 | 0.0021 |
| 8 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 |
| 9 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0019 |
| 10 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0023 |
| 11 | 0.0000 | 0.0011 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 |
| 12 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 |
| 13 | 0.0000 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0022 | 0.0024 | 0.0023 | 0.0025 | 0.0024 |
| 14 | 0.0000 | 0.0015 | 0.0017 | 0.0019 | 0.0021 | 0.0021 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |
| 15 | 0.0000 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 |
| 16 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | 0.0024 |
| 17 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0022 |
| 18 | 0.0000 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0023 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0023 |
| 19 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 20 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| 21 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0023 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0024 |
| 22 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 |
| 23 | 0.0000 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0021 | 0.0020 | 0.0022 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 |
| 24 | 0.0000 | 0.0013 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 |
| 25 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0025 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0023 |
| Med. | 0.0000 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0024 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.0000 | 0.0011 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 |
| Max. | 0.0000 | 0.0016 | 0.0017 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0025 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0029 | 0.0028 |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-4 (Continued)**
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.0026 | 0.0024 | 0.0022 | 0.0024 | 0.0025 | | | | | | | | | | | |
| 2 | 0.0025 | 0.0023 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 3 | 0.0028 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | | | | | | | | | | | |
| 4 | 0.0023 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | | | | | | | | | | | |
| 5 | 0.0022 | 0.0020 | 0.0018 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 6 | 0.0024 | 0.0023 | 0.0021 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 7 | 0.0020 | 0.0017 | 0.0018 | 0.0020 | 0.0020 | | | | | | | | | | | |
| 8 | 0.0024 | 0.0021 | 0.0020 | 0.0022 | 0.0023 | | | | | | | | | | | |
| 9 | 0.0020 | 0.0018 | 0.0017 | 0.0020 | 0.0019 | | | | | | | | | | | |
| 10 | 0.0024 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | | | | | | | | | | | |
| 11 | 0.0019 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| 12 | 0.0022 | 0.0022 | 0.0020 | 0.0023 | 0.0021 | | | | | | | | | | | |
| 13 | 0.0024 | 0.0023 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 14 | 0.0026 | 0.0024 | 0.0023 | 0.0026 | 0.0025 | | | | | | | | | | | |
| 15 | 0.0025 | 0.0023 | 0.0022 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 16 | 0.0025 | 0.0024 | 0.0023 | 0.0025 | 0.0024 | | | | | | | | | | | |
| 17 | 0.0023 | 0.0020 | 0.0019 | 0.0022 | 0.0021 | | | | | | | | | | | |
| 18 | 0.0023 | 0.0021 | 0.0020 | 0.0021 | 0.0021 | | | | | | | | | | | |
| 19 | 0.0024 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | | | | | | | | | | | |
| 20 | 0.0024 | 0.0022 | 0.0022 | 0.0024 | 0.0023 | | | | | | | | | | | |
| 21 | 0.0024 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | | | | | | | | | | | |
| 22 | 0.0023 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | | | | | | | | | | | |
| 23 | 0.0021 | 0.0020 | 0.0018 | 0.0021 | 0.0020 | | | | | | | | | | | |
| 24 | 0.0022 | 0.0021 | 0.0019 | 0.0022 | 0.0021 | | | | | | | | | | | |
| 25 | 0.0025 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.0023 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | | | | | | | | | | | |
| Med. | 0.0024 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | | | | | | | | | | | |
| σ | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | | | | | | | | | | | |
| Min. | 0.0019 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | | | | | | | | | | | |
| Max. | 0.0028 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | | | | | | | | | | | |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-5**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.2589 | 0.2574 | 0.2573 | 0.2571 | 0.2570 | 0.2569 | 0.2568 | 0.2567 | 0.2566 | 0.2566 | 0.2564 | 0.2565 | 0.2565 | 0.2565 | 0.2564 | 0.2564 |
| 2 | 0.2595 | 0.2579 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | 0.2575 | 0.2573 | 0.2572 | 0.2573 | 0.2571 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2570 |
| 3 | 0.2602 | 0.2586 | 0.2585 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2573 | 0.2574 |
| 4 | 0.2606 | 0.2592 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2583 |
| 5 | 0.2611 | 0.2598 | 0.2596 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2589 |
| 6 | 0.2597 | 0.2584 | 0.2582 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2577 | 0.2575 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2573 | 0.2573 | 0.2573 |
| 7 | 0.2594 | 0.2580 | 0.2579 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2572 | 0.2573 | 0.2573 | 0.2572 | 0.2573 | 0.2573 |
| 8 | 0.2589 | 0.2575 | 0.2573 | 0.2572 | 0.2572 | 0.2570 | 0.2570 | 0.2570 | 0.2568 | 0.2568 | 0.2567 | 0.2568 | 0.2567 | 0.2567 | 0.2566 | 0.2566 |
| 9 | 0.2586 | 0.2573 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2568 | 0.2567 | 0.2567 | 0.2567 | 0.2566 | 0.2566 | 0.2566 | 0.2566 | 0.2566 | 0.2567 |
| 10 | 0.2589 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2568 | 0.2567 | 0.2568 | 0.2568 | 0.2566 | 0.2566 | 0.2566 |
| 11 | 0.2621 | 0.2610 | 0.2607 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2602 | 0.2601 |
| 12 | 0.2598 | 0.2584 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2578 | 0.2579 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2576 |
| 13 | 0.2600 | 0.2587 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2579 | 0.2578 | 0.2578 | 0.2577 | 0.2579 | 0.2576 | 0.2577 | 0.2576 | 0.2576 |
| 14 | 0.2586 | 0.2572 | 0.2569 | 0.2568 | 0.2566 | 0.2566 | 0.2567 | 0.2565 | 0.2564 | 0.2564 | 0.2562 | 0.2562 | 0.2563 | 0.2562 | 0.2561 | 0.2561 |
| 15 | 0.2597 | 0.2583 | 0.2581 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | 0.2573 | 0.2574 |
| 16 | 0.2614 | 0.2601 | 0.2599 | 0.2598 | 0.2596 | 0.2595 | 0.2596 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2592 | 0.2590 | 0.2590 | 0.2590 |
| 17 | 0.2617 | 0.2604 | 0.2603 | 0.2601 | 0.2600 | 0.2601 | 0.2601 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2596 | 0.2594 | 0.2595 | 0.2595 |
| 18 | 0.2594 | 0.2579 | 0.2578 | 0.2577 | 0.2575 | 0.2575 | 0.2576 | 0.2574 | 0.2573 | 0.2574 | 0.2571 | 0.2573 | 0.2573 | 0.2571 | 0.2571 | 0.2571 |
| 19 | 0.2590 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2570 | 0.2571 | 0.2568 | 0.2569 | 0.2569 | 0.2567 | 0.2567 | 0.2567 | 0.2566 | 0.2566 | 0.2566 |
| 20 | 0.2607 | 0.2594 | 0.2593 | 0.2592 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2583 | 0.2583 | 0.2584 |
| 21 | 0.2608 | 0.2595 | 0.2593 | 0.2592 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 |
| 22 | 0.2596 | 0.2582 | 0.2581 | 0.2580 | 0.2578 | 0.2577 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | 0.2573 |
| 23 | 0.2619 | 0.2607 | 0.2605 | 0.2605 | 0.2604 | 0.2602 | 0.2602 | 0.2602 | 0.2599 | 0.2600 | 0.2598 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2598 |
| 24 | 0.2598 | 0.2585 | 0.2582 | 0.2582 | 0.2580 | 0.2579 | 0.2580 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2576 | 0.2575 | 0.2576 |
| 25 | 0.2594 | 0.2581 | 0.2579 | 0.2578 | 0.2577 | 0.2575 | 0.2576 | 0.2574 | 0.2573 | 0.2573 | 0.2572 | 0.2571 | 0.2571 | 0.2569 | 0.2569 | 0.2569 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2600 | 0.2586 | 0.2585 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2578 | 0.2578 | 0.2578 | 0.2577 | 0.2576 | 0.2577 |
| Med. | 0.2597 | 0.2584 | 0.2582 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2577 | 0.2577 | 0.2577 | 0.2575 | 0.2576 | 0.2575 | 0.2574 | 0.2573 | 0.2574 |
| σ | 0.0010 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.2586 | 0.2572 | 0.2569 | 0.2568 | 0.2566 | 0.2566 | 0.2567 | 0.2565 | 0.2564 | 0.2564 | 0.2562 | 0.2562 | 0.2563 | 0.2562 | 0.2561 | 0.2561 |
| Max. | 0.2621 | 0.2610 | 0.2607 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2602 | 0.2601 |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-5 (Continued)**
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.2563 | 0.2565 | 0.2566 | 0.2565 | 0.2565 | | | | | | | | | | | |
| 2 | 0.2570 | 0.2572 | 0.2573 | 0.2571 | 0.2572 | | | | | | | | | | | |
| 3 | 0.2573 | 0.2575 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 4 | 0.2583 | 0.2585 | 0.2585 | 0.2584 | 0.2584 | | | | | | | | | | | |
| 5 | 0.2589 | 0.2591 | 0.2593 | 0.2591 | 0.2591 | | | | | | | | | | | |
| 6 | 0.2573 | 0.2574 | 0.2576 | 0.2573 | 0.2574 | | | | | | | | | | | |
| 7 | 0.2573 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| 8 | 0.2566 | 0.2569 | 0.2569 | 0.2568 | 0.2568 | | | | | | | | | | | |
| 9 | 0.2566 | 0.2568 | 0.2569 | 0.2567 | 0.2568 | | | | | | | | | | | |
| 10 | 0.2565 | 0.2567 | 0.2568 | 0.2567 | 0.2567 | | | | | | | | | | | |
| 11 | 0.2602 | 0.2605 | 0.2606 | 0.2604 | 0.2604 | | | | | | | | | | | |
| 12 | 0.2576 | 0.2577 | 0.2578 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 13 | 0.2576 | 0.2577 | 0.2578 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 14 | 0.2561 | 0.2563 | 0.2563 | 0.2561 | 0.2562 | | | | | | | | | | | |
| 15 | 0.2572 | 0.2574 | 0.2575 | 0.2572 | 0.2573 | | | | | | | | | | | |
| 16 | 0.2589 | 0.2590 | 0.2592 | 0.2589 | 0.2591 | | | | | | | | | | | |
| 17 | 0.2595 | 0.2597 | 0.2598 | 0.2596 | 0.2597 | | | | | | | | | | | |
| 18 | 0.2571 | 0.2573 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | |
| 19 | 0.2566 | 0.2568 | 0.2569 | 0.2568 | 0.2568 | | | | | | | | | | | |
| 20 | 0.2583 | 0.2585 | 0.2586 | 0.2585 | 0.2585 | | | | | | | | | | | |
| 21 | 0.2585 | 0.2587 | 0.2587 | 0.2585 | 0.2587 | | | | | | | | | | | |
| 22 | 0.2573 | 0.2574 | 0.2575 | 0.2572 | 0.2573 | | | | | | | | | | | |
| 23 | 0.2598 | 0.2599 | 0.2601 | 0.2599 | 0.2599 | | | | | | | | | | | |
| 24 | 0.2576 | 0.2577 | 0.2579 | 0.2576 | 0.2577 | | | | | | | | | | | |
| 25 | 0.2569 | 0.2570 | 0.2571 | 0.2570 | 0.2570 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.2577 | 0.2578 | 0.2579 | 0.2577 | 0.2578 | | | | | | | | | | | |
| Med. | 0.2573 | 0.2575 | 0.2576 | 0.2574 | 0.2574 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.2561 | 0.2563 | 0.2563 | 0.2561 | 0.2562 | | | | | | | | | | | |
| Max. | 0.2602 | 0.2605 | 0.2606 | 0.2604 | 0.2604 | | | | | | | | | | | |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-6**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h |
| 1 | 0.5264 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5265 | 0.5265 | 0.5265 |
| 2 | 0.5265 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5269 | 0.5267 | 0.5267 | 0.5267 |
| 3 | 0.5296 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5299 | 0.5299 | 0.5299 |
| 4 | 0.5277 | 0.5279 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5278 | 0.5277 | 0.5277 |
| 5 | 0.5291 | 0.5293 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5296 | 0.5296 | 0.5295 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5295 | 0.5295 | 0.5295 |
| 6 | 0.5270 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5272 | 0.5272 | 0.5271 |
| 7 | 0.5258 | 0.5260 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5259 | 0.5259 | 0.5258 |
| 8 | 0.5258 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5257 | 0.5257 | 0.5256 |
| 9 | 0.5275 | 0.5278 | 0.5279 | 0.5279 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5278 | 0.5276 | 0.5276 | 0.5275 |
| 10 | 0.5272 | 0.5274 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5273 |
| 11 | 0.5291 | 0.5292 | 0.5293 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5293 | 0.5292 | 0.5292 |
| 12 | 0.5284 | 0.5286 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | 0.5286 |
| 13 | 0.5268 | 0.5269 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5270 |
| 14 | 0.5268 | 0.5270 | 0.5271 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5269 | 0.5270 | 0.5269 |
| 15 | 0.5272 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5275 | 0.5275 | 0.5274 |
| 16 | 0.5290 | 0.5291 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5290 | 0.5290 | 0.5290 |
| 17 | 0.5280 | 0.5281 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5282 | 0.5282 | 0.5282 |
| 18 | 0.5285 | 0.5287 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5287 | 0.5287 | 0.5287 |
| 19 | 0.5282 | 0.5283 | 0.5283 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5283 | 0.5283 | 0.5283 |
| 20 | 0.5284 | 0.5285 | 0.5286 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5285 | 0.5283 |
| 21 | 0.5284 | 0.5285 | 0.5286 | 0.5286 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | 0.5286 | 0.5284 | 0.5284 | 0.5283 |
| 22 | 0.5270 | 0.5272 | 0.5272 | 0.5273 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5271 |
| 23 | 0.5285 | 0.5289 | 0.5289 | 0.5290 | 0.5290 | 0.5290 | 0.5291 | 0.5290 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5290 | 0.5289 | 0.5289 | 0.5288 |
| 24 | 0.5273 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5274 | 0.5274 | 0.5273 |
| 25 | 0.5289 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5291 | 0.5289 | 0.5289 | 0.5288 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5277 | 0.5279 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5279 | 0.5279 | 0.5278 |
| Med. | 0.5277 | 0.5279 | 0.5279 | 0.5280 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5278 | 0.5277 | 0.5277 |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Min. | 0.5258 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5257 | 0.5257 | 0.5256 |
| Max. | 0.5296 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5300 | 0.5299 | 0.5299 | 0.5299 |

## Data Set 12 : 105 °C, 180 mA

| | |
|---|---|
| Actual Case Temperature [$T_S$] | 106.1 °C |
| Actual Ambient Temperature [$T_A$] | 102.5 °C |
| Drive Current [$I_F$] | 180 mA |
| Measurement Current | 180 mA |

NOTES:
$T_S$ and $T_A$ were measured during initial setup.
Number of LED failures: 0

**TABLE 12-6 (Continued)**
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 8000 h | 8500 h | 9000 h | 9500 h | 10000 h | | | | | | | | | | | |
| 1 | 0.5265 | 0.5265 | 0.5261 | 0.5260 | 0.5258 | | | | | | | | | | | |
| 2 | 0.5267 | 0.5267 | 0.5265 | 0.5263 | 0.5262 | | | | | | | | | | | |
| 3 | 0.5298 | 0.5298 | 0.5297 | 0.5295 | 0.5294 | | | | | | | | | | | |
| 4 | 0.5277 | 0.5277 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| 5 | 0.5294 | 0.5292 | 0.5290 | 0.5290 | 0.5289 | | | | | | | | | | | |
| 6 | 0.5271 | 0.5270 | 0.5268 | 0.5265 | 0.5263 | | | | | | | | | | | |
| 7 | 0.5258 | 0.5257 | 0.5255 | 0.5252 | 0.5251 | | | | | | | | | | | |
| 8 | 0.5255 | 0.5255 | 0.5253 | 0.5251 | 0.5250 | | | | | | | | | | | |
| 9 | 0.5275 | 0.5274 | 0.5271 | 0.5269 | 0.5268 | | | | | | | | | | | |
| 10 | 0.5273 | 0.5272 | 0.5270 | 0.5267 | 0.5266 | | | | | | | | | | | |
| 11 | 0.5291 | 0.5290 | 0.5289 | 0.5287 | 0.5287 | | | | | | | | | | | |
| 12 | 0.5286 | 0.5286 | 0.5284 | 0.5283 | 0.5282 | | | | | | | | | | | |
| 13 | 0.5270 | 0.5270 | 0.5269 | 0.5267 | 0.5265 | | | | | | | | | | | |
| 14 | 0.5268 | 0.5268 | 0.5266 | 0.5264 | 0.5264 | | | | | | | | | | | |
| 15 | 0.5274 | 0.5274 | 0.5272 | 0.5270 | 0.5270 | | | | | | | | | | | |
| 16 | 0.5288 | 0.5287 | 0.5285 | 0.5283 | 0.5282 | | | | | | | | | | | |
| 17 | 0.5281 | 0.5279 | 0.5279 | 0.5277 | 0.5276 | | | | | | | | | | | |
| 18 | 0.5286 | 0.5285 | 0.5284 | 0.5282 | 0.5281 | | | | | | | | | | | |
| 19 | 0.5282 | 0.5282 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 20 | 0.5283 | 0.5282 | 0.5280 | 0.5278 | 0.5278 | | | | | | | | | | | |
| 21 | 0.5283 | 0.5282 | 0.5280 | 0.5279 | 0.5277 | | | | | | | | | | | |
| 22 | 0.5270 | 0.5270 | 0.5267 | 0.5266 | 0.5265 | | | | | | | | | | | |
| 23 | 0.5289 | 0.5287 | 0.5286 | 0.5283 | 0.5282 | | | | | | | | | | | |
| 24 | 0.5273 | 0.5272 | 0.5271 | 0.5269 | 0.5268 | | | | | | | | | | | |
| 25 | 0.5288 | 0.5288 | 0.5286 | 0.5284 | 0.5283 | | | | | | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | | | | | | | | | | | |
| Avg. | 0.5278 | 0.5277 | 0.5275 | 0.5273 | 0.5272 | | | | | | | | | | | |
| Med. | 0.5277 | 0.5277 | 0.5275 | 0.5273 | 0.5273 | | | | | | | | | | | |
| σ | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | | | | | | | | | | | |
| Min. | 0.5255 | 0.5255 | 0.5253 | 0.5251 | 0.5250 | | | | | | | | | | | |
| Max. | 0.5298 | 0.5298 | 0.5297 | 0.5295 | 0.5294 | | | | | | | | | | | |