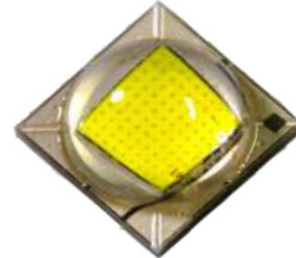


# SST-40-W

## Specialty White LED

### Preliminary



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### Features:

- High Brightness Cool white LED with maximum output in excess of 1,650 lm
- Compact monolithic emitter ideal for directional lighting applications with high uniformity
- Binned at 85 °C
- Typical efficacy 170 lm/W at 700 mA
- Maximum drive current: 5 A DC
- High thermal conductivity package - junction thermal resistance of only 2.5° C/W
- Wide viewing angle: 120°
- 8000V HBM ESD rating per MIL STD-883D
- Electrically isolated thermal path
- RoHS and REACH compliant

### Applications

- Flashlights
- Automotive accessory spotlights
- Portable lighting accessories
- Spot lights
- Instrumentation
- Work lights
- Battery and solar-powered applications
- Bicycle lights

## General Considerations

### Environmental Considerations:

As a leading provider of solid-state Lighting solutions, Luminus implements strict substance control policies to ensure all of its products are environmentally friendly. As all Luminus LEDs, the SST-40-W series are compliant with the Restriction of Hazardous Substances Directive (RoHS) and REACH directives from the European Community.

### Product Testing:

Every SST-40-W LED is fully production tested to ensure it meets the high quality standards customers have come to expect from Luminus products. Devices are binned to correlated values at 700 mA, 20 msec pulse condition at  $T_j = 85^{\circ}\text{C}$ . Current and temperature curves are provided in this document allowing users to predict the LED performance and characteristics under their own driving and thermal conditions.

### Reliability:

Luminus SST-40-W LED series are required to pass a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. These tests ensure that the devices deliver high performance and achieve reliable long term operation in the automotive and other demanding environments. Please contact Luminus for further information.

## Flux Binning Structure

SST-40-W LEDs are binned for luminous flux based on  $I_f = 700$  mA and 85 °C junction temperature ( $T_j$ ) conditions.

| Flux Bin (FF) <sup>1</sup> | Min Flux (lm)<br>700 mA, 85 °C | Min Flux (lm)<br>700 mA, 25 °C | Calculated Minimum Luminous Flux (lm) @ 85 °C <sup>2</sup> |         |         |
|----------------------------|--------------------------------|--------------------------------|--|---------|---------|
|                            |                                |                                | 2000 mA  | 3000 mA | 5000 mA |
| N2                         | <b>260</b>                     | 286                            | 666  | 933     | 1394    |
| N3                         | <b>280</b>                     | 308                            | 717  | 1005    | 1501    |
| N4                         | <b>300</b>                     | 330                            | 768  | 1077    | 1608    |
| N5                         | <b>320</b>                     | 352                            | 819  | 1149    | 1715    |
| P2                         | <b>340</b>                     | 374                            | 870  | 1221    | 1822    |

Note 1: Luminus maintains a +/- 6% tolerance on flux measurement.

Note 2: Calculated flux values at 2000 mA and 3000 mA are for reference only.

## Forward Voltage Binning Structure

SST-40-W LEDs are binned for forward voltage based on  $I_f = 700$  mA and 85 °C junction temperature ( $T_j$ ).

| Voltage Bin <sup>3</sup> | Minimum Voltage (V) | Maximum Voltage (V) |
|--------------------------|---------------------|---------------------|
| VH                       | 2.5                 | 2.7                 |
| VJ                       | 2.7                 | 2.9                 |
| VK                       | 2.9                 | 3.1                 |
| VL                       | 3.1                 | 3.3                 |

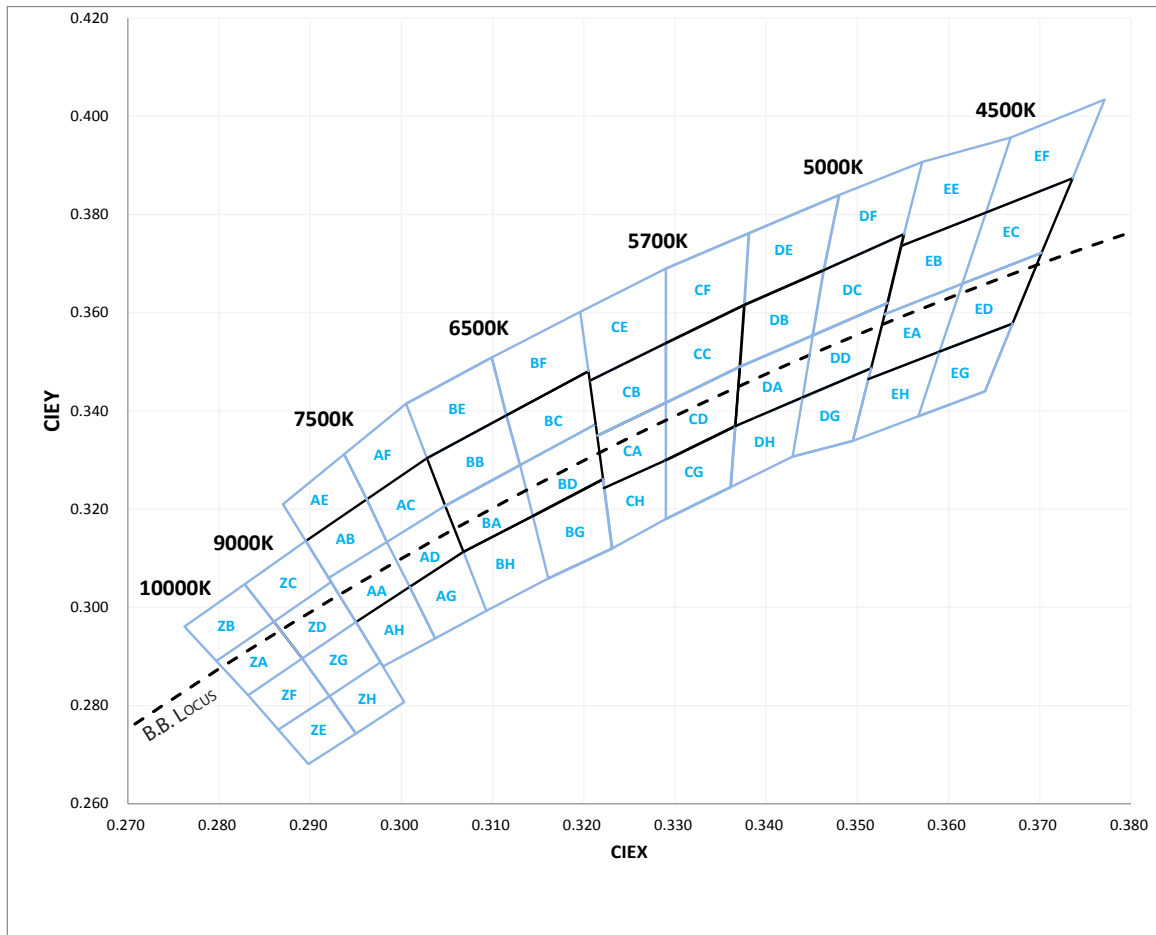
Note 3: Individual voltage bins are not orderable.

**Chromaticity Bin Definitions**

| CCT   | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  |        |        |
|-------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|--------|--------|
| 10000 | ZA       | 0.2860 | 0.2971 | ZB       | 0.2828 | 0.3047 | ZC       | 0.2895 | 0.3135 | ZD       | 0.2923 | 0.3052 |        |        |
|       |          | 0.2891 | 0.2896 |          | 0.2860 | 0.2971 |          | 0.2923 | 0.3052 |          | 0.2950 | 0.2970 |        |        |
|       |          | 0.2832 | 0.2821 |          | 0.2797 | 0.2891 |          | 0.2860 | 0.2971 |          | 0.2891 | 0.2896 |        |        |
|       |          | 0.2797 | 0.2891 |          | 0.2762 | 0.2961 |          | 0.2828 | 0.3047 |          | 0.2860 | 0.2971 |        |        |
|       | ZE       | 0.2921 | 0.2819 | ZF       | 0.2891 | 0.2896 | ZG       | 0.2950 | 0.2970 | ZH       | 0.2977 | 0.2888 | 0.2977 | 0.2888 |
|       |          | 0.2950 | 0.2743 |          | 0.2921 | 0.2819 |          | 0.2977 | 0.2888 |          | 0.3003 | 0.2807 |        |        |
|       |          | 0.2898 | 0.2681 |          | 0.2865 | 0.2751 |          | 0.2921 | 0.2819 |          | 0.2950 | 0.2743 |        |        |
|       |          | 0.2865 | 0.2751 |          | 0.2832 | 0.2821 |          | 0.2891 | 0.2896 |          | 0.2921 | 0.2819 |        |        |
| 7500  | AA       | 0.2950 | 0.2970 | AB       | 0.2920 | 0.3060 | AC       | 0.2984 | 0.3133 | AD       | 0.2984 | 0.3133 |        |        |
|       |          | 0.2920 | 0.306  |          | 0.2895 | 0.3135 |          | 0.2962 | 0.3220 |          | 0.3048 | 0.3207 |        |        |
|       |          | 0.2984 | 0.3133 |          | 0.2962 | 0.322  |          | 0.3028 | 0.3304 |          | 0.3068 | 0.3113 |        |        |
|       |          | 0.3009 | 0.3042 |          | 0.2984 | 0.3133 |          | 0.3048 | 0.3207 |          | 0.3009 | 0.3042 |        |        |
|       | AH       | 0.2980 | 0.2880 | AE       | 0.2895 | 0.3135 | AF       | 0.2962 | 0.3220 | AG       | 0.3037 | 0.2937 |        |        |
|       |          | 0.2950 | 0.2970 |          | 0.287  | 0.3210 |          | 0.2937 | 0.3312 |          | 0.3009 | 0.3042 |        |        |
|       |          | 0.3009 | 0.3042 |          | 0.2937 | 0.3312 |          | 0.3005 | 0.3415 |          | 0.3068 | 0.3113 |        |        |
|       |          | 0.3037 | 0.2937 |          | 0.2962 | 0.3220 |          | 0.3028 | 0.3304 |          | 0.3093 | 0.2993 |        |        |
| 6500  | BA       | 0.3048 | 0.3207 | BB       | 0.3028 | 0.3304 | BC       | 0.3115 | 0.3391 | BD       | 0.3130 | 0.329  |        |        |
|       |          | 0.3130 | 0.3290 |          | 0.3115 | 0.3391 |          | 0.3205 | 0.3481 |          | 0.3213 | 0.3373 |        |        |
|       |          | 0.3144 | 0.3186 |          | 0.3130 | 0.3290 |          | 0.3213 | 0.3373 |          | 0.3221 | 0.3261 |        |        |
|       |          | 0.3068 | 0.3113 |          | 0.3048 | 0.3207 |          | 0.313  | 0.3290 |          | 0.3144 | 0.3186 |        |        |
|       | BH       | 0.3068 | 0.3113 | BE       | 0.3005 | 0.3415 | BF       | 0.3099 | 0.3509 | BG       | 0.3144 | 0.3186 |        |        |
|       |          | 0.3144 | 0.3186 |          | 0.3099 | 0.3509 |          | 0.3196 | 0.3602 |          | 0.3221 | 0.3261 |        |        |
|       |          | 0.3161 | 0.3059 |          | 0.3115 | 0.3391 |          | 0.3205 | 0.3481 |          | 0.3231 | 0.3120 |        |        |
|       |          | 0.3093 | 0.2993 |          | 0.3028 | 0.3304 |          | 0.3115 | 0.3391 |          | 0.3161 | 0.3059 |        |        |

**Chromaticity Bin Definitions (continued)**

| CCT  | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  | Bin Code | CIE-X  | CIE-Y  |
|------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|
| 5700 | CA       | 0.3215 | 0.3350 | CB       | 0.3207 | 0.3462 | CC       | 0.3290 | 0.3538 | CD       | 0.3290 | 0.3417 |
|      |          | 0.3290 | 0.3417 |          | 0.3290 | 0.3538 |          | 0.3376 | 0.3616 |          | 0.3371 | 0.3490 |
|      |          | 0.3290 | 0.330  |          | 0.3290 | 0.3417 |          | 0.3371 | 0.3490 |          | 0.3366 | 0.3369 |
|      |          | 0.3222 | 0.3243 |          | 0.3215 | 0.3350 |          | 0.3290 | 0.3417 |          | 0.3290 | 0.3300 |
|      | CH       | 0.3222 | 0.3243 | CE       | 0.3196 | 0.3602 | CF       | 0.3290 | 0.3690 | CG       | 0.3290 | 0.3300 |
|      |          | 0.3290 | 0.3300 |          | 0.3290 | 0.3690 |          | 0.3381 | 0.3762 |          | 0.3366 | 0.3369 |
|      |          | 0.3290 | 0.318  |          | 0.3290 | 0.3538 |          | 0.3376 | 0.3616 |          | 0.3361 | 0.3245 |
|      |          | 0.3231 | 0.3120 |          | 0.3207 | 0.3462 |          | 0.3290 | 0.3538 |          | 0.3290 | 0.3180 |
| 5000 | DA       | 0.3371 | 0.3490 | DB       | 0.3376 | 0.3616 | DC       | 0.3463 | 0.3687 | DD       | 0.3451 | 0.3554 |
|      |          | 0.3451 | 0.3554 |          | 0.3463 | 0.3687 |          | 0.3551 | 0.3760 |          | 0.3533 | 0.3620 |
|      |          | 0.3440 | 0.3427 |          | 0.3451 | 0.3554 |          | 0.3533 | 0.3620 |          | 0.3515 | 0.3487 |
|      |          | 0.3366 | 0.3369 |          | 0.3371 | 0.3490 |          | 0.3451 | 0.3554 |          | 0.3440 | 0.3427 |
|      | DH       | 0.3366 | 0.3369 | DE       | 0.3381 | 0.3762 | DF       | 0.348  | 0.3840 | DG       | 0.3440 | 0.3428 |
|      |          | 0.344  | 0.3428 |          | 0.3480 | 0.384  |          | 0.3571 | 0.3907 |          | 0.3515 | 0.3487 |
|      |          | 0.3429 | 0.3307 |          | 0.3463 | 0.3687 |          | 0.3551 | 0.3760 |          | 0.3495 | 0.3339 |
|      |          | 0.3361 | 0.3245 |          | 0.3376 | 0.3616 |          | 0.3463 | 0.3687 |          | 0.3429 | 0.3307 |
| 4500 | EA       | 0.3530 | 0.3597 | EB       | 0.3548 | 0.3736 | EC       | 0.3641 | 0.3804 | ED       | 0.3615 | 0.3659 |
|      |          | 0.3615 | 0.3659 |          | 0.3641 | 0.3804 |          | 0.3736 | 0.3874 |          | 0.3702 | 0.3722 |
|      |          | 0.3590 | 0.3521 |          | 0.3615 | 0.3659 |          | 0.3702 | 0.3722 |          | 0.3670 | 0.3578 |
|      |          | 0.3512 | 0.3465 |          | 0.3530 | 0.3597 |          | 0.3615 | 0.3659 |          | 0.3590 | 0.3521 |
|      | EH       | 0.3512 | 0.3465 | EE       | 0.3571 | 0.3907 | EF       | 0.3668 | 0.3957 | EG       | 0.3590 | 0.3521 |
|      |          | 0.3590 | 0.3521 |          | 0.3668 | 0.3957 |          | 0.3771 | 0.4034 |          | 0.3670 | 0.3578 |
|      |          | 0.3567 | 0.3389 |          | 0.3641 | 0.3804 |          | 0.3736 | 0.3874 |          | 0.3640 | 0.3440 |
|      |          | 0.3495 | 0.3339 |          | 0.3548 | 0.3736 |          | 0.3641 | 0.3804 |          | 0.3567 | 0.3389 |

**SST-40-W Cool White Color Space  
Plotted on the ANSI 1931 Curve**

**Chromaticity Bin Kit Codes**

| CCT   | Bin Kit | Chromaticity Bins  |
|-------|---------|--|
| 7500K | 751     | AA, AB, AC, AD, AE, AF, AG, AH   |
|       | 752     | AA, AB, AC, AD   |
| 7000K | 700     | AA, AB, AC, AD, AE, AF, AG, AH, BA, BB, BC, BD, BE, BF, BG, BH   |
|       | 702     | AA, AB, AC, AD, BA, BB, BC, BD   |
| 6500  | 650     | ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, AA, AB, AC, AD, AE, AF, AG, AH, BA, BB, BC, BD, BE, BF, BG, CA, CB, CD, CE, CF, CG, CH |
|       | 651     | BA, BB, BC, BD, BE, BF, BG, BH   |
|       | 652     | BA, BB, BC, BD   |

### Part Numbering Nomenclature

SST — 40 — <WCS> — <F50> — <FFCCC>

| Product Family  | LED Emission Area      | Color   | Package Configuration | Bin Kit  |
|---|------------------------|---|-----------------------|--|
| S: Surface mount<br>S: Lensed<br>T: Single monolithic emitter | 40=4.0 mm <sup>2</sup> | W: White<br>C: Cool White<br>S: standard CRI 70 | F50 Package code      | See Tables<br>FF = minimum flux bin<br>CCC: Chromaticity bin kit |

### Ordering Part Numbers

| CCT   | Min. Flux Bin <sup>1</sup> | Min Flux (lm) | Chromaticity Bin Kit <sup>2</sup> | Ordering Part Numbers |
|-------|----------------------------|---------------|-----------------------------------|-----------------------|
| 7500K | N2                         | 260           | 751                               | SST-40-WCS-F50-N2751  |
|       |                            |               | 752                               | SST-40-WCS-F50 N2752  |
|       | N3                         | 280           | 751                               | SST-40-WCS-F50 N3751  |
|       |                            |               | 752                               | SST-40-WCS-F50 N3752  |
|       | N4                         | 300           | 751                               | SST-40-WCS-F50-N4751  |
|       |                            |               |                                   |                       |
| 7000K | N2                         | 260           | 700                               | SST-40-WCS-F50-N2700  |
|       |                            |               | 702                               | SST-40-WCS-F50-N2702  |
|       | N3                         | 280           | 700                               | SST-40-WCS-F50-N3700  |
|       |                            |               | 702                               | SST-40-WCS-F50-N3702  |
|       | N4                         | 300           | 700                               | SST-40-WCS-F50-N4700  |
|       |                            |               | 702                               | SST-40-WCS-F50-N4702  |
| 6500K | N2                         | 260           | 650                               | SST-40-WCS-F50-N2650  |
|       |                            |               | 651                               | SST-40-WCS-F50-N2651  |
|       |                            |               | 652                               | SST-40-WCS-F50-N2652  |
|       | N3                         | 280           | 650                               | SST-40-WCS-F50-N3650  |
|       |                            |               | 651                               | SST-40-WCS-F50-N3651  |
|       |                            |               | 652                               | SST-40-WCS-F50-N3652  |
|       | N4                         | 300           | 650                               | SST-40-WCS-F50-N4650  |
|       |                            |               | 651                               | SST-40-WCS-F50-N4651  |
|       |                            |               | 652                               | SST-40-WCS-F50-N4652  |

Note 1: The minimum flux of each bin kit is determined by the minimum flux bin as defined on page 3. Higher flux bins are eligible to ship against shown bin kits and part numbers.

Note 2: See page 6 for chromaticity bin kit definitions.

Example: The part number SST-40-WCS-F50-N2750 refers to a part with flux greater than 260 lm and chromaticity bins AA, AB, AC,AD,AE,AF,AG,AH as defined on page 3.

**SST-40-W Product Characteristics**

| Parameter                                   | Symbol                       | Minimum  | Typical | Maximum | Unit   |    |
|---|------------------------------|----------|---------|---------|--------|----|
| Forward Current                             | $I_F$                        |          | 700     | 5000    | mA     |    |
| Forward Voltage                             | 700 mA @85°C                 | $V_F$    | 2.5     | 2.75    | 3.3    | V  |
|   | 5000 mA @85°C                | $V_F$    |         | 3.3     |        | V  |
| Luminus Flux                                | 700 mA @85°C                 | $\phi_v$ |         | 310     |        | lm |
|   | 5000 mA @85°C                | $\phi_v$ |         | 1662    |        | lm |
| Viewing Angle                               | $2 \text{ } \emptyset_{1/2}$ |          | 120     |         | Degree |    |
| LED Junction Temperature <sup>1</sup>       | $T_J$                        |          |         | 150     | °C     |    |
| Thermal resistance junction to case         | $R_{\theta_{JC}}$            |          | 2.5     |         | °C/W   |    |
| Operating Temperature                       | $T_{OPR}$                    | - 40     |         | 80      | °C     |    |
| Storage Temperature                         | $T_{STG}$                    | - 40     |         | 30      | °C     |    |
| Reverse voltage <sup>2</sup>                | $V_F$                        |          |         | N.A.    | V      |    |
| ESD withstand Voltage HBM Per Mil STD -883D | $V_{ESD}$                    |          |         | 8,000   | V      |    |
| Color Rendering Index                       | CRI                          |          | 70      |         |        |    |

Note 1: Absolute maximum junction temperature not intended for sustained operation. Luminus recommend to keep  $T_J < 120^\circ\text{C}$  continuous operation.

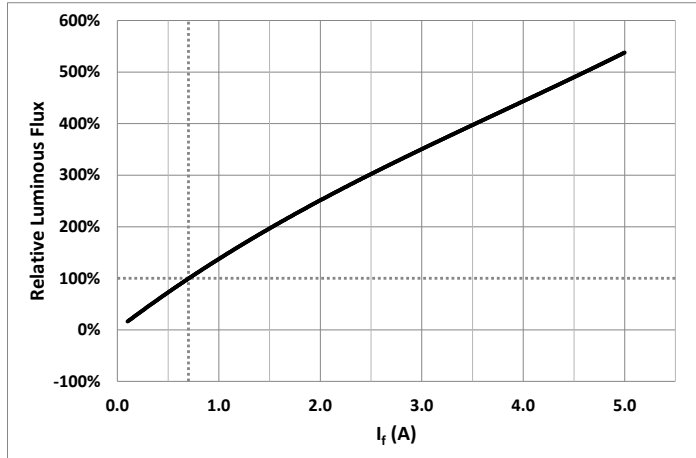
Note 2: Not designed for reverse voltage operation



## Optical & Electrical Characteristics

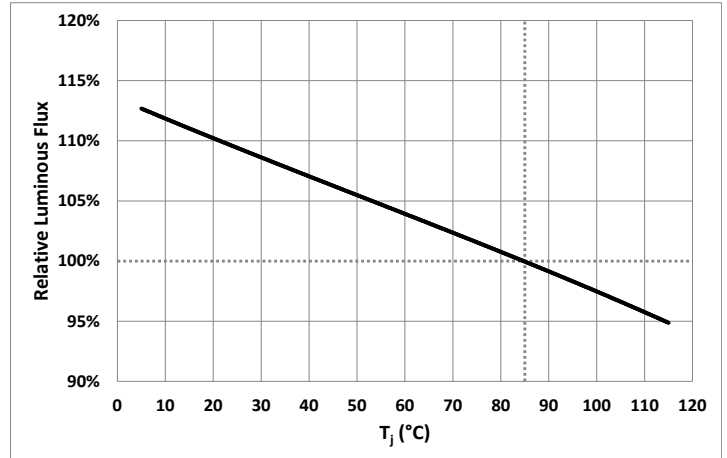
### Relative Luminous Flux vs. Forward Current

$$\phi_v(I_f) / \phi_v(0.7A) @ T_j = 85^\circ C$$



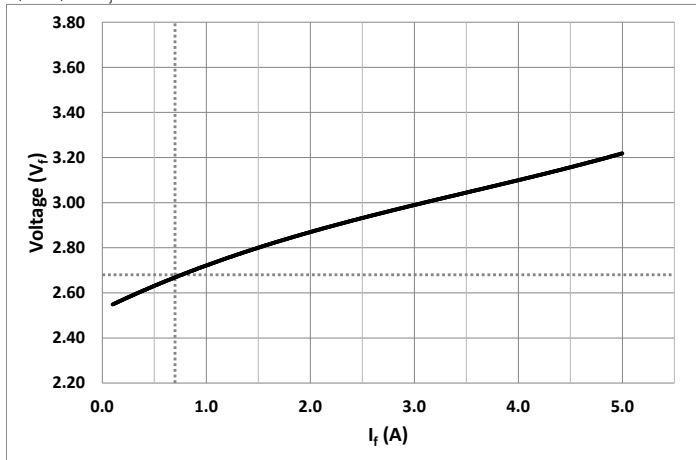
### Relative Luminous Flux vs. Temperature( $T_j$ )

$$\phi_v(T_j) / \phi_v(85^\circ C) @ I_f = 0.7A$$



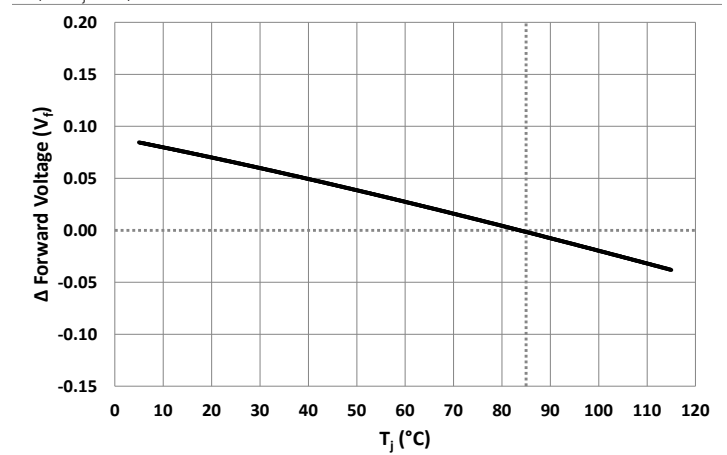
### Forward Current vs. Forward Voltage

$$V_f = f(I_f) @ T_j = 85^\circ C$$



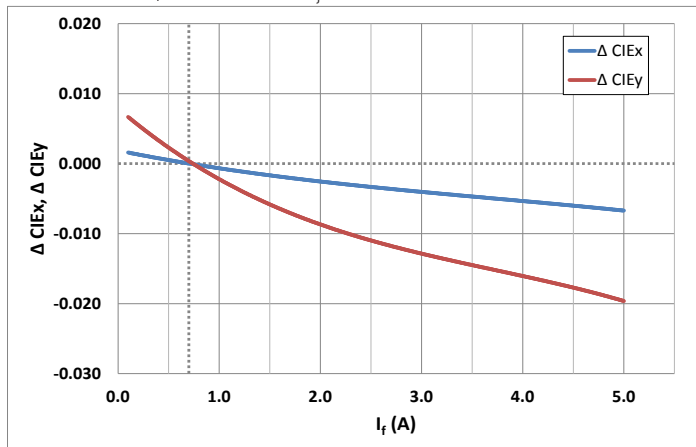
### Relative Forward Voltage vs. Temperature( $T_j$ )

$$\Delta V_f = f(T_j) @ I_f = 0.7A$$



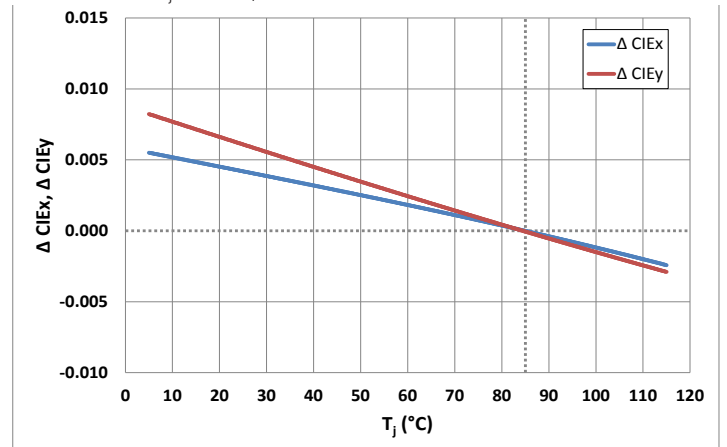
### Relative Chromaticity Shift vs. $I_f$

$$\Delta CIE_{x,y} = CIE_{x,y}(I_f) - CIE_{x,y}(0.7A) @ T_j = 85^\circ C$$



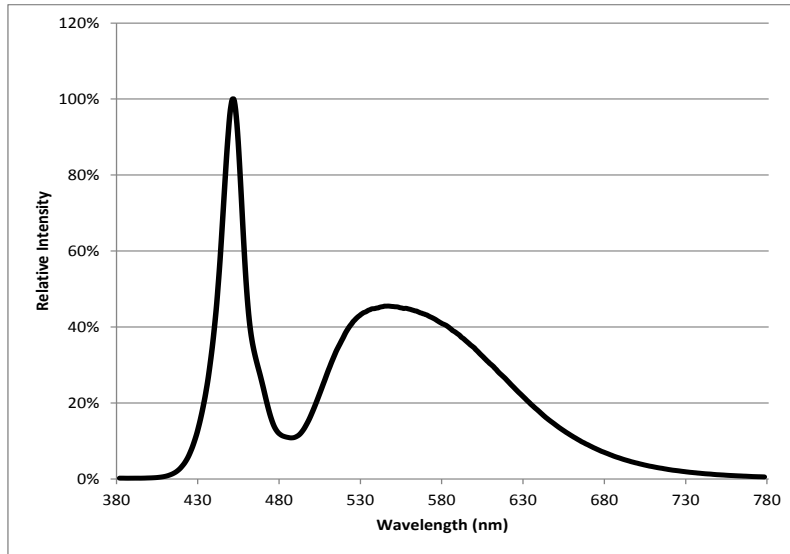
### Relative Chromaticity Shift vs. $T_j$

$$\Delta CIE_{x,y} = CIE_{x,y}(T_j) - CIE_{x,y}(I_f = 0.7A)$$

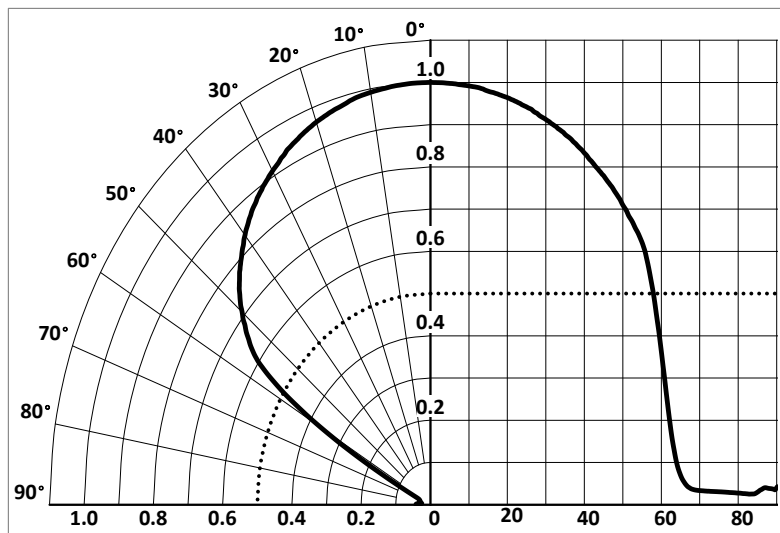


## Optical & Electrical Characteristics

### Typical Relative Radiant Power (%)



### Typical Angular Radiation Pattern

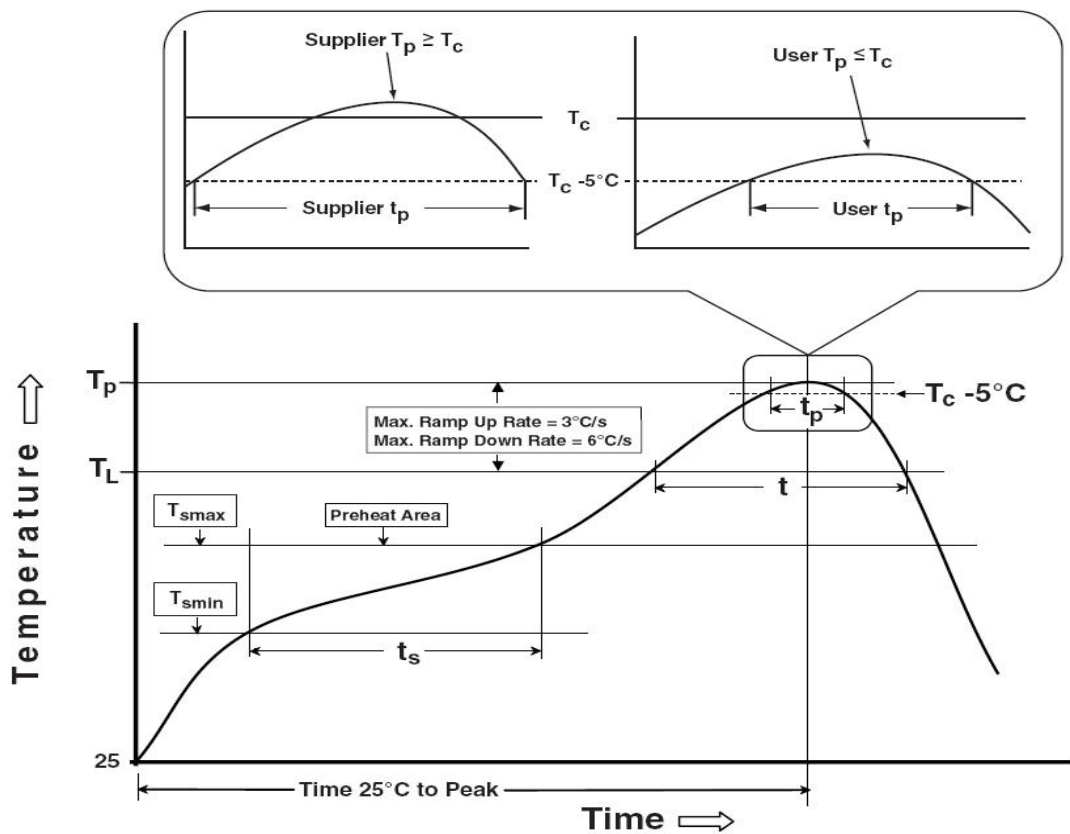


### Soldering Profile

| Profile Feature  | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|-------------------------|------------------|
| Preheat & Soak   | 100 °C                  | 150 °C           |
| Temperature min (T <sub>smin</sub> )   | 150 °C                  | 200 °C           |
| Temperature max (T <sub>smax</sub> )   | 60-120 seconds          | 60-120 seconds   |
| Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                 |                         |                  |
| Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )                                      | 3 °C/second max         | 3 °C/second max  |
| Liquidous temperature (T <sub>L</sub> )  | 183 °C                  | 217 °C           |
| Time at liquidous (t <sub>L</sub> )  | 60-150 seconds          | 60-150 seconds   |
| Peak package body temperature (T <sub>p</sub> )*   | 230 °C ~235 °C          | 255 °C ~260 °C   |
| Classification temperature (T <sub>c</sub> )   | 235 °C                  | 260 °C           |
| Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> ) | 20 seconds              | 30 seconds       |
| Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )                                    | 6 °C/second max         | 6 °C/second max  |
| Time 25 °C to peak temperature   | 6 minutes max           | 8 minutes max    |

\* Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.



## Precautions for Use

### Storage:

1. The recommended storage condition is 5 °C- 30 °C and relative humidity less than or equal to 60% RH in its original package.
2. After this bag is opened, devices that will be applied to infrared reflow, vapor - phase reflow, or equivalent soldering process must be:
  - a) Completed within 168 hours.
  - b) Stored at less than 60% relative humidity.
  - c) If not completely used within 168 hours, seal the remaining in the moisture barrier bag.
3. Devices require baking before mounting, if 2 a) is not met.
4. If baking is required, devices must be baked under below conditions:  
24 hours at 60 C +/-5C

The LED's electrode and leadframe are a silver plated copper alloy. The silver surface may be affected by its environment. Please avoid conditions which may cause the LEDs to corrode or become discolored. The corrosion or discoloration might lower the solderability or affect the optical characteristics of the device.

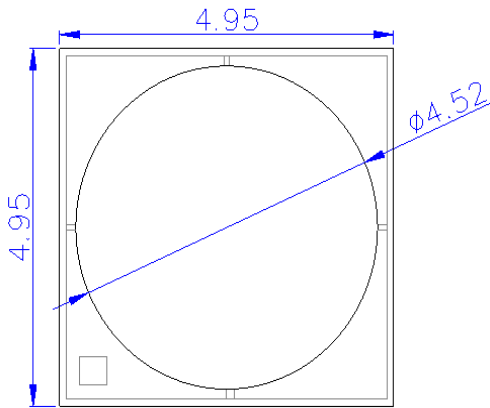
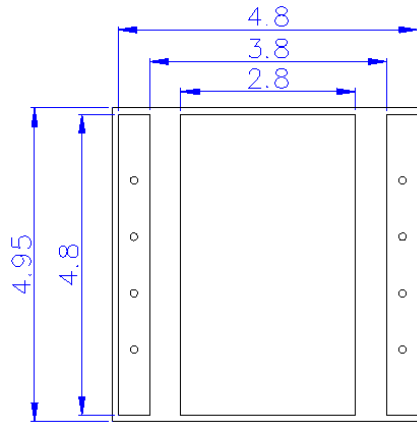
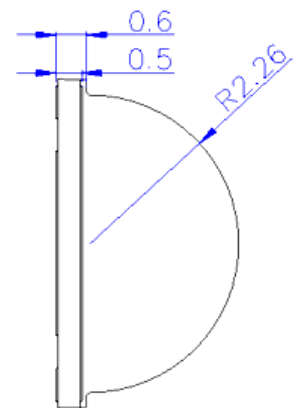
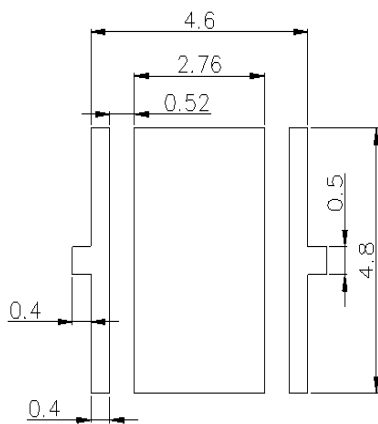
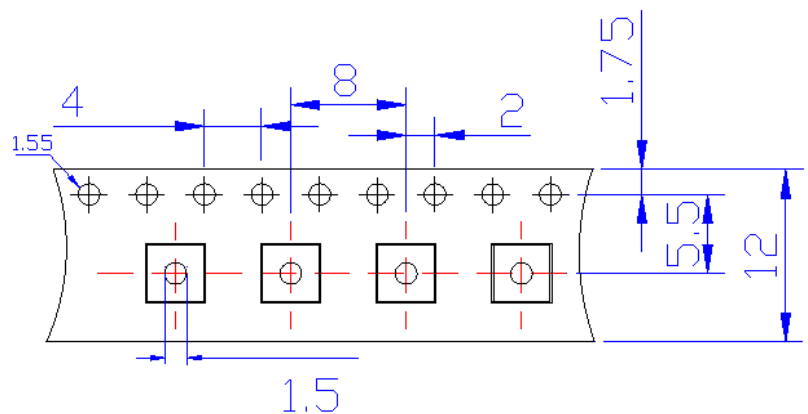
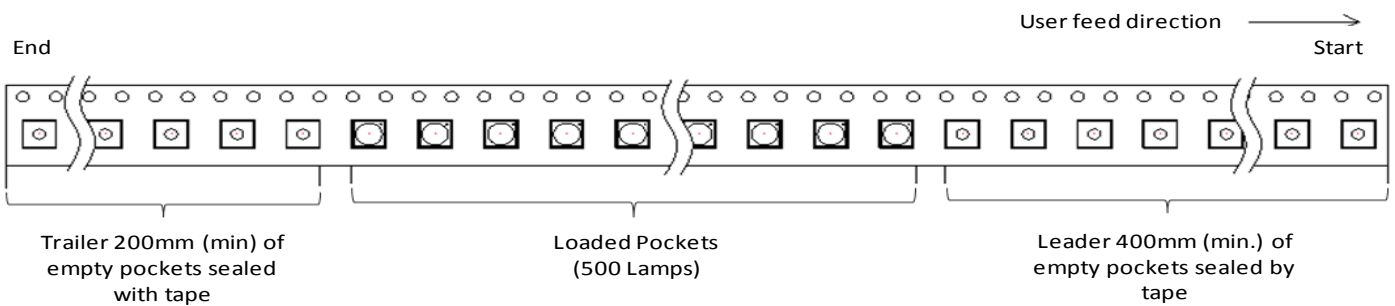
Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

### Static Electricity:

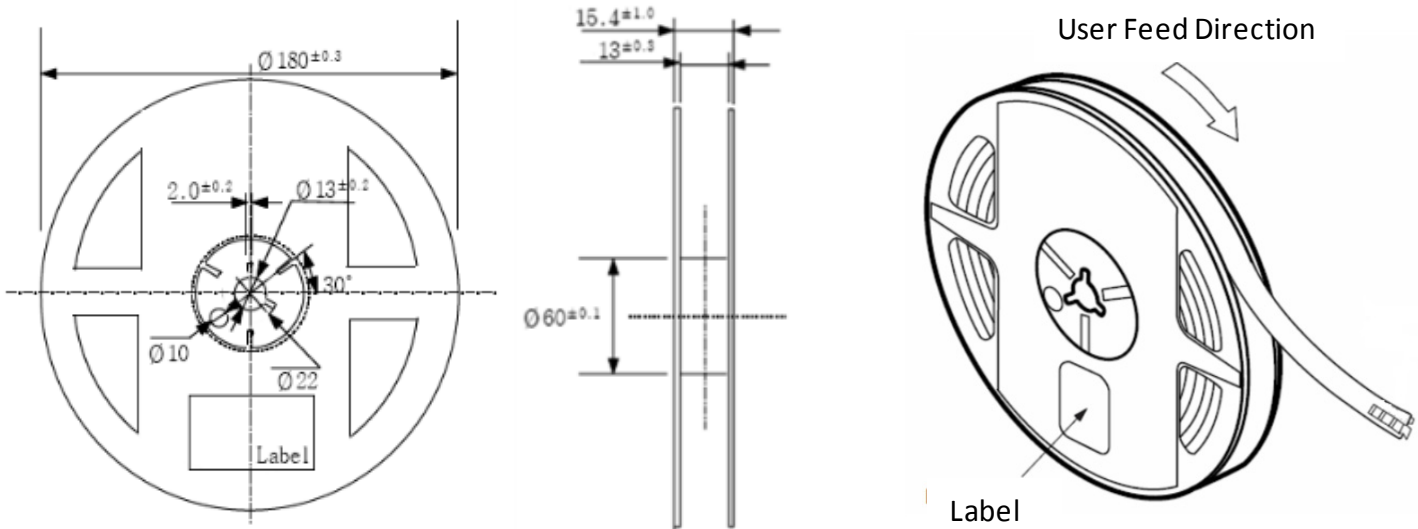
1. The products are sensitive to static electricity and care should be taken when handling them.
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or anti-electrostatic gloves when handling the LEDs.
3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

### Vision Advisory

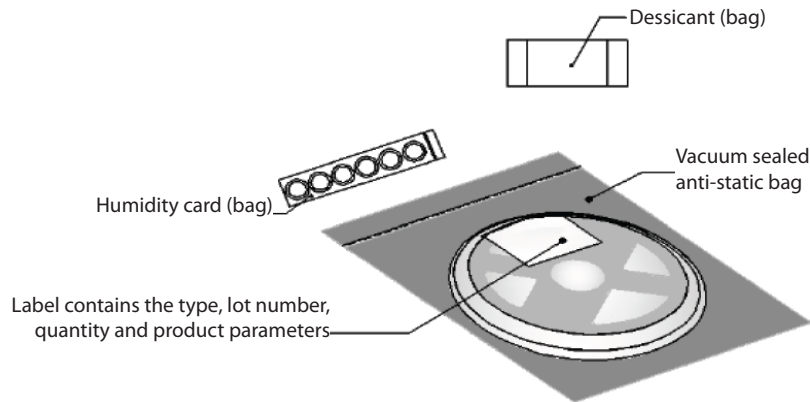
WARNING: Looking at an exposed LED during operation can result in eye injury.

**Mechanical Dimensions(mm)**

**Top View**

**Bottom View**

**Side View**
**Tape Information**

**Pad drawing**

**Tape Drawing**


### Reel Packaging



Reel dimensions are in millimeters.



### Label

#### Label Fields (subject to change):

- CPN: Luminus ordering part number
- MPN: For Luminus internal use
- QTY: Quantity of devices in pack
- 2D Bar code
- Flux: FF as defined on page 3
- Voltage: VV as defined on page 3
- Color: CC as defined on pages 4 and 5
- Mfg Info: For Luminus internal use



CPN: SST-40-WCS-F50-N2751

MPN: 113231

QTY: 500

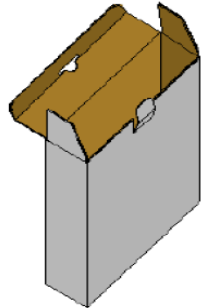


| BIN INFO |    |
|----------|----|
| Flux:    | N2 |
| Voltage: | VJ |
| Color:   | AA |

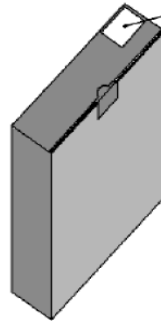
| MFG INFO          |
|-------------------|
| Rev: 01           |
| Lot#: TOR-1607034 |

RoHS Compliant

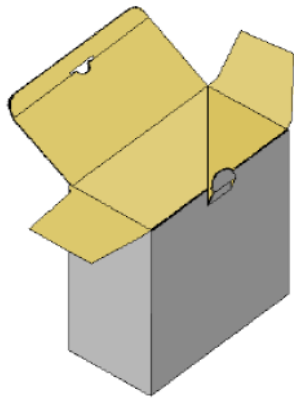
### Box Packaging Information



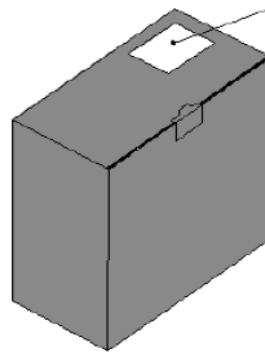
Size: 22.5\*24.5\*6.5 cm  
Capacity: 5 reels per box



Label contains the type, lot number,  
quantity and product parameters



Size: 22.5\*24.5\*13 cm  
Capacity: 10 reels per box



Label contains the type, lot number,  
quantity and product parameters

### History of Changes

| Rev              | Date       | Description of Change |
|------------------|------------|-----------------------|
| PDS-002938 Rev01 | 05/15/2017 | Initial release.      |

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