

High Power White LEDs

SFT-40-WxS

SFT-40-WxE

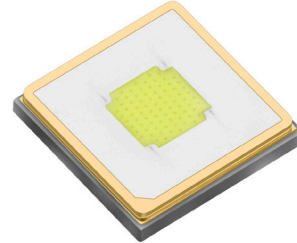


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Features

The flat window of an SFT White LED results in a much smaller light emitting surface than a dome-shaped cover, enabling much smaller optics and higher optical coupling efficiency. Along with the high lumen density of a monolithic emitter, SFT white series is a powerful light source for beam pattern critical lighting applications, in delivery of extremely high intensity, long beam distance and tight beam angles.

- Cool white LEDs with a maximum output in excess of 2200 lm @8 A, 85°C (6500K).
- High lumen density up to 588 lm/mm² (6500K)
- Maximum Drive Current: 8 A
- Luminous Efficacy: Typ. 171 lm/W @ 700 mA, 85°C (6500K)
- Color Temperature: 5000K, 5700K, 6500K
- Color Rendering Index: Typ. 73 (5000K, 5700K), Typ. 70 (6500K)
- Low thermal resistance: 0.7°C/W
- ANSI-compatible chromaticity bins
- Electrically isolated thermal path
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001
- RoHS and REACH compliant

Applications

- Portable Lights
- Bicycle Lights
- Automotive Auxiliary Lights
- LED Work Lights
- Outdoor and Roadway Lighting
- High Bay Industrial Lighting
- Entertainment Lighting
- Directional Light Fixtures

Ordering Part Numbers

| CCT | CRI | Minimum Flux Bin ¹ | Minimum Flux (lm) | Chromaticity Bin Kit Code ² | Ordering Part Numbers |
|-------|--------------------|-------------------------------|-------------------|--|-----------------------|
| 5000K | Typ. 73 Min. 70 | N3 | 554 | 501 | SFT-40-W50E-F50-N3501 |
| | | | | 502 | SFT-40-W50E-F50-N3502 |
| | | N4 | 594 | 501 | SFT-40-W50E-F50-N4501 |
| | | | | 502 | SFT-40-W50E-F50-N4502 |
| 5700K | Typ. 73 Min. 70 | N3 | 554 | 571 | SFT-40-W57E-F50-N3571 |
| | | | | 572 | SFT-40-W57E-F50-N3572 |
| 6500K | Typ. 70 Min. 65 | N4 | 594 | 651 | SFT-40-W65S-F50-N4651 |
| | | | | 652 | SFT-40-W65S-F50-N4652 |
| | | N5 | 634 | 651 | SFT-40-W65S-F50-N5651 |
| | | | | 652 | SFT-40-W65S-F50-N5652 |

Notes

- The Ordering Part Number specifies the Minimum Flux Bin in shipment; higher flux bins may be shipped without advance notice. Please refer to 'Luminous Flux Binning' table for details of all flux bins.
- Shipments always adhere to the color bins specified in each Chromaticity Bin Kit. See 'Chromaticity Bin Kit Codes' table for the color bins included in each Bin Kit.

Part Number Nomenclature

SFT — 40 — W<xx> — F50 — <ffcc>

| Product Family | Light Emission Area | Light Color | Package Configuration | Bin Kit |
|--|--------------------------------|--|--------------------------|---|
| S: Surface Mount F: Flat Window T: Single Emitter | 40: 4.0 mm ² | W: White <xx> Color Temperature 50: 5000K 65: 6500K <y> CRI Category Code S: CRI>65 E: CRI>70 | F50: Package Code | <ff> Minimum Flux Bin, see 'Luminus Flux Binning' table for details <ccc> Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details |

Luminous Flux Binning

| Flux Bin Code | Binning @ 1500 mA, T _j =85°C ¹ | | @ 700 mA, T _j =25°C ² | Correlated Minimum Flux (lm) @ T _j =85°C ² | | | | | |
|---------------|--|-------------------|---|--|---------|---------|---------|---------|---------|
| | Minimum Flux (lm) | Maximum Flux (lm) | Minimum Flux (lm) | 700 mA | 2000 mA | 3000 mA | 5000 mA | 6000 mA | 8000 mA |
| N3 | 554 | 594 | 316 | 283 | 709 | 986 | 1446 | 1640 | 1985 |
| N4 | 594 | 634 | 339 | 303 | 760 | 1057 | 1550 | 1758 | 2128 |
| N5 | 634 | 673 | 362 | 323 | 812 | 1129 | 1655 | 1877 | 2272 |
| P2 | 673 | 713 | 384 | 343 | 861 | 1198 | 1757 | 1992 | 2411 |
| P3 | 713 | 763 | 407 | 364 | 913 | 1269 | 1861 | 2110 | 2555 |

Notes

- LEDs are measured at 25°C ambient temperature with 1500 mA 20 ms single pulse. The measured values are correlated to 1500 mA at 85°C junction temperature (T_j). Luminus maintains a ±6% tolerance on flux measurement.
- Flux values at other junction temperature (T_j) and/or forward current conditions are calculated and for reference only.

Forward Voltage Binning

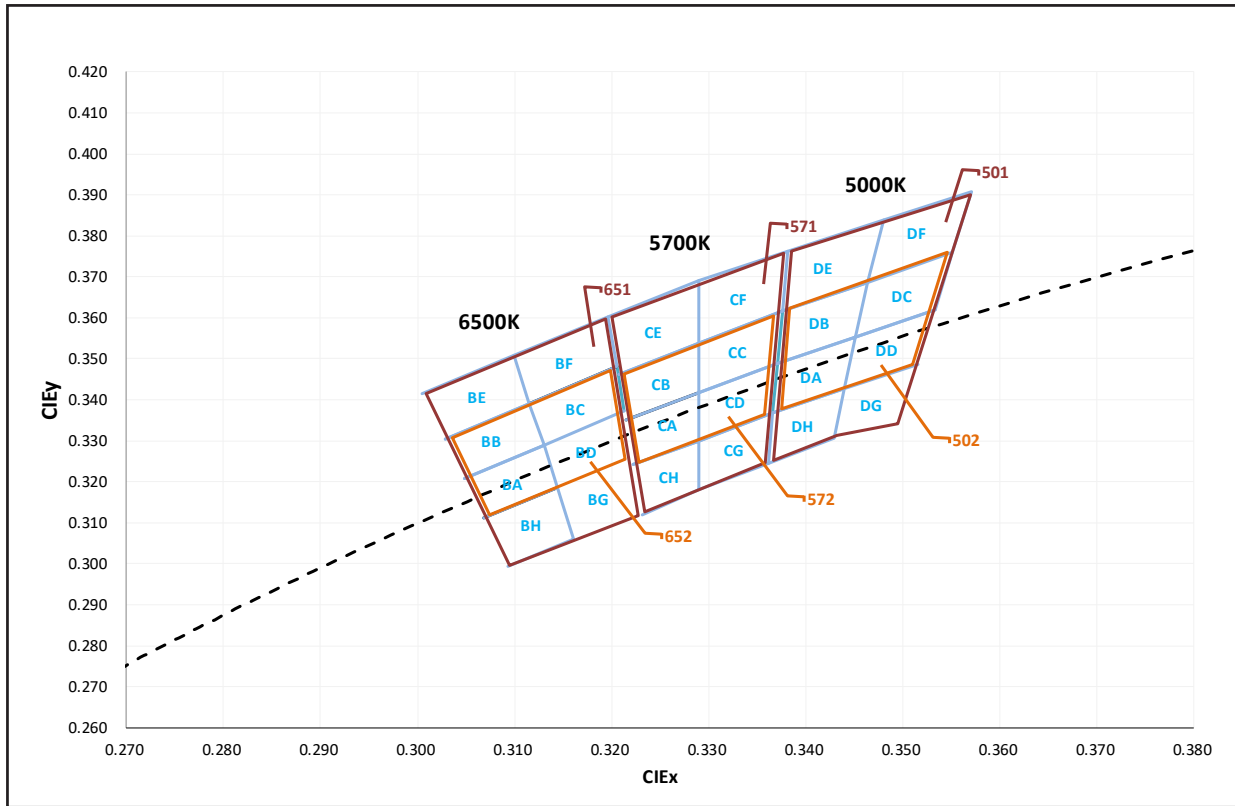
| Voltage Bin Code | Binning @ 1500 mA, T _j =85°C | |
|------------------|---|---------------------|
| | Minimum Voltage (V) | Maximum Voltage (V) |
| VH | 2.5 | 2.7 |
| VJ | 2.7 | 2.9 |
| VK | 2.9 | 3.1 |

Note: Individual voltage bins are not orderable.

Chromaticity Binning Coordinates

| 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 |
|-------|----------|------------------|------------------|----------|------------------|------------------|----------|------------------|------------------|----------|------------------|------------------|
| 5000K | 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 | 0.3480 | 0.3840 | DG | 0.3440 | 0.3428 |
| | | 0.3440 | 0.3428 | | 0.3480 | 0.3840 | | 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 |
| 5700K | 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 | 0.3300 | | 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 | 0.3180 | | 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 |
| 6500K | BA | 0.3048 | 0.3207 | BB | 0.3028 | 0.3304 | BC | 0.3115 | 0.3391 | BD | 0.3130 | 0.3290 |
| | | 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 | | 0.3130 | 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 Binning Diagram



Chromaticity Bin Kit Codes

| CCT | Bin Kit | Chromaticity Bins |
|-------|---------|--------------------------------|
| 5000K | 501 | DA, DB, DC, DD, DE, DF, DG, DH |
| | 502 | DA, DB, DC, DD |
| 5700K | 571 | CA, CB, CC, CD, CE, CF, CG, CH |
| | 572 | CA, CB, CC, CD |
| 6500K | 651 | BA, BB, BC, BD, BE, BF, BG, BH |
| | 652 | BA, BB, BC, BD |

Note: Luminus maintains a tolerance of ± 0.005 on chromaticity (CIE_x, CIE_y), and ± 2 on Color Rendering Index (CRI) measurements.

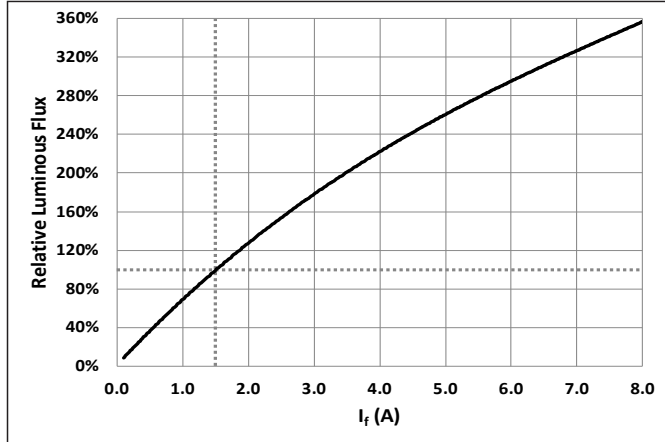
Product Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|--|-----------------|---------|---------|---------|--------|
| Viewing Angle (FWHM) | $2\theta_{1/2}$ | | 120 | | Degree |
| Color Rendering Index SFT-40-WxS | CRI_{WxS} | 65 | 70 | | |
| Color Rendering Index SFT-40-WxE | CRI_{WxE} | 70 | 73 | | |
| Thermal resistance (Electrical) Junction/Solder Point | $R_{thjs-EL}$ | | 0.7 | | °C/W |
| Junction Temperature | T_j | | | 150 | °C |
| Forward Voltage (@ $I_f=1500$ mA, $T_j=85^\circ\text{C}$) | V_f | 2.6 | 2.8 | 3.1 | V |
| DC Forward Current | I_f | 0.1 | | 8 | A |
| Surge Current (t <10 ms, Duty Cycle < 10%) | I_{s-max} | | | 10 | A |
| Reverse Voltage ($I_r=10$ mA) | V_r | | | 5 | V |
| Power Dissipation | P_d | | | 29 | W |
| Operating Temperature | T_{opr} | -40 | | 100 | °C |
| Storage Temperature | T_{stg} | -40 | | 100 | °C |
| ESD withstand Voltage HBM Per ANSI/ESDA/JEDEC JS-001 | V_{HBM} | 8 | | | kV |
| ESD withstand Voltage CDM Per ANSI/ESDA/JEDEC JS-002 | V_{CDM} | 1 | | | kV |

Optical & Electrical Characteristics

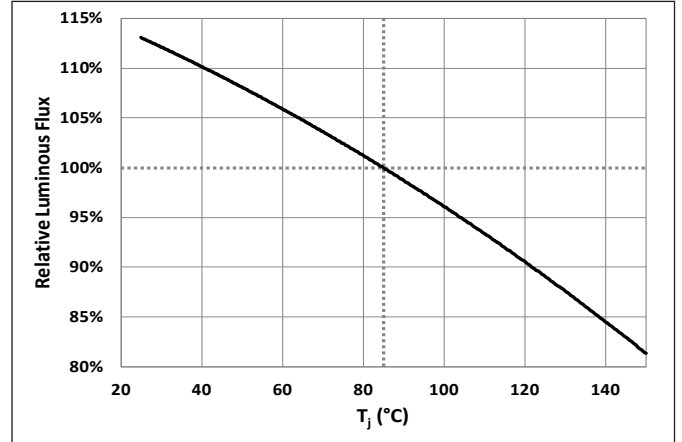
Relative Luminous Flux vs. Forward Current

$\Phi_v/\Phi_v(1.5\text{ A}), T_j = 85^\circ\text{C}$



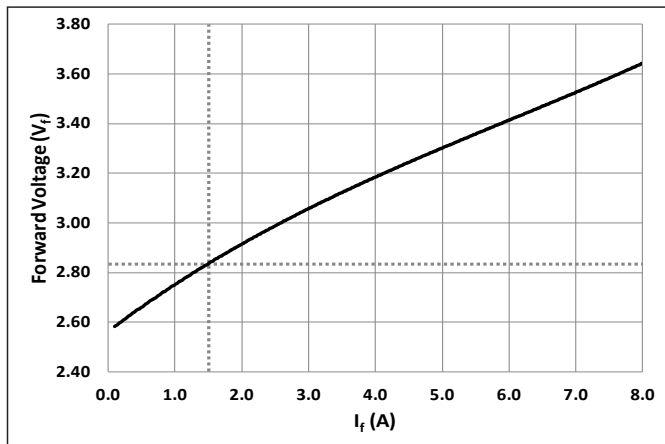
Relative Luminous Flux vs. Temperature (T_j)

$\Phi_v/\Phi_v(85^\circ\text{C}), I_f = 1.5\text{ A}$



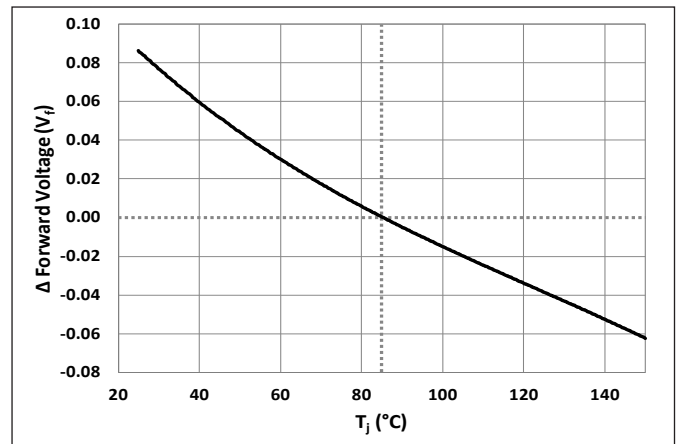
Forward Voltage vs. Forward Current

$V_f = f(I_f), T_j = 85^\circ\text{C}$



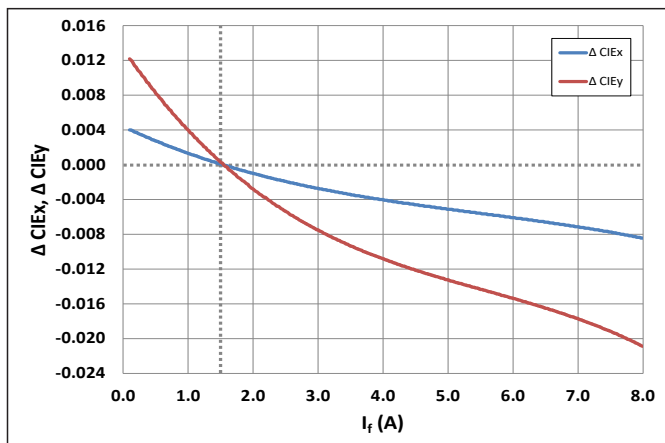
Relative Forward Voltage vs. Temperature (T_j)

$\Delta V_f = V_f(T_j) - V_f(85^\circ\text{C}), I_f = 1.5\text{ A}$



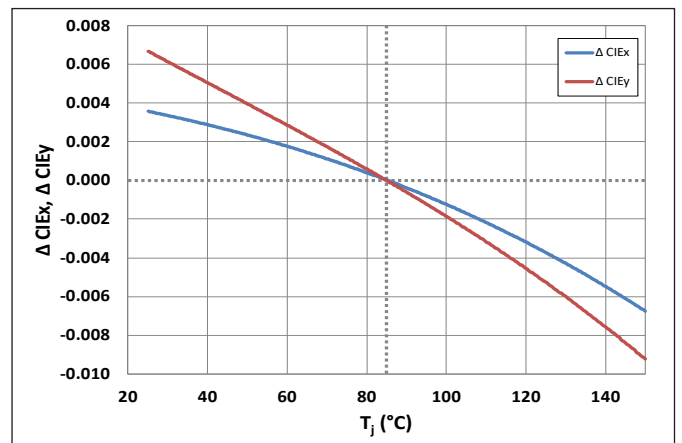
Relative Chromaticity vs. Forward Current

$\Delta \text{CIEx}, \Delta \text{CIEy} = \text{CIEx}, \text{y}(I_f) - \text{CIEx}, \text{y}(1.5\text{ A}), T_j = 85^\circ\text{C}$



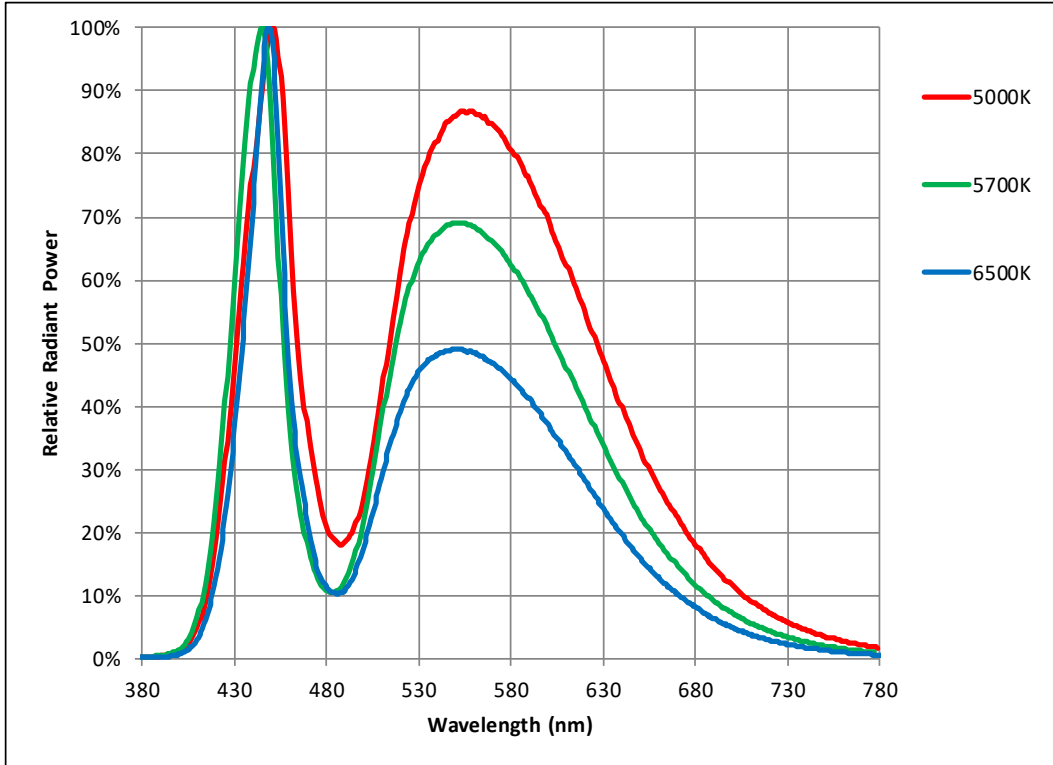
Relative Chromaticity vs. Temperature (T_j)

$\Delta \text{CIEx}, \Delta \text{CIEy} = \text{CIEx}, \text{y}(T_j) - \text{CIEx}, \text{y}(85^\circ\text{C}), I_f = 1.5\text{ A}$



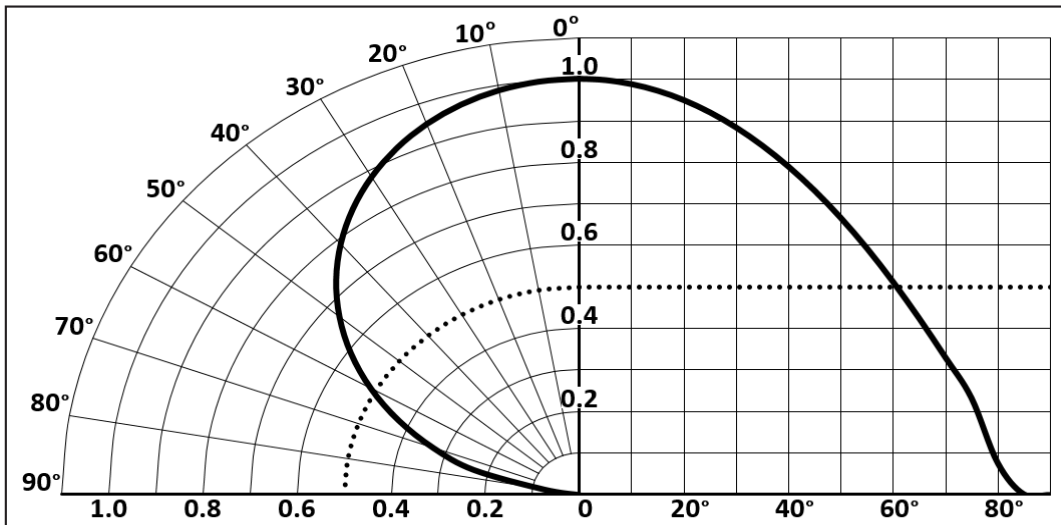
Relative Spectral Power Distribution

$I_f=1.5\text{ A}$, $T_j=85^\circ\text{C}$

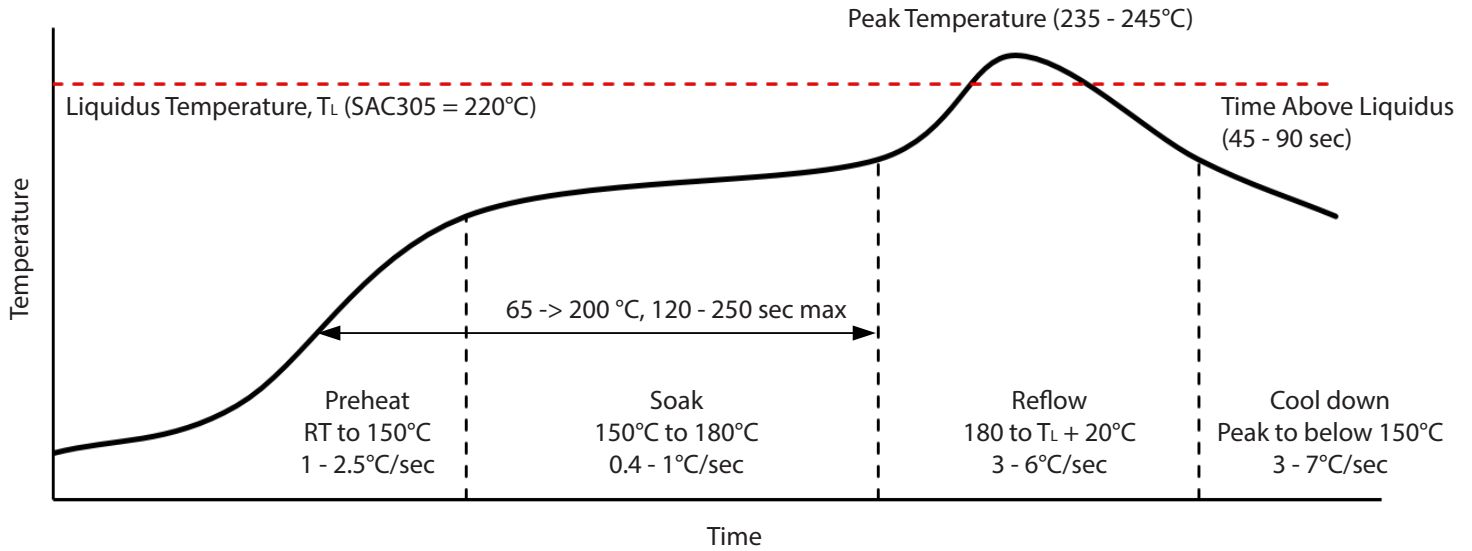


Typical Radiation Characteristics

$I_f=1.5\text{ A}$, $T_j=25^\circ\text{C}$



Soldering Profile



| SMT Rework Guideline | Manual Hotplate Reflow | Hot Air Gun Reflow |
|----------------------|------------------------|--------------------|
| Heating Time | < 60 sec | |
| Hotplate Temperature | < 245°C | < 150°C |

Notes

- Product complies to Moisture Sensitivity Level 3 (MSL 3).
- The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
- During the pick and place process, ensure the pick-up tool does not touch any die components.
- Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
- Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. Temperature is referenced to the center of the PCB.
- Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
- These are general guidelines. Consult the solder paste manufacturer's datasheet for guidelines specific to the alloy and flux combination used in your application. For more information, please refer to: <https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components->
- For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

Precautions for Use

Storage:

1. Before opening the package

The LEDs should be kept at a temperature lower than 40°C and relative humidity lower than 90%. The LEDs should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.

2. After opening the package

The LEDs should be kept at a temperature lower than 30°C and relative humidity lower than 60%. The LEDs should be soldered within 168 hours (7 days) after opening the moisture proof package.

If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with moisture absorbent material (silica gel). It is also recommended to return the unused LEDs to the original moisture proof package and to seal it again.

If the moisture absorbent material (silica gel) vaporizes or passes the expiration date, baking treatment should be performed by using the following conditions : 60°C for 20 hours.

The LED's electrode and lead frame comprise a silver plated copper alloy. The silver surface may be affected by environments. Please avoid conditions which may cause the LEDs to corrode or discolor. The corrosion or discoloration might lower solderability or affect optical characteristics.

Please avoid rapid transition 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.

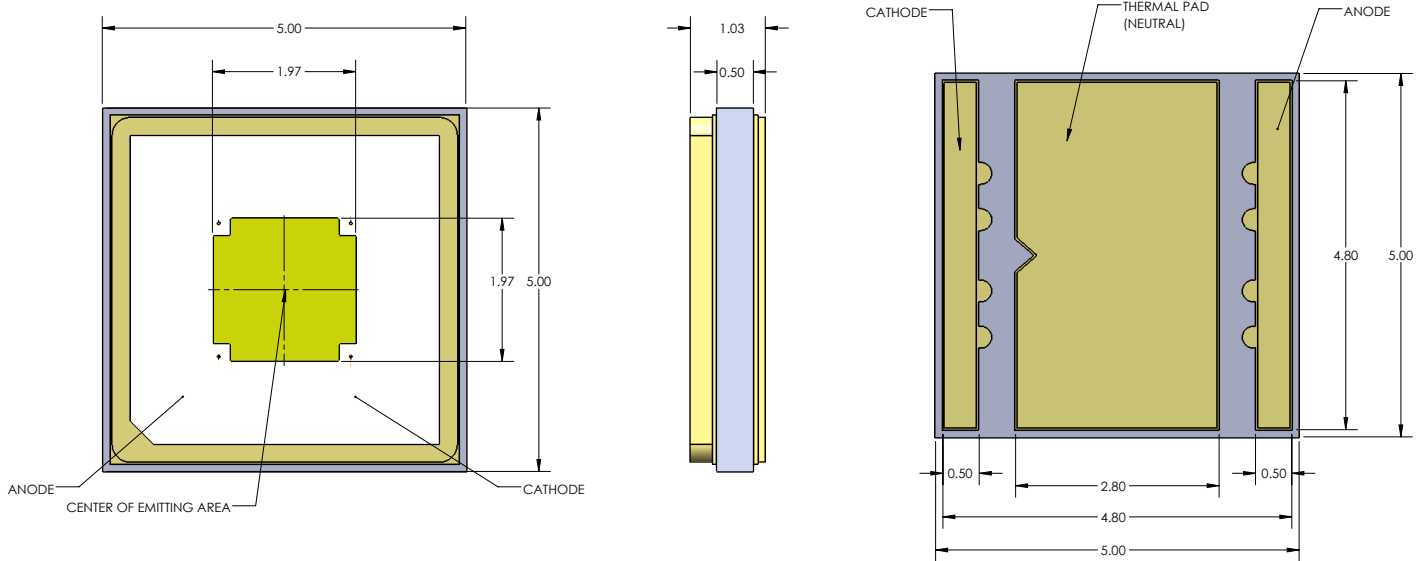
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear anti-electrostatic gloves or wristband when handling the LEDs.

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.

Package Configuration

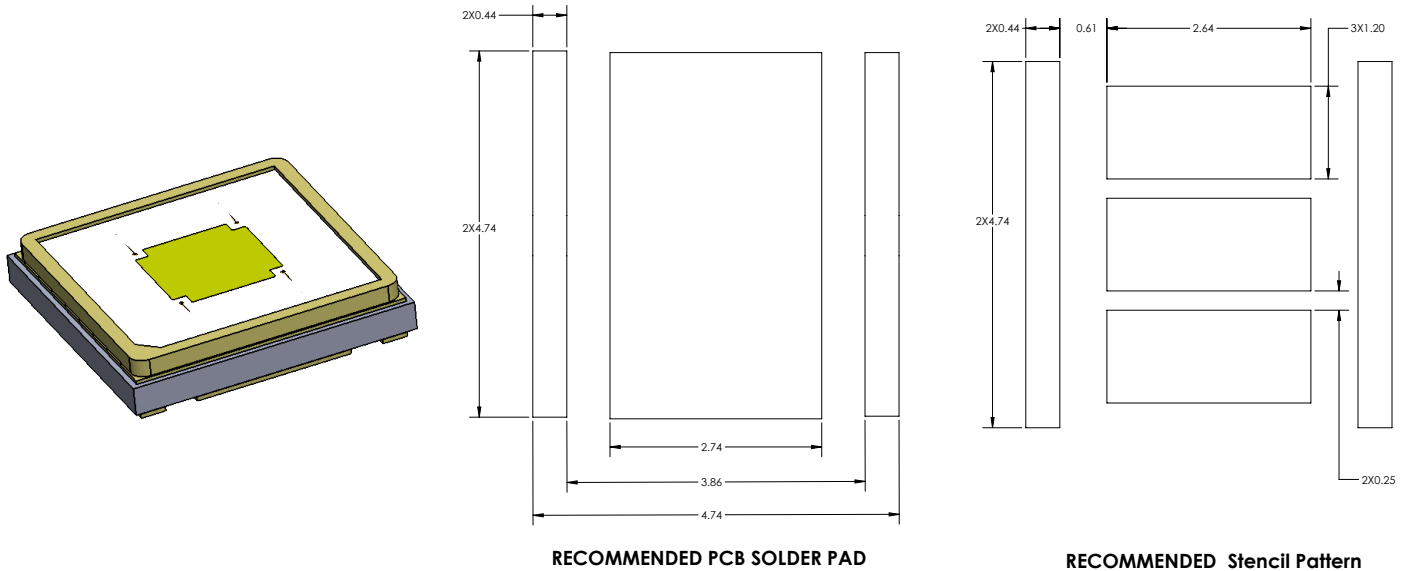
Mechanical Dimensions

All dimensions are in millimeter ± 0.13 mm



Recommended PCB Solder Pad and Stencil Pattern

All dimensions are in millimeter ± 0.13 mm

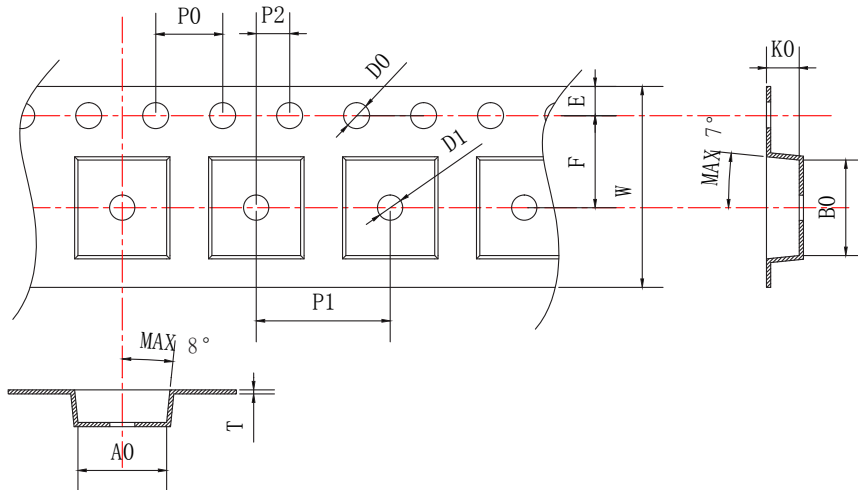


RECOMMENDED PCB SOLDER PAD

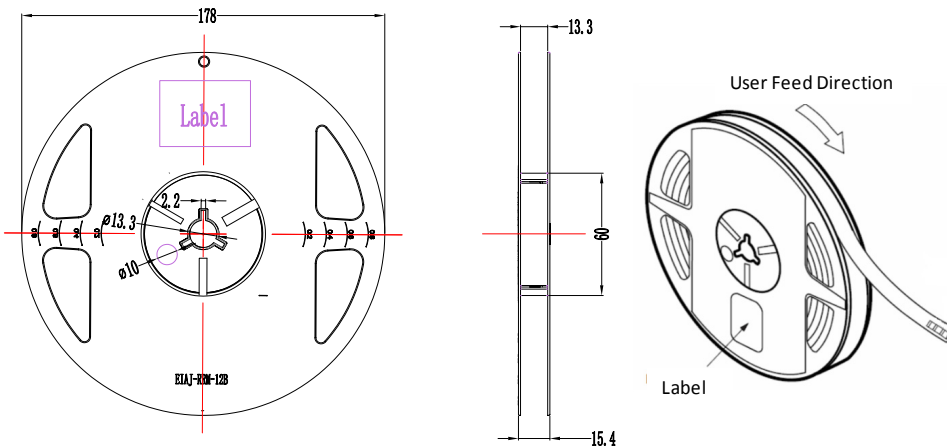
RECOMMENDED Stencil Pattern

Tape and Reel

All dimensions are in millimeter ± 0.13 mm



| Parameter | Dimension (mm) |
|-----------|------------------|
| A0 | 5.3 \pm 0.1 |
| B0 | 5.3 \pm 0.1 |
| D0 | 1.5 \pm 0.1 |
| D1 | 1.5 \pm 0.25 |
| E | 1.75 \pm 0.1 |
| F | 5.5 \pm 0.1 |
| K0 | 1.7 \pm 0.1 |
| P0 | 4.0 \pm 0.1 |
| P1 | 8.0 \pm 0.1 |
| P2 | 2.0 \pm 0.1 |
| T | 0.25 \pm 0.02 |
| W | 12+0.3 12-0.1 |



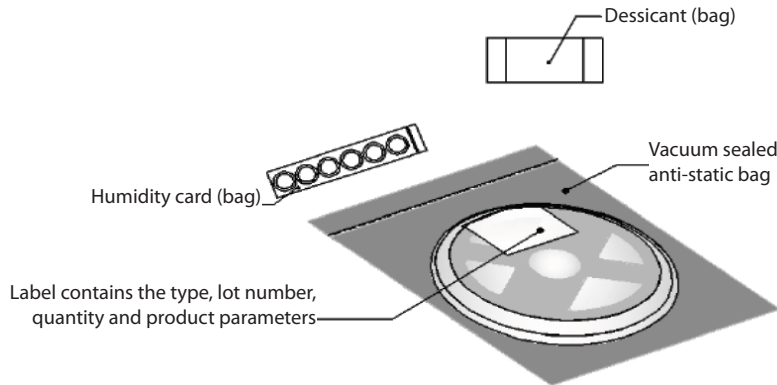
Notes:

1. Each Reel contains 500 units of LEDs.
2. Black anti-static tape material (Denka ECM3/ECAP3)
3. The accumulated tolerance for ten chain holes should be no more than 0.2 mm.
4. The tortuosity of 250 mm tape should be no more than 1 mm.
5. Leave 800 mm of type empty for lead in (100 empty pockets)
6. Leave 1200 mm of type empty for trailer (150 empty pockets)
7. All dimensions must comply to EIA-481-D
8. Final tape and reel packaging must meet the requirements of JEDEC-STD-033, LEVEL 2A.

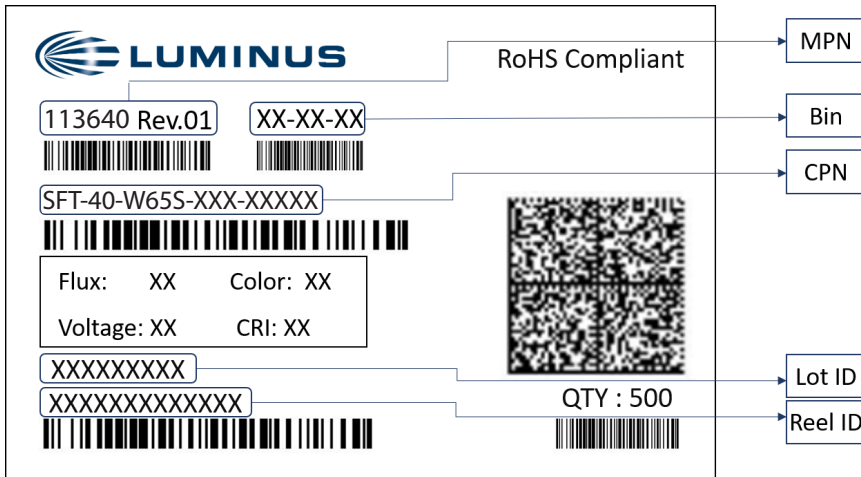
Packaging and Labeling

Packaged Reel

Each reel contains 500 units.



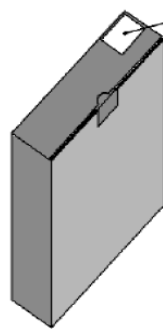
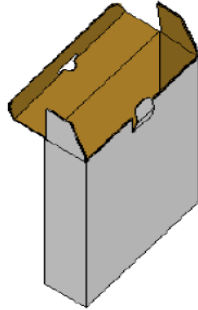
Label on Reel



| Label Information | |
|-------------------|--|
| CPN | Luminus ordering part number |
| MPN | For Luminus internal use |
| QTY | Quantity of parts per reel |
| Flux | Single flux bin code (see <i>Luminous Flux Binning</i> table on page 3) |
| Voltage | Single voltage bin code (see <i>Forward Voltage Binning</i> table on page 3) |
| Color | Single chromaticity bin code (see <i>Chromaticity Bin Coordinates</i> table on page 4) |
| CRI | N/A |
| Lot ID & Reel ID | For Luminus internal use |

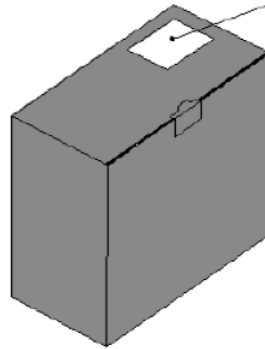
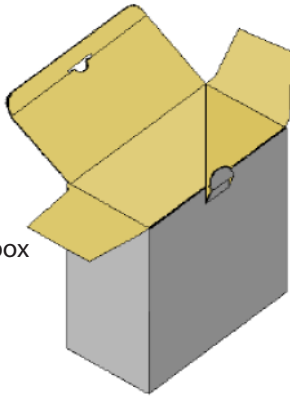
Packaging Boxes

Box Size 1 - 5 reels per box
 Size: 22.5 x 24.5 x 6.5 cm



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

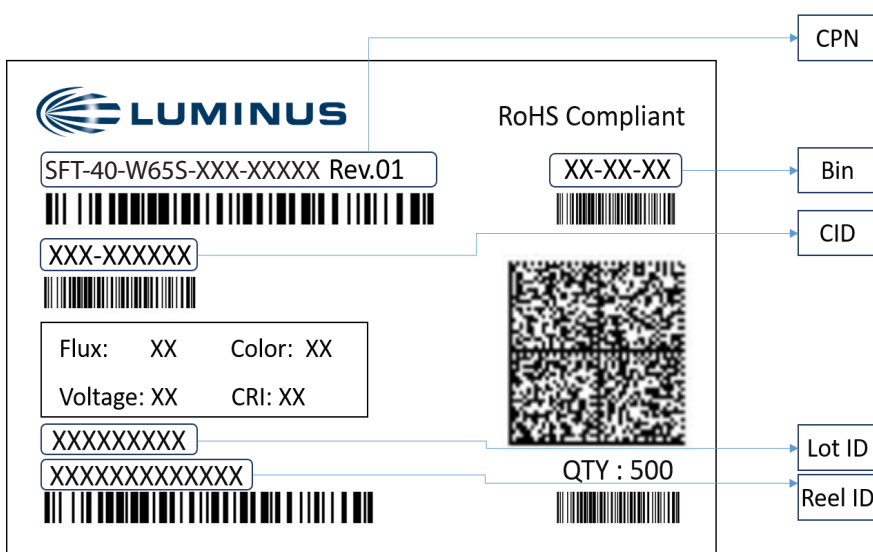
Box Size 2 - 10 reels per box
 Size: 22.5 x 24.5 x 13 cm



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

Shipping Label on Packaging Box

Multiple labels are attached to the box (one label per reel inside the box)



| Label Information | |
|-----------------------------|--|
| CPN | Luminus ordering part number |
| CID | Customer ID |
| QTY | Quantity of parts per reel |
| Flux | Single flux bin code (see <i>Luminous Flux Binning</i> table on page 3) |
| Voltage | Single voltage bin code (see <i>Forward Voltage Binning</i> table on page 3) |
| Color | Single chromaticity bin code (see <i>Chromaticity Bin Coordinates</i> table on page 4) |
| CRI | N/A |
| Lot ID & Reel ID | For Luminus internal use |