

SST-20-DR Gen 3

Deep Red LED

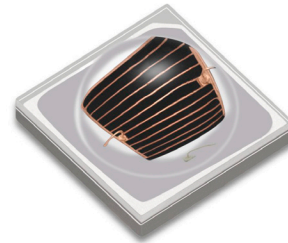


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Features:

- High Power Deep Red LED with Typical Peak Wavelength at 660nm
- High Photosynthetic Photon Efficacy (PPE): typ. 4.33 $\mu\text{mol}/\text{J}$ @ 350mA and 3.92 $\mu\text{mol}/\text{J}$ @ 700mA
- Wall-Plug Efficiency: typ. 79% @ 350mA
- 120° viewing angle at 50% Iv
- Low Thermal Resistance
- Built-in ESD Protection
- Corrosion Resistant
- RoHS and REACH compliant

Applications

- Horticulture / Growlights
- Life Sciences
- Medical

Ordering Information

The following table describes the bin kit ordering codes available for the SST-20 Deep Red LEDs. Each bin kit specifies a minimum flux as well as specific chromaticity bins allowed. Please note that within each kit a maximum flux is not specified and as a result Luminus may ship any part meeting or exceeding the minimum flux specification. Shipments will always meet the listed chromaticity bins. For information on ordering bin kits not listed below, please contact Luminus.

Ordering Part Numbers

| Color | Luminous Flux | | Wavelength Bins | Ordering Part Numbers |
|----------|-------------------|-----------|-----------------|-----------------------|
| | Bin Kit Flux Code | Min. Flux | | |
| Deep Red | AA | 990 | D4,D5,D6 | SST-20-DR-B120H-AA660 |
| | AB | 1030 | D4,D5,D6 | SST-20-DR-B120H-AB660 |

Part Number Nomenclature

SST — 20 — DR — <B###> — <FFWW>

| Product Family | LED Emission Area | Color | Package Configuration | Bin kit |
|----------------------------|-------------------------|---------------|---|---|
| SST: Surface Mount Package | 20: 2.0 mm ² | DR = Deep Red | B120H: 120-degree lens and improved performance substrate | Flux and Chromaticity bin kit code - See available ordering codes |

Binning Structure

Flux Bins

| Flux Bin (FF) | Minimum Flux (mW) | Maximum Flux (mW) |
|---------------|-------------------|-------------------|
| AA | 990 | 1030 |
| AB | 1030 | 1070 |
| AC | 1070 | 1110 |

Dominant Wavelength Bins

| Dominant Wavelength Bin (WWW) | Minimum Wavelength (nm) | Maximum Wavelength (nm) |
|-------------------------------|-------------------------|-------------------------|
| D4 | 655 | 660 |
| D5 | 660 | 665 |
| D6 | 665 | 670 |

Note 1: Test condition at drive current 700mA, 20ms single pulse at 25°C.

Note 2: Luminus maintains a +/- 6% tolerance on flux measurements.

Typical Device Performance

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|--------------------------------|---------|---------|---------|----------------------|
| Forward Current ² | I_f | 0.20 | 700 | 2,000 | mA |
| Output Power at 350mA | Φ_r | | 525 | | mW |
| Forward Voltage at 350mA | V_f | 1.70 | 1.90 | 2.10 | V |
| Photosynthetic Photon Flux (PPF) at 350mA | $PPF_{400-700nm}$ | | 2.87 | | $\mu\text{mol/s}$ |
| PPF Efficiency (PPE) at 350mA | $PPE_{400-700nm}$ | | 4.32 | | $\mu\text{mol/J}$ |
| Wall-Plug Efficiency at 350mA | WPE | | 79 | | % |
| Output Power at 700mA | Φ_r | | 1050 | | mW |
| Forward Voltage at 700mA | V_f | 1.80 | 2.10 | 2.30 | V |
| Photosynthetic Photon Flux (PPF) at 700mA | $PPF_{400-700nm}$ | | 5.74 | | $\mu\text{mol/s}$ |
| PPF Efficiency (PPE) at 700mA | $PPE_{400-700nm}$ | | 3.90 | | $\mu\text{mol/J}$ |
| Wall-Plug Efficiency at 700mA | WPE | | 71 | | % |
| Viewing Angle | $2 \text{ } \varnothing_{1/2}$ | | 120 | | degrees |
| Peak Wavelength | λ_p | 655 | 660 | 670 | nm |
| FWHM | $\Delta\lambda_{1/2}$ | 18 | 21 | 24 | nm |
| Thermal Resistance (Electrical) | R_{TH} | | 1.3 | | $^{\circ}\text{C/W}$ |

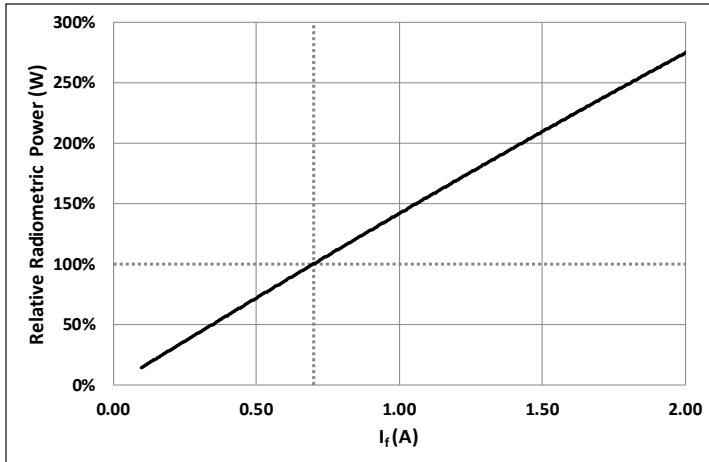
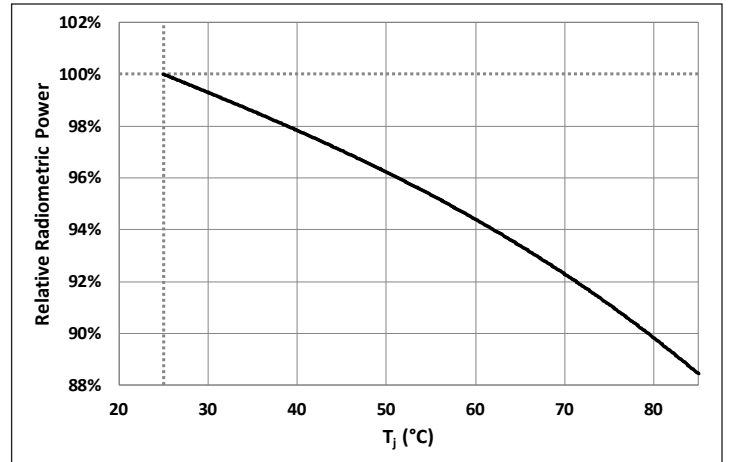
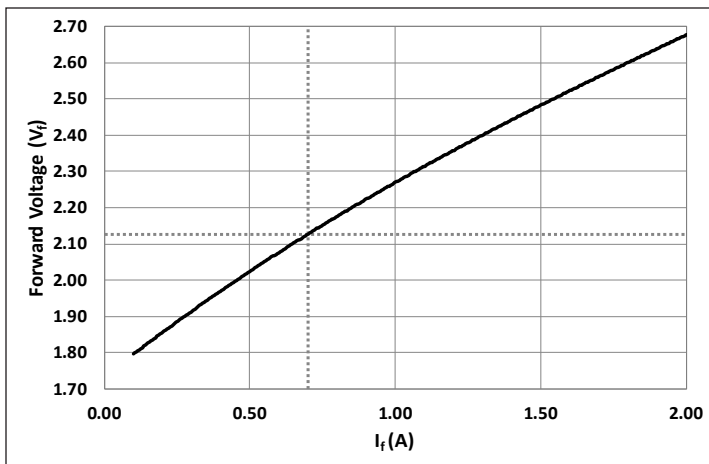
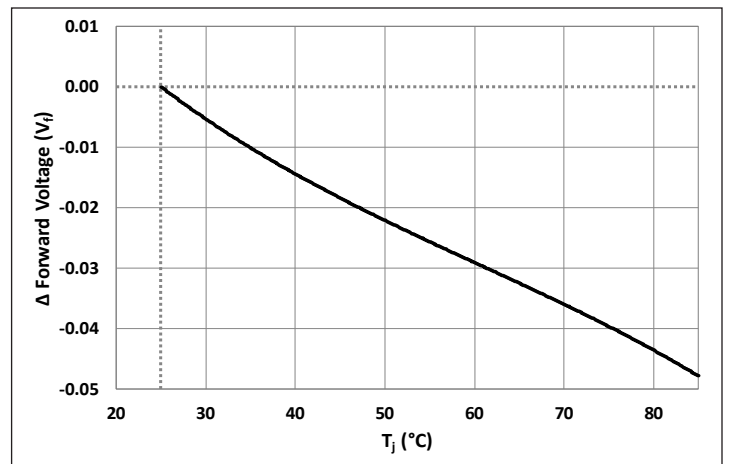
- Note 1: Ratings are based on operation at a constant junction temperature of $T_j = 25^{\circ}\text{C}$. All ratings are at 700mA unless specified otherwise.
- Note 2: To prevent damage, please refer to operating conditions and derating curves for appropriate maximum operating conditions
- Note 3: Maximum operating case temperature combined with maximum drive current defines the total maximum operating condition for the device. To prevent damage, please follow derating curves for all operating conditions.
- Note 4: Luminus SST-20-DR LEDs are designed for operation up to an absolute maximum forward drive current as specified above. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to typical forward drive currents. Actual device lifetimes will also depend on junction temperature. Refer to the current vs. junction temperature derating curves for further information. In pulsed operation, rise time from 10-90% of forward current should be larger than 0.5 microseconds.

Absolute Maximum Ratings

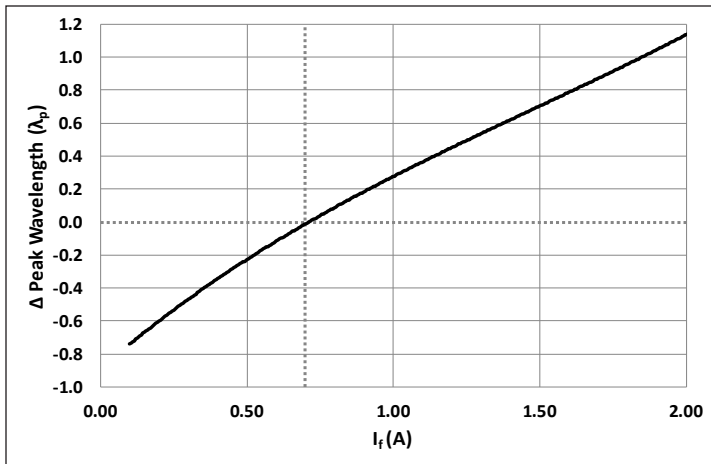
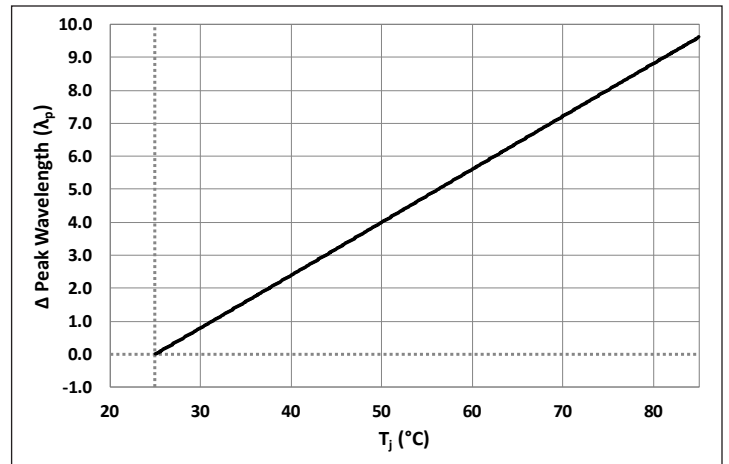
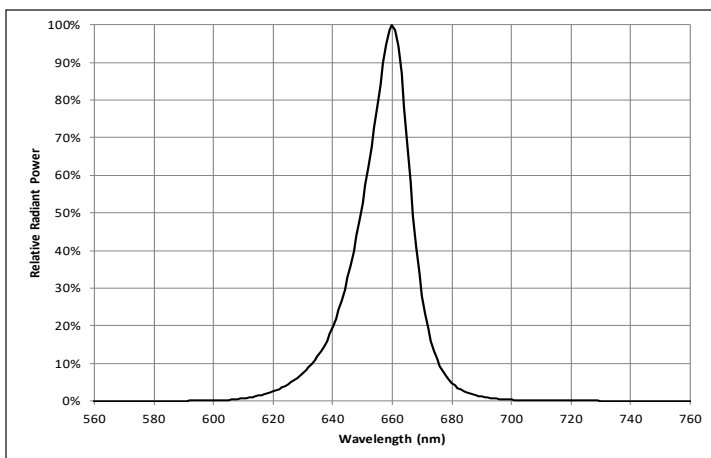
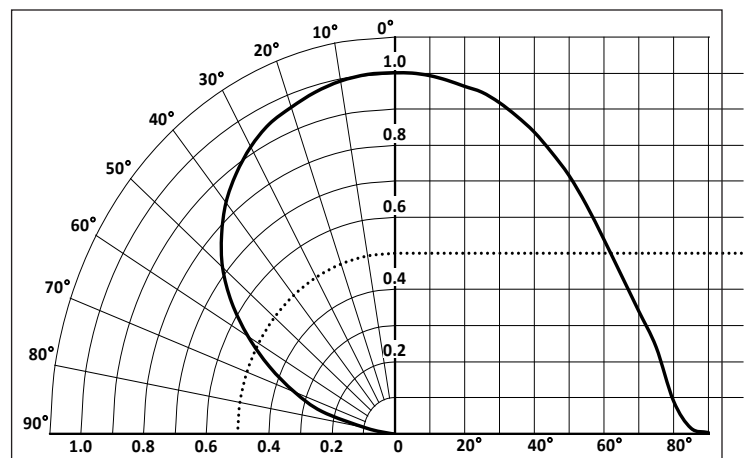
| Parameter | Symbol | Rating | Unit |
|--------------------------------|------------------|-------------------|------|
| Forward Current ^{3,4} | I | 2.0 | A |
| Power Dissipation | P _D | 6 | W |
| Reverse Voltage | V _R | 5 | V |
| Storage Temperature | T _{STG} | -40~100 | °C |
| Junction Temperature | T _J | 115 °C | °C |
| Soldering Temperature | T _{SLD} | JEDEC 020, 245 °C | |
| ESD Sensitivity (HBM) | V _B | 6000 | V |

- Note 1: Ratings are based on operation at a constant junction temperature of $T_j = 25^{\circ}\text{C}$. All ratings are at 700mA unless specified otherwise.
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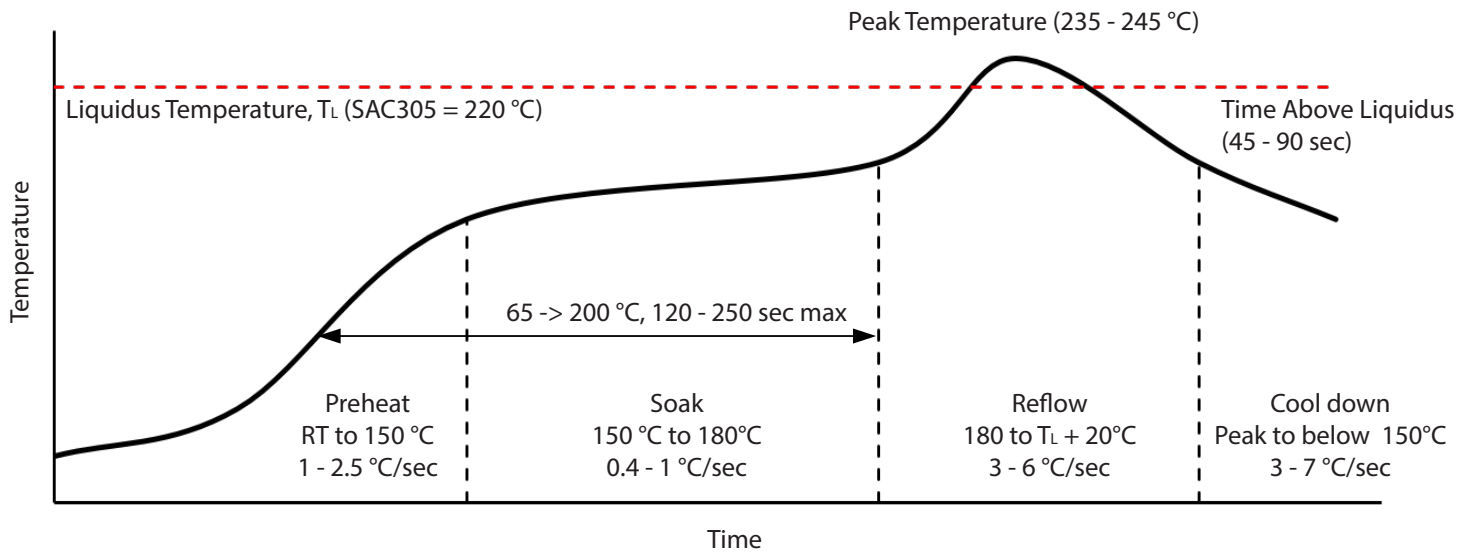
Optical and Electrical Characteristics

Relative Radiometric Power vs. Forward Current

Relative Radiometric Power vs. Junction Temperature

Forward Voltage vs. Forward Current

Relative Forward Voltage vs. Junction Temperature


Optical and Electrical Characteristics

Relative Peak Wavelength vs. Forward Current

Relative Peak Wavelength vs. Junction Temperature

Typical Spectrum

Typical Polar Radiation Plot - B120H


Solder Profile



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

Note 1: Product complies to Moisture Sensitivity Level 1 (MSL 1).

Note 2: 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.

Note 3: During the pick and place process, axial forces on the dome (or window) should not exceed 0.5 Newtons (N).

Note 4: Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.

Note 5: 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.

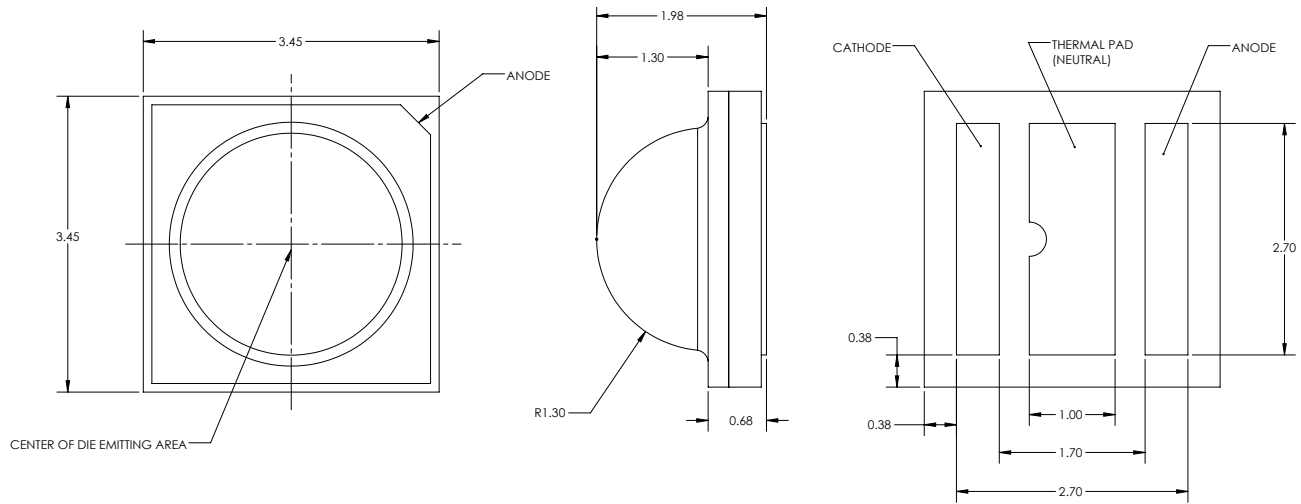
Note 6: Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.

Note 7: 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:

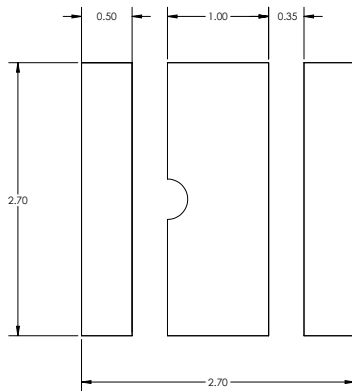
<https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components->

Note 8: For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

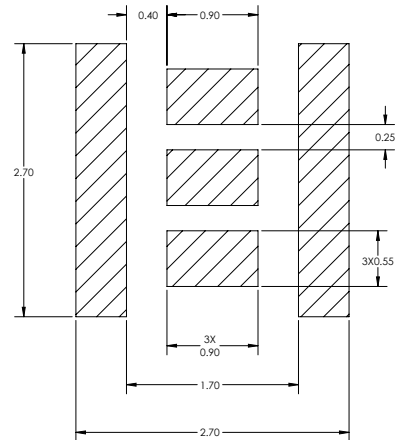
Mechanical Dimensions



Recommended PCB Solder Pad

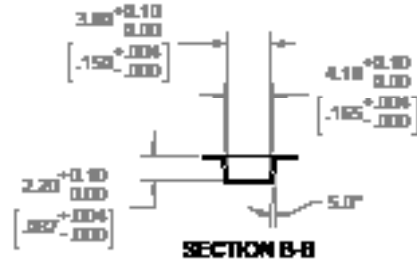
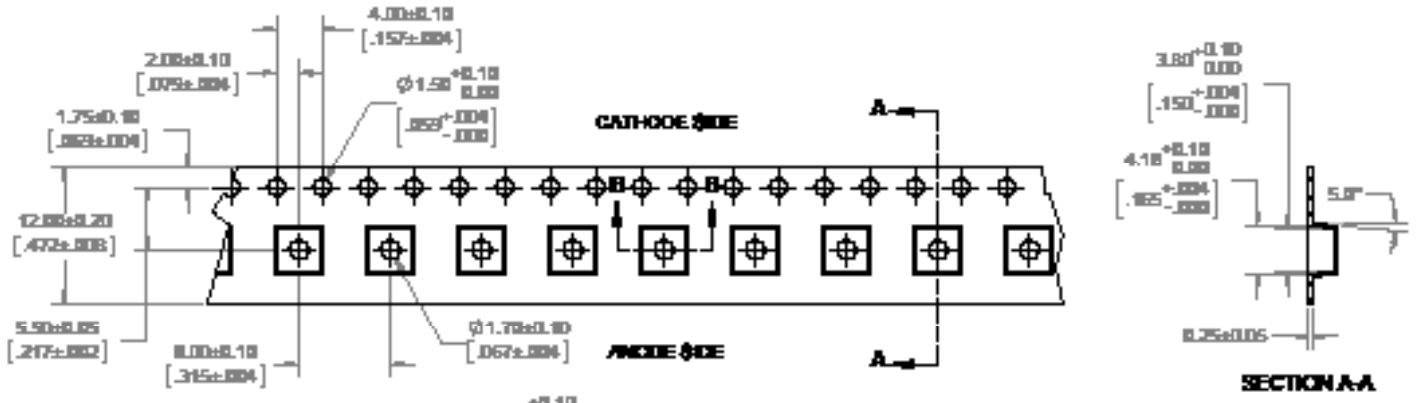


Recommended PCB Solder Pad

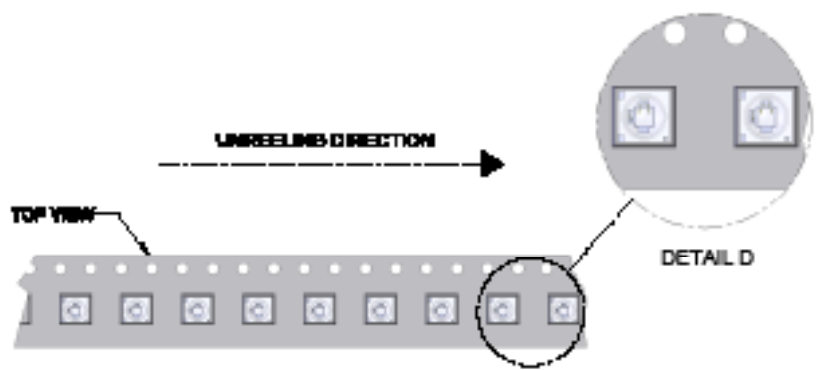
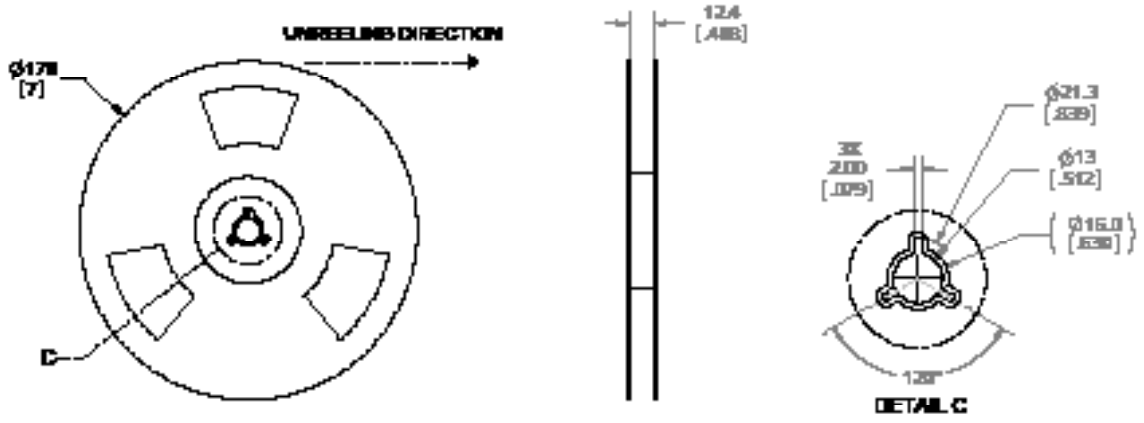


Recommended Stencil Pattern

Tape and Reel - B120H Package

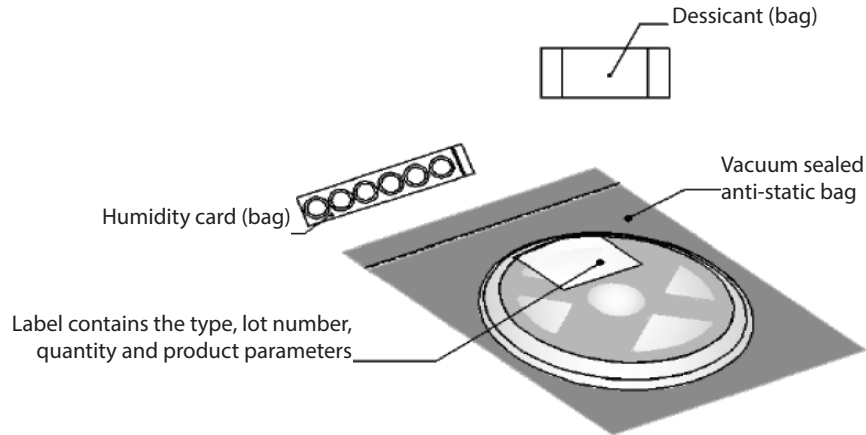


- NOTES:**
1. FINAL TAPE AND REEL PACKAGING MUST MEET THE REQUIREMENT OF JEDEC-STD-033, LEVEL 2A.
 2. LEAVE 304.8mm [12.00 IN] OF TAPE EMPTY FOR LEAD IN (38 EMPTY POCKET).
 3. LEAVE 457.2mm [18.00 IN] OF TAPE EMPTY FOR TRAILER (57 EMPTY POCKET).
 4. MUST COMPLY TO EM-481-C-0003

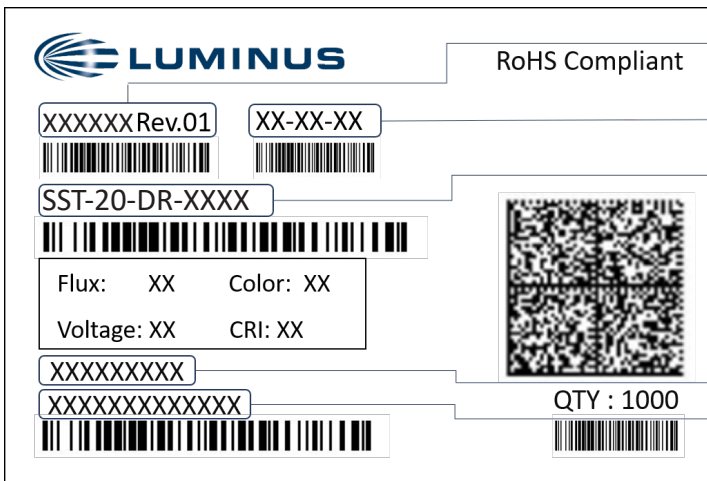


Packaging Information

Packaged Reel



Label on Reel

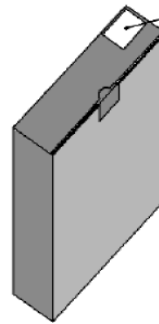
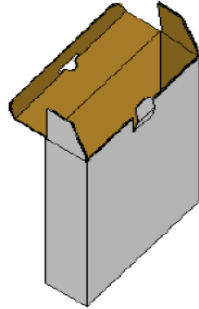


| Label Information | |
|-------------------|---|
| CPN | Luminus ordering part number |
| MPN | For Luminus internal use |
| QTY | Quantity of parts per reel |
| Flux | Single flux bin code (see <i>Flux Bins</i> table on page 3) |
| Color | Single Dominant Wavelength bin code (see <i>Dominant Wavelength Bins</i> table on page 3) |
| Voltage | N/A |
| CRI | N/A |
| Lot ID & Reel ID | For Luminus internal use |

Packaging Information

Packaging Boxes

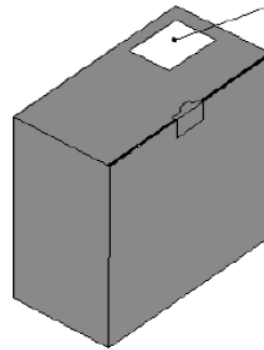
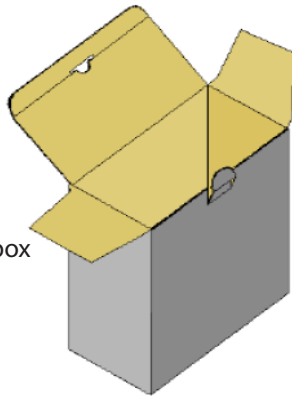
Box Size 1 - 5 reels per box
Size: 22.5 x 24.5 x 6.5 cm



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

*Capacity 5 reels per box

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

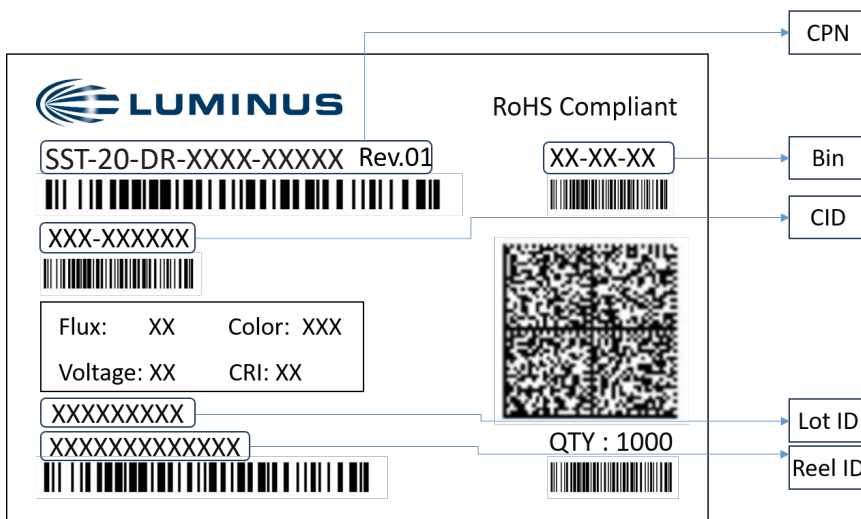


Label contains the type, lot number, quantity and product parameters

*Capacity 10 reels per box

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>Flux Bins</i> table on page 3) |
| Voltage | N/A |
| Color | Single Dominant Wavelength bin code (see <i>Dominant Wavelength Bins</i> table on page 3) |
| CRI | N/A |
| Lot ID & Reel ID | For Luminus internal use |

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

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

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

The LEDs electrode and leadframe 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.

Revision History

| Rev | Date | Description of Change |
|-----|------------|-----------------------|
| A | 02/13/2022 | Initial Release |
| 01 | 05/21/2022 | Production Release |