

SST-20-DR Gen 3

Deep Red LED

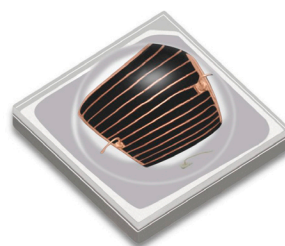


Table of Contents

Ordering Information	2
Binning Structure	3
Typical Device Performance . . .	4
Absolute Maximum Ratings . . .	5
Optical and Electrical Characteristics	6
Angular Distribution and Spectrum	7
Solder Profile	8
Mechanical Dimensions	9
Packaging Information	11
Precautions for Use	13
Revision History	14

Features:

- High Power Deep Red LED with Typical Peak Wavelength at 660 nm
- High Photosynthetic Photon Efficacy (PPE): typ. 4.33 $\mu\text{mol/J}$ @ 350 mA and 3.92 $\mu\text{mol/J}$ @ 700 mA
- Wall-Plug Efficiency: typ. 79% @ 350 mA
- 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 350 mA	Φ_r		525		mW
Forward Voltage at 350 mA	V_f	1.70	1.90	2.10	V
Photosynthetic Photon Flux (PPF) at 350 mA	$PPF_{400-700nm}$		2.87		$\mu\text{mol/s}$
PPF Efficiency (PPE) at 350 mA	$PPE_{400-700nm}$		4.32		$\mu\text{mol/J}$
Wall-Plug Efficiency at 350 mA	WPE		79		%
Output Power at 700 mA	Φ_r		1050		mW
Forward Voltage at 700 mA	V_f	1.80	2.10	2.30	V
Photosynthetic Photon Flux (PPF) at 700 mA	$PPF_{400-700nm}$		5.74		$\mu\text{mol/s}$
PPF Efficiency (PPE) at 700 mA	$PPE_{400-700nm}$		3.90		$\mu\text{mol/J}$
Wall-Plug Efficiency at 700 mA	WPE		71		%
Viewing Angle	$2\ \varnothing_{1/2}$		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 700 mA 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
Soldering Temperature	T _{sld}	JEDEC 020, 245°C	
ESD Sensitivity (HBM)	V _b	6000	V

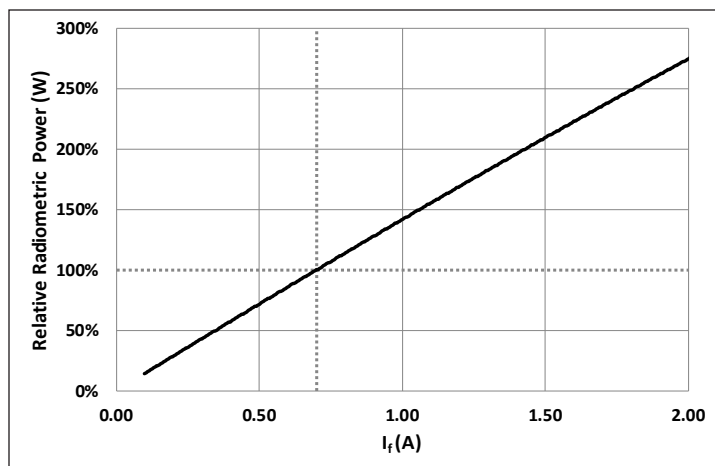
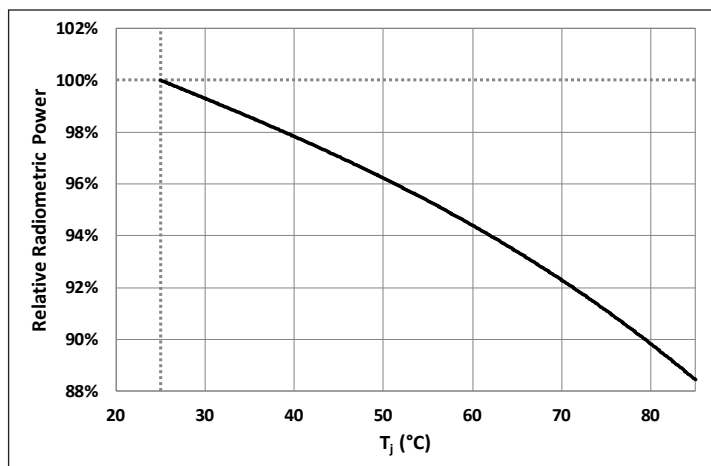
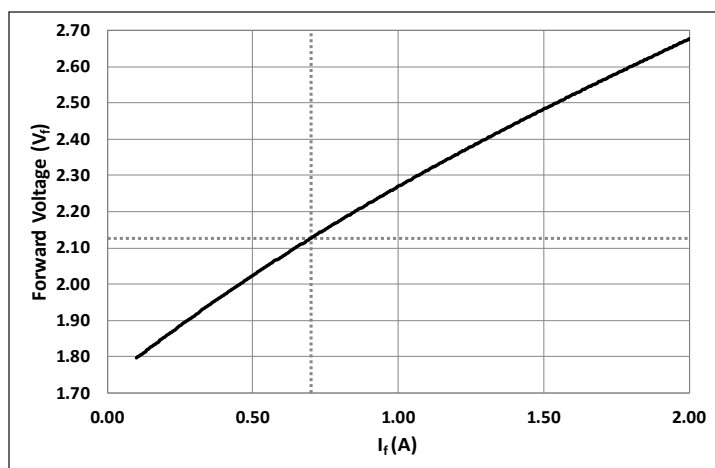
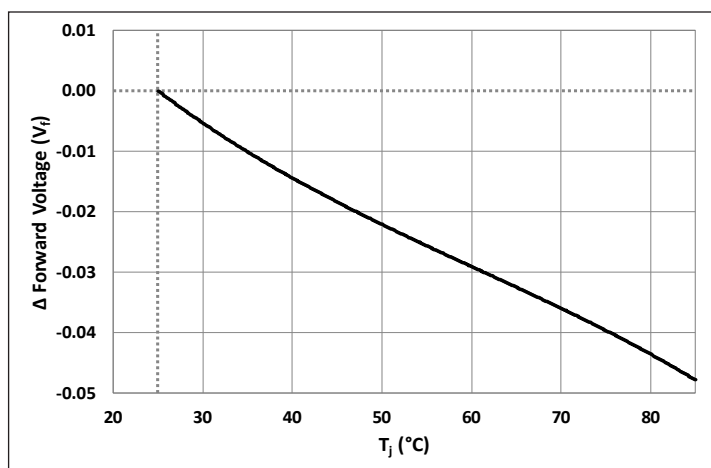
Note 1: Ratings are based on operation at a constant junction temperature of $T_j = 25^{\circ}\text{C}$. All ratings are at 700 mA unless specified otherwise.

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.

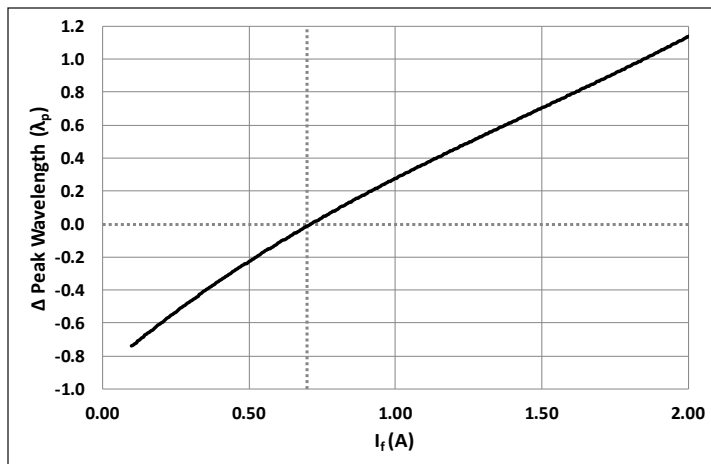
Note 4: Luminus SST-20-DR LEDs are designed for operation up to an absolute maximum forward drive current as specified above. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to 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.

Optical and Electrical Characteristics

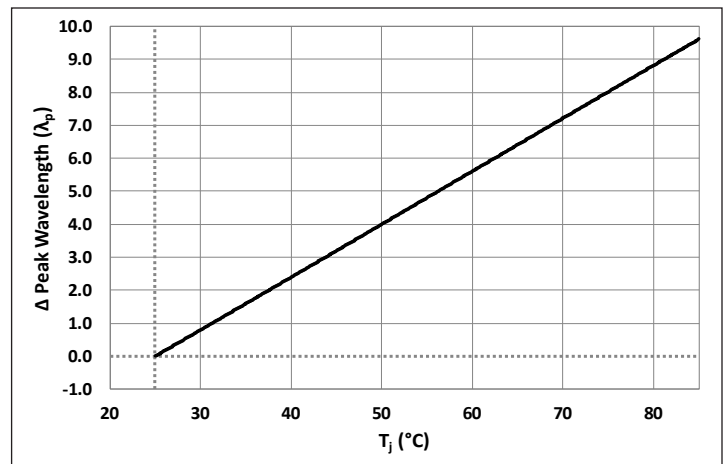
Relative Radiometric Power vs. Forward Current

Relative Radiometric Power vs. Junction Temperature

Forward Voltage vs. Forward Current

Relative Forward Voltage vs. Junction Temperature


Optical and Electrical Characteristics

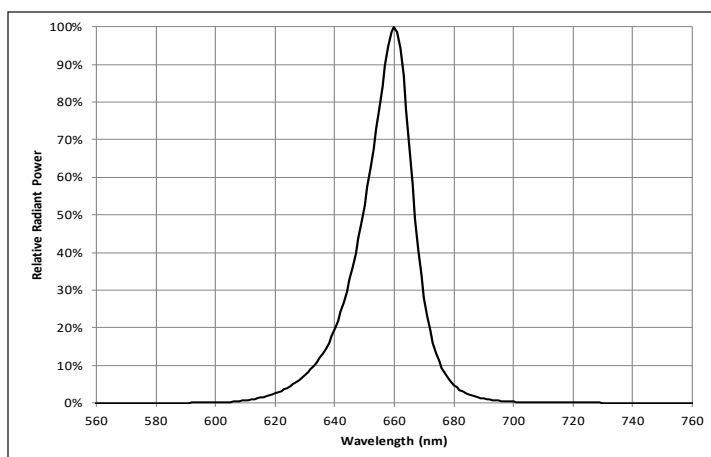
Relative Peak Wavelength vs. Forward Current



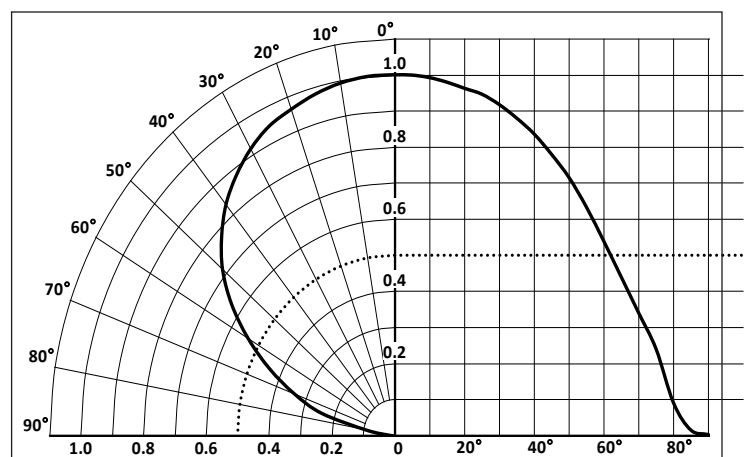
Relative Peak Wavelength vs. Junction Temperature



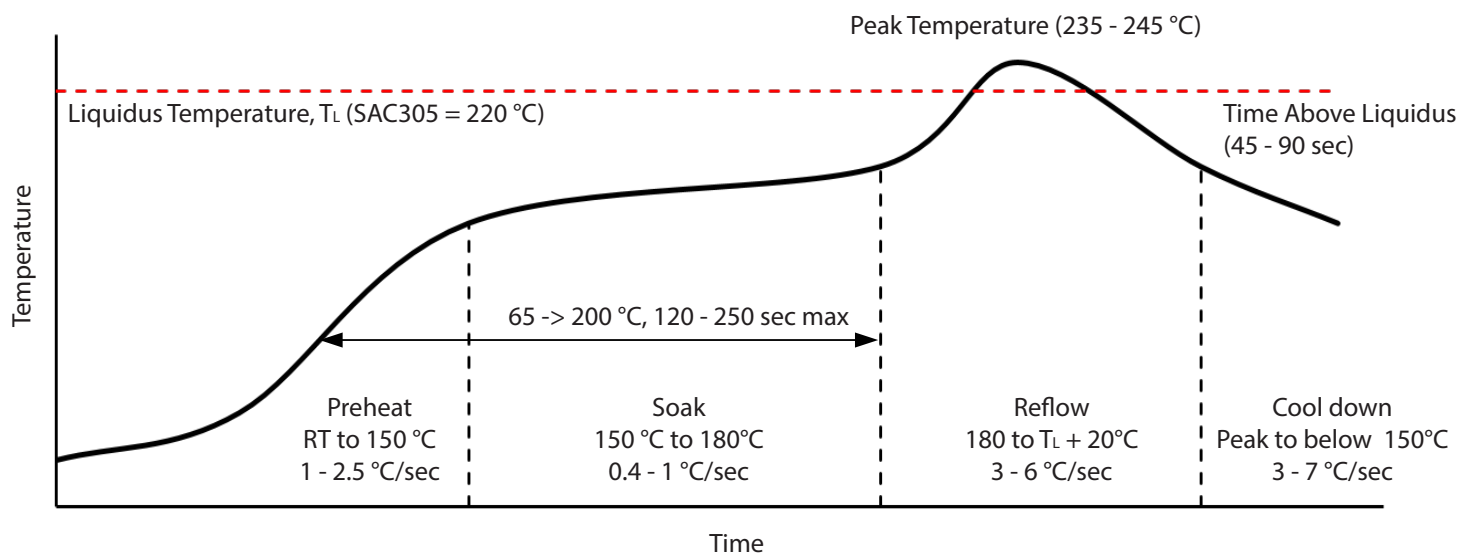
Typical Spectrum



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.

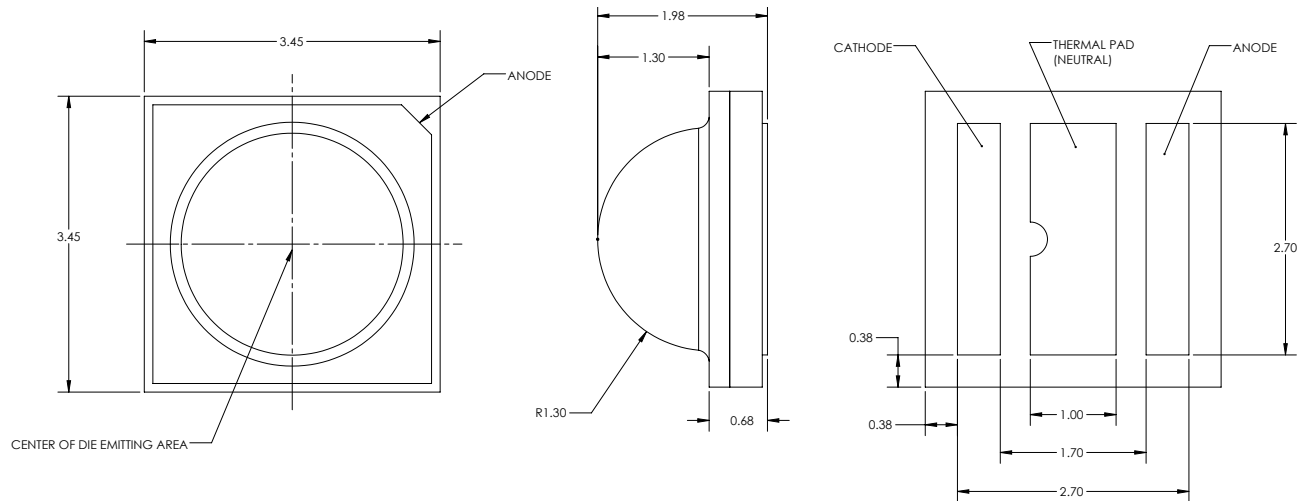
Note 6: Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.

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:

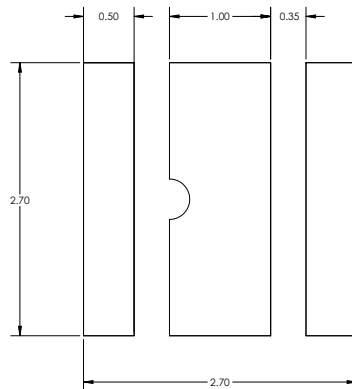
<https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components->

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

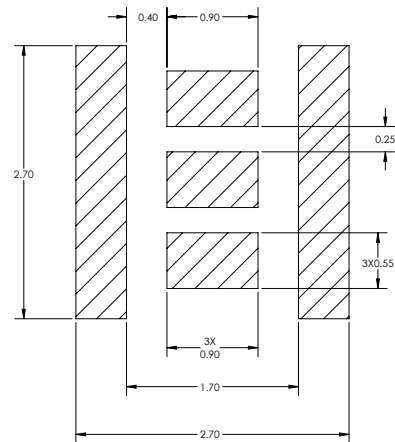
Mechanical Dimensions¹



Recommended PCB Solder Pad



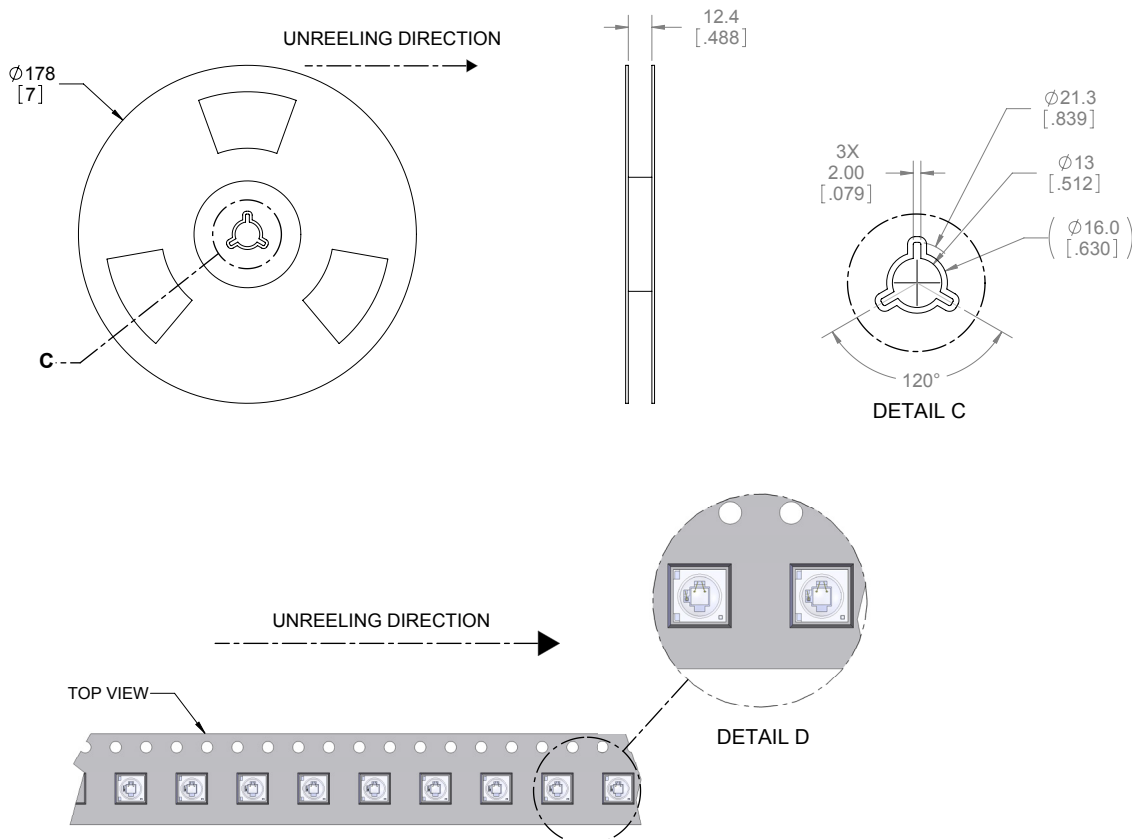
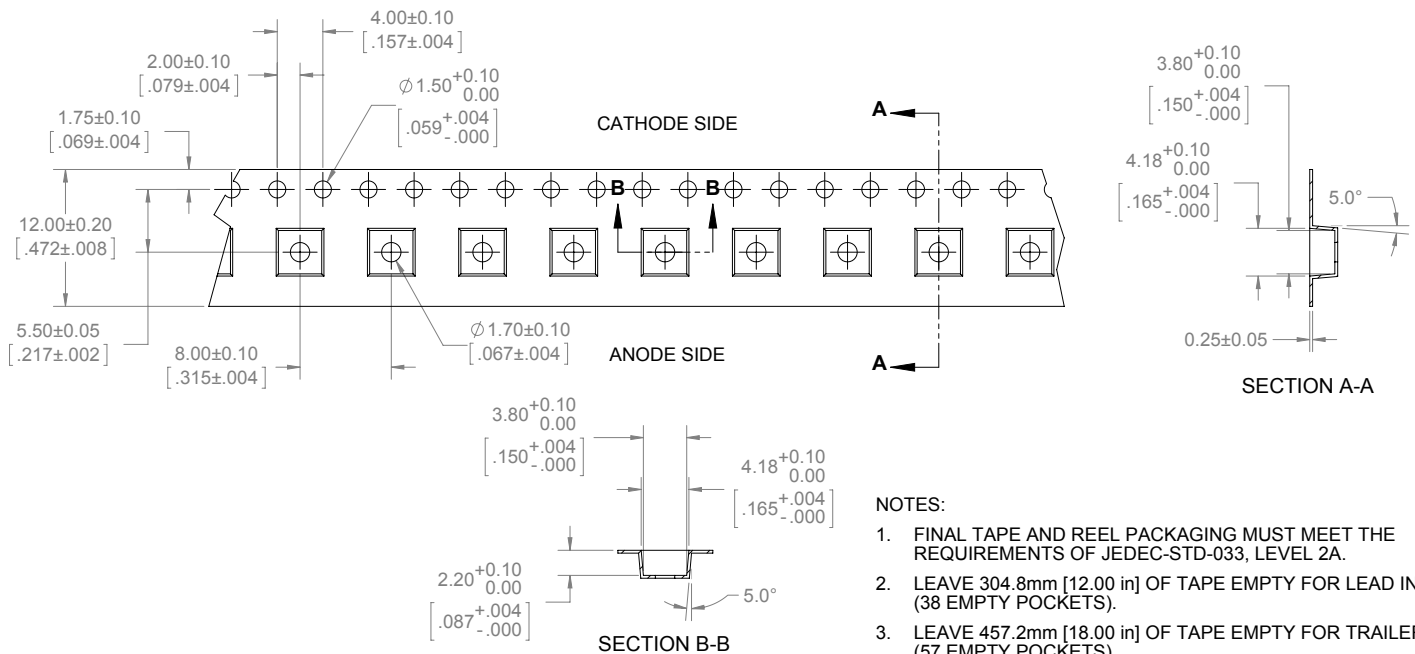
Recommended PCB Solder Pad



Recommended Stencil Pattern

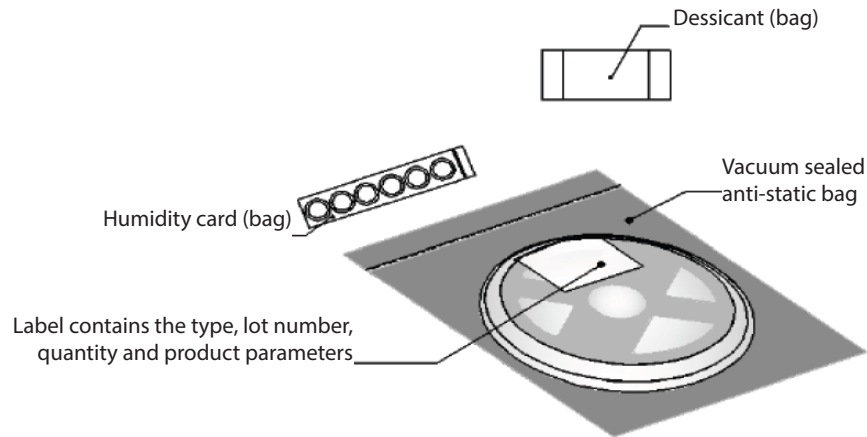
Note 1: All dimensions are in millimeter ± 0.13 mm

Tape and Reel - B120H Package

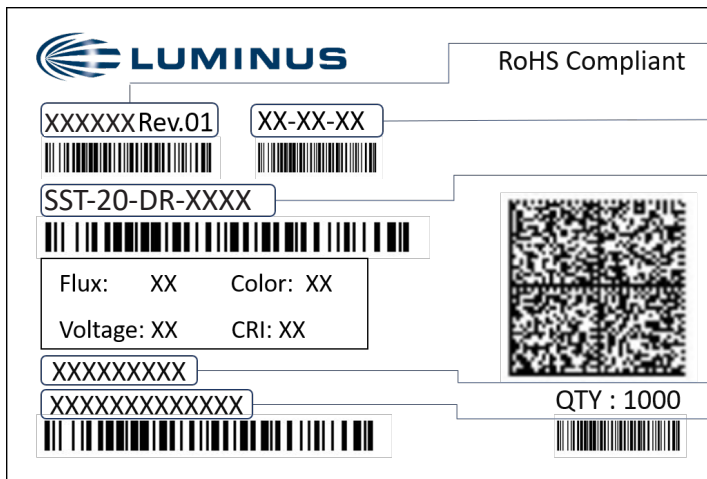


Packaging Information

Packaged Reel



Label on Reel

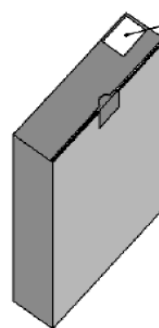
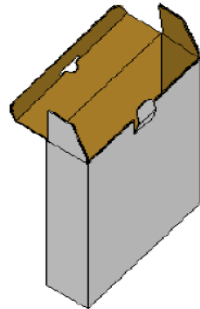


Label Information	
CPN	Luminus ordering part number
MPN	For Luminus internal use
QTY	Quantity of parts per reel
Flux	Single flux bin code (see <i>Flux Bins</i> table on page 3)
Color	Single Dominant Wavelength bin code (see <i>Dominant Wavelength Bins</i> table on page 3)
Voltage	N/A
CRI	N/A
Lot ID &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

Packaging Information

Packaging Boxes

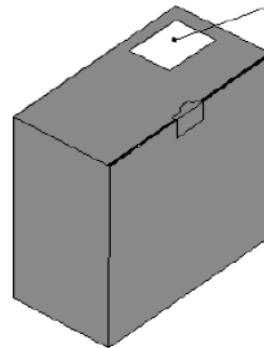
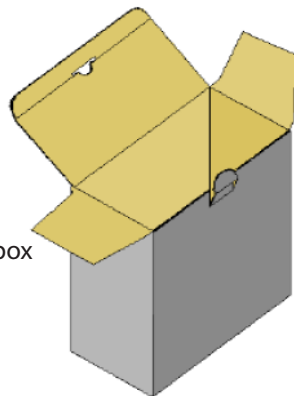
Box Size 1 - 5 reels per box
Size: 22.5 x 24.5 x 6.5 cm



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

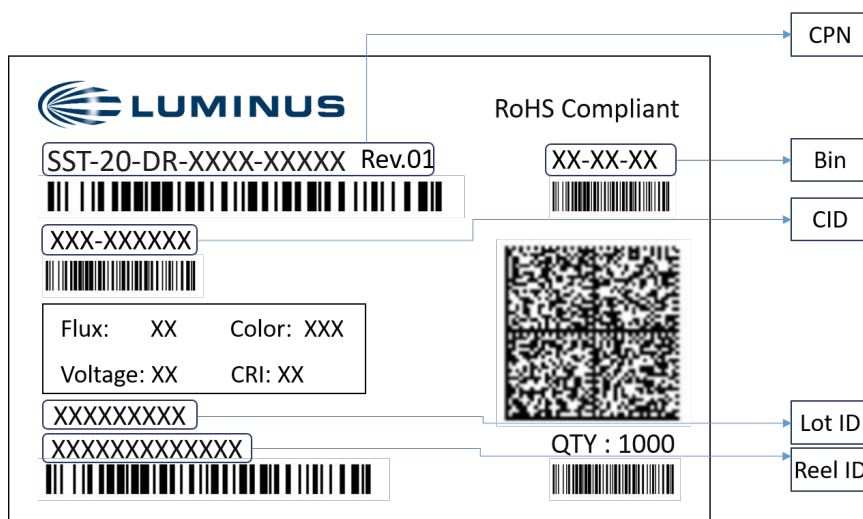


Label contains the type, lot number, quantity and product parameters

*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 (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 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 discolore. 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