SFT-14

Projection LED Chipset

Features

- Matched Red Amber, Converted Green, Blue and Blue bump Chipset with for 0.2" / 0.3" Pico projection applications
- Standard 3535 SMT package
- Low thermal resistance: Red-Amber 1.9°C/W, Converted Green, Blue and Blue bump 1.6°C/W
- Lambertian emitting profile
- Flat surface emission for high collection efficiency and low optical losses
- Wide color gamut with dominant wavelengths: Red-Amber 613 nm / Converted Green (filtered spectrum) 555 nm / Blue 459 nm at 0.98 A, 25°C

Applications

- Specifically engineered for stand alone, embedded, or battery-assisted projection display applications.
- Entertainment / Stage Lighting
- Medical / Life Sciences
- Industrial
- Transportation / Beacons
- High performance illumination

Table of Contents

Ordering Information

Ordering Part Numbers[1]

Color	Luminous Flux		Wavelength Bin	Bin Kit Ordering Code	Ordering Part Number
	Min. Flux Bin	Min. Flux			
Red Amber	1C	150	N/A	MPC	SFT-14-RA-F35-MPC
	1D	165	N/A	MPD	SFT-14-RA-F35-MPD
Converted Green	2G	455	N/A	MPG	SFT-14-CG-F35-MPG
	2H	490	N/A	MPH	SFT-14-CG-F35-MPH
	2J	530	N/A	MPJ	SFT-14-CG-F35-MPJ
Blue	4D	1.15	B2, B6, B7	EPD	SFT-14-B-F35-EPD
	4E	1.30	B2, B6, B7	EPE	SFT-14-B-F35-EPE
Blue Pump	4E	1.30	B0, B1	EPE	SFT-14-BP-F35-EPE
	4F	1.45	B0, B1	EPF	SFT-14-BP-F35-EPF

Part Number Nomenclature

SFT	14	<XX>	F35	<Bin kit>
Product Family	**Chip Area**	**Color**	**Package Configuration**	**Bin Kit**
SFT: Surface-Mount Flat-Top	14: 1.4 mm^2	RA: Red Amber CG: Converted Green B: Blue BP: Blue Pump	F35: 3535 EMC SMD See Mechanical Drawing section	Refer to ordering part numbers in this document

Note:

1. Flux Bin listed is minimum bin shipped, higher bins may be included at Luminus' discretion.

Binning Structure

All SFT-14 LEDs are tested for luminous flux/dominant wavelength and placed into one of the following flux/wavelength bins. The binning structure is universally applied across each monochromatic color of the SFT-14 product line.

Flux Bins[1,2]

Color	Luminous Flux Bin[3]	Binning @ 0.98 A, T_c= 25°C[4]	
		Minimum Flux (lm)	Maximum Flux (lm)
Red Amber	1A	125	140
	1B	140	150
	1C	150	165
	1D	165	180
	1E	180	200
	1F	200	220
Converted Green	2D	360	395
	2E	395	425
	2F	425	455
	2G	455	490
	2H	490	530
	2J	530	580
	2K	580	625
Blue / Blue Pump	4C	1.05	1.15
	4D	1.15	1.30
	4E	1.30	1.45
	4F	1.45	1.60
	4G	1.60	1.75
	4H	1.75	1.90

Note:

1. Luminus maintains a +/- 6% tolerance on flux measurements.

2. Products are production tested then sorted and packed by bin.

3. Individual bins are not orderable. Please refer to the Product Ordering information page for a list of orderable bin kits.

4. T_c= Case temperature.

Binning Structure

All SFT-14 LEDs are tested for luminous flux/dominant wavelength and placed into one of the following flux/wavelength bins. The binning structure is universally applied across each monochromatic color of the SFT-14 product line.

Dominant Wavelength Bins

Color	Dominant Wavelength Bin[3]	Binning @ 0.98 A, T_c= 25°C[4]	
		Minimum Wavelength (nm)	Maximum Wavelength (nm)
Blue Pump	B0	444	449
	B1	449	455
Blue	B2 (Under EOL)	455	465
	B6	454	462
	B7	462	465

Note:

1. Luminus maintains a +/- 6% tolerance on flux measurements.

2. Products are production tested then sorted and packed by bin.

3. Individual bins are not orderable. Please refer to the Product Ordering information page for a list of orderable bin kits.

4. T_c= Case temperature.

Absolute Maximum Ratings[1]

	Symbol	Red Amber	Converted Green	Blue & Blue Pump	Unit
Forward Current (Single pulse 20 ms or Pulsed)[2,3,4]	$I_{f\,min}$	0.2	0.2		A
	$I_{f\,max}$	4.2	5.6		
Forward Current Pulsed[2,3,4] Frequency >240Hz, Duty <70%	$I_{fp\,max}$	5.6	6.0		A
Forward Surge Current (Pulsed)[2,3,4] Frequency >240Hz, duty cycle <10% or t=1ms)	$I_{surge\,max}$	6.3	6.6		A
Storage Temperature	$T_{s\,min}$	-40	-40		°C
	$T_{s\,max}$	100	100		
Junction Temperature	$T_{j\,max}$	110	150		°C
ESD sensitivity ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}	2000	2000		V

Note:

1. All ratings are based on standard testing conditions at drive current 0.98 A, 20 ms single pulse at T_c = 25°C.
2. In pulsed operation, rise time from 10% to 90% of forward current should be larger than 0.5 microseconds.
3. Product performance and lifetime data is specified at recommended forward drive current. Sustained operation at or near absolute minimum current may result in a reduction of device performance and device lifetime compared to recommended forward drive current.
4. Sustained operation above maximum current is not recommended and will result in a reduction of device lifetime.

Device Characteristics[1]

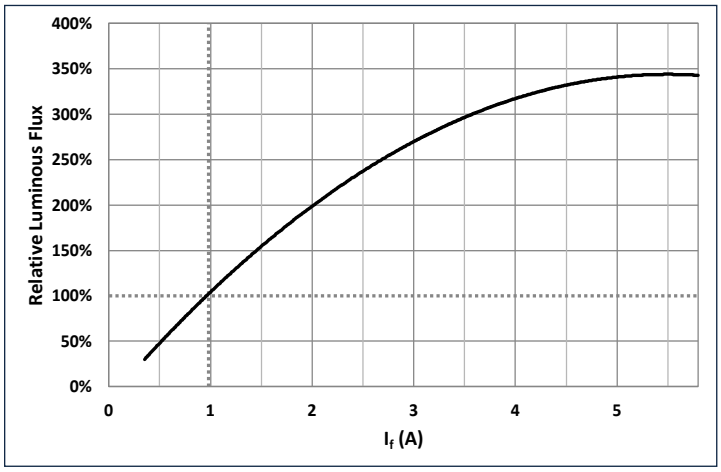
Optical and Electrical Characteristics	Symbol	Red Amber	Converted Green	Blue	Blue Pump	Unit
Emitting Area	A_E	1.40	1.40	1.40	1.40	mm^2
Peak Luminous Flux[2]	Φ_V	158	490	45	40	lm
Peak Radiometric Flux[2]	Φ_E	0.54	1.06	1.50	1.75	W
Forward Voltage	$V_{f\ min}$	2.0	2.5	2.5	2.5	V
	V_f	2.3	3.0	3.0	3.0	
	$V_{f\ max}$	3.0	3.6	3.6	3.6	
Dominant Wavelength	$\lambda_{d\ min}$	609	545	454	444	nm
	λ_d	613	555	459	448	
	$\lambda_{d\ max}$	621	565	465	455	
FWHM- Spectral bandwidth at 50% of Φ_V	$\Delta\lambda_{1/2}$	16	98	19	19	nm
Chromaticity Coordinates[3]	CIE x	0.66	0.33	0.15	0.15	
	CIE y	0.32	0.56	0.04	0.04	
Chromaticity Coordinates (filtered spectrum)[3,4]	CIE x	-	0.31	-	-	
	CIE y	-	0.63	-	-	
Thermal Characteristics						
Real thermal resistance (junction-case)	$R_{th\ real\ (j\text{-}c)}$	1.90	1.60	1.60	1.60	°C/W
Electrical thermal resistance[4,5] (junction-case)	$R_{th\ elec.(j\text{-}c)}$	1.36	0.92	0.72	0.72	°C/W

Note:

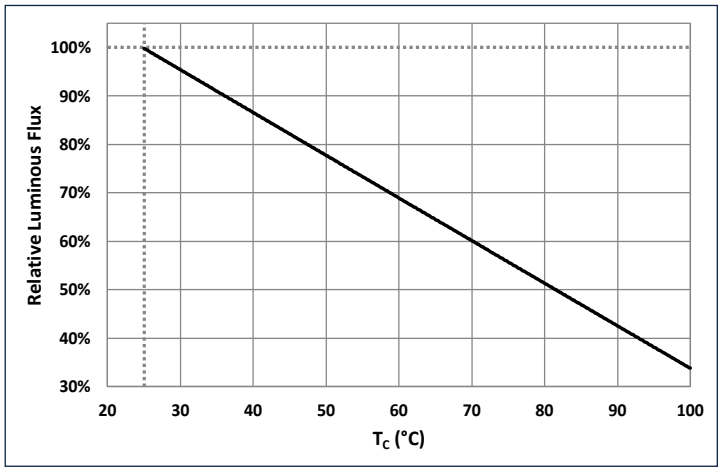
1. Product test condition: 0.98 A, 25°C case temperature.
2. Typical flux at typical dominant wavelength.
3. CIE 1931 chromaticity diagram coordinates, normalized to X+Y+Z=1.
4. Optical filter of 50% cut off range between 580 nm and 600 nm applied in typical projection display engine.
5. Thermal resistance values are based on modeled results correlated to measured $R_{th(j\text{-}c)}$ data using Forward Voltage sensitivity parametric method, compliant with JEDEC Standards JESD51-14.
6. For optimal results, Luminus recommends customer PCB Design per guidelines from Luminus application note, "Design Guidelines for SFT Chipset Assembly".

Relative Luminous Flux - Red Amber

Forward current: φ_v/φ_v(0.98 A) Single pulse 20 ms, T_c = 25°C

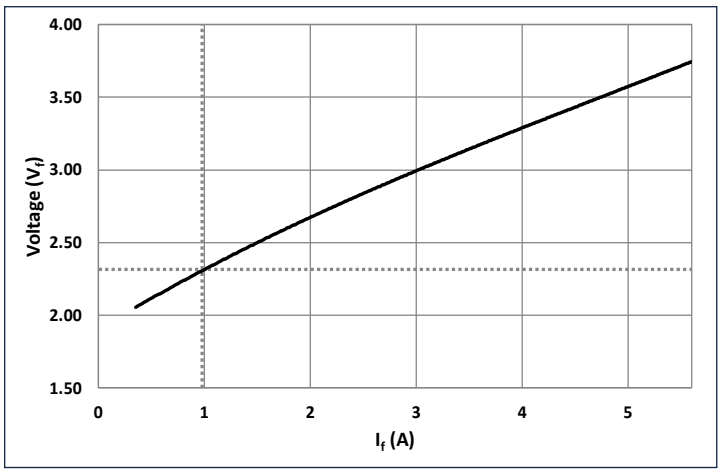


Temperature: φ_v/φ_v(25°C) Single pulse 20 ms, I_f = 0.98 A

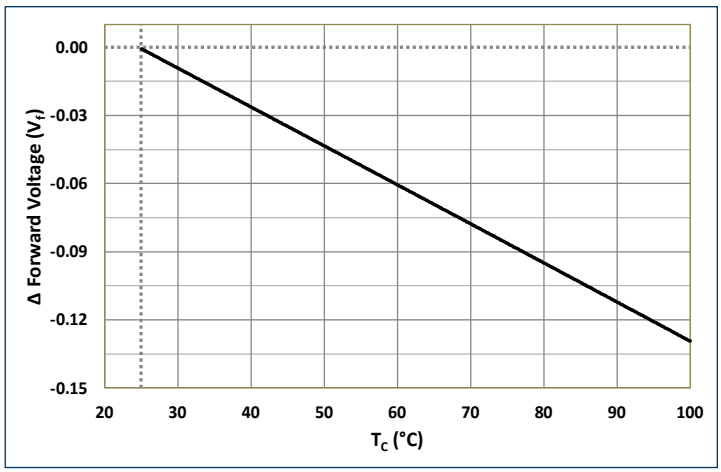


Forward Voltage - Red Amber

Forward current: $V_f = V(I_f)$ Single pulse 20 ms, T_c = 25°C

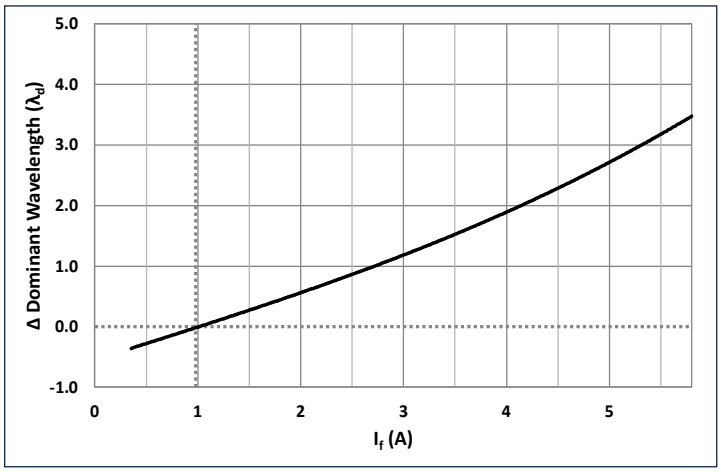


Temperature: $\Delta V_f = V(T_c) - V(25°C)$ Single pulse 20 ms, I_f = 0.98 A

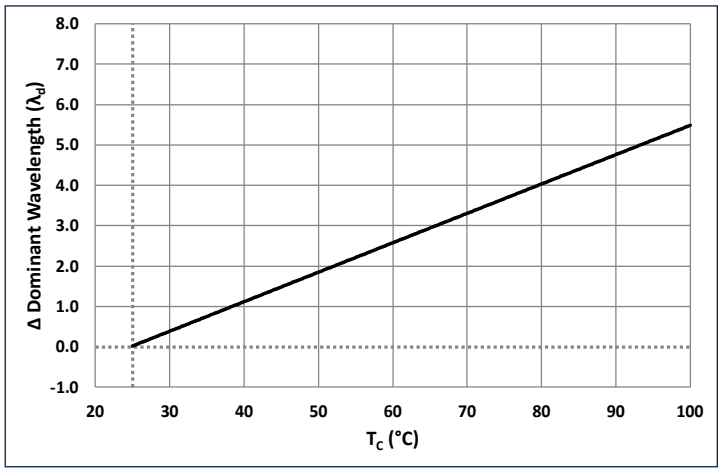


Dominant Wavelength Shift - Red Amber

Forward current: $\Delta\lambda_d = \lambda_d(I_f) - \lambda_d$(0.98 A) Single pulse 20 ms, T_c = 25°C

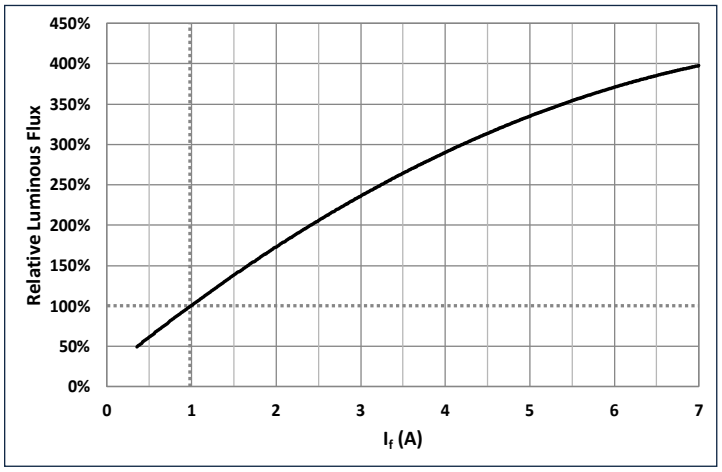


Temperature: $\Delta\lambda_d = \lambda_d(T_c) - \lambda_d$(25°C) Single pulse 20 ms, I_f = 0.98 A

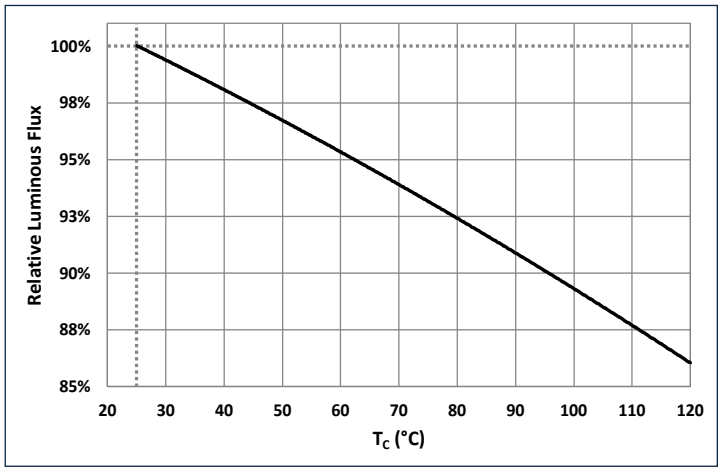


Relative Luminous Flux - Converted Green

Forward current: φ_v/φ_v(0.98 A) Single pulse 20 ms, T_c = 25°C

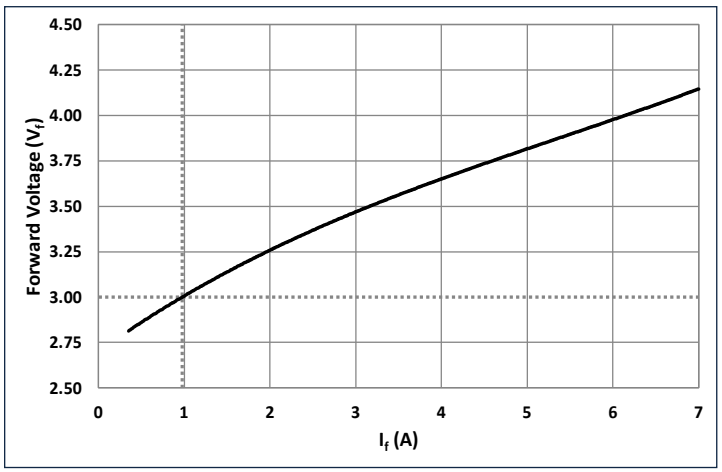


Temperature: φ_v/φ_v(25°C) Single pulse 20 ms, I_f = 0.98 A

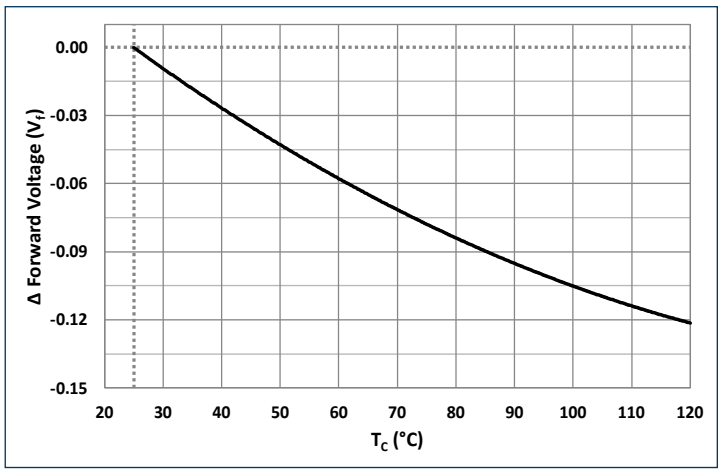


Forward Voltage - Converted Green

Forward current: $V_f = V(I_f)$ Single pulse 20 ms, T_c = 25°C

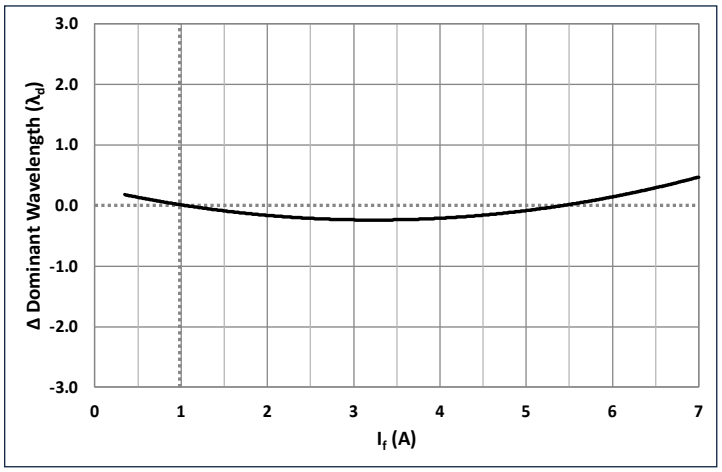


Temperature: $\Delta V_f = V(T_c)$ - V(25°C) Single pulse 20 ms, I_f = 0.98 A

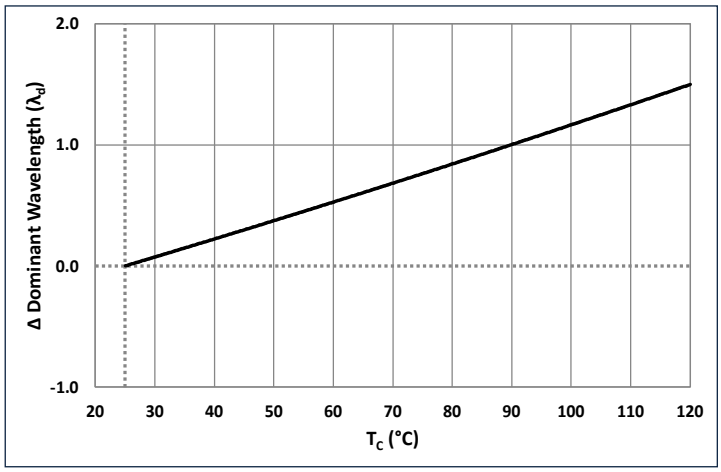


Dominant Wavelength Shift - Converted Green

Forward current: $\Delta\lambda_d = \lambda_d(I_f)$ - λ_d(0.98 A) Single pulse 20 ms, T_c = 25°C

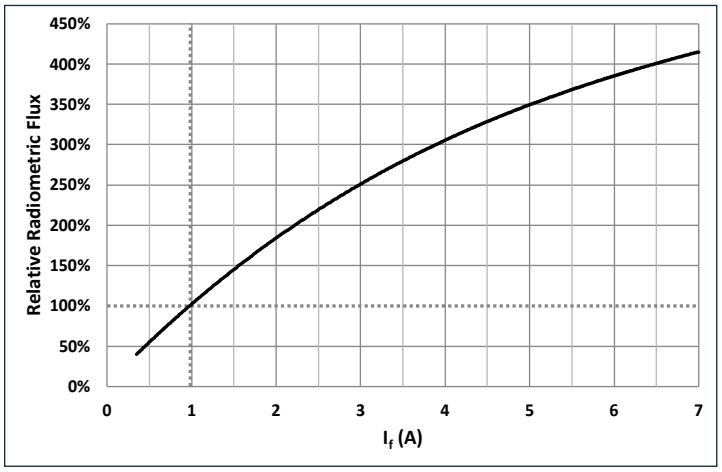


Temperature: $\Delta\lambda_d = \lambda_d(T_c)$ - λ_d(25°C) Single pulse 20 ms, I_f = 0.98 A

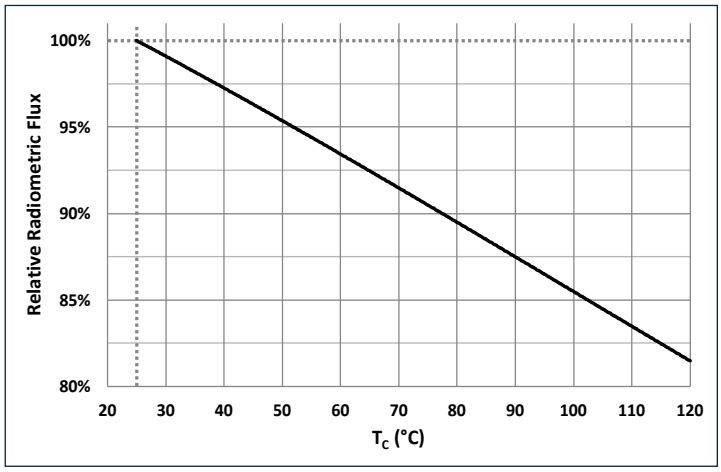


Relative Radiometric Flux - Blue / Blue Pump

Forward current: φ_v/φ_v(0.98 A) Single pulse 20 ms, T_c = 25°C

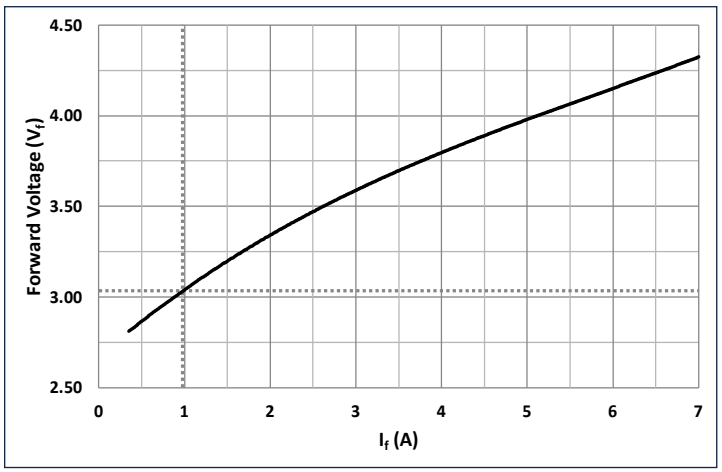


Temperature: φ_v/φ_v(25°C) Single pulse 20 ms, I_f = 0.98 A

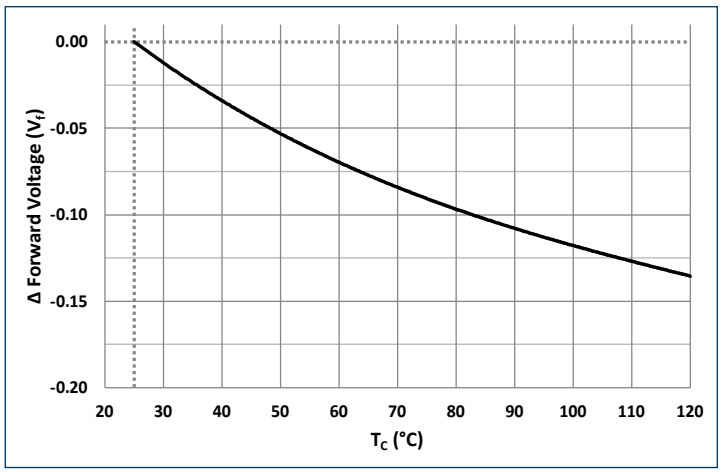


Forward Voltage - Blue / Blue Pump

Forward current: $V_f = V(I_f)$ Single pulse 20 ms, T_c = 25°C

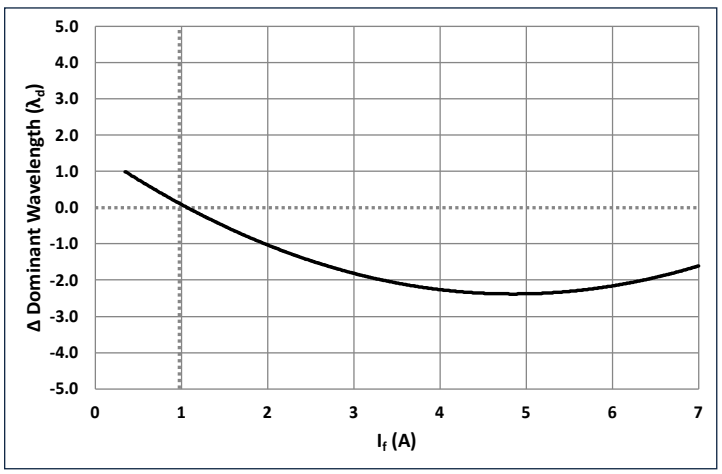


Temperature: $\Delta V_f = V(T_c) - V(25°C)$ Single pulse 20 ms, I_f = 0.98 A

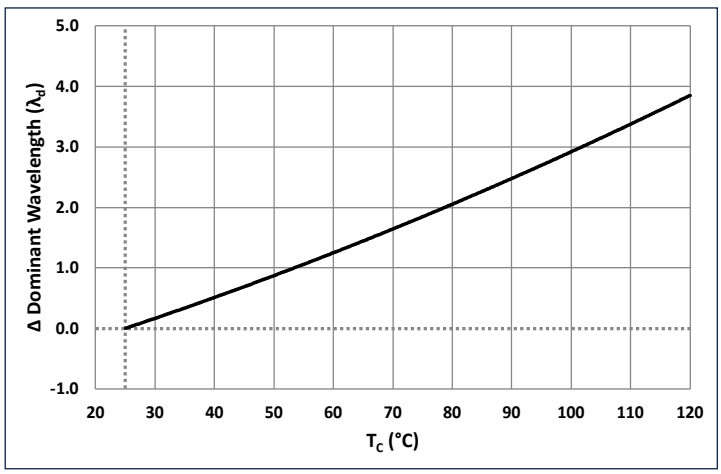


Dominant Wavelength Shift - Blue / Blue Pump

Forward current: $\Delta\lambda_d = \lambda_d(I_f) - \lambda_d$(0.98 A) Single pulse 20 ms, T_c = 25°C



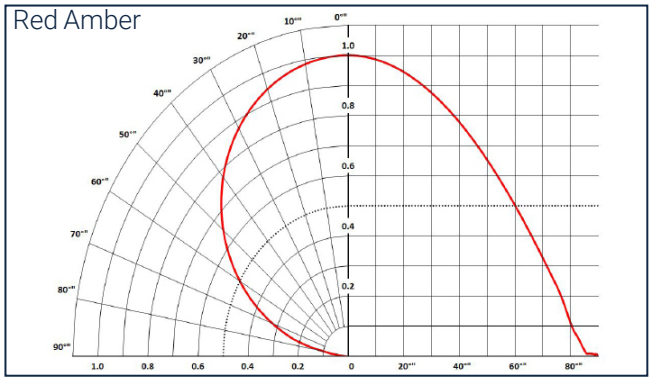
Temperature: $\Delta\lambda_d = \lambda_d(T_c) - \lambda_d$(25°C) Single pulse 20 ms, I_f = 0.98 A

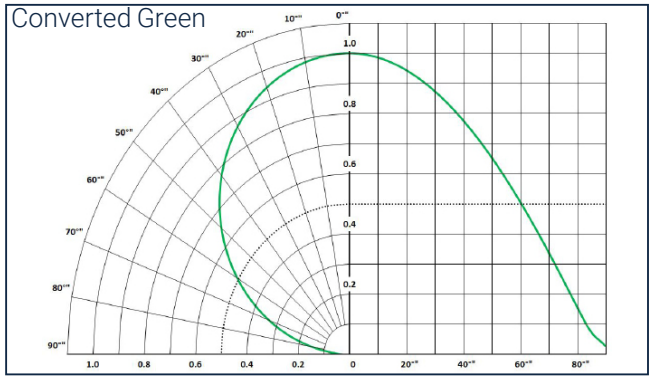


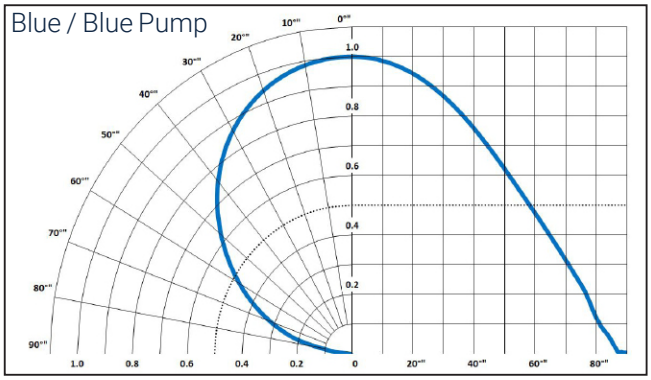
Angular Distribution and Typical Spectrum

Angular Intensity Distribution

$I_{ref} = f(\Phi)$; $T_c = 25°C$

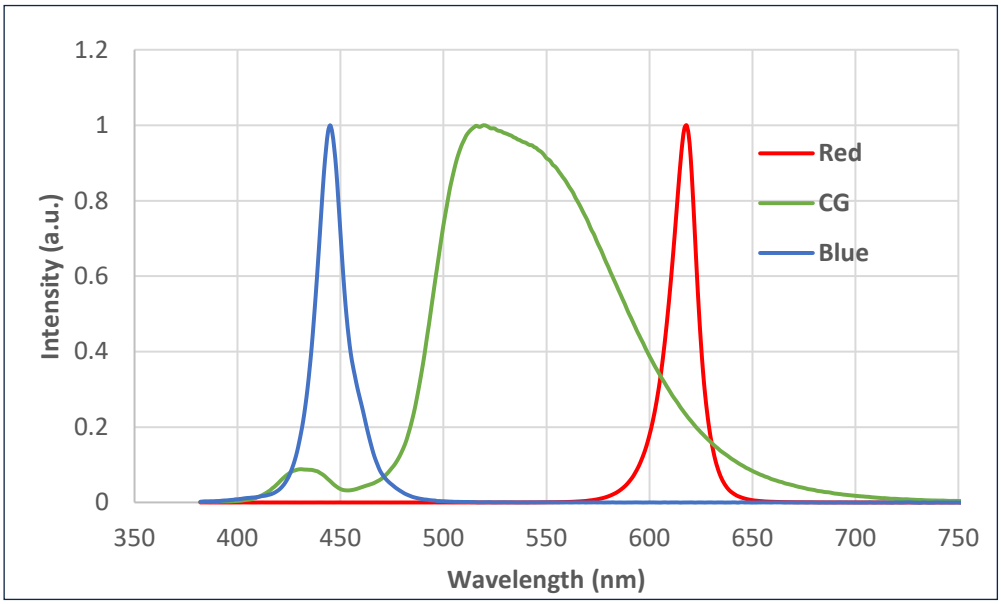




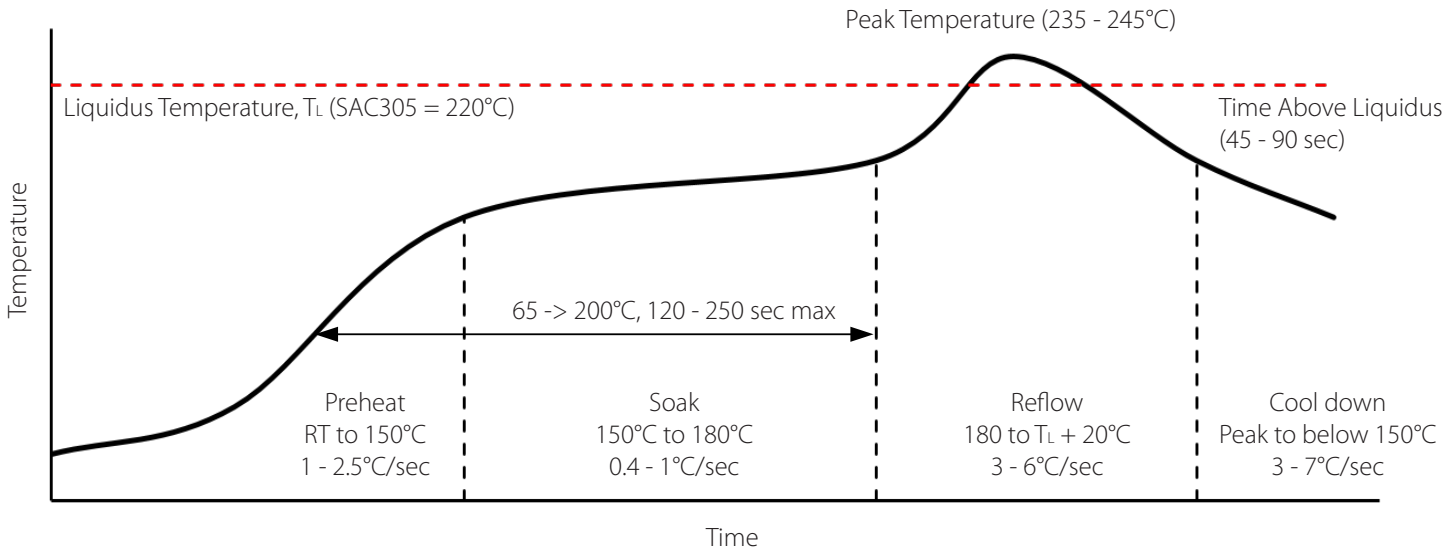


Typical Spectrum

$\Phi_{ref} = f(\lambda)$; $I_f = 0.98$ A; $T_c = 25°C$



Soldering Profile



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

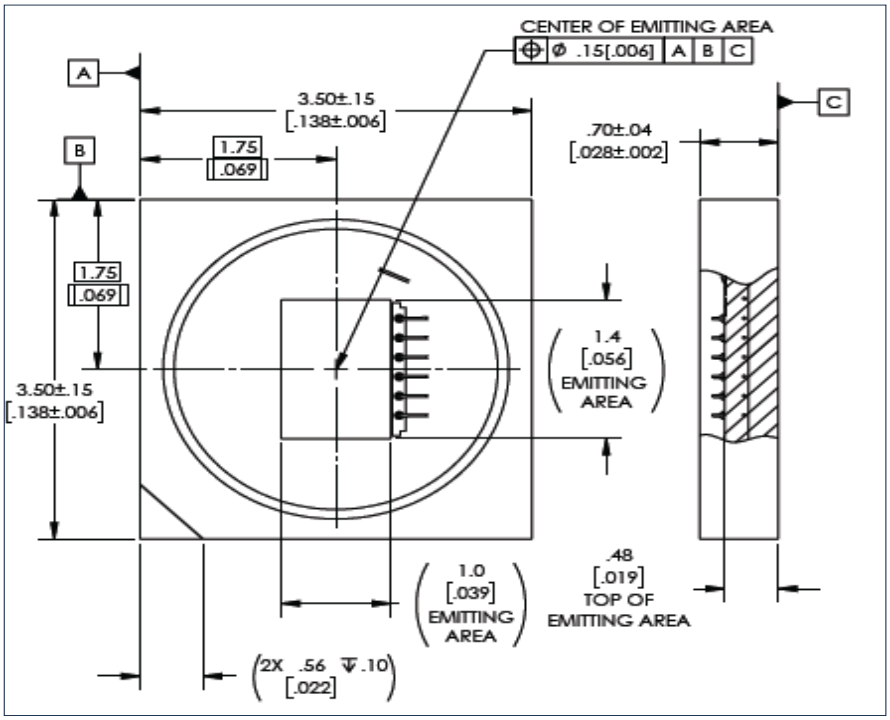
Note:

1. Product complies to Moisture Sensitivity Level 3 (MSL 3).
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.
3. During the pick and place process, ensure the pick-up tool does not touch any die components.
4. Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
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.
6. Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
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:

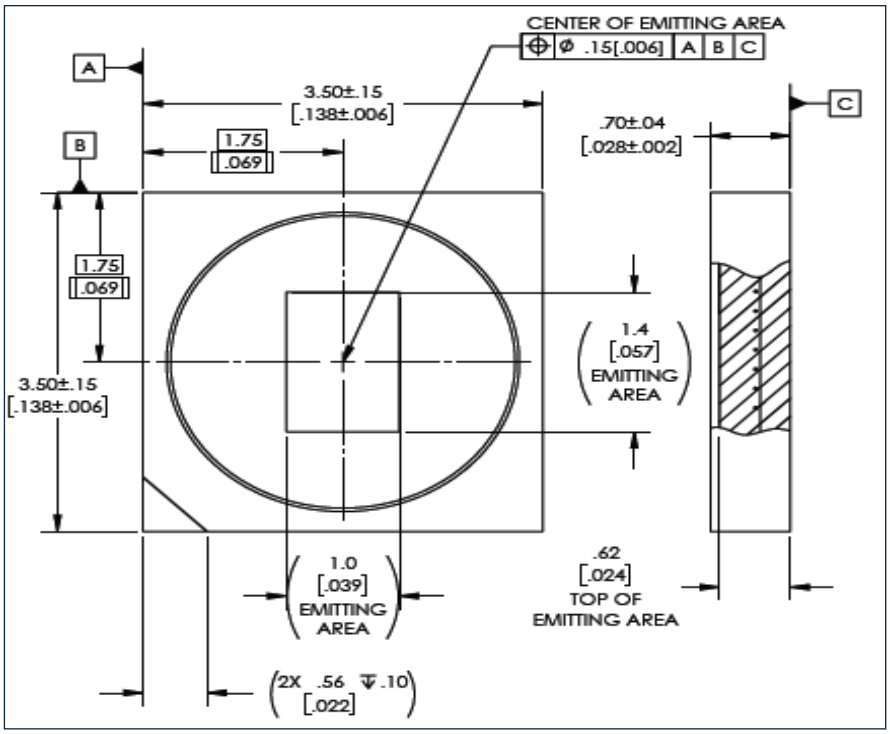
   https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

Mechanical Dimensions

SFT-14 [Red Amber / Blue] in "F35" Package Configuration



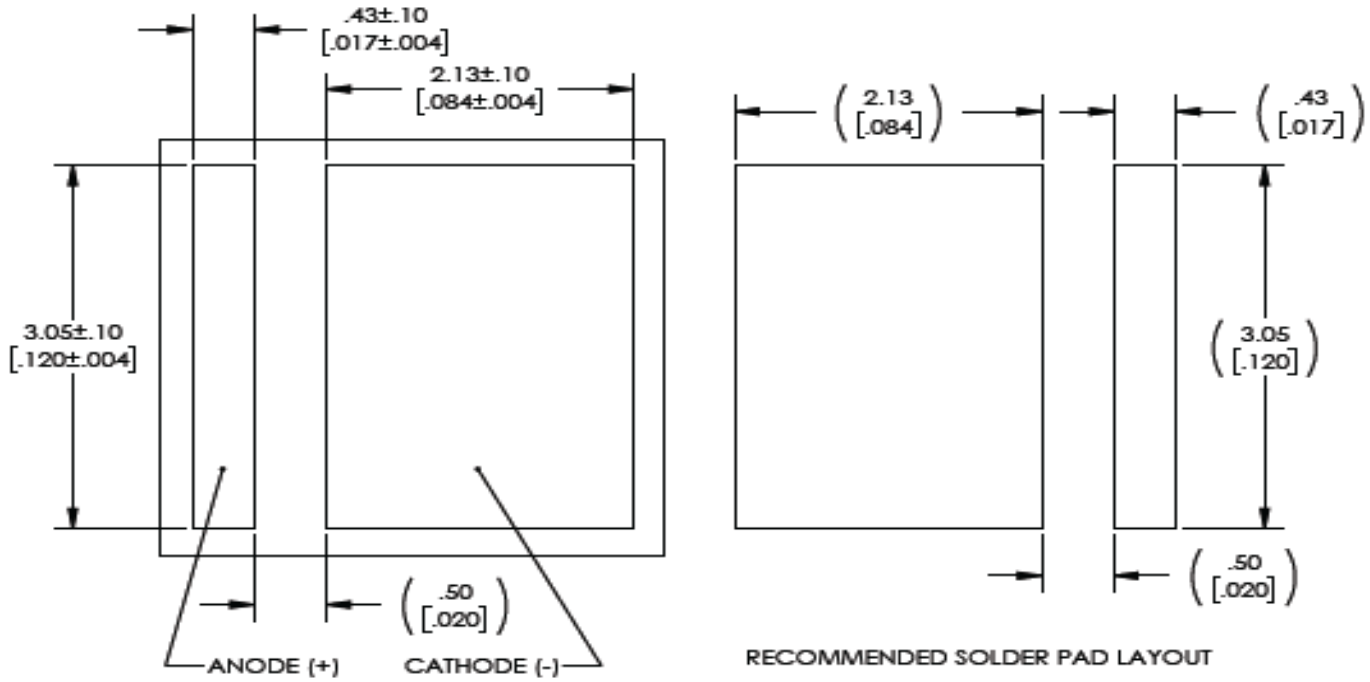
SFT-14 [Converted Green] in "F35" Package Configuration



Note:

1. Converted Green differs from Red Amber/Blue in only the emitting surface is slightly larger than the underlaying die.

Solder Pad Layout

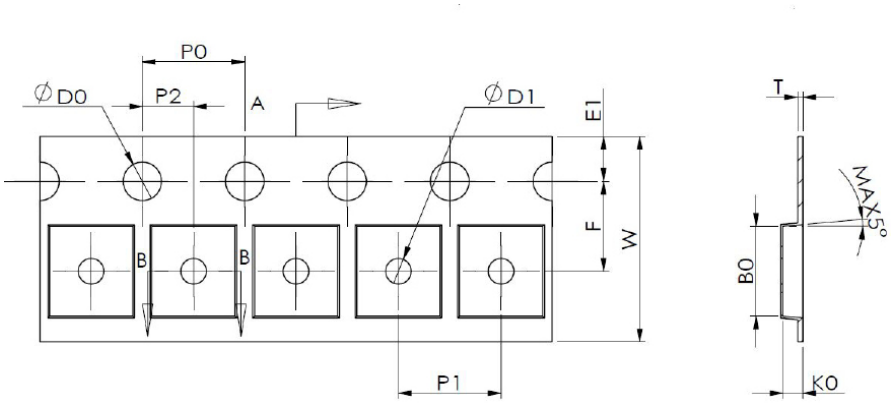


Note:

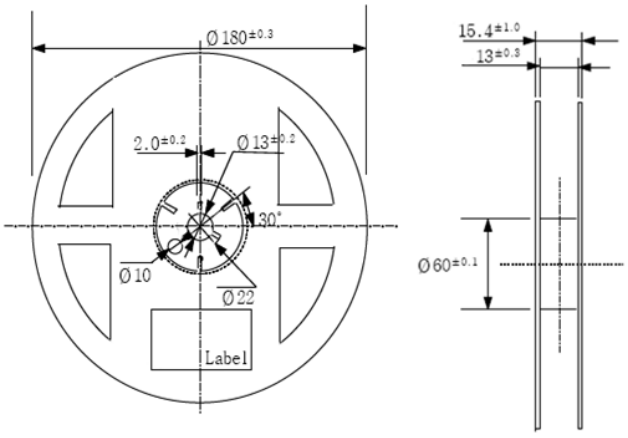
1. Layout is common to all colors. For recommended solder profiles, see page 13.
2. Optimal LED performance is dependent on a proper system design. Please review the Luminus application note, "Design Guidelines for SFT Chipset Assembly."
3. Contact Luminus for more detail.

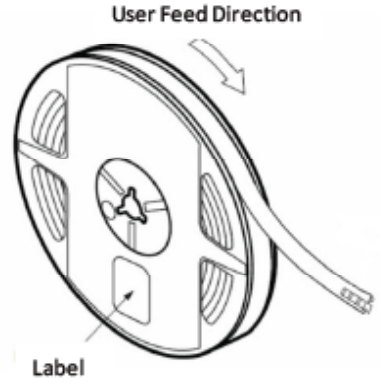
Tape and Reel Outline

Shipping Reel Outline



Parameter	Dimension (mm)
A0	3.80 +/- 0.10
B0	4.00 +/- 0.10
K0	1.20 +/- 0.10
P0	4.00 +/- 0.10
P1	8.00 +/- 0.10
P2	2.00 +/- 0.05
T	0.30 +/- 0.05
E1	1.75 +/- 0.10
F	5.50 +/- 0.05
D0	1.55 +/- 0.05
D1	1.55 +/- 0.05
W	12.00 +/- 0.01





Parameter	Quantity (pcs)
Pieces per reel	250
	500

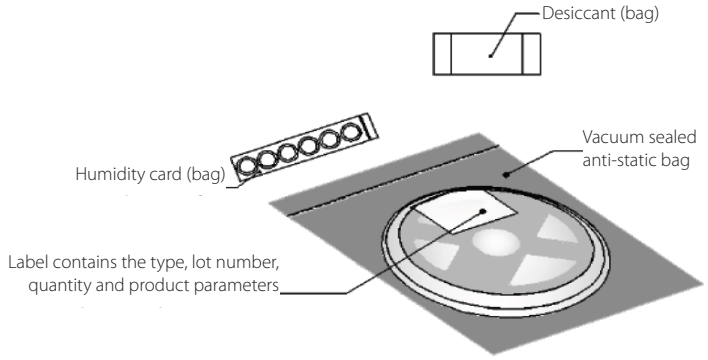
Note

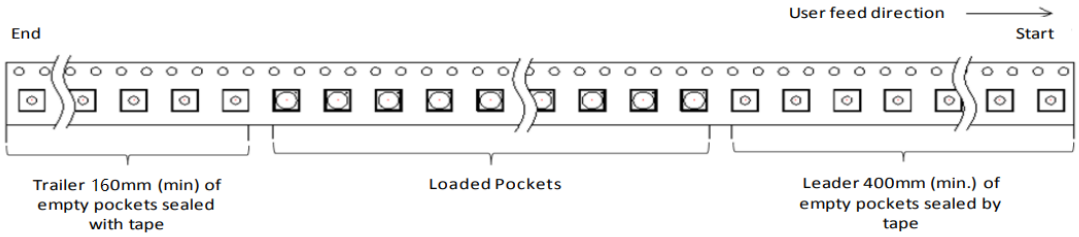
1. The quantity per reel is not orderable.

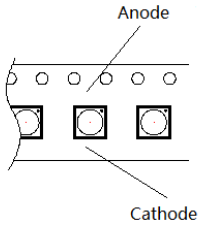
2. Minimum order quantity: 500 pcs.

Tape and Reel Outline

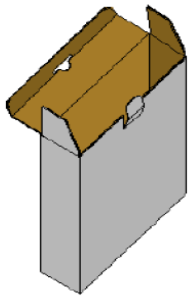
Reel Package



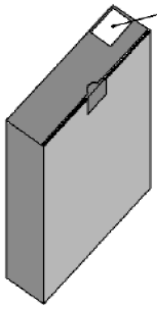


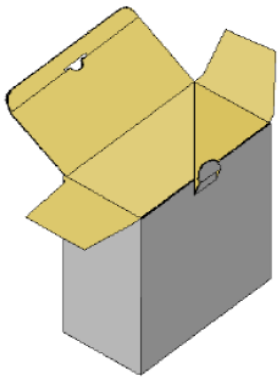


Box Packaging Information

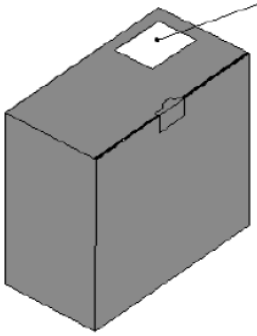


*Capacity 5 reels per box

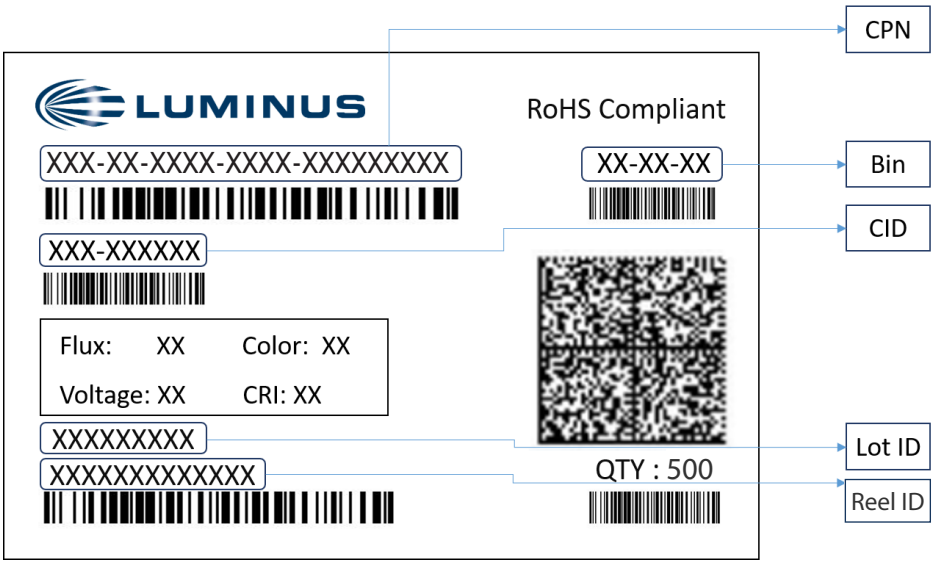




*Capacity 10 reels per box



Shipping Label



Label Fields:

- CPN: Luminus ordering part number
- CID: Customer's part number
- QTY: Quantity of devices in pack
- Flux: Bin as defined on page 3
- Voltage: NA
- Color: NA
- CRI: NA
- Lot ID: For Luminus internal use
- Reel ID: For Luminus internal use

Packing Configuration:

- Maximum of 500 devices per reel
- Partial reel may be shipped
- Each pack is enclosed in anti-static bag
- Shipping label is placed on top of each pack

Notes

Static Electricity

This product is sensitive to static electricity, and care should be taken when handling them. 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. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken to isolate LED processing equipment from potential sources of voltage surges.

Reference: APN-002815 Electrical Stress Damage to LEDs and How to Prevent It

Eye Safety

According to the test specification risk group IEC 62471-Non-GLS under 0.98 A, this product complies to Risk group 2 (RG2) Moderate risk.

Do not stare at operating lamp, may be harmful to the eyes.

For more information, please refer to: https://luminusdevices.zendesk.com/hc/en-us/articles/10532958752397

Revision History

Rev	Date	Description of Change
01	08/23/2021	Revision 01 release.
02	02/04/2022	1.Add CG flux bins 2.Make wavelength bin B2 only on SFT-14-B ordering part number 3.Update PDS format.
03	01/25/2024	Update datasheet template, ordering part numbers and bin-kit codes.