SBT-10X-UV
Surface Mount LED

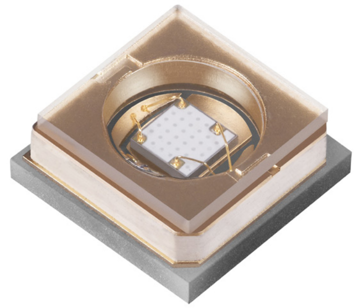

Table of Contents

Features:

- High power UV LED with peak wavelengths 365 - 425 nm
- Latest UVX technology enables ultra-high power density—operation up to 4 A.
- Up to 5 W output to maximize performance of curing systems.
- Industry standard 3.5 mm x 3.5 mm package
- 120° viewing angle
- Environmentally friendly: REACH, RoHS and Halogen compliant

Applications:

- Curing- inks, coating and adhesives
- 3D Printing
- Maskless Lithography
- Diagnostics
- Fluorescence Imaging

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Ordering Information

Ordering Part Numbers

Wavelength Range (nm)	Radiometric Flux		Wavelength Bins	Ordering Part Number[1,2]
	Bin Kit Code	Min. Flux (W)		
365-375	AH	1.3	365, 370	SBT-10X-UV-A120-AH365-22
380-390	AH	1.3	380, 385	SBT-10X-UV-A120-AH380-22
390-400	AH	1.3	390, 395	SBT-10X-UV-A120-AH390-22
400-410	AH	1.3	400, 405	SBT-10X-UV-A120-AH400-22
415-425	AH	1.3	415, 420	SBT-10X-UV-A120-AH415-22

Note 1: A Bin Kit represents a group of flux and wavelength bins that are shippable for a given ordering part number. Individual flux, wavelength and voltage bins are not always orderable—contact Luminus for special requests.
Note 2: Flux Bin listed is minimum bin shipped—higher bins may be included at Luminus' discretion.

Part Number Nomenclature

SBT — 10X — UV — A120 — FFWWW-2#

Product Family	Chip Area	Color	Package Configuration	Bin Kit
SBT: Surface Mount LED	10X: 1 mm^2 Approximate values. See mechanical drawing for details.	UV: Ultraviolet	A120: 3.5 mm x 3.5 mm package See Mechanical Drawing section	See Ordering Part Number table and Binning Structure tables for bin definitions

Binning Structure

SBT-10X-UV LEDs are specified for radiometric flux and peak wavelength at a drive current of 1.0 A with a 20 ms pulse at 25°C and placed into one of the following Flux, Wavelength and Forward Voltage bins.

Radiometric Flux Bins

Color	Radiometric Flux Bin (FF)	Minimum Flux (W)	Maximum Flux (W)
	AH	1.3	1.4
	AJ	1.4	1.5
	AK	1.5	1.75
	AL	1.75	2.0

Note 1: Luminus maintains a +/- 6% tolerance on power measurements.

Peak Wavelength Bins

Color	Wavelength Bin (WWW)	Minimum Wavelength (nm)	Maximum Wavelength (nm)
UV	365	365	370
	370	370	375
	380	380	385
	385	385	390
	390	405	410
	395	395	400
	400	400	405
	405	405	410
	415	415	420
	420	420	425

Binning Structure

Forward Voltage Bins

Color	Forward Voltage Bin	Minimum Voltage (V)	Maximum Voltage (V)
UV	V3	3.3	3.4
	V4	3.4	3.5
	V5	3.5	3.6
	V6	3.6	3.7
	V7	3.7	3.8
	V8	3.8	3.9
	V9	3.9	4.0
	V10	4.0	4.1
	V11	4.1	4.2
	V12	4.2	4.3
	V13	4.3	4.4
	V14	4.4	4.5

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Typical Device Performance (T_c = 25°C)

Characteristics at Recommended Test Drive Current		Symbol	365 nm	385 nm	395 nm	405 nm	420 nm	Unit
Peak Wavelength Range	typ	λ	365-375	380-390	390-400	400-410	415-425	nm
Test Current [1]	typ	I	1.0	1.0	1.0	1.0	1.0	A
Peak Wavelength Typ.	typ	λ_p	367	385	395	405	420	nm
Forward Voltage	min	$V_{F\ min}$	3.0	3.1	3.1	3.2	3.2	V
	typ	V_F	3.7	3.4	3.6	3.7	3.7	V
	max	$V_{F\ max}$	4.2	4.1	4.1	4.2	4.2	V
Radiometric Flux [2]	typ	Φ_{typ}	1.6	1.6	1.5	1.4	1.4	W
FWHM at 50% of Φ	typ	$\Delta\lambda_{1/2}$	15	15	15	17	17	nm
Device Thermal Characteristics at 3.0 A [3]								
Electrical thermal resistance (junction to case)	typ	$R_{\theta j\text{-}c\ (elec.)}$		1.8				°C/W
Real thermal resistance (junction to case) WPE = 31.7%	typ	$R_{\theta j\text{-}c\ (real)}$		2.6				°C/W

Note 1: Unless otherwise noted, values listed are typical. Devices are tested and specified at 1.0 A with a 20 ms pulse at 25°C .

Note 2: Typical radiometric flux is for reference only. Minimum flux values are guaranteed based on the bin kit ordered. For product roadmap and future performance of devices, contact Luminus.

Note 3: Measurements are in accordance with JEDEC 51-14.

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Absolute Maximum Ratings

	Symbol	Values	Unit
Absolute Minimum Current (CW or Pulsed) [1]	I_{min}	0.2	A
Absolute Maximum Current for 365 nm (CW) [2]	I_{max}	2.5	A
Absolute Maximum Current for 385/395/405/420 nm (CW) [2]	I_{max}	4.0	A
Absolute Maximum Surge Current for 365 nm [2]	I_s	3.75	A
Absolute Maximum Surge Current for 385/395/405/420 nm [2]	I_s	6.0	A
Maximum Junction Temperature [2]	T_{jmax}	125	°C
Storage Temperature Range	T_s	-40 to +100	°C
ESD Sensitivity (HBM)	V_b	8	kV

Note 1: Special design considerations must be observed for operation under 0.2 A. Please contact Luminus for further information.

Note 2: SBT-10X-UV LEDs are designed for operation to an absolute maximum current as specified above. Product lifetime data is specified at or below maximum drive current. Sustained operation beyond absolute maximum currents will result in a reduction of device lifetime. Actual device lifetimes will also depend on junction temperature and operation beyond maximum junction temperature is not recommended. Contact Luminus for lifetime derating curves and for further information. In pulsed operation, rise time from 10-90% of forward current should be longer than 0.5 micro seconds.

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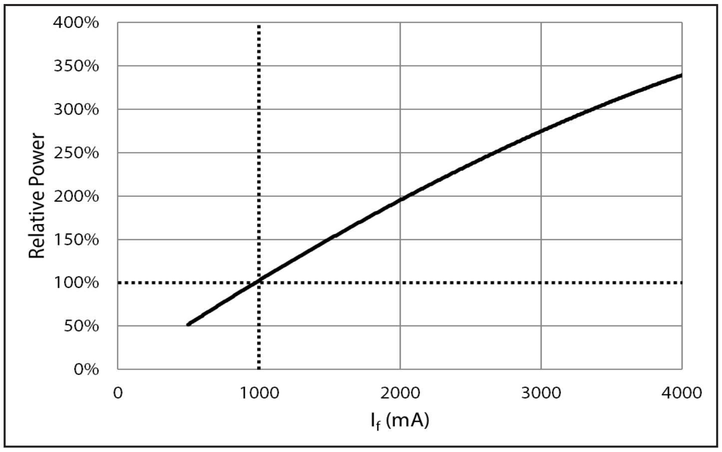
Optical & Electrical Characteristics - 365 nm

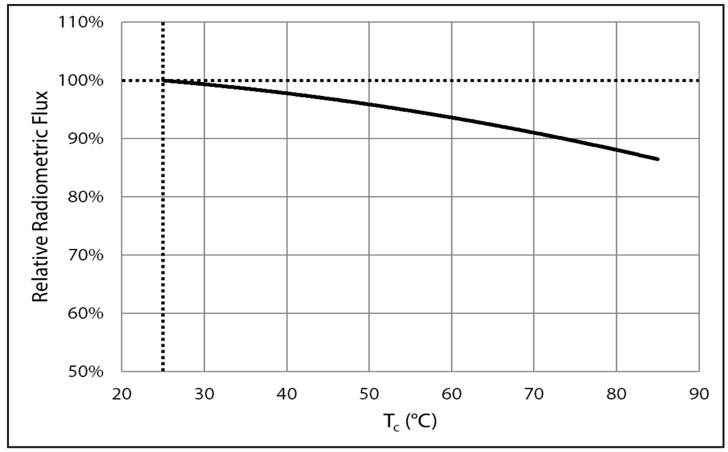
Relative Power vs. Forward Current

φ/φ$_{(1.0\,A)}$, 20 ms pulse, T_c = 25°C



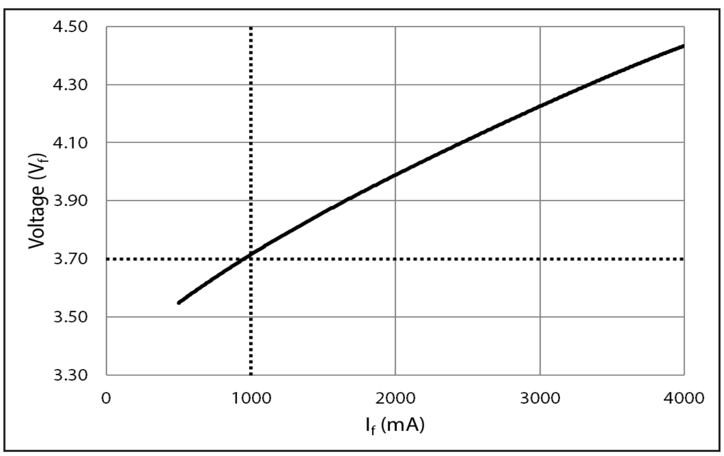
Relative Power vs. Case Temperature

φ/φ$_{(25°C)}$, 20 ms pulse, 1.0 A



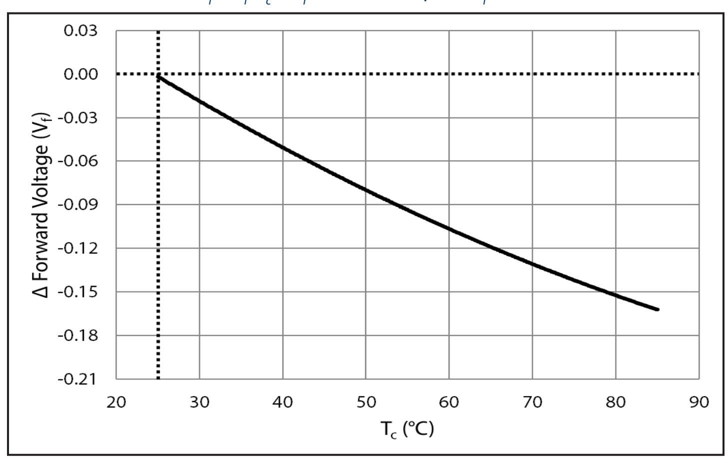
Forward Voltage vs. Forward Current

25°C , 20 ms pulse



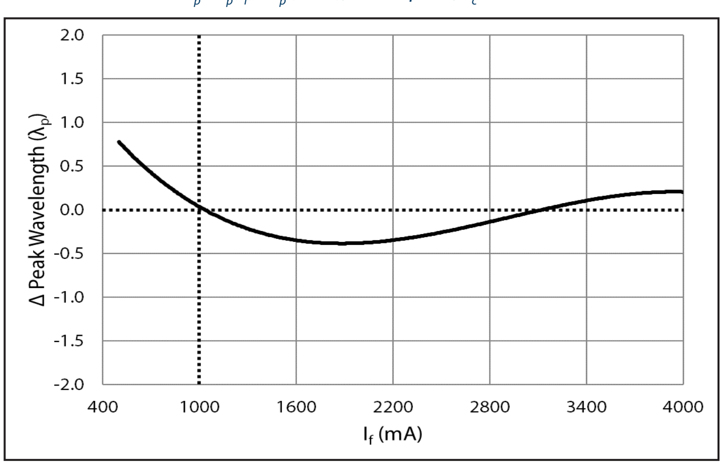
Forward Voltage Shift vs. Case Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, I_f = 1.0 A



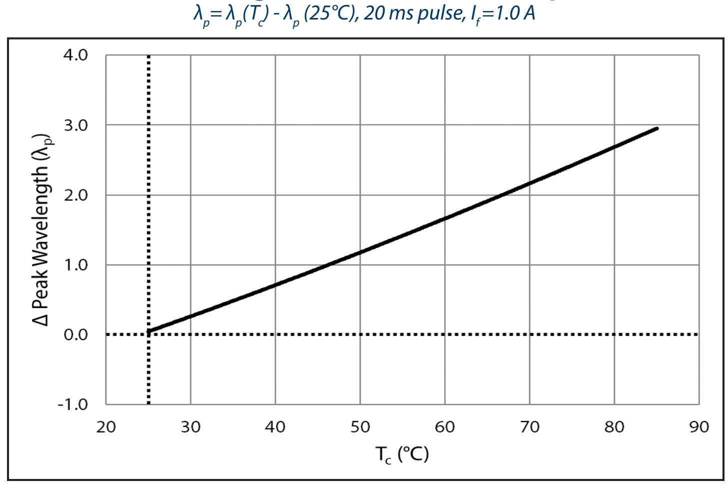
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (1.0 A), 20 ms pulse, T_c = 25°C



Peak Wavelength Shift vs. Case Temperature

$\lambda_p = \lambda_p(T_c) - \lambda_p$ (25°C), 20 ms pulse, I_f=1.0 A



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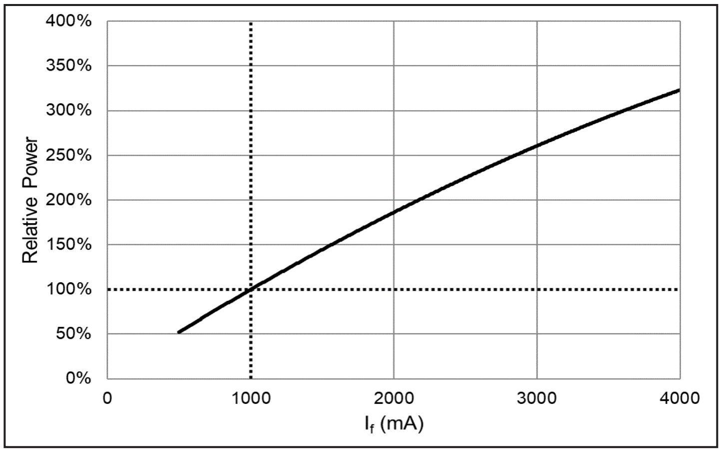
Optical & Electrical Characteristics - 385 nm

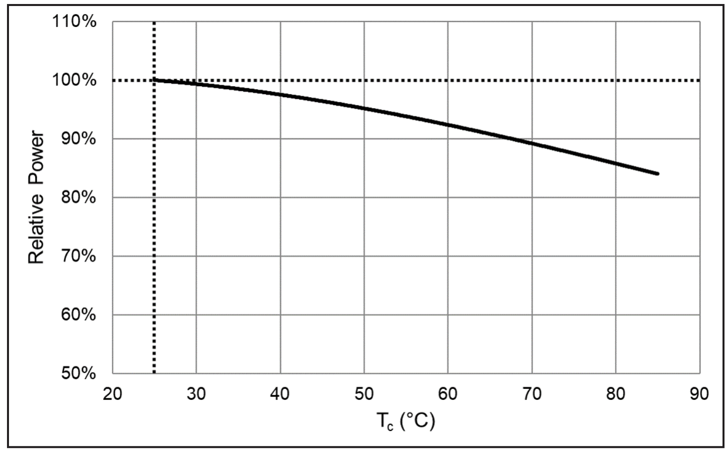
Relative Power vs. Forward Current

$\varphi/\varphi_{(1.0\,A)}$, 20 ms pulse, $T_c = 25°C$



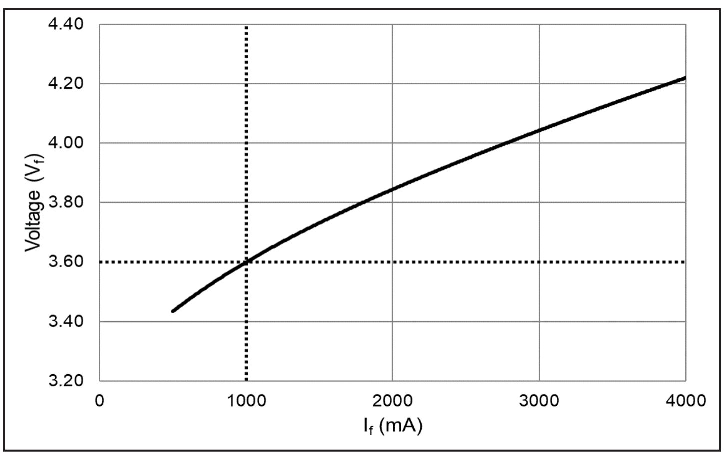
Relative Power vs. Case Temperature

$\varphi/\varphi_{(25°C)}$, 20 ms pulse, 1.0 A



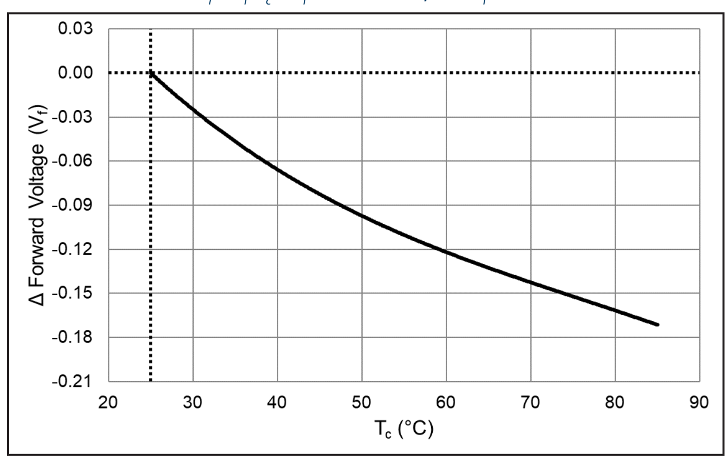
Forward Voltage vs. Forward Current

25°C , 20 ms pulse



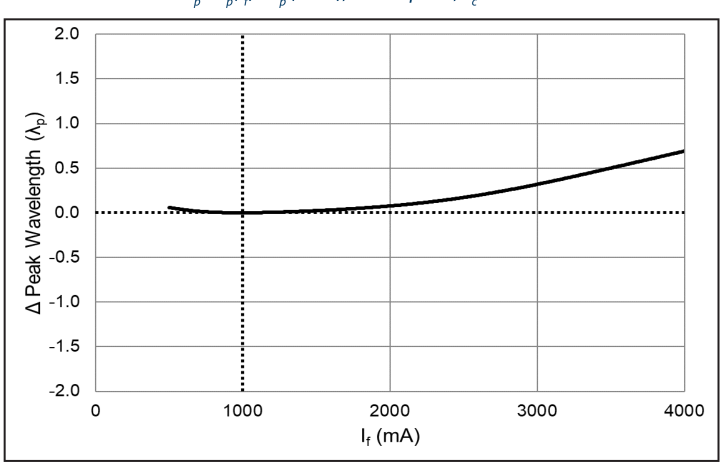
Forward Voltage Shift vs. Case Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, $I_f = 1.0$ A



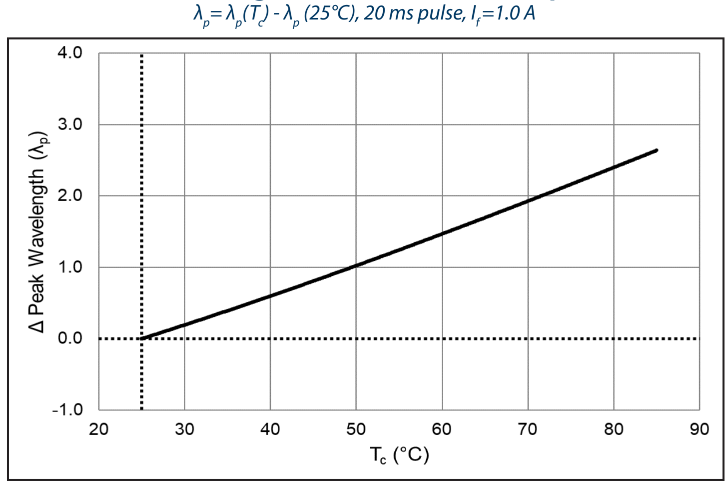
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (1.0 A), 20 ms pulse, $T_c = 25°C$



Peak Wavelength Shift vs. Case Temperature

$\lambda_p = \lambda_p(T_c) - \lambda_p$ (25°C), 20 ms pulse, $I_f = 1.0$ A



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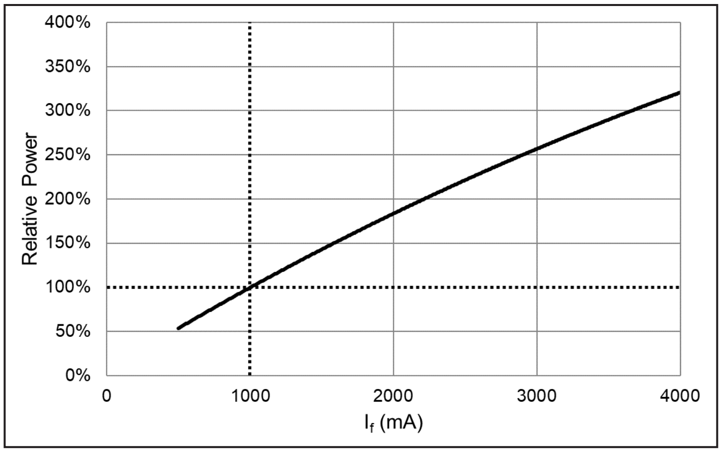
Optical & Electrical Characteristics - 395 nm

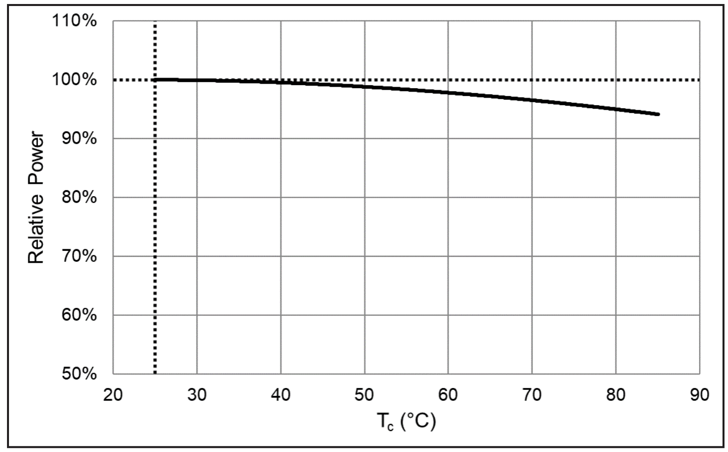
Relative Power vs. Forward Current

$\varphi/\varphi_{(1.0\,A)}$, 20 ms pulse, $T_c = 25°C$



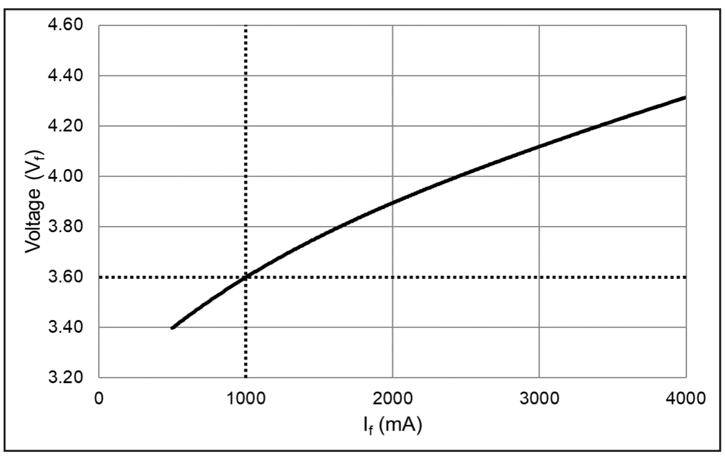
Relative Power vs. Case Temperature

$\varphi/\varphi_{(25°C)}$, 20 ms pulse, 1.0 A



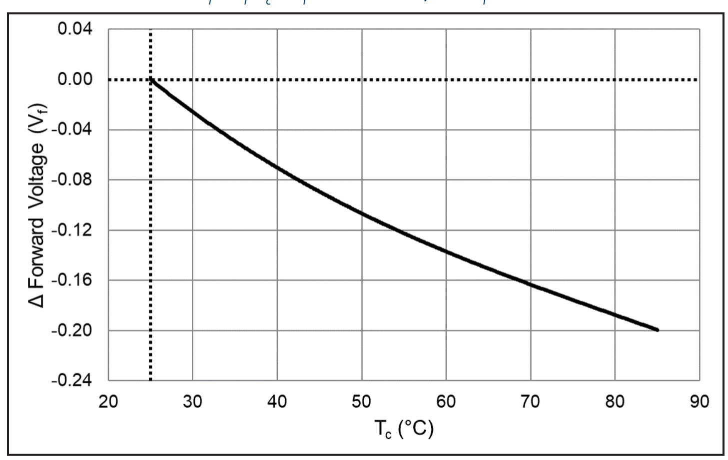
Forward Voltage vs. Forward Current

25°C , 20 ms pulse



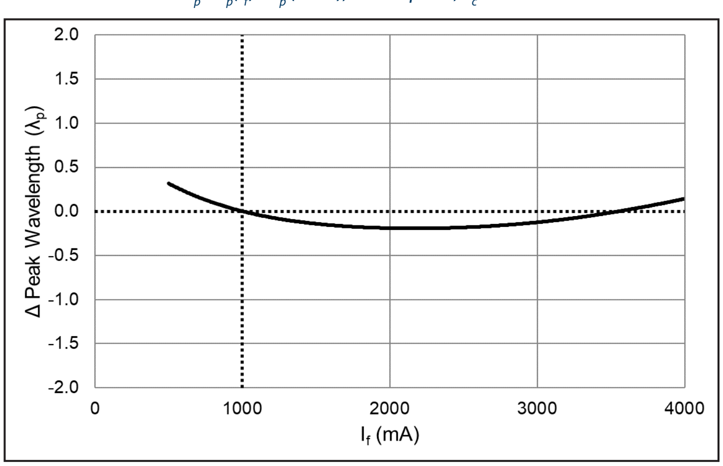
Forward Voltage Shift vs. Case Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, $I_f = 1.0$ A



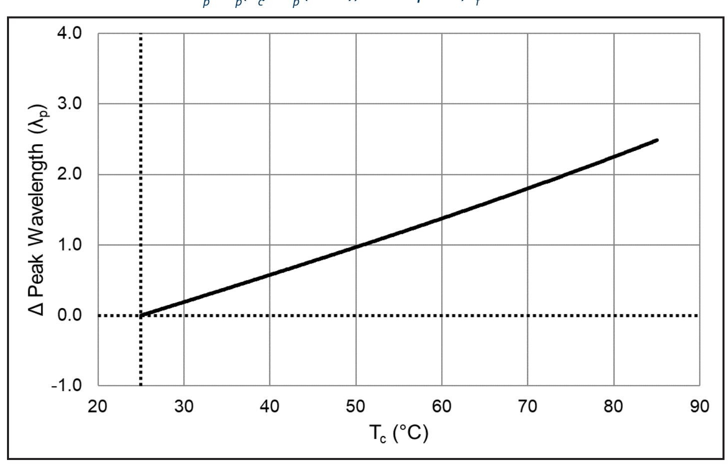
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (1.0 A), 20 ms pulse, $T_c = 25°C$



Peak Wavelength Shift vs. Case Temperature

$\lambda_p = \lambda_p(T_c) - \lambda_p$ (25°C), 20 ms pulse, I_f=1.0 A



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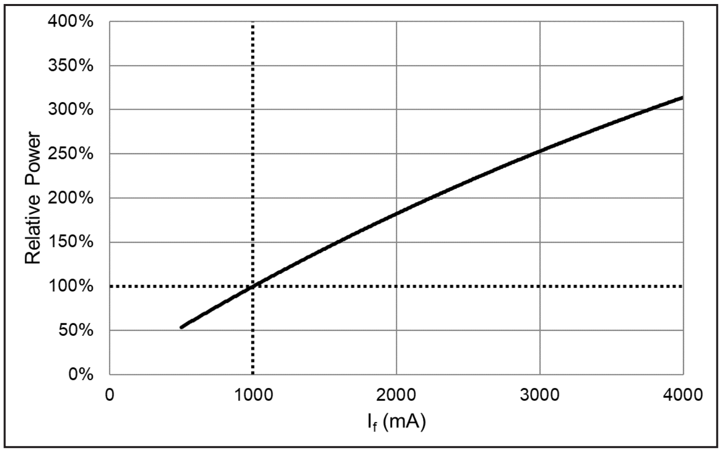
Optical & Electrical Characteristics - 405 nm

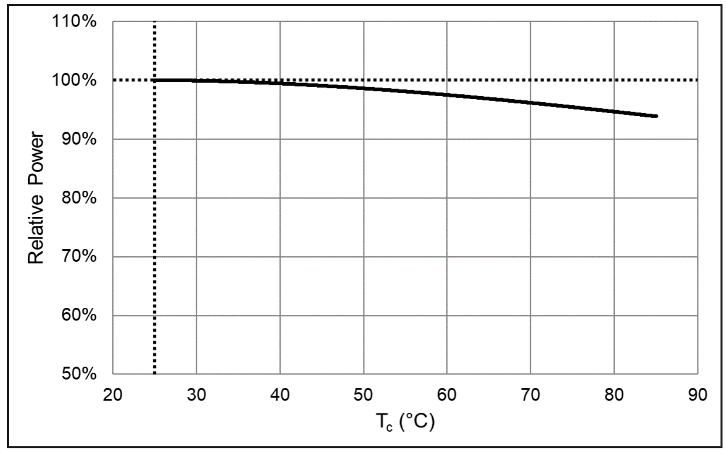
Relative Power vs. Forward Current

$\varphi/\varphi_{(1.0 A)}$, 20 ms pulse, $T_c = 25°C$



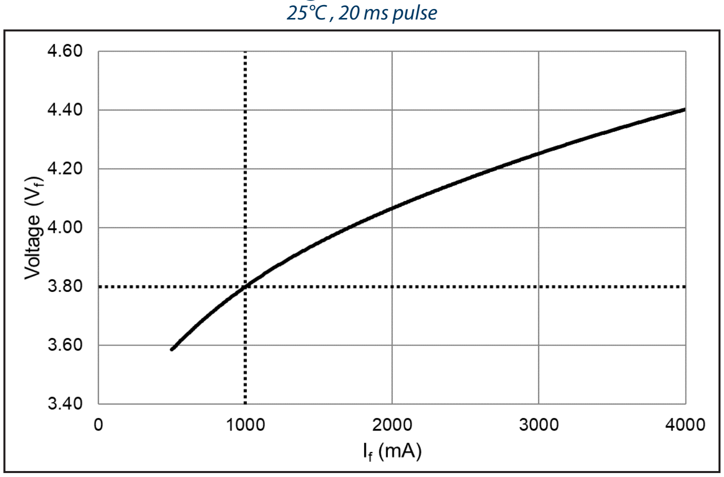
Relative Power vs. Case Temperature

$\varphi/\varphi_{(25°C)}$, 20 ms pulse, 1.0 A



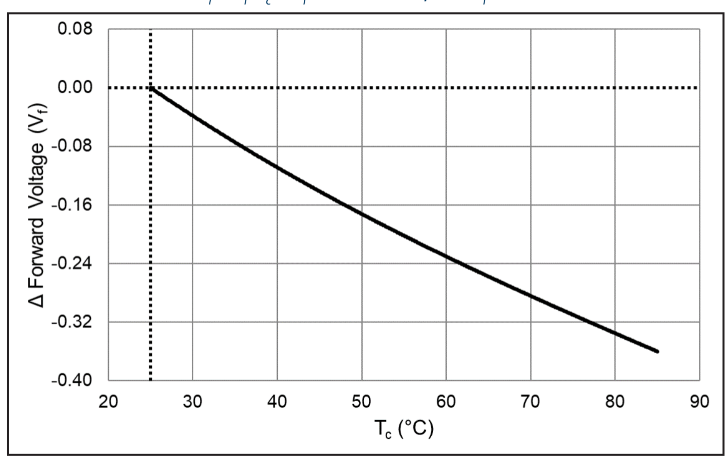
Forward Voltage vs. Forward Current

25°C , 20 ms pulse



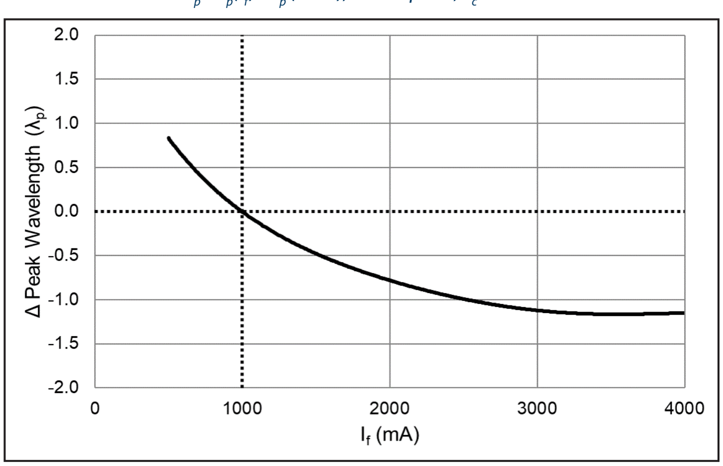
Forward Voltage Shift vs. Case Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, $I_f = 1.0$ A



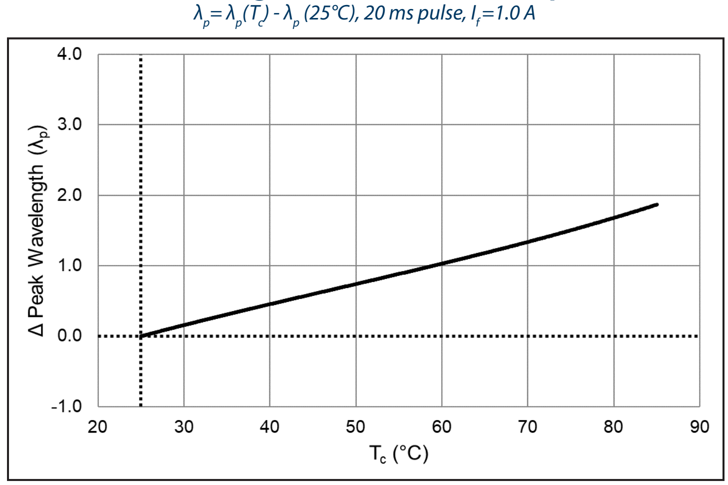
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (1.0 A), 20 ms pulse, $T_c = 25°C$



Peak Wavelength Shift vs. Case Temperature

$\lambda_p = \lambda_p(T_c) - \lambda_p$ (25°C), 20 ms pulse, I_f=1.0 A



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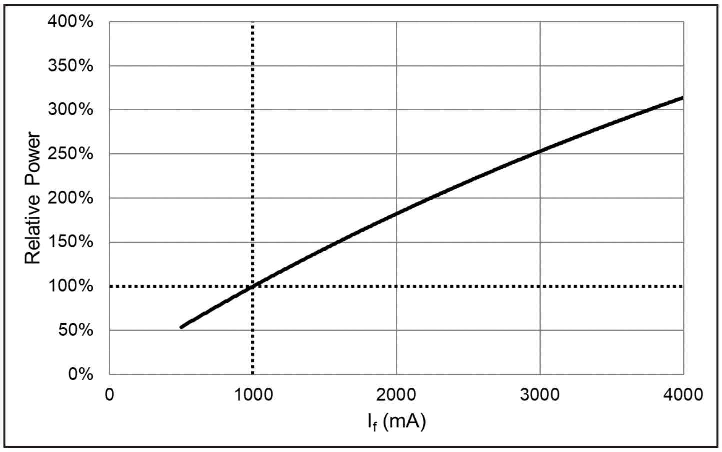
Optical & Electrical Characteristics - 420 nm

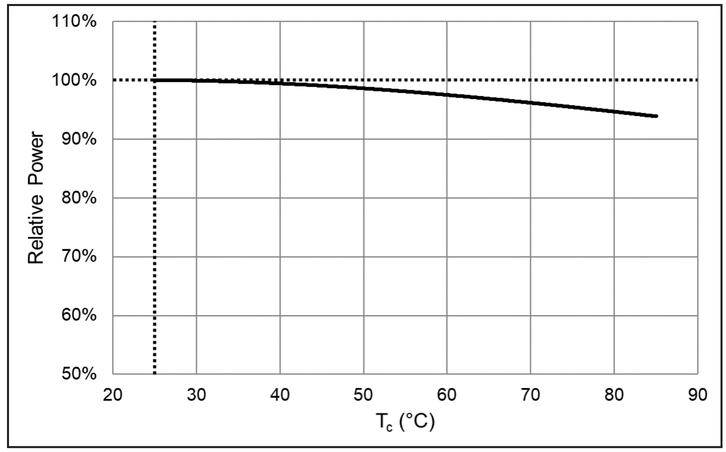
Relative Power vs. Forward Current

$\varphi/\varphi_{(1.0\,A)}$, 20 ms pulse, $T_c = 25°C$



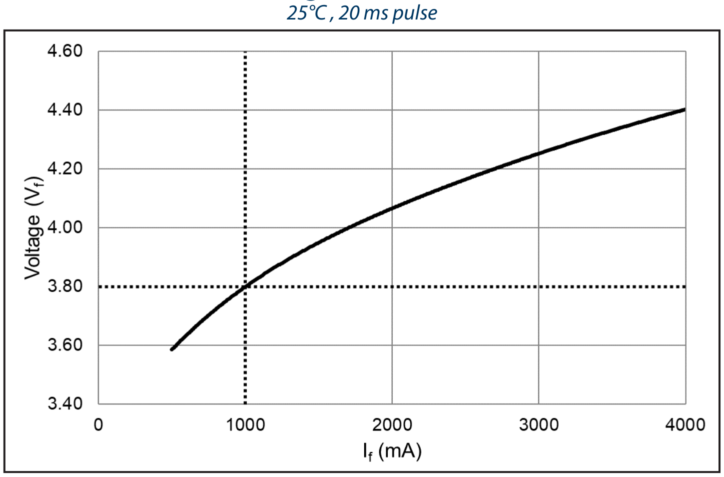
Relative Power vs. Case Temperature

$\varphi/\varphi_{(25°C)}$, 20 ms pulse, 1.0 A



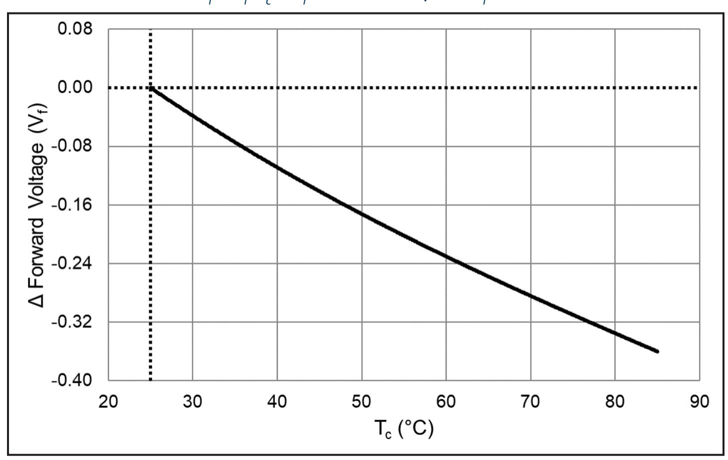
Forward Voltage vs. Forward Current

25°C , 20 ms pulse



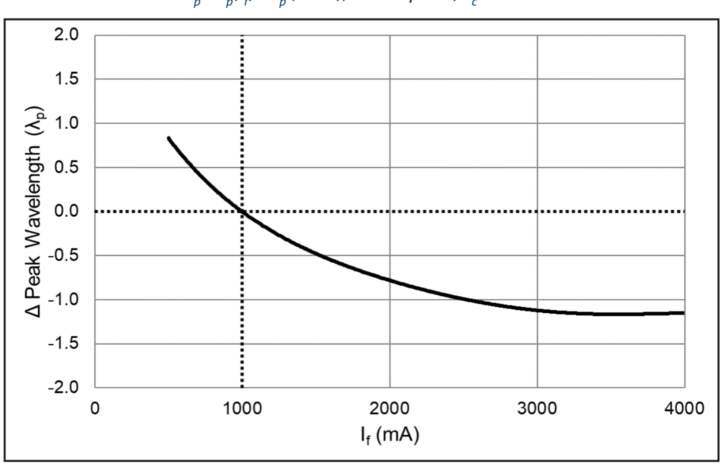
Forward Voltage Shift vs. Case Temperature

$\Delta V_f = V_f(T_c) - V_f(25°C)$, 20 ms pulse, $I_f = 1.0$ A



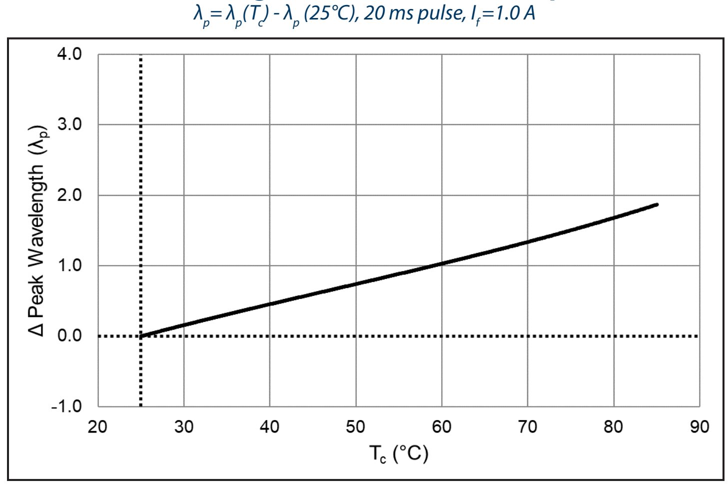
Peak Wavelength Shift vs. Forward Current

$\lambda_p = \lambda_p(I_f) - \lambda_p$ (1.0 A), 20 ms pulse, $T_c = 25°C$



Peak Wavelength Shift vs. Case Temperature

$\lambda_p = \lambda_p(T_c) - \lambda_p$ (25°C), 20 ms pulse, $I_f = 1.0$ A



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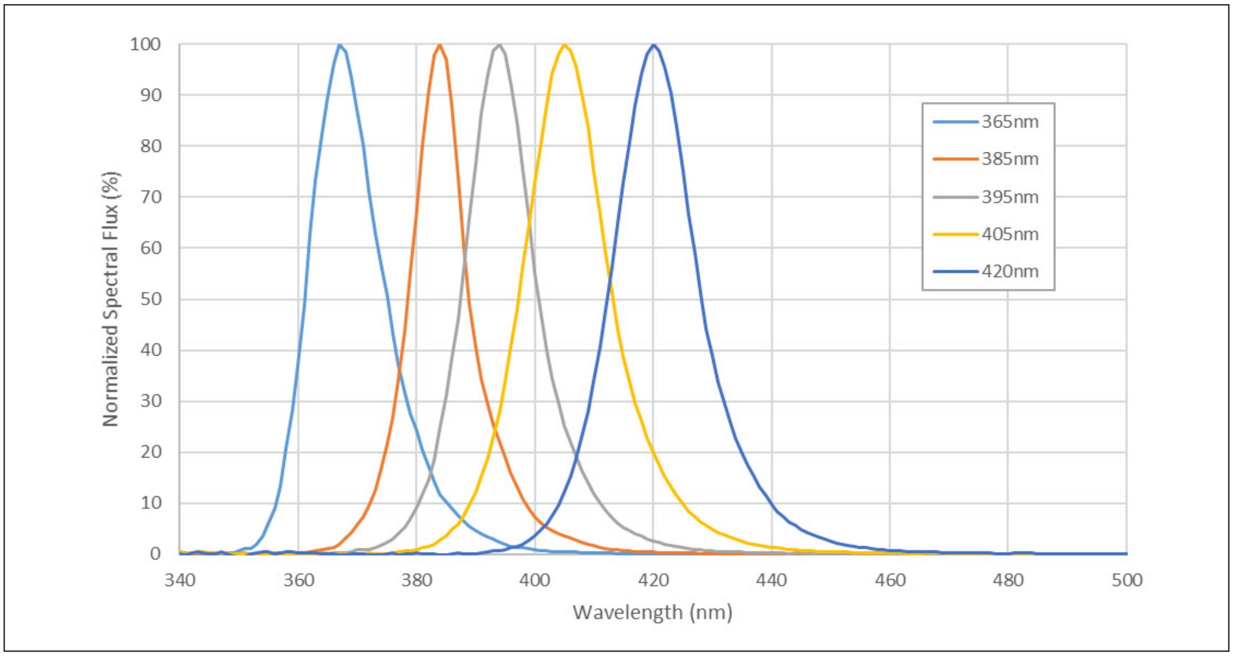
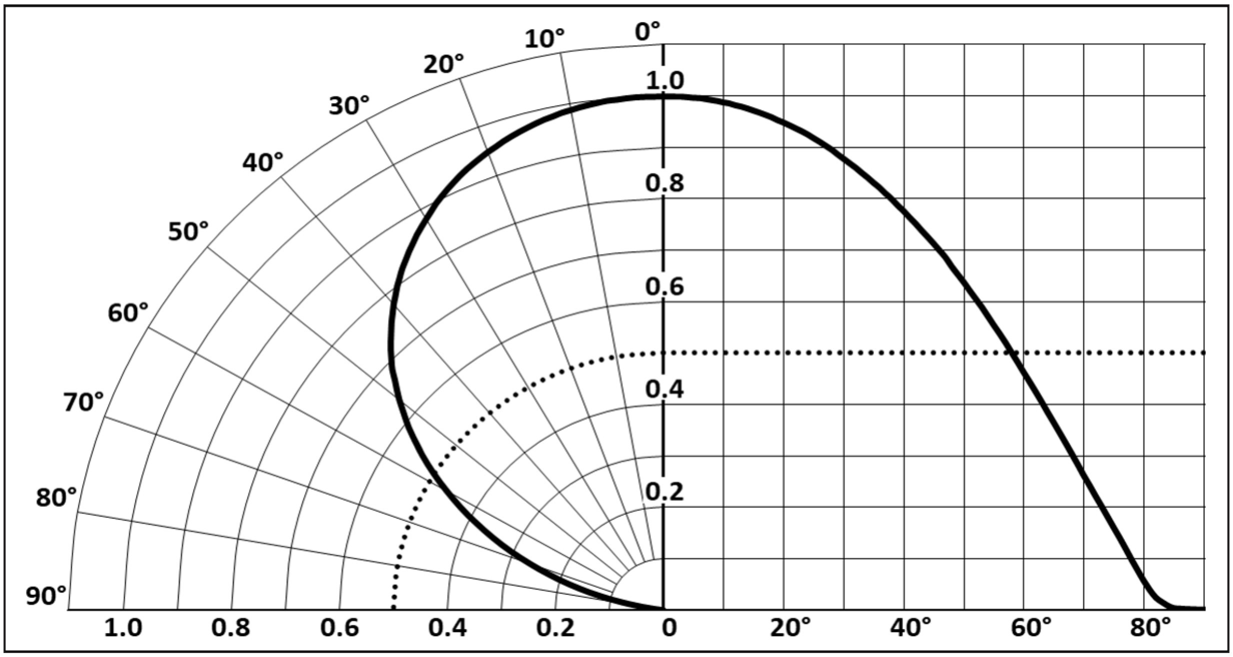
Typical Spectrum

$I_{ref} = f(\Phi); T_c = 25°C$



Radiation Pattern[7]

$\Phi_{ref} = f(\lambda); I_f = 1.0\ A; T_c = 25°C$



Note 1: Contact Luminus for optical source models.

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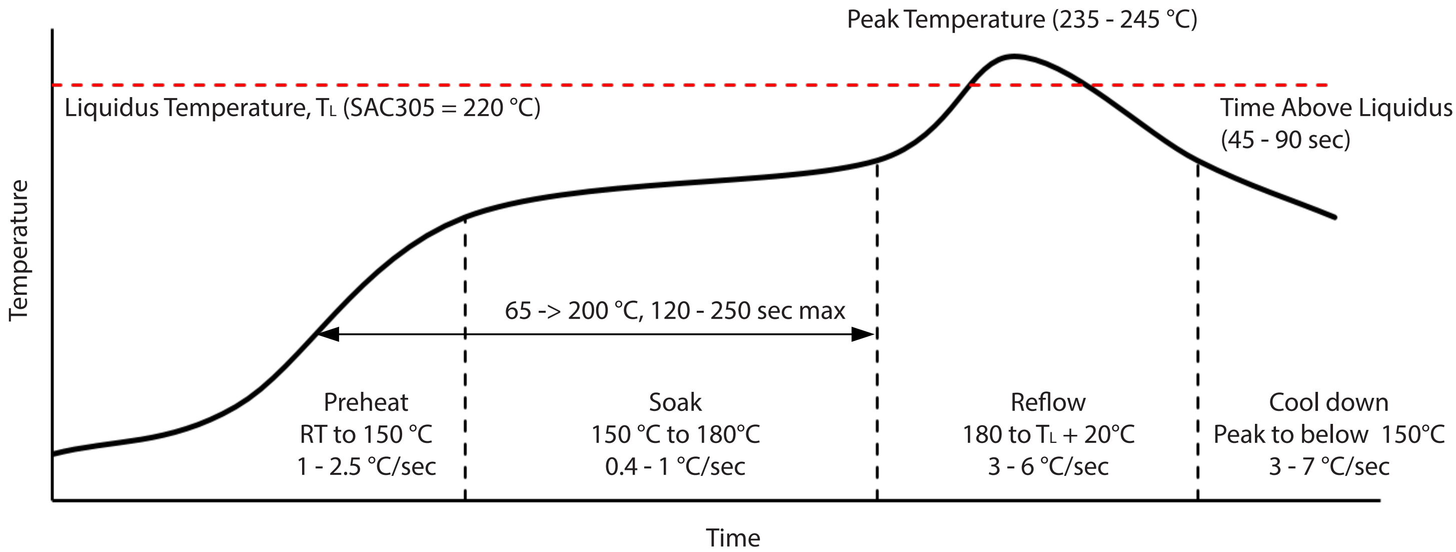
Solder Profile



SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 230°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: Vapor phase soldering is not recommended as the package is not hermetic.

Note 8: 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 9: For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

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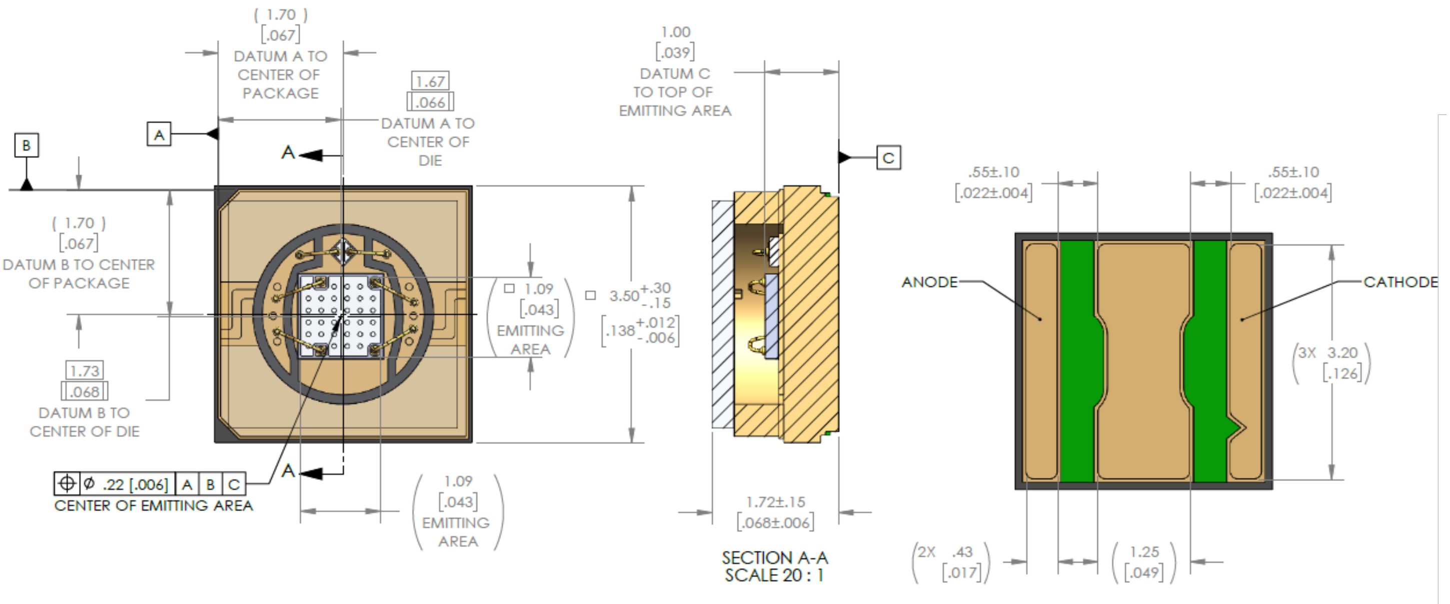
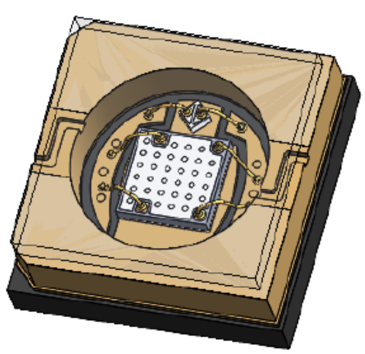
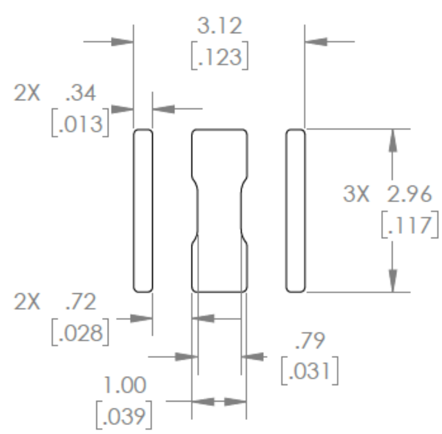
Mechanical Dimensions







RECOMMENDED SOLDER STENCIL

Note: The subtrates and windows of LEDs may have minor cosmetic differences, for e.g. slightly different hues, because of different supply sources. These differences are only cosmetic and do not affect form, fit or function of the LED.

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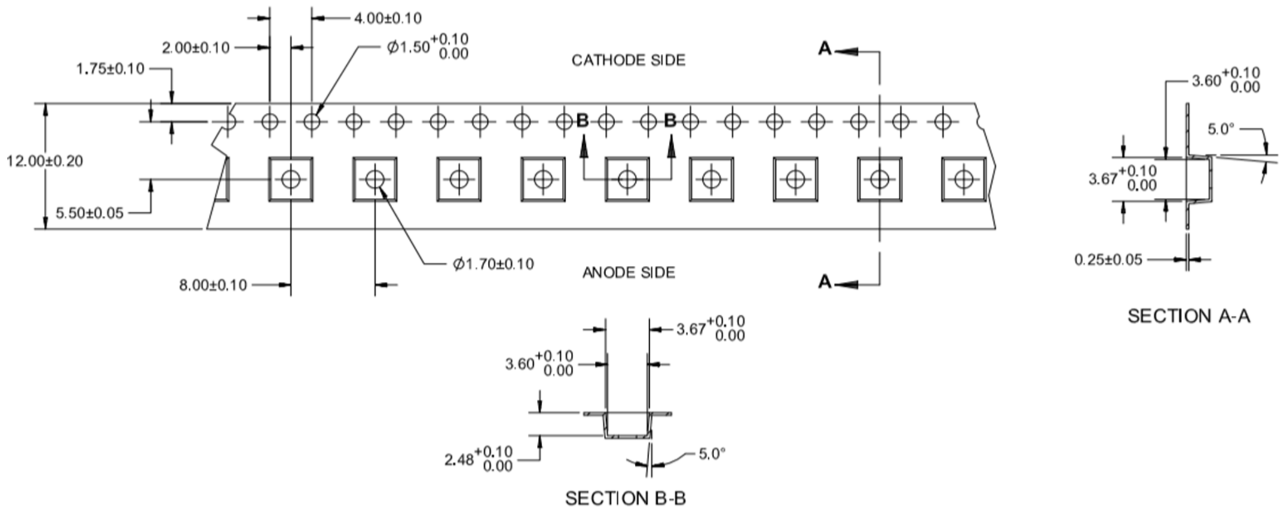
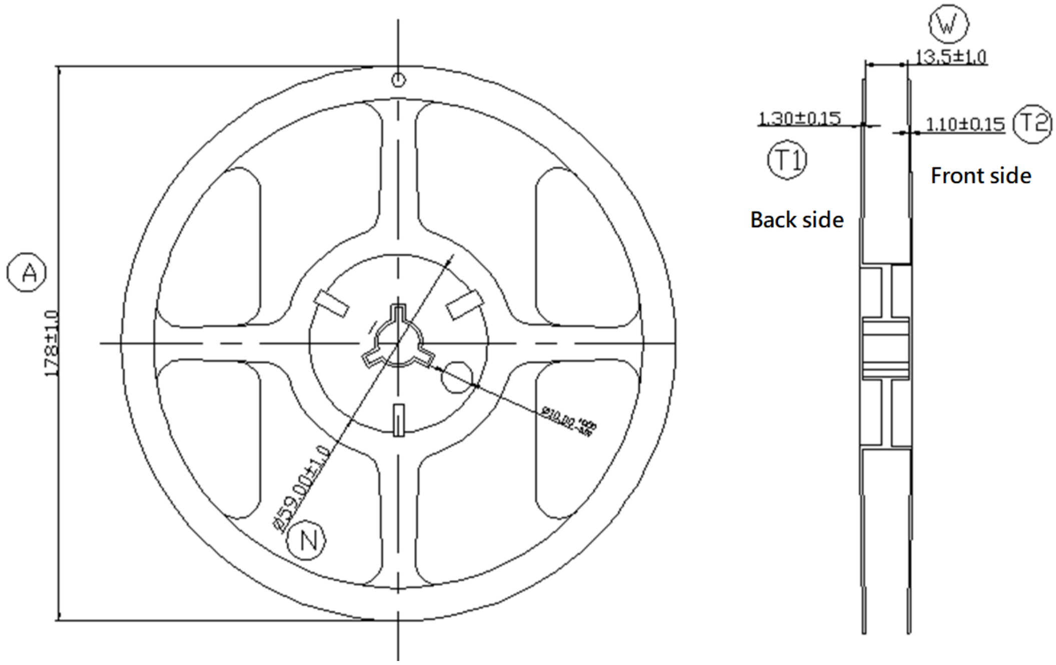
Shipping Reel Outline





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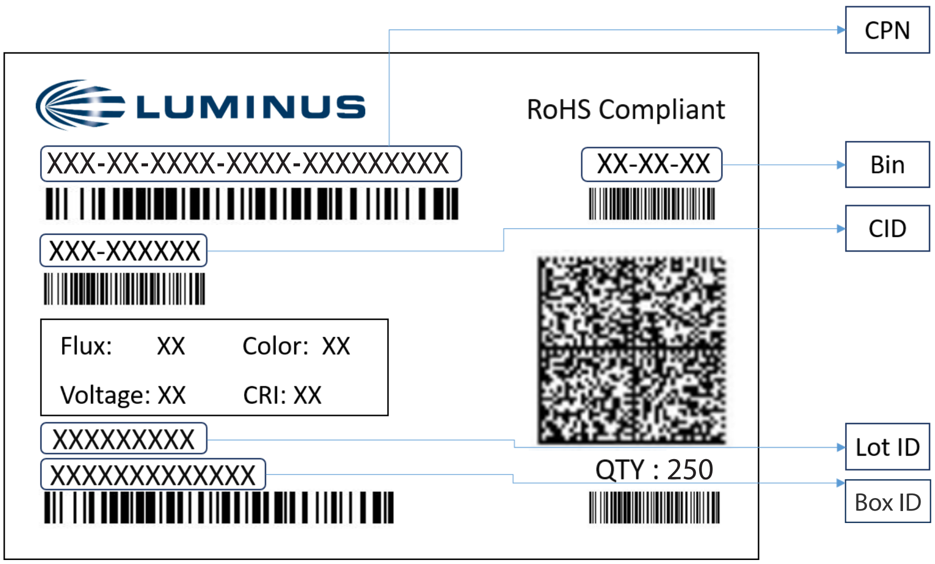
Shipping Label



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: Bin as defined on page 4
- Color: Bin as defined on page 3
- CRI: NA

Packing Configuration:

- Maximum 250 devices per reel
- Partial pack or reel may be shipped
- Each pack is enclosed in anti-static bag
- Shipping label is placed on top of each pack

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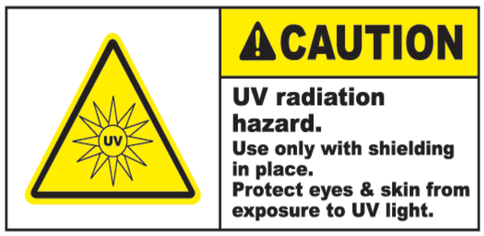
Precautions for Use

1. UV Light

SBT-10X LEDs are short wavelength, UV LEDs. During operation, the LED emits high intensity UV radiation, which is harmful to skin and eyes. UV light is also hazardous to skin and may cause cancer. Avoid exposure to UV light when LED is operational. Precautions must be taken to avoid looking directly at the UV light without the use of UV light protective glasses. Do not look directly at the front or at the LED's lens when LED is operational.



2. Static Electricity (ESD)

SBT-10X LEDs have built-in Zener protection diodes, they are particularly sensitive to ESD (Electrostatic Discharge). Static electricity and surge voltages seriously damage UV LEDs and can result in complete failure of the device. Anti-electrostatic wristband or gloves are recommended when handling the LEDs. All devices, equipment and machinery must be properly grounded and precautions must be taken against surge voltages.

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

3. Operating Conditions

In order to ensure the correct functioning of these LEDs, compliance to maximum allowed specifications is important. UV LEDs are particularly sensitive to drive currents that exceed the max operating specifications and may be damaged by such drive curents. The use of current regulated drive circuits is strongly recommended when operating these devices. Customers should also provide adequate thermal management to ensure LEDs do not exceed maximum recommended temperatures. Operating LEDs at temperatures in excess of specification will result in damage and possibly complete failure of the device.

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Revision History

Rev	Date	Description of Change
01	08/15/2022	Initial Release
02	05/20/2024	Added 365 nm and 420 nm

This product is protected by U.S. Patents 6,831,302; 7,074,631; 7,083,993; 7,084,434; 7,098,589; 7,105,861; 7,138,666; 7,166,870; 7,166,871; 7,170,100; 7,196,354; 7,211,831; 7,262,550; 7,274,043; 7,301,271; 7,341,880; 7,344,903; 7,345,416; 7,348,603; 7,388,233; 7,391,059 Patents Pending in the U.S. and other countries.

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