

BRIDGELUX BLUE POWER DIE

BXFE 45 x 45

PRODUCT DATA SHEET DS-C18

The Bridgelux family of blue power die enables high performance and cost effective solutions to serve solid state lighting market. This next generation chip technology delivers improved efficiency and performance to enable increased light output for a variety of lighting, signaling and display applications.

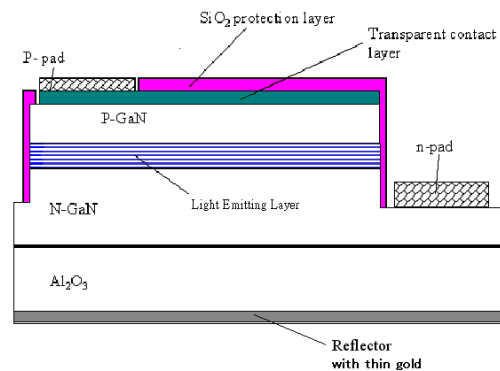
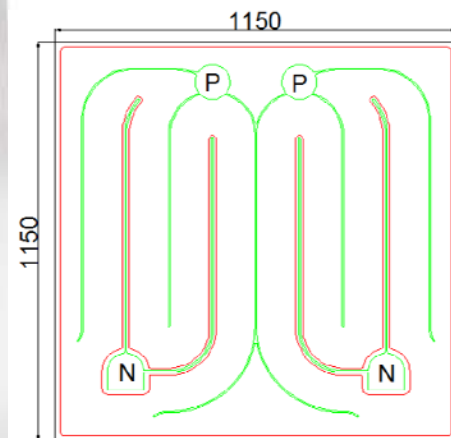
Features

- High lumen output and efficiency
- Long operating life
- Increased current spreading traces for highly efficient and uniform illumination
- 100% Tested and sorted by wavelength, power and forward voltage
- Lambertian emission pattern
- Compatible with Solder paste, solder preform or silver epoxy die attach
- Delivered on medium tack blue tape (20cm±10mm ×20 cm±10mm)

Applications

- General Illumination
- Street Lights
- Portable Lighting
- Architectural Lighting
- Directional Lighting
- Wide Area Lighting
- Display Backlighting
- Digital Camera Flash
- Automotive Lighting
- White LED

LED Chip Diagram



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Product Nomenclature

B X F E 4 5 4 5 X X X - Y Y - Z

Where:

- BXFE: Designates product family
- 4545: Designates die size (45 mil x 45 mil)
- XXX: Designates dominant wavelength bin
- YY: Designates radiometric power bin
- Z: Designates forward voltage bin

Part Numbering and Bin Definitions

Bridgelux LED chips are sorted into brightness, dominant wavelength, and forward voltage bins shown below at $I_f = 350$ mA. Each blue tape contains chips from one single bin only.

The forward voltage bins are set up as: 3.0 - 3.1 V, 3.1 - 3.2 V, 3.2 - 3.3 V and 3.3 - 3.4 V. The typical forward voltage is 3.2 V and the maximum forward voltage ($V_f \text{ max}$) = 3.4 V.

Dominant Wavelength	Power Bin F1 (340 – 360 mW)	Power Bin F2 (360 – 380 mW)	Power Bin G1 (380 – 400 mW)
450 to 452.5nm	BXFE4545450- F1-z	BXFE4545450- F2-z	BXFE4545450- G1-z
452.5 to 455nm	BXFE4545452- F1-z	BXFE4545452- F2-z	BXFE4545452- G1-z
455 to 457.5nm	BXFE4545455- F1-z	BXFE4545455- F2-z	BXFE4545455- G1-z
457.5 to 460nm	BXFE4545457- F1-z	BXFE4545457- F2-z	BXFE4545457- G1-z
460 to 462.5nm	BXFE4545460- F1-z	BXFE4545460- F2-z	BXFE4545460- G1-z

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Dominant Wavelength	Power Bin G2 (400 - 420 mW)	Power Bin H1 (420 - 440 mW)
450 to 452.5nm	BXFE4545450- G2-z	BXFE4545450- H1-z
452.5 to 455nm	BXFE4545452- G2-z	BXFE4545452- H1-z
455 to 457.5nm	BXFE4545455- G2-z	BXFE4545455- H1-z
457.5 to 460nm	BXFE4545457- G2-z	BXFE4545457- H1-z
460 to 462.5nm	BXFE4545460- G2-z	BXFE4545460- H1-z

Note: z = "A1" for Vf bin of 3.0-3.1V; z = "A2" for Vf bin of 3.1-3.2V; z = "B1" for Vf bin of 3.2-3.3V; z = "B2" for Vf bin of 3.3-3.4V

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Mechanical Dimensions

Chip Size	1150 +/-30 μm \times 1150 +/-30 μm (45 mil \times 45 mil)
Chip Thickness	150 \pm 10 μm (5.9 mil)
Au Pad Thickness	3.6 \pm 0.3 μm
Au Pad Diameter	P Pad (2X): 90 μm N Pad (2X): 100 μm

Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating	Condition
DC Forward Current	I_f	700 mA ¹	$T_j = 140^\circ\text{C}$
Forward Voltage	V_f	3.4 V	$I_f = 350\text{ mA}$
Junction Temperature	T_j	150°C	
Reverse Voltage	V_r	-5 V	$T_a = 25^\circ\text{C}$
Reverse Current	I_r	2.0 μA	$V_r = -5\text{ V}$
Optical Power (minimum)	P_0	340 mW	$I_f = 350\text{ mA}$
Assembly Process Temperature		325°C for < 5 seconds	
Storage Conditions (chip on tape) ⁶		0°C to +40°C ambient, RH < 65%	

Notes:

1. Maximum drive current depends on junction temperature, die attach methods/materials, and lifetime requirements of the application.
2. Bridgelux LED chips are Class 1 ESD sensitive.
3. The typical spectra half-width of the BXFE4545 blue power die is < 25 nm.
4. Please consult the Bridgelux technical support team for information on how to optimize the light output of our chips in your package.
5. Brightness values are measured in an integrating sphere using gold plated TO39 headers without encapsulation.
6. Tapes should be stored in a vertical orientation, not horizontally stacked. Stacking of tapes can place excessive pressure on the bond pads of the LED, resulting in reduced wire bonding strength.

Environmental Compliance

Bridgelux is committed to providing environmentally friendly products to the solid state lighting market. Bridgelux BXFE4545 blue power die are compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS directive. Bridgelux will not intentionally add the following restricted materials to BXFE4545 die products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

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Performance vs. Current

The following curves represent typical performance of the BXFE4545 blue power die. Actual performance will vary slightly for different power and dominant wavelength bins

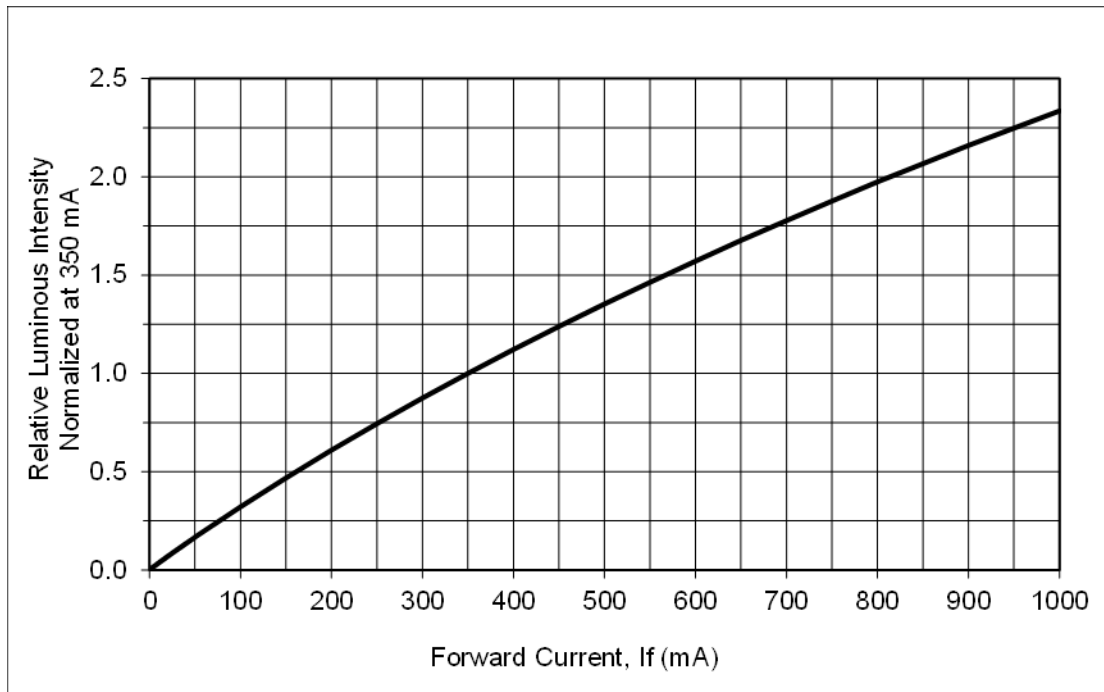


Figure 1: Relative Luminous Intensity vs. Forward Current (device tested on a probe station)

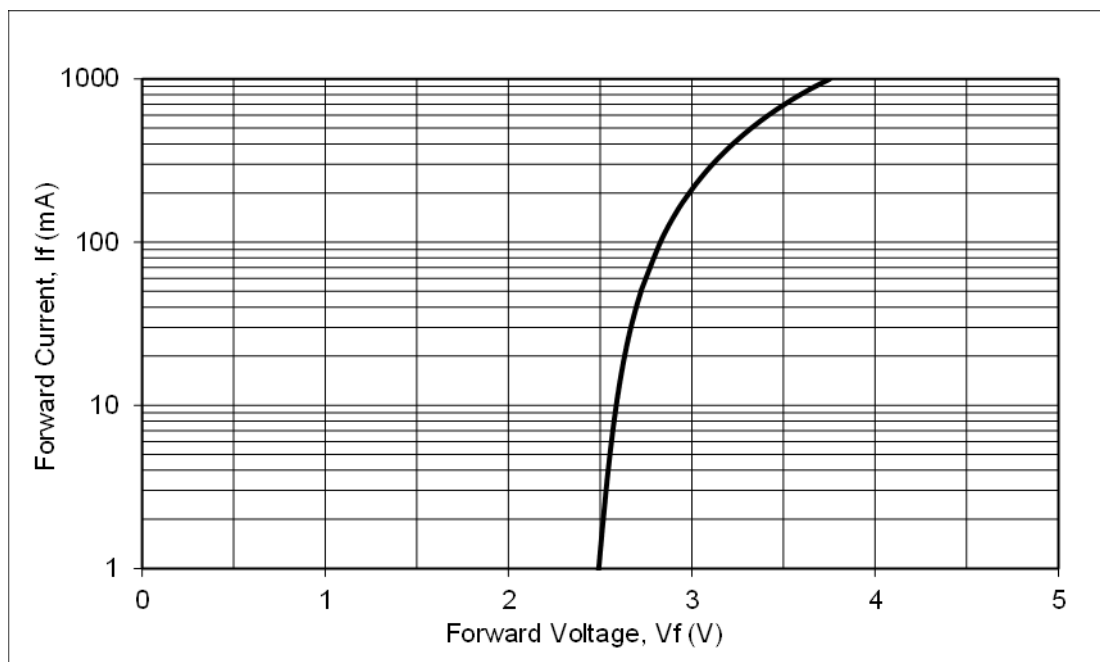


Figure 2: Forward Current vs. Forward Voltage ($T_j = 25^\circ\text{C}$)

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Performance vs. Junction Temperature

The following curves represent typical performance of the BXFE4545 blue power die. Actual performance will vary slightly for different power and dominant wavelength bins.

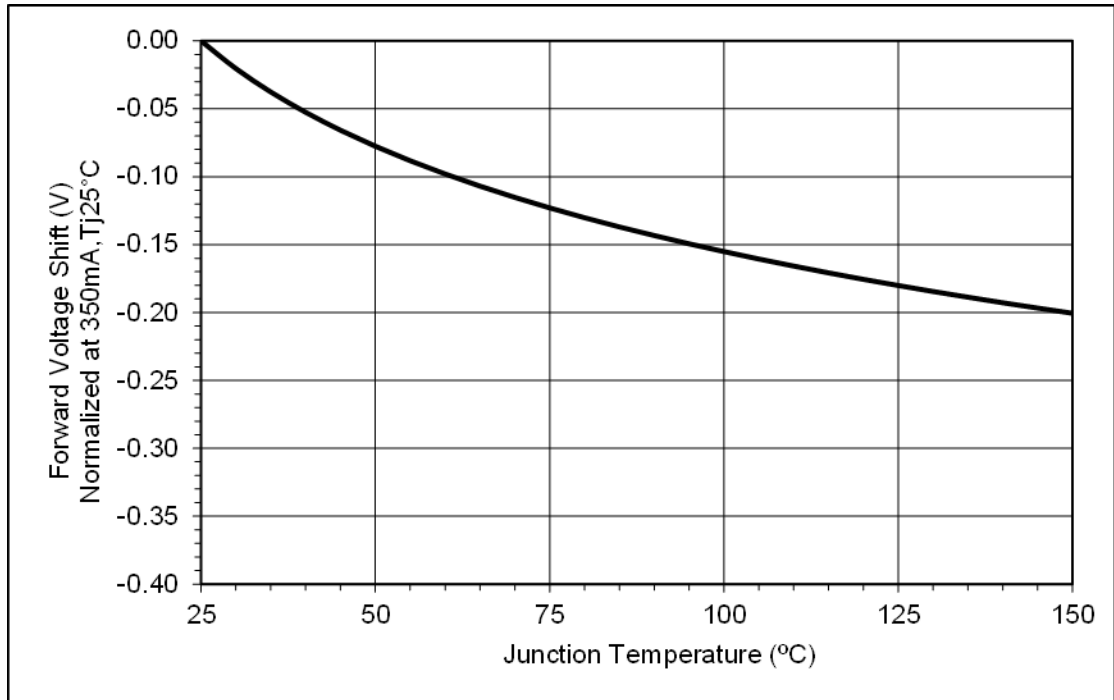


Figure 3: Forward Voltage vs. Junction Temperature

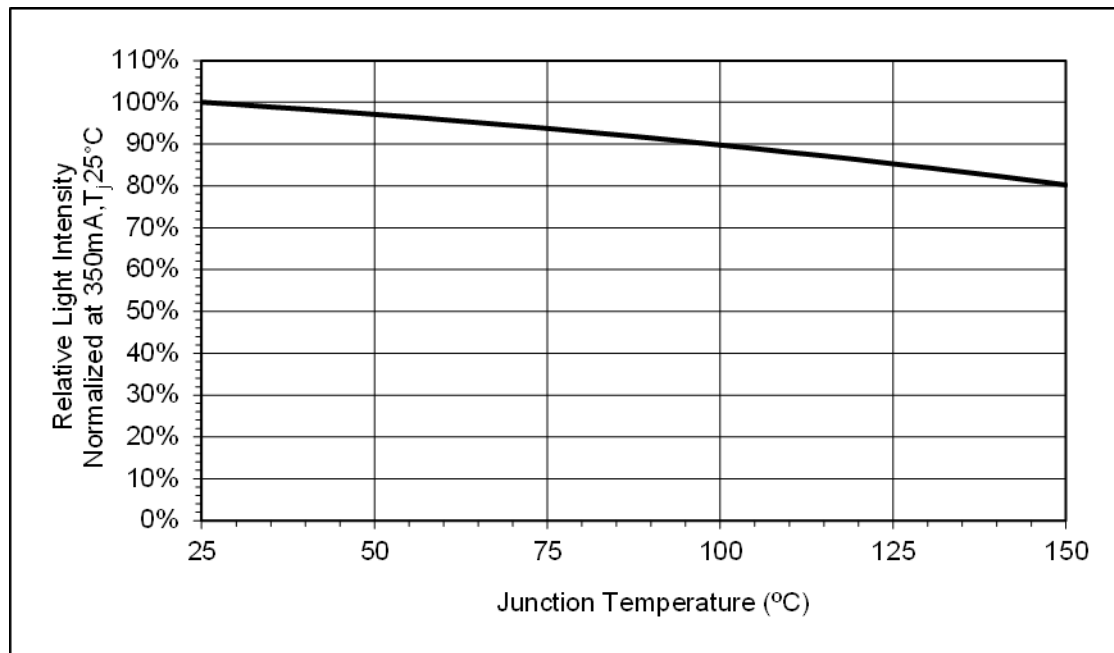


Figure 4: Relative Light Output vs. Junction Temperature

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Wavelength Shift

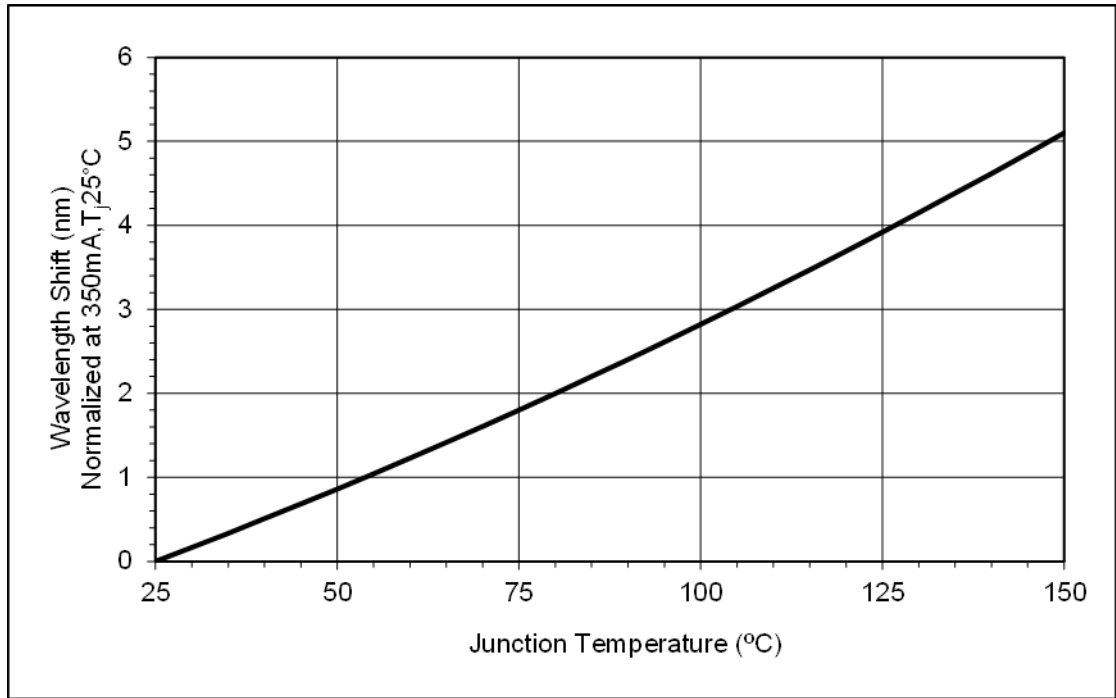


Figure 5: Wavelength Shift vs. Junction Temperature

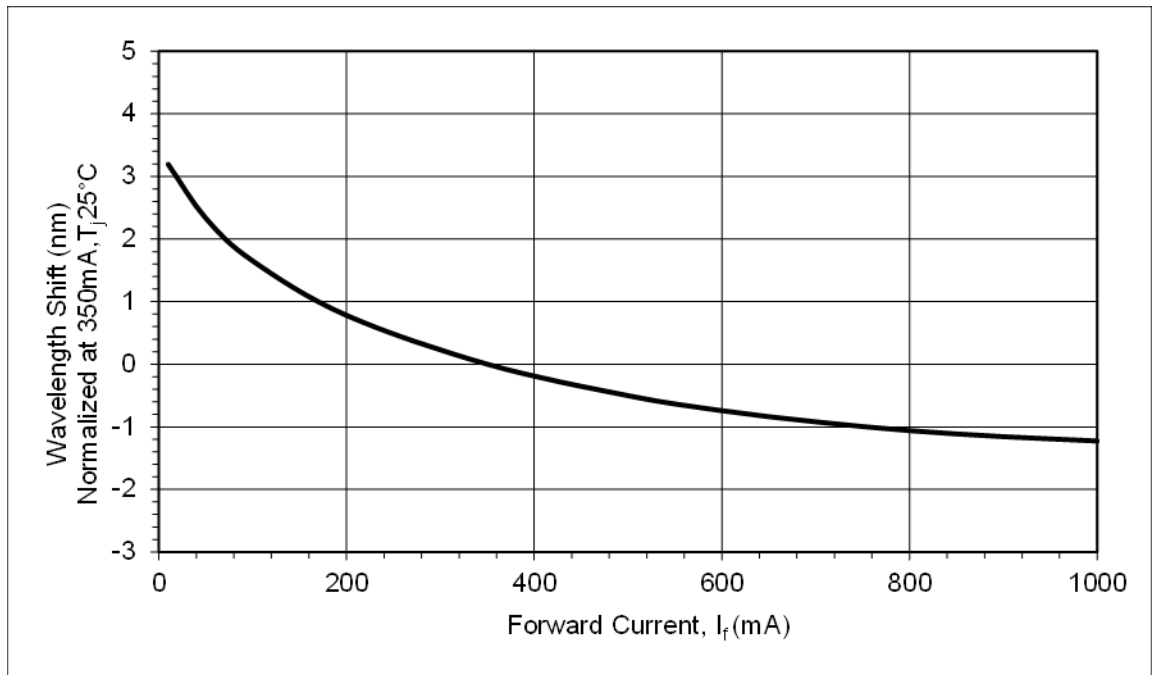


Figure 6: Wavelength Shift vs. Forward Current

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Typical Radiation Pattern

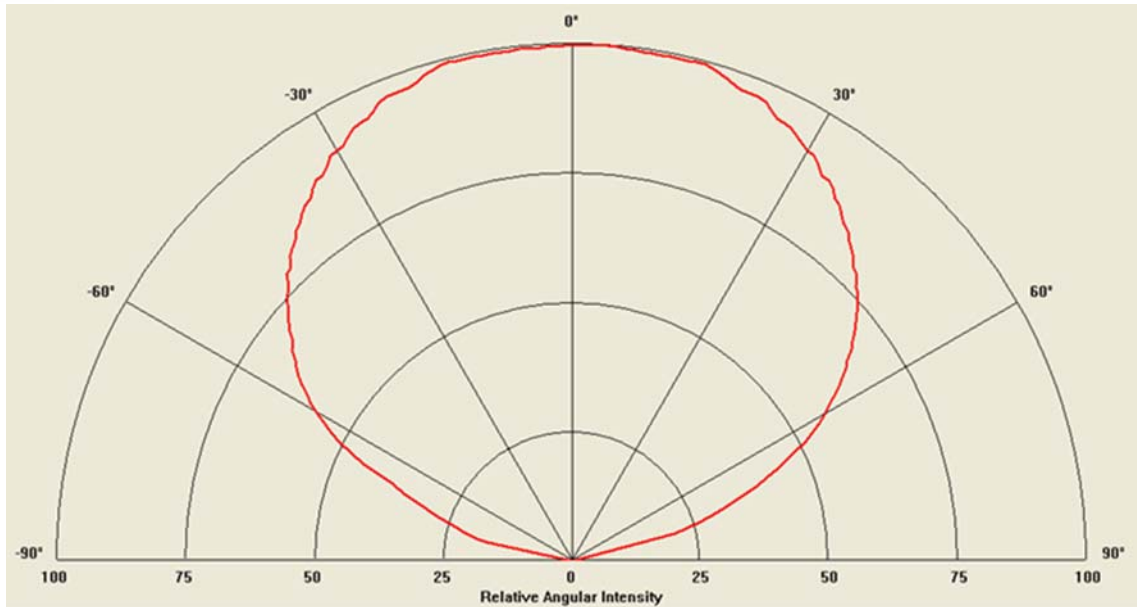


Figure 7: Typical Radiation Pattern (350 mA Operation)

Current De-rating Curves

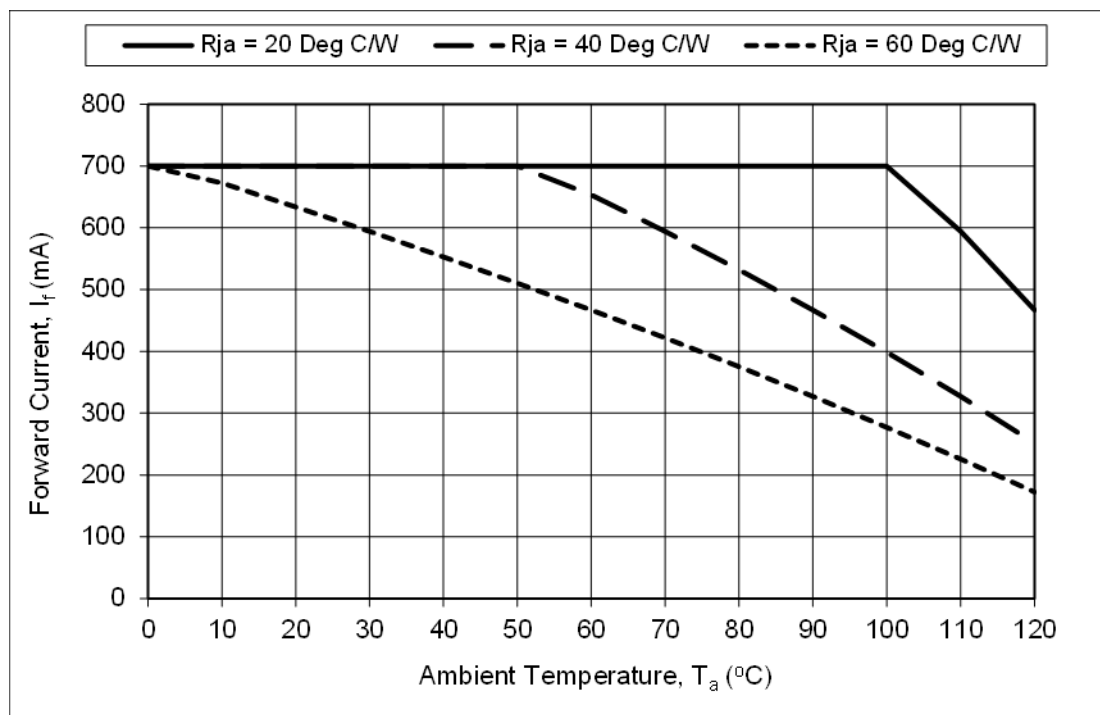


Figure 8: Current De-rating Curve vs. Ambient Temperature (derating based on T_j max 150°C)

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About Bridgelux

Bridgelux is a leading developer and manufacturer of technologies and solutions transforming the \$40 billion global lighting industry into a \$100 billion market opportunity. Based in Livermore, California, Bridgelux is a pioneer in solid-state lighting (SSL), expanding the market for light-emitting diode (LED) technologies by driving down the cost of LED lighting systems. Bridgelux's patented light source technology replaces traditional technologies (such as incandescent, halogen, fluorescent and high intensity discharge lighting) with integrated, solid-state lighting solutions that enable lamp and luminaire manufacturers to provide high performance and energy-efficient white light for the rapidly growing interior and exterior lighting markets, including street lights, commercial lighting and consumer applications. Bridgelux is the only vertically integrated LED manufacturer and developer of solid-state light sources that designs its solutions specifically for the lighting industry.

For more information about the company, please visit www.bridgelux.com

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