Light is OSRAM

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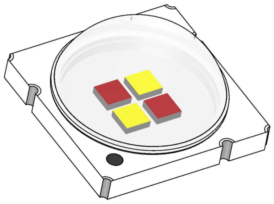
Our Brand
LED ENGIN

LuxiGen™ Multi-Color Emitter Series

LZ4 Infrared 940nm + White 5500K LED Emitter

LZ4-00RW08



Key Features

- Infrared 940nm and White 5500K integrated in one surface mount ceramic LED package with integrated dome glass lens.
- Individually addressable die
- Electrically neutral thermal path
- Ultra-small foot print – 7.0mm x 7.0mm
- Low Thermal Resistance (2.8°C/W)
- JEDEC Level 1 for Moisture Sensitivity Level
- Lead (Pb) free and RoHS compliant
- Reflow solderable (up to 6 cycles)

Typical Applications

- Surveillance
- Machine Vision

Note

This product emits non-visible light, which can be hazardous depending on total system configuration (including, but not limited to optics, drive current and temperature). Do not stare directly into the beam and observe safety precaution given in IEC 62471 when operating this product.

Custom part number

Base part number

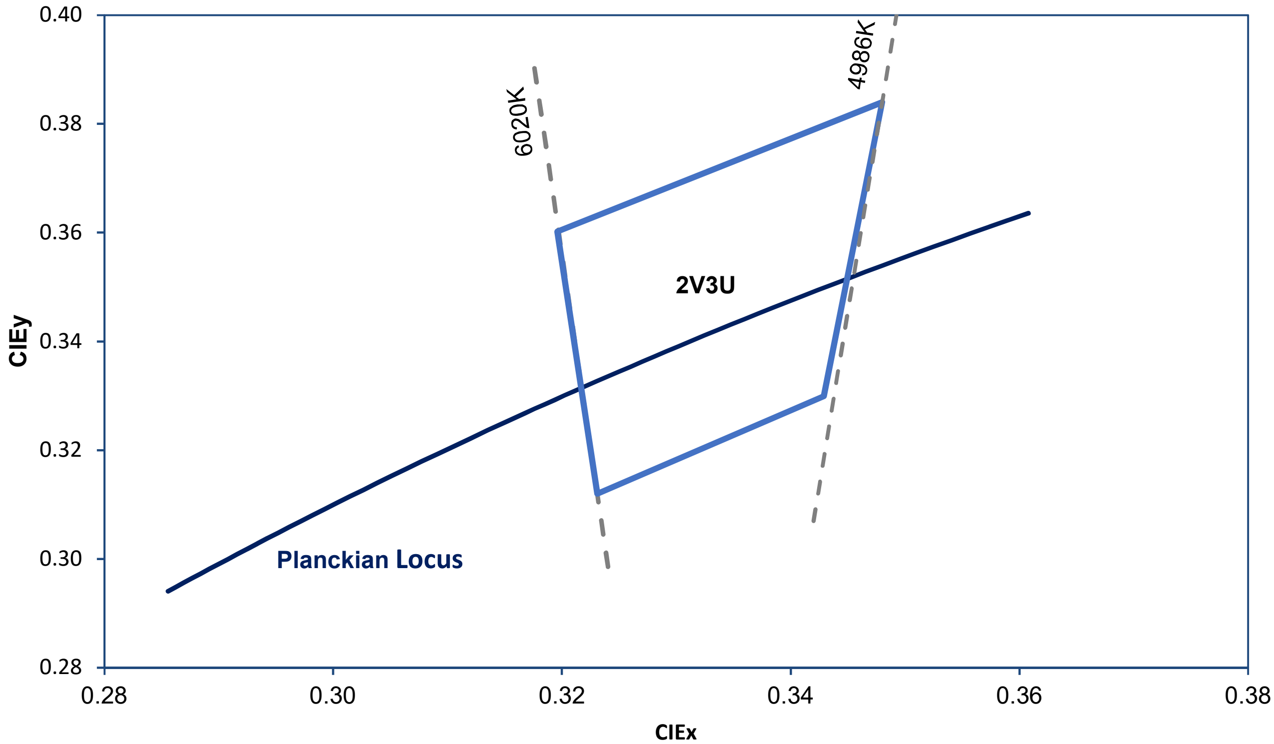
Part number	Description
LZ4-00RW08-xxxx	LZ4 Infrared 940nm + White 5500K Emitter

Bin kit option codes

RW, Infrared 940nm + CW (typ. 5500K)

Kit number suffix	Min flux bin	Wavelength bin range	Description
R755	PQ	F09	940nm, full distribution flux; full distribution wavelength
	ST	2V3U	White 5500K, full distribution flux; full distribution color coordinates

White Chromaticity Group



Standard Chromaticity Group plotted on excerpt from the CIE 1931 (2°) x-y Chromaticity Diagram.

Coordinates are listed below.

White Bin Coordinates

Bin Code	CIEx	CIEy
2V3U	0.3196	0.3602
	0.348	0.384
	0.3429	0.3299
	0.3231	0.312
	0.3196	0.3602

Luminous Flux Bins

Table 1:

Bin Code	Minimum Flux (Φ) @ I_F = 700mA [1] (lm) W 2x IR	Minimum Flux (Φ) @ I_F = 700mA [1] (lm) Lm 2x CW	Maximum Flux (Φ) @ I_F = 700mA [1] (lm) W 2x IR	Maximum Flux (Φ) @ I_F = 700mA [1] (lm) Lm 2x CW
PQ	1.6		2.4	
ST		356		556

Note for Table 1:

1. Flux performance is measured at 10ms pulse, T_C = 25°C. LED Engin maintains a tolerance of ±10% on flux measurements.

Wavelength Bins

Table 2:

Bin Code	Minimum Peak Wavelength (λ_p) @ I_F = 700mA[1] (nm) 2x IR	Maximum Peak Wavelength (λ_p) @ I_F = 700mA[1] (nm) 2x IR
F09	920	960

Note for Table 2:

1. Wavelength is measured at 10ms pulse, TC = 25°C. LED Engin maintains a tolerance of ± 2.0nm on peak wavelength measurements.

Forward Voltage Bin

Table 3:

Bin Code	Minimum Forward Voltage (V_F) @ I_F = 700mA[1] (V) 2x IR	Minimum Forward Voltage (V_F) @ I_F = 700mA[1] (V) 2x CW	Maximum Forward Voltage (V_F) @ I_F = 700mA[1] (V) 2x IR	Maximum Forward Voltage (V_F) @ I_F = 700mA[1] (V) 2x CW
0	5.4	5.6	7.4	7.6

Note for Table 3:

1. F Forward voltage is measured at 10ms pulse, Tc = 25ºC. LED Engin maintains a tolerance of ± 0.08V on forward voltage measurements.

Absolute Maximum Ratings

Table 4:

Parameter	Symbol	Value	Unit
DC Forward Current	I_F	1500	mA
Peak Pulsed Forward Current [2] IR CW	I_{FP}	 5000 1500	mA
Reverse Voltage	V_R	See Note 3	V
Storage Temperature	T_{stg}	-40 ~ +145	°C
Junction Temperature	T_J	145	°C
Soldering Temperature [4]	T_{sol}	260	°C
Allowable Reflow Cycles		6	
ESD Sensitivity [5]		ESD Sensitive Device Class 0 ANSI/ ESDA/ JEDEC JS-001 HBM	

Notes for Table 4:

1. Maximum DC forward current is determined by thermal resistance and case temperature. Follow Figure 12 for current derating.
2. Pulse forward current conditions for IR: pulse width ≤ 150µs and Duty Cycle ≤ 10%; for CW: Pulse Width ≤ 10msec and Duty Cycle ≤ 10%.
3. LEDs are not designed to be reversing biased.
4. Solder conditions per JEDEC 020D. See Reflow Soldering Profile Figure 4.
5. LED Engin recommends taking reasonable precautions towards possible ESD damages and handling the emitter in an electrostatic protected area (EPA). An EPA may be adequately protected by ESD controls as outlined in ANSI/ESD S6.1.

Optical Characteristics @ T_C = 25°C

Table 5:

Parameter	Symbol	Typical		Unit
		2x IR	2x CW	
Flux (@ I_F = 700mA)	Φ	1.9 W	480 lm	
Flux (@ I_F = 1500mA)	Φ	3.8 W	850 lm	
Peak Wavelength (@ I_F = 700mA)	λ_P	940		nm
Correlated Color Temperature	CCT		5500	K
Viewing Angle [1]	$2\Theta_{½}$	95		Degrees
Total Included Angle [2]	$\Theta_{0.9}$	125		Degrees

Notes for Table 5:

1. Viewing Angle is the off axis angle from emitter centerline where the luminous intensity is ½ of the peak value
2. Total Included Angle is the total solid cone angle that includes 90% of the total luminous flux.

Electrical Characteristics @ T_C = 25°C

Table 6:

Parameter	Symbol	Typical 2x IR	Typical 2x CW	Unit
Forward Voltage (@ I_F = 700mA)	V_F	5.6	6.4	V
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T_J$	-4.0	-4.0	mV/°C
Thermal Resistance, electrical (Junction to Case)	$R\Theta_{J\text{-}C,\ el}$	2.8		°C/W

IPC/JEDEC Moisture Sensitivity Level

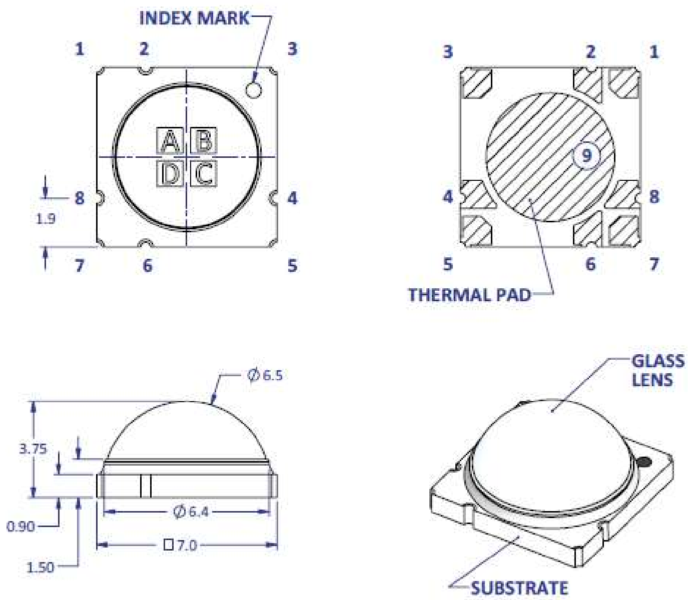
Table 7 - IPC/JEDEC J-STD-20 MSL Classification:

	Floor Life		Soak Requirements: Standard		Soak Requirements: Accelerated	
Level	Time	Conditions	Time (hrs)	Conditions	Time (hrs)	Conditions
1	Unlimited	≤ 30°C/ 85% RH	168 +5/-0	85°C/ 85% RH	n/a	n/a

Note for Table 7:

1. The standard soak time is the sum of the default value of 24 hours for the semiconductor manufacturer's exposure time (MET) between bake and bag and the floor life of maximum time allowed out of the bag at the end user of distributor's facility.

Mechanical Dimensions (mm)



Pin Out			
Pad #	Die	Color	Function
1	A	IR	Anode
2	A	IR	Cathode
3	B	CW	Anode
4	B	CW	Cathode
5	C	IR	Anode
6	C	IR	Cathode
7	D	CW	Anode
8	D	CW	Cathode
9 [2]	n/a	n/a	Thermal

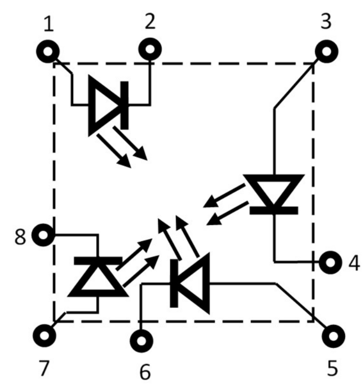


Figure 1: Package outline drawing.

Notes for Figure 1:

1. Unless otherwise noted, the tolerance = ± 0.20 mm.
2. Thermal contact, Pad 9, is electrically neutral.
3. Tc (case temperature) point is Pad 9. Because it is not easily accessible, the recommended temperature measurement point is side of the substrate.

Recommended Solder Pad Layout (mm)

Non-pedestal MCPCB Design | **Pedestal MCPCB Design**

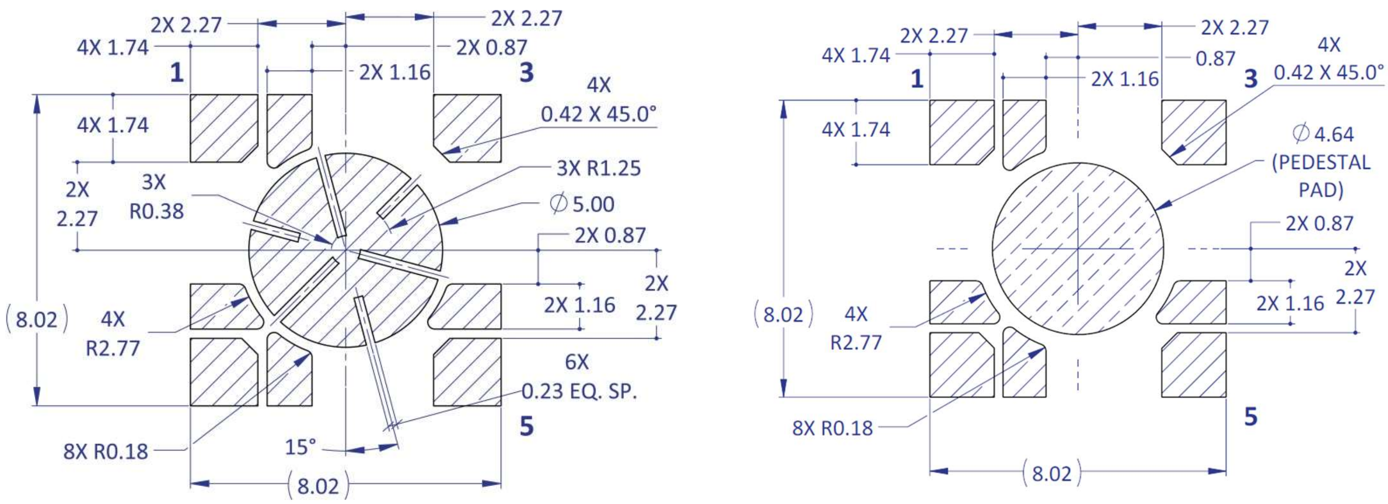


Figure 2a: Recommended solder pad layout for anode, cathode, and thermal pad for non-pedestal and pedestal design

Notes for Figure 2a:

1. Unless otherwise noted, the tolerance = ± 0.20 mm.
2. Pedestal MCPCB allows the emitter thermal slug to be soldered directly to the metal core of the MCPCB. Such MCPCB eliminate the high thermal resistance dielectric layer that standard MCPCB technologies use in between the emitter thermal slug and the metal core of the MCPCB, thus lowering the overall system thermal resistance.
3. LED Engin recommends x-ray sample monitoring for solder voids underneath the emitter thermal slug. The total area covered by solder voids should be less than 20% of the total emitter thermal slug area. Excessive solder voids will increase the emitter to MCPCB thermal resistance and may lead to higher failure rates due to thermal over stress.

Recommended Solder Mask Layout (mm)

Non-pedestal MCPCB Design | **Pedestal MCPCB Design**

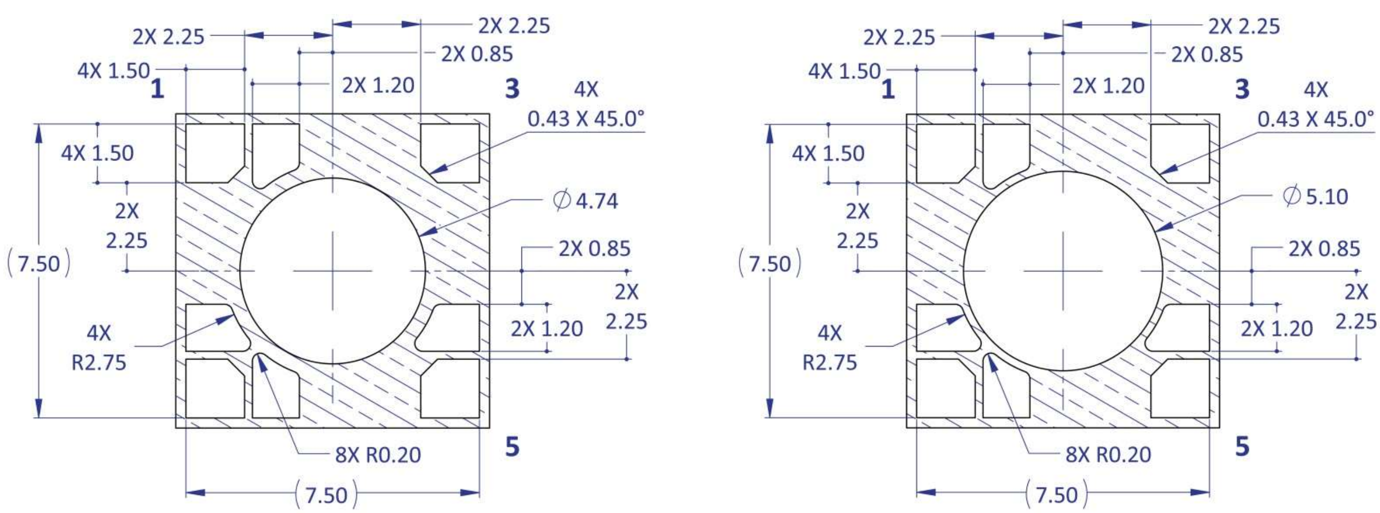
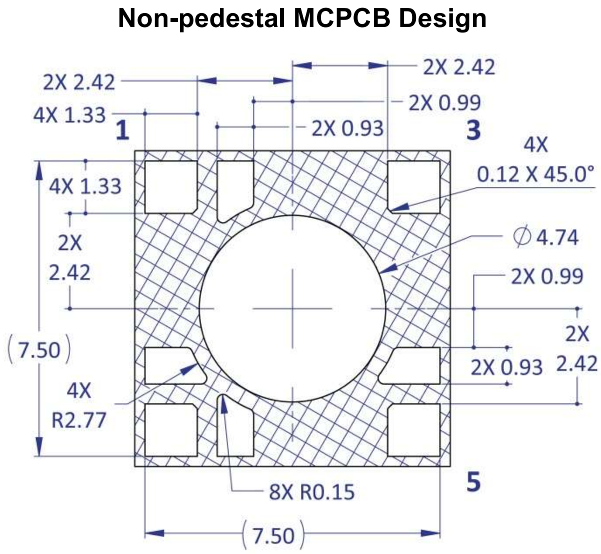


Figure 2b: Recommended solder mask opening for anode, cathode, and thermal pad for non-pedestal and pedestal design

Note for Figure 2b:

1. Unless otherwise noted, the tolerance = ± 0.20 mm.

Recommended 8 mil Stencil Apertures Layout (mm)



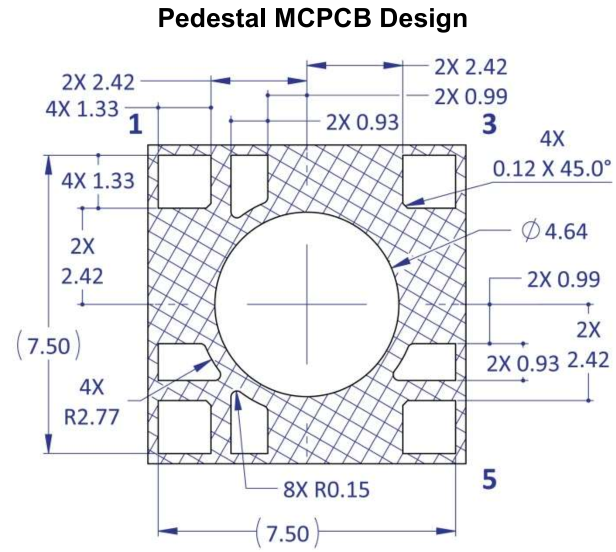


Figure 2c: Recommended 8mil stencil apertures for anode, cathode, and thermal pad for non-pedestal and pedestal design

Note for Figure 2c:

1. Unless otherwise noted, the tolerance = ± 0.20 mm.

Reflow Soldering Profile

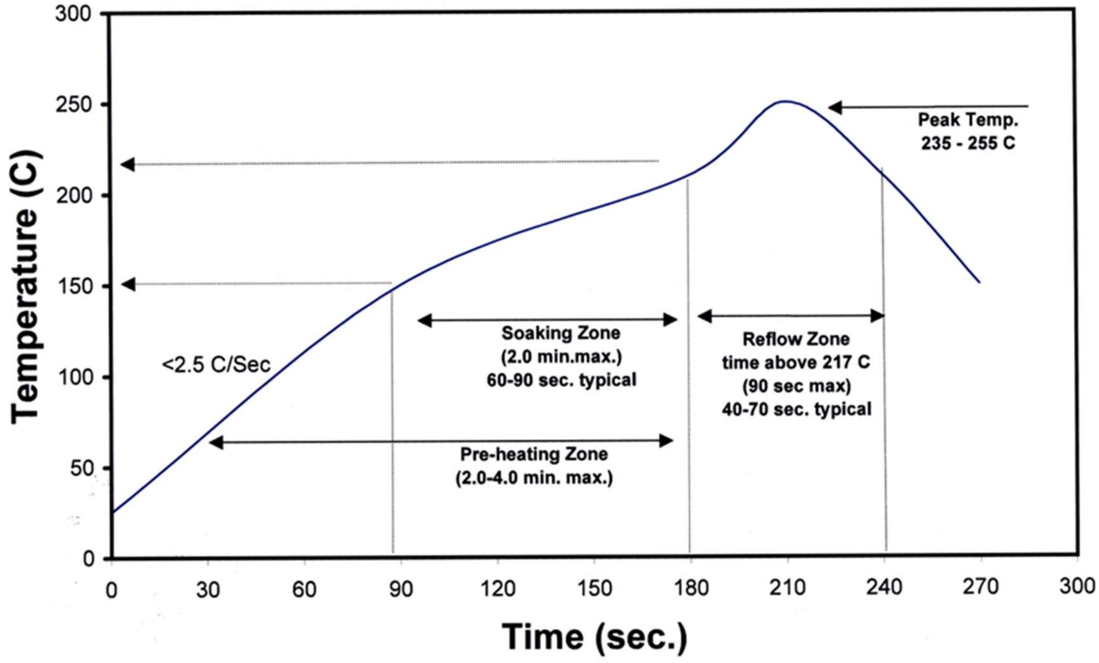


Figure 3: Reflow soldering profile for lead free soldering

Typical Radiation Pattern

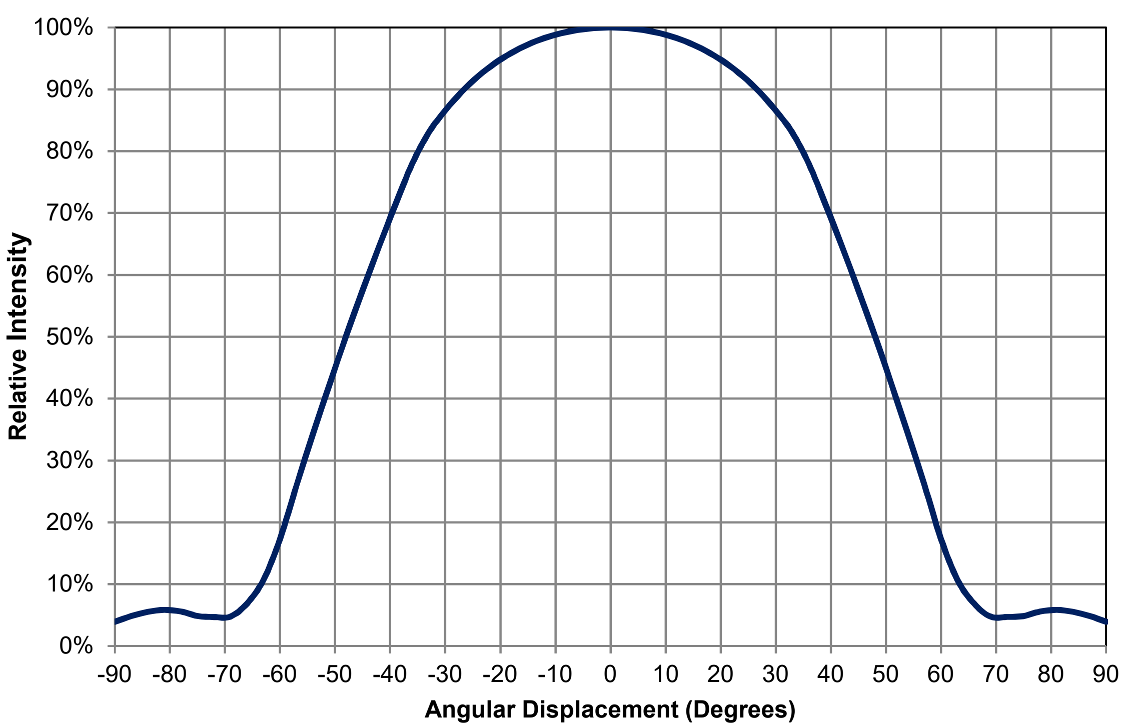


Figure 4: Typical representative spatial radiation pattern

Typical Relative Spectral Power Distribution

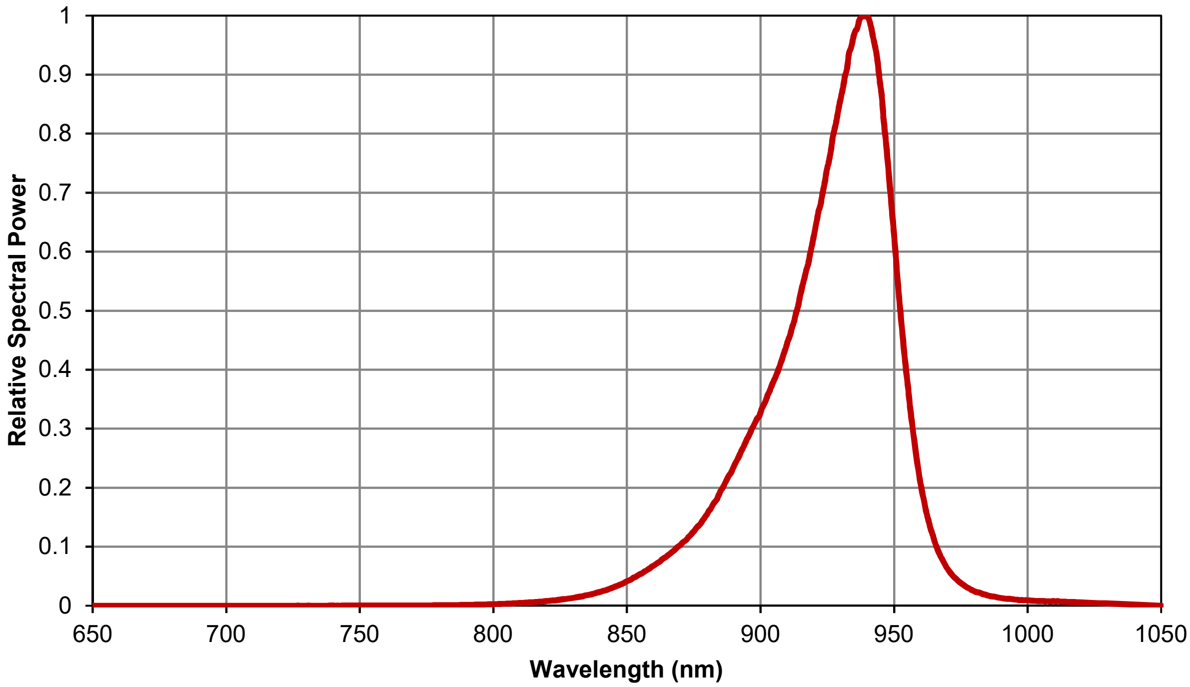


Figure 5a: Relative spectral power vs. wavelength @ T_C = 25°C – IR 940nm

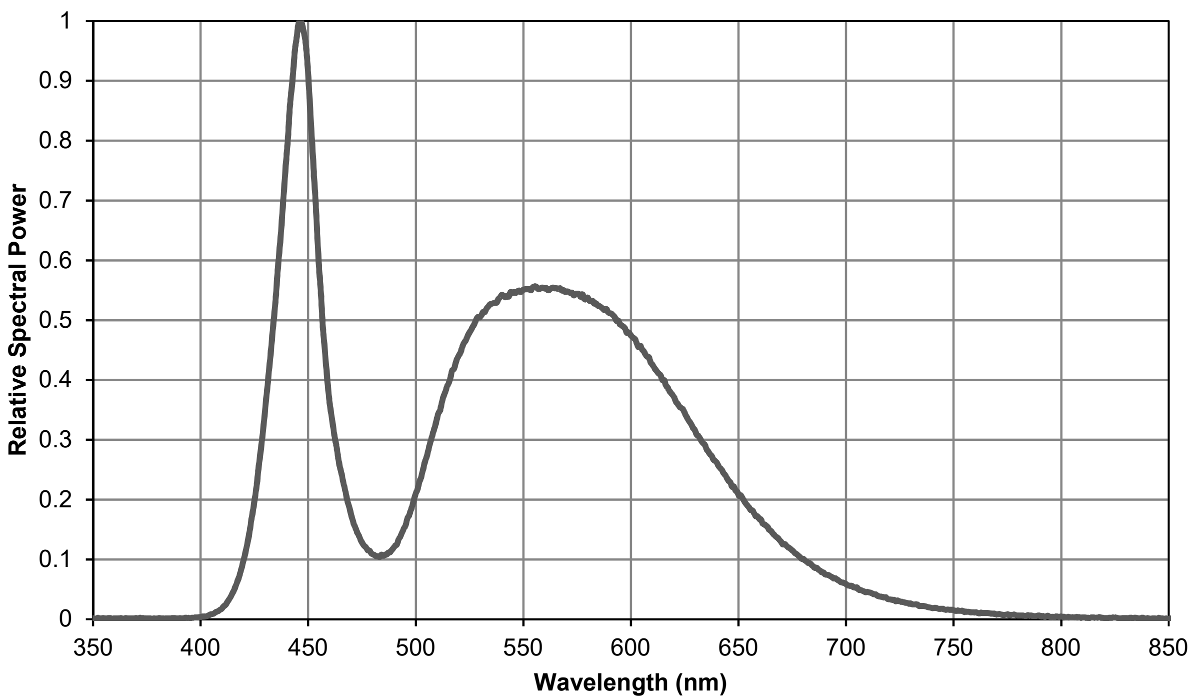


Figure 5b: Relative spectral power vs. wavelength @ T_C = 25°C – White 5500K

Typical Relative Light Output over Current

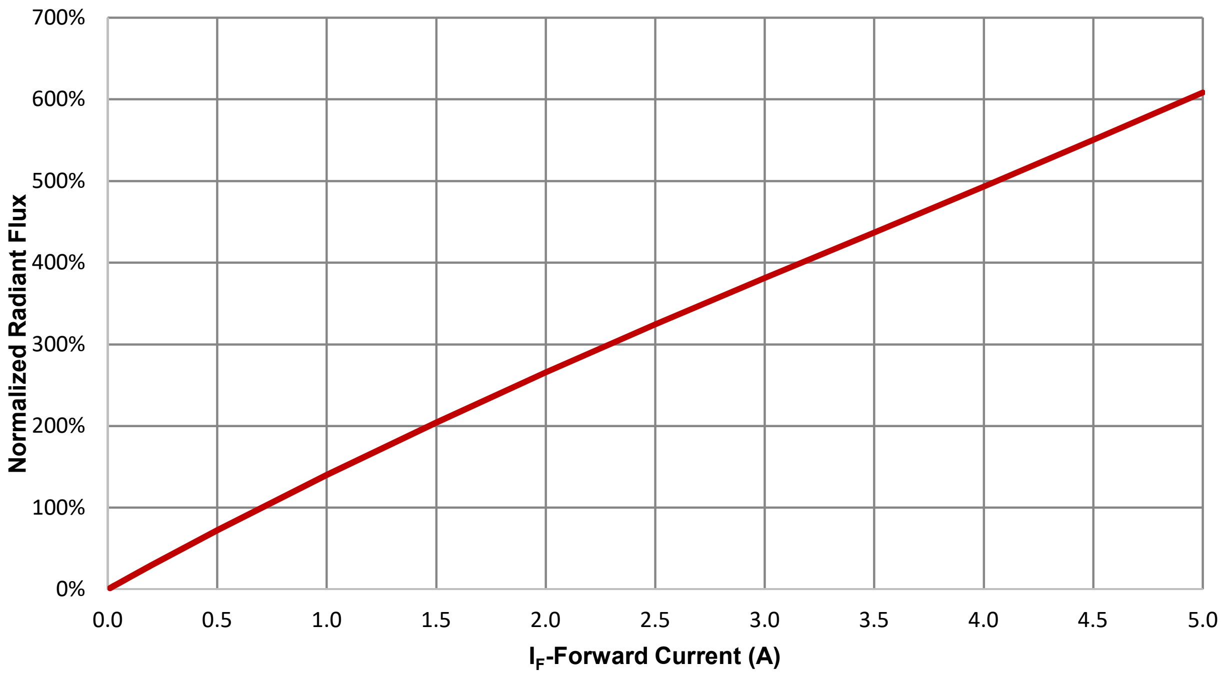


Figure 6a: Typical normalized radiant flux vs. forward current – IR 940nm

@ T_C = 25°C, 100μs pulse

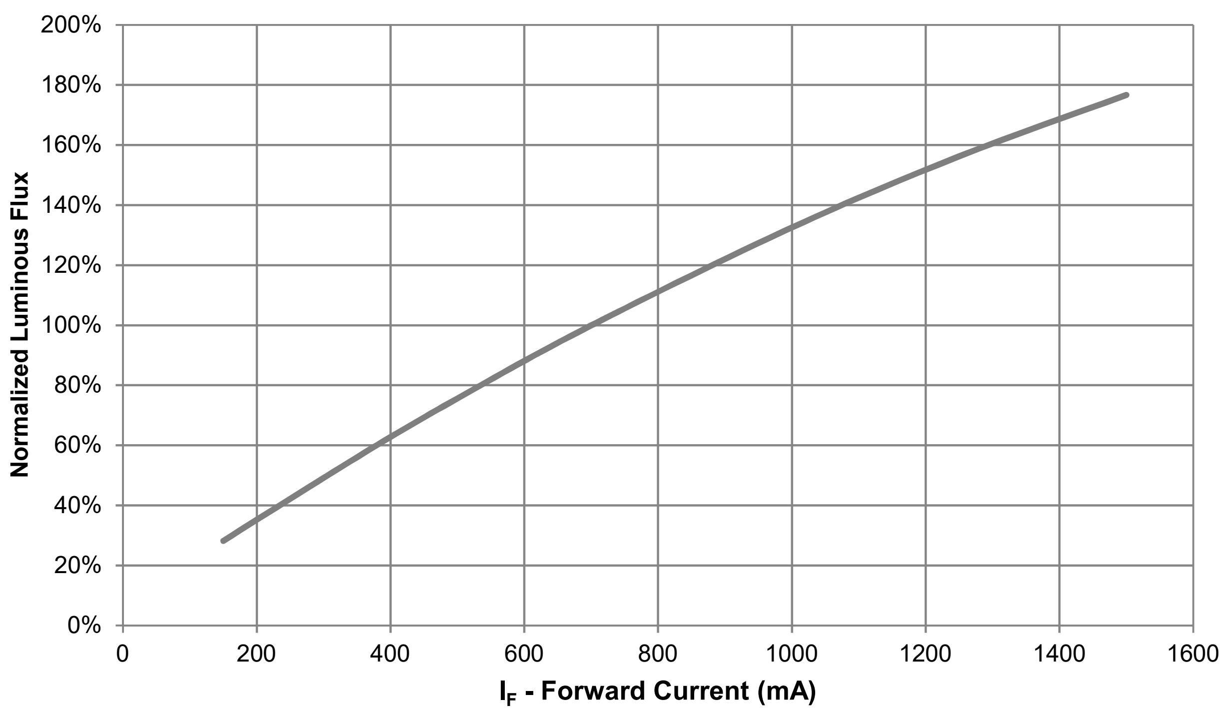


Figure 6b: Typical normalized luminous flux vs. forward current – CW 5500K

@ T_C = 25°C, 10 ms pulse

Typical Relative Light Output over Temperature

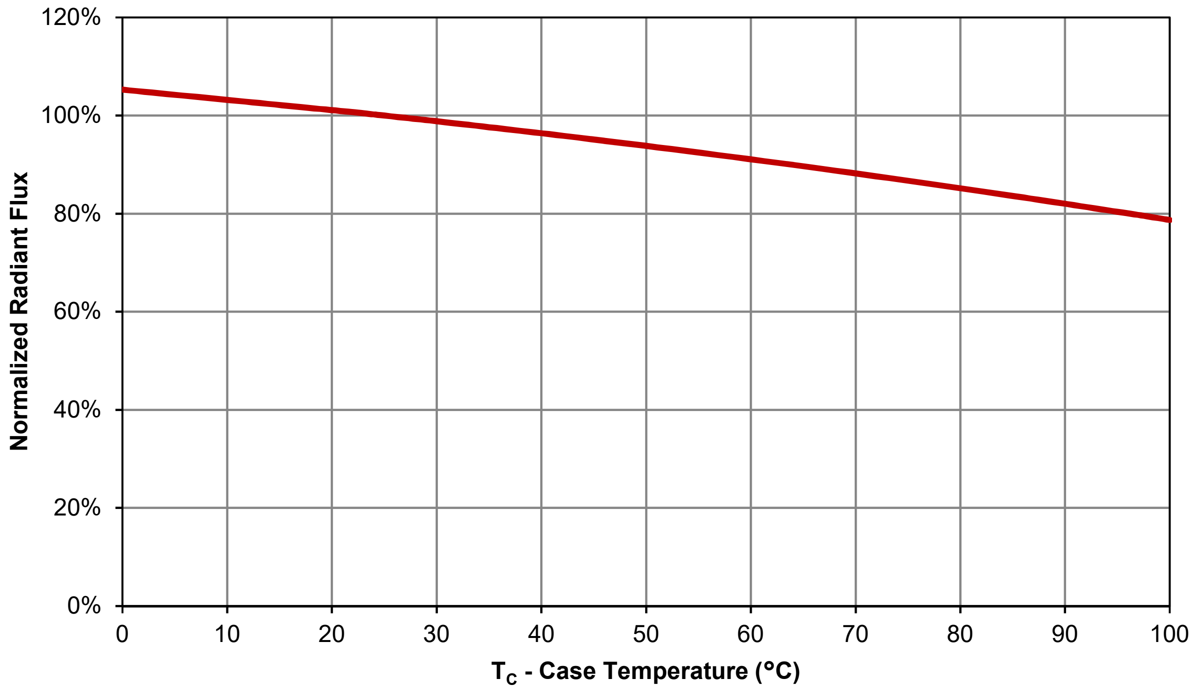


Figure 7a: Typical relative light output vs. case temperature @700mA, 10 ms pulse – IR 940nm

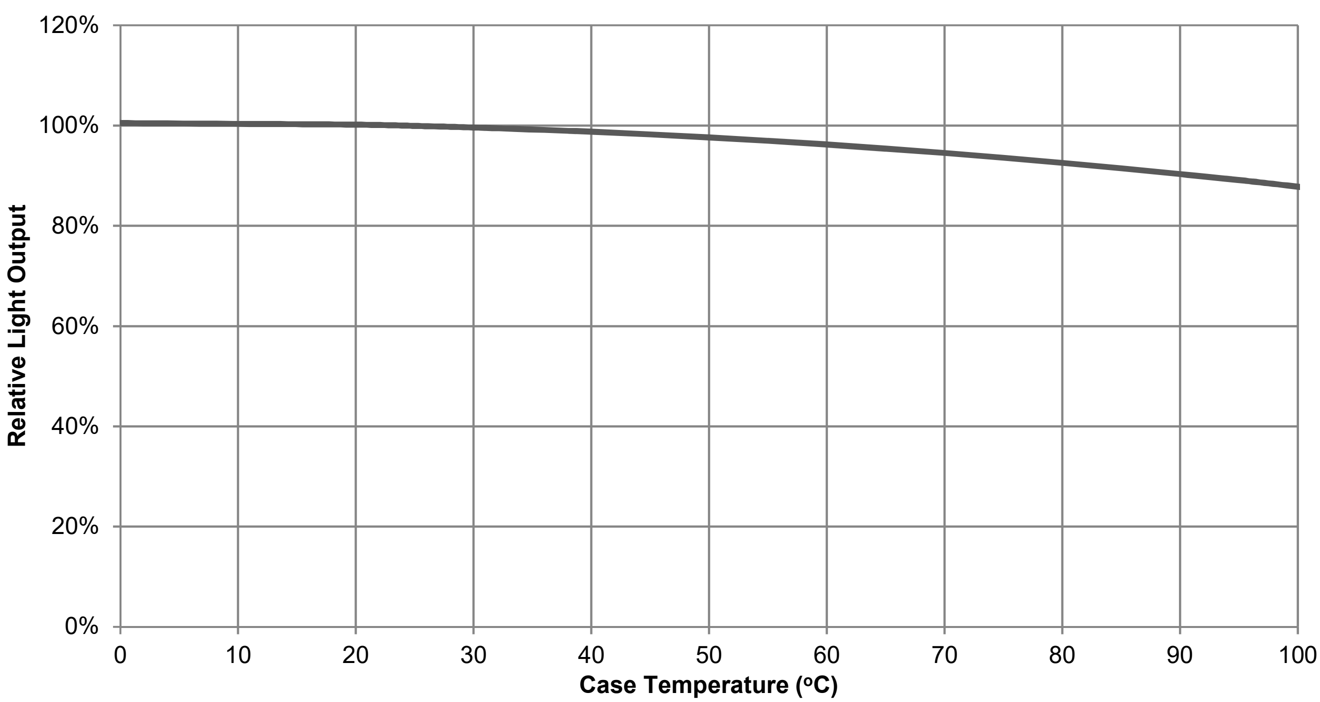


Figure 7b: Typical relative light output vs. case temperature @700mA, 10 ms pulse – White 5500K

Typical Peak Wavelength Shift over Current

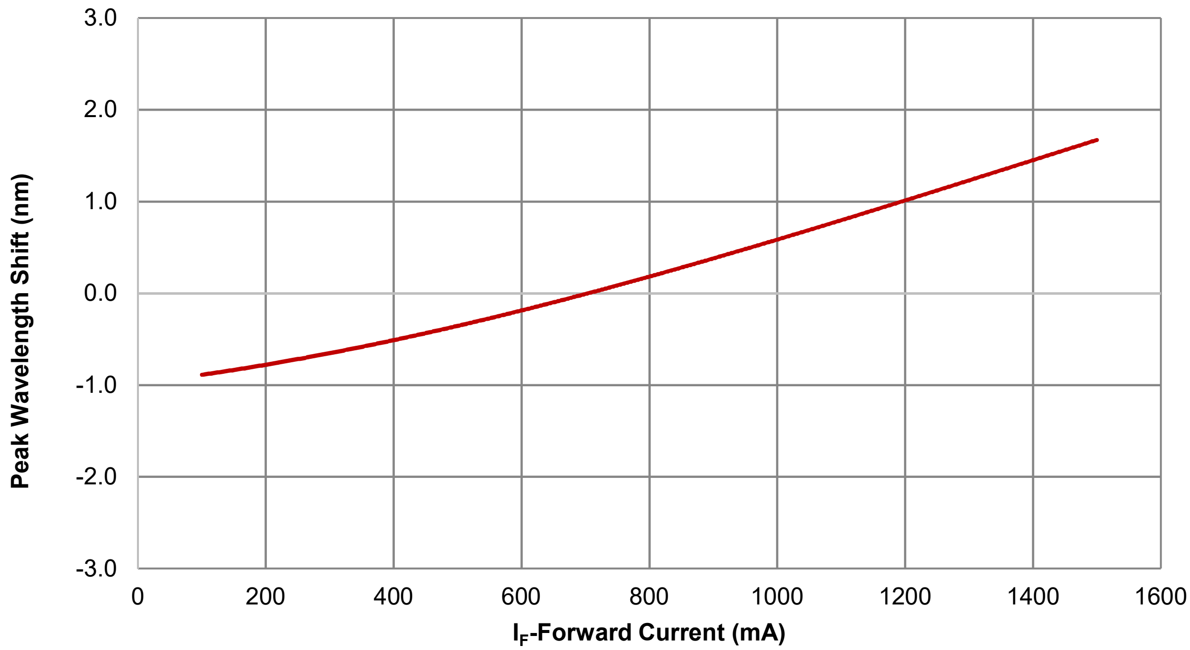


Figure 8a: Typical peak wavelength shift vs. forward current @ Tc = 25°C, 10 ms pulse – IR 940nm

Typical Chromaticity Coordinate Shift over Current

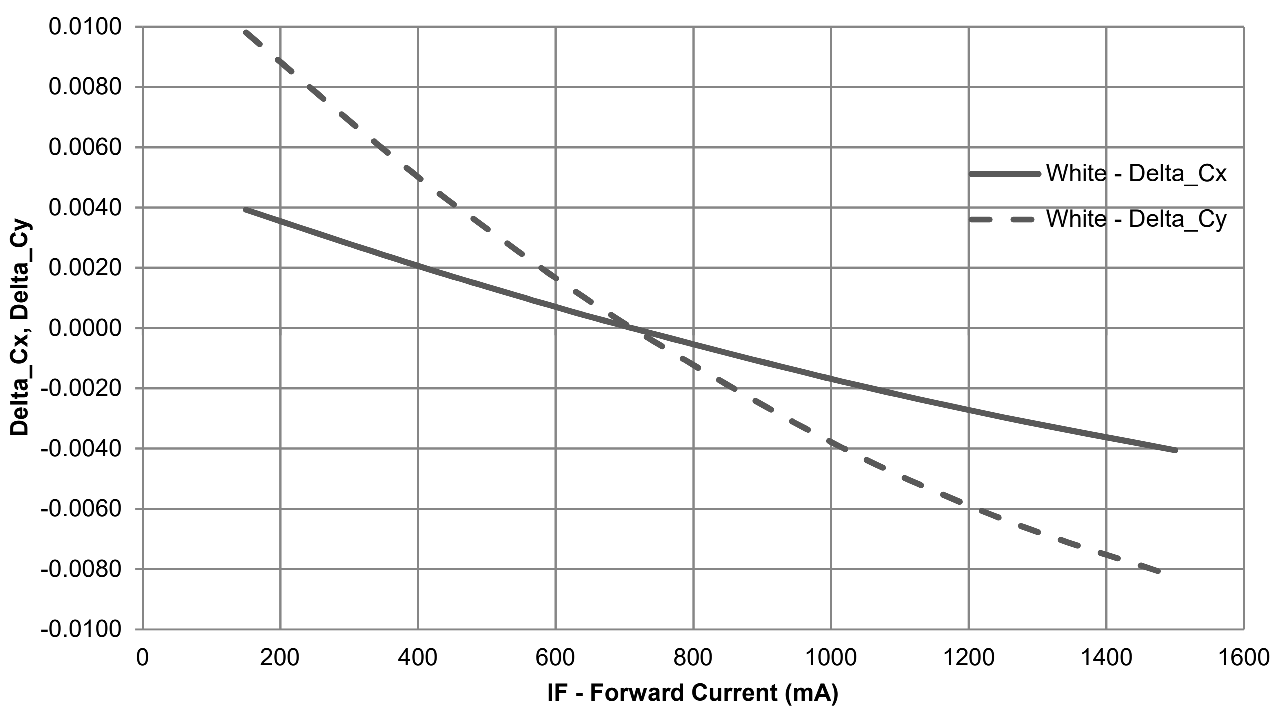


Figure 8b: Typical chromaticity coordinate shift vs. forward current @ Tc = 25°C, 10 ms pulse – White 5500K

Typical Peak Wavelength Shift over Temperature

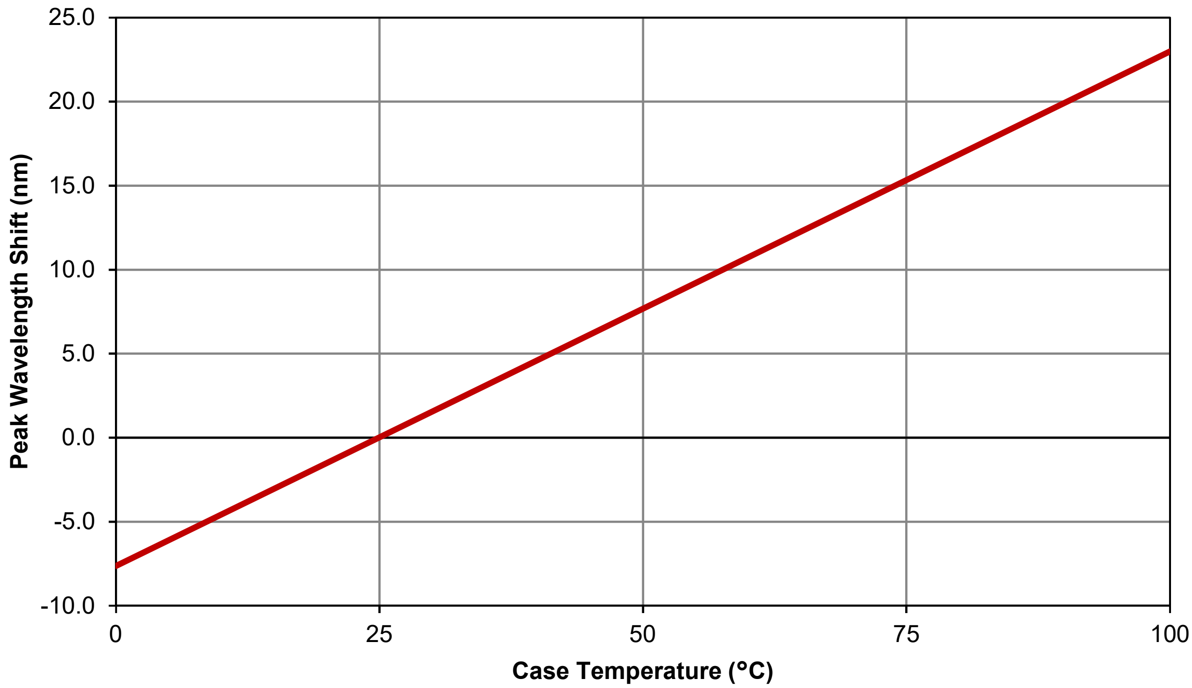


Figure 9a: Typical peak wavelength shift vs. case temperature @700mA, 10 ms pulse – IR 940nm

Typical Chromaticity Coordinate Shift over Temperature

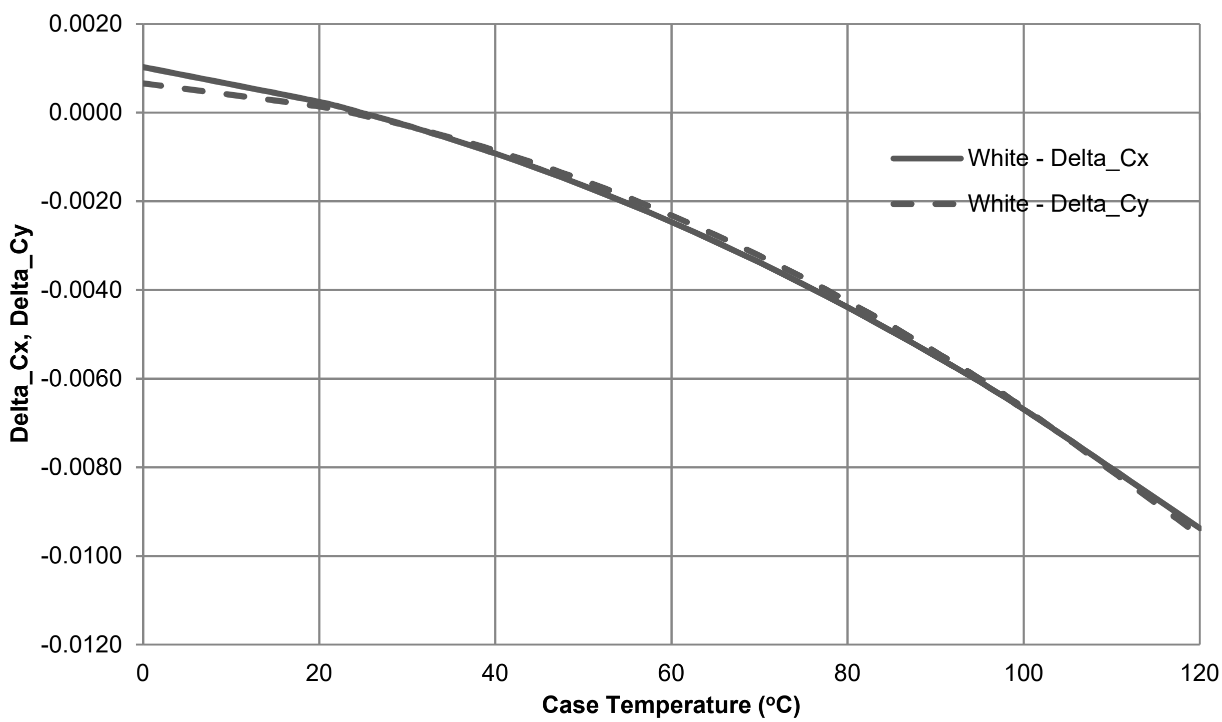


Figure 9b: Typical chromaticity coordinate shift vs. case temperature @700mA, 10 ms pulse – White 5500K

Typical Forward Current Characteristics

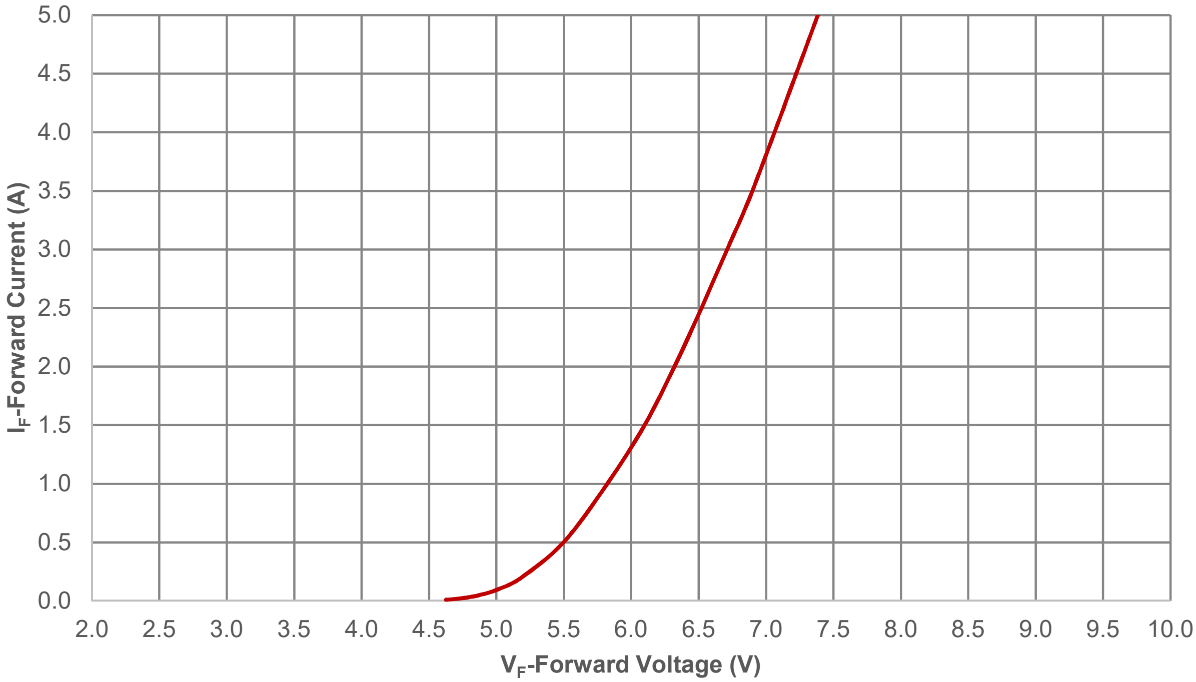


Figure 10a: Typical forward current vs. forward voltage @ T_C = 25°C, 100us pulse - IR 940nm (2 dies in series)

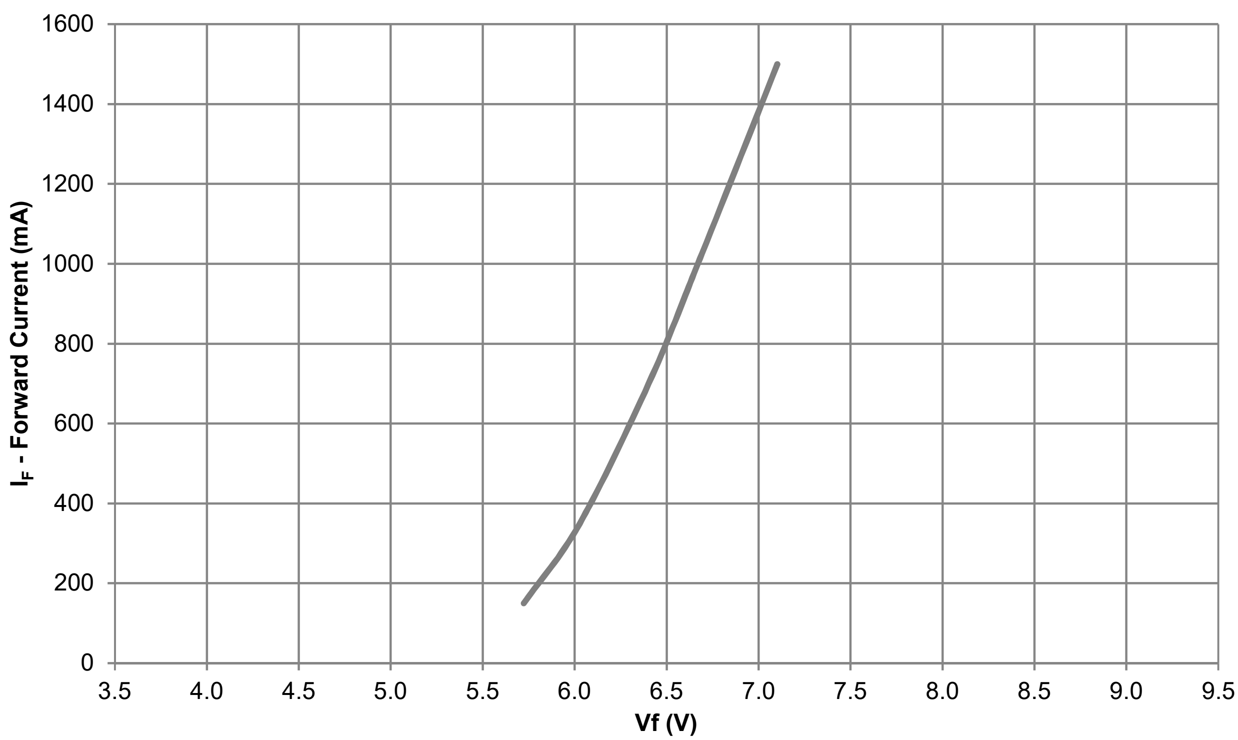


Figure 10b: Typical forward current vs. forward voltage @ T_C = 25°C, 10ms pulse - White 5500K (2 dies in series)

Current De-rating

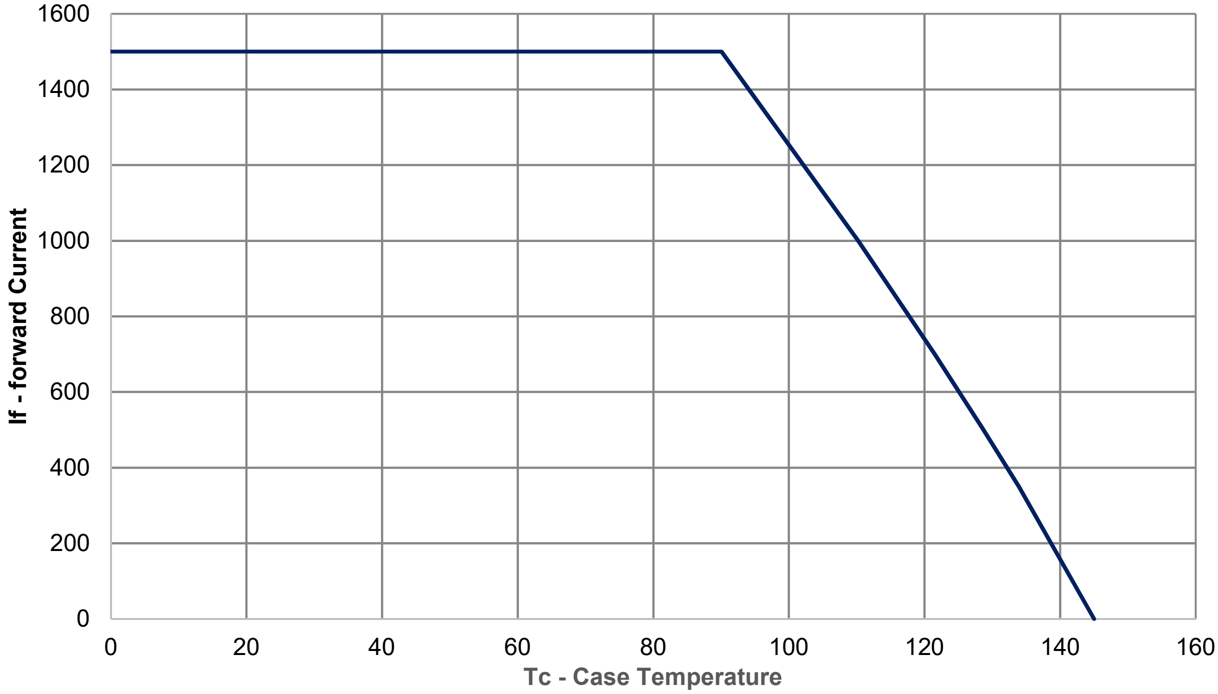
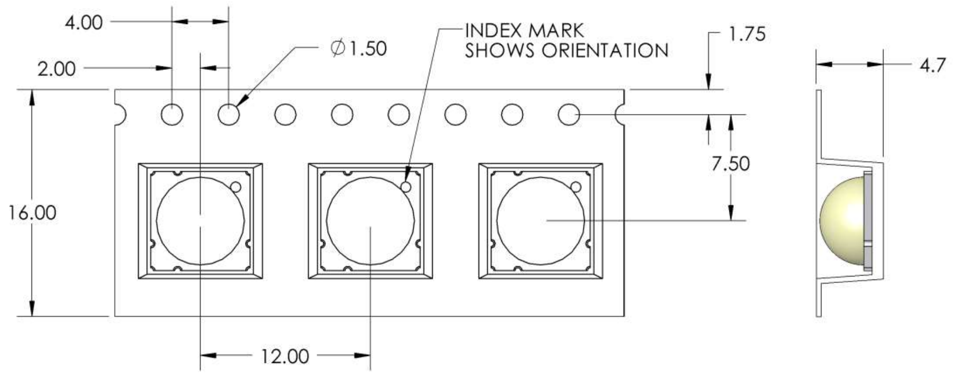


Figure 11: Maximum forward current vs. case temperature based on $T_{J(MAX)}$ = 145°C

Notes for Figure 11:

1. Maximum current assumes that all four LED dies are operating concurrently at the same current.
2. $R\Theta_{J-C}$ [Junction to Case Thermal Resistance] for the LZ4-00RW08 is typically 2.8°C/W.

Emitter Tape and Reel Specifications (mm)



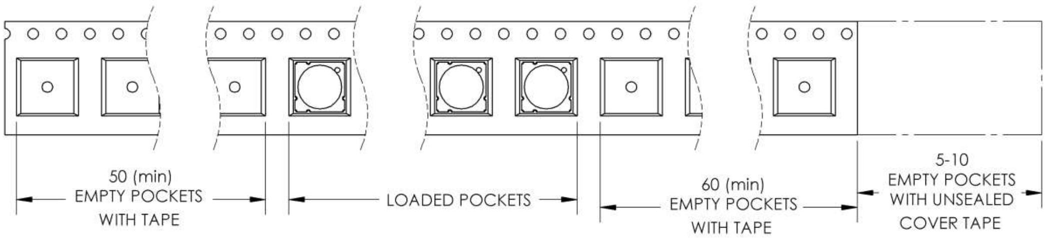


Figure 12: Emitter carrier tape specifications (mm)

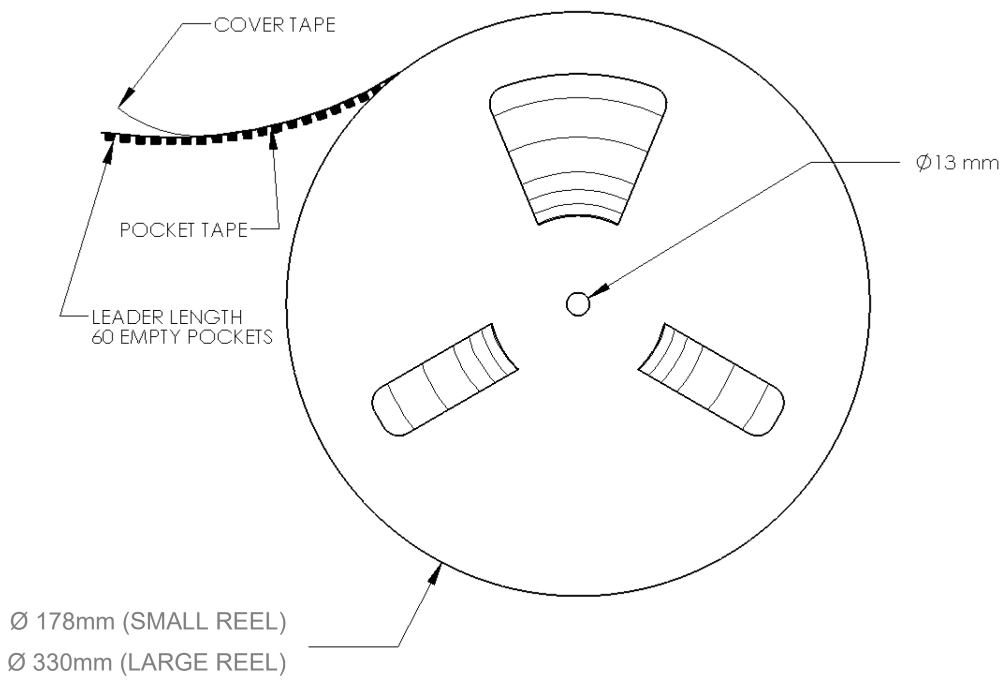


Figure 13: Emitter reel specifications (mm).

Notes for Figure 13:

1. Small reel quantity: up to 250 emitters
2. Large reel quantity: 250-1200 emitters.
3. Single flux bin and single wavelength bin per reel.

About LED Engin

LED Engin, an OSRAM brand based in California's Silicon Valley, develops, manufactures, and sells advanced LED emitters, optics and light engines to create uncompromised lighting experiences for a wide range of entertainment, architectural, general lighting and specialty applications. LuxiGen™ multi-die emitter and secondary lens combinations reliably deliver industry-leading flux density, upwards of 5000 quality lumens to a target, in a wide spectrum of colors including whites, tunable whites, multi-color and UV LEDs in a unique patented compact ceramic package. Our LuxiTune™ series of tunable white lighting modules leverage our LuxiGen emitters and lenses to deliver quality, control, freedom and high density tunable white light solutions for a broad range of new recessed and downlighting applications. The small size, yet remarkably powerful beam output and superior in-source color mixing, allows for a previously unobtainable freedom of design wherever high-flux density, directional light is required. LED Engin is committed to providing products that conserve natural resources and reduce greenhouse emissions; and reserves the right to make changes to improve performance without notice.

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