Light is OSRAM

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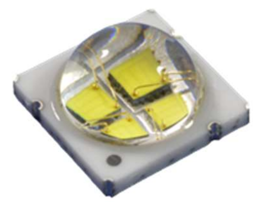
Our Brand
LED ENGIN

LuxiGen™ Multi-Color Emitter Series

LZ4 4 White CCTs LED Emitter

LZ4-00W408



Key Features

- 4 White CCTs (Cool White, Neutral White, Warm White, 2200K) LED 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

- Architectural Lighting
- Retail Spot and Display Lighting
- Stage and Studio Lighting
- Hospitality Lighting
- Museum Lighting
- Video Walls and Full Color Displays

Part number options

Base part number

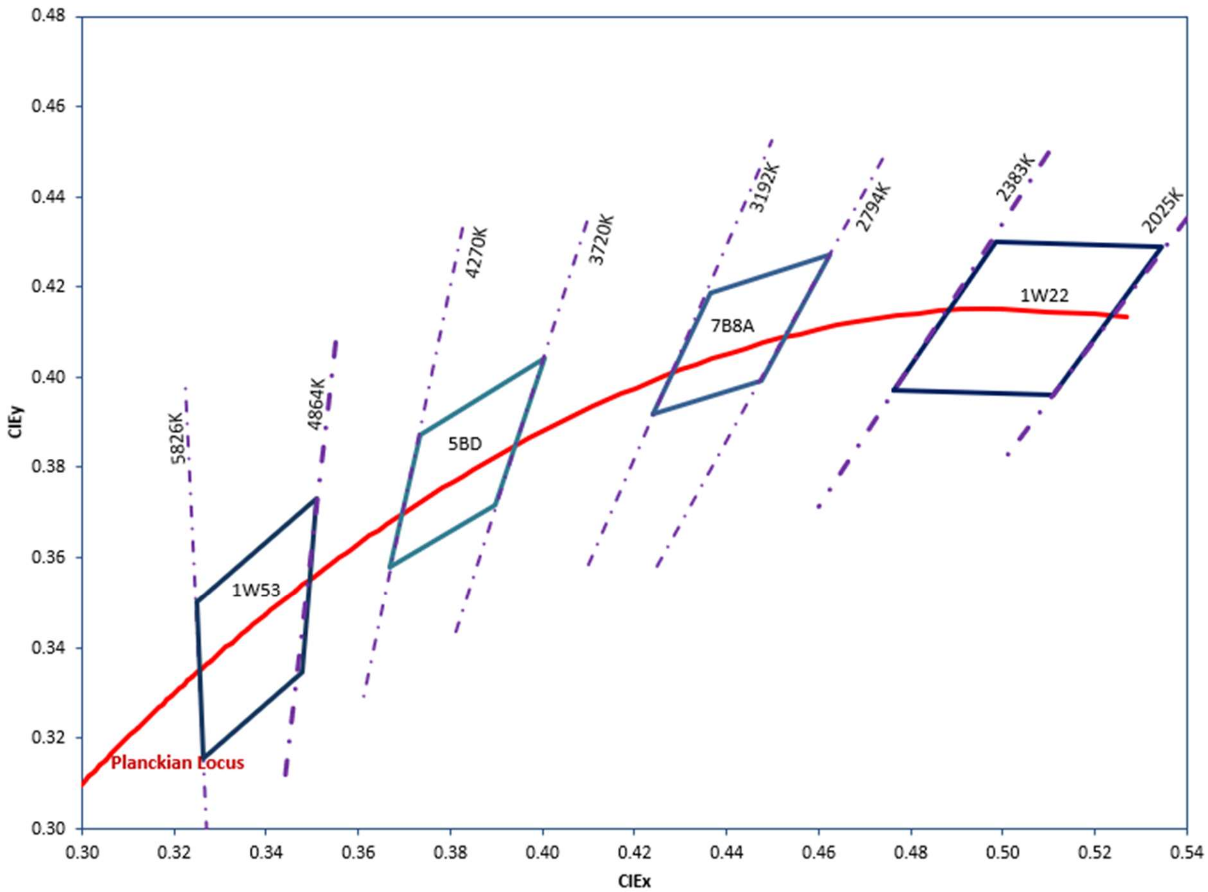
Part number	Description
LZ4-00W408-xxxx	LZ4 4 White CCTs Emitter

Bin kit option codes

W4, CW (typ. 5300K), NW (typ. 4000K), WW (typ. 3000K), WWA (typ. 2200K)

Kit number suffix	Min flus bin	Wavelength bin range	Description
0000	PQ	1W53	Full distribution flux; typ. 5300K bin
	18W	5BD	Full distribution flux; typ. 4000K bin
	19W	7B8A	Full distribution flux; typ. 3000K bin
	20W	1W22	Full distribution flux; typ. 2200K bin

White Chromaticity Groups



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

Coordinates are listed below in Table 5.

White Bin Coordinates

Color	Bin Code	CIEx	CIEy
CW	1W53	0.3248	0.35
		0.3511	0.3733
		0.3477	0.3345
		0.3265	0.3154
		0.3248	0.35
NW	5BD	0.367	0.3578
		0.3736	0.3874
		0.4006	0.4044
		0.3898	0.3716
		0.367	0.3578

Color	Bin Code	CIEx	CIEy
WW	7B8A	0.4242	0.3919
		0.4364	0.4188
		0.4624	0.4274
		0.4475	0.3994
		0.4242	0.3919
WWA	1W22	0.4765	0.3972
		0.4985	0.4302
		0.5347	0.4289
		0.511	0.3962
		0.4765	0.3972

Luminous Flux Bins

Table 1:

Bin Code	Minimum Luminous Flux (Φ_V) @ I_F = 700mA [1] (lm)				Maximum Luminous Flux (Φ_V) @ I_F = 700mA [1] (lm)			
	1 CW	1 NW	1 WW	1 WWA	1 CW	1 NW	1 WW	1 WWA
PQ	182				285			
18W		155				242		
19W			146				228	
20W				105				164

Note for Table 1:

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

Forward Voltage Bin

Table 2:

Bin Code	Minimum Forward Voltage (V_F) @ I_F = 700mA[1] (V)				Maximum Forward Voltage (V_F) @ I_F = 700mA[1] (V)			
	1 CW	1 NW	1 WW	1 WWA	1 CW	1 NW	1 WW	1 WWA
0	2.8	2.8	2.8	2.8	3.8	3.8	3.8	3.8

Note for Table 2:

1. Forward voltage is measured at 10ms pulse, T_C = 25ºC. LED Engin maintains a tolerance of ± 0.04V/ die for forward voltage measurements.

Absolute Maximum Ratings

Table 3:

Parameter	Symbol	Value	Unit
DC Forward Current	I_F	1500	mA
Peak Pulsed Forward Current[2]	I_{FP}	1500	mA
Reverse Voltage	V_R	See Note 3	V
Storage Temperature	T_{stg}	-40 ~ +150	°C
Junction Temperature	T_J	150	°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 3:

1. Maximum DC forward current is determined by thermal resistance and case temperature. Follow Figure 9 for current derating.
2. Pulse forward current conditions: 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 4:

Parameter	Symbol	Typical				Unit
		1 CW	1 NW	1 WW	1 WWA	
Luminous Flux (@ I_F = 700mA)	Φ_V	240	190	170	140	lm
Luminous Flux (@ I_F = 1500mA)	Φ_V	420	335	300	245	lm
Correlated Color Temperature	CCT	5300	4000	3000	2200	K
Color Rendering Index (CRI)	R_a	75	82	85	85	
Viewing Angle[1]	$2\Theta_{½}$	95				Degrees
Total Included Angle[2]	$\Theta_{0.9}$	125				Degrees

Notes for Table 4:

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 5:

Parameter	Symbol	Typical				Unit
		1 CW	1 NW	1 WW	1 WWA	
Forward Voltage (@ I_F = 700mA)	V_F	3.2	3.2	3.2	3.2	V
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T_J$	-2.0	-2.0	-2.0	-2.0	mV/°C
Thermal Resistance, electrical (Junction to Case)	$R\Theta_{J\text{-}C, el}$	2.8				°C/W

IPC/JEDEC Moisture Sensitivity Level

Table 6 - IPC/JEDEC J-STD-20 MSL Classification:

	Floor Life		Soak Requirements			
			Standard		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 6:

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)

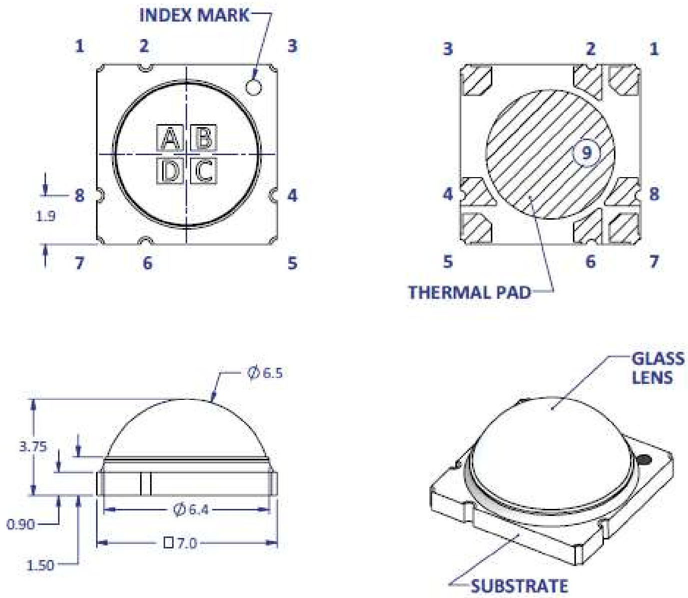
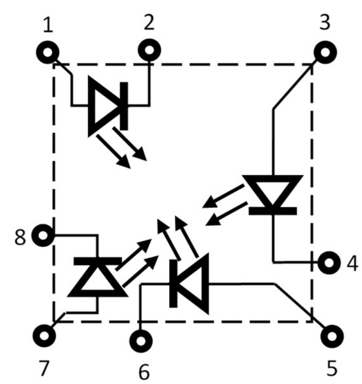


Figure 1: Package outline drawing.

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



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**

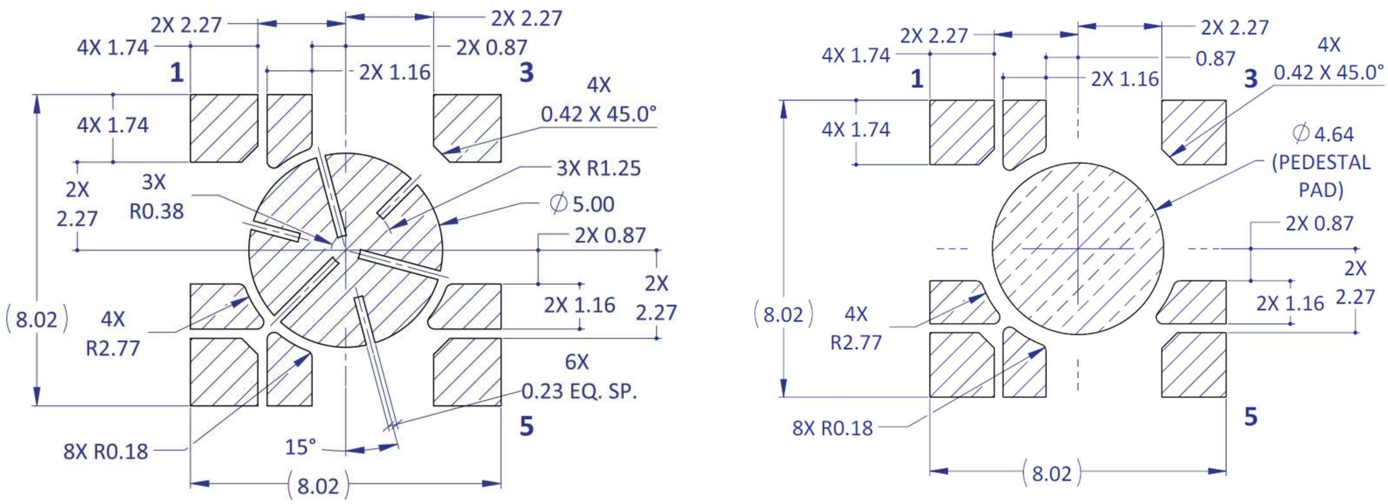


Figure 2a: Recommended solder pad layout for anode, cathode, and thermal pad for non-pedestal and pedestal design

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**

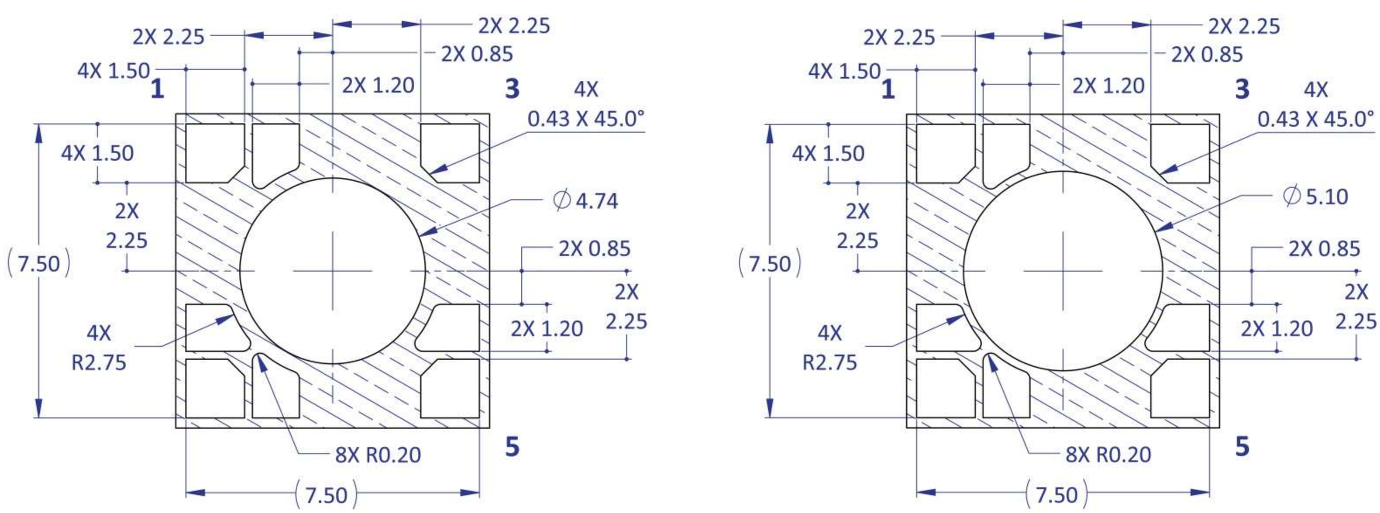


Figure 2b: Recommended solder mask opening for anode, cathode, and thermal pad for non-pedestal and pedestal design

Note for Figure 2b:

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

Recommended 8 mil Stencil Apertures Layout (mm)

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

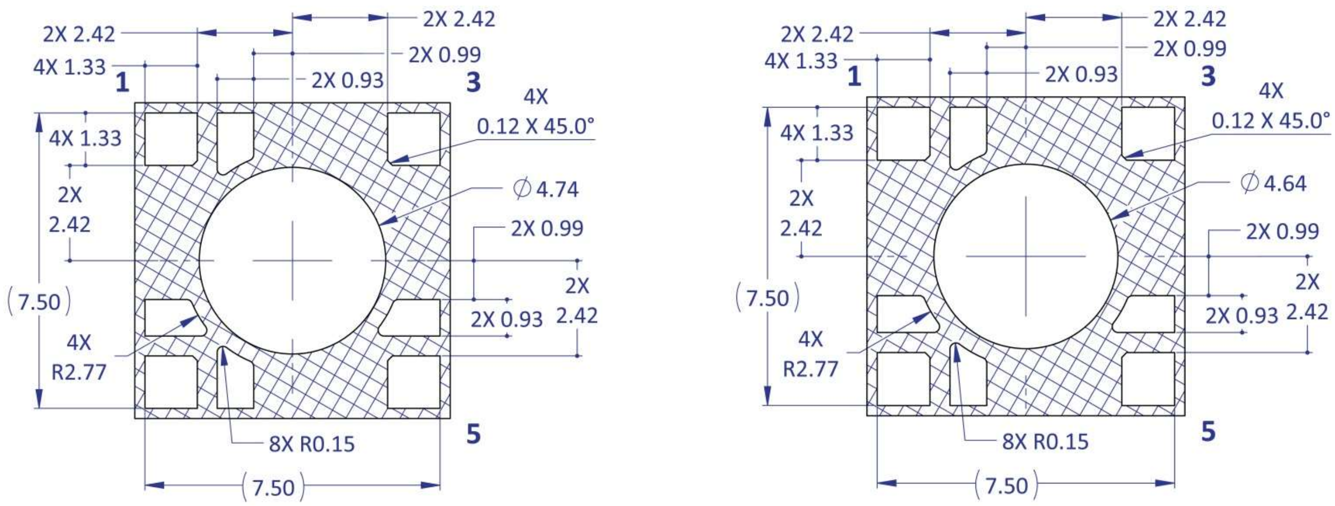


Figure 2c: Recommended 8mil stencil apertures for anode, cathode, and thermal pad for non-pedestal and pedestal design

Note for Figure 2c:

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

Reflow Soldering Profile

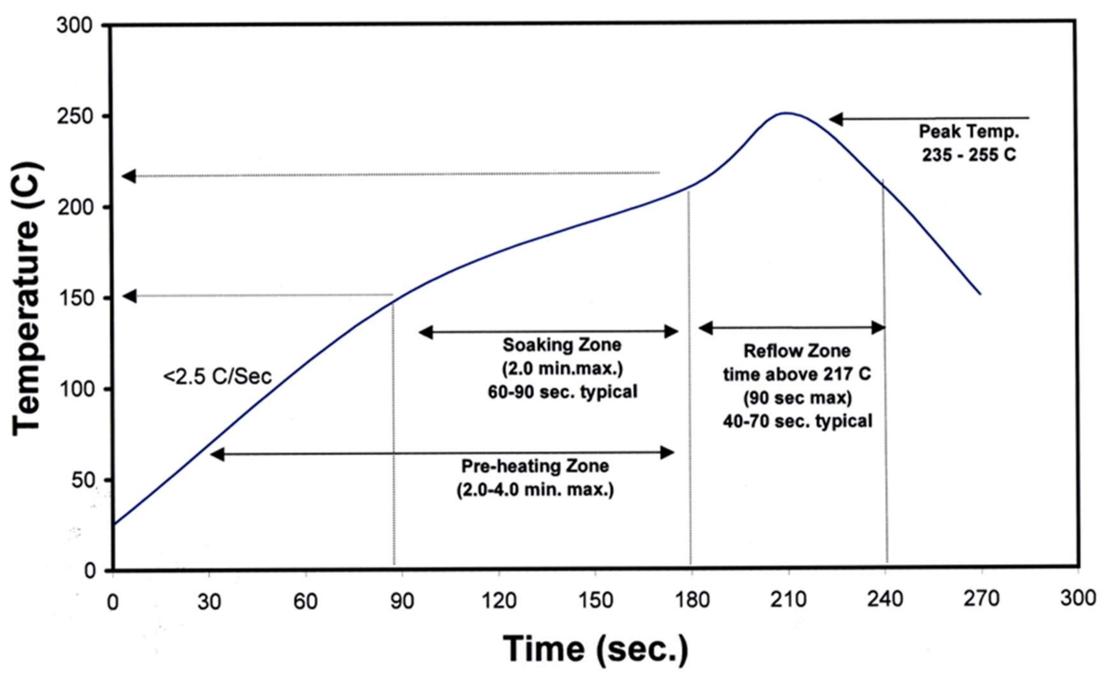


Figure 3: Reflow soldering profile for lead free soldering

Typical Radiation Pattern

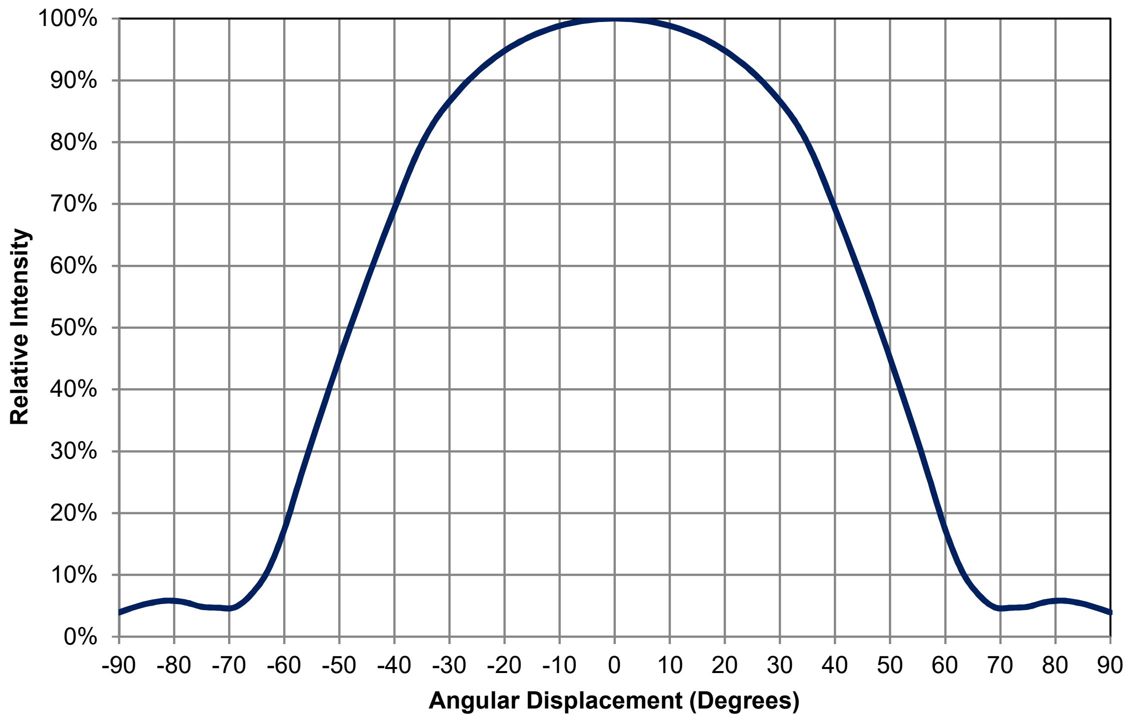


Figure 4: Typical representative spatial radiation pattern

Typical Relative Spectral Power Distribution

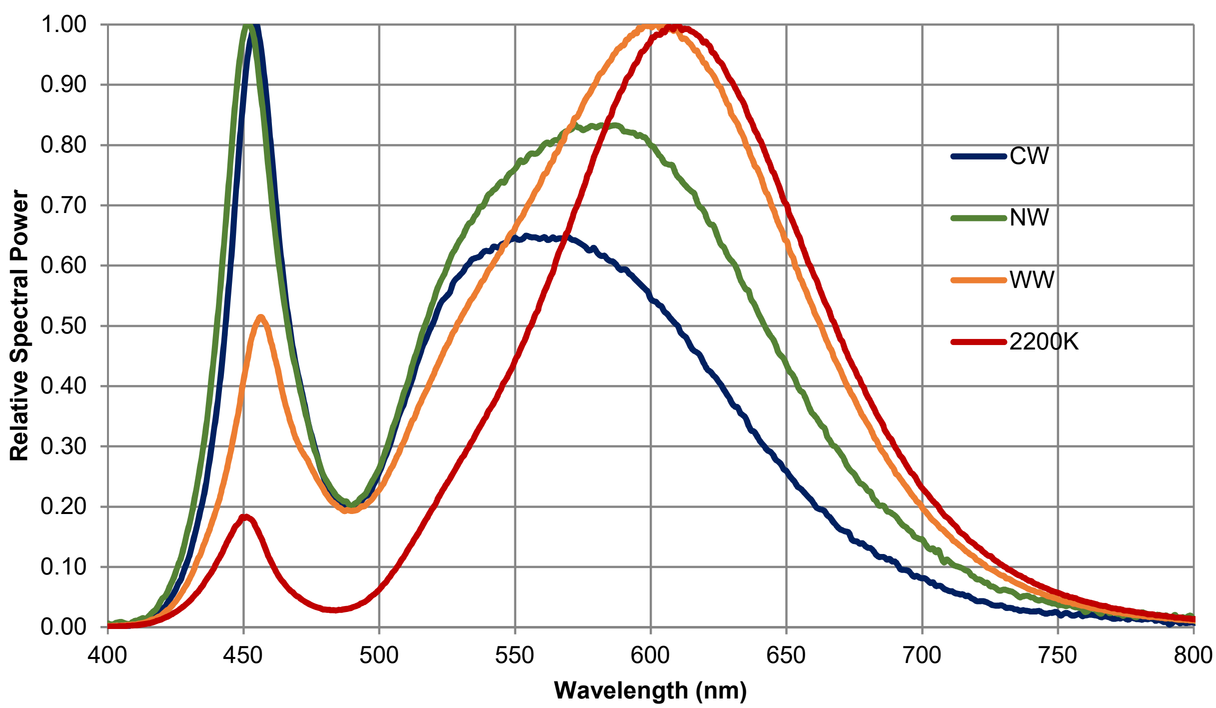


Figure 5: Relative spectral power vs. wavelength @ T_C = 25°C

Typical Relative Light Output over Current

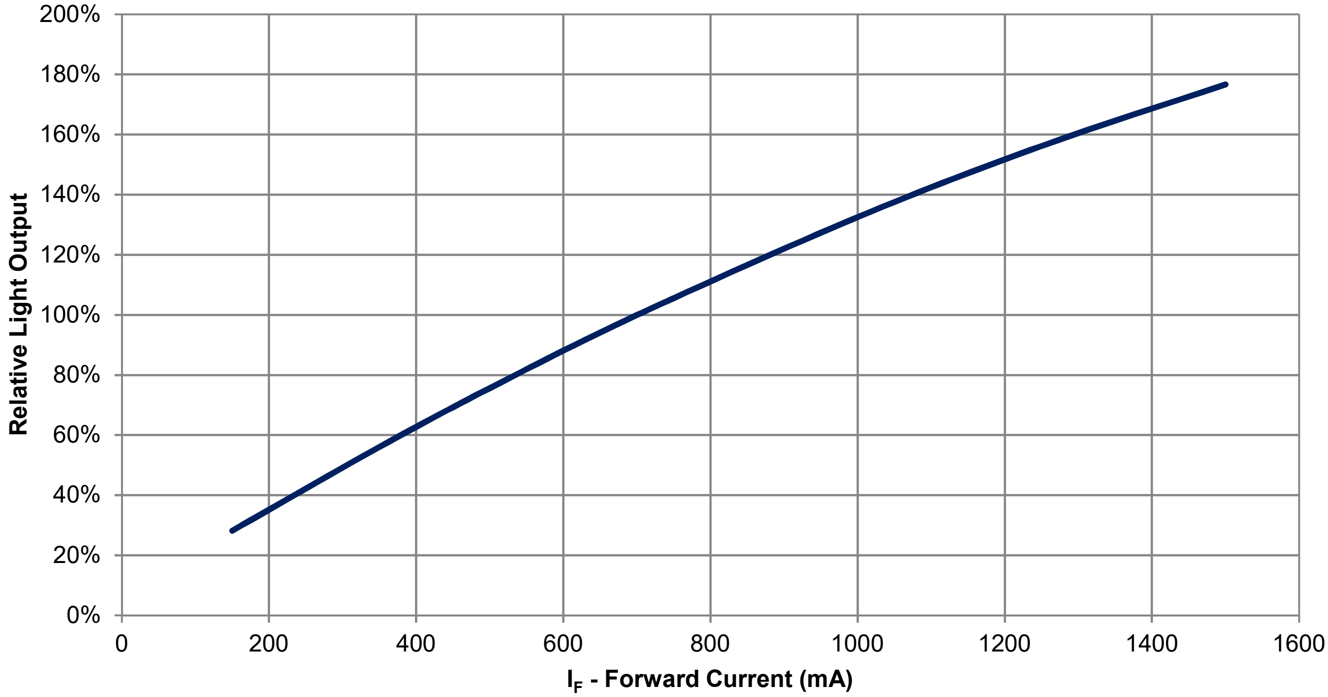


Figure 6: Typical relative light output vs. forward current @ T_C = 25°C

Typical Relative Light Output over Temperature

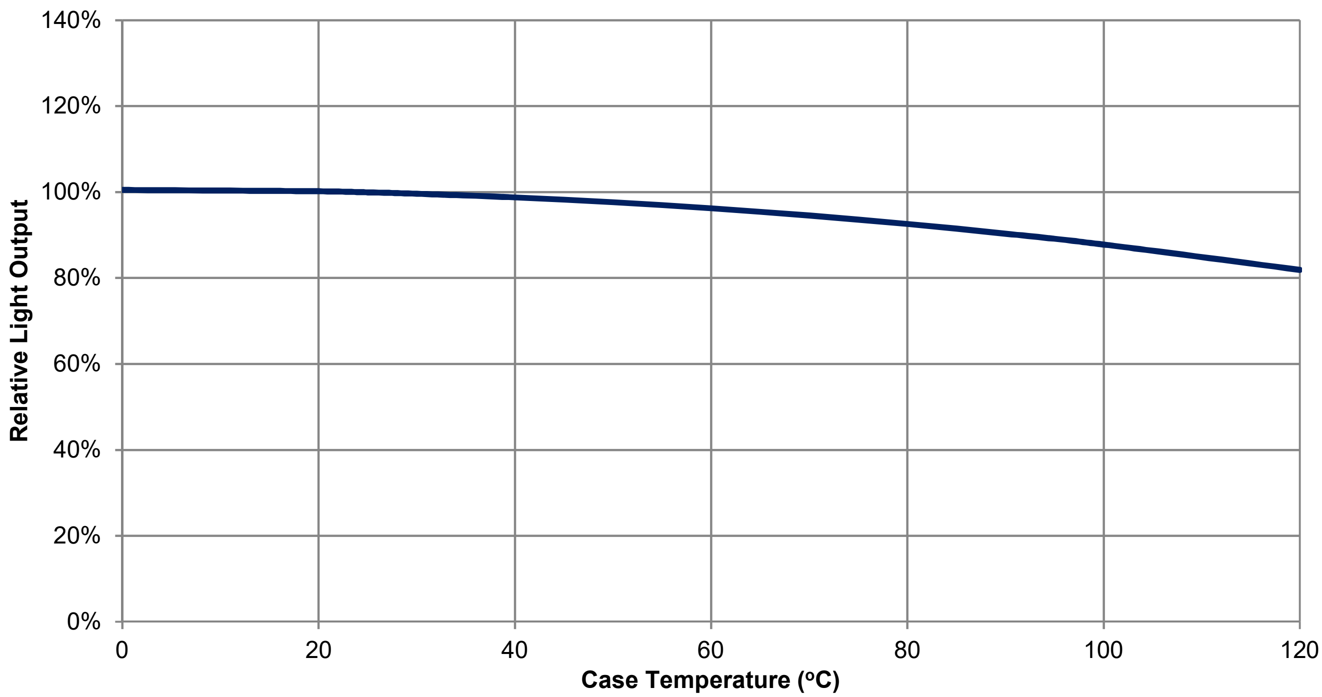


Figure 7: Typical relative light output vs. case temperature

Typical Forward Current Characteristics

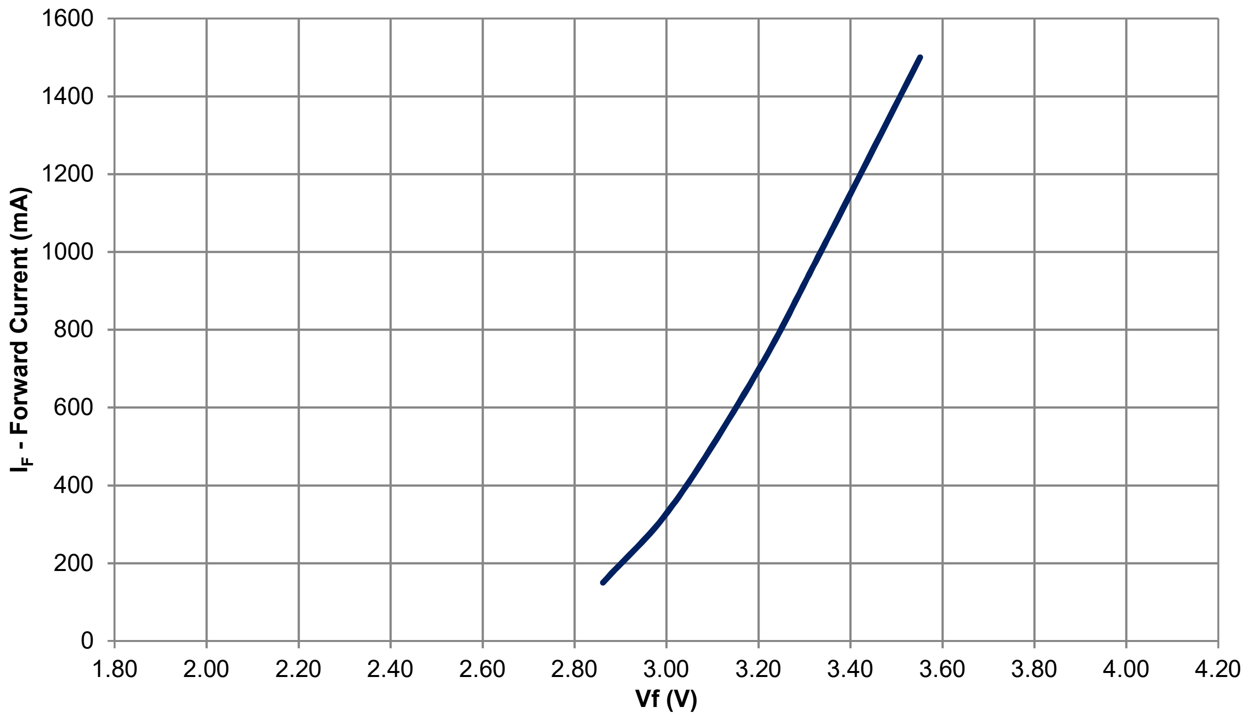


Figure 8: Typical forward current (per die) vs. forward voltage @ T_C = 25°C

Current De-rating

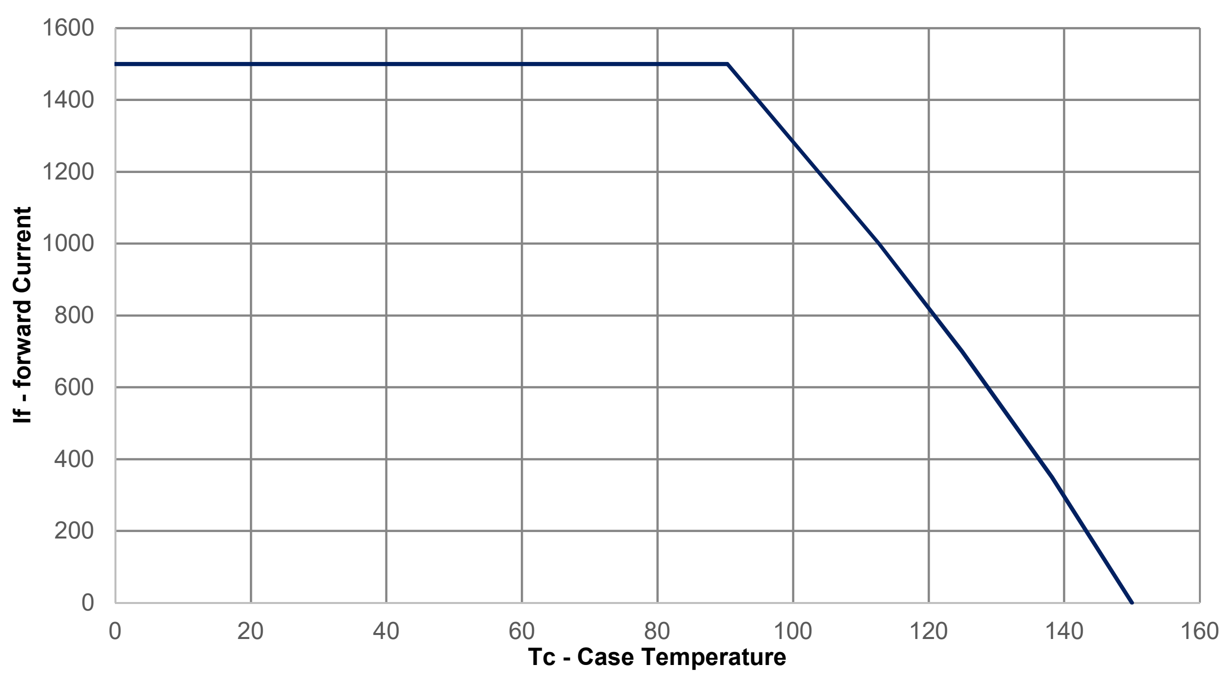


Figure 9: Maximum forward current vs. case temperature based on $T_{J(MAX)}$ = 150°C

Notes for Figure 9:

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 LZ4-00W408 is typically 2.8°C/W.

Emitter Tape and Reel Specifications (mm)

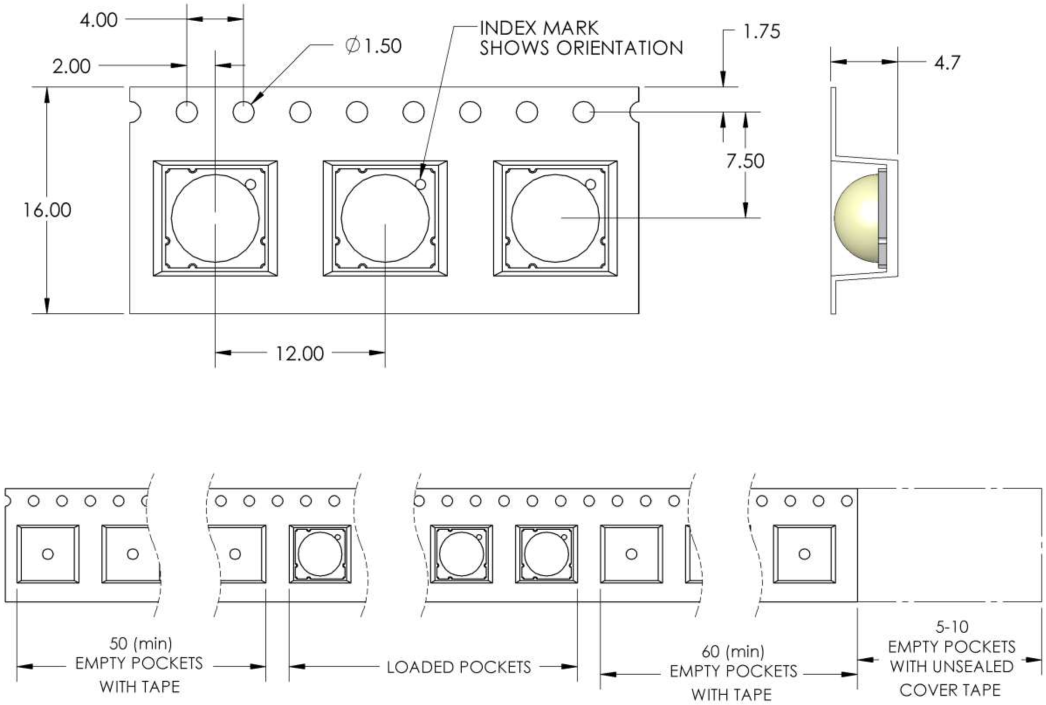


Figure 10: Emitter carrier tape specifications (mm).

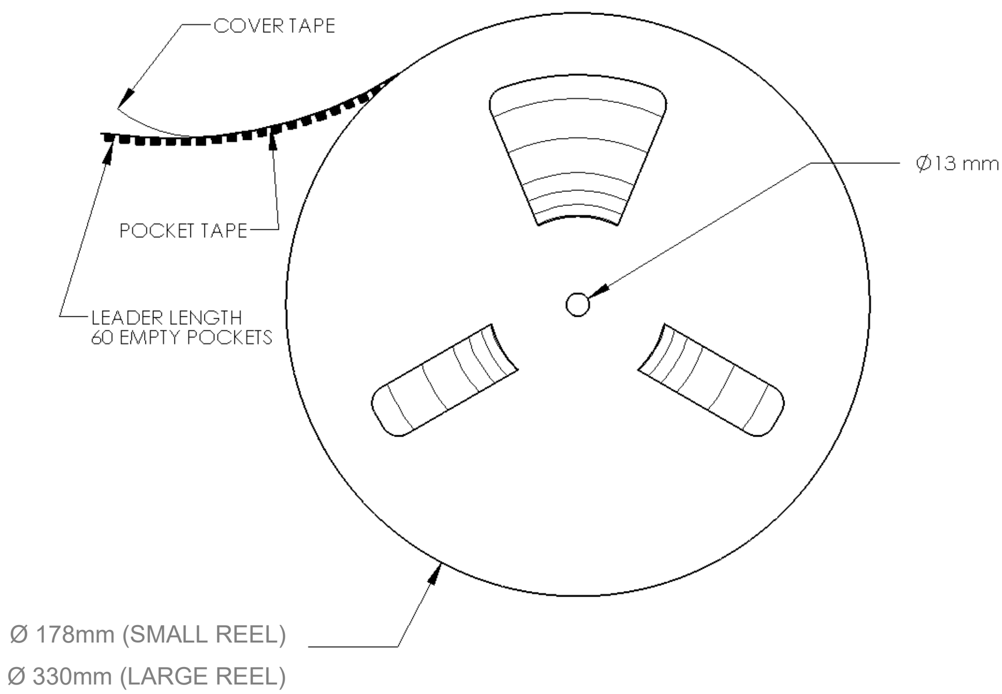


Figure 11: Emitter reel specifications (mm).

Notes for Figure 11:

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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