

**For NEW designs consider this replacement product:**

• LUXEON 5050

# LUXEON 5258

Multi-die, single LED for effective single source lamps

LUXEON 5258 is a multi-die package LED that provides high luminance from a single package to enable cost effective, single optic and directional lamp designs. LUXEON 5258 uses an industry standard 5258 surface mount package and is available in 24V and 96V to interface with high efficiency drivers. LUXEON 5258 comes in 70, 80 and 90CRI in wide range of CCTs and offers hot-color targeting to ensure that the LEDs are within color target at application conditions of 85°C.



## FEATURES AND BENEFITS

- 5mm optical source enables good optic design for great punch
- Hot-color targeting ensures color is within ANSI bin at 85°C
- Binned within 3-step and 5-step MacAdam ellipse ensuring color uniformity
- Compatible with low cost and high efficiency drivers
- Available in 24V and 96V options

## PRIMARY APPLICATIONS

- High Bay & Low Bay
- Lamps
- Outdoor
- Spotlights

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# General Product Information

## Product Test Conditions

LUXEON 5258 LEDs are tested and binned at 160mA for 24V products and 40mA for 96V products at a junction temperature,  $T_j$ , of 25°C.

## Part Number Nomenclature

Part numbers for LUXEON 5258 follow the convention below:

L 1 5 2 - **A A B B** 5 0 **D D** 0 0 0 0 0

Where:

- A A** - designates CCT (27=2700K, 30=3000K, 40=4000K, 50=5000K, 57=5700K)
- B B** - designates minimum CRI (70=70CRI, 80=8-CRI, 90=90CRI)
- D D** - designates forward voltage (24=24V and 96=96V)

Therefore, the following part number is used for a LUXEON 5258 3000K 80CRI 24V:

L 1 5 2 - **3 0 8 0** 5 0 **2 4** 0 0 0 0 0

## Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON 5258 is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

# Performance Characteristics

## Product Selection Guide

Table 1. Product performance of LUXEON 5258 at test current,  $T_j=25^\circ\text{C}$ .

VOLTAGE	NOMINAL CCT <sup>[1]</sup>	MINIMUM CRI	LUMINOUS FLUX <sup>[2]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	PART NUMBER
			MINIMUM	TYPICAL			
24V	4000	70	550	590	148	160	L152-4070502400000
	5000	70	550	590	148	160	L152-5070502400000
	5700	70	530	590	148	160	L152-5770502400000
	2700	80	460	485	121	160	L152-2780502400000
	3000	80	475	500	125	160	L152-3080502400000
	4000	80	520	550	138	160	L152-4080502400000
	2700	90	425	450	113	160	L152-2790502400000
	3000	90	440	465	116	160	L152-3090502400000
	4000	90	470	495	124	160	L152-4090502400000
96V	2700	80	400	445	115	40	L152-2780509600000
	3000	80	410	458	118	40	L152-3080509600000

**Notes for Table 1:**

1. Correlated color temperature is based upon mounted die on highly reflective surface at  $T_j=25^\circ\text{C}$ .
2. Lumileds maintains a tolerance of  $\pm 2$  on CRI and  $\pm 7\%$  on luminous flux measurements.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON 5258 at test current,  $T_j=25^\circ\text{C}$ .

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L152-xx8050xx00000	135°	115°

**Notes for Table 2:**

1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is  $\frac{1}{2}$  of the peak value.

## Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 5258 at test current,  $T_j=25^\circ\text{C}$ .

PART NUMBER	FORWARD VOLTAGE ( $V_f$ ) <sup>[1]</sup>			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE ( $\text{mV}/^\circ\text{C}$ ) <sup>[2]</sup>	TYPICAL THERMAL RESISTANCE — JUNCTION TO SOLDER PAD ( $^\circ\text{C}/\text{W}$ )
	MINIMUM	TYPICAL	MAXIMUM		
L152-xx80502400000	23.5	25.0	26.5	-17	1.5
L152-xx80509600000	92.0	97.0	100.0	-50	1.5

**Notes for Table 3:**

1. Lumileds maintains a tolerance of  $\pm 6\%$  on forward voltage measurements.
2. Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .

## Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 5258.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1,2]</sup>	24V=240mA 96V=60mA
Peak Pulsed Forward Current <sup>[1,3]</sup>	24V=300mA 96V=80mA
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature <sup>[1]</sup>	-40°C to 105°C
Storage Temperature	-40°C to 105°C
Reverse Voltage ( $V_{\text{reverse}}$ )	LUXEON LEDs are not designed to be driven in reverse bias

**Notes for Table 4:**

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
  - The frequency of the ripple current is 100Hz or higher
  - The average current for each cycle does not exceed the maximum allowable DC forward current
  - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current
3. At 10% duty cycle with pulse width of 10ms.

# Characteristic Curves

## Spectral Power Distribution Characteristics

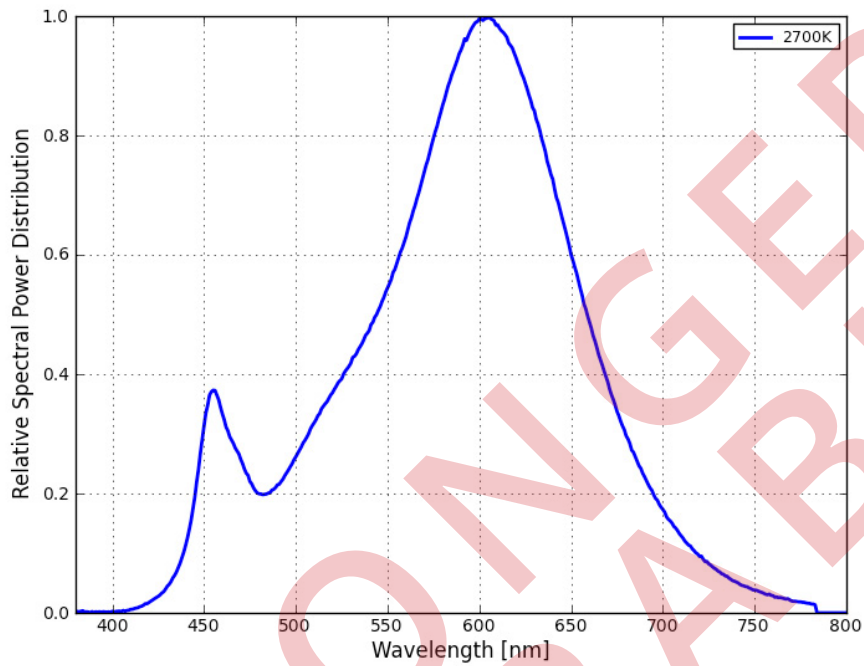


Figure 1. Typical normalized power vs. wavelength for L152-xx80050xx00000 at test current,  $T_j=25^{\circ}\text{C}$ .

## Light Output Characteristics

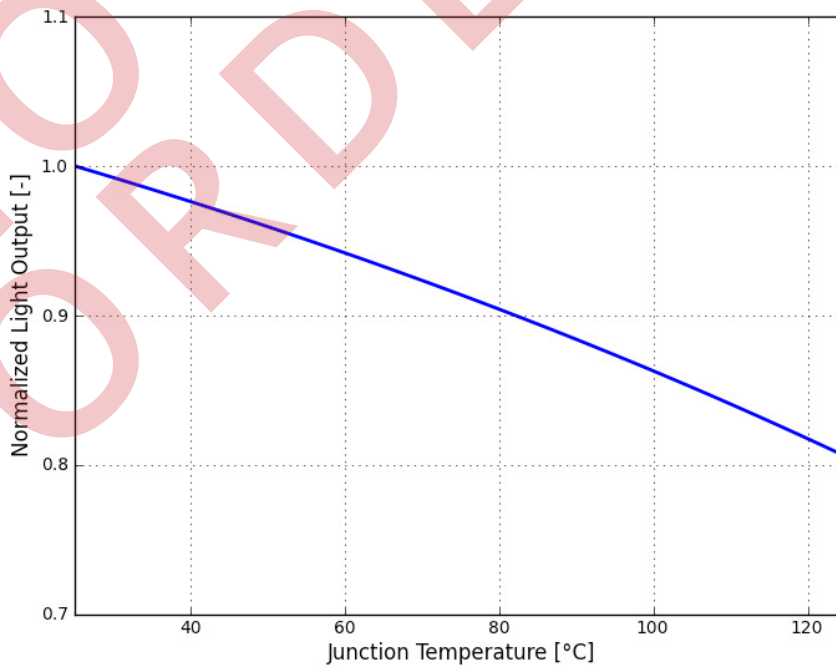


Figure 2. Typical normalized light output vs. junction temperature for L152-xx80050xx00000 at test current.

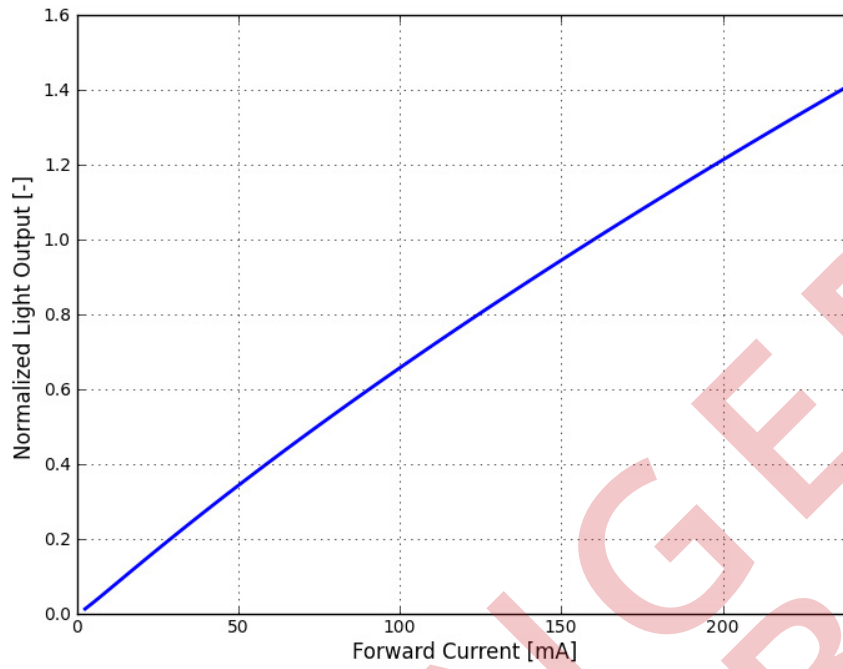


Figure 3a. Typical normalized light output vs. forward current for L152-xx800502400000,  $T_j=25^\circ\text{C}$ .

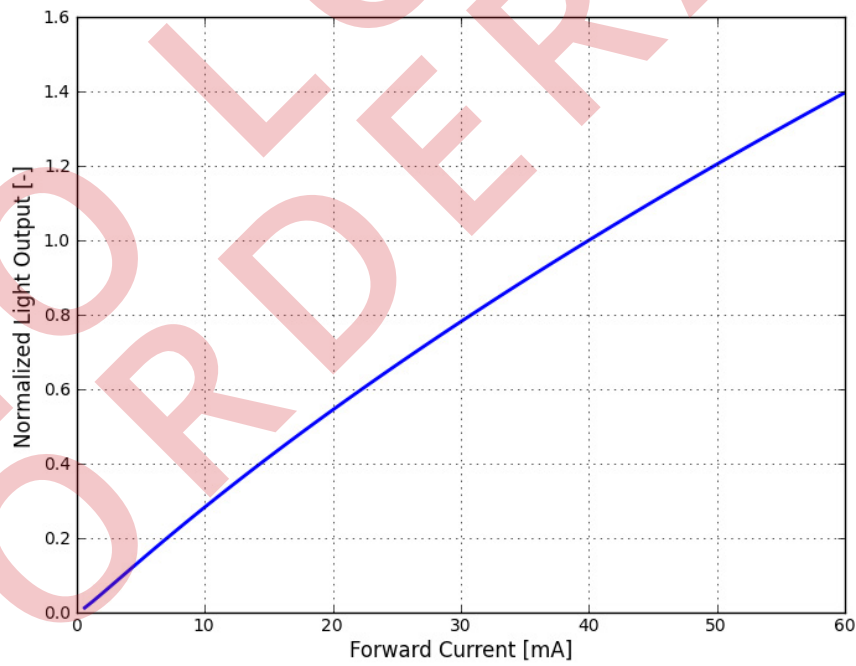


Figure 3b. Typical normalized light output vs. forward current for L152-xx800509600000,  $T_j=25^\circ\text{C}$ .

## Forward Current Characteristics

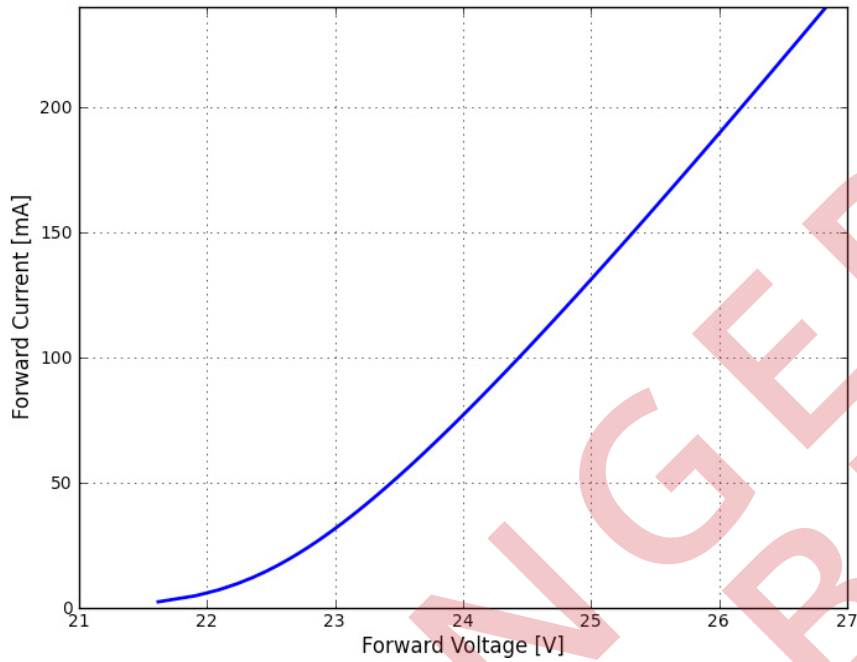


Figure 4a. Typical forward current vs. forward voltage for L152-xx800502400000,  $T_j=25^\circ\text{C}$ .



Figure 4b. Typical forward current vs. forward voltage for L152-xx800509600000,  $T_j=25^\circ\text{C}$ .



## Radiation Pattern Characteristics

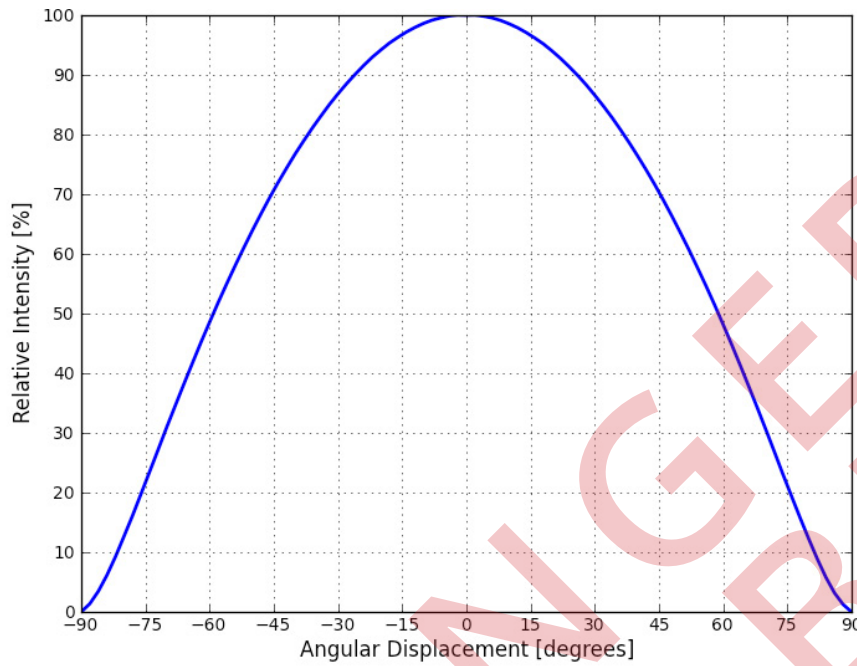


Figure 5. Typical radiation pattern for L152-xx80050xx00000 at test current,  $T_j=25^\circ\text{C}$ .

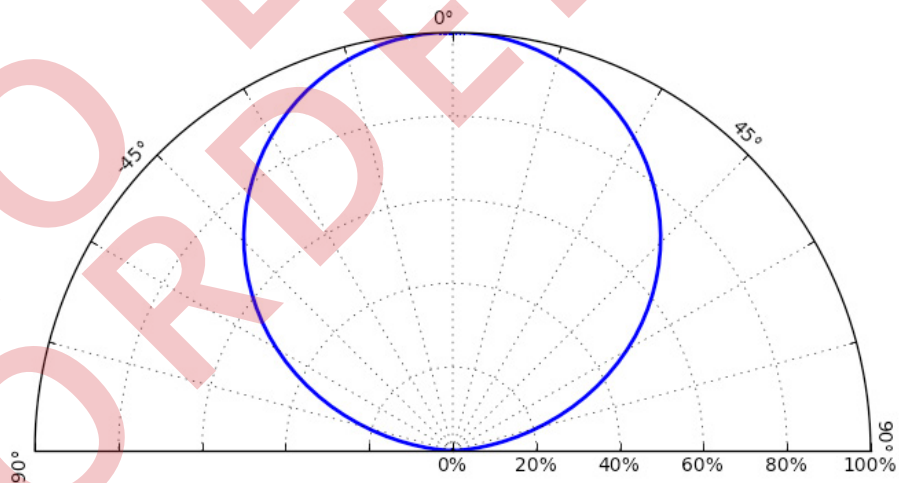


Figure 6. Typical polar radiation pattern for L152-xx80050xx00000 at test current,  $T_j=25^\circ\text{C}$ .

# Product Bin and Labeling Definitions

## Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Lumileds bins LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON 5258 LEDs are labeled using a 3-digit alphanumeric CAT code following the format below:

Where:

### A B C

- A** – designates luminous flux bin (example: K=420 to 460 lumens, Q=620 to 660 lumens)
- B** – designates color bin (example: 3=3 SDCM, 5=5 SDCM parts)
- C** – designates forward voltage bin (example: E=24 to 25.5V, G=95.5 to 97V)

Therefore, a LUXEON 5258 with a lumen range of 620 to 660, color bin of 3 and forward voltage range of 24 to 25.5V has the following CAT code:

### Q 3 E

## Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 5258 LEDs. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 5. Luminous flux bin definitions for LUXEON 5258.

BIN	LUMINOUS FLUX <sup>(1)</sup> (lm)	
	MINIMUM	MAXIMUM
J	380	420
K	420	460
L	460	500
M	500	540
N	540	580
P	580	620
Q	620	660

**Notes for Table 5:**

1. Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux measurements.

## Color Bin Definitions

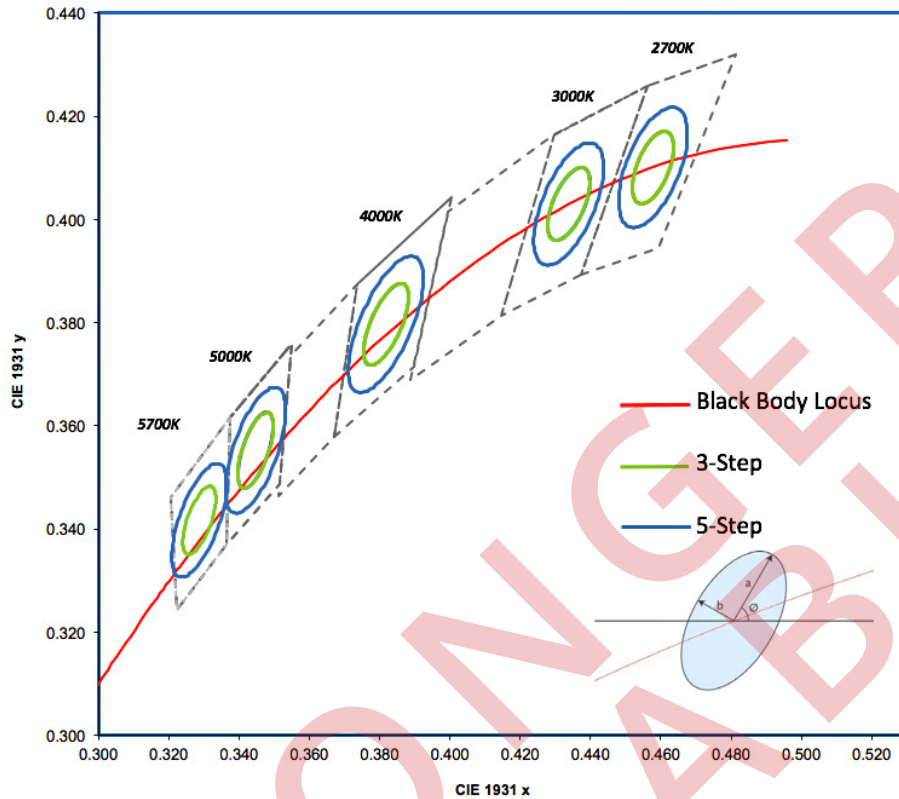


Figure 7. 3- and 5-step MacAdam ellipse illustration for hot-color targeting expected at 85°C.

Table 6. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 5258 at test current,  $T_j=25^\circ\text{C}$ .

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
2700K	Single 3-step MacAdam ellipse	(0.4604, 0.4151)	0.00810	0.00420	53.70°
3000K	Single 3-step MacAdam ellipse	(0.4373, 0.4090)	0.00834	0.00408	53.22°
4000K	Single 3-step MacAdam ellipse	(0.3868, 0.3877)	0.00940	0.00400	53.72°
5000K	Single 3-step MacAdam ellipse	(0.3481, 0.3601)	0.00750	0.00320	59.09°
5700K	Single 3-step MacAdam ellipse	(0.3321, 0.3465)	0.00822	0.00354	59.62°
2700K	Single 5-step MacAdam ellipse	(0.4604, 0.4151)	0.01350	0.00700	53.70°
3000K	Single 5-step MacAdam ellipse	(0.4373, 0.4090)	0.01390	0.00680	53.22°
4000K	Single 5-step MacAdam ellipse	(0.3868, 0.3877)	0.01570	0.00670	53.72°
5000K	Single 5-step MacAdam ellipse	(0.3321, 0.3465)	0.01370	0.00590	59.62°
5700K	Single 5-step MacAdam ellipse	(0.3321, 0.3465)	0.01240	0.00530	59.09°

**Notes for Table 6:**

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

# Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 5258.

VOLTAGE	BIN	FORWARD VOLTAGE <sup>(1)</sup> (V <sub>f</sub> )	
		MINIMUM	MAXIMUM
24V	D	22.5	24
	E	24	25.5
	F	25.5	27
96V	A	92	95.5
	G	95.5	97
	H	97	98.5
	I	98.5	100

**Notes for Table 7:**

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

## Mechanical Dimensions

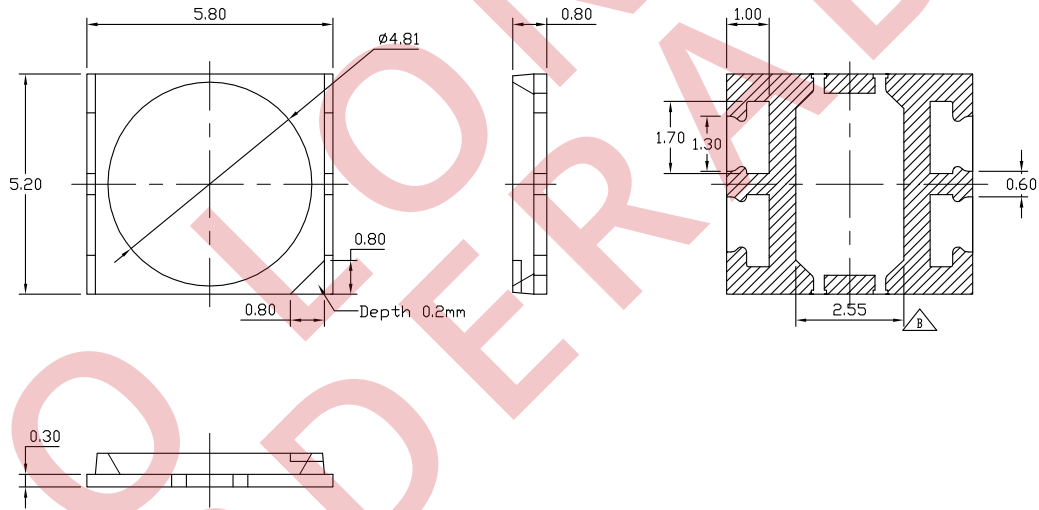


Figure 8. Mechanical dimensions for LUXEON 5258.

**Notes for Figure 8:**

1. Drawings are not to scale.
2. All dimensions are in millimeters.

# Reflow Soldering Guidelines

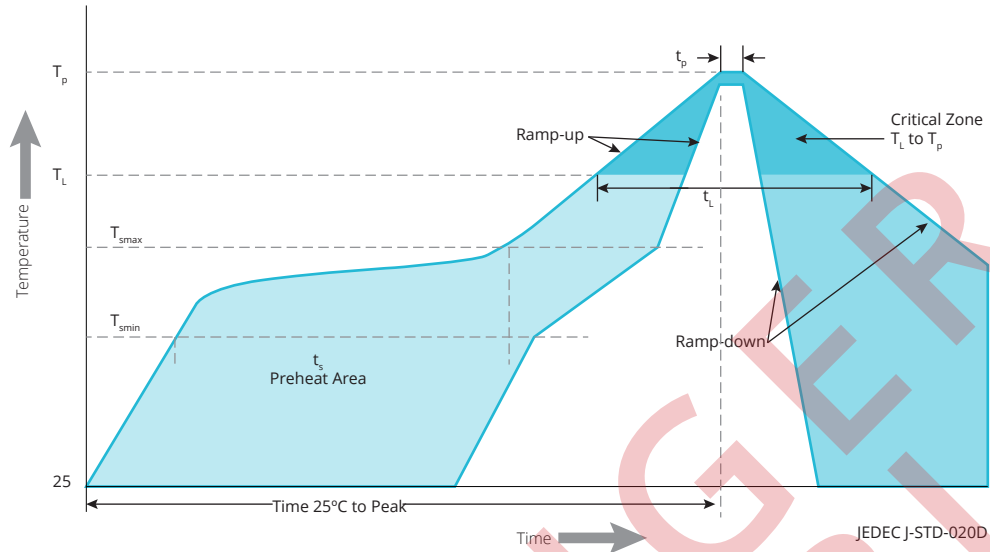


Figure 9. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 5258.

PROFILE FEATURE	LEAD-FREE ASSEMBLY
Preheat Minimum Temperature ( $T_{smin}$ )	150°C
Preheat Maximum Temperature ( $T_{smax}$ )	200°C
Preheat Time ( $t_{smin}$ to $t_{smax}$ )	60 to 180 seconds
Ramp-Up Rate ( $T_L$ to $T_p$ )	3°C / second maximum
Liquidus Temperature ( $T_L$ )	217°C
Time Maintained Above Temperature $T_L$ ( $t_L$ )	60 to 150 seconds
Peak / Classification Temperature ( $T_p$ )	260°C
Time Within 5°C of Actual Temperature ( $t_p$ )	20 to 40 seconds
Ramp-Down Rate ( $T_p$ to $T_L$ )	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

## JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON 5258.

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
2	1 Year	≤30°C / 85% RH	168 Hours +5/-0	85°C / 60% RH

# Solder Pad Design

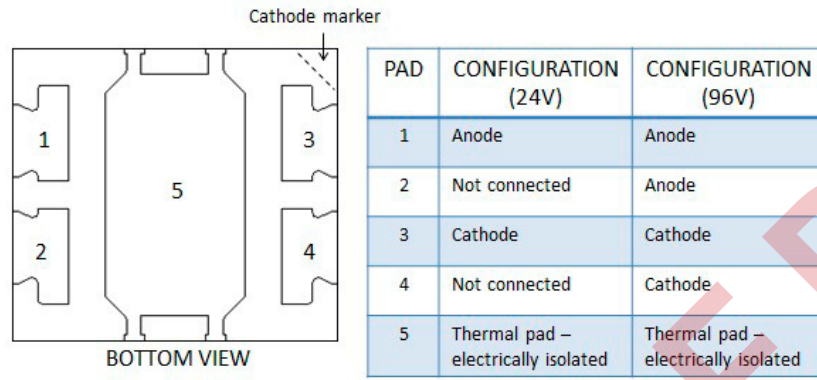


Figure 10. Recommended PCB solder pad layout for LUXEON 5258.

- Notes for Figure 10:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

# Packaging Information

## Pocket Tape Dimensions

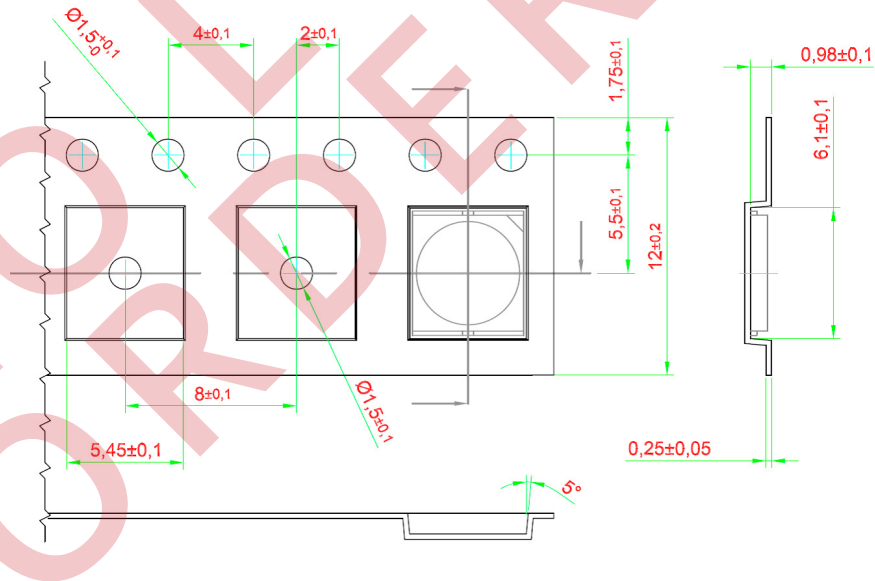


Figure 11. Pocket Tape dimensions for LUXEON 5258.

- Notes for Figure 11:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

## Reel Dimensions

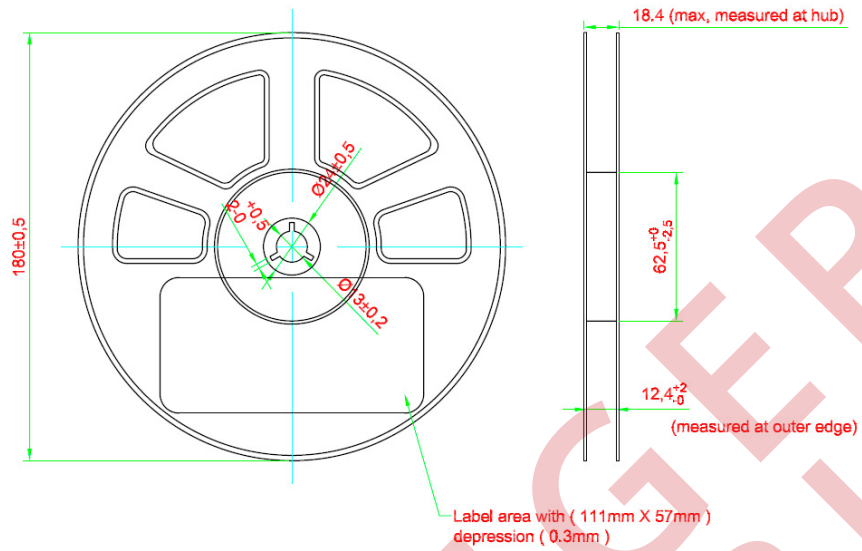


Figure 12. Reel dimensions for LUXEON 5258.

### Notes for Figure 12:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

## About Lumileds

Lumileds is the global leader in light engine technology. The company develops, manufactures and distributes groundbreaking LEDs and automotive lighting products that shatter the status quo and help customers gain and maintain a competitive edge.

With a rich history of industry “firsts,” Lumileds is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

To learn more about our portfolio of light engines, visit [lumileds.com](http://lumileds.com).

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