LUXEON IR ONYX

Industry leading broadband IR solution for spectroscopy and hyperspectral imaging applications



The LUXEON IR ONYX emitter features a continuous broadband infrared (IR) emission from 650 to 1100nm with superior light output characteristics. The product comes in an industry standard 2720 package and footprint for easy integration in existing designs. The LUXEON IR ONYX allows for new possibilities for miniaturization of spectroscopy and hyperspectral imaging applications in hand-held devices for mobile, industrial, and medical applications.

FEATURES AND BENEFITS

- Radiant Power over 40mW IR (600–1050nm) to reduce exposure time
- More than 80 µW/nm over a broad range (750–1000nm)
- 2.75mm x 2.00mm package with a 2 pad configuration that is compatible with the industry common footprint
- Lumileds phosphor expertise resulting in robust, long lifetime phosphors
- Flat spectrum allows for ease of calibration

PRIMARY APPLICATIONS

- Spectroscopy
- Machine Vision
- Healthcare
- Hyperspectral Imaging

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General Product Information

Product Test Conditions

LUXEON IR ONYX emitters are tested and binned with a 20ms monopulse of 350mA at a junction temperature, T_j, of 25°C.

Part Number Nomenclature

LUXEON IR ONYX has the following part number:

L 1 I G – 0 7 5 0 1 0 0 0 0 0 0 0

Radiometric Power 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 IR ONYX 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).

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Performance Characteristics

Product Selection Guide

Table 1. Product performance and optical characteristics of LUXEON IR ONYX at 350mA, T_j=25°C.

WAVELENGTH [1] (nm)	TYPICAL FWHM BEAM ANGLE (°)	RADIOMETRIC POWER [2] 600-1050nm (mW)		SPECTRAL FLUX 750-1000nm (µW/nm)		PART NUMBER
		MINIMUM	TYPICAL	MINIMUM	TYPICAL	
600-1050	120	40	50	80	150	L1IG-0750100000000

Notes for Table 1:
1. Lumileds maintains a tolerance of ±5nm on peak wavelength measurements.
2. Lumileds maintains a tolerance of ±7% on radiometric power and spectral flux measurements.

Electrical and Thermal Characteristics

Table 2. Electrical and thermal characteristics for LUXEON IR ONYX at 350mA, T_j=25°C.

PART NUMBER	FORWARD VOLTAGE [1] (V_f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L1IG-0750100000000	3.0	3.20	3.4	-2.0 to -4.0	19

Notes for Table 3:
1. Lumileds maintains a tolerance of ±1% on forward voltage measurements..
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 3. Absolute maximum ratings for LUXEON IR ONYX.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	500mA
Peak Pulsed Forward Current [1, 3]	1000mA
Emitter Junction Temperature [1]	125°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2
Operating Case Temperature [1]	-40°C to 105°C
Emitter Storage Temperature	-40°C to 105°C
SMD Process Classification Temperature	260°C per JEDEC J-STD-020E
Allowable Reflow Cycles	3
Reverse Voltage ($V_{reverse}$)	7.0V (@<1 µA)

Notes for Table 3:
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.

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Characteristic Curves

Spectral Power Distribution Characteristics

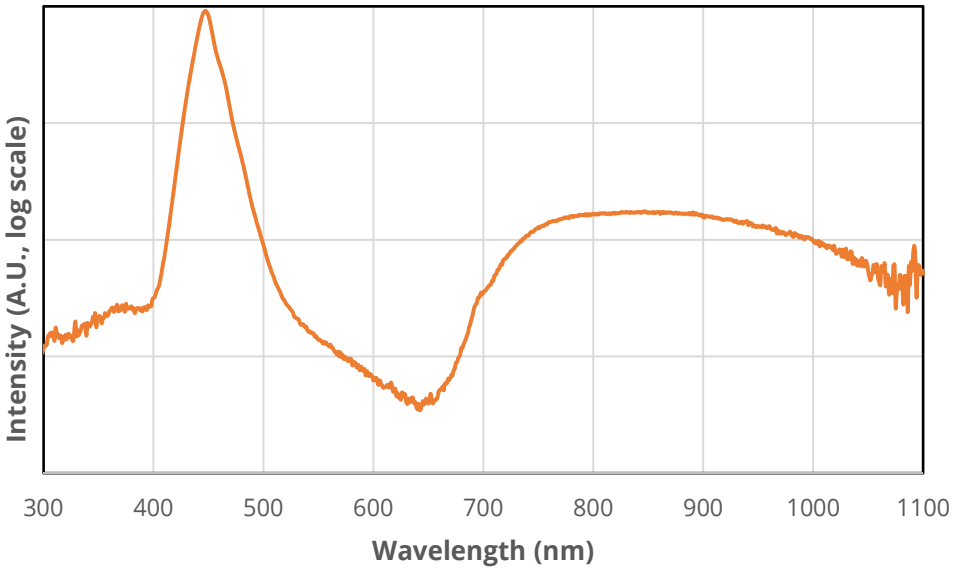


Figure 1. Typical normalized power vs. wavelength for LUXEON IR ONYX at 350mA, T_j=25°C.

Light Output Characteristics

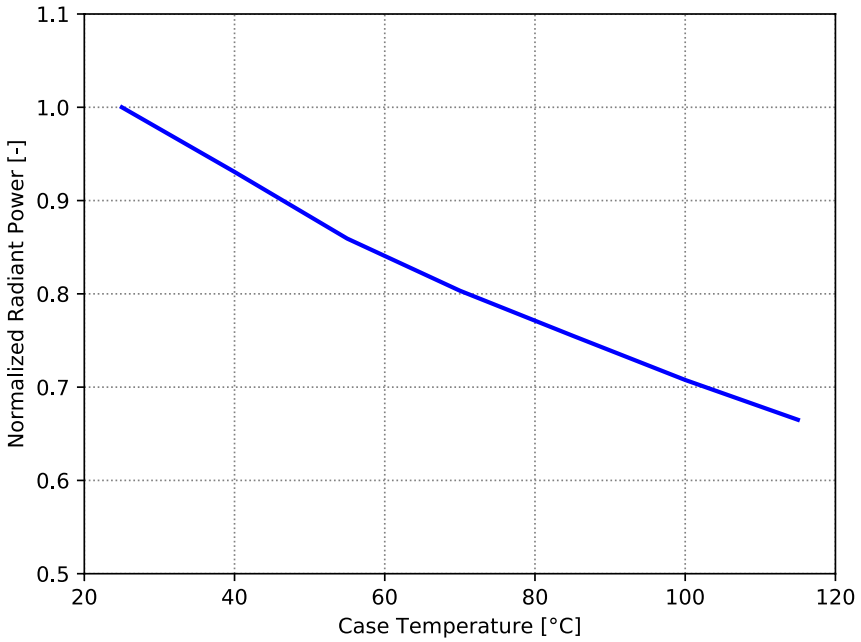


Figure 2. Typical normalized radiant power vs. case temperature for LUXEON IR ONYX at 350mA.

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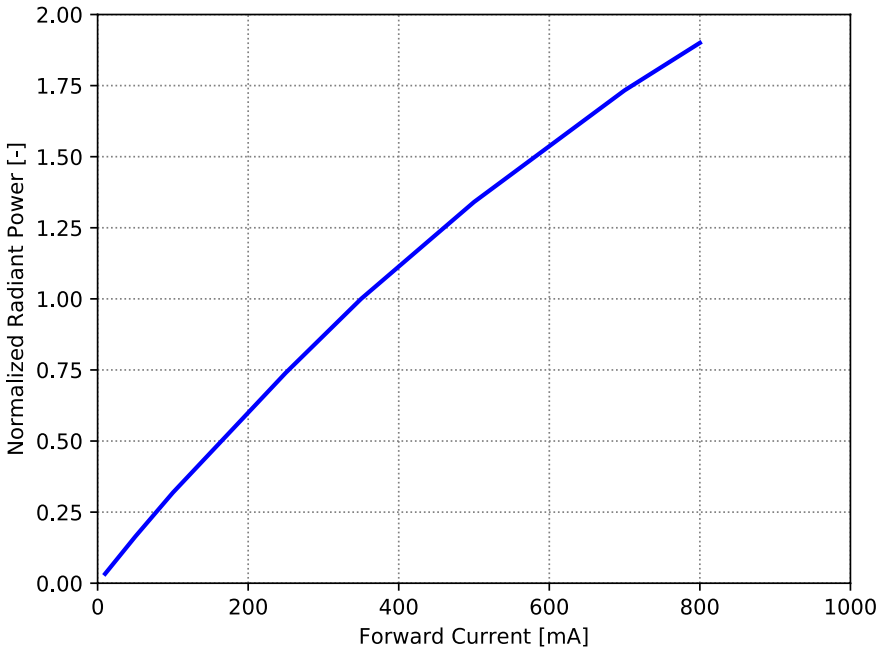


Figure 3. Typical normalized radiant power vs. forward current for LUXEON IR ONYX at T_j=25°C.

Electrical Characteristics

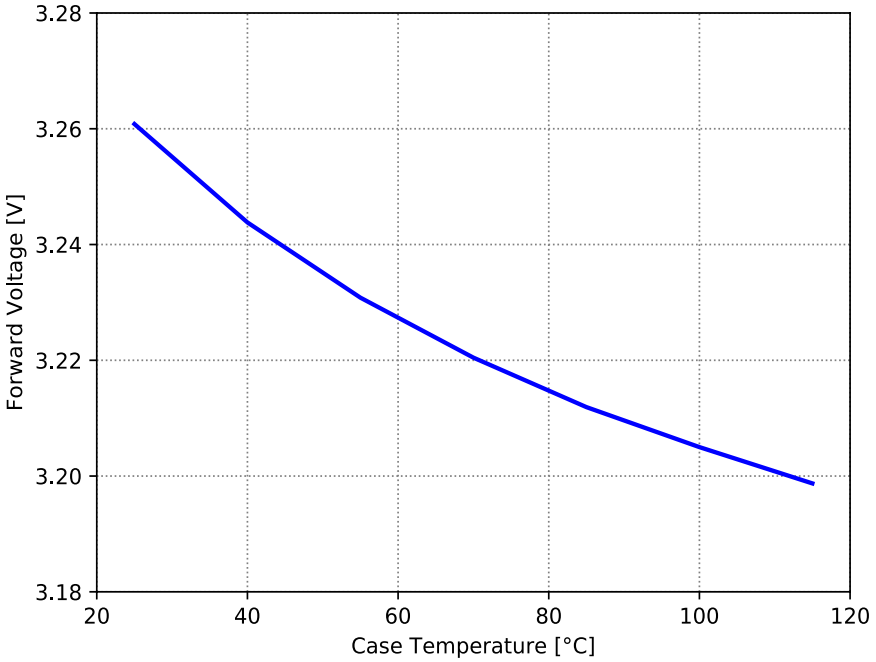


Figure 4. Typical forward voltage vs. case temperature for LUXEON IR ONYX at 350mA.

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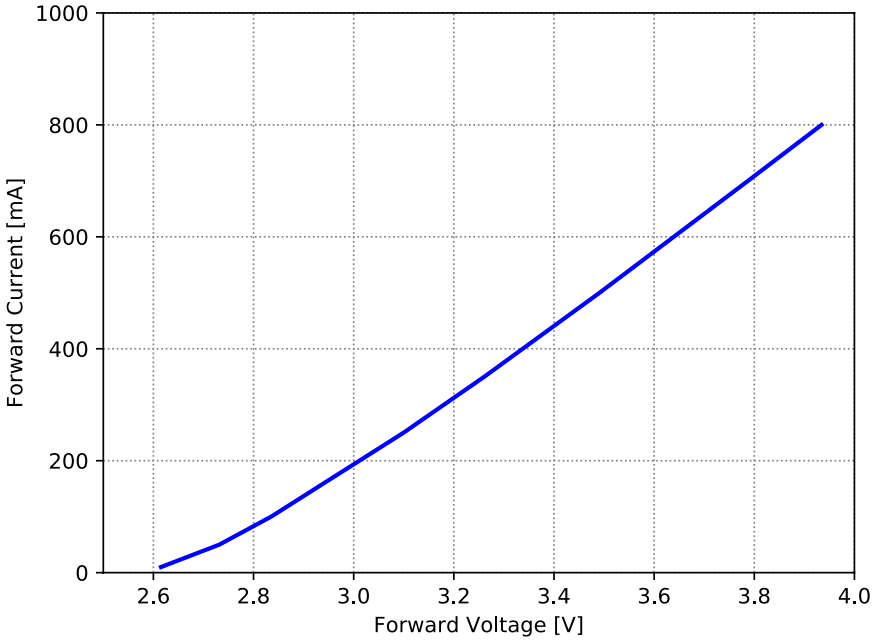


Figure 5. Typical forward current vs. forward voltage for LUXEON IR ONYX at T_j=25°C.

Radiation Pattern Characteristics

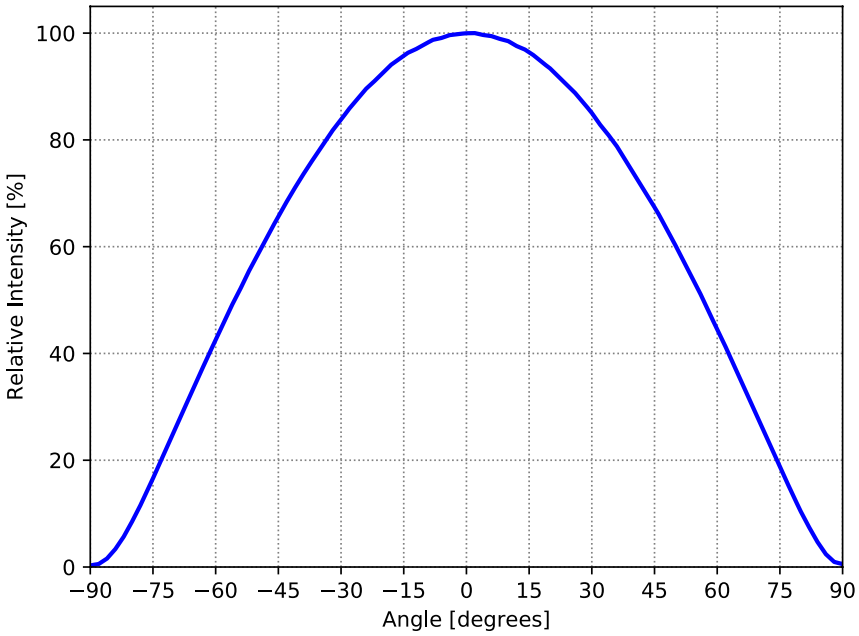


Figure 6. Typical radiation pattern for LUXEON IR ONYX at 350mA, T_j=25°C.

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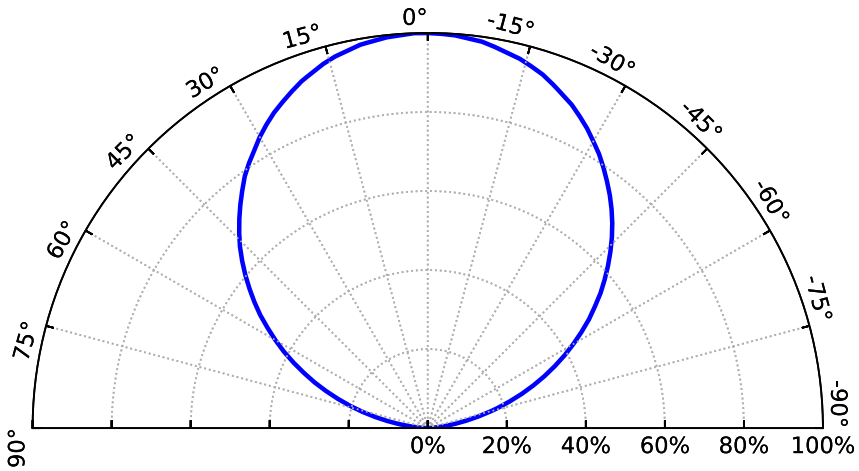


Figure 7. Typical polar radiation pattern for LUXEON IR ONYX at 350mA, T_j=25°C.

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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 components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage..

LUXEON IR ONYX emitters are labeled using a 2-digit alphanumeric CAT code following the format below:

A B

Where:

A – designates radiometric power bin (example: J=40 to 48mW, K=48 to 56mW)

B – designates forward voltage bin (example: D=3.0 to 3.1V, E=3.1 to 3.2V)

Therefore, a LUXEON IR ONYX emitter with a radiometric power range of 48 to 56 mW and a forward voltage range of 3.1 to 3.2V has the following CAT code:

K E

Radiometric Power Bins

Table 4 lists the standard radiometric power bins for LUXEON IR ONYX emitters. 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 proliferations.

Table 4. Radiometric power bin definitions for LUXEON IR ONYX at 350mA, T_j=25°C.

BIN	RADIOMETRIC POWER [1] (600-1050nm, mW)	
	MINIMUM	MAXIMUM
J	40	48
K	48	56
L	56	64
M	64	72

Notes for Table 4:
1. Lumileds maintains a tolerance of ±7% on radiometric power measurements.

Forward Voltage Bins

Table 5. Forward voltage bin definitions for LUXEON IR ONYX at 350mA, T_j=25°C.

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
D	3.0	3.1
E	3.1	3.2
F	3.2	3.3
G	3.3	3.4

Notes for Table 5:
1. Lumileds maintains a tolerance of ±1% on forward voltage measurements.

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Mechanical Dimensions

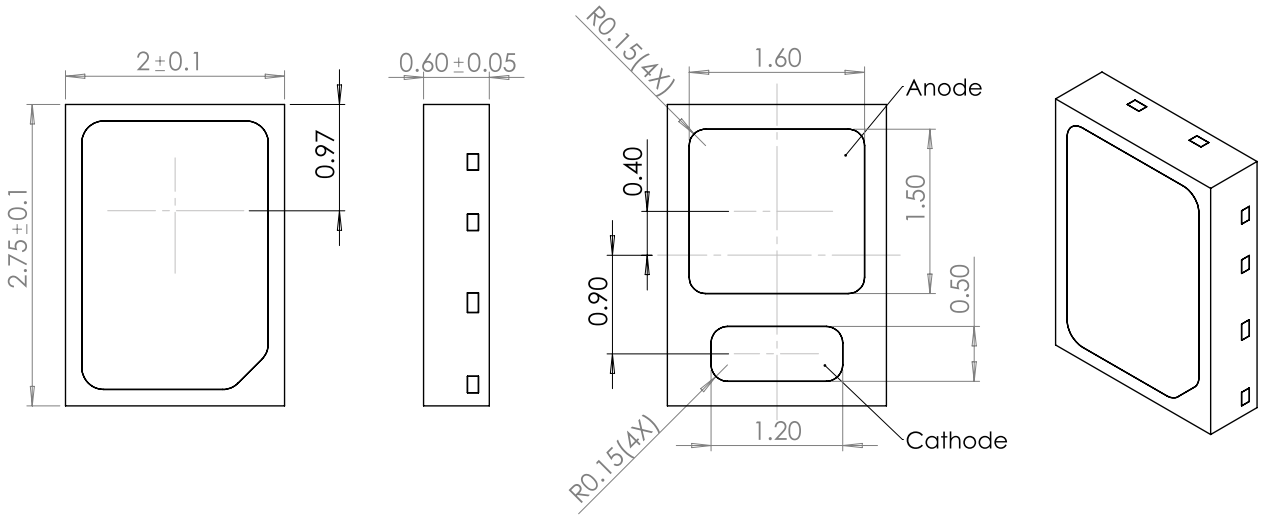


Figure 8. Mechanical dimensions for LUXEON IR ONYX.

Notes for Figure 8:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

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Reflow Soldering Guidelines

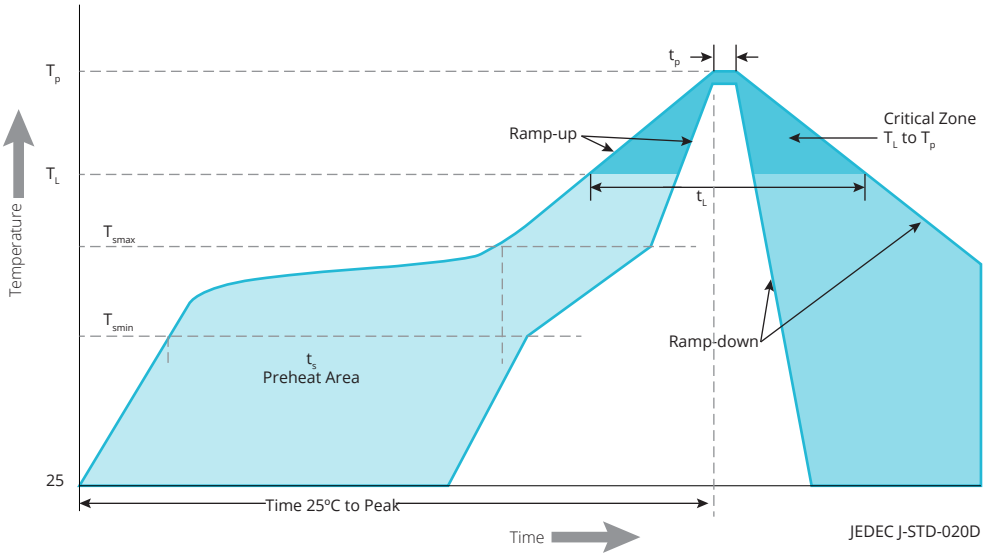


Figure 9. Visualization of the acceptable reflow temperature profile as specified in Table 6.

Table 6. Reflow profile characteristics for LUXEON IR ONYX.

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})	120 seconds
Ramp-Up Rate (T_L to T_p)	3°C / second maximum
Liquidous Temperature (T_L)	217°C
Time Maintained Above Temperature T_L (t_L)	150 seconds
Peak / Classification Temperature (T_p)	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	10 to 30 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 7. Moisture sensitivity levels for LUXEON IR ONYX.

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

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Solder Pad Design

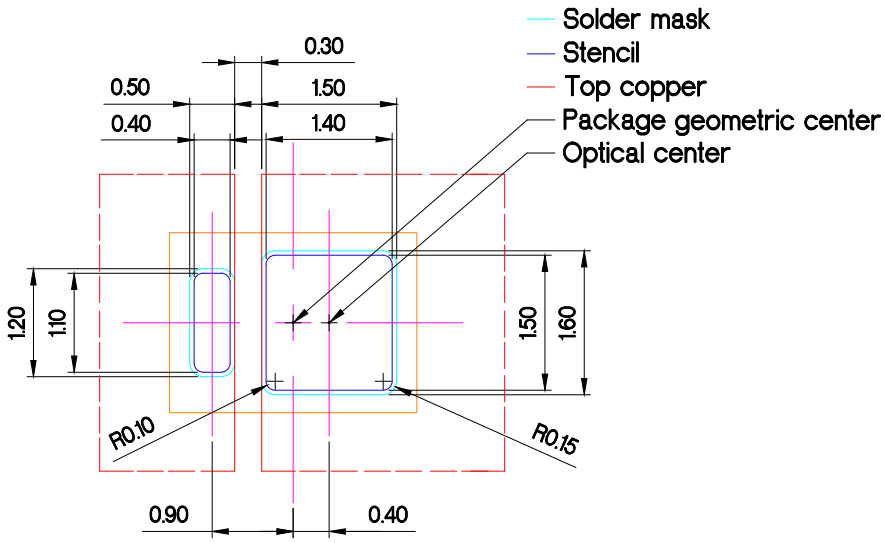


Figure 10. Recommended PCB solder pad layout for LUXEON IR ONYX.

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

Packaging Information

Pocket Tape Dimensions

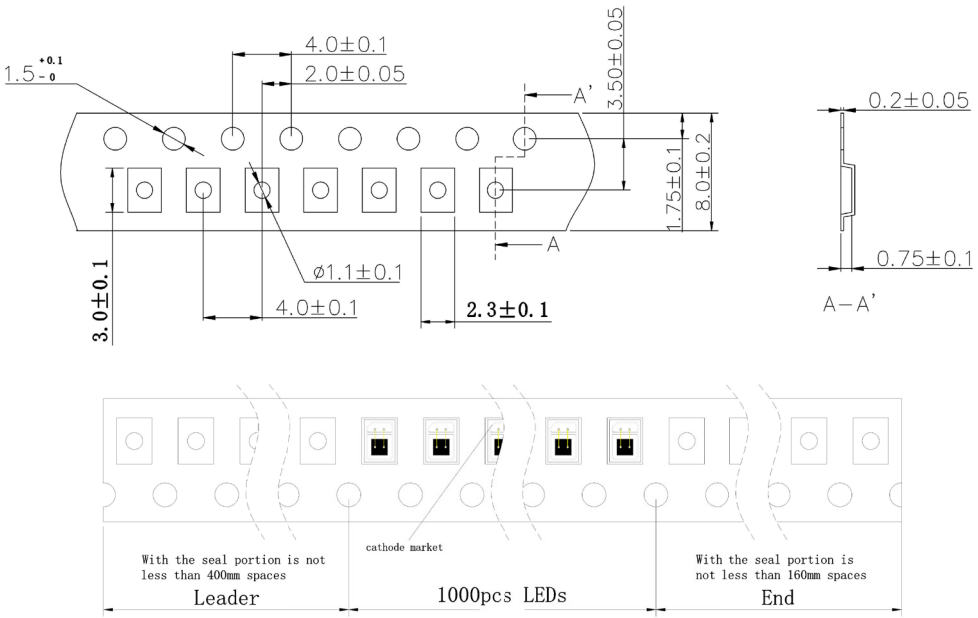


Figure 11. Pocket tape dimensions for L1IG-0750100000000.

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

Reel Dimensions

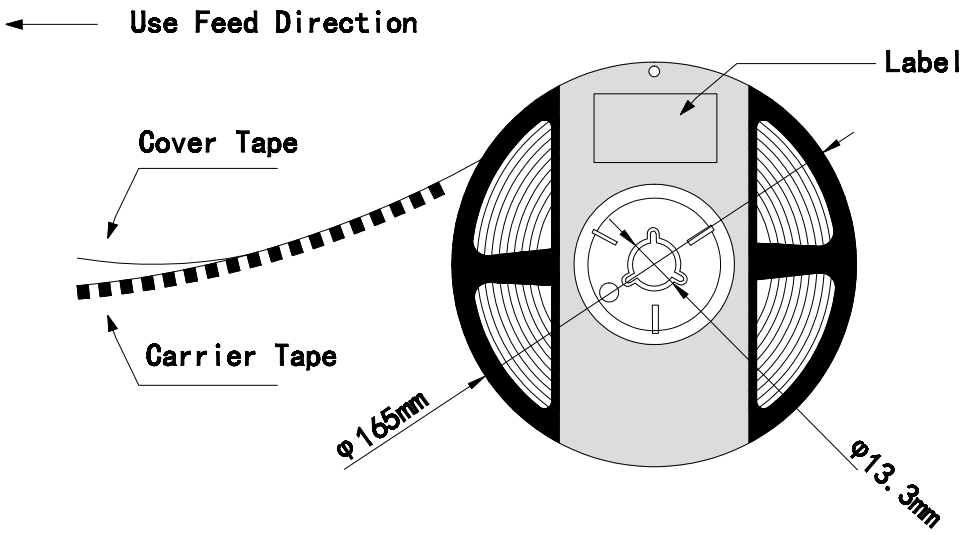


Figure 12. Reel dimensions for L1IG-0750100000000.

Notes for Figure 12:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.

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L128-4080HA35000B1 L128-RED1003500000 L150-50805024000H0 L1HZ-6580100000000
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