

LUXEON 3735 RGB

RGB 3-in-1 versatile package

The LUXEON 3735 RGB is a compact 3-in-1 package that offers flexibility and versatility. With the ability to control individually or all at the same time the color control is precise.



FEATURES AND BENEFITS

RGB 3-in-1 module

3.7mm x 3.5mm

Individually control each channel

IPX8 water resistant rating

PRIMARY APPLICATIONS

Panel Lights

- Display Wall

Linear

Wall Wash

Landscape Lighting

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General Product Information

Product Test Conditions

LUXEON 3735 RGB LEDs are tested and binned with a 20ms monopulse of 20mA at a junction temperature, T_j , of 25°C.

Part Number Nomenclature

The part number for the LUXEON 3735 RGB follows the convention below:

L 1 M C – **A A A** 0 0 3 5 0 0 0 M P 0

Where:

A A A – designates color (R=Red, G=Green, B=Blue)

Therefore, the following part number is used for the Red, Green, Blue LUXEON 3735 RGB:

L 1 M C – **R G B** 0 0 3 5 0 **0** 0 M P 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 3735 RGB 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 3735 RGB at 20mA, T_j=25°C.

| COLOR | DOMINANT WAVELENGTH ^[1] (nm) | | INTENSITY ^[2] (mcd) | | PART NUMBER |
|-------|---|---------|--------------------------------|---------|--------------------|
| | MINIMUM | MAXIMUM | MINIMUM | TYPICAL | |
| Red | 619 | 625 | 850 | 1000 | L1MC-RGB0035000MPO |
| Green | 520 | 535 | 1800 | 2300 | |
| Blue | 465 | 478 | 360 | 500 | |

Notes for Table 1:

1. Lumileds maintains a tolerance of ±1nm on dominant wavelength measurements.
2. Lumileds maintains a tolerance of ±10% on luminous intensity measurements.

Optical Characteristics

Table 2. Optical characteristics for LUXEON 3735 RGB at 20mA, T_j=25°C.

| COLOR | PART NUMBER | TYPICAL SPECTRAL HALF-WIDTH ^[1] (nm) | TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C) | TYPICAL VIEWING ANGLE ^[2] |
|-------|--------------------|---|--|--------------------------------------|
| Red | L1MC-RGB0035000MPO | 15 | 0.04 | 102° |
| Green | | 25 | 0.04 | 102° |
| Blue | | 18 | 0.04 | 102° |

Notes for Table 2:

1. Spectral half-width is the spectral bandwidth at 50% of the peak intensity.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 3735 RGB at 20mA, T_j=25°C.

| COLOR | 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 | | |
| Red | L1MC-RGB0035000MPO | 1.70 | 2.10 | 2.50 | -1.6 | 75 |
| Green | | 2.60 | 2.80 | 3.40 | -2.4 | 120 |
| Blue | | 2.60 | 3.00 | 3.40 | -2.6 | 85 |

Notes for Table 3:

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 3735 RGB.

| PARAMETER | RED | GREEN AND BLUE |
|--|--|----------------|
| DC Forward Current ^[1, 2] | 50mA | 35mA |
| Peak Pulsed Forward Current ^[1, 3] | 200mA | 100mA |
| LED Junction Temperature ^[1] (DC & Pulse) | 115°C | 115°C |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012) | Class 2 | |
| LED Storage Temperature | -40°C to 100°C | |
| Soldering Temperature | JEDEC 020c 250°C | |
| Allowable Reflow Cycles | 3 | |
| Reverse Voltage ($V_{reverse}$) | LUXEON 3735 RGB 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. Single-color light.
3. At 0.01ms pulse on time test with a pulse period of 0.1ms.

Characteristic Curves

Spectral Power Distribution Characteristics

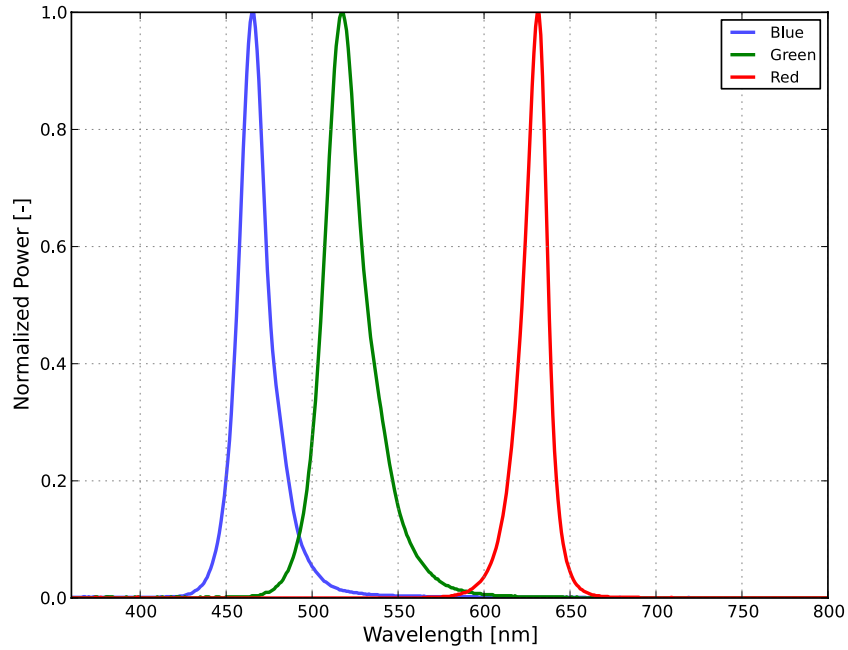


Figure 1. Typical normalized power vs. wavelength for LUXEON 3735 RGB at 20mA, $T_j=25^{\circ}\text{C}$.

Light Output Characteristics

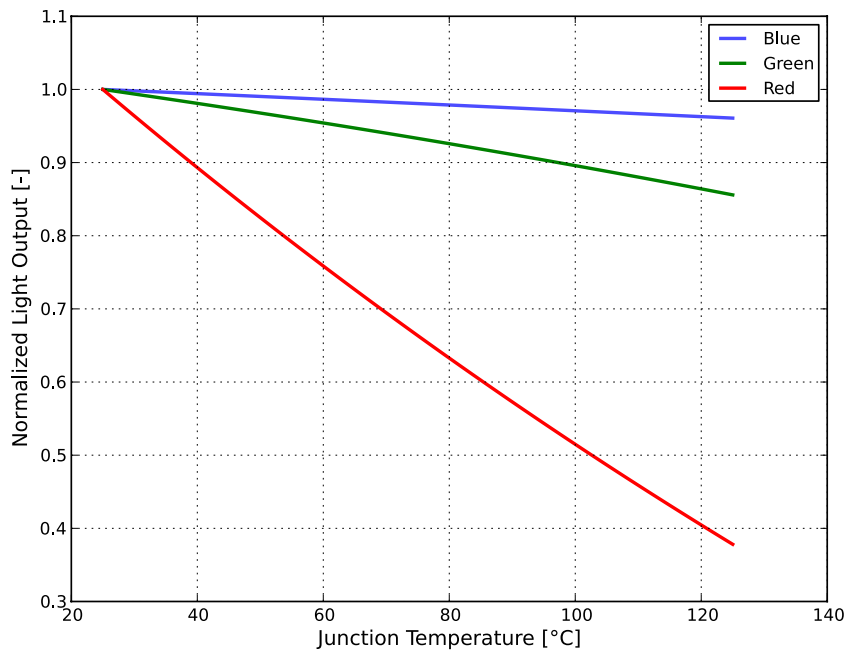


Figure 2. Typical normalized light output vs. junction temperature for LUXEON 3735 RGB at 20mA.

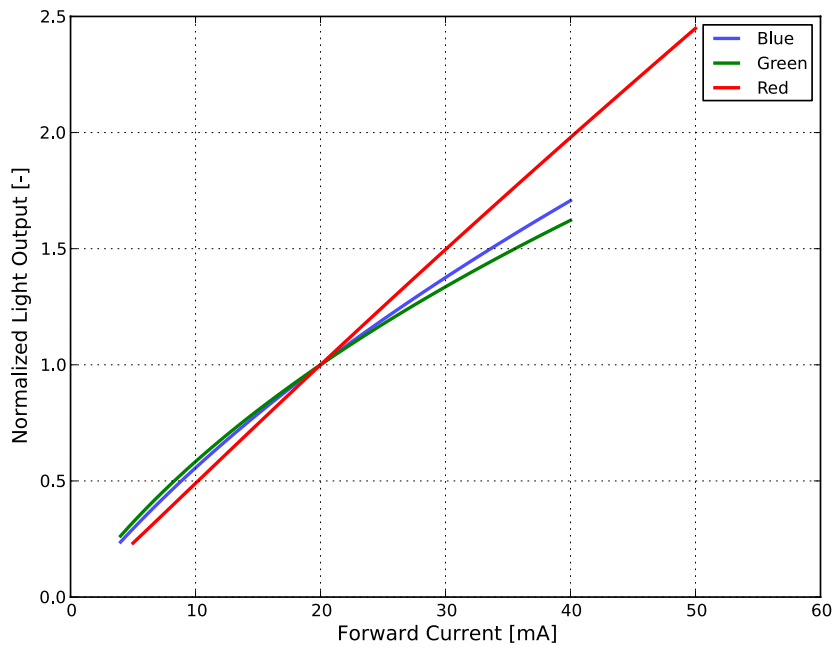


Figure 3. Typical normalized light output vs. forward current for LUXEON 3735 RGB at $T_j=25^\circ\text{C}$.

Forward Current Characteristics

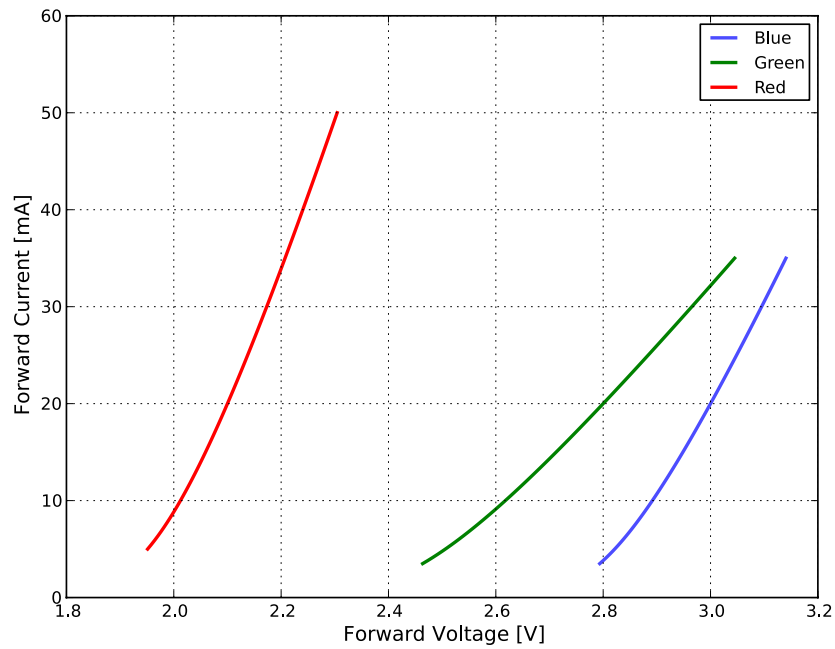


Figure 4. Typical forward current vs. forward voltage for LUXEON 3735 RGB at $T_j=25^\circ\text{C}$.

Radiation Pattern Characteristics

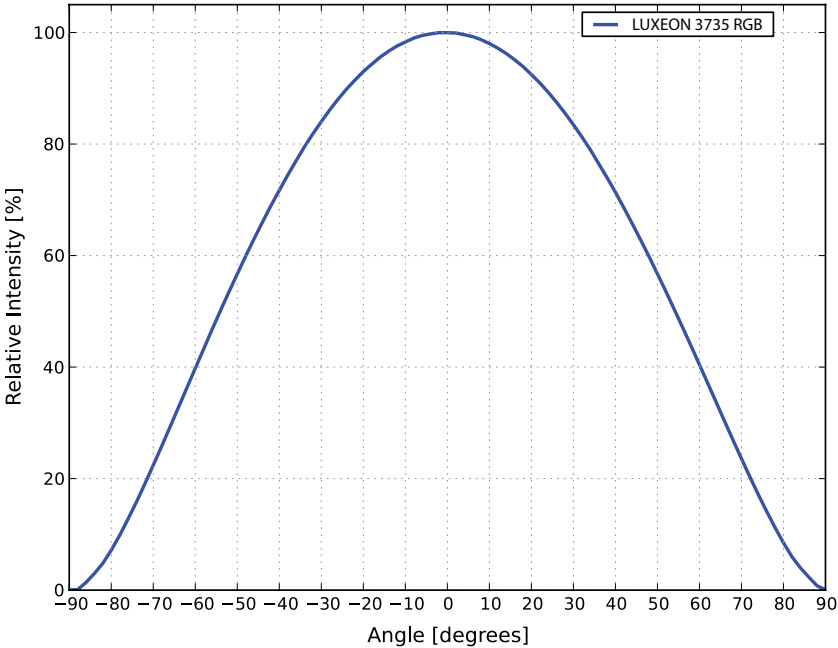


Figure 5. Typical radiation pattern for LUXEON 3735 RGB at 20mA, T_j=25°C.

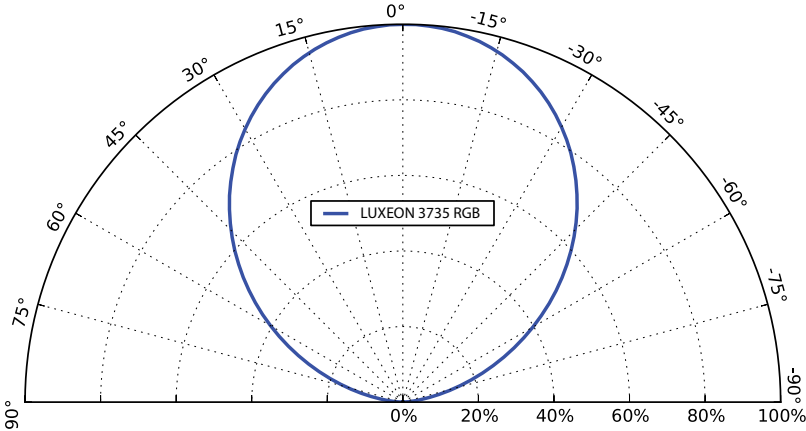


Figure 6. Typical polar radiation pattern for LUXEON 3735 RGB at 20mA, T_j=25°C.

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, intensity, radiometric power, color point, peak wavelength, dominant wavelength and forward voltage.

LUXEON 3735 RGB LEDs are labeled using a 12-digit alphanumeric CAT code following the format below:

A B C D – Red

E F G H – Green

J K L M – Blue

Where:

A E J – designates intensity for the red, green and blue LED (example: B=440 to 520mcd, S=2200 to 2500mcd)

BC FG KL – designates color, dominant wavelength bin (example: Red 10=619 to 625nm, Green 20=520 to 525nm, Blue 31=468 to 471nm)

D H M – designates forward voltage bin (example: A=1.70 to 2.4V, B=2.60 to 3.40V)

Therefore, a LUXEON 3735 RGB LED with a red intensity of 975 to 1150mcd / color 619 to 625nm / forward voltage of 1.70 to 2.50V; green intensity of 2200 to 2500mcd / color 525 to 530nm / forward voltage of 2.60 to 3.40V; blue intensity of 440 to 520mcd / color 468 to 471nm and forward voltage of 2.60 to 3.40V has the following CAT Code:

H 1 0 A – Red

S 2 1 B – Green

B 3 1 B – Blue

Intensity Bins

Table 5 lists the standard intensity bins for LUXEON 3735 RGB LEDs. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Table 5. Intensity bin definitions for LUXEON 3735 RGB.

| BIN | BIN | INTENSITY ⁽¹⁾ (mcd) | |
|-------|-----|--------------------------------|---------|
| | | MINIMUM | MAXIMUM |
| Red | G | 850 | 975 |
| | H | 975 | 1150 |
| Green | R | 1800 | 2200 |
| | S | 2200 | 2500 |
| | T | 2500 | 3000 |
| Blue | A | 360 | 440 |
| | B | 440 | 520 |
| | C | 520 | 600 |
| | D | 600 | 700 |

Notes for Table 5:

1. Lumileds maintains a tolerance of $\pm 10\%$ on intensity measurements.

Dominant Wavelength Bins

Table 6. Dominant wavelength bins for LUXEON 3735 RGB at 20mA, $T_j = 25^\circ\text{C}$.

| COLOR | PART NUMBER | BIN | DOMINANT WAVELENGTH ⁽¹⁾ (nm) | |
|-------|--------------------|-----|---|---------|
| | | | MINIMUM | MAXIMUM |
| Red | L1MC-RGB0035000MP0 | 10 | 619 | 625 |
| Green | | 20 | 520 | 525 |
| | | 21 | 525 | 530 |
| | | 22 | 530 | 535 |
| Blue | | 30 | 465 | 468 |
| | | 31 | 468 | 471 |
| | | 32 | 471 | 475 |
| | | 33 | 475 | 478 |

Notes for Table 6:

1. Lumileds maintains a tolerance of $\pm 1\text{nm}$ on dominant wavelength measurements.

Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 3735 RGB.

| COLOR | BIN | FORWARD VOLTAGE ⁽¹⁾ (V_f) | |
|-------|-----|--|---------|
| | | MINIMUM | MAXIMUM |
| Red | A | 1.70 | 2.50 |
| Green | B | 2.60 | 3.40 |
| Blue | B | 2.60 | 3.40 |

Notes for Table 7:

1. Lumileds maintains a tolerance of $\pm 0.1\text{V}$ on forward voltage measurements.

Mechanical Dimensions

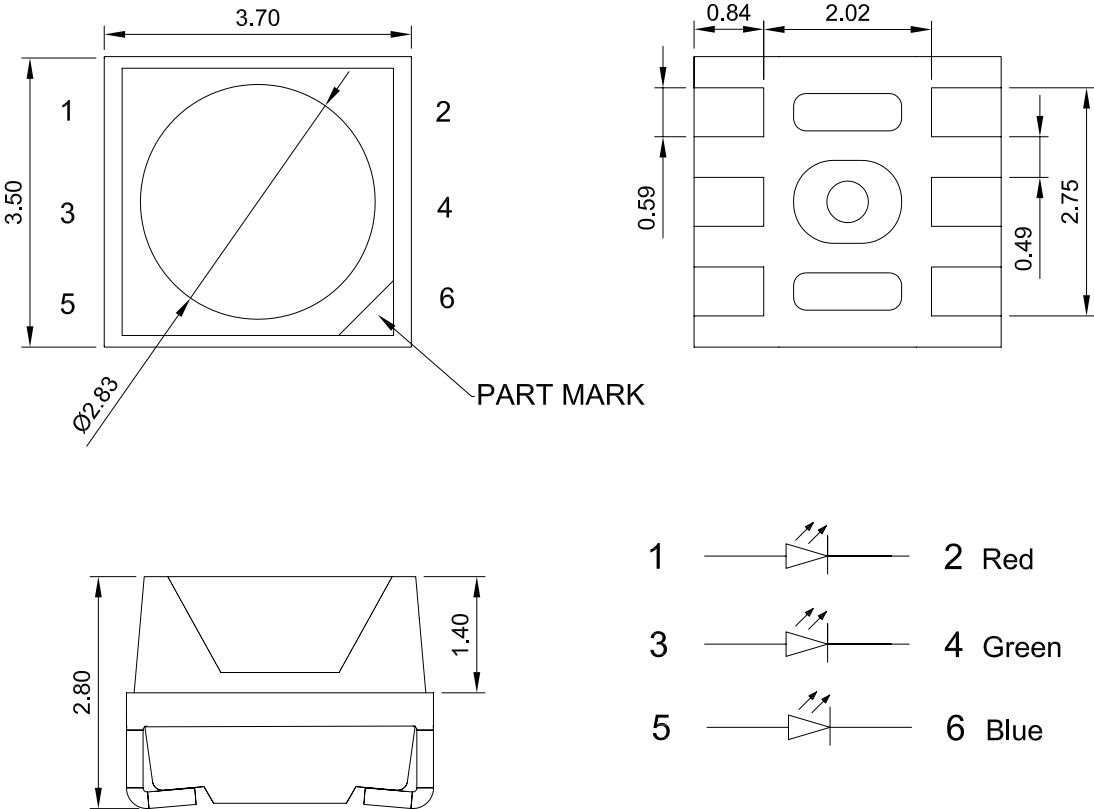


Figure 7. Mechanical dimensions for LUXEON 3735 RGB.

Notes for Figure 7:
 1. Drawings are not to scale.
 2. All dimensions are in millimeters.

Reflow Soldering Guidelines

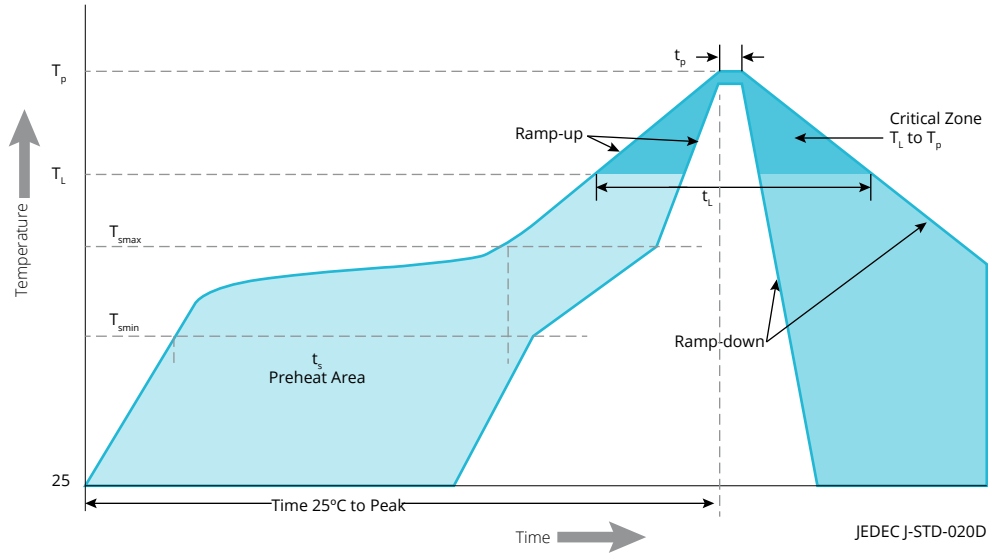


Figure 8. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 3735 RGB.

| 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 120 seconds |
| Ramp-Up Rate (T_L to T_p) | 4°C / second maximum |
| Liquidous Temperature (T_L) | 217°C |
| Time Maintained Above Temperature T_L (t_L) | 60 to 150 seconds |
| Peak / Classification Temperature (T_p) | 250°C |
| Time Within 5°C of Actual Peak 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 3735 RGB.

| LEVEL | FLOOR LIFE | | SOAK REQUIREMENTS STANDARD | |
|-------|------------|----------------|----------------------------|---------------|
| | TIME | CONDITIONS | TIME | CONDITIONS |
| 5a | 24 hours | ≤30°C / 60% RH | 48 Hours +2 / -0 | 30°C / 60% RH |

Waterproof Test

Table 10. Waterproof test for LUXEON 3735 RGB. ^[1]

| STANDARD | CONDITIONS | TIME |
|----------------|----------------------------|----------|
| IEC 60529:2001 | IPX8 immersing in 1m water | 24 hours |

Notes for Table 10:

1. Waterproof test is conducted on the component level by assembling the module on a PCB, isolating the electrical path by silicone. It is recommended to test the product in the application and insulate for moisture.

Solder Pad Design

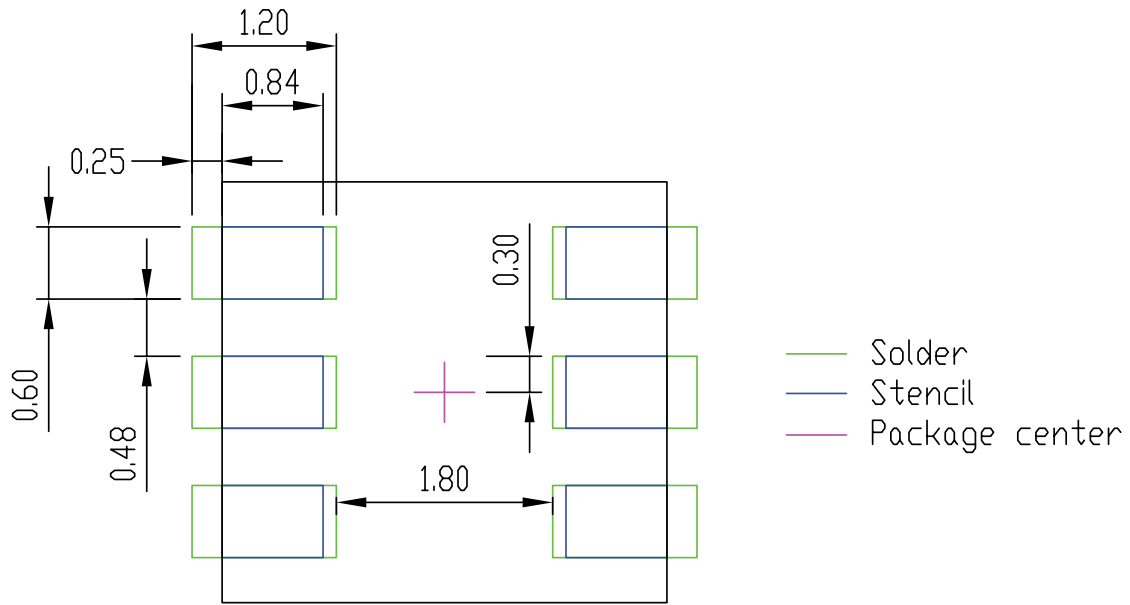


Figure 9. Recommended PCB solder pad layout for LUXEON 3735 RGB.

Notes for Figure 9:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Layout is symmetric around package center.
4. All six pads patterns are identical in size.

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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