

# LUXEON XR-3020

Linear LED module on an ultra-slim and rigid substrate enabling high efficacy designs

LUXEON XR-3020 products are ultra-slim linear LED modules optimized for narrow (20mm wide) lighting applications such as fluorescent replacements. The integrated solution comes in 1 or 2 foot versions with 24 or 48 LEDs mounted on a CEM3 thermally conductive substrate. LUXEON XR-3020 is designed for ease of system integration, simplified supply chain and faster time to market.



## FEATURES AND BENEFITS

1100 or 2200 lumen packages at 100mA/LED and 45°C board temperature

160lm/W for maximum light output and low power consumption

1ft (24-up) or 2ft (48-up) length and Zhaga defined screw hole locations

A range of CCT options available in 80 or 90CRI (3000–5000K)

Uses the industry's most compact, highest drive current 3V mid power LEDs—LUXEON 3020

>50k hours LED lifetime (L70)

LED performance matching to support the best light output uniformity, forward voltage, and color control

5 year limited warranty

## PRIMARY APPLICATIONS

Architectural

Indoor Area Lighting

– T-LEDs

– Troffers

Specialty Lighting

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# General Product Information

## Product Test Conditions

LUXEON XR-3020 products are specified using a forward DC drive current of 200mA and a board temperature,  $T_c$ , of 45°C. The LEDs are electrically configured in series strings of 12 with 2 or 4 parallel strings.

The LUXEON 3020 LEDs on LUXEON XR-3020 are tested using a DC drive current at 120mA at a junction temperature,  $T_j$ , of 25°C. The minimum, typical and maximum performance numbers for LUXEON XR-3020 in this datasheet are derived from individual LED measurements. The confidence level on all minimum and maximum performance parameters in this datasheet is 99% to within individual LED tolerance.

## Part Number Nomenclature

Part numbers for LUXEON XR-3020 follow the convention below:

L 2 1 8 – A A B B 0 D D C E 0 0 0 0

Where:

- A A – designates nominal CCT (30=3000K, 35=3500K, 40=4000K, 50=5000K)
- B B – designates minimum CRI (80=80CRI, 90=90CRI)
- D D – designates number of LEDs on board (24 or 48)
- E – designates board length (3=280mm, 0=560mm)

Therefore, the following part number is used for a LUXEON XR-3020, 3000K, 80CRI with 24 LEDs and length of 280mm:

L 2 1 8 – 3 0 8 0 0 2 4 C 3 0 0 0

For LUXEON XR-3020 CCT/CRI combinations not listed in this datasheet, contact your local Lumileds Sales Representative or Technical Solutions Manager.

## 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 XR-3020 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 XR-3020 at 100mA/LED,  $T_c=45^\circ\text{C}$ .

| CONFIGURATION                         | NOMINAL CCT | MINIMUM CRI <sup>[1]</sup> | LUMINOUS FLUX <sup>[2]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TYPICAL DRIVE CURRENT (mA) | PART NUMBER        |
|---------------------------------------|-------------|----------------------------|-----------------------------------|---------|----------------------------------|----------------------------|--------------------|
|                                       |             |                            | MINIMUM                           | TYPICAL |                                  |                            |                    |
| 280mm, 24-up (2 parallel x 12 series) | 3000K       | 80                         | 1012                              | 1050    | 151                              | 200                        | L218-3080024C30000 |
|                                       | 3500K       | 80                         | 1029                              | 1070    | 153                              | 200                        | L218-3580024C30000 |
|                                       | 4000K       | 80                         | 1049                              | 1088    | 156                              | 200                        | L218-4080024C30000 |
|                                       | 5000K       | 80                         | 1049                              | 1088    | 156                              | 200                        | L218-5080024C30000 |
|                                       | 4000K       | 90                         | 850                               | 890     | 127                              | 200                        | L218-4090024C30000 |
| 560mm, 48-up (4 parallel x 12 series) | 3000K       | 80                         | 2024                              | 2100    | 151                              | 400                        | L218-3080048C00000 |
|                                       | 3500K       | 80                         | 2058                              | 2140    | 153                              | 400                        | L218-3580048C00000 |
|                                       | 4000K       | 80                         | 2098                              | 2176    | 156                              | 400                        | L218-4080048C00000 |
|                                       | 5000K       | 80                         | 2098                              | 2176    | 156                              | 400                        | L218-5080048C00000 |
|                                       | 4000K       | 90                         | 1700                              | 1780    | 127                              | 400                        | L218-4090048C00000 |

**Notes for Table 1:**

1. Lumileds maintains a tolerance of  $\pm 2$  on CRI measurements.
2. Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux measurements.

## Electrical and Thermal Characteristics

Table 2. Electrical and thermal characteristics for LUXEON XR-3020 at 100mA/LED,  $T_c=45^\circ\text{C}$ .

| PART NUMBER        | FORWARD VOLTAGE (V) <sup>[1]</sup> |         |         | TYPICAL THERMAL RESISTANCE — JUNCTION TO HEAT SINK ( $^\circ\text{C/W}$ ) | TYPICAL THERMAL RESISTANCE — JUNCTION TO SOLDER PAD ( $^\circ\text{C/W}$ ) <sup>[2]</sup> |
|--------------------|------------------------------------|---------|---------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|                    | MINIMUM                            | TYPICAL | MAXIMUM |                                                                           |                                                                                           |
| L218-xxxx024C30000 | 34                                 | 34.8    | 36      | 2.0                                                                       | 13                                                                                        |
| L218-xxxx048C00000 | 34                                 | 34.8    | 36      | 1.0                                                                       | 13                                                                                        |

**Notes for Table 2:**

1. Lumileds maintains a tolerance of  $\pm 0.1\text{V}$  on forward voltage measurements.
2. Typical thermal resistance — junction to solder pad, is per LED.

# Absolute Maximum Ratings

Table 3. Absolute maximum ratings for LUXEON XR-3020.

| PARAMETER                                                    | MAXIMUM PERFORMANCE                                       |
|--------------------------------------------------------------|-----------------------------------------------------------|
| DC Forward Current <sup>[1,2]</sup>                          | 480mA for L218-xyy024C30000, 960mA for L218-xyy048C00000  |
| Peak Pulsed Forward Current <sup>[1,3]</sup>                 | 600mA for L218-xyy024C30000, 1200mA for L218-xyy048C00000 |
| LED Junction Temperature <sup>[1]</sup> (DC & Pulse)         | 125°C                                                     |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)                | IEC 61000-4-2 Level 4 (8/15 kV contact/air discharge)     |
| Operating Temperature at T <sub>c</sub> point <sup>[4]</sup> | -40 to 85°C                                               |
| LED Module Storage Temperature                               | -40 to 105°C                                              |
| Reverse Voltage (V <sub>reverse</sub> )                      | LUXEON LEDs are not designed to be driven in reverse bias |

Notes for Table 3:

- 1. Proper current derating must be observed to maintain the junction temperature below the maximum.
- 2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," with frequencies  $\geq 100\text{Hz}$  and amplitude  $\leq 15\%$  of the maximum allowable DC forward current are acceptable, assuming the average current throughout each cycle does not exceed the maximum allowable DC Forward Current at the corresponding maximum junction temperature.
- 3. Pulsed operation with a peak drive current equal to the stated Peak Pulsed Forward Current is acceptable if the pulse on-time is  $\leq 5\text{ms}$  per cycle and the duty cycle is  $\leq 50\%$ .
- 4. Measured at T<sub>c</sub> point next to LED. Some manufacturers refer to T<sub>c</sub> as T<sub>s</sub>. See [AB209 LUXEON 3020 Application Brief](#) for details.
- 5. Per IEC 62031, Ethr=2215 Lux.

## Characteristic Curves

### Spectral Power Distribution Characteristics

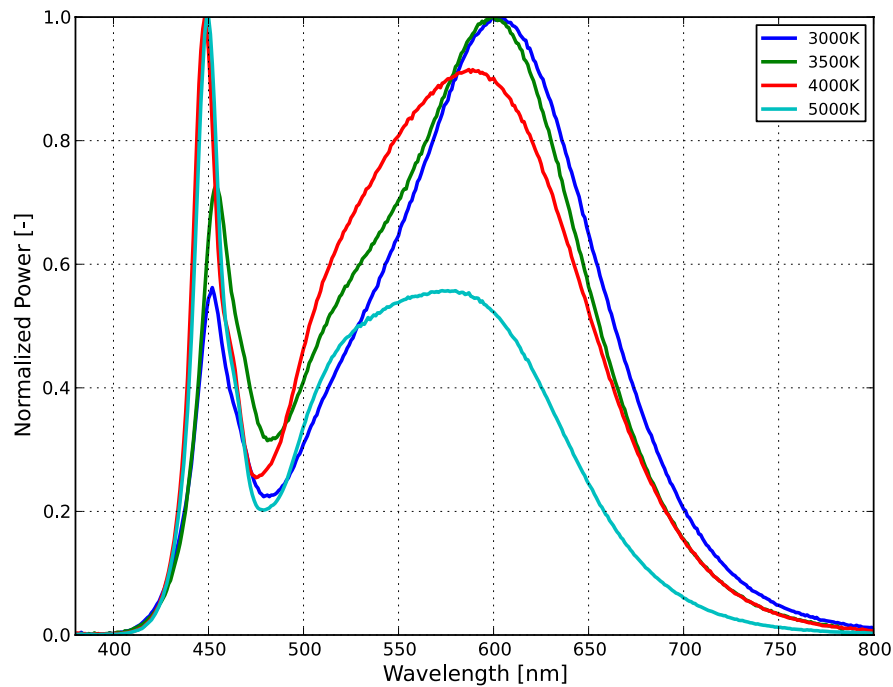


Figure 1: Typical normalized power vs. wavelength for LUXEON 3020 at 120mA, T<sub>j</sub>=25°C.

# Radiation Pattern Characteristics

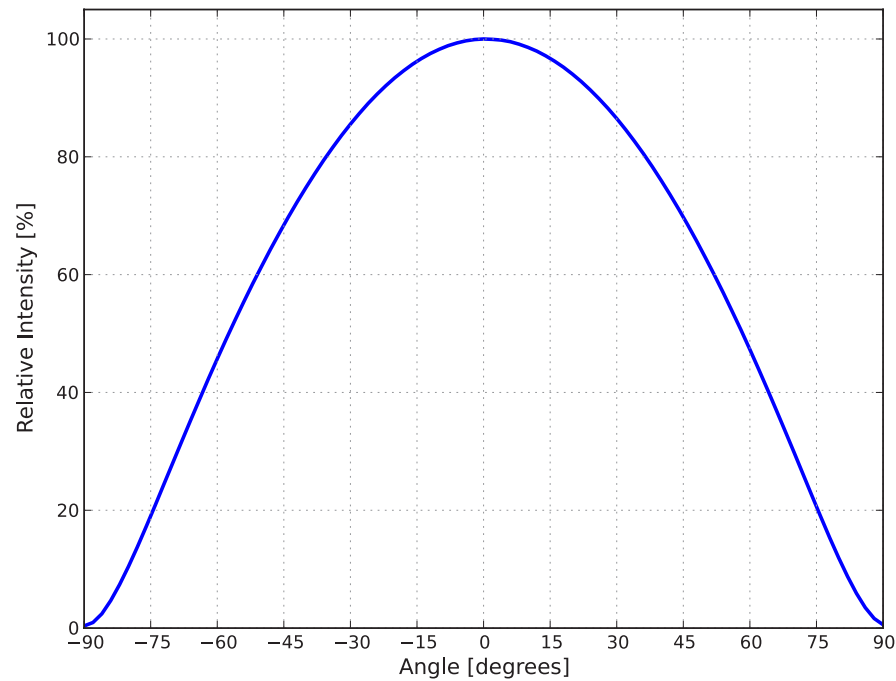


Figure 2: Typical radiation pattern for LUXEON 3020 at 120mA,  $T_j=25^{\circ}\text{C}$ .

# Color Bin Definition

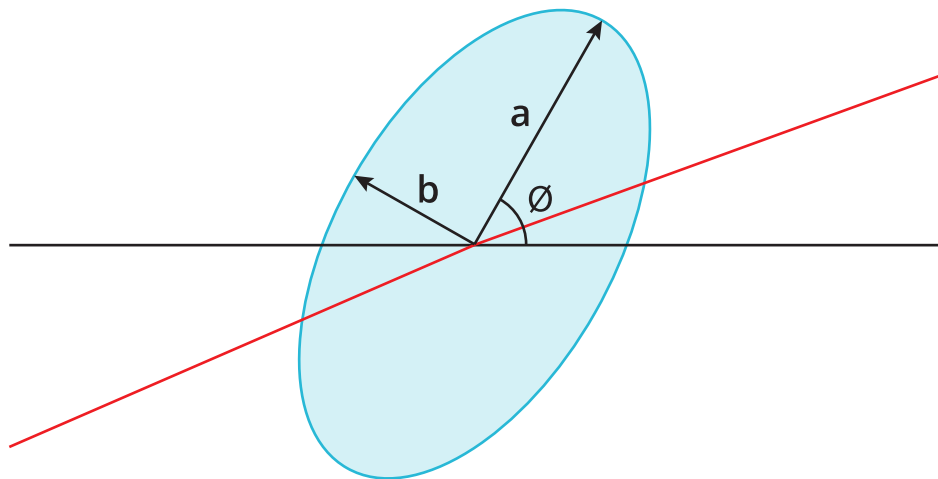


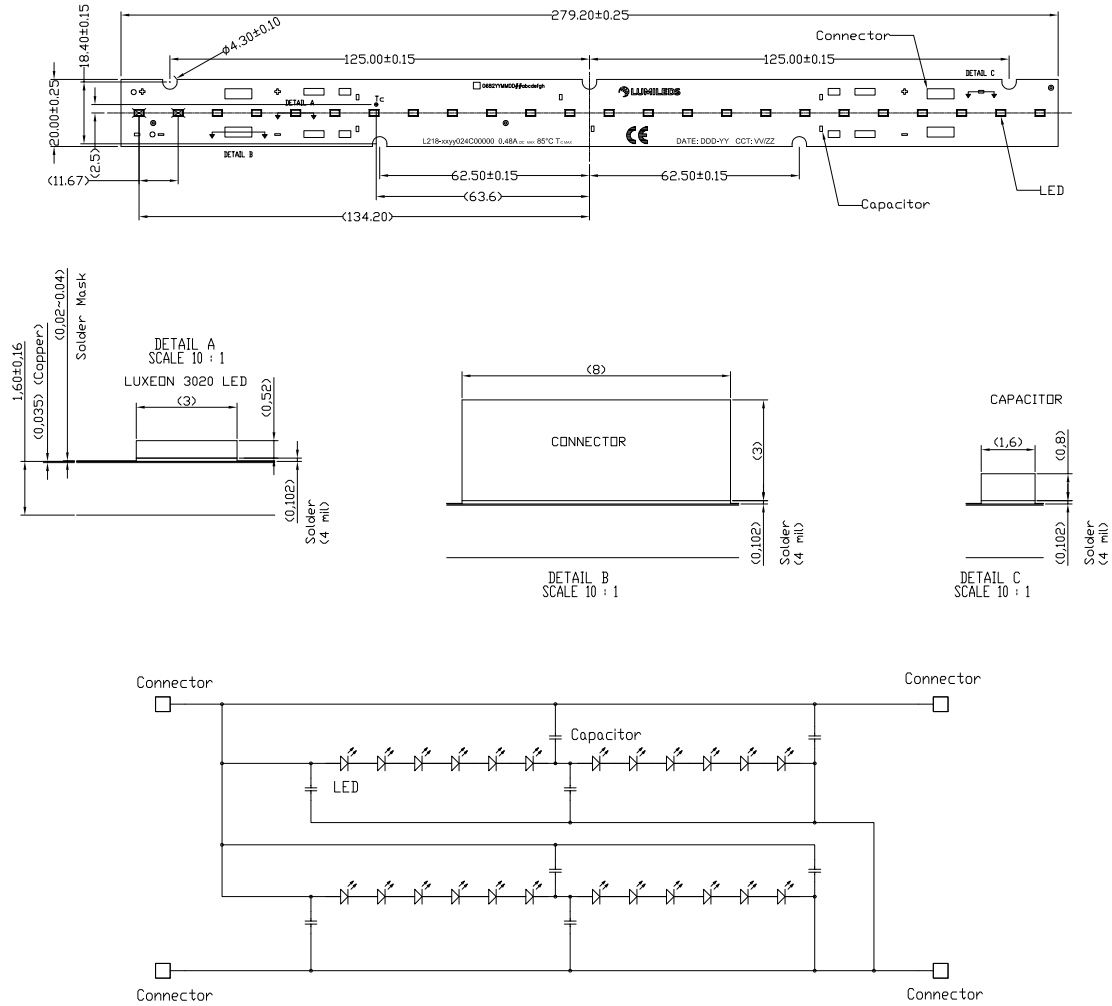
Figure 3: 3-step MacAdam ellipse illustration for Table 4.

Table 4. 3-step MacAdam ellipse color bin definitions for LUXEON M at 700mA,  $T_j= 85^{\circ}\text{C}$ .

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT<br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>ANGLE, $\theta$ |
|-------------|-------------------------------|--------------------------|------------------|------------------|-------------------------------------|
| 3000K       | Single 3-step MacAdam ellipse | (0.4338, 0.4030)         | 0.00834          | 0.00408          | 53.22°                              |
| 3500K       | Single 3-step MacAdam ellipse | (0.4073, 0.3917)         | 0.00927          | 0.00414          | 54.00°                              |
| 4000K       | Single 3-step MacAdam ellipse | (0.3818, 0.3797)         | 0.00939          | 0.00402          | 53.72°                              |
| 5000K       | Single 3-step MacAdam ellipse | (0.3447, 0.3558)         | 0.00822          | 0.00354          | 59.62°                              |

Notes for Table 4:  
1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

# Mechanical Dimensions



## Notes for Figure 4:

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

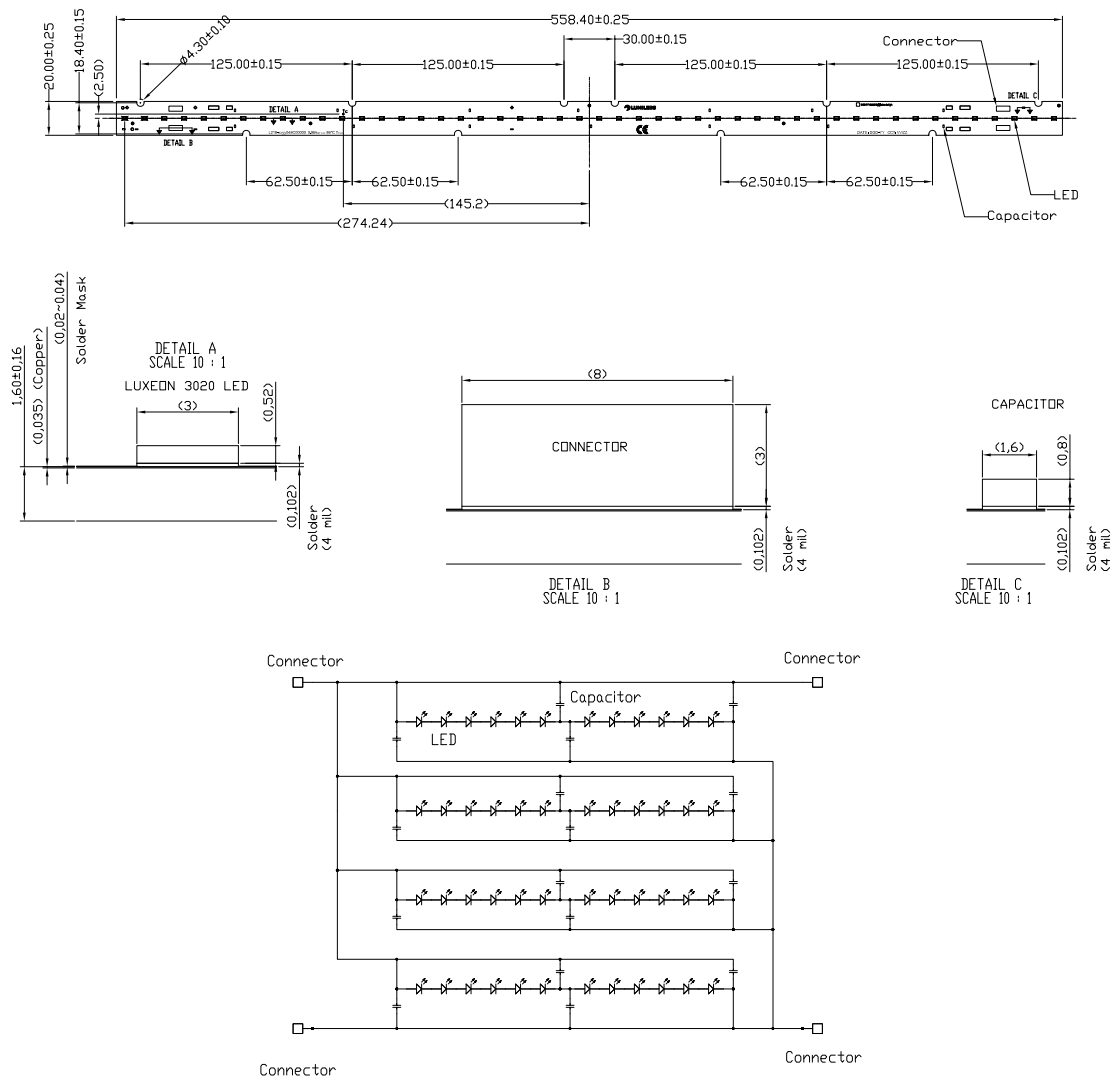


Figure 5: Mechanical dimensions for L218-xxxx048C00000.

- Notes for Figure 5:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

## Packaging Information

Table 5. Packaging information for LUXEON XR-3020.

| PART NUMBER        | TRAY DIMENSIONS (mm) | QUANTITY PER TRAY | NUMBER OF TRAYS PER BOX |
|--------------------|----------------------|-------------------|-------------------------|
| L218-xxxx024C30000 | 635 x 220            | 20                | 5                       |
| L218-xxxx048C00000 | 635 x 220            | 10                | 5                       |

## Tray Dimensions

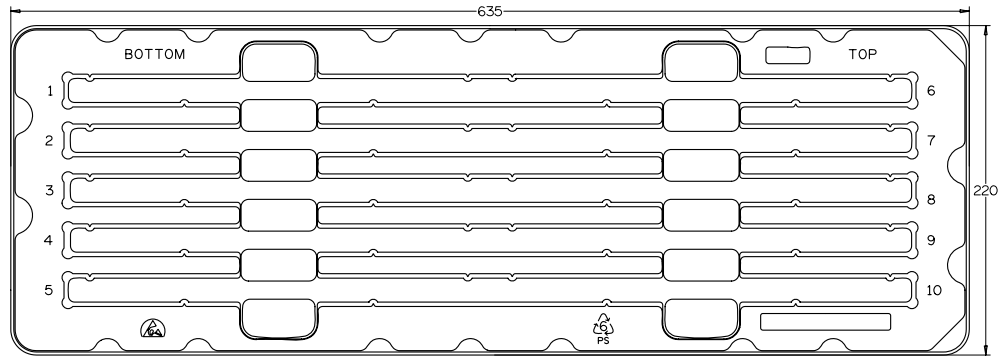


Figure 6: Tray dimensions for L218-xxxx0ccCx0000.

### Notes for Figure 6:

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

## Product Packaging Considerations—Chemical Compatibility

The LUXEON emitter package contains a silicone overcoat to protect the LED chip and extract the maximum amount of light. As with most silicones used in LED optics, care must be taken to prevent any incompatible chemicals from directly or indirectly reacting with the silicone. Refer to the [LUXEON 3020 Application Brief AB209](#) for guidelines on chemical compatibilities.

## 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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