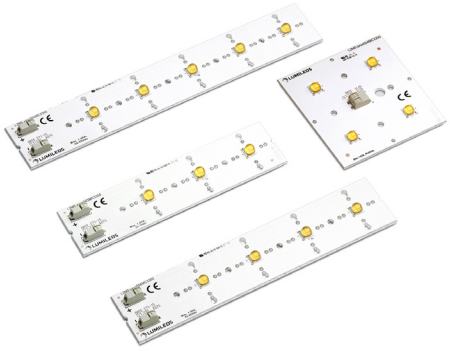
# LUXEON XR-M

## Bright, uniform light source in practical, convenient and easy to configure modules



LUXEON XR-M products are LED modules optimized for lighting applications requiring high power LED arrays mounted on a rigid and thermally conductive substrate. These versatile building blocks come with 3, 4 or 5 LUXEON M LEDs on a MCPCB substrate and are designed for ease of system integration, faster time to market, and use with industry standard optics. The 4 LED square version will become a complete IP66 solution when used in combination with standard third party optics and heat sink.

### FEATURES AND BENEFITS

- Typical 3200–5300 lumen building blocks with 140 lm/W efficacy @700mA, $T_c$=85°C
- Available in 70CRI 4000K, 5000K and 5700K
- May be used with off-the-shelf individual lenses and lens plates for easy system integration
- Constant board-to-board LED pitch for versatile system design
- 3, 4 and 5 LED linear board options and 4 LED square board option for design flexibility and luminaire adaptability
- MCPCB for efficient heat dissipation and mechanical robustness
- 5 year limited warranty

### PRIMARY APPLICATIONS

- Architectural
- High Bay & Low Bay
- Outdoor
  - Streetlights
  - Stadium

DS158 LUXEON XR-M Product Datasheet ©2016 Lumileds Holding B.V. All rights reserved.

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# General Product Information

## Product Test Conditions

LUXEON XR-M products are specified using a forward DC drive current of 700mA and a board temperature, $T_c$ of 85°C. The LEDs are electrically configured in series which means each LED is driven at equal current.

The LUXEON M LEDs on LUXEON XR-M are tested and binned using a DC drive current at 700mA and junction temperature, $T_j$, of 85°C. The minimum, typical, and maximum performance numbers for LUXEON XR-M 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-M follow the convention below:

L 2 M 0 – **A A B B** 0 0 **D** M C **E E** 0 0

Where:

- **A A** – designates nominal ANSI CCT (40=4000K, 50=5000K, 57=5700K)
- **B B** – designates minimum CRI (70=70CRI)
- **D** – designates number of LEDs (3, 4 or 5)
- **E E** – designates LED configuration (22=square, 33=linear)

Therefore, a LUXEON XR-M, 4000K, 70CRI, with 4 LEDs in a linear configuration will have the following part number:

L 2 M 0 – **4 0 7 0** 0 0 **4** M C **3 3** 0 0

For LUXEON XR-M CCT and 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-M 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 of LUXEON XR-M at 700mA, $T_c$=85°C.**

| CONFIGURATION | NOMINAL CCT | MINIMUM CRI [1] | LUMINOUS FLUX [2] (lm) | | TYPICAL LUMINOUS EFFICACY (lm/W) | PART NUMBER |
|---|---|---|---|---|---|---|
| | | | MINIMUM | TYPICAL | | |
| Square | 4000K | 70 | 4053 | 4211 | 138 | L2M0-4070004MC2200 |
| | 5000K | 70 | 4200 | 4363 | 144 | L2M0-5070004MC2200 |
| | 5700K | 70 | 4156 | 4318 | 142 | L2M0-5770004MC2200 |
| Linear | 4000K | 70 | 3040 | 3158 | 138 | L2M0-4070003MC3300 |
| | 5000K | 70 | 3150 | 3272 | 144 | L2M0-5070003MC3300 |
| | 5700K | 70 | 3117 | 3239 | 142 | L2M0-5770003MC3300 |
| | 4000K | 70 | 4053 | 4211 | 138 | L2M0-4070004MC3300 |
| | 5000K | 70 | 4200 | 4363 | 144 | L2M0-5070004MC3300 |
| | 5700K | 70 | 4156 | 4318 | 142 | L2M0-5770004MC3300 |
| | 4000K | 70 | 5067 | 5264 | 138 | L2M0-4070005MC3300 |
| | 5000K | 70 | 5249 | 5454 | 144 | L2M0-5070005MC3300 |
| | 5700K | 70 | 5195 | 5397 | 142 | L2M0-5770005MC3300 |

Notes for Table 1:
1. Lumileds maintains a tolerance of ±2 on CRI measurements.
2. Lumileds maintains a tolerance of ±7.5% on luminous flux measurements.

## Electrical and Thermal Characteristics

**Table 2. Electrical and thermal characteristics for LUXEON XR-M at 700mA, $T_c$=85°C.**

| PART NUMBER | FORWARD VOLTAGE (V) [1] | | | TYPICAL THERMAL RESISTANCE — JUNCTION TO HEAT SINK (K/W) $R_{TH\ J\text{-}HS}$ |
|---|---|---|---|---|
| | MINIMUM | TYPICAL | MAXIMUM | |
| L2M0-xxxx003MC3300 | 32.60 | 32.85 | 33.10 | 1.60 |
| L2M0-xxxx004MCzz00 | 43.55 | 43.80 | 44.05 | 1.20 |
| L2M0-xxxx005MC3300 | 54.50 | 54.75 | 55.00 | 0.96 |

Notes for Table 2:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

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# Absolute Maximum Ratings

**Table 3. Absolute maximum ratings for LUXEON XR-M.**

| PARAMETER | MAXIMUM PERFORMANCE |
|---|---|
| DC Forward Current [1,2] | 1050mA |
| Peak Pulsed Forward Current [1,3] | 1200mA |
| LED Junction Temperature [1] (DC & Pulse) | 135°C |
| ESD Sensitivity | IEC 61000-4-2 Level 4 (8/15 kV contact/air discharge) |
| Operating Temperature at $T_c$ point [4] | -40 to 85°C |
| LED Module Storage Temperature | -40 to 105°C |
| Reverse Voltage ($V_{reverse}$) | 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 ≥100Hz and amplitude ≤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 ≤5ms per cycle and the duty cycle is ≤50%.
4. Measured at $T_c$ point next to LED. See AB103 LUXEOM M Application Brief for details. Some manufacturers refer to $T_c$ as $T_s$.
5. Per IEC 62471, Ethr=770 lux.

# Characteristic Curves

## Spectral Power Distribution Characteristics

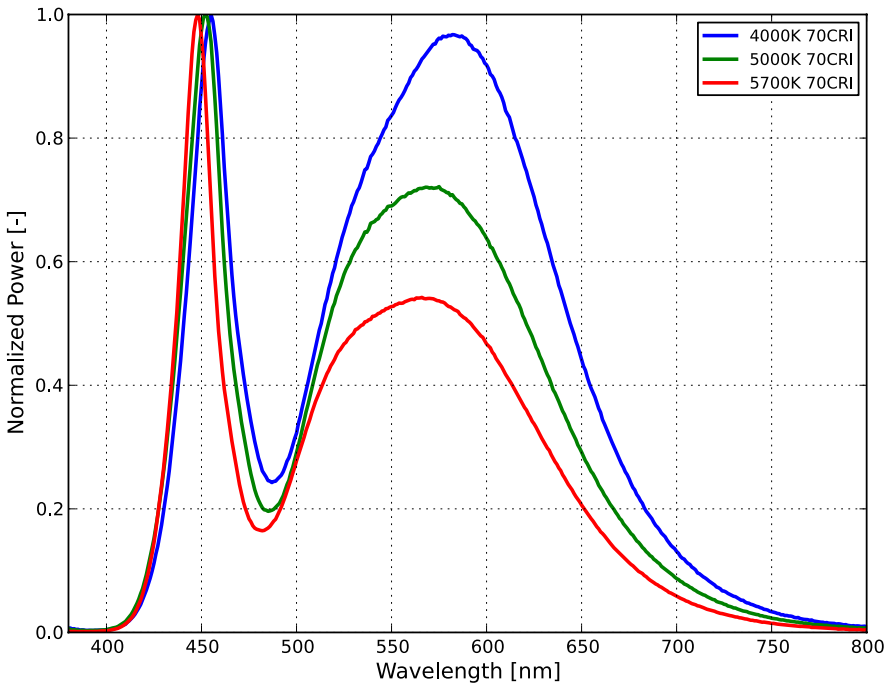


**Figure 1: Typical normalized power vs. wavelength for LUXEON M at 700mA, $T_j$=85°C.**

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## Radiation Pattern Characteristics

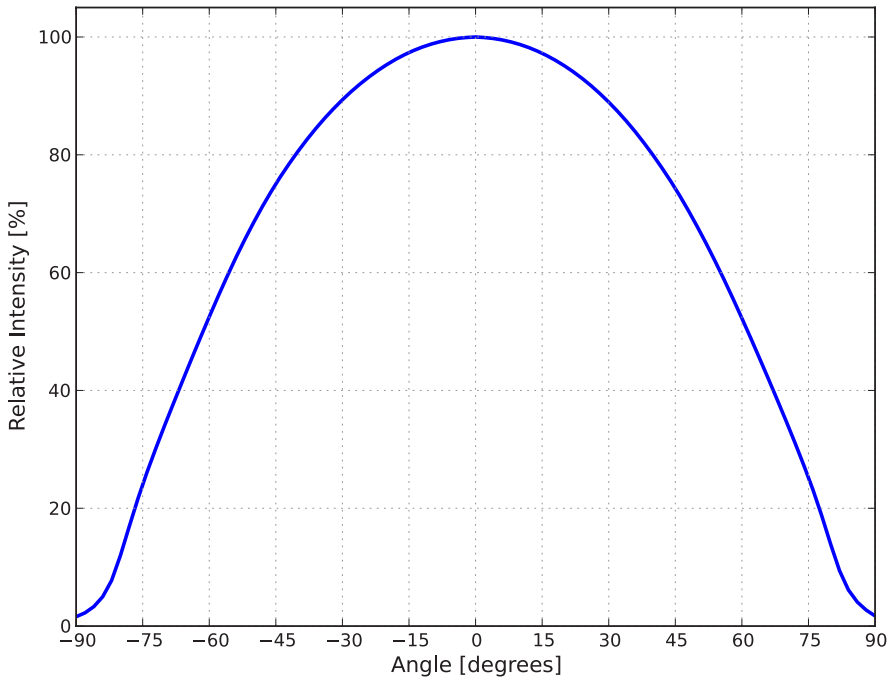


Figure 2: Typical radiation pattern for LUXEON M at 700mA, $T_j$=85°C.

## Color Bin Definition

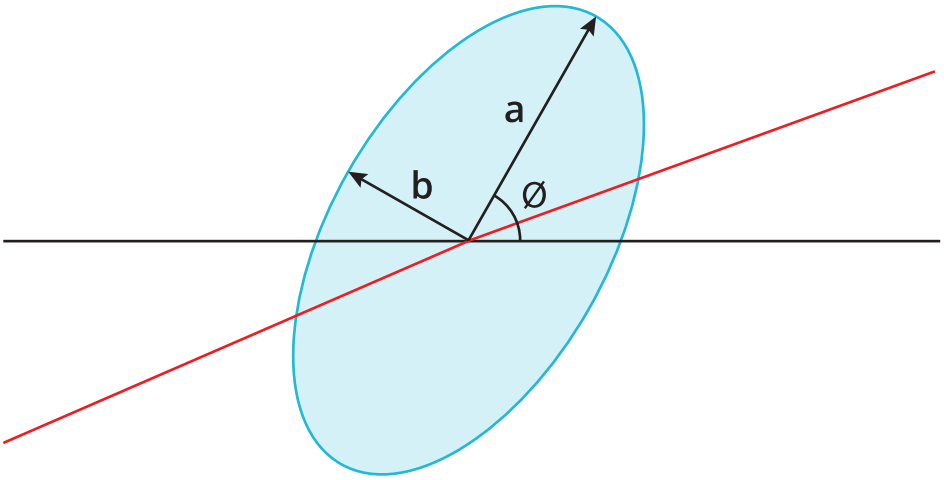


Figure 3: 5-step MacAdam ellipse illustration for Table 4.

Table 4. 5-step MacAdam ellipse color bin definitions for LUXEON M at 700mA, $T_j$= 85°C.

| NOMINAL CCT | COLOR SPACE | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ |
|---|---|---|---|---|---|
| 4000K | Single 5-step MacAdam ellipse | (0.3818, 0.3797) | 0.01565 | 0.00670 | 53.72° |
| 5000K | Single 5-step MacAdam ellipse | (0.3447, 0.3553) | 0.01370 | 0.00590 | 59.62° |
| 5700K | Single 5-step MacAdam ellipse | (0.3287, 0.3417) | 0.01243 | 0.00533 | 59.09° |

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

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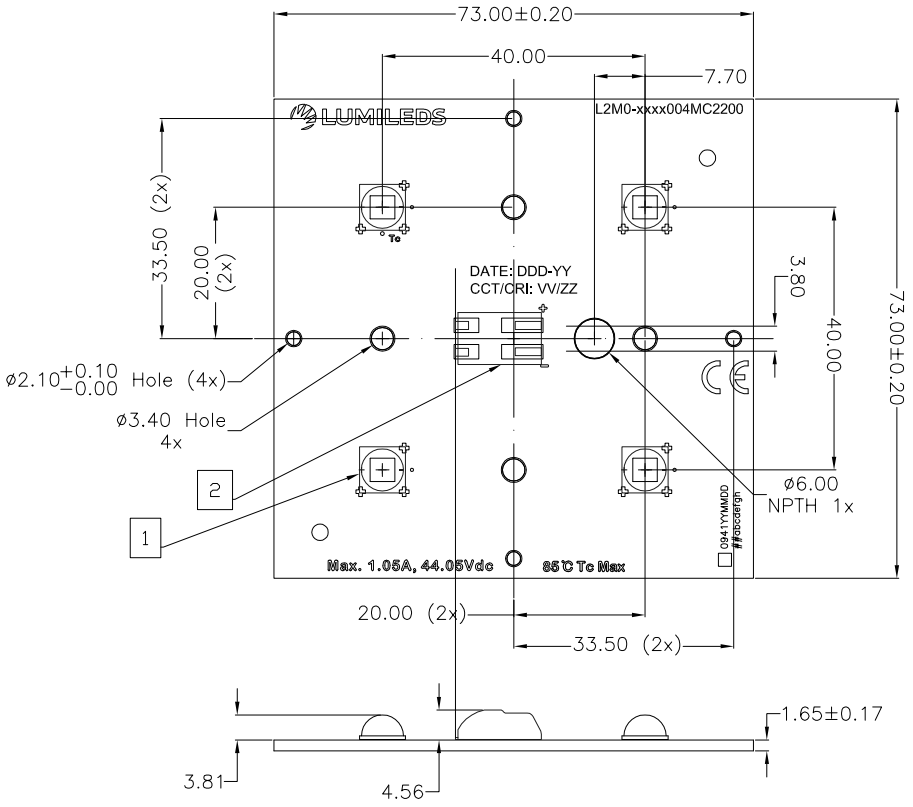
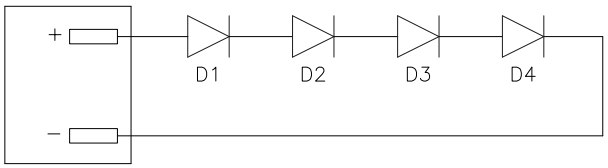
# Mechanical Dimensions




Circuit Diagram

| ITEM | QTY | PART/MATERIAL-DESCRIPTION | REFERENCE |
|---|---|---|---|
| 1 | 4 | LUXEON M | |
| 2 | 1 | 2-pole Connector | |

**Figure 4: Mechanical dimensions for L2M0-xxxx004MC2200.**

Notes for Figure 4:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

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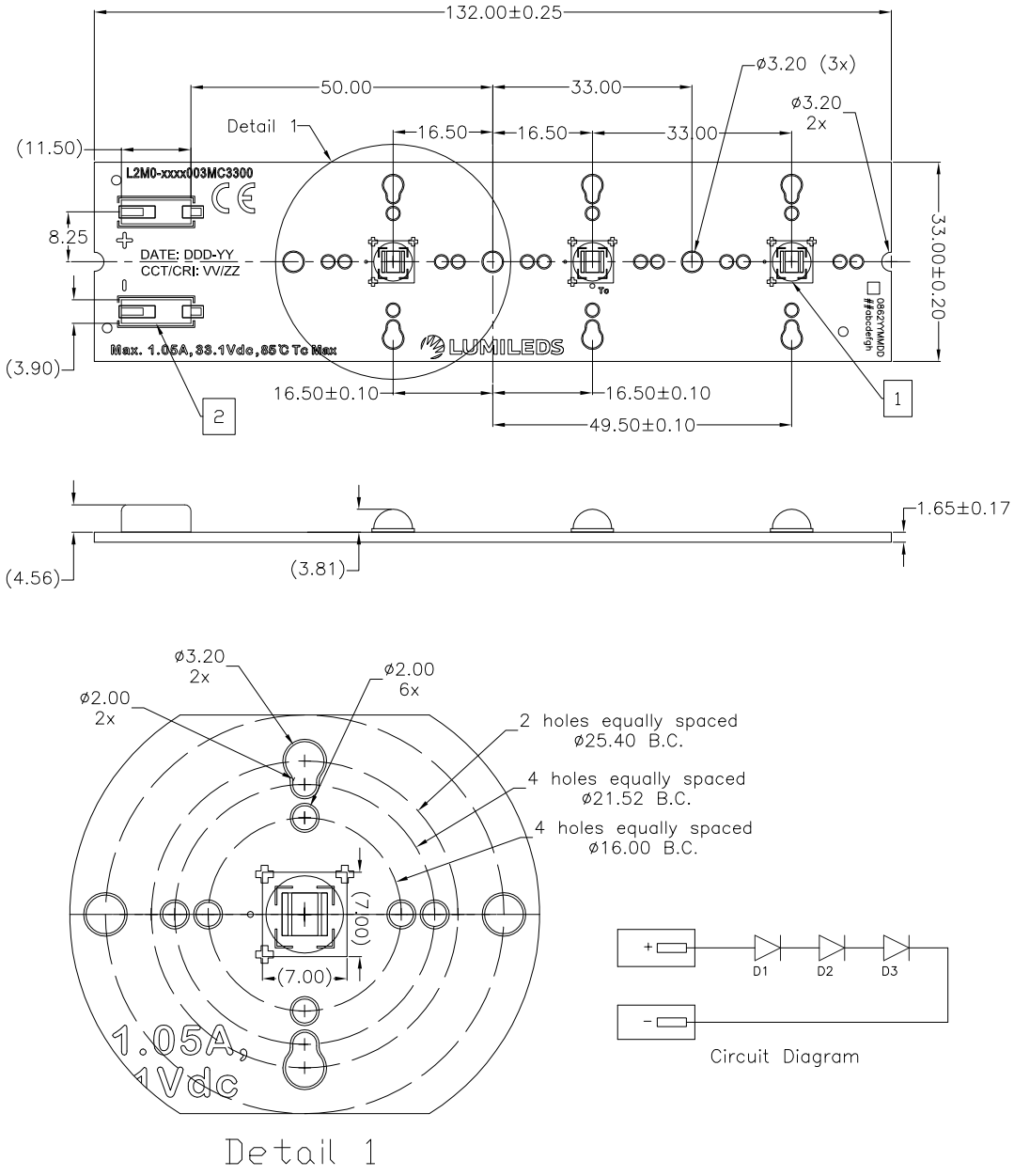
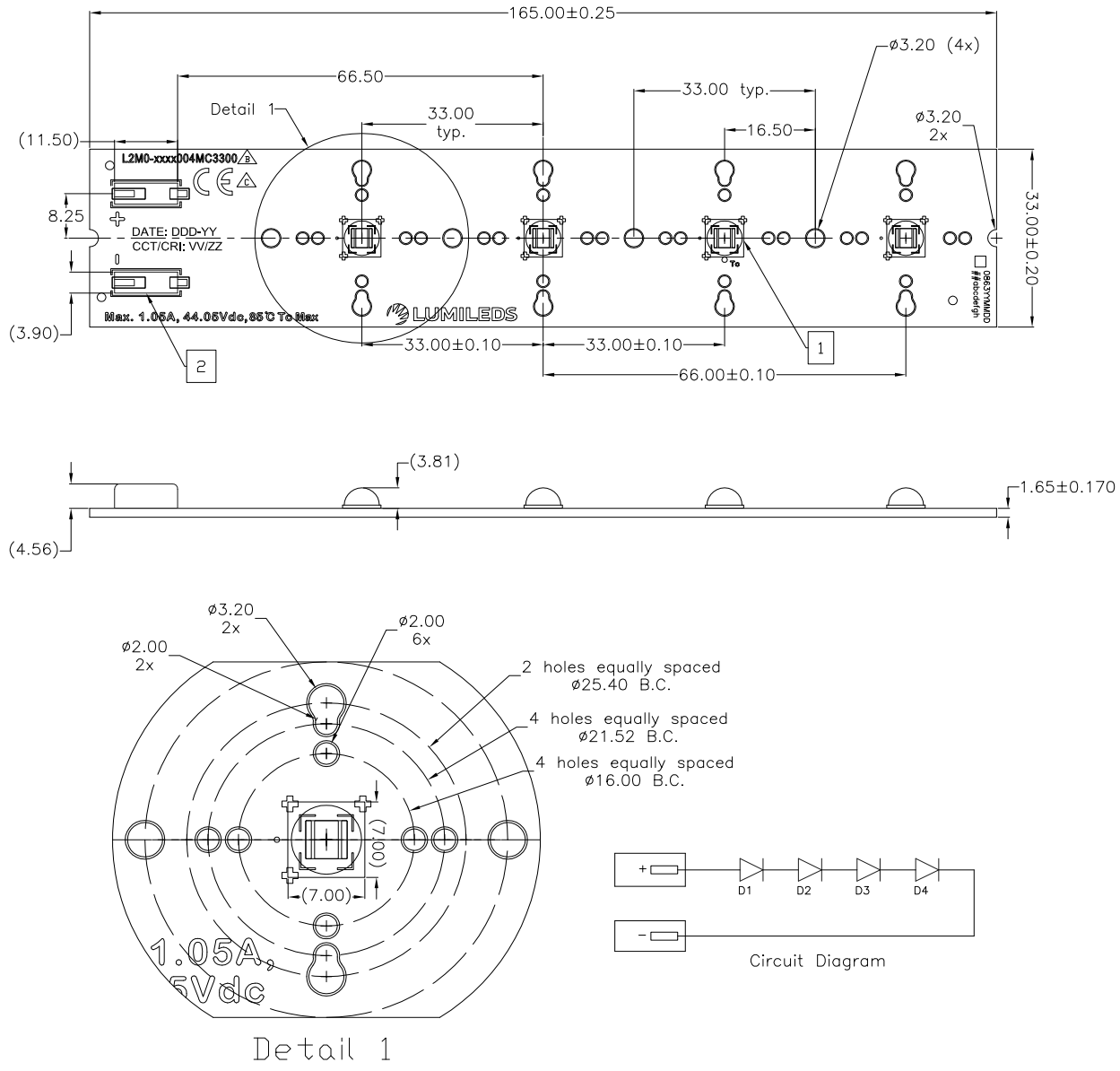



| ITEM | QTY | PART/MATERIAL-DESCRIPTION | REFERENCE |
|---|---|---|---|
| 1 | 3 | LUXEON M | |
| 2 | 2 | 1-pole Connector | |

**Figure 5: Mechanical dimensions for L2M0-xxxx003MC3300.**

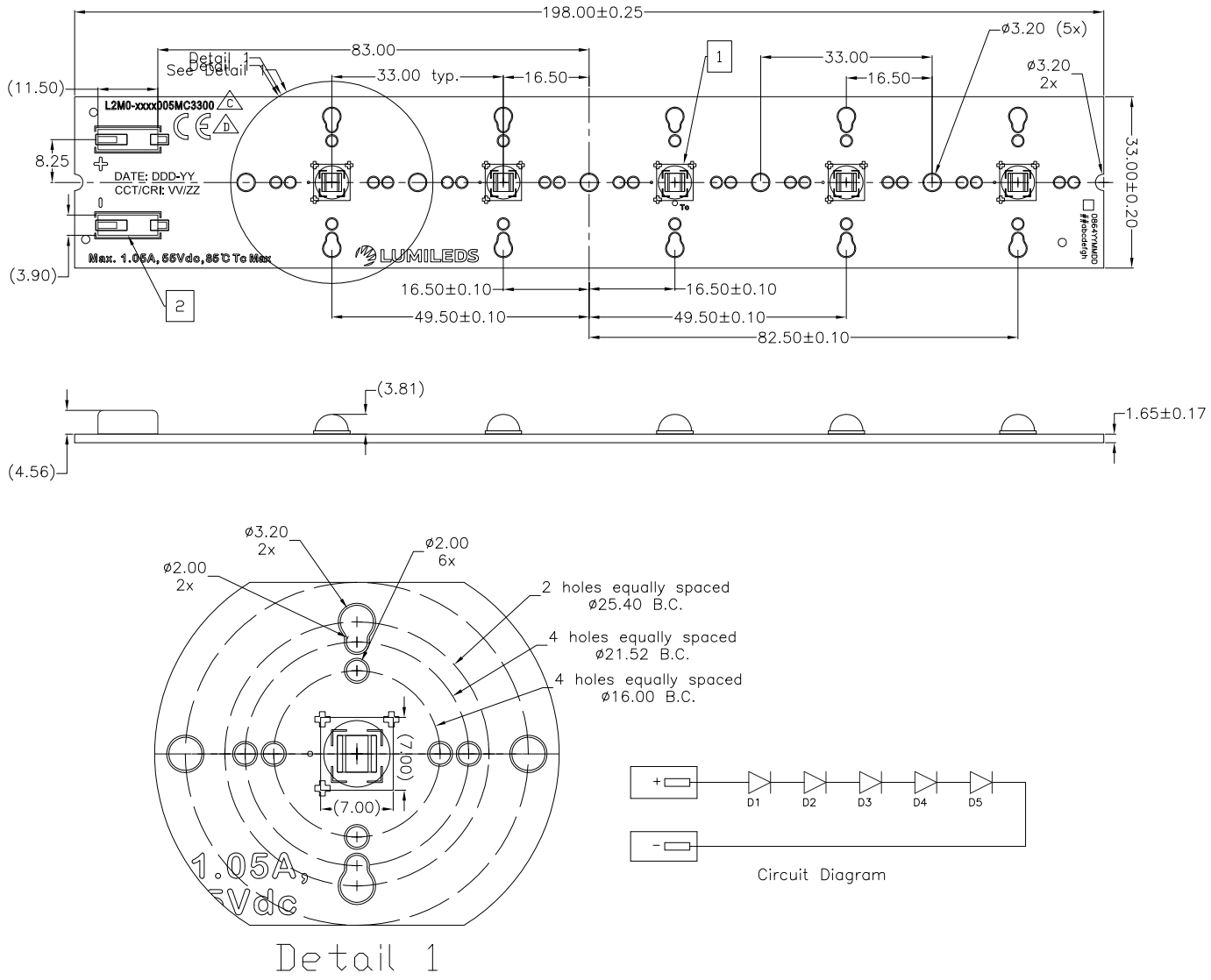
Notes for Figure 5:
1. Drawings are not to scale.
2. All dimensions are in millimeters.




| ITEM | QTY | PART/MATERIAL-DESCRIPTION | REFERENCE |
|---|---|---|---|
| 1 | 4 | LUXEON M | |
| 2 | 2 | 1-pole Connector | |

**Figure 6: Mechanical dimensions for L2M0-xxxx004MC3300.**

Notes for Figure 6:
1. Drawings are not to scale.
2. All dimensions are in millimeters.




| ITEM | QTY | PART/MATERIAL-DESCRIPTION | REFERENCE |
|---|---|---|---|
| 1 | 5 | LUXEON M | |
| 2 | 2 | 1-pole Connector | |

**Figure 7: Mechanical dimensions for L2M0-xxxx005MC3300.**

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

# Packaging Information

**Table 5. Packaging information for LUXEON XR-M.**

| PART NUMBER | TRAY DIMENSIONS (mm) | QUANTITY PER TRAY | NUMBER OF TRAYS PER BOX |
|---|---|---|---|
| L2M0-xxxx004MC2200 | 450 x 250 x 64 | 60 | 1 |
| L2M0-xxxx003MC3300 | 450 x 185 x 31 | 30 | 1 |
| L2M0-xxxx004MC3300 | 450 x 220 x 31 | 30 | 1 |
| L2M0-xxxx005MC3300 | 450 x 250 x 31 | 30 | 1 |

## Tray Dimensions

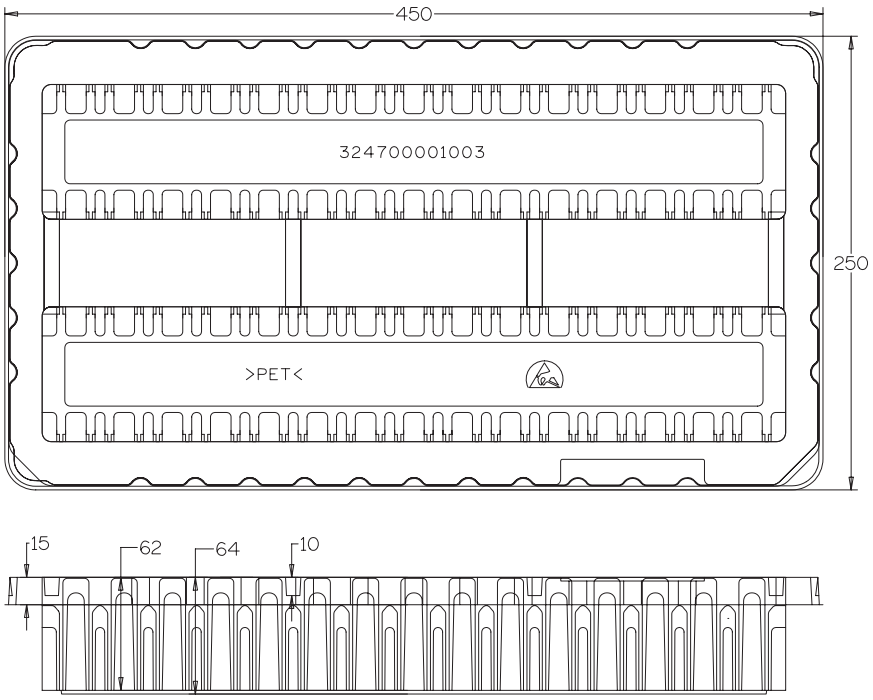



**Figure 8: Tray dimensions for L2M0-xxxx004MC2200.**

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

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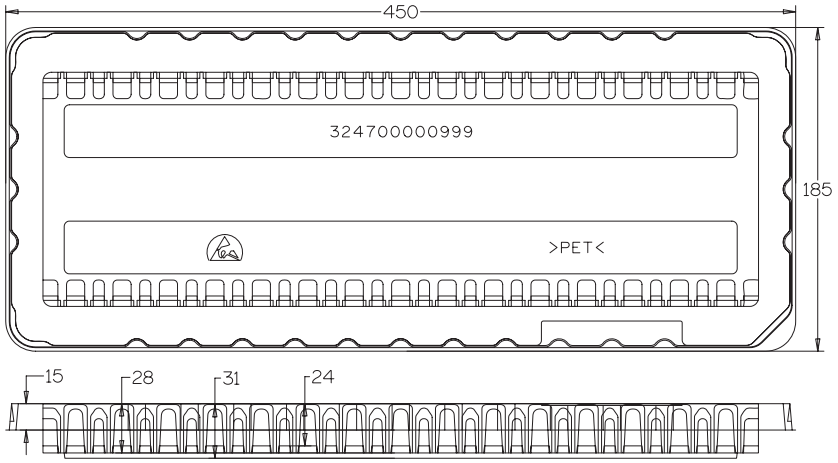


**Figure 9: Tray dimensions for L2M0-xxxx003MC3300.**

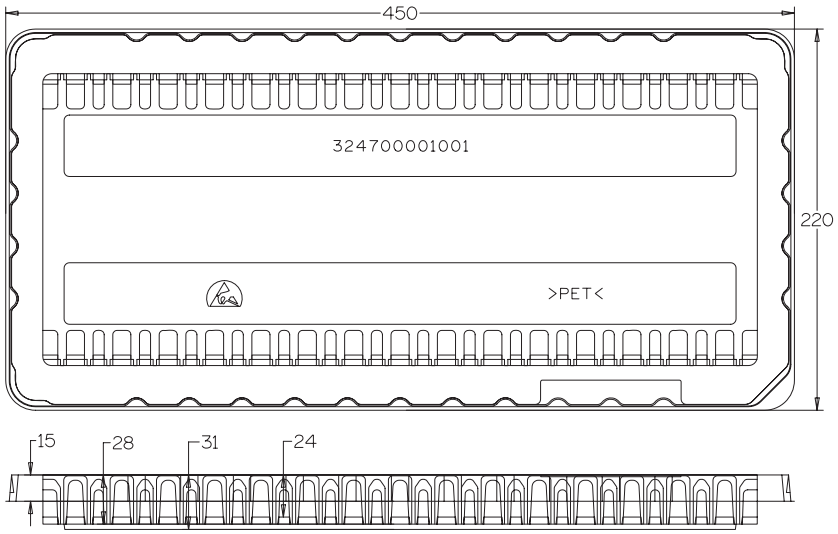


**Figure 10: Tray dimensions for L2M0-xxxx004MC3300.**

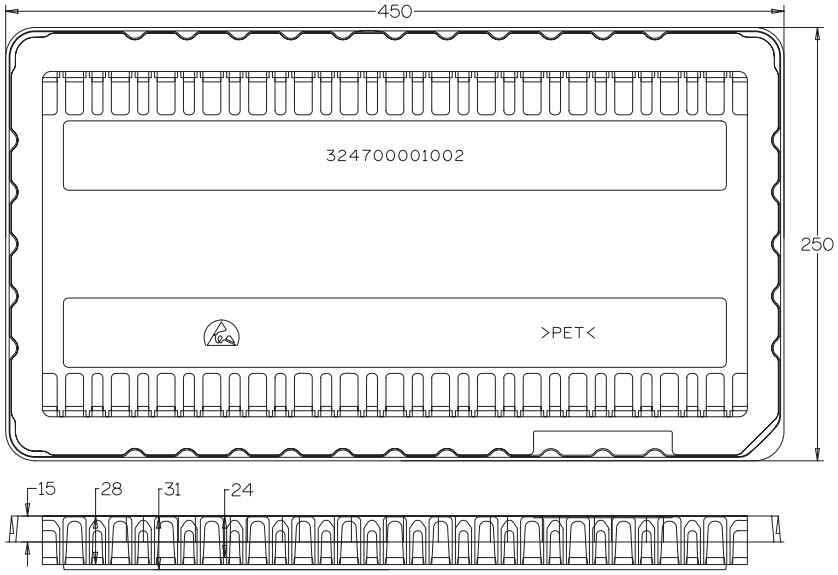


**Figure 11: Tray dimensions for L2M0-xxxx005MC3300.**

Notes for Figure 9, 10 and 11:
1. Drawings are not scale.
2. All dimensions are in millimeters.

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## Product Packaging Considerations — Chemical Compatibility

The LUXEON M package contains a silicone overcoat and dome to protect the LED chips 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 M Application Brief AB103 for guidelines on chemical compatibilities.

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# 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.

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Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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**Офис по работе с юридическими лицами:**

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9