

LUXEON XR-5050 SQR

High performance LED modules with extreme efficacy for robust lighting designs

LUXEON XR-5050 SQR products are LED modules optimized for lighting applications requiring high efficacy LED arrays mounted on a rigid and thermally conductive substrate. These versatile building blocks feature 8, 12 or 16 LUXEON 5050 Square LEDs on a MCPCB substrate, electrical connectors, and are designed for ease of system integration, faster time to market, and use with industry standard optics. LUXEON XR-5050 SQR is a complete solution when used in combination with standard third party optics and heatsinks.



FEATURES AND BENEFITS

Efficacy and luminous flux of up to 186lm/W and 5770lm available

Available CCT/CRI combinations: 70CRI (2200K, 2700K, 3000K, 4000K and 5000K) and 80CRI (2700K, 3000K and 4000K)

Superior board level color control of $\leq 3\text{SDCM}$

Excellent case to heatsink thermal resistance of $3.5\text{K/W}_{\text{th}}$

Design compatible with standard third party optics

Features LUXEON 5050 SQR LEDs with industry-leading efficacy and lumens in multi-die, high power package

5-year guarantee

PRIMARY APPLICATIONS

High Bay

Low Bay

Urban Streetlights

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General Product Information

Product Test Conditions

LUXEON XR-5050 SQR LEDs are tested using a forward DC drive current of 700mA and a board temperature, T_c , of 85°C. The LEDs are electrically configured such that each LED is driven at equal current.

Part Number Nomenclature

Part numbers for LUXEON XR-5050 SQR follow the convention below:

L 2 1 3 – **V V Z Z 0 C C M R H 0 0 1**

Where:

- V V** – designates nominal ANSI CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K)
- Z Z** – designates minimum CRI (70=70CRI, 80=80CRI)
- C C** – designates number of emitters (8=8 emitters, 12=12 emitters, 16=16 emitters)
- R H** – designates internal Lumileds program code.
- 0 1** – designates internal Lumileds program code.

Therefore, a LUXEON XR-5050 SQR 3000K 80CRI with 12 emitters, will have the following part number:

L 2 1 3 – **3 0 8 0 0 1 2 M R H 0 0 1**

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-5050 SQR is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the ROHS Directive 2011/65/EU including amendments 2015/863/EU & 2017/2102/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-5050 SQR at 700mA, T_c =85°C.

NOMINAL CCT	MINIMUM CRI ^[1, 2]	LUMINOUS FLUX ^[1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	ENERGY EFFICIENCY CLASS	PART NUMBER
		MINIMUM	TYPICAL			
		700mA				
2200	70	2272	2450	158	E	L213-2270008MRH001
2700	70	2477	2706	174	D	L213-2770008MRH001
3000	70	2563	2778	179	D	L213-3070008MRH001
4000	70	2664	2885	186	D	L213-4070008MRH001
5000	70	2545	2885	186	D	L213-5070008MRH001
2700	80	2210	2374	153	E	L213-2780008MRH001
3000	80	2272	2494	161	E	L213-3080008MRH001
4000	80	2366	2609	168	E	L213-4080008MRH001
2200	70	3409	3675	158	E	L213-2270012MRH001
2700	70	3716	4060	174	D	L213-2770012MRH001
3000	70	3844	4167	179	D	L213-3070012MRH001
4000	70	3996	4327	186	D	L213-4070012MRH001
5000	70	3818	4327	186	D	L213-5070012MRH001
2700	80	3315	3561	153	E	L213-2780012MRH001
3000	80	3409	3741	161	E	L213-3080012MRH001
4000	80	3549	3913	168	E	L213-4080012MRH001
2200	70	4545	4900	158	E	L213-2270016MRH001
2700	70	4955	5413	174	D	L213-2770016MRH001
3000	70	5126	5556	179	D	L213-3070016MRH001
4000	70	5328	5770	186	D	L213-4070016MRH001
5000	70	5091	5770	186	D	L213-5070016MRH001
2700	80	4420	4748	153	E	L213-2780016MRH001
3000	80	4545	4988	161	E	L213-3080016MRH001
4000	80	4732	5218	168	E	L213-4080016MRH001

Notes for Table 1:

- Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
- Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.

Electrical Characteristics

Table 2. Electrical characteristics for LUXEON XR-5050 SQR at 700mA, T_c =85°C.

PART NUMBER	FORWARD VOLTAGE ^[1] (V _f)		
	MINIMUM	TYPICAL	MAXIMUM
L213-xxxx008MRH001	21.0	22.2	23.4
L213-xxxx012MRH001	31.5	33.3	35.1
L213-xxxx016MRH001	41.9	44.4	46.7

Notes for Table 2:

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

Board Level Color Control

Table 3. Board Level Color Control for LUXEON XR-5050 SQR.

PART NUMBER	COLOR CONTROL
L213-xxxx008MRH001	3SDCM
L213-xxxx012MRH001	
L213-xxxx016MRH001	

Notes for Table 3:

- Lumileds maintains a tolerance of ± 0.005 on x and y coordinates in the CIE 1931 color space.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON XR-5050 SQR.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current ^[1, 2]	2000mA
Peak Pulsed Forward Current ^[1, 3]	2000mA
Maximum Working Voltage ^[4]	250V
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Temperature at T_c point ^[1, 5]	-40°C to 85°C
Storage Temperature	-40°C to 105°C
Reverse Voltage ($V_{reverse}$)	LUXEON LEDs are not designed to be driven in reverse bias

Notes for Table 4:

- Proper current derating must be observed to maintain the T_c temperature below the maximum allowable T_c temperature.
- 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
- At $\leq 50\%$ duty cycle with pulse width of 5ms.
- Basic insulation between live parts on the LED module and mounting surface or touchable parts when mounted in a luminaire for SELV and other than SELV operations has been evaluated according to IEC 62031.
- $T_c = T_p$ (Test Point).

Application Information

Table 5. Approbation for LUXEON XR-5050 SQR.

ITEM	COMPLIANT TO
Test and Certification	CE
	ENEC
	UL8750
	UKCA
Declaration	RoHS
	REACH

Recommended Wire

Table 6. Recommended Wire for LUXEON XR-5050 SQR.^[1]

RECOMMENDED WIRE	STRIP LENGTH
AWG 24 - 18	7mm to 9mm

Note for Table 6:

- Please refer to Application Brief AB311 for installation guide.

Characteristic Curves

Spectral Power Distribution Characteristics

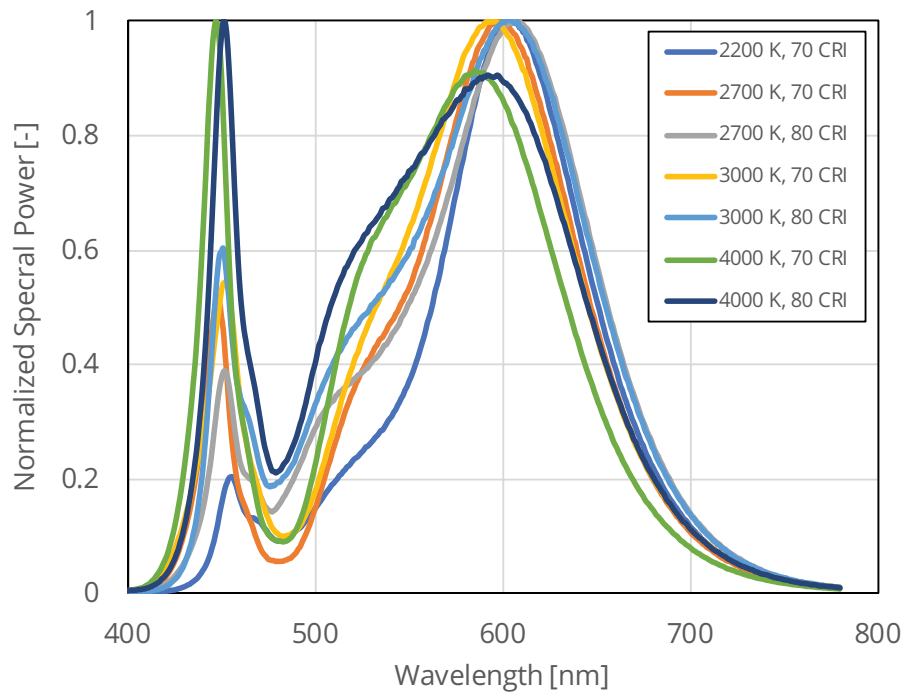


Figure 1. Typical normalized spectral power vs. wavelength for LUXEON XR-5050 SQR at 700mA, $T_c=85^\circ\text{C}$.

Light Output Characteristics

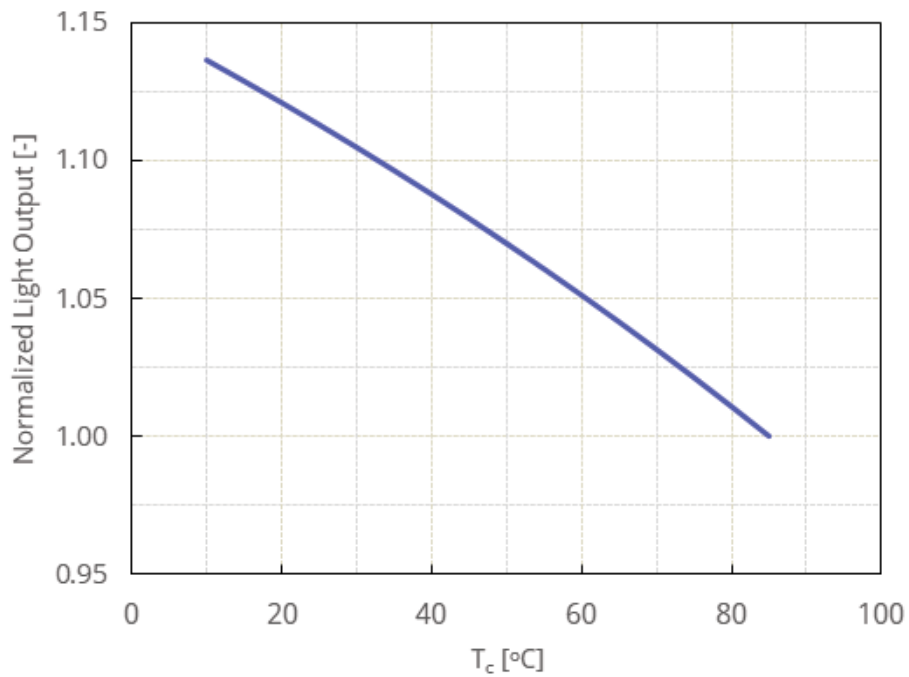


Figure 2. Typical normalized light output vs. case temperature for LUXEON XR-5050 SQR at 700mA.

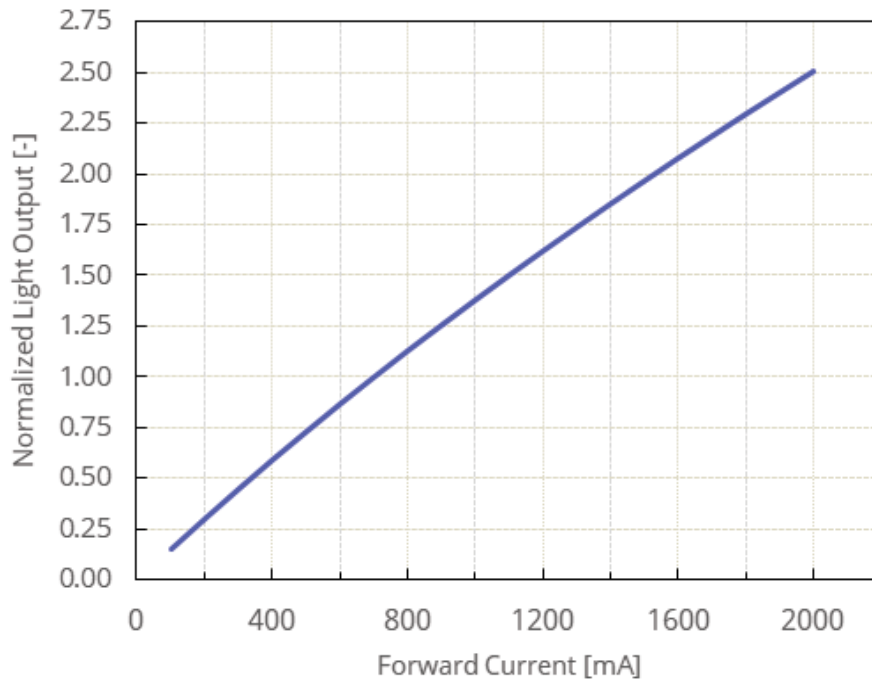


Figure 3. Typical normalized light output vs. forward current for LUXEON XR-5050 SQR at $T_c=85^\circ\text{C}$.

Efficacy Characteristics

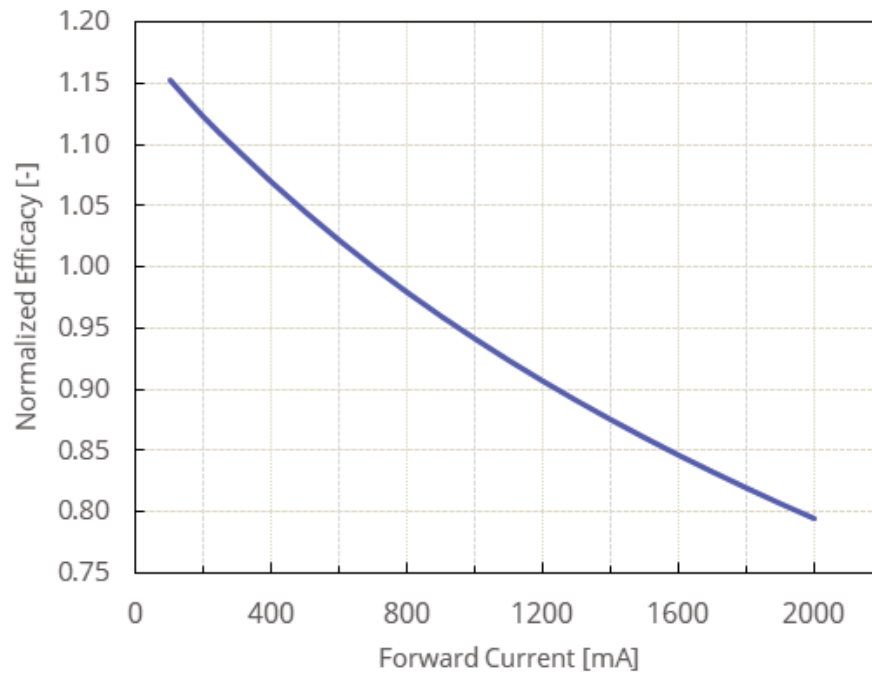


Figure 4. Typical normalized efficacy vs. forward current for LUXEON XR-5050 SQR at $T_c=85^\circ\text{C}$.

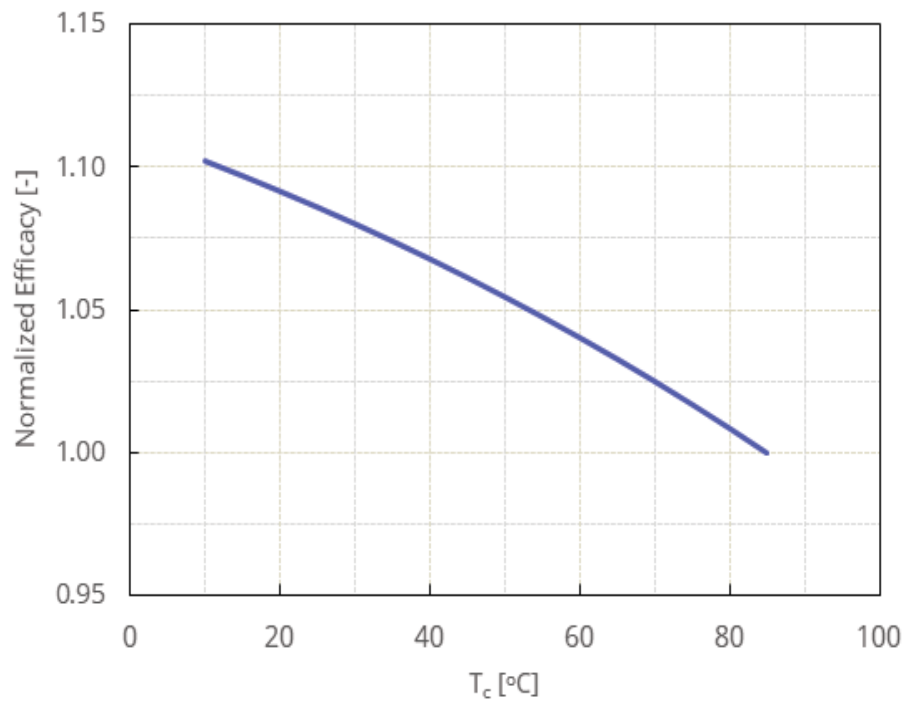


Figure 5. Typical efficacy vs. case temperature for LUXEON XR-5050 SQR at 700mA.

Mechanical Dimensions

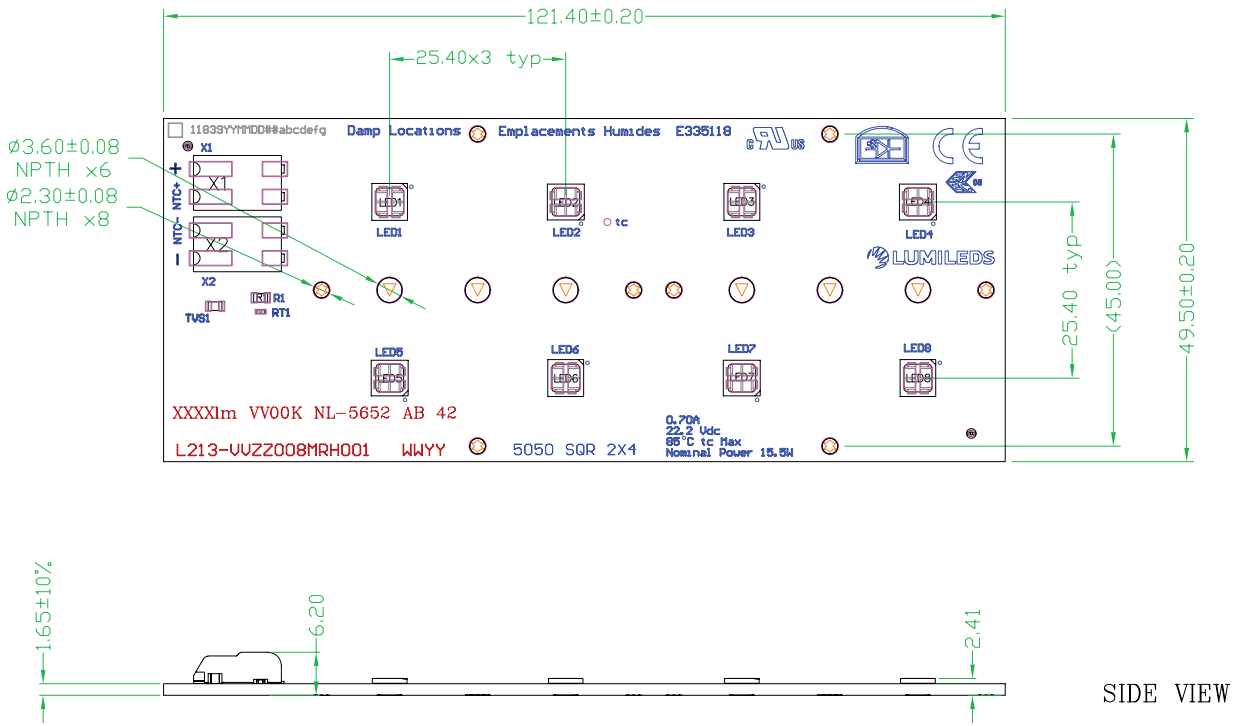


Figure 6. Mechanical dimensions for L213-xxxx008MRH001.

Notes for Figure 6:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. t_c in drawing is the same as T_c .

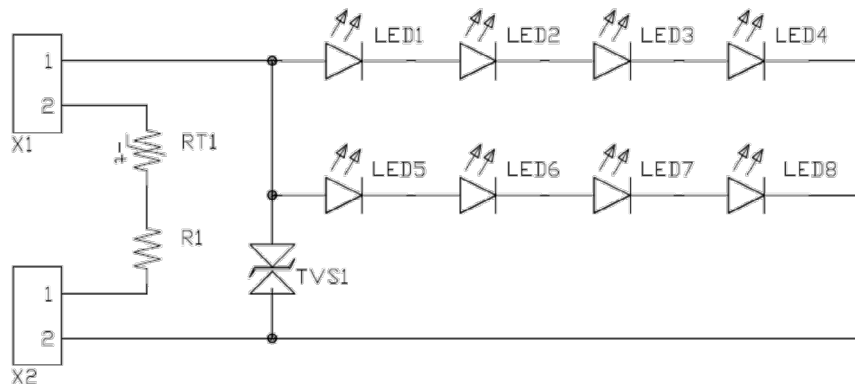


Figure 7. Electric circuit diagram for L213-xxxx008MRH001.

Table 7. Bill of Materials for L213-xxxx008MRH001.

COMPONENT	QUANTITY
LED: LUXEON 5050 Square LES	8
PCB: MCPCB	1
2-pole Connectors	2
Thermistor 15kΩ	1
Resistor 2kΩ	1
Diode	1

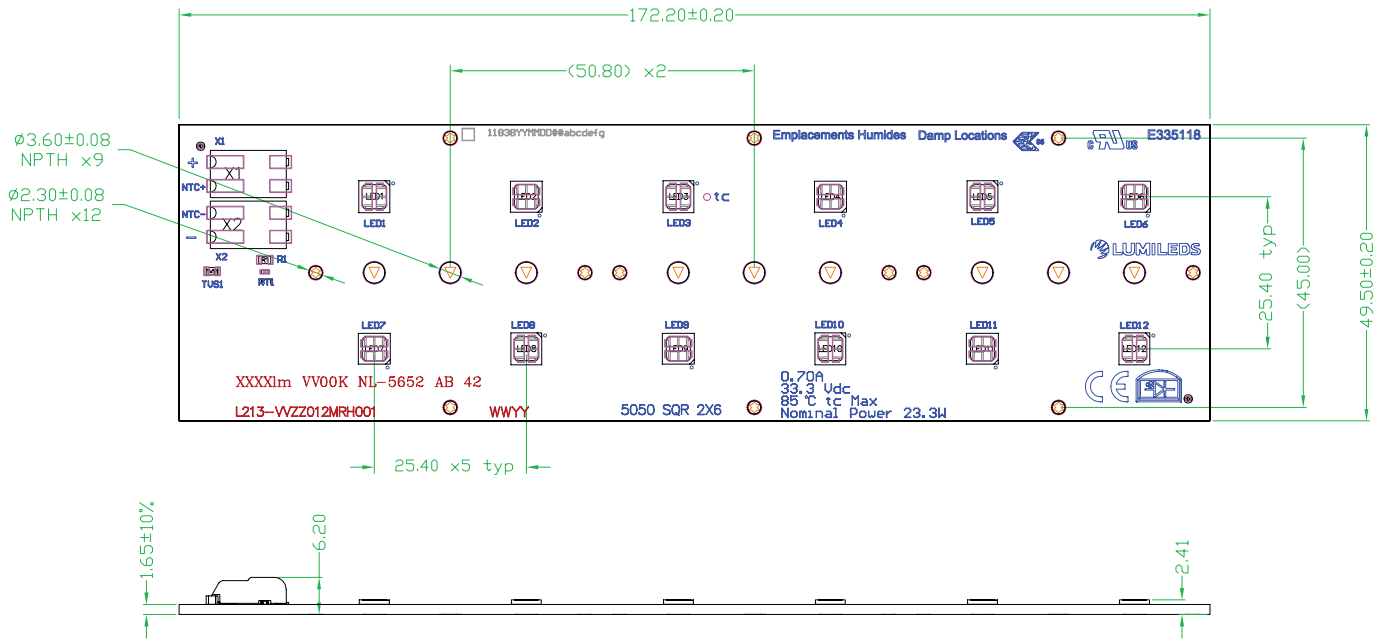


Figure 8. Mechanical dimensions for L213-xxxx012MRH001.

- Notes for Figure 8:
1. Drawings are not to scale.
 2. All dimensions are in millimeters.
 3. t_c in drawing is the same as T_c .

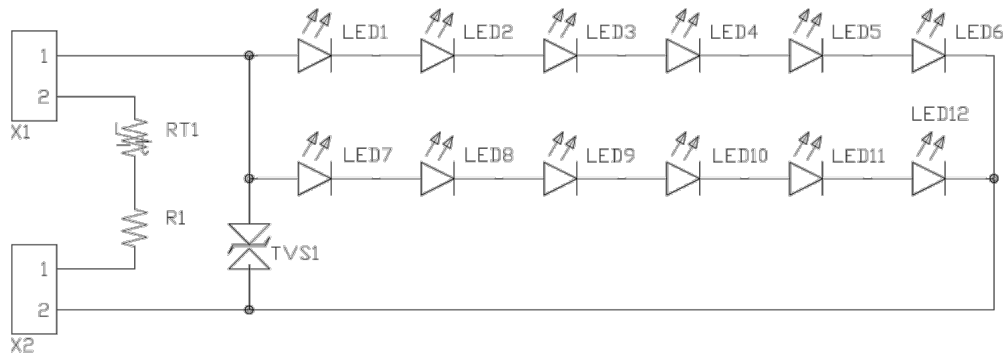


Figure 9. Electric circuit diagram for L213-xxxx012MRH001.

Table 8. Bill of Materials for L213-xxxx012MRH001.

COMPONENT	QUANTITY
LED: LUXEON 5050 Square LES	12
PCB: MCPCB	1
2-pole Connectors	2
Thermistor 15kΩ	1
Resistor 2kΩ	1
Diode	1

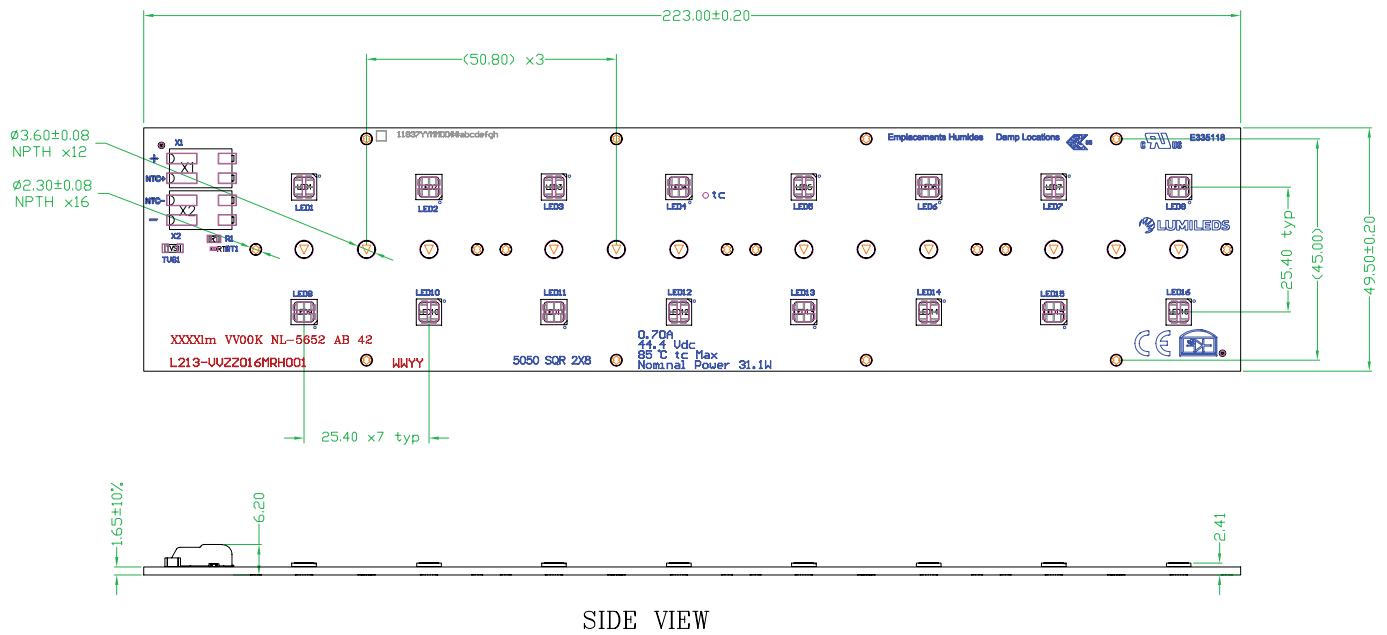


Figure 10. Mechanical dimensions for L213-xxxx016MRH001.

Notes for Figure 10:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. t_c in drawing is the same as T_c .

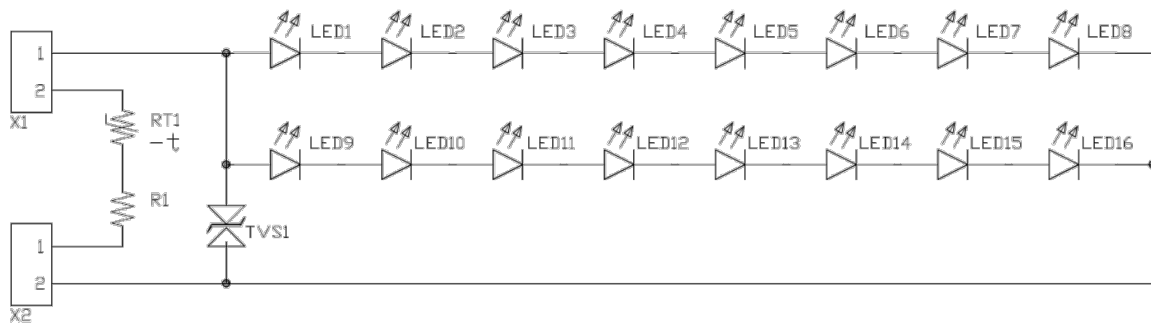


Figure 11. Electric circuit diagram for L213-xxxx016MRH001.

Table 9. Bill of Materials for L213-xxxx016MRH001.

COMPONENT	QUANTITY
LED: LUXEON 5050 Square LES	16
PCB: MCPCB	1
2-pole Connectors	2
Thermistor 15kΩ	1
Resistor 2kΩ	1
Diode	1

Packaging Information

Table 10. Packing information for LUXEON XR-5050 SQR.

PART NUMBER	QUANTITY PER TRAY	TRAY QUANTITY PER BOX	STANDARD PACKING INCREMENT, SPI	SHIPPING BOX DIMENSION, L x W x H (MM)
L213-xxxx008MRH001	20	5	80	398 x 390 x 100
L213-xxxx012MRH001	20	5	80	390 x 382 x 100
L213-xxxx016MRH001	20	5	80	587 x 387 x 100