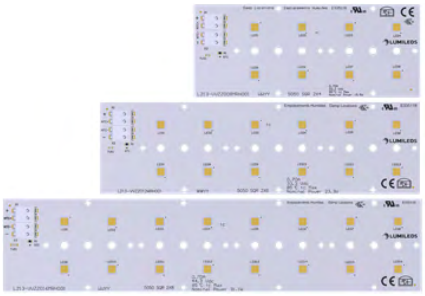


LUXEON XR-5050 SQR

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 ≤ 3SDCM
- Excellent case to heatsink thermal resistance of 3.5K/W_{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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No. E335118

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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).

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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:
1. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
2. 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:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

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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:
1. 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:
1. Proper current derating must be observed to maintain the Tc temperature below the maximum allowable Tc 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
3. At <=50% duty cycle with pulse width of 5ms.
4. 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.
5. $T_c = T_p$ (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:
1. Please refer to Application Brief AB311 for installation guide.

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Characteristic Curves

Spectral Power Distribution Characteristics

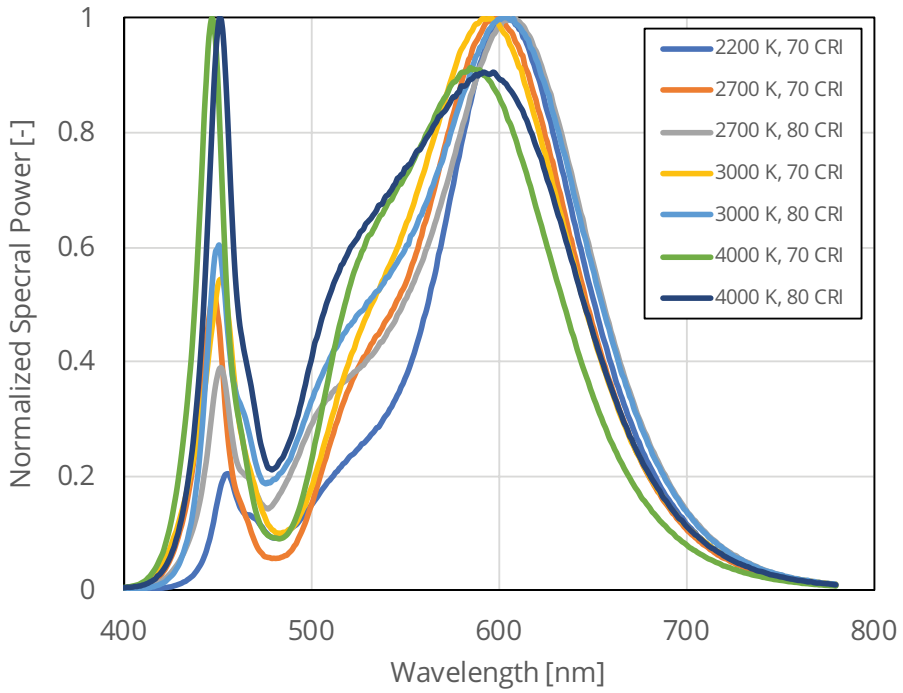


Figure 1. Typical normalized spectral power vs. wavelength for LUXEON XR-5050 SQR at 700mA, T_c=85°C.

Light Output Characteristics

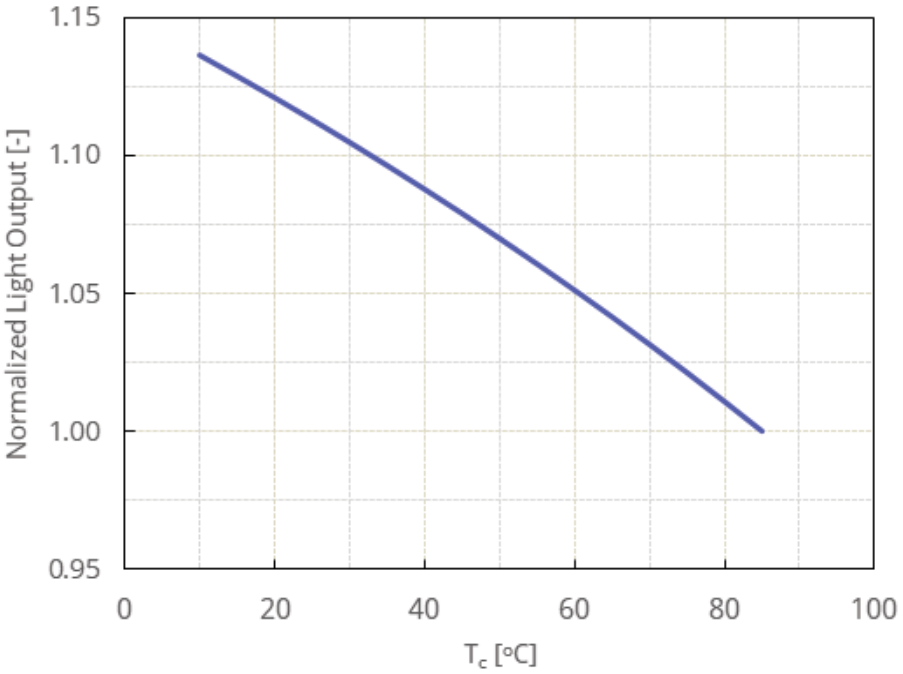


Figure 2. Typical normalized light output vs. case temperature for LUXEON XR-5050 SQR at 700mA.

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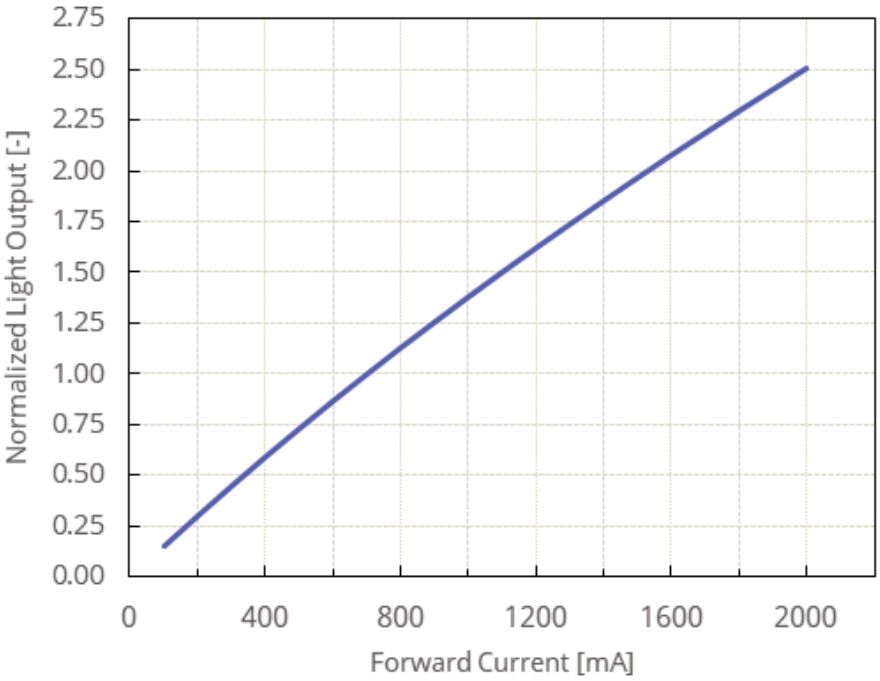


Figure 3. Typical normalized light output vs. forward current for LUXEON XR-5050 SQR at T_C=85°C.

Efficacy Characteristics

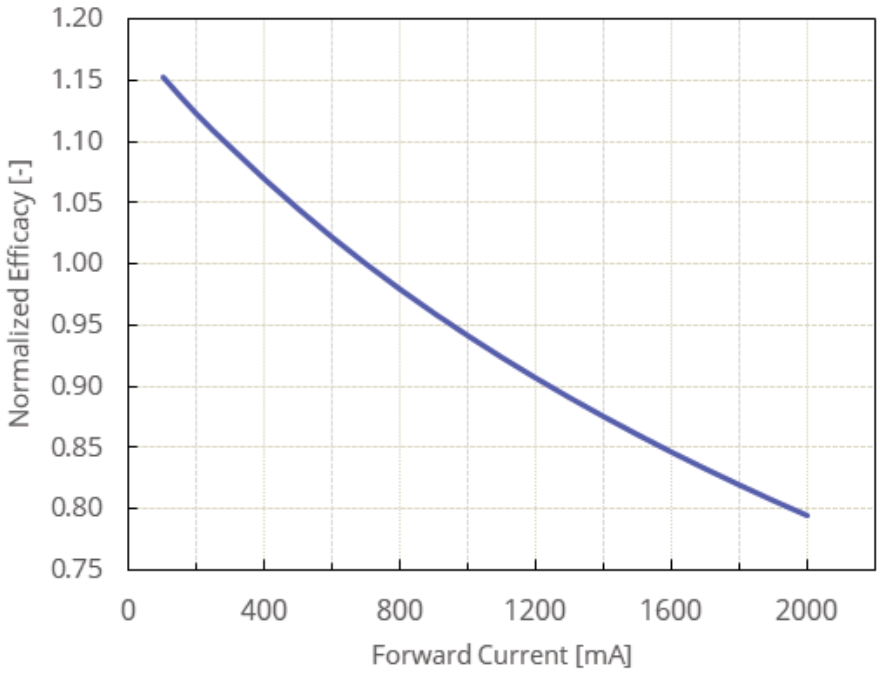


Figure 4. Typical normalized efficacy vs. forward current for LUXEON XR-5050 SQR at T_C=85°C.

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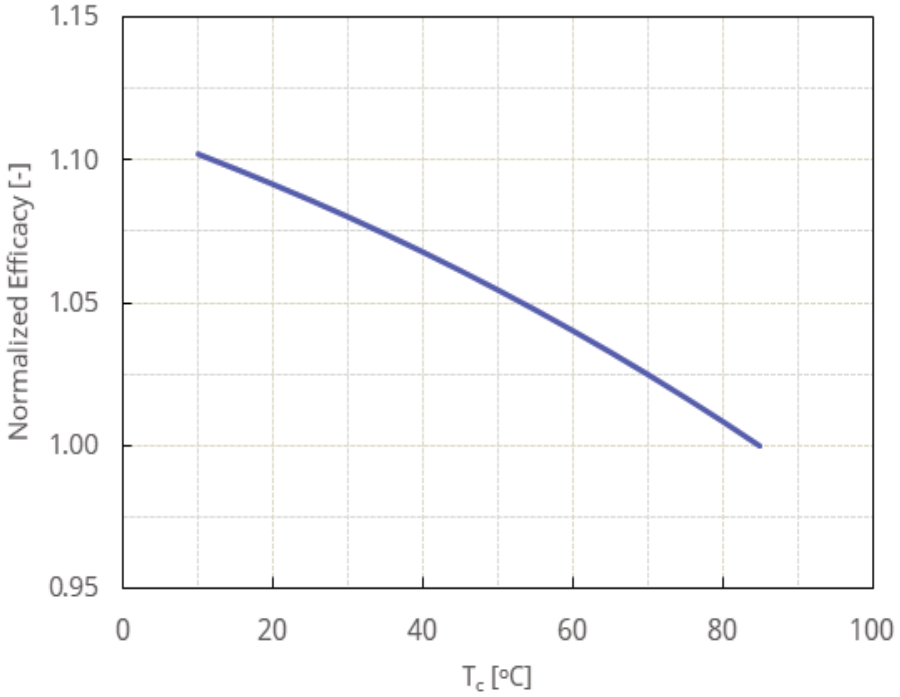


Figure 5. Typical efficacy vs. case temperature for LUXEON XR-5050 SQR at 700mA.

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Mechanical Dimensions

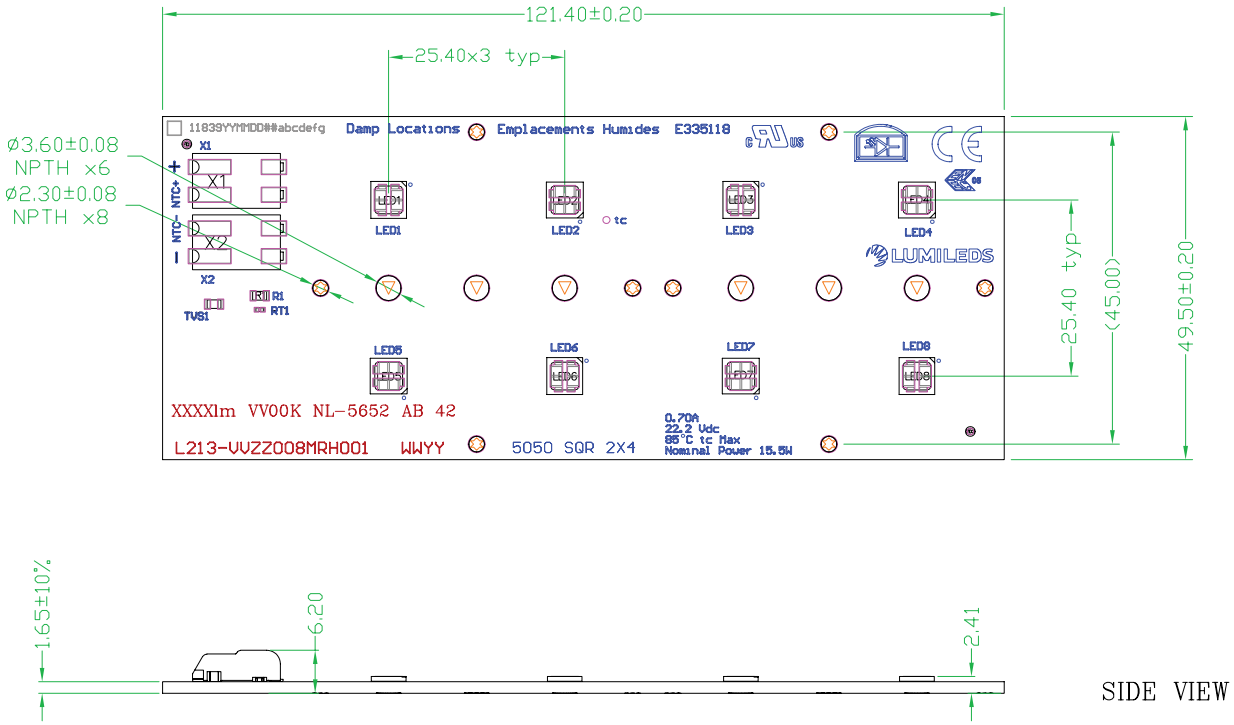


Figure 6. Mechanical dimensions for L213-xxxx008MRH001.

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.

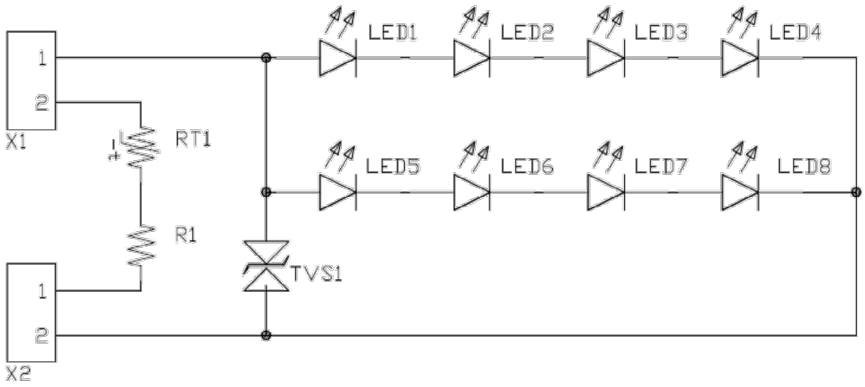


Figure 7. Electric circuit diagram for L213-xxxx008MRH001.

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

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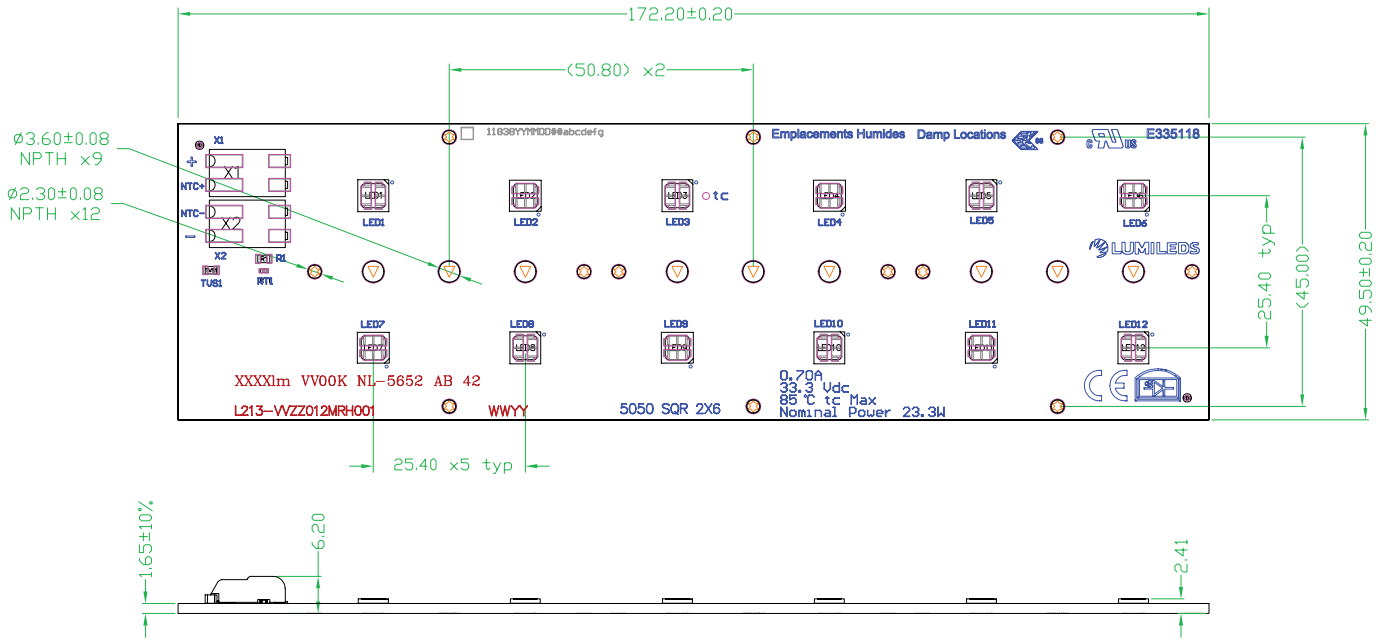


Figure 8. Mechanical dimensions for L213-xxxx012MRH001.

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.

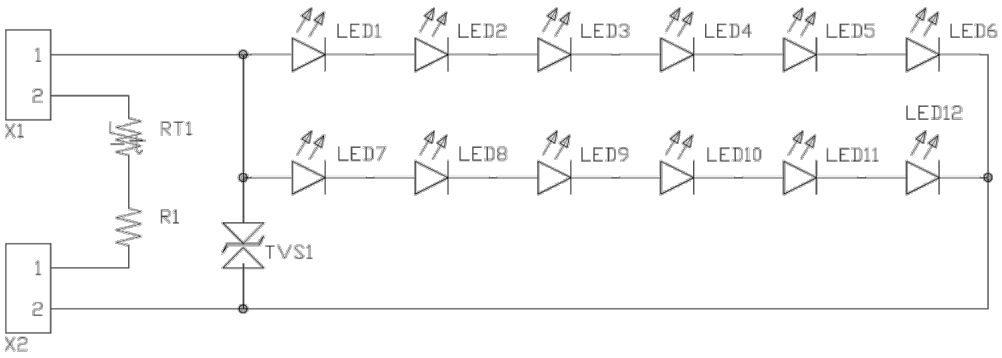


Figure 9. Electric circuit diagram for L213-xxxx012MRH001.

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

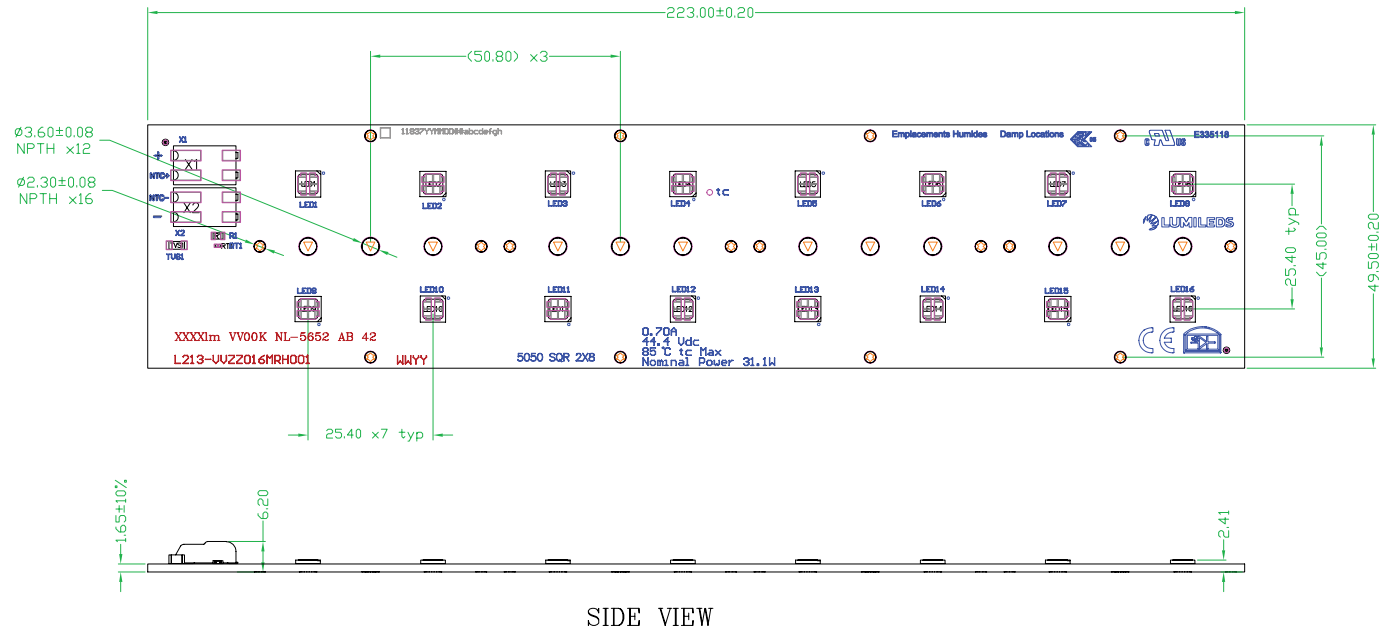


Figure 10. Mechanical dimensions for L213-xxxx016MRH001.

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.

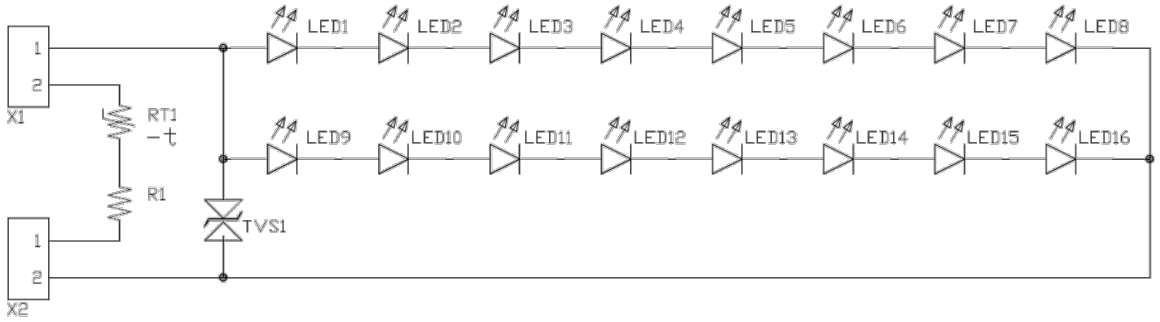


Figure 11. Electric circuit diagram for L213-xxxx016MRH001.

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

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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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