

5050RGB R Series

RGB 3-in-1 versatile package

The product is designed for operation with forward current (voltage only).



Features and Benefits

RGB 3-in-1 module

5.4mm x 5.0mm x 1.05mm

Individually control each channel

Primary Applications

Point light source

Wall Wash

Decorative

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Part Number Nomenclature

Part numbers for 5050RGB R series follow the convention below:

L 1 M C – **A A A** **0 0 5** 0 0 0 **B B C C**

Where:

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

B B – designates voltage (03=3V,06=6V,09=9V,18=18V,27=27V,36=36V,54=54V)

C C – designates Lumileds internal code(A1,B1,C1,etc.=shares the same base part)

Therefore, the following part number is used for the 5050RGB R-series 9V LED:

L 1 M C – R G B 0 0 5 0 0 0 **0 9 A 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. Lumileds 5050RGB R 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

Table1: Tested and binned at 25°C, If =30mA.

TYPE	DOMINANT WAVELENGTH (nm)		OPTICAL PERFORMANCE (lm)		FORWARD VOLTAGE (Vf)		Part Number
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
Red	619	625	15	20	8.8	9.6	L1MC-RGB00500009A1
Green	520	530	24	29	8.8	9.6	
Blue	460	470	5	8	8.8	9.6	

Notes for Table 1:

1. Lumileds maintains a tolerance of $\pm 2\text{nm}$ on dominant wavelength measurements.
2. Lumileds flux maintains a tolerance of $\pm 10\%$
3. Lumileds maintains a tolerance of $\pm 0.2\text{V}$ on forward voltage measurements.

Absolute Maximum Ratings

Table 2: Absolute maximum ratings for 5050 RGB R

PARAMETER	RED	GREEN	BLUE
DC Forward Current (mA)	30	30	30
Power dissipation (mW)	288	288	288
LED junction temperature (°C)	115		
ESD sensitivity (V)	2000		
LED storage temperature (°C)	-40 ~ 85		
LED operating temperature range (°C)	-40 ~ 105		
Soldering temperature (°C)	260		
Allowable reflow cycles	3		

Notes for Table 2:

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. At 0.01ms pulse on time test with a pulse period of 0.1ms.

Reliability Test Items And Conditions

Test Items	Test condition	Time	Quantity	Ac/Re
Reflow Soldering	Temp. :260°C/10sec.	6Min.	22pcs	0/1
Thermal Shock	-40~125°C, 15min dwell, 10sec transfer	100Cycles	22pcs	0/1
High Temperature High Humidity life Test	85°C,85%RH, IF=30mA	1000Hrs.	10pcs	0/1
Low Temperature Storage	Ta=-40°C	1000Hrs.	10pcs	0/1
High Temperature Storage	Ta=105°C	1000Hrs.	10pcs	0/1
High Temperature Operation Life Test	Ta=105°C, IF =30mA.	1000Hrs.	10pcs	0/1

Failure Criteria

Item	Symbol	Failure Criteria
Luminous Flux	Lm	$\geq 70\%$
Forward voltage	VF	$\pm 10\%$
Colour	CIE_X CIE_Y	± 0.01

Characteristic Curves

Spectral Power Distribution Characteristics

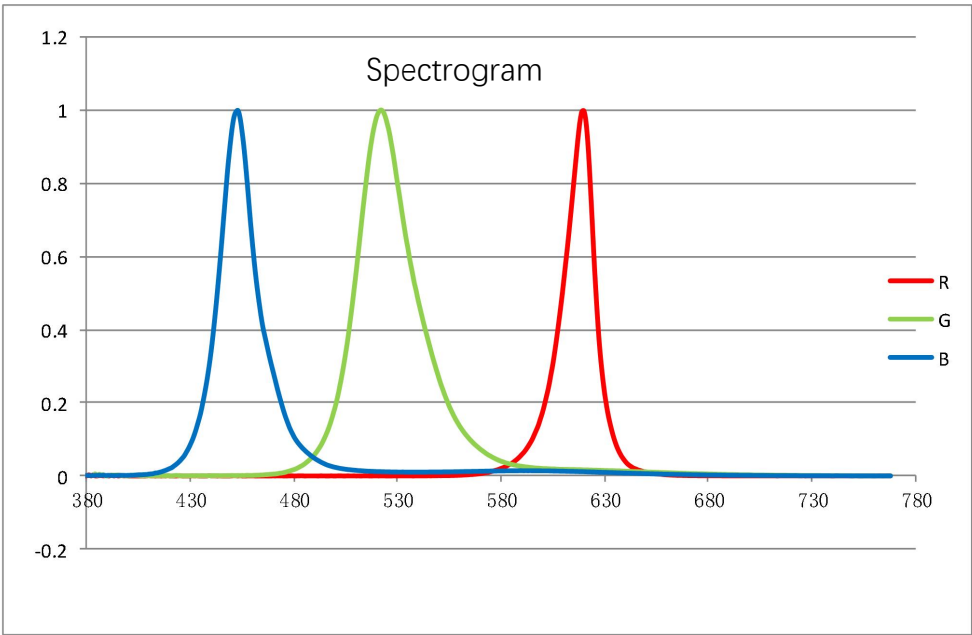


Figure1 . Typical normalized power vs. wavelength for Lumileds 5050 RGB R at 30mA, T=25 °C

Light Output Characteristics

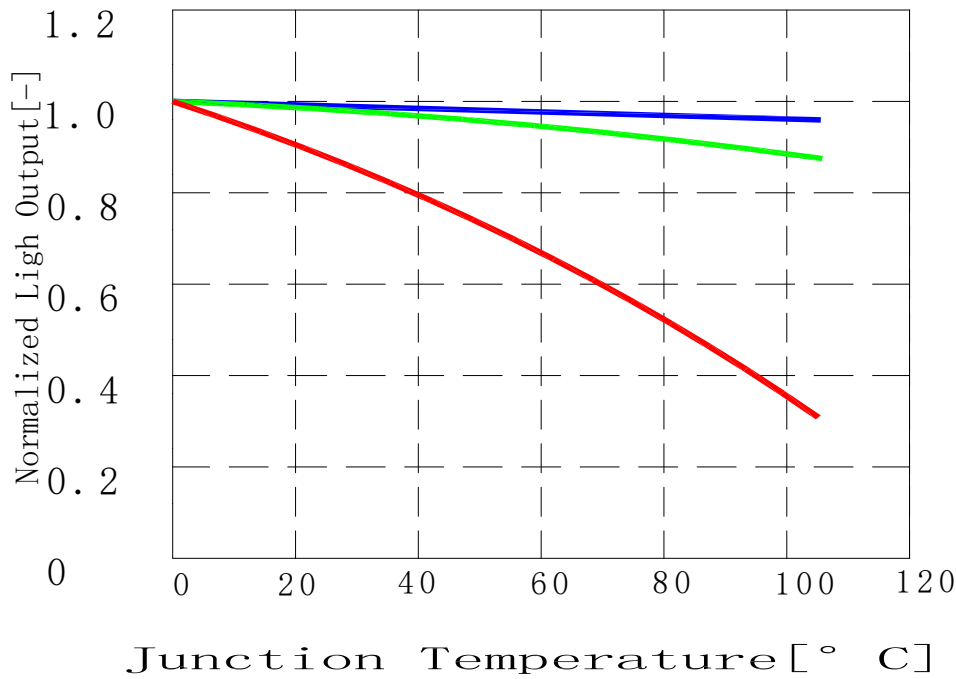


Figure 2 . Typical normalized light output vs . junction temperature for Lumileds 5050 RGB R at 30mA .

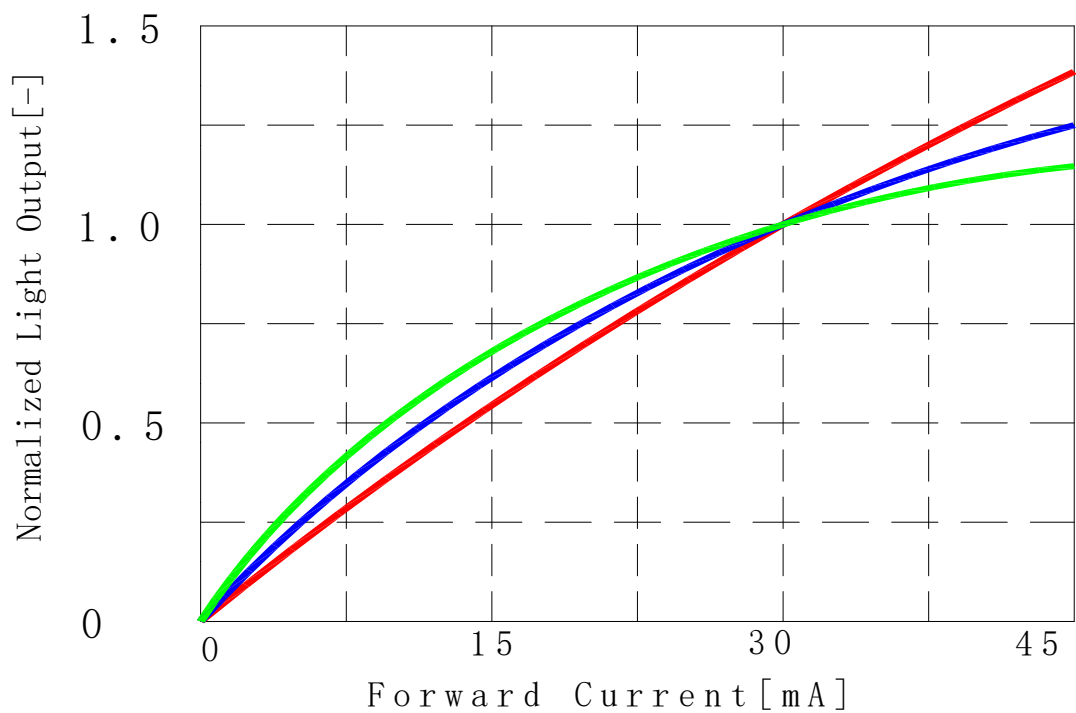


Figure 3. Typical normalized light output vs. forward current for Lumileds 5050 RGB R at $T=25^{\circ}\text{C}$

Forward Current Characteristics

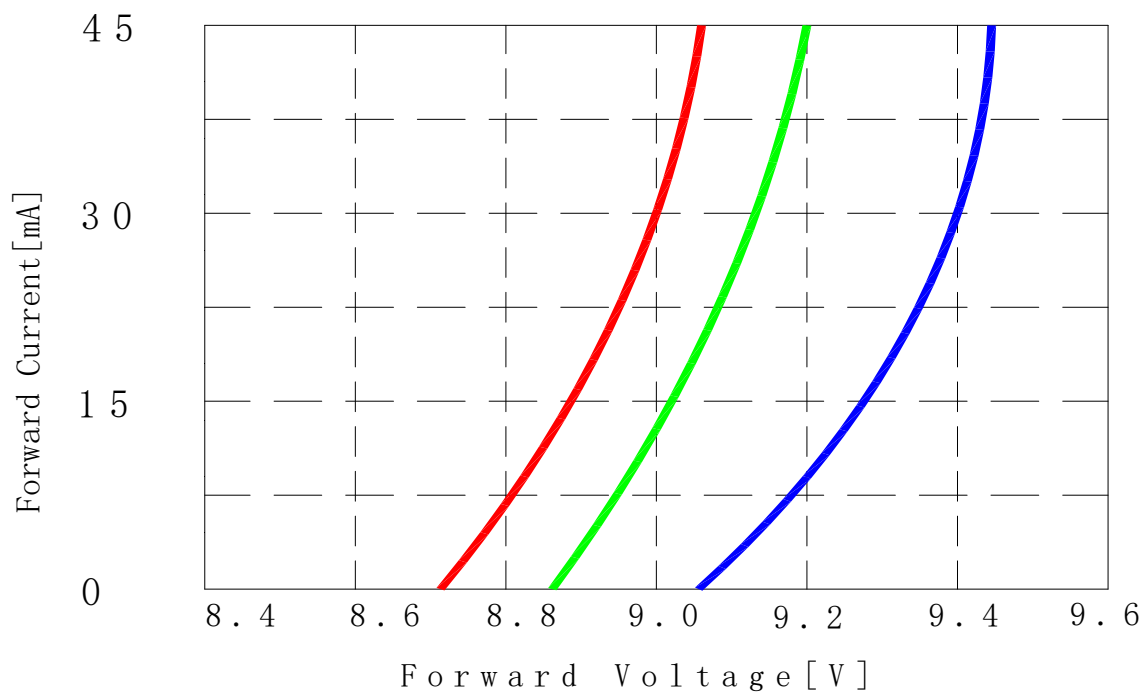
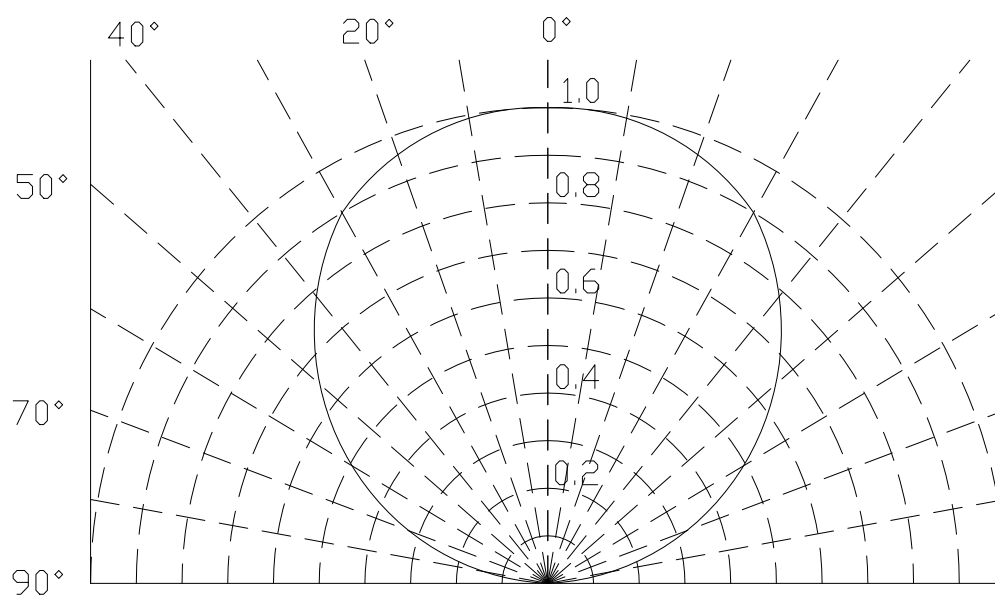


Figure 4. Typical forward current vs. forward voltage for Lumileds 5050 RGB R at $T=25^{\circ}\text{C}$.

Curves of beam angle and relative brightness



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

5050RGB R Series Cat code following the format below:

A B C	–	Flux for R-G-B
EF GH JK	–	wavelength for R-G-B
PS QT RU	–	Vf for R-G-B

Where:

A B C	– designates luminous flux bin (example: R=15 to 20lm, G=24 to 29lm, B=5 to 8lm)
EF GH JK	– dominant wavelength bins for RGB (example: 10=619 to 625nm, 20=520 to 525nm, 32=460 to 465nm)
PS QT RU	– designates forward voltage bin (example: RA=red 8.8 to 9.6V, GA=green 8.8 to 9.6V, BA=blue 8.8 to 9.6V)

Luminous Flux Bins

Table4: Tested and binned at 25°C, If =30mA.

TYPE	BIN	OPTICAL PERFORMANCE ^[1] (lm)	
		MINIMUM	MAXIMUM
Red	R	15	20
Green	G	24	29
Blue	B	5	8

Dominant Wavelength Bins

Table6: Tested and binned at 25°C, If =30mA.

TYPE	BIN	DOMINANT WAVELENGTH (nm)	
		MINIMUM	MAXIMUM
Red	10	619	625
Green	20	520	525
	21	525	530
Blue	30	450	455
	31	455	460
	32	460	465
	33	465	470

Notes for table 6
1. Lumileds maintains a tolerance of ±2nm on dominant wavelength measurements.

Forward Voltage Bins

Table7: Tested and binned at 25°C, If =30mA.

TYPE	BIN	FORWARD VOLTAGE(Vf)	
		MINIMUM	MAXIMUM
Red	RA	8.8	9.6
Green	GA	8.8	9.6
Blue	BA	8.8	9.6

Notes for table 7
1. Lumileds maintains a tolerance of ±0.2V on forward voltage measurements.

Mechanical Dimensions

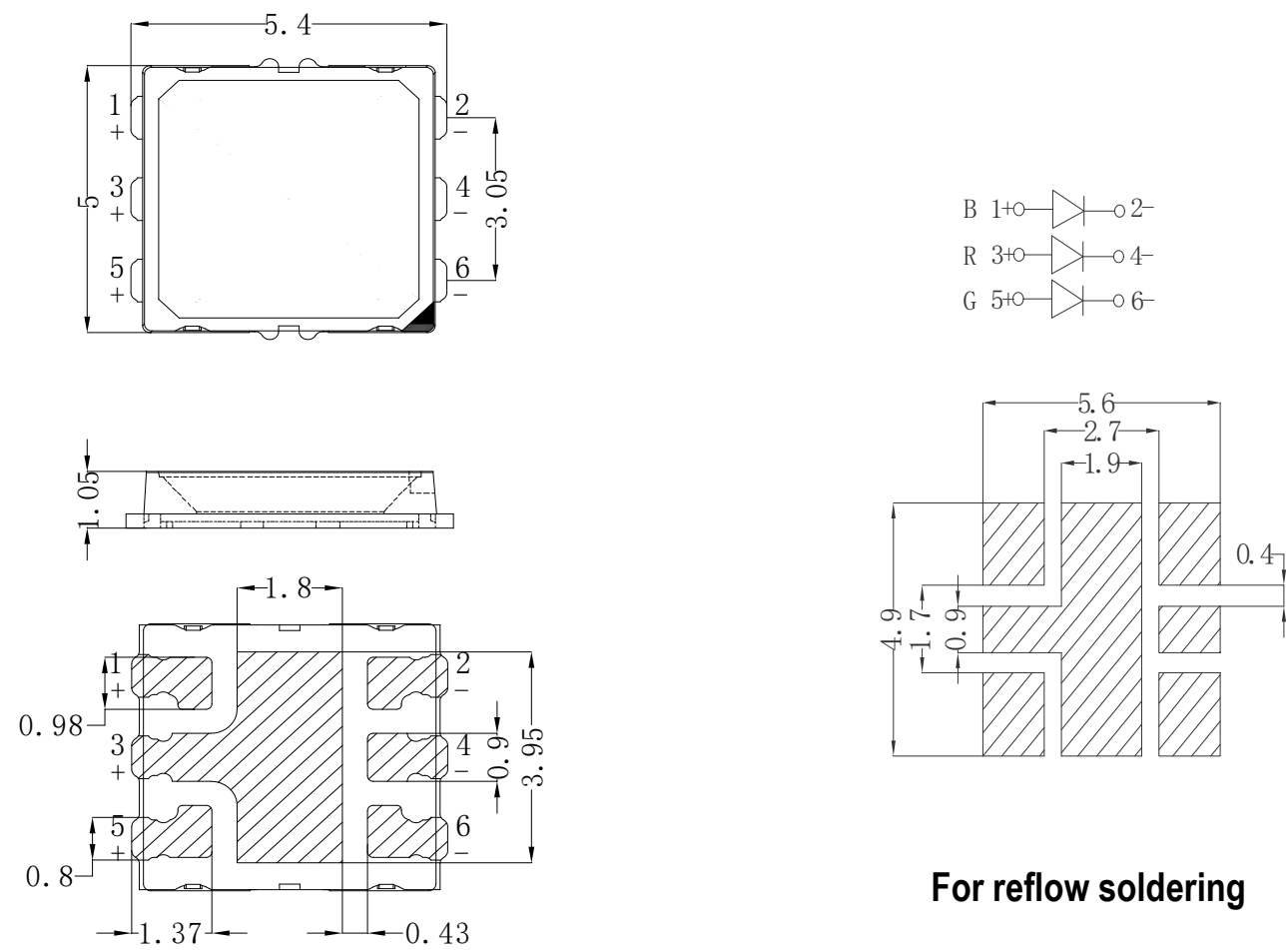


Figure. Mechanical dimension

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

Reflow Soldering Guidelines

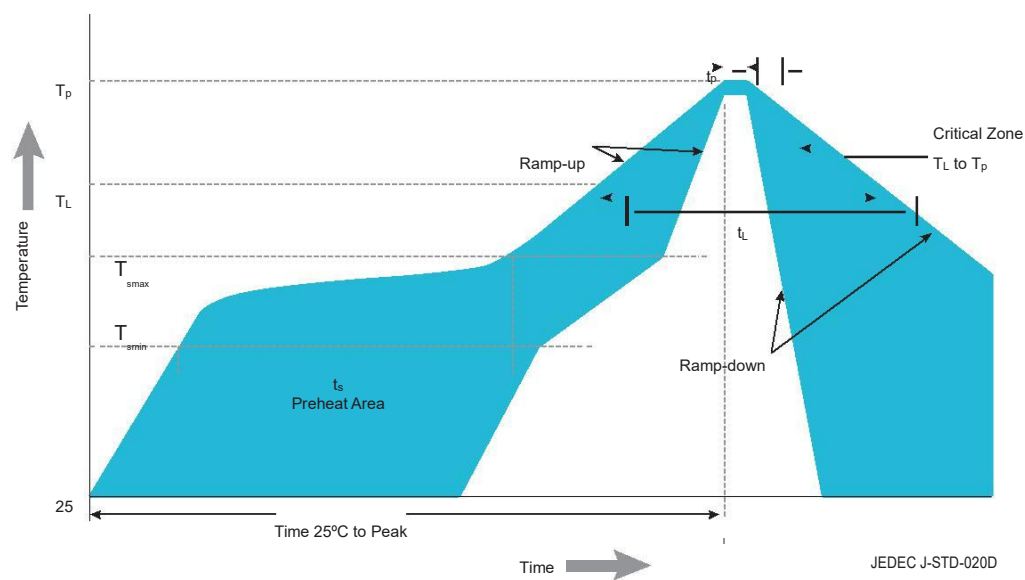


Figure. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for 5050RGB R Series

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 (TL to T_p)	3°C / second maximum
Liquidus Temperature (TL)	217°C
Time Maintained Above Temperature TL (t_L)	60 to 150 seconds
Peak / Classification Temperature (T_p)	260°C
Time Within 5°C of Peak Temperature (t_p)	20 to 40 seconds
Ramp-Down Rate (T_p to TL)	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

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.