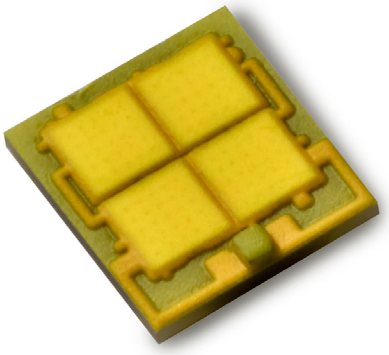
LUMILEDS

GENERAL ILLUMINATION

LUXEON MZ

Best combination of brightness, uniformity and luminance enabling precision light control



LUXEON MZ is an undomed multi-die LED designed to enable outdoor and industrial applications with all of the features of LUXEON M including the identical solder footprint, but allowing for tighter beam control and higher punch due to a smaller apparent source size. With *Freedom from Binning* and leading performance, LUXEON MZ falls within a single 3- or 5-step MacAdam ellipse centered in ANSI to ensure color consistency from LED to LED, delivering high efficacy and high flux density from a uniform source with tight correlated color temperature control. The superior quality of light, volume of lumens, and real world efficacy enable leading performance and efficient solution development in a wide variety of lighting segments.

FEATURES AND BENEFITS
Undomed package for improved punch and exceptional luminance
Common footprint as LUXEON M for compatibility with existing designs
Industry leading 11.2V package delivers exceptional efficacy
Leading thermal resistance enables flexible system design to optimize for lm/$ and lm/W
Exceeds ENERGY STAR® lumen maintenance requirements

PRIMARY APPLICATIONS
Downlights
High Bay & Low Bay
Lamps
Outdoor
Spotlights

Table of Contents

General Information

Part Number Nomenclature

LUXEON MZ emitters are specified and binned "hot" under conditions comparable to those found in "real-world" lighting products.

The part number designation is explained as follows:

L M Z a - b c d e - f g h j

Where:

a — designates minimum CRI (7 = 70, 8 = 80, 9 = 90)

b — is S for serially connected product with a voltage less than 12V; R for series-parallel connected product with voltage less than 6V; Q for parallel connected product with voltage less than 3V

c — designates color designation (W = White, R = Royal Blue)

d e — designates CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)

fghi — minimum flux lumen (optional)

The test conditions for 12V LUXEON MZ LMZa-Scde-fghj are 700mA DC with junction temperature 85°C. The test conditions for 6V LUXEON MZ LMZa-Rcde-fghj are 1400mA DC with junction temperature 85°C. The test conditions for 3V LUXEON MZ LMZa-Qcde-fghj are 2800mA DC with junction temperature 85°C.

Therefore LUXEON MZ 12V products tested and binned at 700mA follow the part numbering scheme:

L M Z 7 - S W 3 0 - x x x x

L M Z 7 - S W 4 0 - x x x x

L M Z 7 - S W 5 0 - x x x x

L M Z 7 - S W 5 7 - x x x x

L M Z 7 - S W 6 5 - x x x x

L M Z 8 - S W 2 7 - x x x x

L M Z 8 - S W 3 0 - x x x x

L M Z 8 - S W 4 0 - x x x x

L M Z 8 - S W 5 0 - x x x x

L M Z 9 - S W 2 7 - x x x x

L M Z 9 - S W 3 0 - x x x x

L M Z 9 - S W 5 7 - x x x x

Therefore LUXEON MZ 6V products tested and binned at 1400mA follow the part numbering scheme:

L M Z 7 - R W 3 0 - x x x x

L M Z 7 - R W 4 0 - x x x x

L M Z 7 - R W 5 0 - x x x x

L M Z 7 - R W 5 7 - x x x x

L M Z 7 - R W 6 5 - x x x x

L M Z 8 - R W 2 7 - x x x x

L M Z 8 - R W 3 0 - x x x x

L M Z 8 - R W 4 0 - x x x x

L M Z 8 - R W 5 0 - x x x x

L M Z 9 - R W 2 7 - x x x x

L M Z 9 - R W 3 0 - x x x x

L M Z 9 - R W 5 7 - x x x x

Therefore LUXEON MZ 3V products tested and binned at 2800mA follow the part numbering scheme:

L M Z 7 - Q W 3 0 - x x x x

L M Z 7 - Q W 4 0 - x x x x

L M Z 7 - Q W 5 0 - x x x x

L M Z 7 - Q W 5 7 - x x x x

L M Z 7 - Q W 6 5 - x x x x

L M Z 8 - Q W 2 7 - x x x x

L M Z 8 - Q W 3 0 - x x x x

L M Z 8 - Q W 4 0 - x x x x

L M Z 8 - Q W 5 0 - x x x x

L M Z 9 - Q W 2 7 - x x x x

L M Z 9 - Q W 3 0 - x x x x

L M Z 9 - Q W 5 7 - x x x x

Average Lumen Maintenance Characteristics

Lumen maintenance for solid-state lighting devices (LEDs) is typically defined in terms of the percentage of initial light output remaining after a specified period of time. Lumileds projects that LUXEON MZ products will deliver, on average, 70% lumen maintenance (L70) at 50,000 hours of operation at a forward current of up to 700mA for LMZx-Sxxx and 1400mA for LMZx-Rxxx and 2800mA for LMZx-Qxxx. This projection is based on constant current operation with junction temperature maintained at or below 135°C. This performance is based on Lumileds historical data from tests run on similar material systems, and internal LM-80-08 and reliability testing. Observation of design limits included in this data sheet is required in order to achieve this projected lumen maintenance.

Environmental Compliance

Lumileds is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON MZ is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS directive. Lumileds will not intentionally add the following restricted materials to the LUXEON MZ lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Product Selection

Product Selection Guide for LUXEON MZ 12V White Junction Temperature = 85°C

Table 1.

Performance Characteristics at 700mA				
Part Number	Nominal CCT	Minimum CRI	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)
LMZ7-SW30	3000K	70	805	840
LMZ7-SW40	4000K	70	870	940
LMZ7-SW50	5000K	70	870	950
LMZ7-SW57	5700K	70	900	980
LMZ7-SW65	6500K	70	900	980
LMZ8-SW27	2700K	80	710	760
LMZ8-SW30	3000K	80	730	781
LMZ8-SW35	3500K	80	730	800
LMZ8-SW40	4000K	80	840	880
LMZ8-SW50	5000K	80	840	890
LMZ9-SW27	2700K	90	560	600
LMZ9-SW30	3000K	90	600	640
LMZ9-SW57	5700K	90	700	770

Notes for Table 1:

1. Lumileds maintains a tolerance of ± 6.5% on flux measurements and ±2 on CRI.

Product Selection Guide for LUXEON MZ 6V White Junction Temperature = 85°C

Table 2.

Performance Characteristics at 1400mA				
Part Number	Nominal CCT	Minimum CRI	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)
LMZ7-RW30	3000K	70	805	840
LMZ7-RW40	4000K	70	870	940
LMZ7-RW50	5000K	70	870	950
LMZ7-RW57	5700K	70	900	980
LMZ7-RW65	6500K	70	900	980
LMZ8-RW27	2700K	80	710	760
LMZ8-RW30	3000K	80	730	781
LMZ8-RW35	3500K	80	730	800
LMZ8-RW40	4000K	80	840	880
LMZ8-RW50	5000K	80	840	890
LMZ9-RW27	2700K	90	560	600
LMZ9-RW30	3000K	90	600	640
LMZ9-RW57	5700K	90	700	770

Notes for Table 2:

1. Lumileds maintains a tolerance of ± 6.5% on flux measurements and ±2 on CRI.

Product Selection Guide for LUXEON MZ 3V White Junction Temperature = 85°C

Table 3.

Performance Characteristics at 2800mA				
Part Number	Nominal CCT	Minimum CRI	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)
LMZ7-QW30	3000K	70	805	840
LMZ7-QW40	4000K	70	870	940
LMZ7-QW50	5000K	70	870	950
LMZ7-QW57	5700K	70	900	980
LMZ7-QW65	6500K	70	900	980
LMZ8-QW27	2700K	80	710	760
LMZ8-QW30	3000K	80	730	781
LMZ8-QW35	3500K	80	730	800
LMZ8-QW40	4000K	80	840	880
LMZ8-QW50	5000K	80	840	890
LMZ9-QW27	2700K	90	560	600
LMZ9-QW30	3000K	90	600	640
LMZ9-QW57	5700K	90	700	770

Notes for Table 3:

1. Lumileds maintains a tolerance of ± 6.5% on flux measurements and ±2 on CRI.

Optical and Electrical Characteristics

Optical Characteristics for LUXEON MZ White at Test Current [1] Junction Temperature = 85°C

Table 4.

Part Number	Nominal CCT	Typical CCT (K)	Typical Total Included Angle [2] $\theta_{0.90V}$	Typical Viewing Angle [3] 2θ ½
LMZ7-xW30	3000K	3045	140°	120°
LMZ7-xW40	4000K	3985	140°	120°
LMZ7-xW50	5000K	5028	140°	120°
LMZ7-xW57	5700K	5665	140°	120°
LMZ7-xW65	6500K	6530	140°	120°
LMZ8-xW27	2700K	2725	140°	120°
LMZ8-xW30	3000K	3045	140°	120°
LMZ8-xW35	3500K	3465	140°	120°
LMZ8-xW40	4000K	3985	140°	120°
LMZ8-xW50	5000K	5028	140°	120°
LMZ9-xW27	2700K	2725	140°	120°
LMZ9-xW30	3000K	3045	140°	120°
LMZ9-xW57	5700K	5665	140°	120°

Notes for Table 4:

1. Test current is 700mA for LMZx-Sxxx, 1400mA for LMZx-Rxxx and 2800mA for LMZx-Qxxx.
2. Total included angle at which 90% of total luminous flux is captured.
3. Viewing angle is the off axis angle from lamp centerline where the luminous intensity is ½ of the peak value.

Electrical Characteristics for LUXEON MZ at Test Current [1] Junction Temperature = 85°C

Table 5.

Part Number	Forward Voltage V_f [1] [2] (V) I_f = 700mA, 1400mA and 2800mA			Typical Temperature Coefficient of Forward Voltage [3] (mV/°C) $\Delta V_F / \Delta T_J$	Typical Thermal Resistance Junction to Thermal Pad (°C/W) $R\theta_{J-C}$
	Minimum	Typical	Maximum		
LMZx-Sxxx	10.5	11.2	11.7	-7.0	1.25
LMZx-Rxxx	5.25	5.6	6	-3.5	1.25
LMZx-Qxxx	2.63	2.8	3	-1.75	1.25

Notes for Table 5:
1. Test current is 700mA for LMZx-Sxxx, 1400mA for LMZx-Rxxx and 2800mA for LMZx-Qxxx.
2. Lumileds maintains a tolerance of ± 0.06V on forward voltage measurements.
3. Measured between T_J = 25°C and T_J = 135°C.

Absolute Maximum Ratings

Table 6.

Parameter	Maximum Performance
DC Forward Current (mA) [1] [2]	1200mA for LMZx-Sxxx, 2400mA for LMZx-Rxxx and 4800mA for LMZx-Qxxx
Peak Pulsed Forward Current (mA) [1] [3]	1375mA for LMZx-Sxxx, 2750mA for LMZx-Rxxx and 5500mA for LMZx-Qxxx
ESD Sensitivity	≤ 8000V Human Body Model (HBM)Class 3B JESD22-A114-E< 400V Machine Model (MM) Class B JESD22-A115-B
LED Junction Temperature [1]	135°C
Operating Case Temperature at Test Current	-40°C - 120°C
Storage Temperature	-40°C - 120°C
Lead Soldering Temperature	JEDEC 020c 260°C
Allowable Reflow Cycles	3
Reverse Voltage (V_r)	LUXEON MZ LEDs are not designed to be driven in reverse bias.

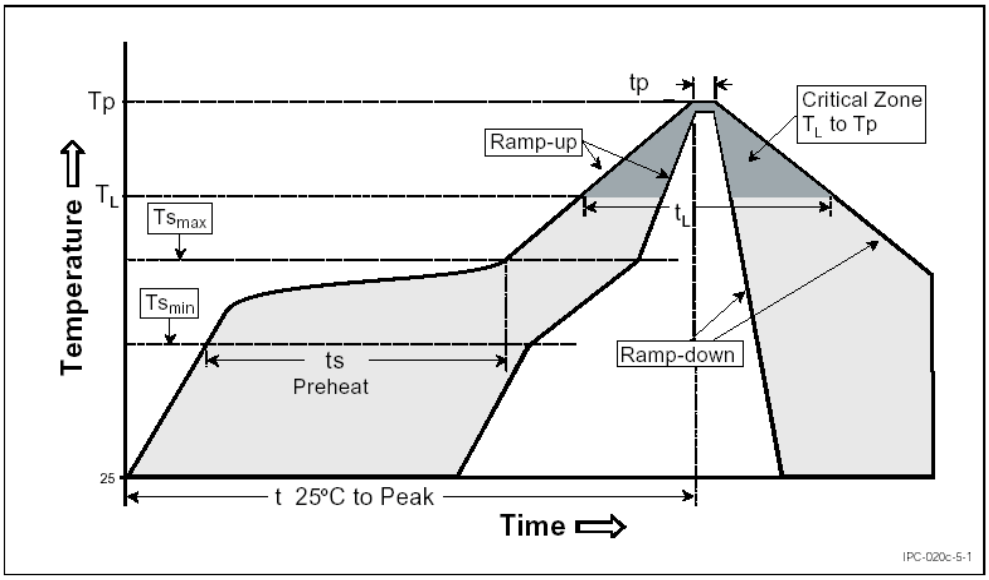
Notes for Table 6:
1. Proper current derating must be observed to maintain junction temperature below the maximum.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", with frequencies ≥ 100Hz and amplitude ≤ 1375mA for LMZx-Sxxx, products are acceptable, assuming the average current throughout each cycle does not exceed 1200mA for LMZx-Sxxx.
3. Pulsed operation with a peak drive current of 1375mA for LMZx-Sxxx, are acceptable if the pulse on time is ≤ 5ms per cycle and the duty cycle is ≤ 50%.
4. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", with frequencies ≥ 100Hz and amplitude ≤ 2750mA for LMZx-Rxxx, products are acceptable, assuming the average current throughout each cycle does not exceed 2400mA for LMZx-Rxxx.
5. Pulsed operation with a peak drive current of 27505mA for LMZx-Rxxx, are acceptable if the pulse on time is ≤ 5ms per cycle and the duty cycle is ≤ 50%.
6. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", with frequencies ≥ 100Hz and amplitude ≤ 5500mA for LMZx-Wxxx, products are acceptable, assuming the average current throughout each cycle does not exceed 4800mA for LMZx-Qxxx.
7. Pulsed operation with a peak drive current of 5500mA for LMZx-Qxxx, are acceptable if the pulse on time is ≤ 5ms per cycle and the duty cycle is ≤ 50%.

JEDEC Moisture Sensitivity

Table 7.

Level	Floor Life		Soak Requirements	
			Standard	
	Time	Conditions	Time	Conditions
1	unlimited	≤ 30°C / 85% RH	168 Hrs. + 5 / 0 Hrs.	85°C / 85% RH

Reflow Soldering Characteristics



Temperature Profile for Table 8.

Table 8.

Profile Feature	Lead Free Assembly
Average Ramp-Up Rate (Ts_{max} to T_p)	3°C / second max
Preheat Temperature Min (Ts_{min})	150°C
Preheat Temperature Max (Ts_{max})	200°C
Preheat Time (ts_{min} to ts_{max})	60 - 180 seconds
Liquidus Temperature (T_L)	217°C
Time Maintained Above Time (t_L)	60 - 150 seconds
Peak / Classification Temperature (T_p)	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	20 - 40 seconds
Ramp-Down Rate	6°C / second max
Time 25°C to Peak Temperature	8 minutes max

Note for Table 8:

1. All temperatures refer to the application Printed Circuit Board (PCB), measured on the surface adjacent to the package body.

Mechanical Dimensions

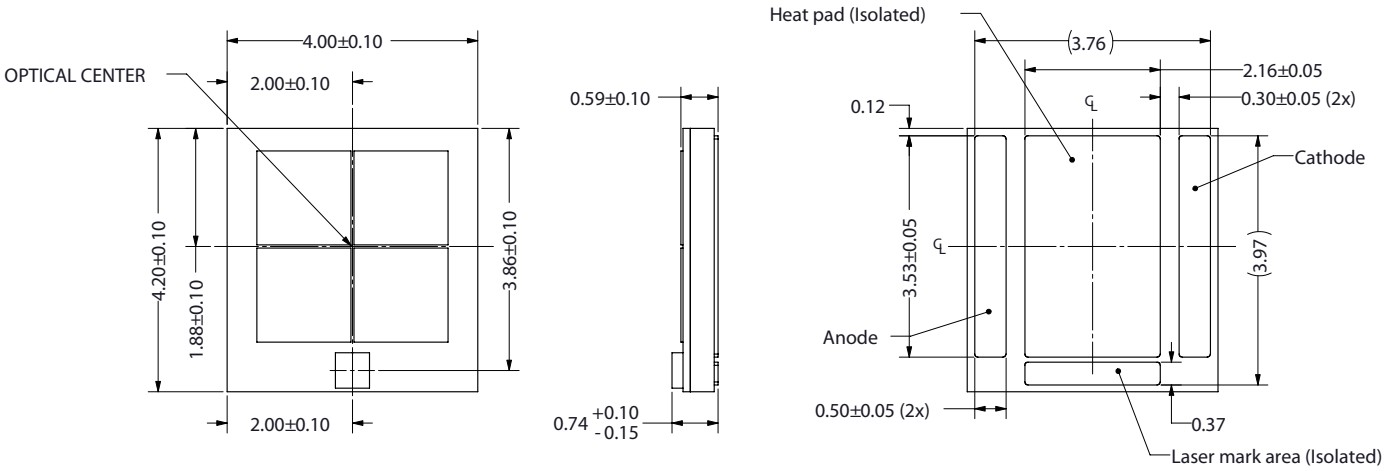


Figure 1.

Notes for Figure 1:

1. Do not handle the device by the lens. Excessive force on the lens may damage the lens itself or the interoir of the device.
2. Drawings not to scale.
3. All dimensions are in millimeters.

Solder Pad Design

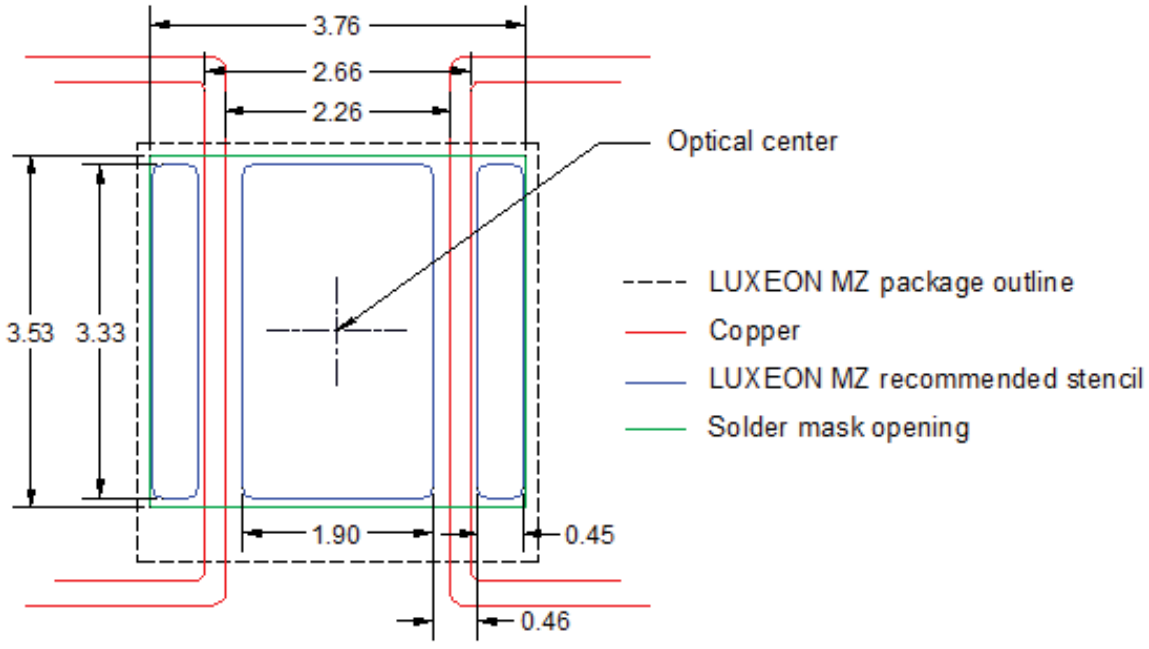


Figure 2.

Notes for Figure 2:

1. All dimensions are in millimeters.

Typical Relative Spectral Distribution vs. Wavelength Characteristics

LMZ7-xWxx at Test Current, Junction Temperature = 85°C

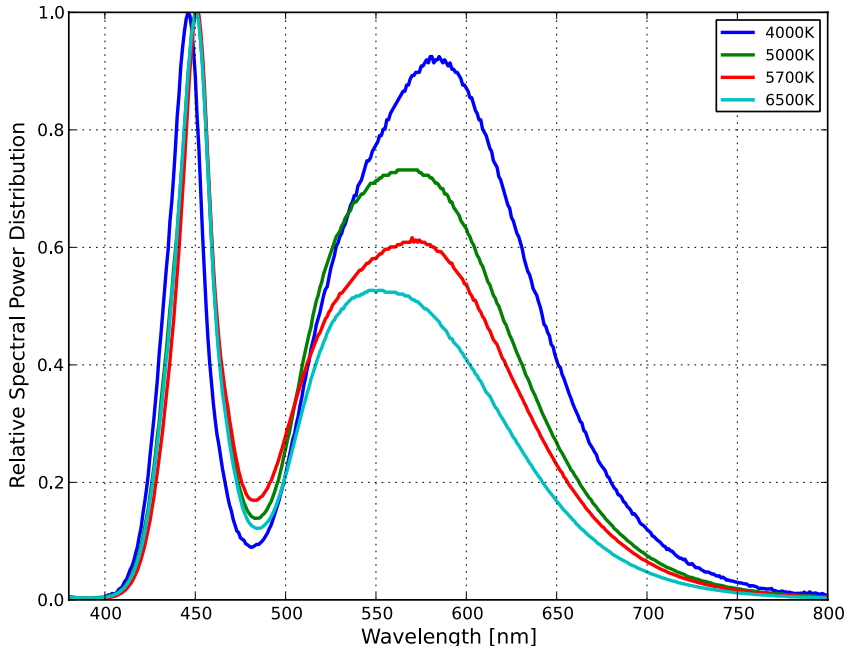


Figure 3. Color Spectrum of LMZ7-xWxx.

LMZ8-xWxx Test Current, Junction Temperature = 85°C

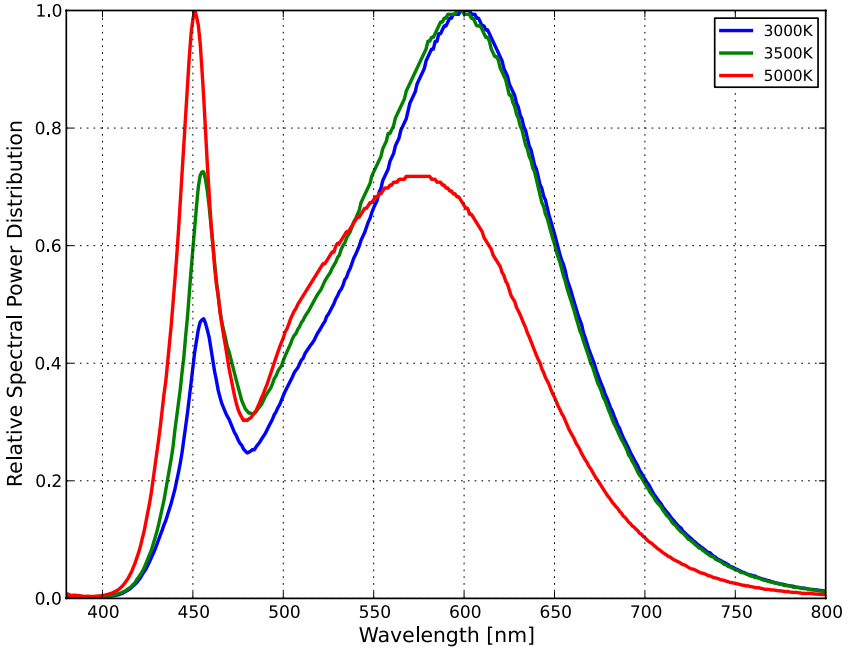


Figure 4. Color Spectrum of LMZ8-xWxx.

LMZ9-xWxx Test Current, Junction Temperature = 85°C

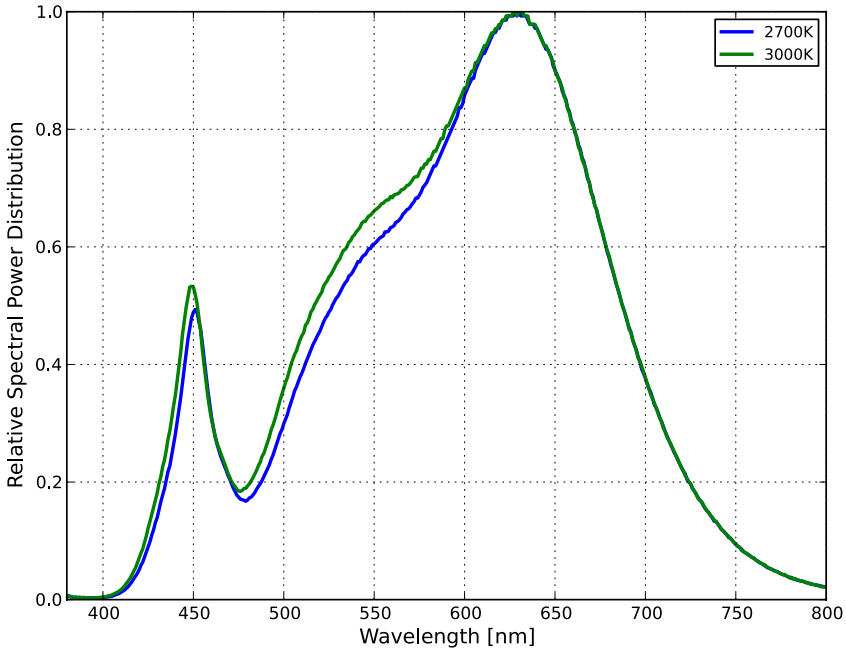


Figure 5. Color Spectrum of LMZ9-xWxx.

Typical Relative Light Output

Typical Relative Light Output vs. Junction Temperature Test Current at 700mA

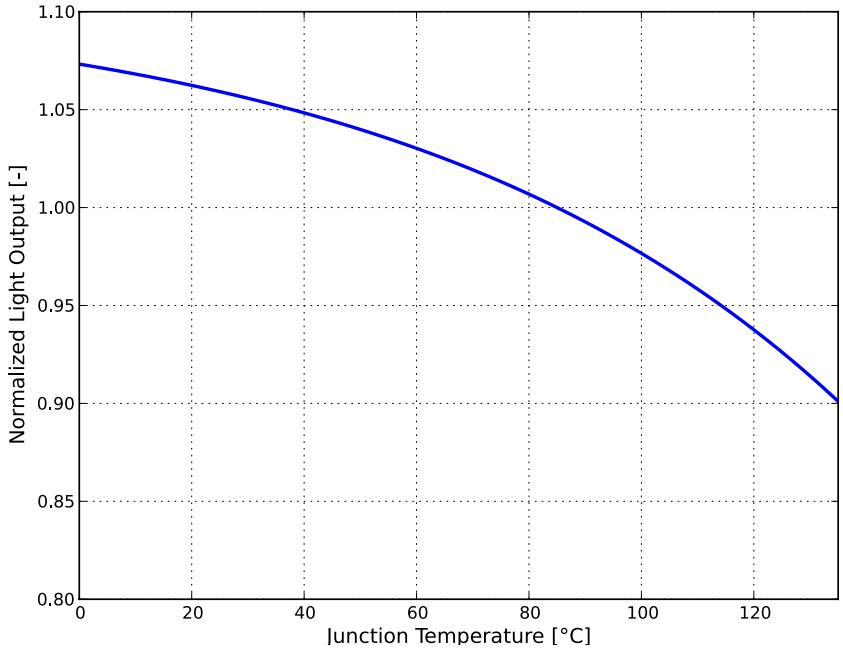


Figure 6. Typical relative light output vs. junction temperature, LMZx-xWxx.

Typical Relative Light Output vs. Forward Current Junction Temperature = 85°C

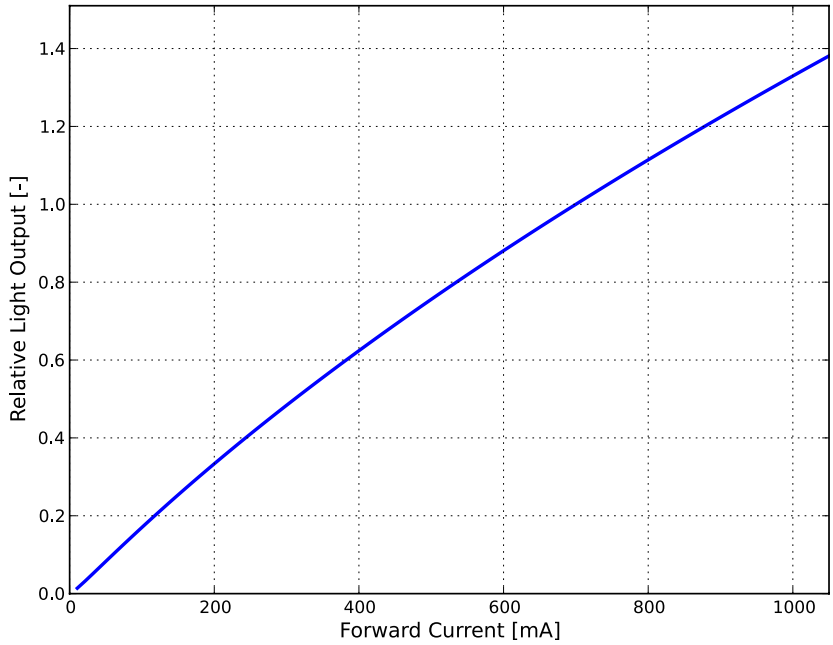


Figure 7. Typical relative light output vs. forward current, LMZx-SWxx.

Typical Relative Light Output vs. Forward Current
Junction Temperature = 85°C

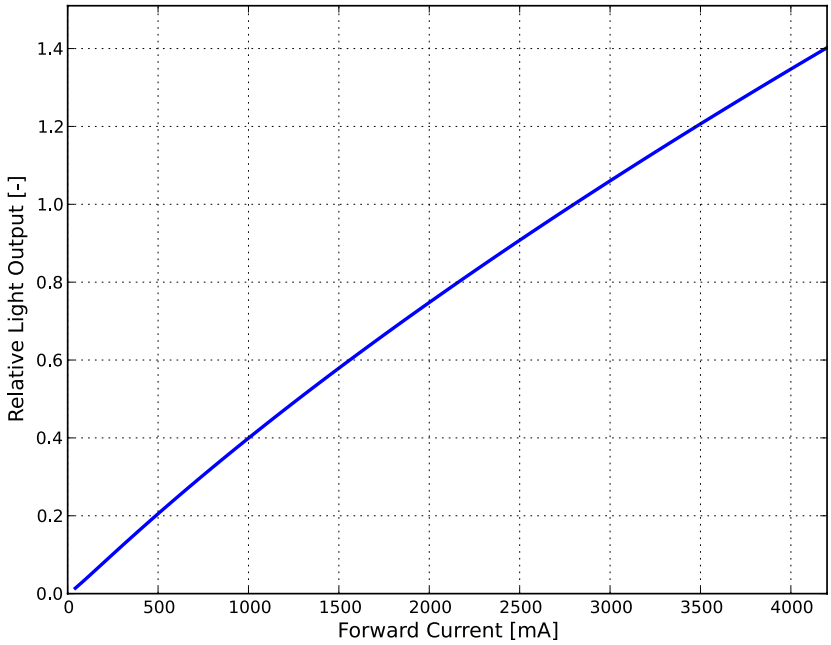


Figure 8. Typical relative light output vs. forward current, LMZx-QWxx.

Typical Forward Current Characteristics

Typical Forward Current vs. Forward Voltage Junction Temperature = 85°C

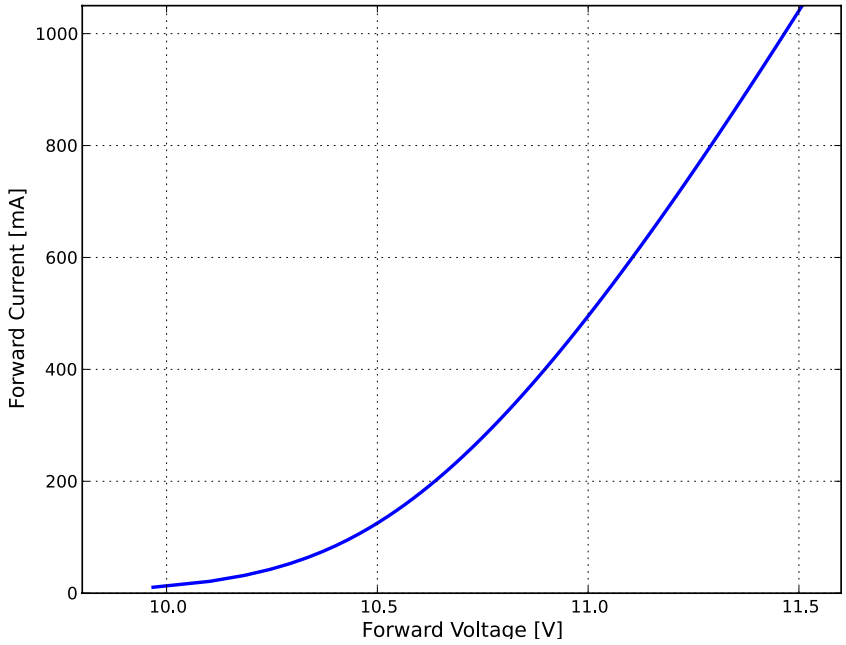


Figure 9. Typical forward current vs. forward voltage, LMZx-SWxx.

Typical Forward Current vs. Forward Voltage Junction Temperature = 85°C

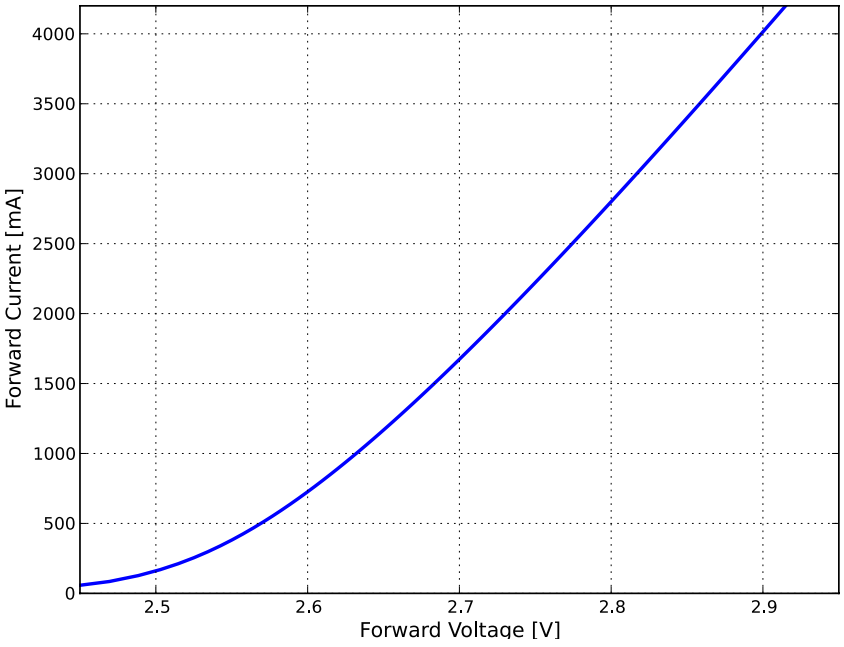


Figure 10. Typical forward current vs. forward voltage, LMZx-QWxx.

Radiation Patterns

Typical Spatial Radiation Pattern

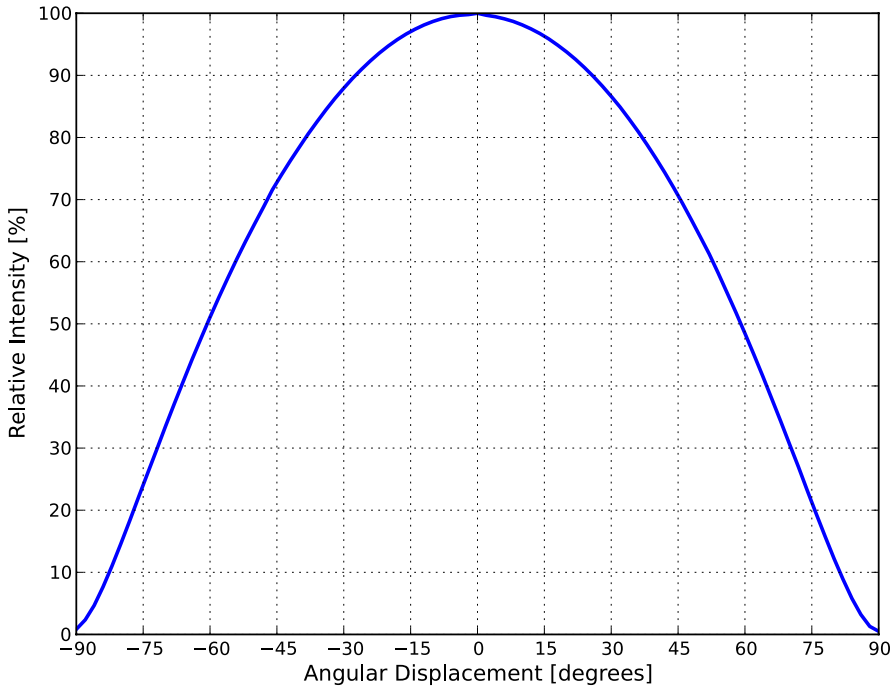


Figure 11. Typical spatial radiation pattern, LMZx-xWxx.

Typical Polar Radiation Pattern

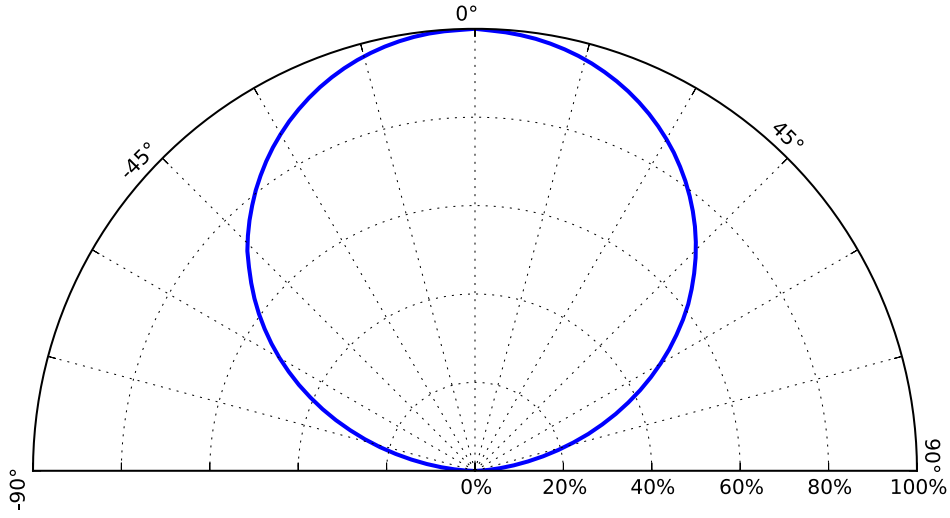
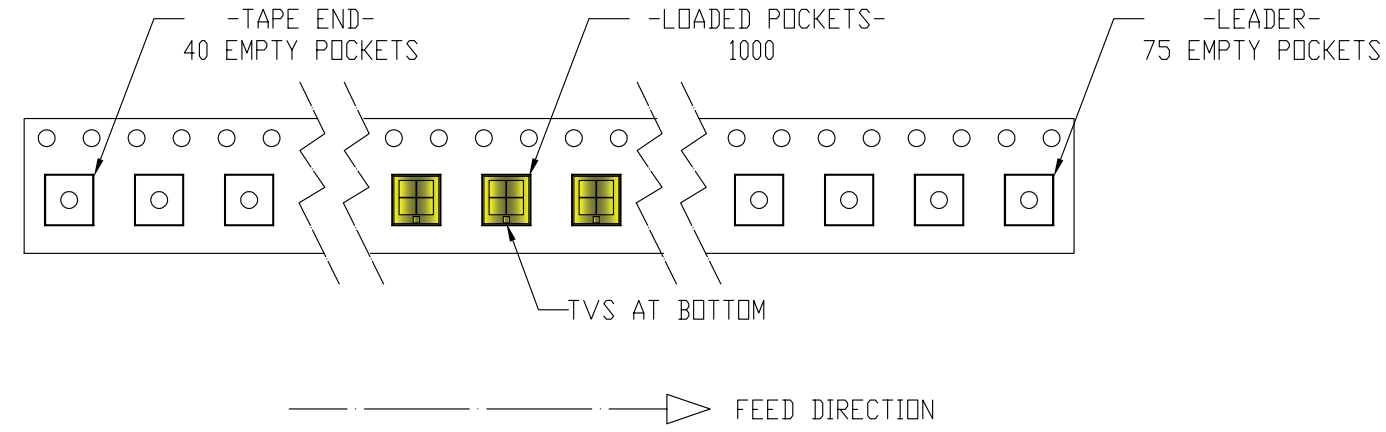


Figure 12. Typical polar radiation pattern, LMZx-xWxx.

Tape and Reel Packaging

Emitter Pocket Tape



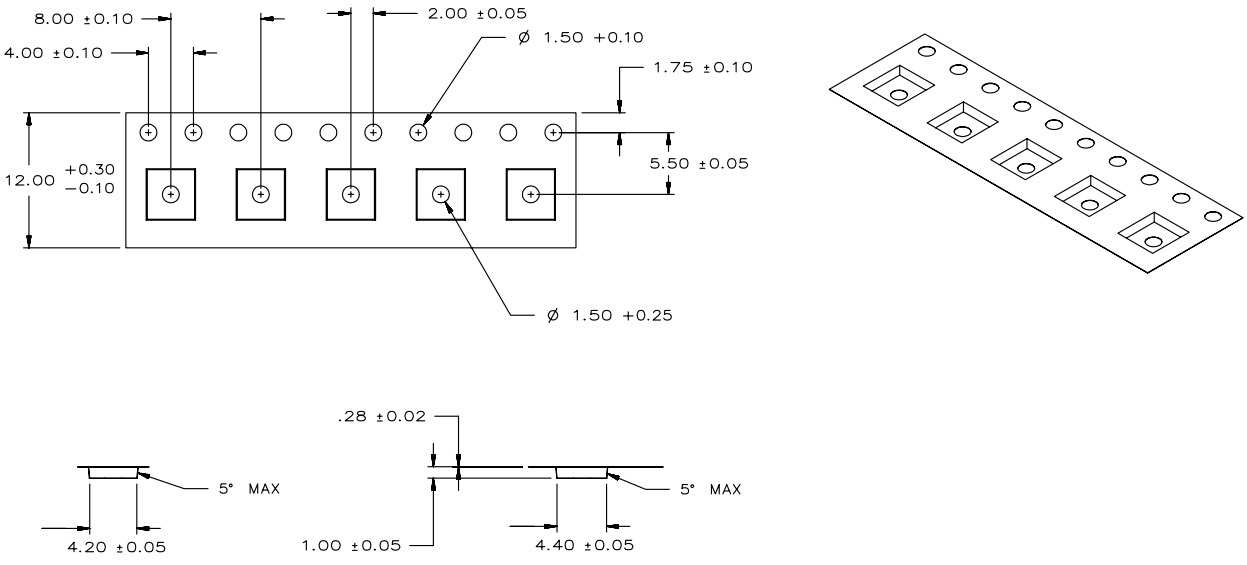


Figure 13.

Notes for Fig 10:
1. Dimensions are in millimeters

Emitter Reel Packaging

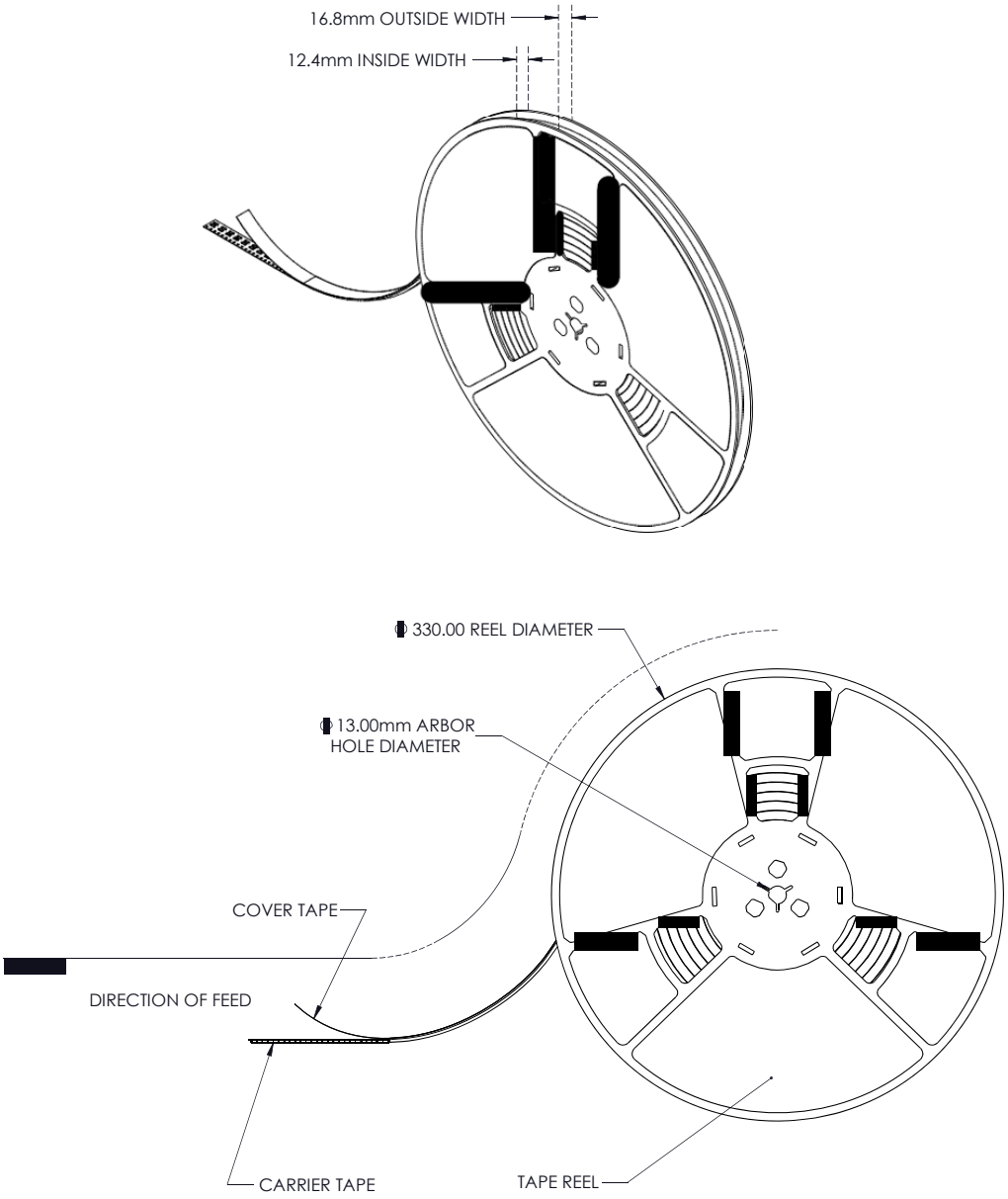


Figure 14. Emitter reel packaging.

Product Binning and Labeling

Purpose of Product Binning

In the manufacturing of semiconductor products, there is a variation of performance around the average values given in the technical data sheets. For this reason, Lumileds bins the LED components for luminous flux, color, and forward voltage (V_f).

Decoding Product Bin Labeling

Reels with LUXEON MZ white emitters are labeled with a four digit alphanumeric code (CAT code) following the format below. All emitters packaged within a reel are of the same 4-variable bin combination.

For LMZx-xWxx, reels of emitters are labeled with a four digit alphanumeric CAT code following the format below.

A B C D

Where:

- A — designates luminous flux bin (See Table 9)
- B — designates color or CCT indication (1 for 6500K, 2 for 5700K, 3 for 5000K, 5 for 4000K, 6 for 3500K, 7 for 3000K, and 8 for 2700K)
- C — designates color consistency (5 for within 5-step MacAdam Ellipse, 3 for within 3-step MacAdam Ellipse). Detailed definitions for these color bins can be found in Table 10.
- D — designates V_f bin (F,G,H)

Luminous Flux Bins

Table 9 lists the standard photometric luminous flux bins for LUXEON MZ white emitters (LMZx-xWxx). LMZx-xWxx units are tested and binned at a drive current of 700mA and a junction temperature of 85°C. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Table 9. Luminous Flux Bins for White

Bin Code	Minimum Photometric Flux(lm)	Maximum Photometric Flux(lm)
K	550	590
L	590	630
M	630	680
N	680	730
P	730	780
Q	780	840
R	840	900
S	900	970
T	970	1040
U	1040	1120
V	1120	1200
W	1200	1290

LUXEON MZ MacAdam Color Bin Definition

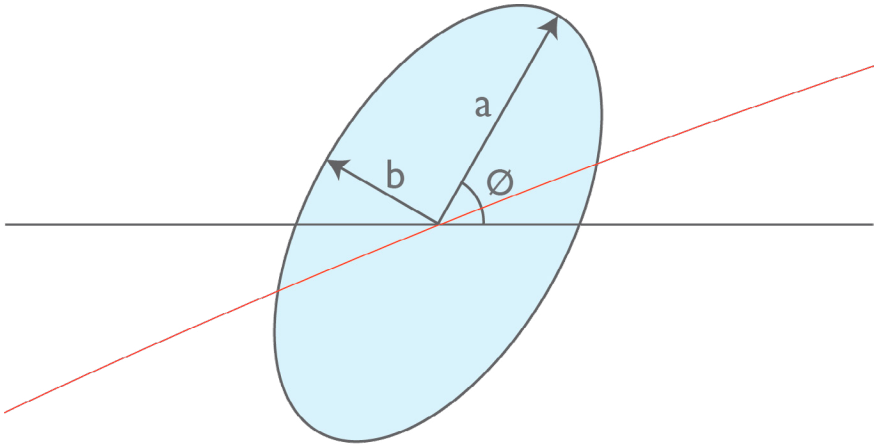


Table 10. LUXEON MZ Product Characteristics for 3-Step and 5-Step MacAdam Ellipse [1][2]

Nominal ANSI CCT	Color Space	Center Point (cx, cy)	Major Axis, a	Minor Axis, b	Ellipse Rotation Angle (degrees)
2700K	Single 3-Step MacAdam ellipse	0.4578, 0.4101	0.00810	0.00420	53.70
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, 0.3553	0.00822	0.00354	59.62
3000K	Single 5-Step MacAdam ellipse	0.4338, 0.4030	0.01390	0.00680	53.22
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
6500K	Single 5-Step MacAdam ellipse	0.3123, 0.3282	0.01115	0.00475	58.57

Notes for Table 10:

1. Lumileds maintains a tester tolerance of ± 0.005 on x, y color coordinates.
2. Tested at 700mA D.C. and Junction Temperature = 85°C.

Forward Voltage Bins

Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.

Table 11. Forward Voltage Bins for LMZx-Sxxx

Bin Code	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
F	10.5	11.0
G	11.0	11.5
H	11.5	11.7

Table 12. Forward Voltage Bins for LMZx-Rxxx

Bin Code	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
F	5.25	5.5
G	5.5	5.75
H	5.75	6.00

Table 13. Forward Voltage Bins for LMZx-Qxxx

Bin Code	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
F	2.63	2.75
G	2.75	2.88
H	2.88	3.00

About Lumileds

Lumileds is the light engine leader, delivering innovation, quality, and reliability.

For 100 years, Lumileds commitment to innovation has helped customers pioneer breakthrough products in the automotive, consumer and illumination markets.

Lumileds is shaping the future of light with our LEDs and automotive lamps, and helping our customers illuminate how people see the world around them.

To learn more about our portfolio of light engines visit www.lumileds.com.

www.lumileds.com

AMEYA360
Components Supply Platform

Authorized Distribution Brand :

Website :

Welcome to visit www.ameya360.com

Contact Us :

- ### Address :

  401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
  Minhang District, Shanghai , China

- ### Sales :

  Direct +86 (21) 6401-6692

  Email amall@ameya360.com

  QQ 800077892

  Skype ameyasales1 ameyasales2

- ### Customer Service :

  Email service@ameya360.com

- ### Partnership :

  Tel +86 (21) 64016692-8333

  Email mkt@ameya360.com