

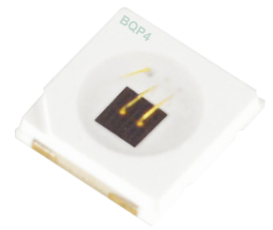
## Primax

Synonymous with function and performance, enter the Primax, the new era of high intensity illumination in LED. With its high flux output and high luminous intensity, Primax transcends today LED lightings technology and how we perceive it. The small package outline and high intensity make it an ideal choice for backlighting, signage, exterior automotive lighting and decorative lighting.



## Features:

- > Super high brightness surface mount LED
- > 120° viewing angle.
- > Compact package outline (LxW) of 3.7 x 3.5 mm.
- > Ultra low height profile - 0.8mm.
- > Low thermal resistance.
- > Compatible to IR reflow soldering.
- > Superior corrosion resistant
- > Environmental friendly; RoHS compliance.
- > Qualified based on AEC-Q102 Standard.



## Applications:

- > Automotive: Driver Monitoring, Seat Occupancy Detection.
- > Infrared Illumination for cameras.
- > Machine Vision Systems.
- > Surveillance Systems.
- > Eye Tracking Systems.

**Optical Characteristics at Tj=25°C**

Part Number	Peak Wavelength	Viewing Angle°	Radiant Intensity <i>Appx. 1.3</i> IF = 1000mA Ie(mW/sr)		Total Radiant Flux (mW) Typ.
			Min.	Max.	
MA94-TZHG-CB-1	940nm	120	320.0	500.0	1200.0

**Electrical Characteristics at Tj=25°C**

Part Number	Vf @ If = 1000		
	Min. (V)	Typ. (V)	Max. (V)
MA94-TZHG	2.60	3.00	3.60

**Absolute Maximum Ratings**

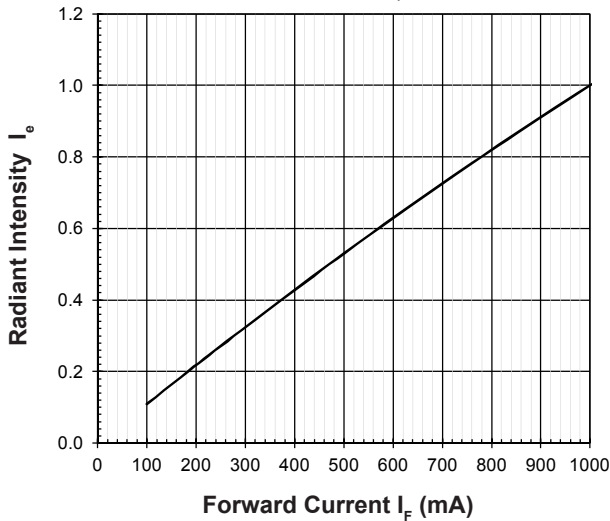
	Maximum Value	Unit
DC forward current	1000	mA
Peak Pulse Current (Ts=55°C, tp<=100µs, Duty cycle=0.03)	5	A
Reverse Voltage	Not designed for reverse bias	V
ESD threshold (HBM)	8000	V
LED junction temperature	150	°C
Operating temperature	-40 ... +125	°C
Storage temperature	-40 ... +125	°C
Thermal resistance (Rated current = 1000mA, Ts = 25 °C)		
- Real Thermal Resistance		
Junction / solder point, Rth JS real (typ = 3.6)	5	K/W
- Electrical Thermal Resistance		
Junction / solder point, Rth JS el (typ = 2.5)	3.3	K/W

**Radiant Intensity at Tj=25°C**

Brightness Group	Radiant Intensity
CB	320.0 ... 500.0

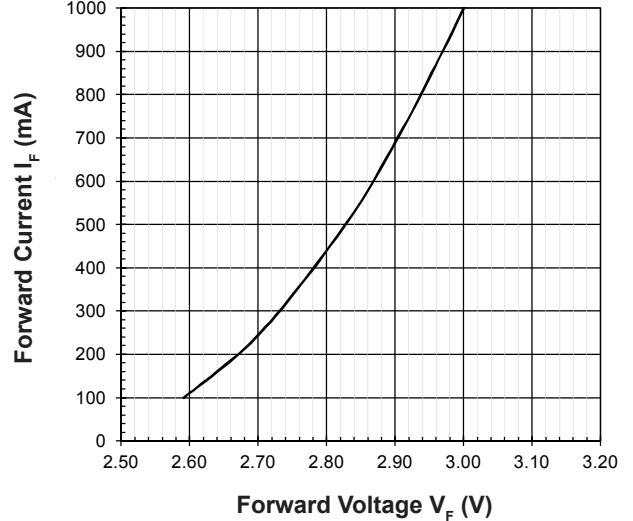
**Radiant Intensity Vs Forward Current**

$I_e/I_e(1000\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$



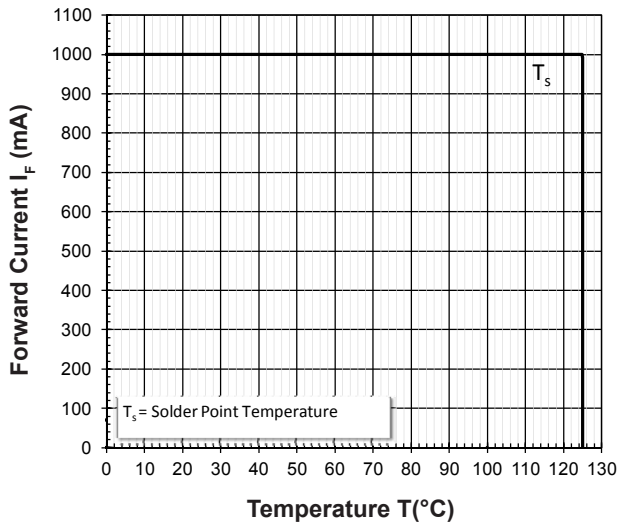
**Forward Current Vs Forward Voltage**

$I_F = f(V_F); T_j = 25^\circ\text{C}$



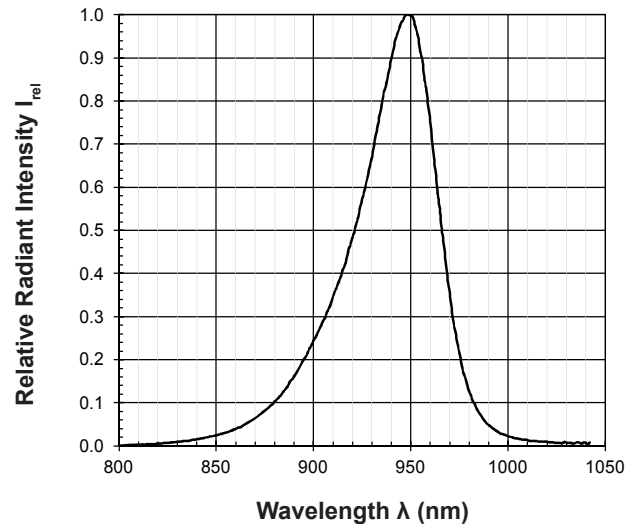
**Maximum Current Vs Temperature**

$I_F = f(T)$

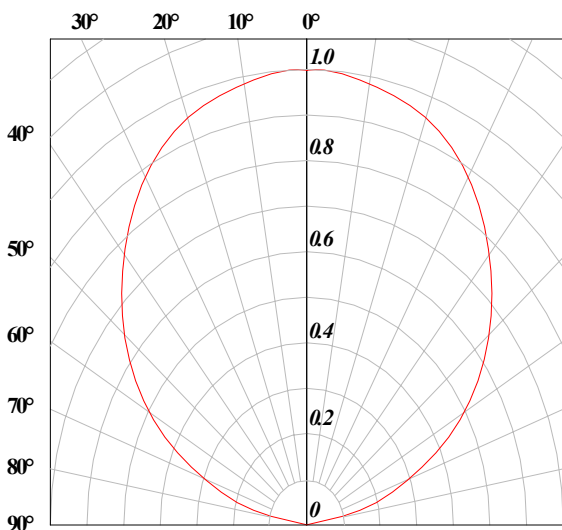


**Relative Spectral Emission**

$I_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 1000\text{mA}$



**Radiation Pattern**



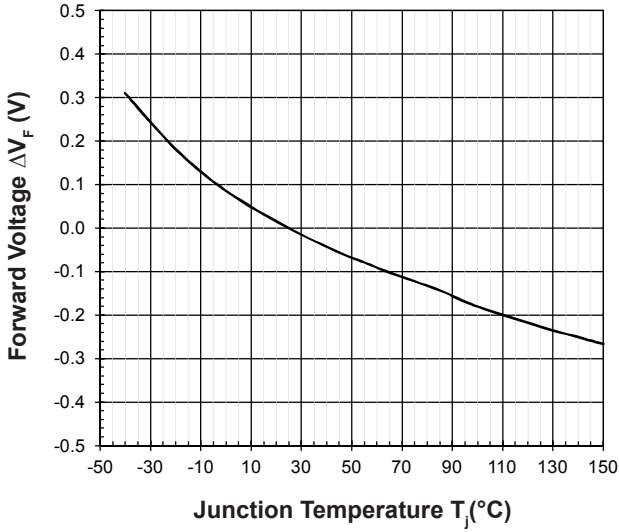
**Allowable Forward Current Vs Duty Ratio**

$(T_s = 55^\circ\text{C}; t_p \leq 100\mu\text{s})$



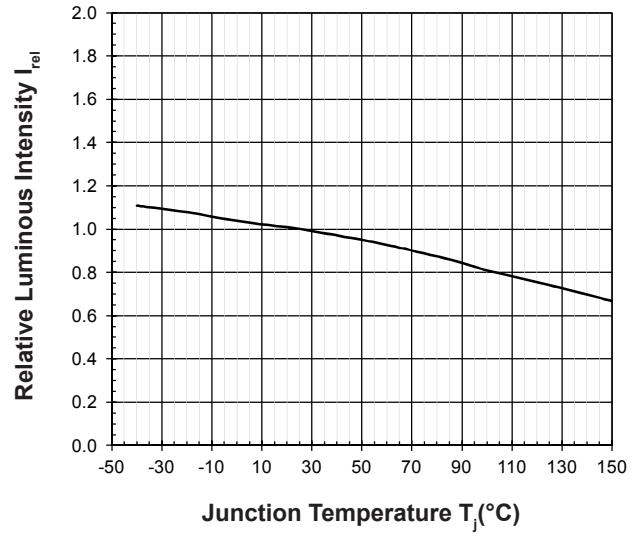
**Forward Voltage Vs Junction Temperature**

$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 1000\text{mA}$



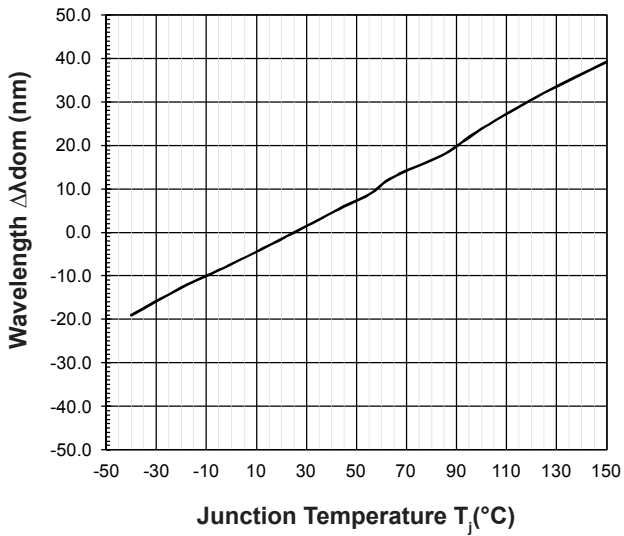
**Relative Radiant Intensity Vs Junction Temperature**

$I_e/I_e(25^\circ\text{C}) = f(T_j); I_F = 1000\text{mA}$

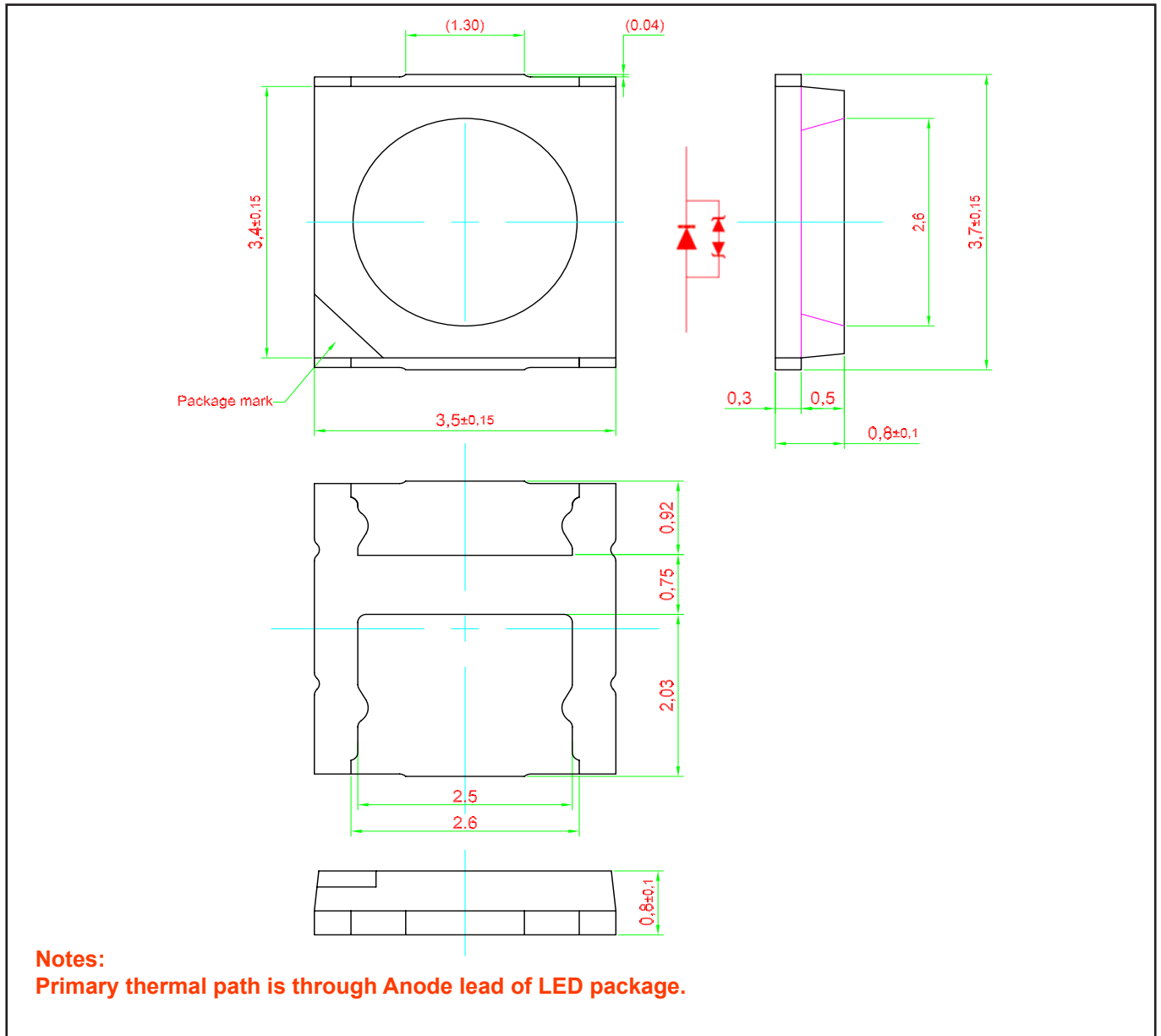


**Wavelength Vs Junction Temperature**

$\Delta \lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 1000\text{mA}$



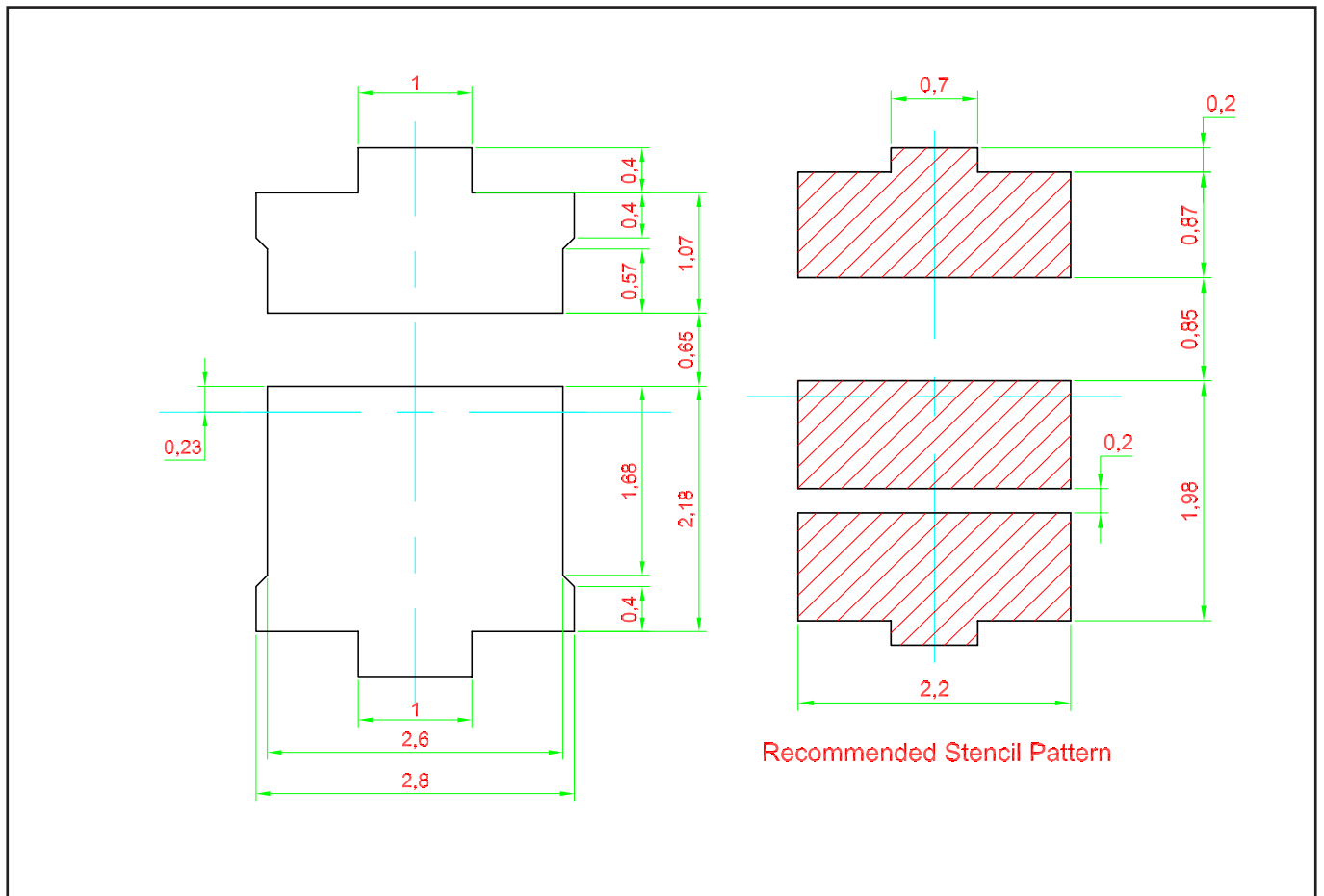
**PrimaxPlus • Infra Red: MA94-TZHG Package Outlines**



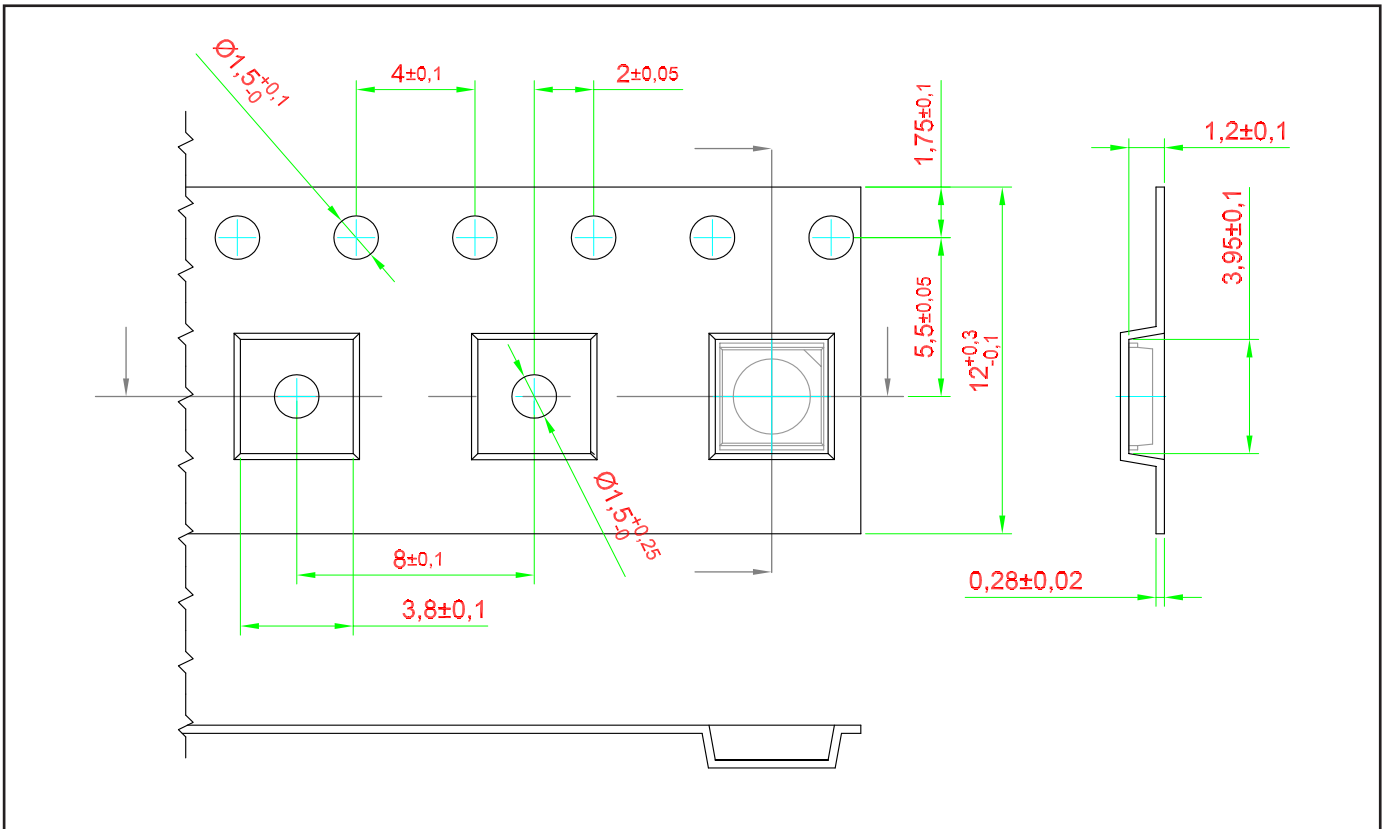
**Material**

Material	
Lead-frame	Cu Alloy With Au Plating
Package	High Temperature Resistant Plastic
Encapsulant	Silicone Resin
Soldering Leads	Au Plating

### Recommended Solder Pad

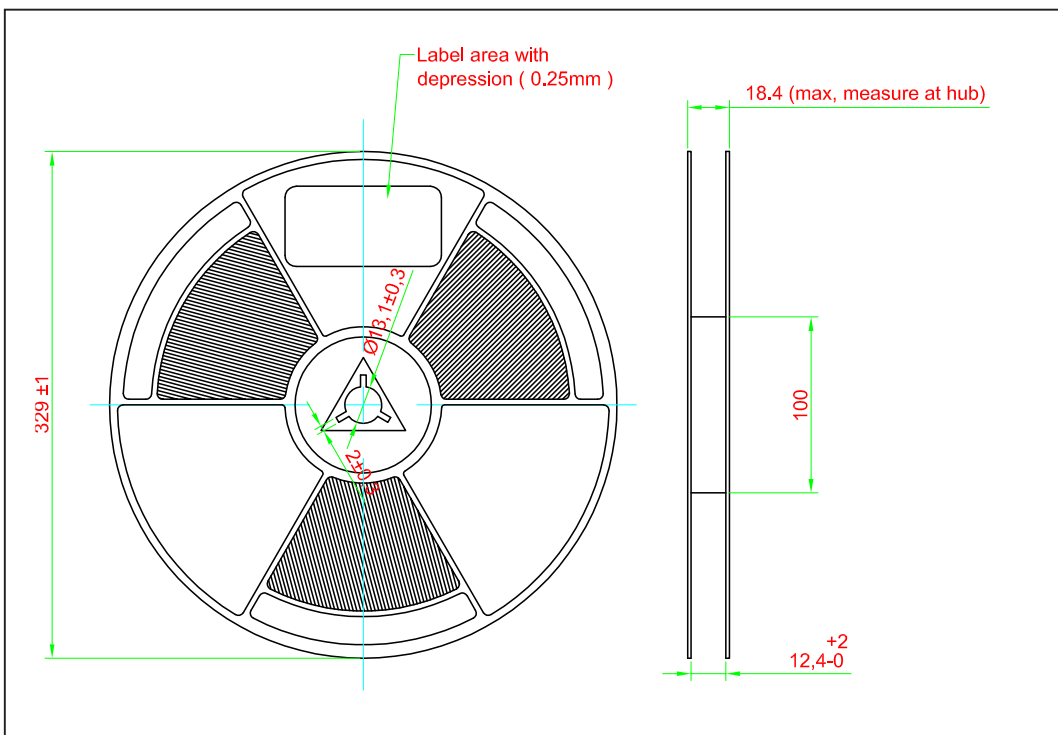
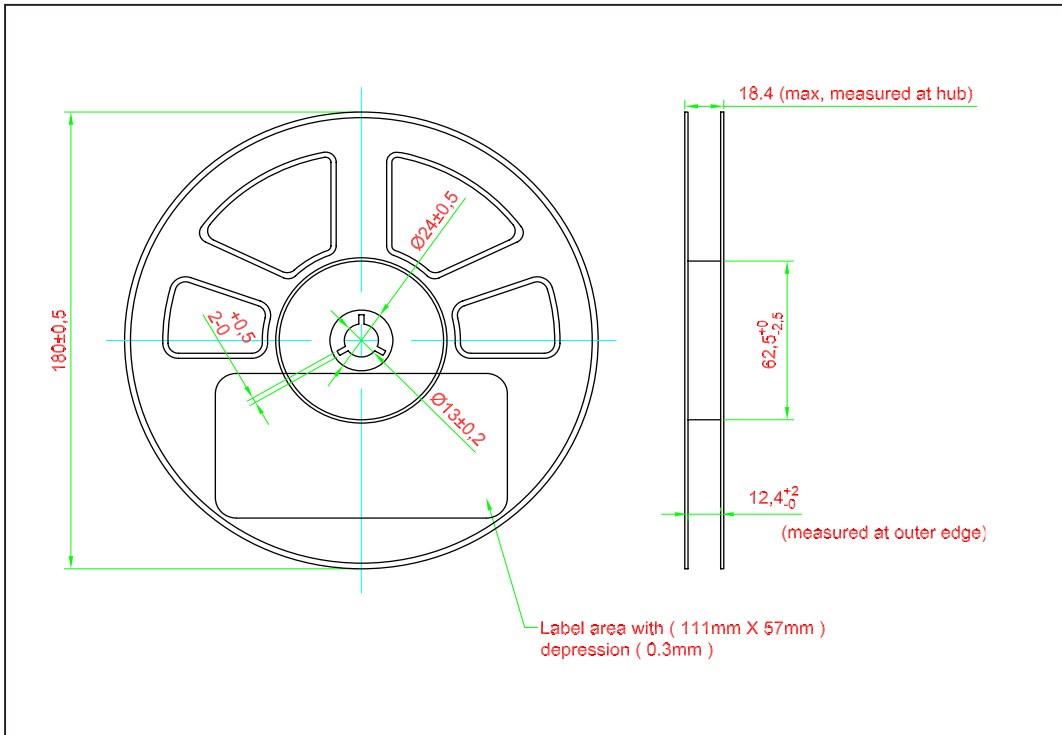


### Taping and orientation





**Packaging Specification**

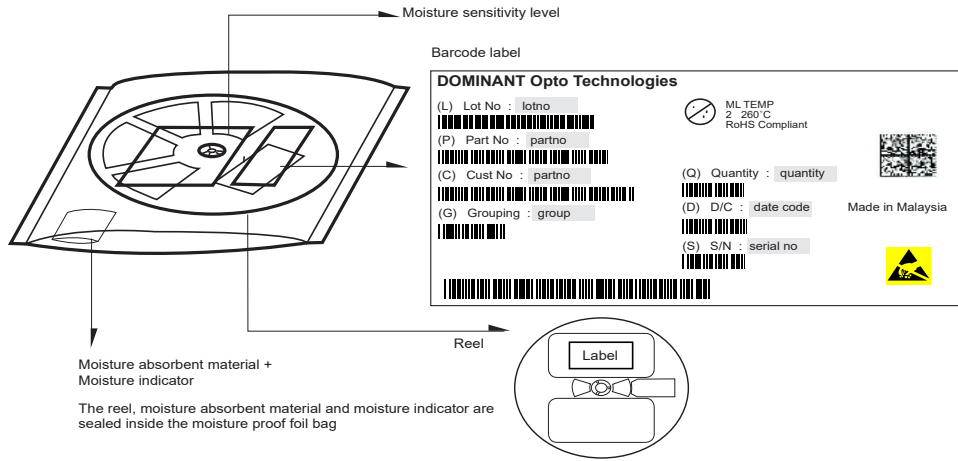


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MA94-TZHG-xxx-x
Optional Packing	329	5000	MA94-TZHG-xxx-x-5

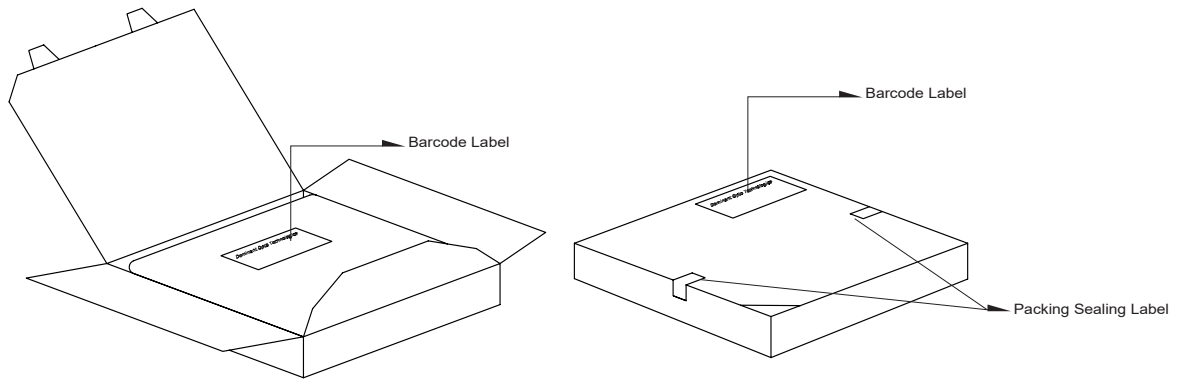
Notes:

\* For ordering purpose only. Please consult sales and marketing for details.

**Packaging Specification**



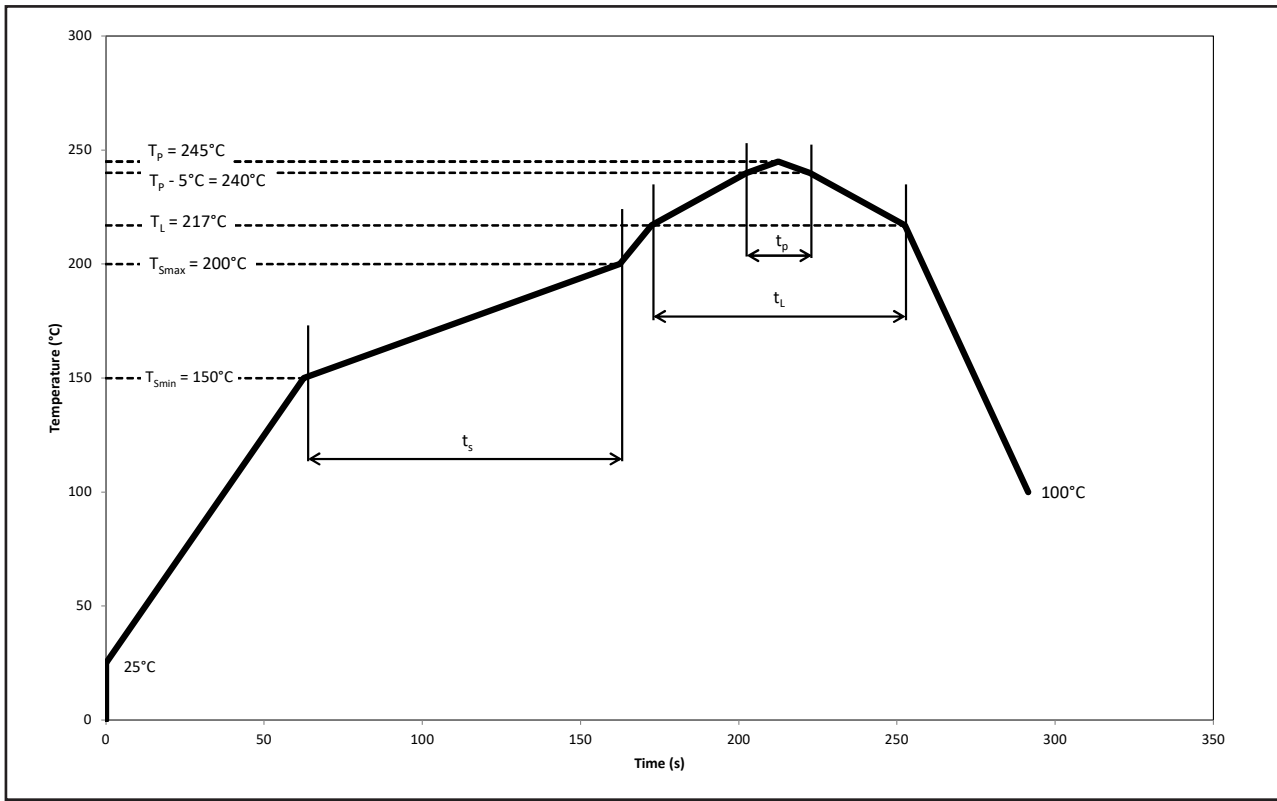
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



Reel Diameter (mm)	Packing Box Dimensions (mm)
180	210 x 210 x 20
329	345 x 345 x 20

## Recommended Pb-free Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



Profile Feature	Symbol	Pb-Free Assembly			Unit
		Min.	Recommended	Max.	
Ramp-up rate to preheat 25°C to $T_{smin}$	-	-	2	3	°C/s
Time $t_s$ $T_{smin}$ to $T_{smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak $T_L$ to $T_p$	-	-	2	3	°C/s
Liquidous temperature	$T_L$	-	217	-	°C
Time above liquidous temperature	$t_L$	60	80	150	s
Peak temperature	$T_p$	-	245	260	°C
Time within 5°C of the specified peak temperature $T_p - 5^\circ\text{C}$	$t_p$	10	20	30	s
Ramp-down rate $T_p$ to 100°C	-	-	3	6	°C/s
Time 25°C to $T_p$	-	-	-	480	s

## Appendix

### 1) **Brightness:**

- 1.1 Luminous intensity is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of  $k=3$ ).
- 1.2 Luminous flux is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of  $k=3$ ).
- 1.3 Radiant intensity is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of  $k=3$ ).
- 1.4 Radiant flux is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of  $k=3$ ).

### 2) **Color:**

- 2.1 Chromaticity coordinate groups are measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 0.005$  and an expanded uncertainty of  $\pm 0.01$  (accordingly to GUM with a coverage factor of  $k=3$ ).
- 2.2 Dominant wavelength is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 0.5\text{nm}$  and an expanded uncertainty of  $\pm 1\text{nm}$  (accordingly to GUM with a coverage factor of  $k=3$ ).

### 3) **Voltage:**

- 3.1 Forward Voltage,  $V_f$  is measured when a current pulse of 8 ms(typ) with an internal reproducibility of  $\pm 0.05\text{V}$  and an expanded uncertainty of  $\pm 0.1\text{V}$  (accordingly to GUM with a coverage factor of  $k=3$ ).

### 4) **Typical Values:**

- 4.1 At special conditions of LED manufacturing processes, typical data or calculated correlations of technical parameters only reflect the statistical figures. But not necessarily correspond to the actual parameters of each single product, which could differ from the typical data or calculated correlations or the typical characteristic line. These typical data may change whenever technical improvements happen.

### 5) **Tolerance of Measure**

- 5.1 Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimension are specific in mm.

**Revision History**

Page	Subjects	Date of Modification
-	Initial Release	07 Mar 2019
9, 10, 11	Update Packaging Specification Update Recommended Pb-free Soldering Profile	28 Mar 2022
9, 10	Update Quantity per Reel: 1000pcs to 1500pcs	01 Nov 2023

**NOTE**

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**Please contact us for more information:**

DOMINANT Opto Technologies Sdn. Bhd.  
Lot 6, Batu Berendam, FTZ Phase III, 75350 Melaka, Malaysia  
Tel: (606) 283 3566 Fax: (606) 283 0566  
E-mail: [sales@dominant-semi.com](mailto:sales@dominant-semi.com)

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