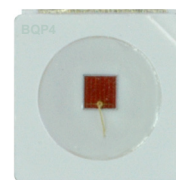


Primax

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
- > 115° 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.
- > Compliance to automotive standard; AEC-Q101.



Applications:

- > Industrial: White goods (eg: Oven, Microwave), Light bar, Illuminated advertising.
- > Automotive: interior applications, eg: switches, telematics, climate control system, dashboard, etc.
- > Automotive: exterior applications, eg: signal lighting, Center High Mounted Stop Light (CHMSL), Rear Combination Lamp (RCL).



Optical Characteristics at Tj=25°C

Part Number	Color	Viewing Angle°	Luminous Flux @ 350mA (lm) <i>Appx. 1.2</i>		
			Min.	Typ.	Max.
● MAA-PHG-S2T3-1	Amber, 615nm	115	51.7	67.2	87.4
● MAA-PHG-Q3S2-1	Amber, 615nm	115	34.8	48.0	59.0
● Not for new design					

Electrical Characteristics at Tj=25°C

Part Number	Min. (V)	Vf @ If = 350 mA <i>Appx. 3.1</i>		Vr @ Ir = 10 uA <i>Appx. 6.1</i>	
		Typ. (V)	Max. (V)	Min. (V)	
MAx-PHG	2.05	2.45	2.80	12	

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	400	mA
Peak pulse current (tp<=10ms, Duty cycle=0.10)	750	mA
Reverse Voltage <i>Appx. 6.1</i>	12	V
ESD threshold (HBM)	2000	V
LED junction temperature	150	°C
Operating temperature	-40 ... +125	°C
Storage temperature	-40 ... +125	°C
Thermal resistance		
- Real Thermal Resistance		
Junction / solder point, Rth JS real (typ = 16)	23	K/W
- Electrical Thermal Resistance		
Junction / solder point, Rth JS el (typ = 12)	17	K/W

Wavelength Grouping at Tj=25⁰C

Color	Group	Wavelength distribution (nm) <i>Appx. 2.2</i>
MAA; Amber	Full	612 - 624
	W	612 - 616
	X	616 - 620
	Y	620 - 624

Luminous Flux at Tj=25⁰C

Brightness Group	Luminous Flux @ If=350mA (lm) <i>Appx. 1.2</i>
Q3	34.8 ... 39.8
R2	39.8 ... 45.2
R3	45.2 ... 51.7
S2	51.7 ... 59.0
S3	59.0 ... 67.2
T2	67.2 ... 76.5
T3	76.5 ... 87.4

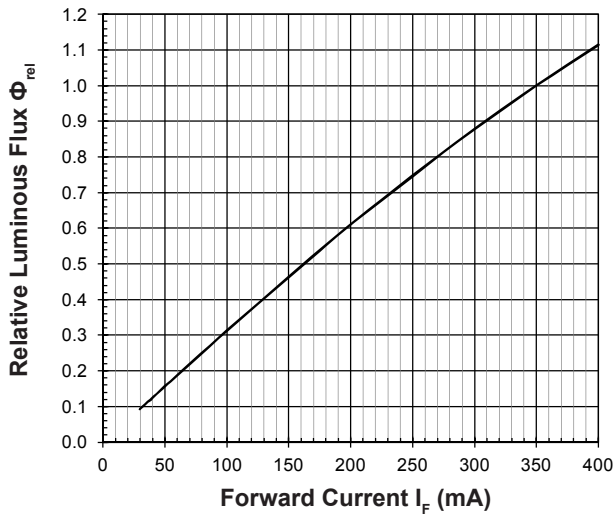
Vf Binning (Optional)

Vf Bin @ 350mA	Forward Voltage (V) <i>Appx. 3.1</i>
V2	2.05 ... 2.20
V3	2.20 ... 2.35
V4	2.35 ... 2.50
V5	2.50 ... 2.65
V6	2.65 ... 2.80

Please consult sales and marketing for special part number to incorporate Vf binning.

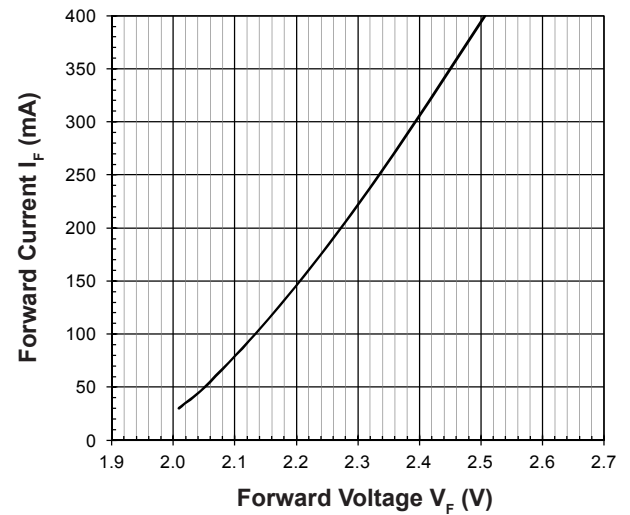
Relative Luminous Flux Vs Forward Current

$$\Phi_v/\Phi_v(350\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$$



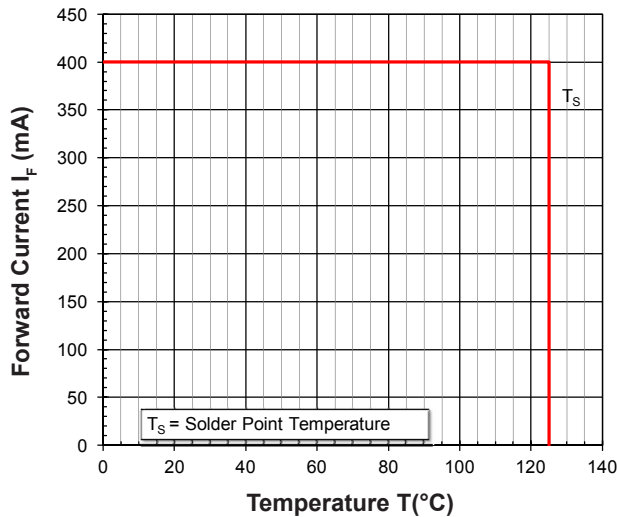
Forward Current Vs Forward Voltage

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



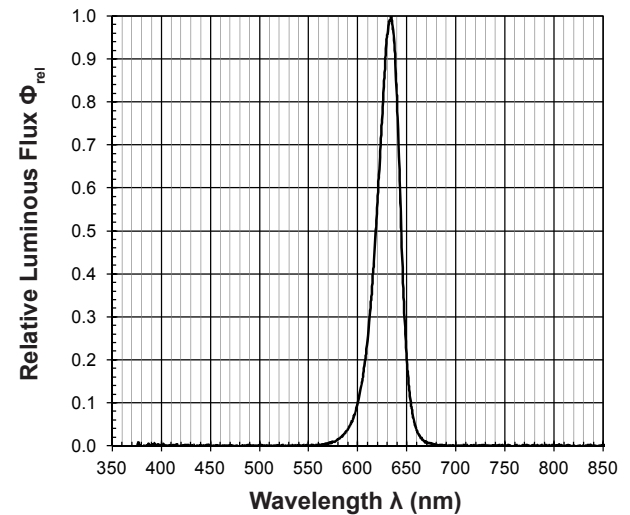
Maximum Current Vs Temperature

$$I_F = f(T)$$



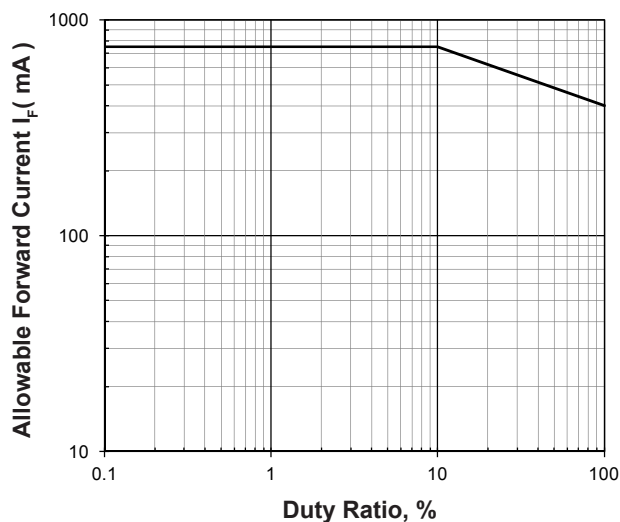
Relative Spectral Emission

$$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 350\text{mA}$$

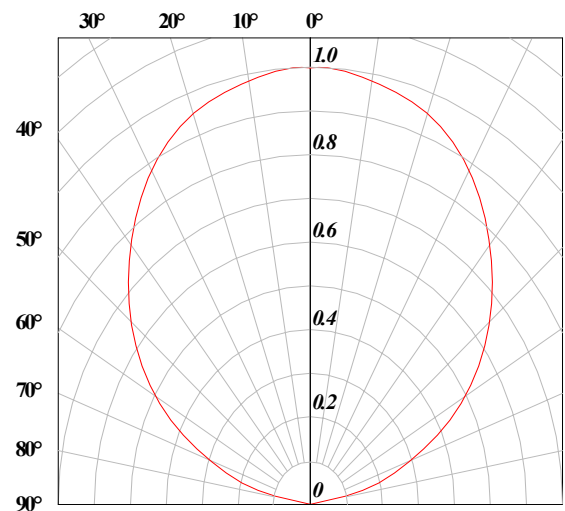


Allowable Forward Current Vs Duty Ratio

$$(T_j = 25^\circ\text{C}; t_p \leq 10\mu\text{s})$$

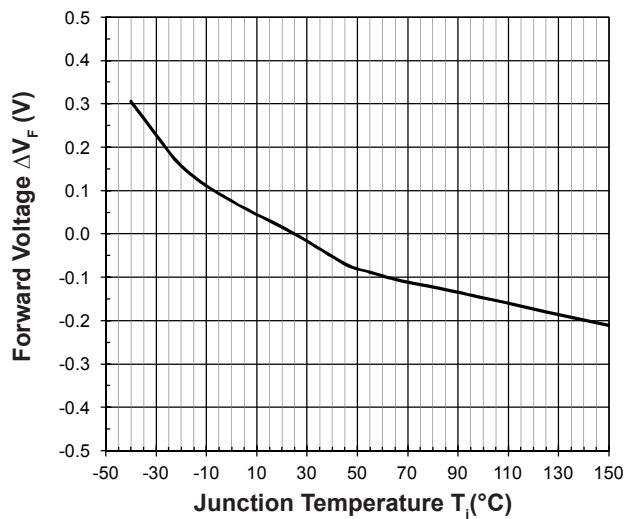


Radiation Pattern



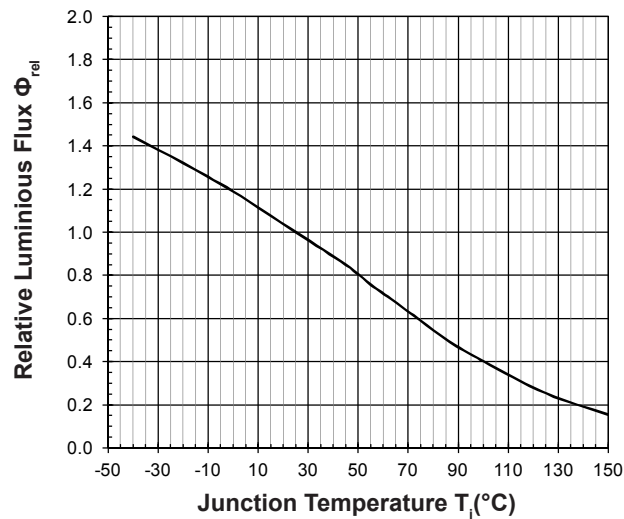
Forward Voltage Vs Junction Temperature

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$



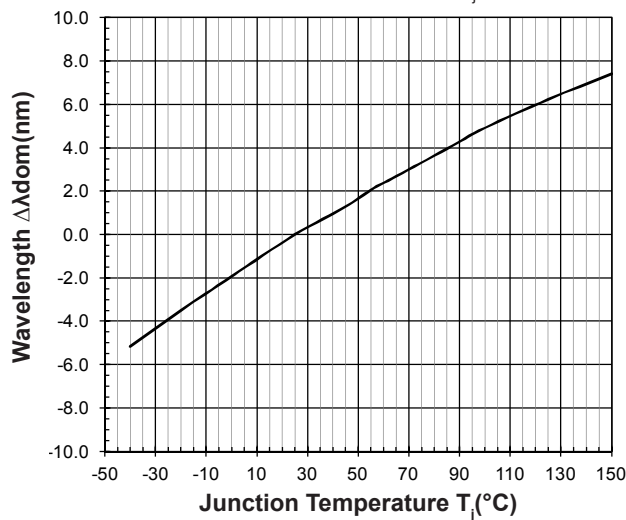
Relative Luminous Flux Vs Junction Temperature

$$\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$

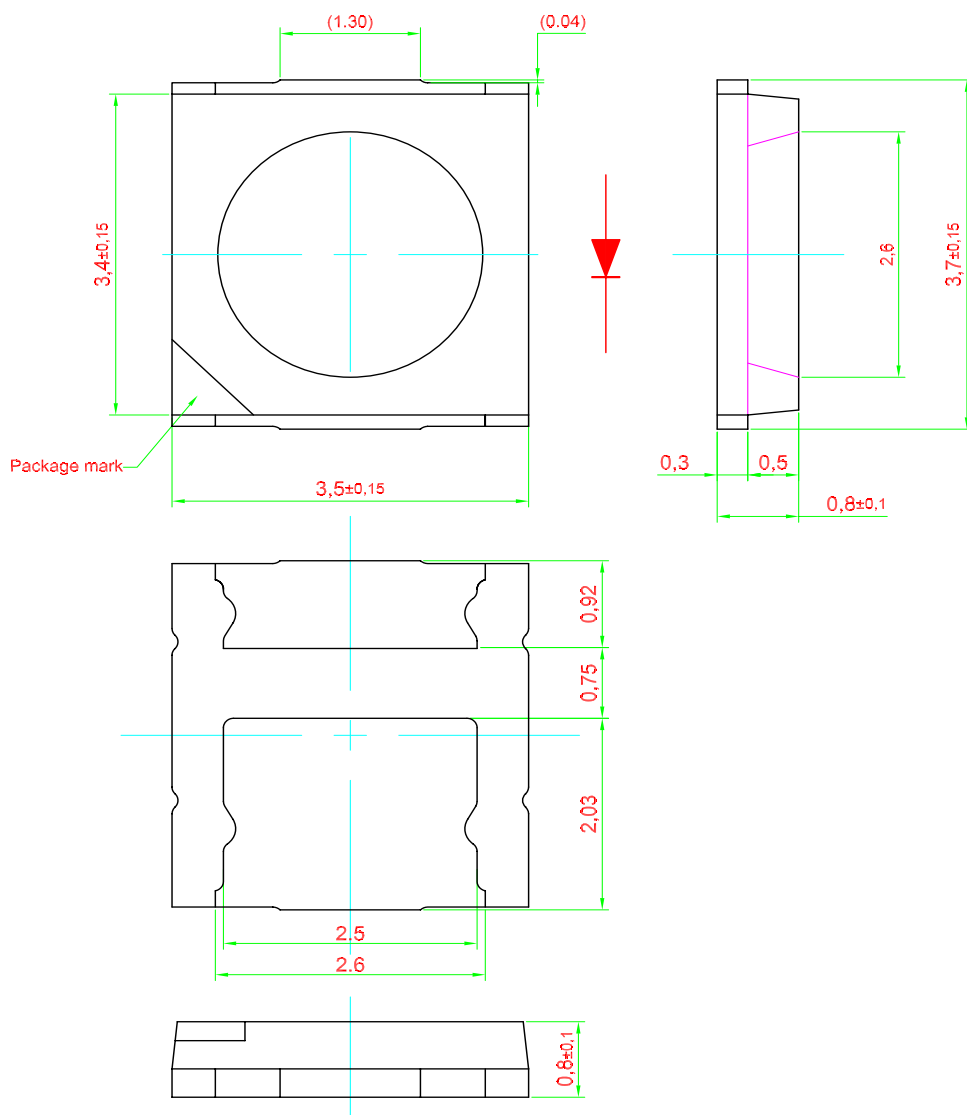


Wavelength Vs Junction Temperature

$$\Delta \lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$



PrimaxPlus • AlInGaP: Mx-PHG Package Outlines

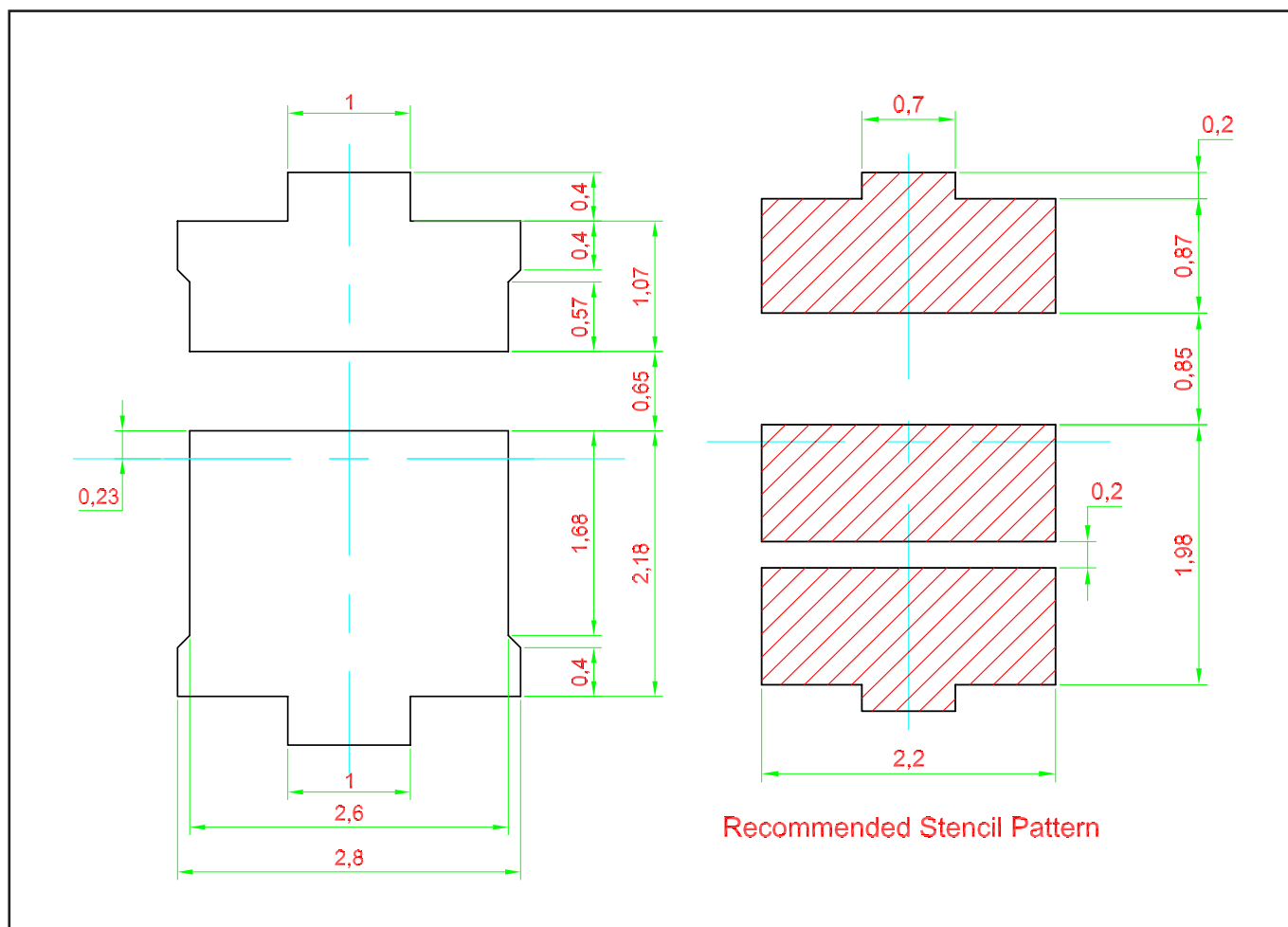


Notes:
Primary thermal path is through Cathode lead of LED package.
General tolerance: +/- 0.1mm.

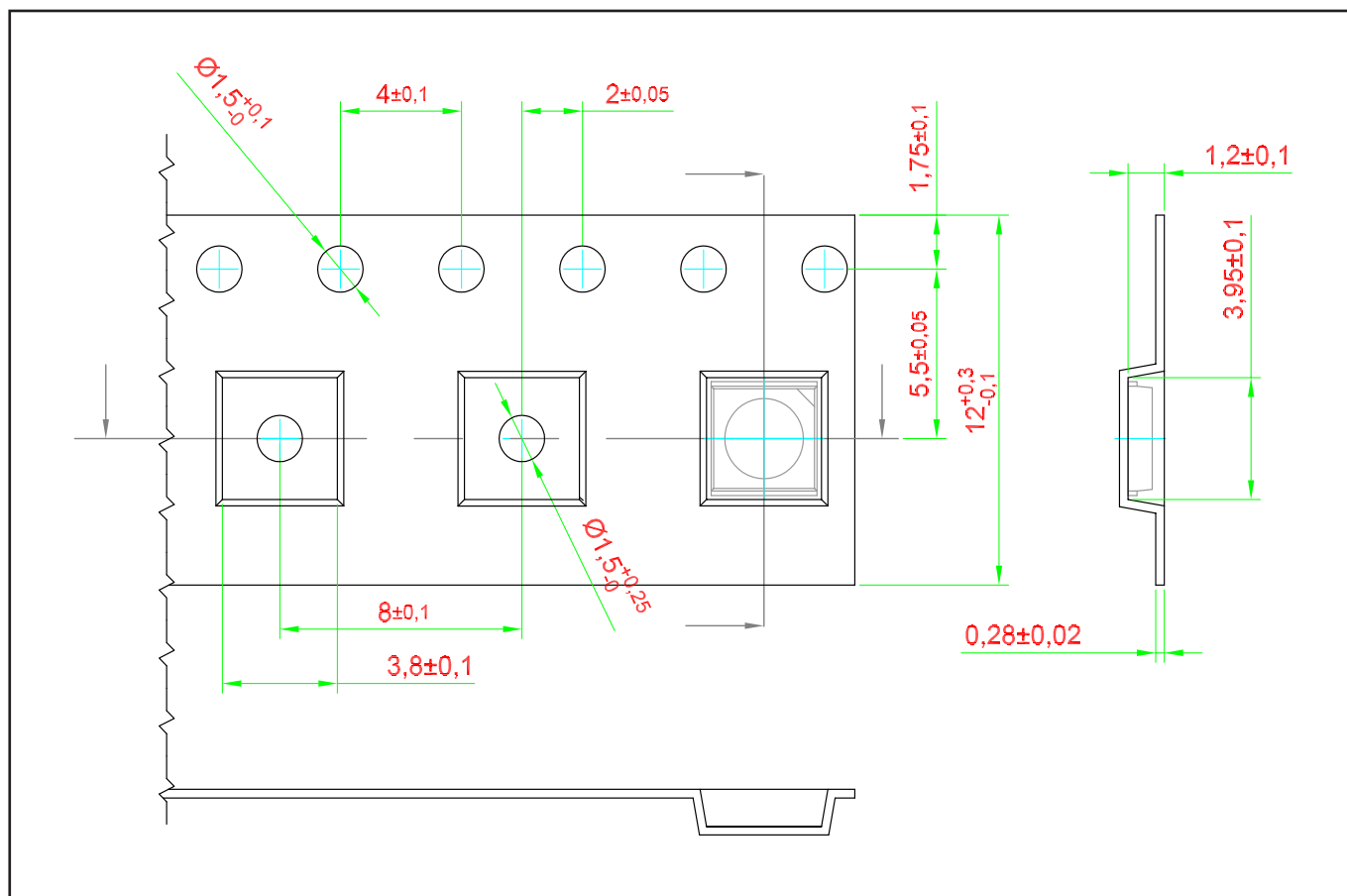
Material

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

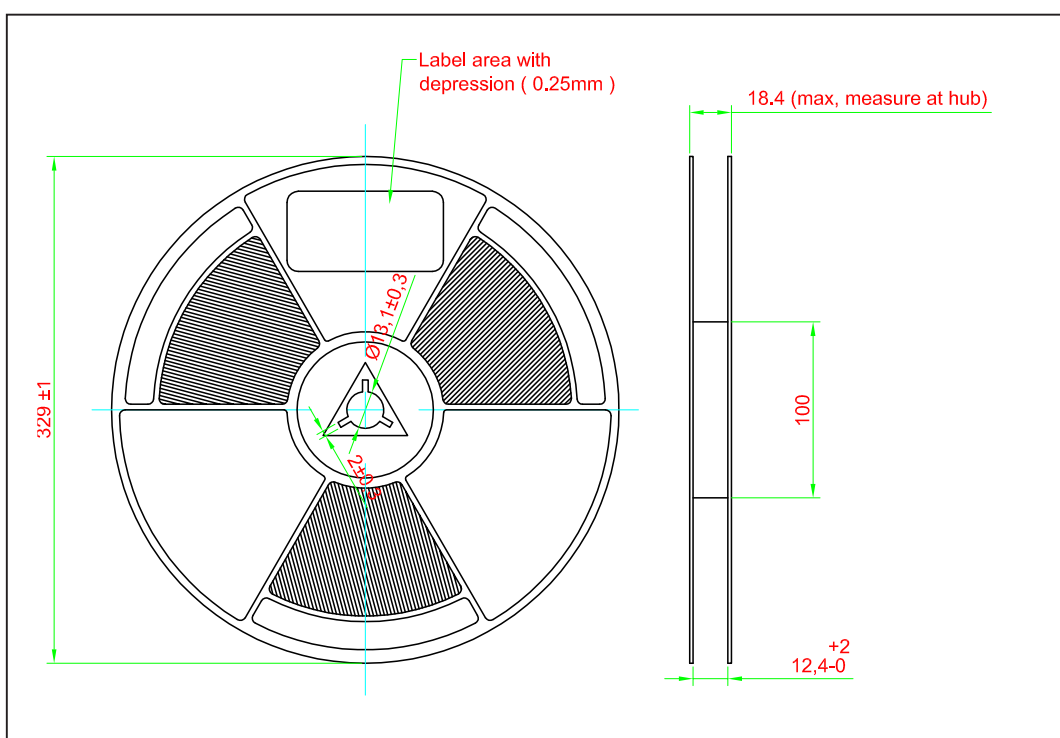
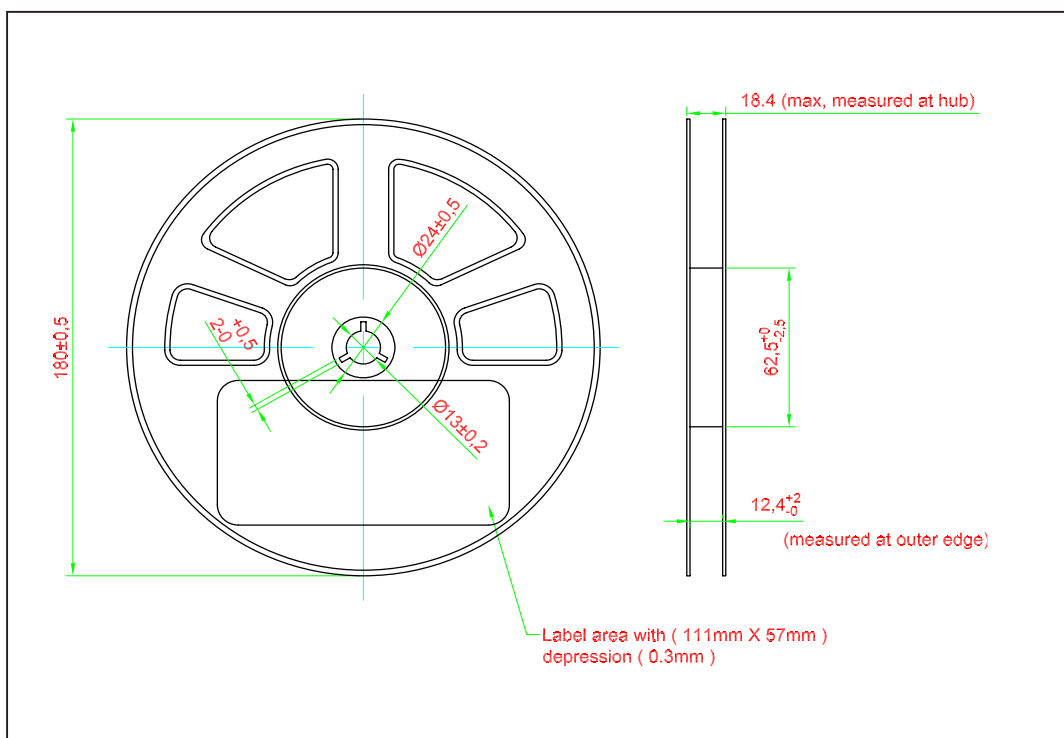
Recommended Solder Pad



Taping and orientation



Packaging Specification

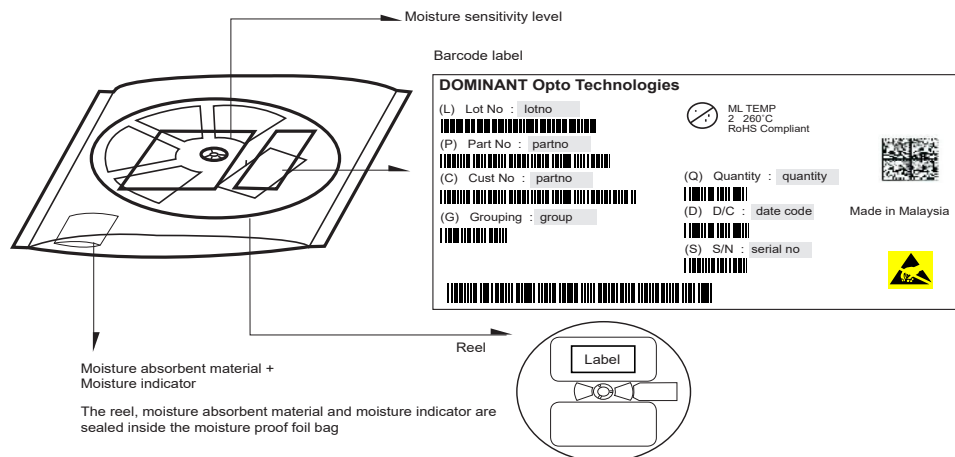


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MAx-PHG-xxx-x
Optional Packing	329	5000	MAx-PHG-xxx-x-5

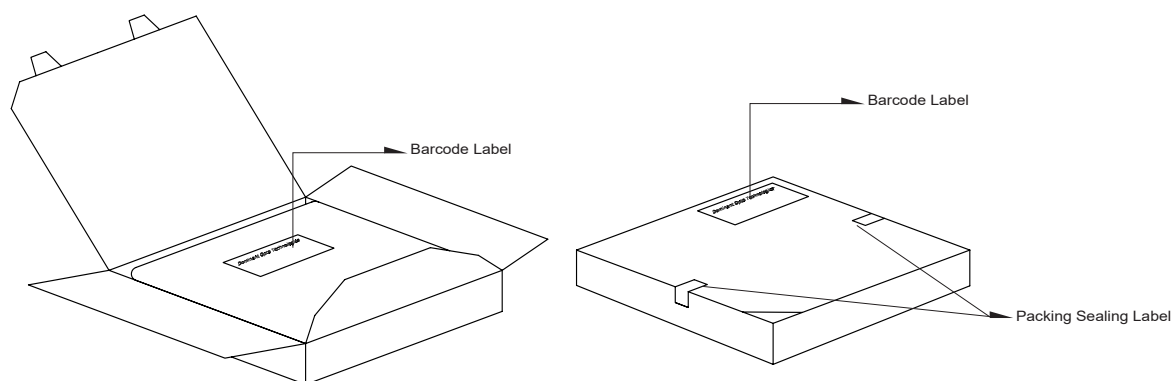
Notes:

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

Packaging Specification



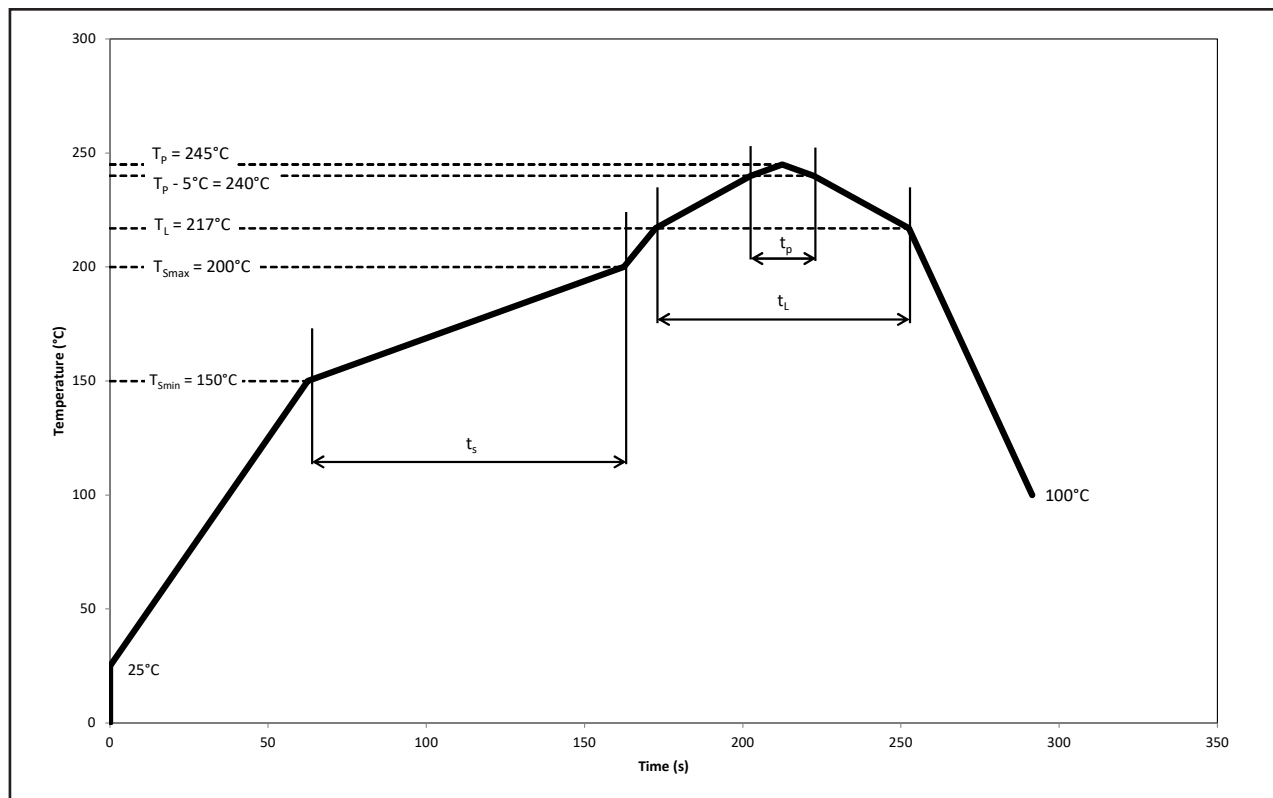
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



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	$^\circ\text{C/s}$
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	$^\circ\text{C/s}$
Liquidous temperature	T_L	-	217	-	$^\circ\text{C}$
Time above liquidous temperature	t_L	60	80	150	s
Peak temperature	T_p	-	245	260	$^\circ\text{C}$
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	$^\circ\text{C/s}$
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 ± 0.005 and an expanded uncertainty of ± 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 ± 0.1 and dimension are specified in mm.

6) **Reverse Voltage:**

- 6.1 Not designed for reverse operation. Continuous reverse voltage can cause migration and LED damage.

Revision History

Page	Subjects	Date of Modification
1, 4, 5	Update Features Typo error on Luminous Flux Update Graph: Relative Intensity Vs Forward Current	14 Apr 2015
1, 5, 6, 10	Add Application Update Graph: Relative Flux Vs Forward Current & Forward Current Vs Forward Voltage Add Graph: Dominant Wavelength Shift Vs Forward Current Add Notes in Package Outline Update Package Specification	29 Feb 2016
6, 7, 12	Update Package Outline Typo Error on Materials Update Recommended Solder Pad Add Appendix	17 Mar 2017
6	Update Package Outline	17 May 2017
2, 4, 5	Update Thermal Resistance Update Graph	08 Sep 2017
2, 12	Not For New Design: MAA-PHG-S2T3-1 Update Appendix	16 Mar 2018
9, 10, 11	Update Packaging Specification Update Recommended Pb-free Soldering Profile	11 Mar 2022
9, 10	Update Quantity per Reel: 1000pcs to 1500pcs	01 Nov 2023

NOTE

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