

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 (3.7 x 3.5 x 0.8 mm) 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.
- > Environmental friendly; RoHS compliance.
- > Superior corrosion resistance.
- > Minimum CRI of 90.
- > Compliance to automotive standard; AEC-Q102.



Applications:

- > Automotive Interior Lighting: eg: Dome Lamp, Map Lighting, Trunk Lighting.
- > Industrial Illumination.
- > White Goods Lighting.

Optical Characteristics at Tj=25°C

Part Number	Color	Viewing Angle°	Luminous Flux @ 150mA (lm) <i>Appx. 1.2</i>		
			Min.	Typ.	Max.
● MAW-EHJ-Q3R-5C8I	White	120	34.80	45.20	51.70

● Not for new design

Notes:

1. High color rendering index (CRI). Minimum CRI of 90.

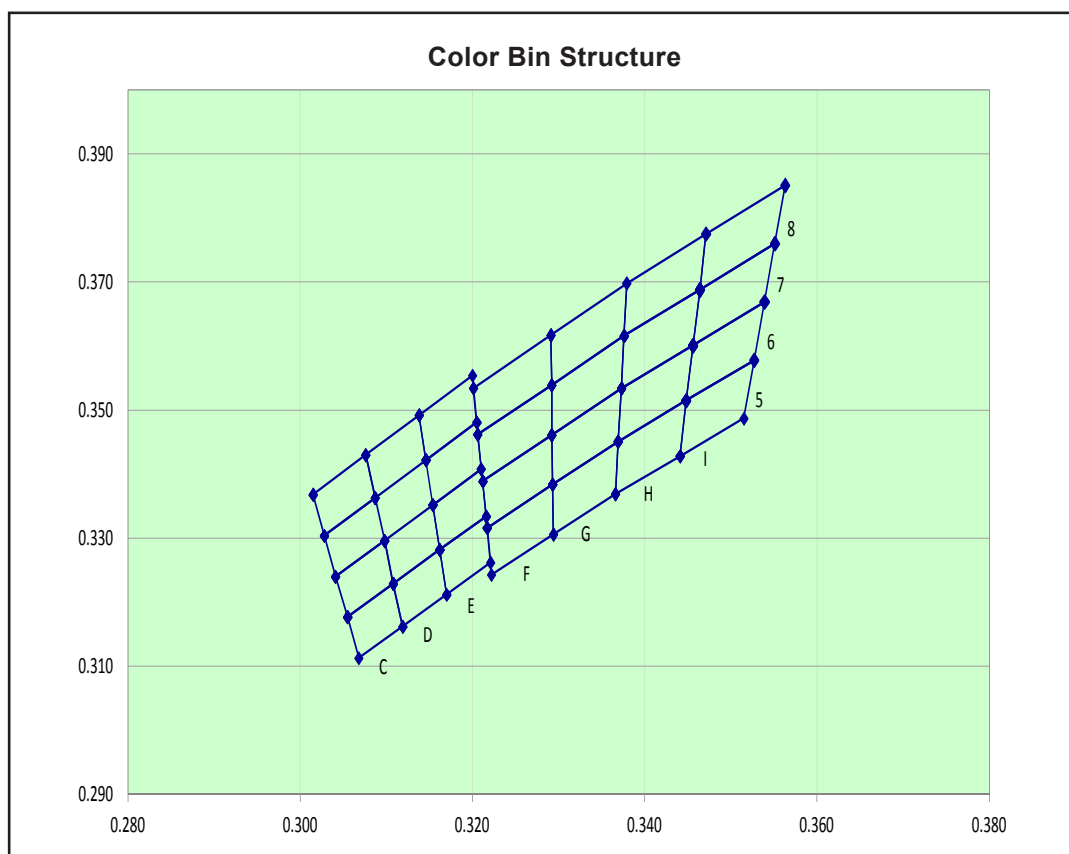
Electrical Characteristics at Tj=25°C

Part Number	Vf @ If = 150 mA <i>Appx. 3.1</i>			Vr @ Ir = 10uA <i>Appx. 6.1</i>
	Min. (V)	Typ. (V)	Max. (V)	Min. (V)
MAW-EHJ	2.80	3.10	3.40	5

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	250	mA
Peak pulse current (tp<=100µs, Duty cycle=0.03, Ts=55°C)	500	mA
Reverse voltage <i>Appx. 6.1</i>	5	V
ESD threshold (HBM)	2	kV
LED junction temperature	150	°C
Operating temperature	-40 ... +125	°C
Storage temperature	-40 ... +125	°C
Thermal resistance (Rated current = 150mA, Ts = 25 °C)		
- Real Thermal Resistance		
Junction / solder point, Rth JS real (typ = 25)	30	K/W
- Electrical Thermal Resistance		
Junction / solder point, Rth JS el (typ = 18)	21	K/W

MAW-EHJ, Color Grouping *Appx. 2.1*



Bin		1	2	3	4
5C	Cx	0.3055	0.3108	0.3119	0.3068
	Cy	0.3177	0.3229	0.3162	0.3113
6C	Cx	0.3041	0.3098	0.3108	0.3055
	Cy	0.3240	0.3296	0.3229	0.3177
7C	Cx	0.3028	0.3087	0.3098	0.3041
	Cy	0.3304	0.3363	0.3296	0.3240
8C	Cx	0.3015	0.3076	0.3087	0.3028
	Cy	0.3368	0.3430	0.3363	0.3304
5D	Cx	0.3108	0.3162	0.3170	0.3119
	Cy	0.3229	0.3282	0.3212	0.3162
6D	Cx	0.3098	0.3154	0.3162	0.3108
	Cy	0.3296	0.3352	0.3282	0.3229
7D	Cx	0.3087	0.3146	0.3154	0.3098
	Cy	0.3363	0.3422	0.3352	0.3296
8D	Cx	0.3076	0.3138	0.3146	0.3087
	Cy	0.3430	0.3492	0.3422	0.3363
5E	Cx	0.3162	0.3216	0.3221	0.3170
	Cy	0.3282	0.3334	0.3262	0.3212
6E	Cx	0.3154	0.3210	0.3216	0.3162
	Cy	0.3352	0.3408	0.3334	0.3282
7E	Cx	0.3146	0.3205	0.3210	0.3154
	Cy	0.3422	0.3481	0.3408	0.3352
8E	Cx	0.3138	0.3200	0.3205	0.3146
	Cy	0.3492	0.3554	0.3481	0.3422

Bin		1	2	3	4
5F	Cx	0.3217	0.3293	0.3294	0.3222
	Cy	0.3316	0.3384	0.3306	0.3243
6F	Cx	0.3212	0.3292	0.3293	0.3217
	Cy	0.3389	0.3461	0.3384	0.3316
7F	Cx	0.3206	0.3212	0.3292	0.3292
	Cy	0.3462	0.3389	0.3461	0.3539
8F	Cx	0.3201	0.3291	0.3292	0.3206
	Cy	0.3534	0.3617	0.3539	0.3462
5G	Cx	0.3293	0.3294	0.3366	0.3369
	Cy	0.3384	0.3306	0.3369	0.3451
6G	Cx	0.3292	0.3293	0.3369	0.3373
	Cy	0.3461	0.3384	0.3451	0.3534
7G	Cx	0.3292	0.3292	0.3376	0.3373
	Cy	0.3461	0.3539	0.3616	0.3534
8G	Cx	0.3291	0.3292	0.3376	0.3379
	Cy	0.3617	0.3539	0.3616	0.3698
5H	Cx	0.3366	0.3369	0.3448	0.3441
	Cy	0.3369	0.3451	0.3515	0.3428
6H	Cx	0.3369	0.3373	0.3456	0.3448
	Cy	0.3451	0.3534	0.3601	0.3515
7H	Cx	0.3373	0.3376	0.3464	0.3456
	Cy	0.3534	0.3616	0.3688	0.3601
8H	Cx	0.3376	0.3379	0.3471	0.3464
	Cy	0.3616	0.3698	0.3775	0.3688
5I	Cx	0.3441	0.3448	0.3527	0.3515
	Cy	0.3428	0.3515	0.3578	0.3487
6I	Cx	0.3448	0.3456	0.3539	0.3527
	Cy	0.3515	0.3601	0.3669	0.3578
7I	Cx	0.3456	0.3464	0.3551	0.3539
	Cy	0.3601	0.3688	0.3760	0.3669
8I	Cx	0.3464	0.3471	0.3563	0.3551
	Cy	0.3688	0.3775	0.3851	0.3760

InGaN wavelength is very sensitive to drive current. Operating at lower current is not recommended and may yield unpredictable performance. Current pulsing should be used for dimming purposes.

Luminous Flux Group at Tj=25°C

Brightness Group	Luminous Flux (lm) <i>Appx. 1.2</i>
Q3	34.8 ... 39.8
R2	39.8 ... 45.2
R3	45.2 ... 51.7

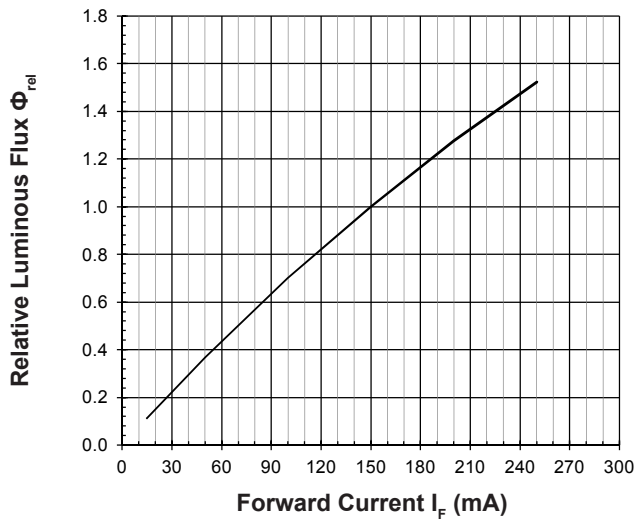
Vf Binning (Optional)

Vf Bin @ 150mA	Forward Voltage (V) <i>Appx. 3.1</i>
VR7	2.80 ... 3.10
VR8	3.10 ... 3.40

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

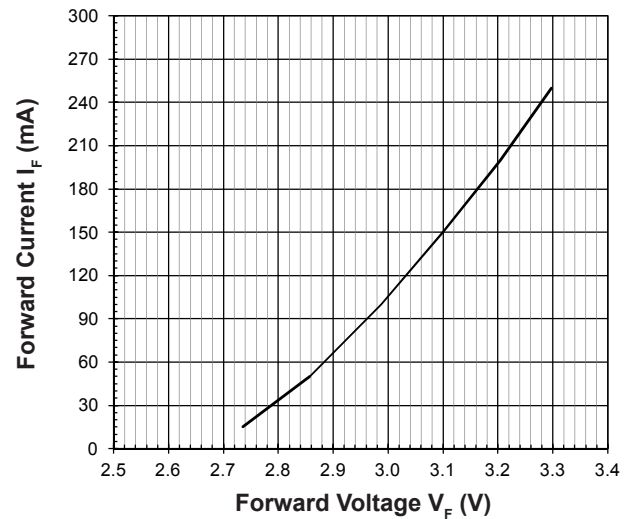
Relative Luminous Flux Vs Forward Current

$$\Phi_v/\Phi_v(150\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$$



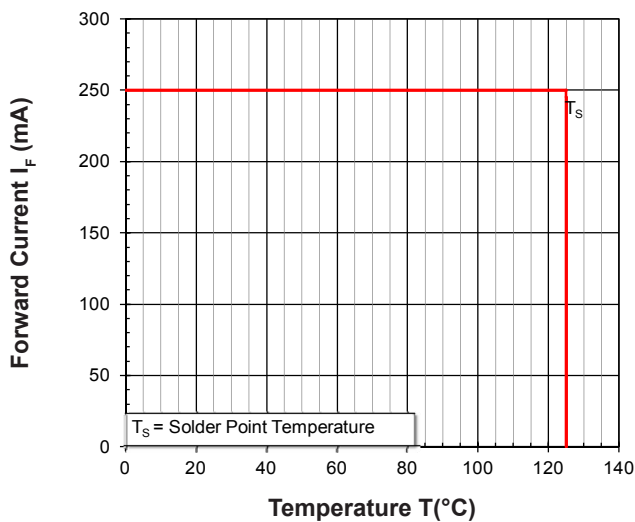
Forward Current Vs Forward Voltage

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



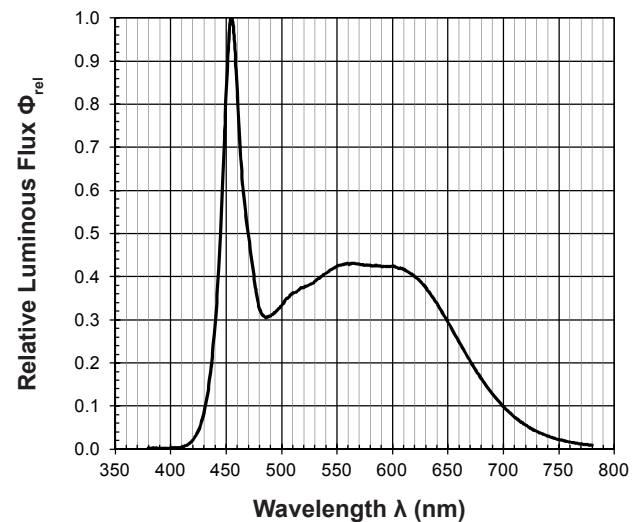
Maximum Current Vs Temperature

$$I_F = f(T)$$



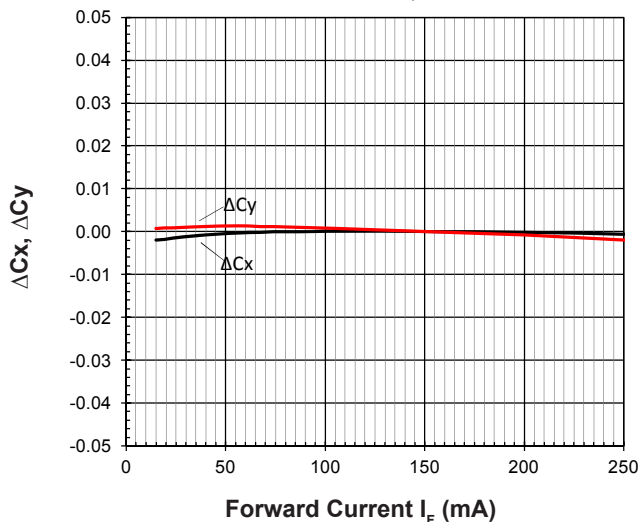
Relative Spectral Emission

$$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 150\text{mA}$$



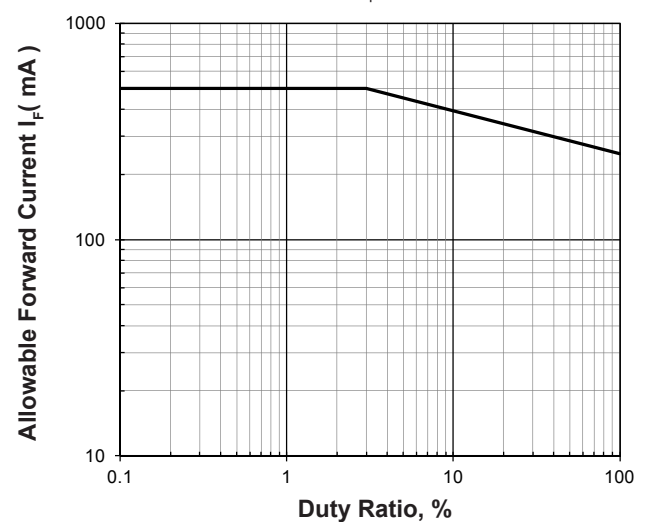
Chromaticity Coordinate Shift Vs Forward Current

$$\Delta Cx, \Delta Cy = f(I_F); T_j = 25^\circ\text{C}$$

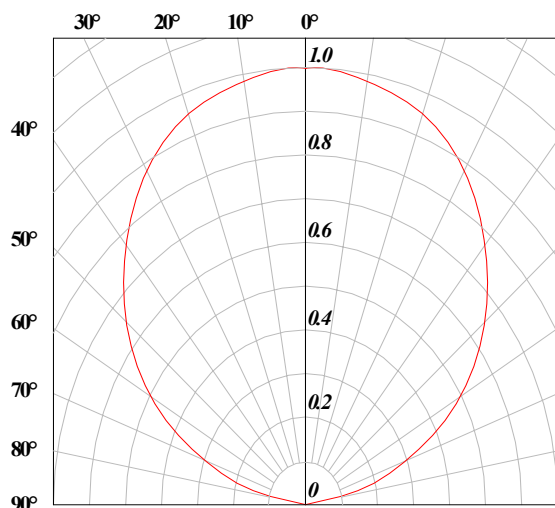


Allowable Forward Current Vs Duty Ratio

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

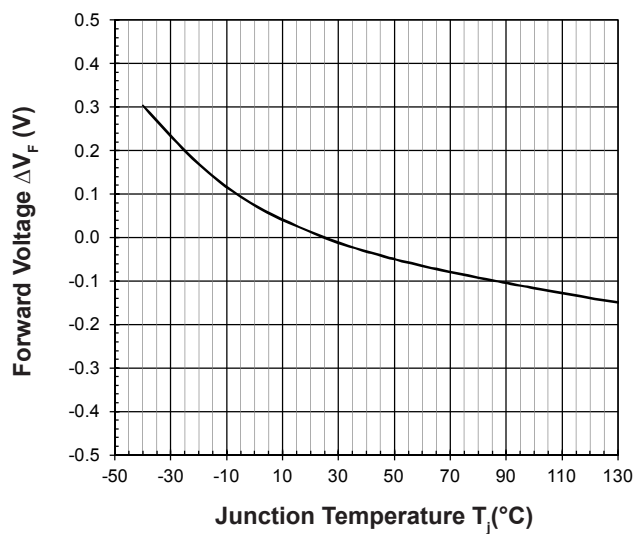


Radiation Pattern



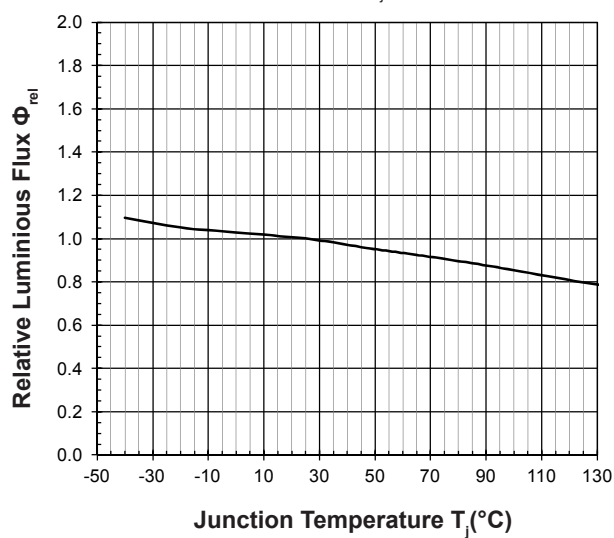
Forward Voltage Vs Junction Temperature

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 150\text{mA}$$



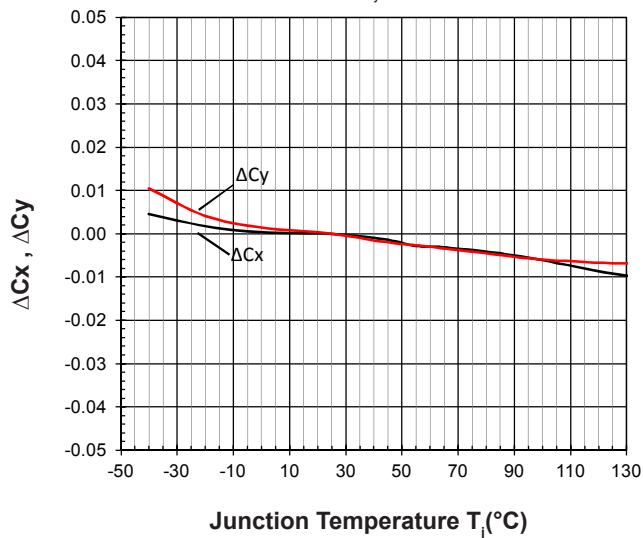
Relative Luminous Flux Vs Junction Temperature

$$\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j); I_F = 150\text{mA}$$

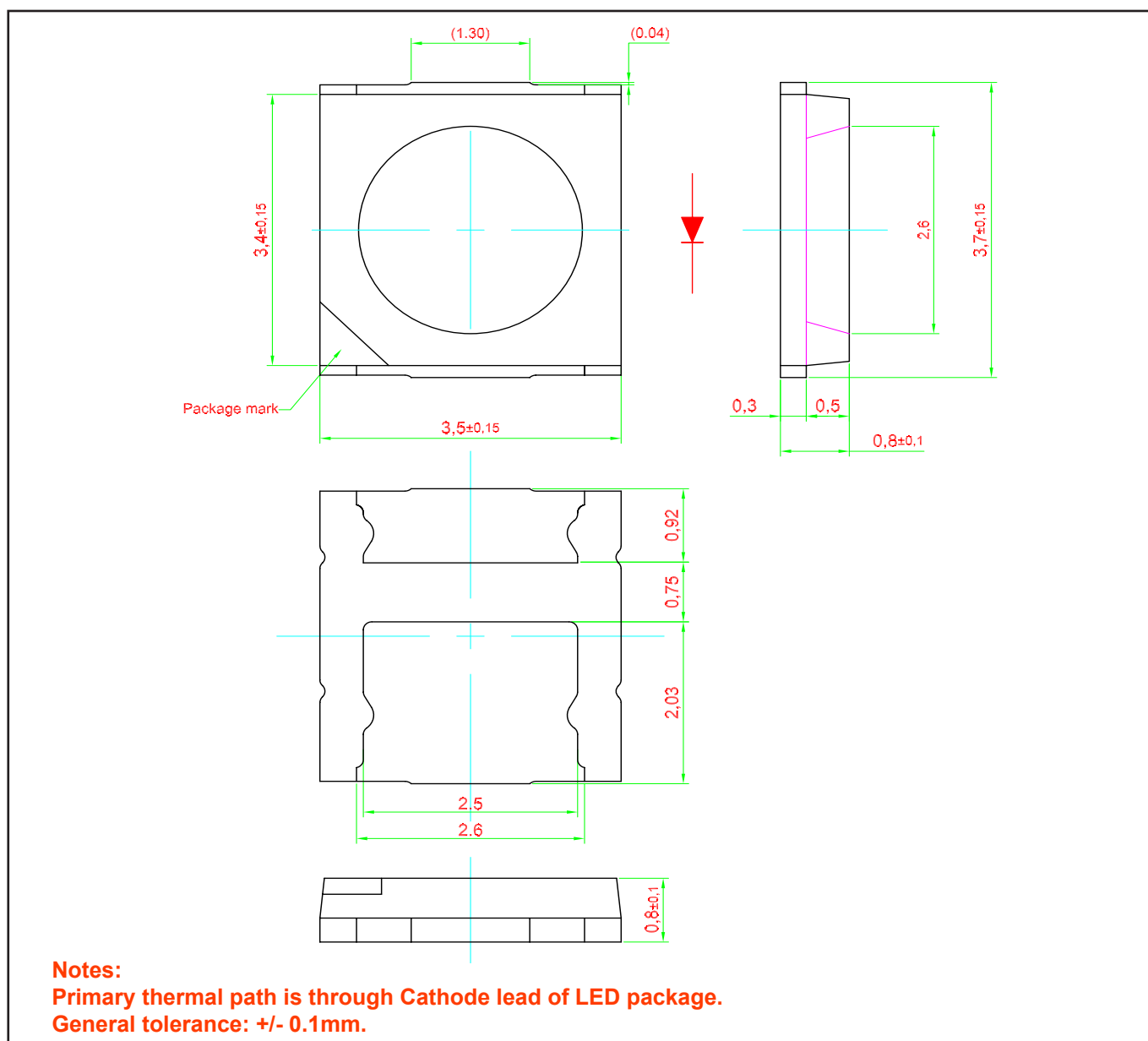


Chromaticity Coordinate Shift Vs Junction Temperature

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 150\text{mA}$$



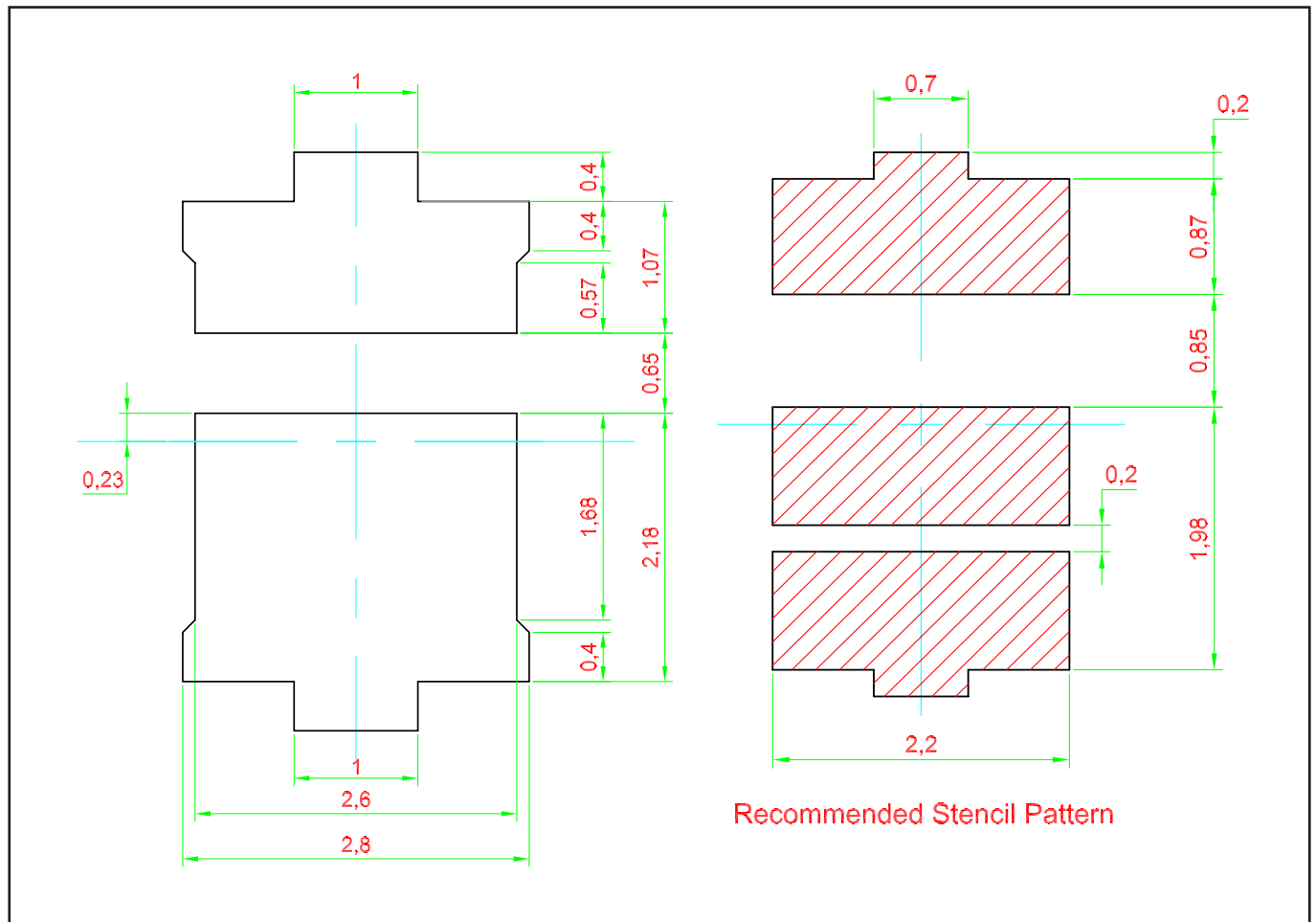
PrimaxPlus • InGaN : MAW-EHJ Package Outlines



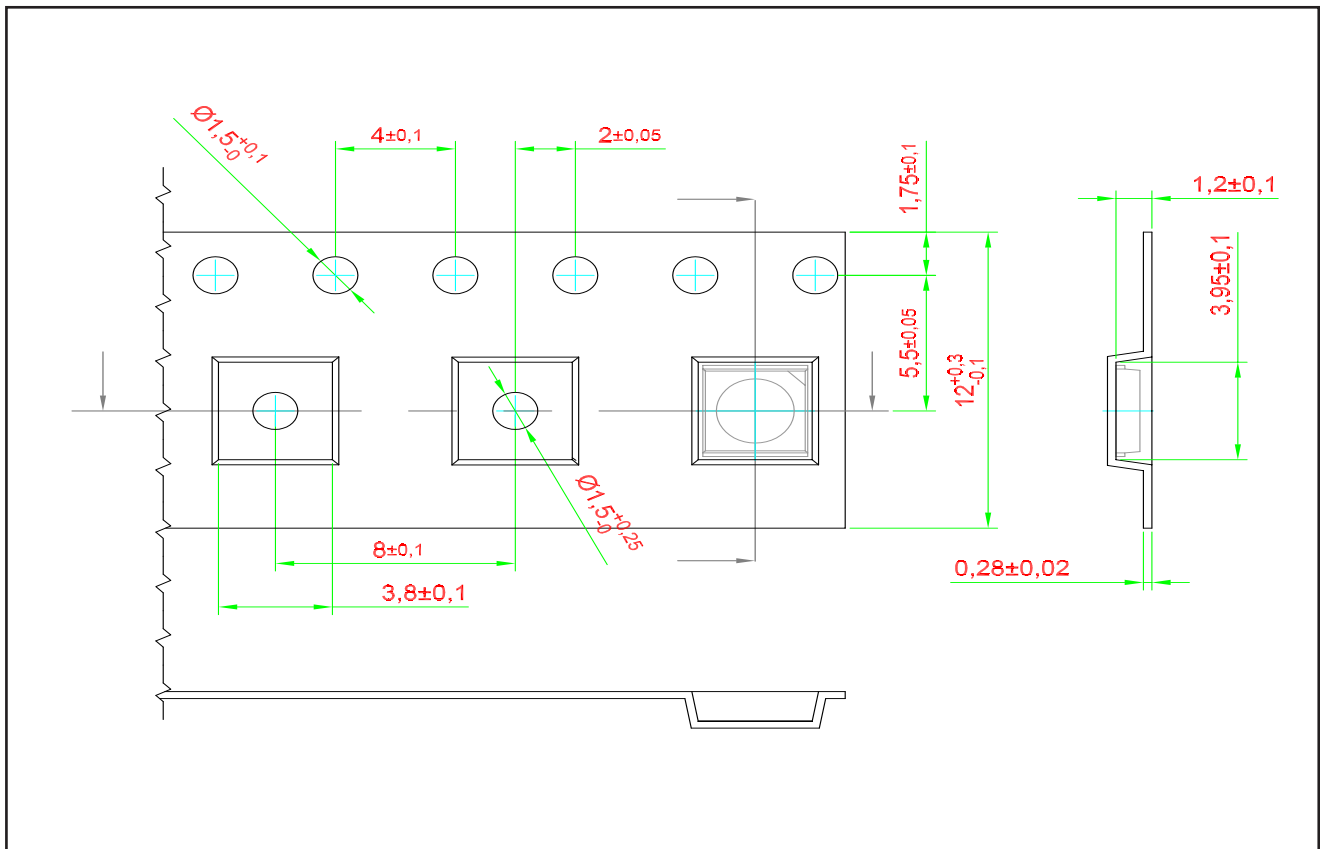
Material

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

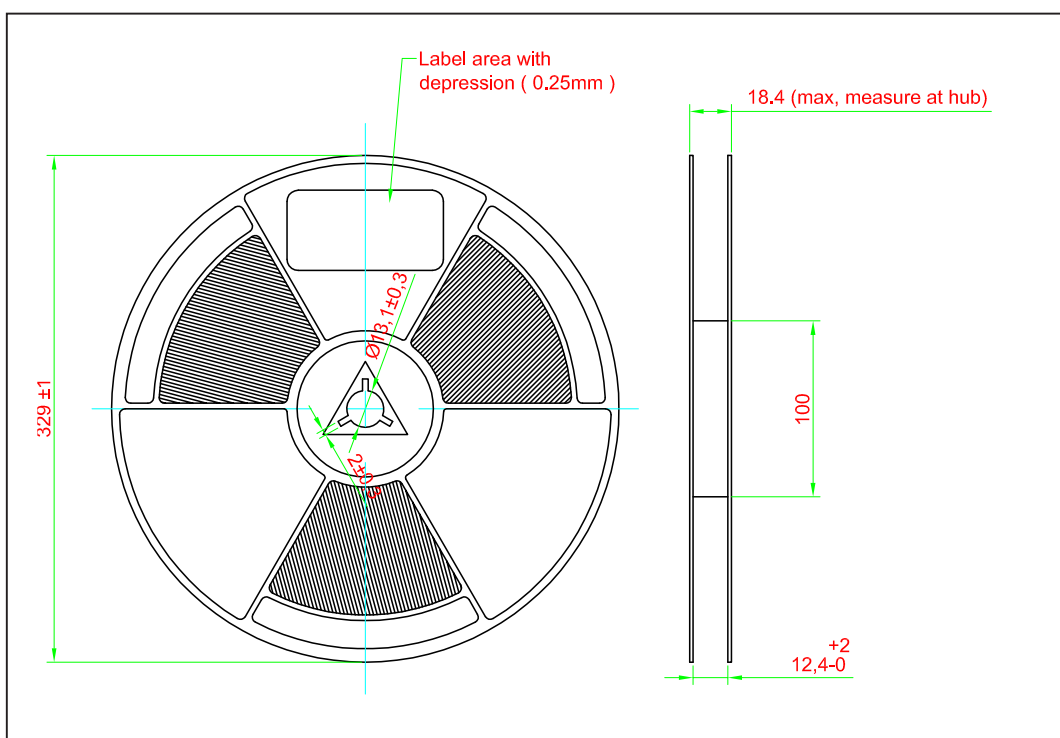
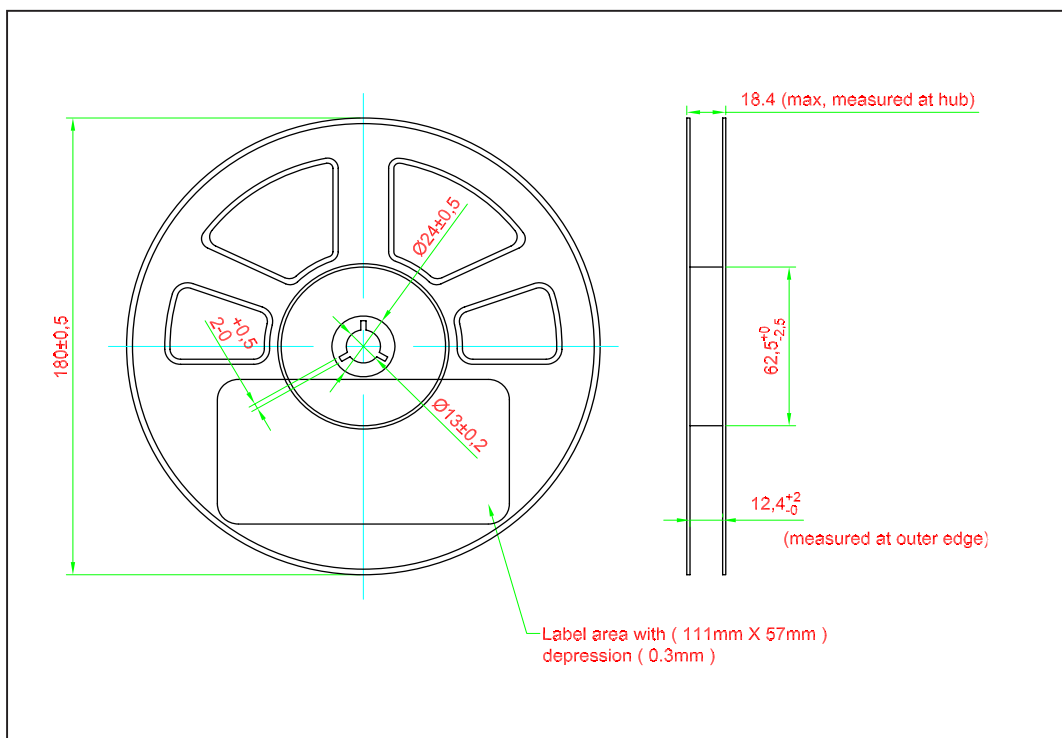
Recommended Solder Pad



Taping and orientation



Packaging Specification

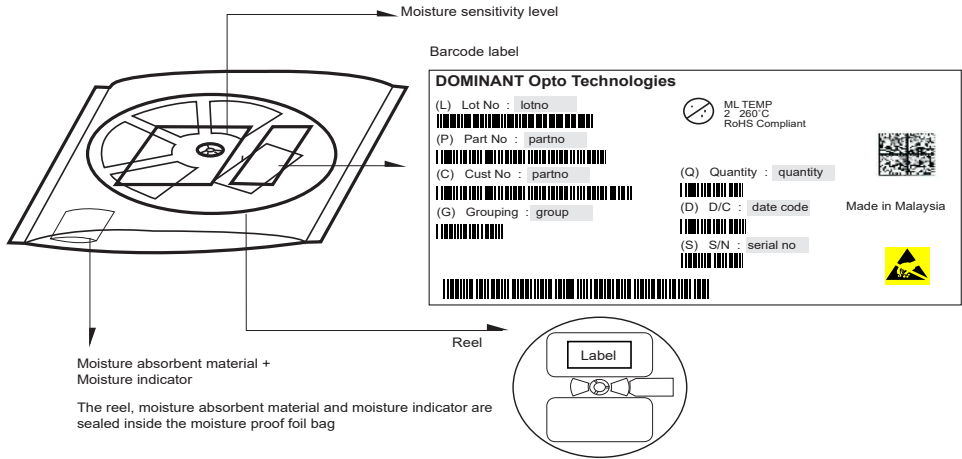


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MAW-EHJ-xxx-x
Optional Packing	329	5000	MAW-EHJ-xxx-x-5

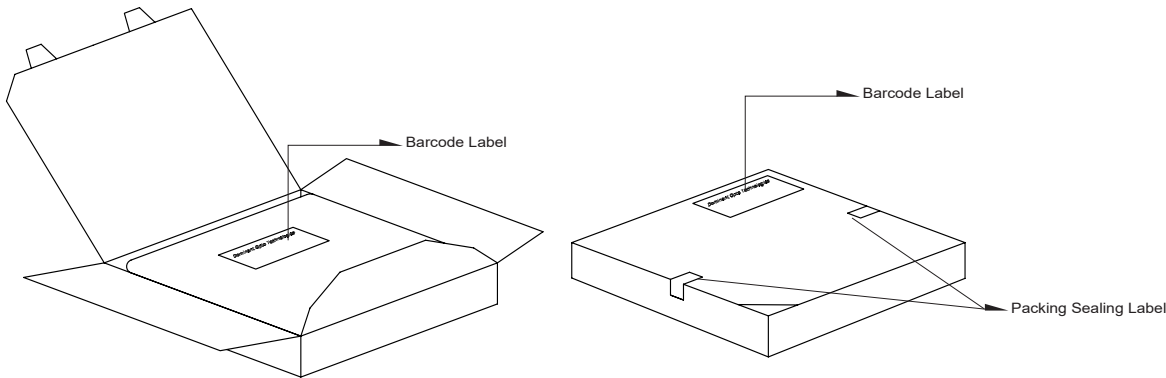
Notes:

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

Packaging Specification



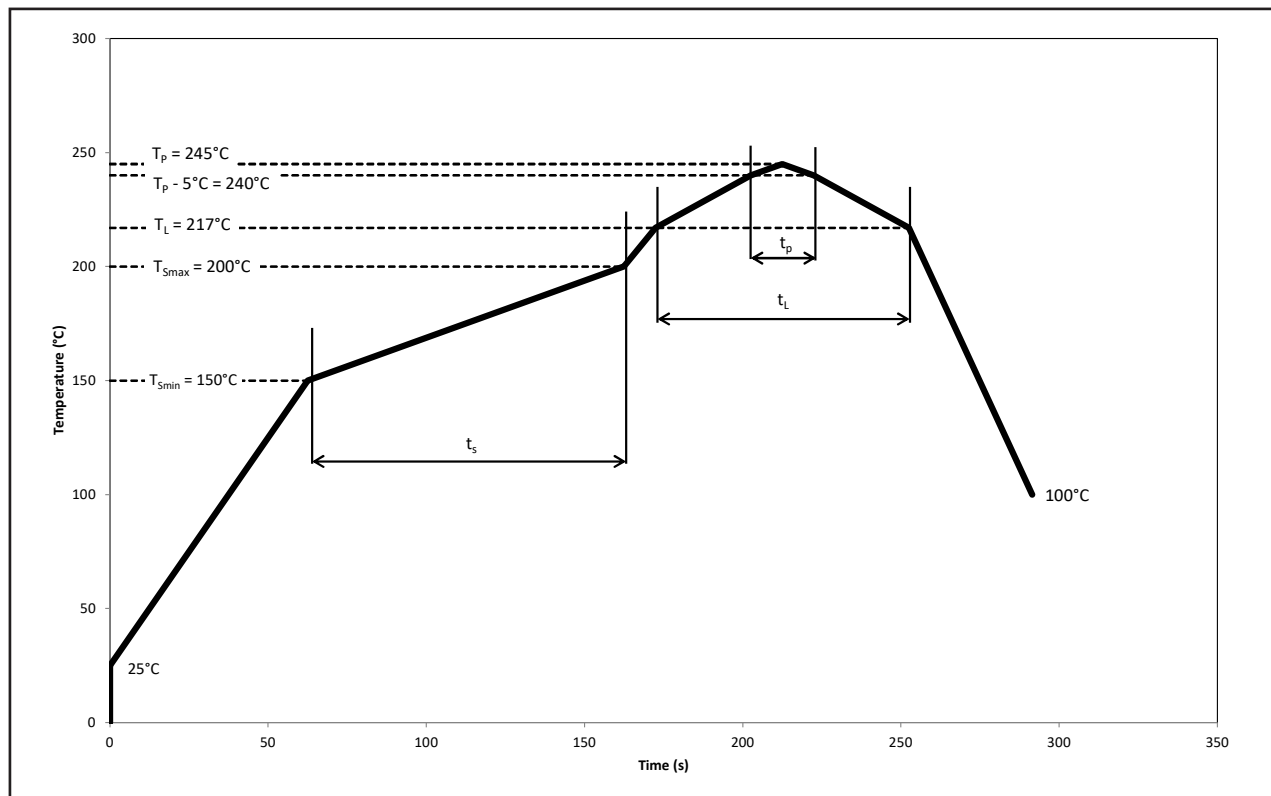
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



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	Min.	Pb-Free Assembly		Unit
			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°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 ± 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 specific 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
-	Initial Release	14 Aug 2019
11, 12, 13	Update Packaging Specification Update Recommended Pb-free Soldering Profile	11 Mar 2022
2	Not for New Design: MAW-EHJ-Q3R-5C8I	29 Dec 2022
11, 12	Update Quantity per Reel: 1000pcs to 1500pcs	26 Oct 2023

NOTE

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About Us

DOMINANT Opto Technologies is a dynamic company that is amongst the world's leading automotive LED manufacturers. With an extensive industry experience and relentless pursuit of innovation, DOMINANT's state-of-art manufacturing and development capabilities have become a trusted and reliable brand across the globe. More information about DOMINANT Opto Technologies, an IATF 16949 and ISO 14001 certified company, can be found under <http://www.dominant-semi.com>.

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