DOMINANT™
Opto Technologies
Innovating Illumination

DATA SHEET :

PrimaxPlus Bi-Color

AlInGaP : MCxx-VZHG

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.
- Compliance to automotive standard; AEC-Q102.

Applications:

- Automotive: exterior applications, eg: signal lighting, Center High Mounted Stop Light (CHMSL), Rear Combination Lamp (RCL), Rear Fog Lamp, Reverse Lamp.

Optical Characteristics at Tj=25^{0}C

Part Number	Color, λdom (nm)		Viewing Angle°	Luminous Flux @ 140mA (lm) *Appx. 1.2*					
				Chip #1			Chip #2		
	Chip #1	Chip #2		Min.	Typ.	Max.	Min.	Typ.	Max.
MCSS-VZHG-L3N+L3N-2+2	Super Red, 630nm	Super Red, 630nm	120	12.2	15.8	23.5	12.2	15.8	23.5
MCSS-VZHG-LM3+LM3-3+3	Super Red, 635nm	Super Red, 635nm	120	10.7	13.9	18.1	10.7	13.9	18.1
MCSY-VZHG-L3N+N3Q-2+1	Super Red, 630nm	Yellow, 589nm	120	12.2	15.8	23.5	20.6	26.8	39.8
MCSY-VZHG-LM3+N3Q-3+1	Super Red, 635nm	Yellow, 589nm	120	10.7	13.9	18.1	20.6	26.8	39.8
MCAA-VZHG-PR2+PR2-2+2	Amber, 615nm	Amber, 615nm	120	23.5	30.6	45.2	23.5	30.6	45.2
MCAA-VZHG-NQ2+NQ2-4+4	Amber, 624nm	Amber, 624nm	120	18.1	23.5	34.8	18.1	23.5	34.8
MCAY-VZHG-PR2+N3Q-2+1	Amber, 615nm	Yellow, 589nm	120	23.5	30.6	45.2	20.6	26.8	39.8
MCAY-VZHG-NQ2+N3Q-4+1	Amber, 624nm	Yellow, 589nm	120	18.1	23.5	34.8	20.6	26.8	39.8

Electrical Characteristics at Tj=25^{0}C

Part Number	Vf @ If = 140 mA *Appx. 3.1*		
	Min. (V)	Typ. (V)	Max. (V)
MCxx-VZHG	1.90	2.30	2.50

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	200	mA
Peak pulse current (tp<=10µs , Duty cycle=0.10)	300	mA
Reverse Voltage	Not designed for reverse bias	V
ESD threshold (HBM)	8	kV
LED junction temperature	150	˚C
Operating temperature	-40 … +125	˚C
Storage temperature	-40 … +125	˚C
Thermal resistance (Rated current = 140mA, Ts=25˚C)		
- Real Thermal Resistance		
Junction / solder point, $R_{th\ JS\ real}$ (Typ = 30K/W)	40	K/W
- Electrical Thermal Resistance		
Junction / solder point, $R_{th\ JS\ el}$ (Typ = 24K/W)	32	K/W

Wavelength Grouping at Tj=25^{0}C

Color	Group	Wavelength distribution (nm) *Appx. 2.2*
Yellow	Full	586 - 595
	X	586 - 589
	Y	589 - 592
	Z	592 - 595
Amber	Full	612 - 627
	W	612 - 616
	X	616 - 620
	Y	620 - 624
	Z	624 - 627
Super Red	Full	627 - 637
	W	627 - 630
	X	630 - 634
	Y	634 - 637

Luminous Flux at Tj=25^{0}C

Brightness Group	Luminous Flux @ If=140mA (lm) *Appx. 1.2*
L2	10.7 ... 12.2
L3	12.2 ... 13.9
M2	13.9 ... 15.8
M3	15.8 ... 18.1
N2	18.1 ... 20.6
N3	20.6 ... 23.5
P2	23.5 ... 26.8
P3	26.8 ... 30.6
Q2	30.6 ... 34.8
Q3	34.8 ... 39.8
R2	39.8 ... 45.2

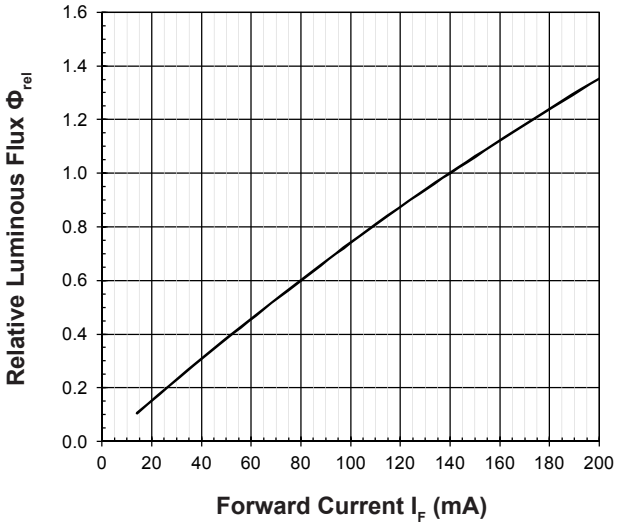
Vf Binning (Optional)

Vf Bin @ 140mA	Forward Voltage (V) *Appx. 3.1*
43	1.90 ... 2.05
44	2.05 ... 2.20
45	2.20 ... 2.35
46	2.35 ... 2.50

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

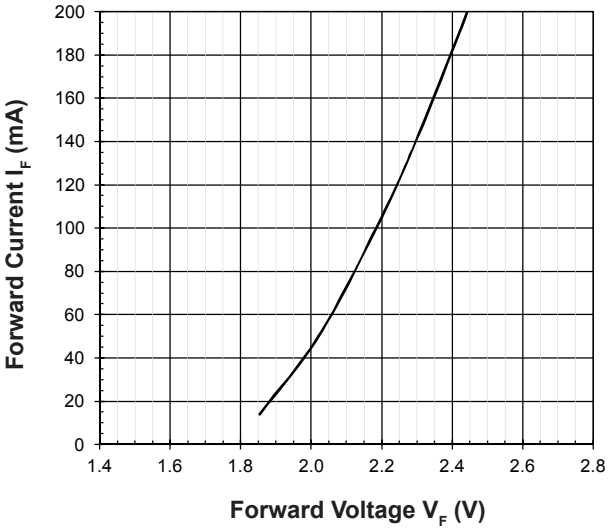
Relative Luminous Flux Vs Forward Current

$\Phi_V/\Phi_V(140mA) = f(I_F)$; $T_j = 25°C$



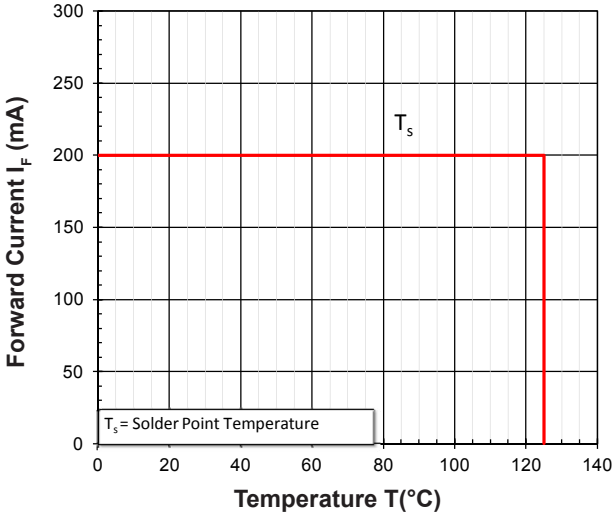
Forward Current Vs Forward Voltage

$I_F = f(V_F)$; $T_j = 25°C$



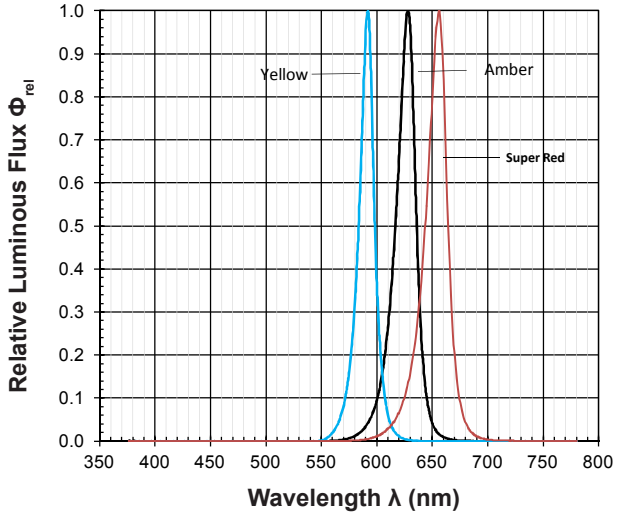
Maximum Current Vs Temperature

$I_F = f(T)$



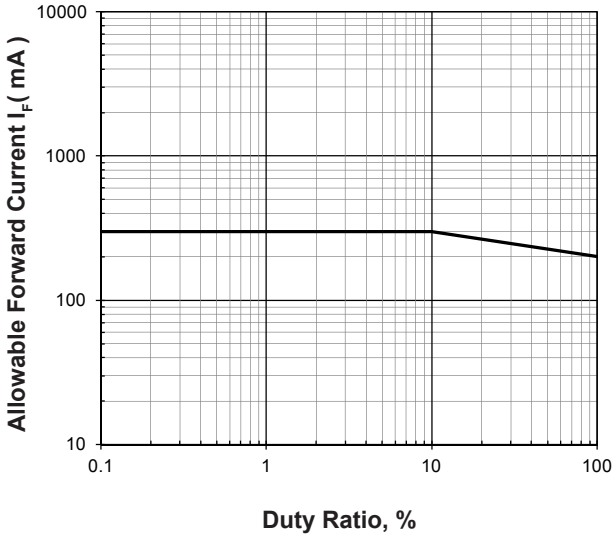
Relative Spectral Emission

$\Phi_{rel} = f(\lambda)$; $T_j = 25°C$; $I_F = 140mA$

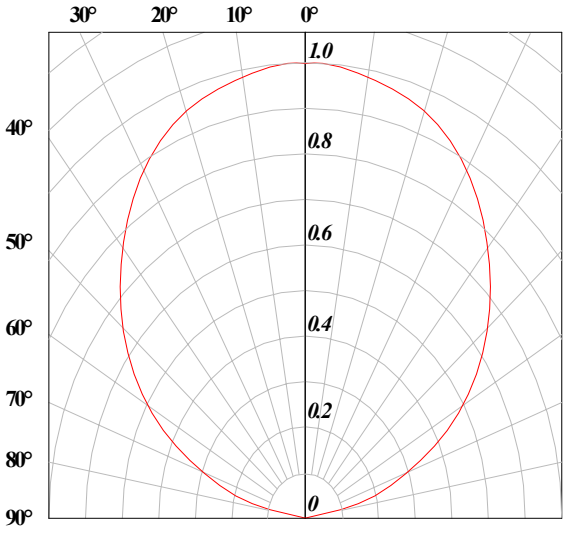


Allowable Forward Current Vs Duty Ratio

($T_j = 25°C$; $t_p \leq 10\mu s$)

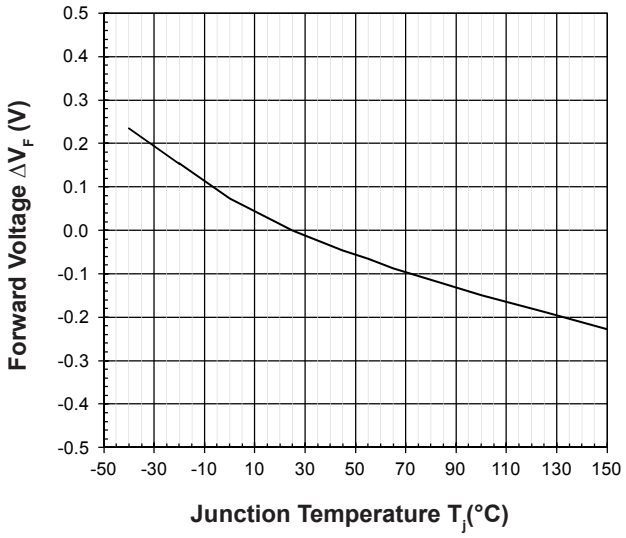


Radiation Pattern



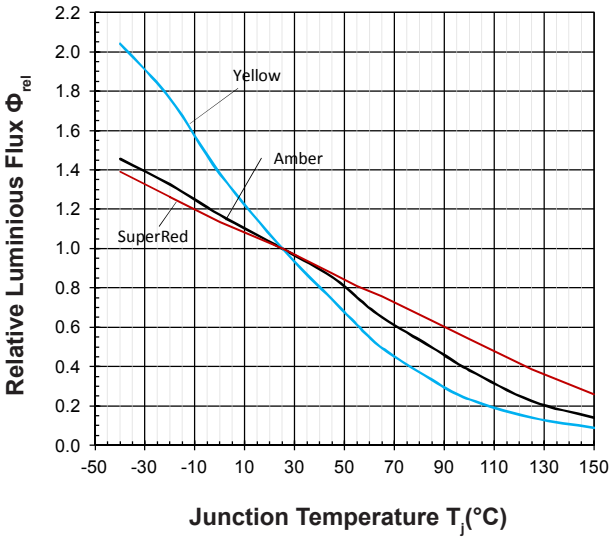
Forward Voltage Vs Junction Temperature

$\Delta V_F = V_F - V_F(25°C) = f(T_j)$; I_F =140mA



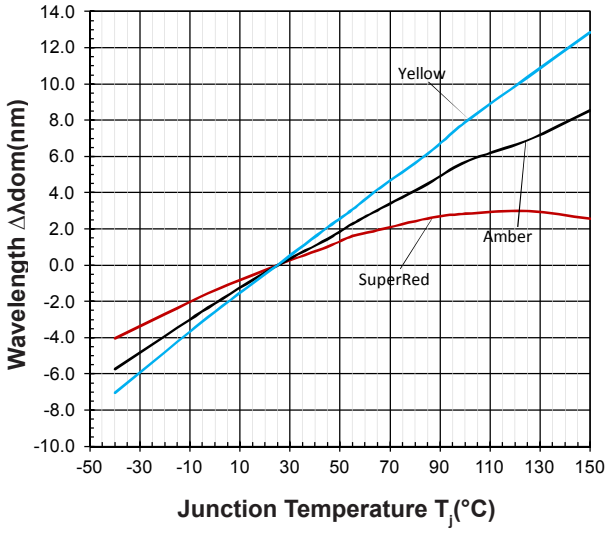
Relative Luminious Flux Vs Junction Temperature

$\Phi V/\Phi V(25°C) = f(T_j)$; I_F = 140mA

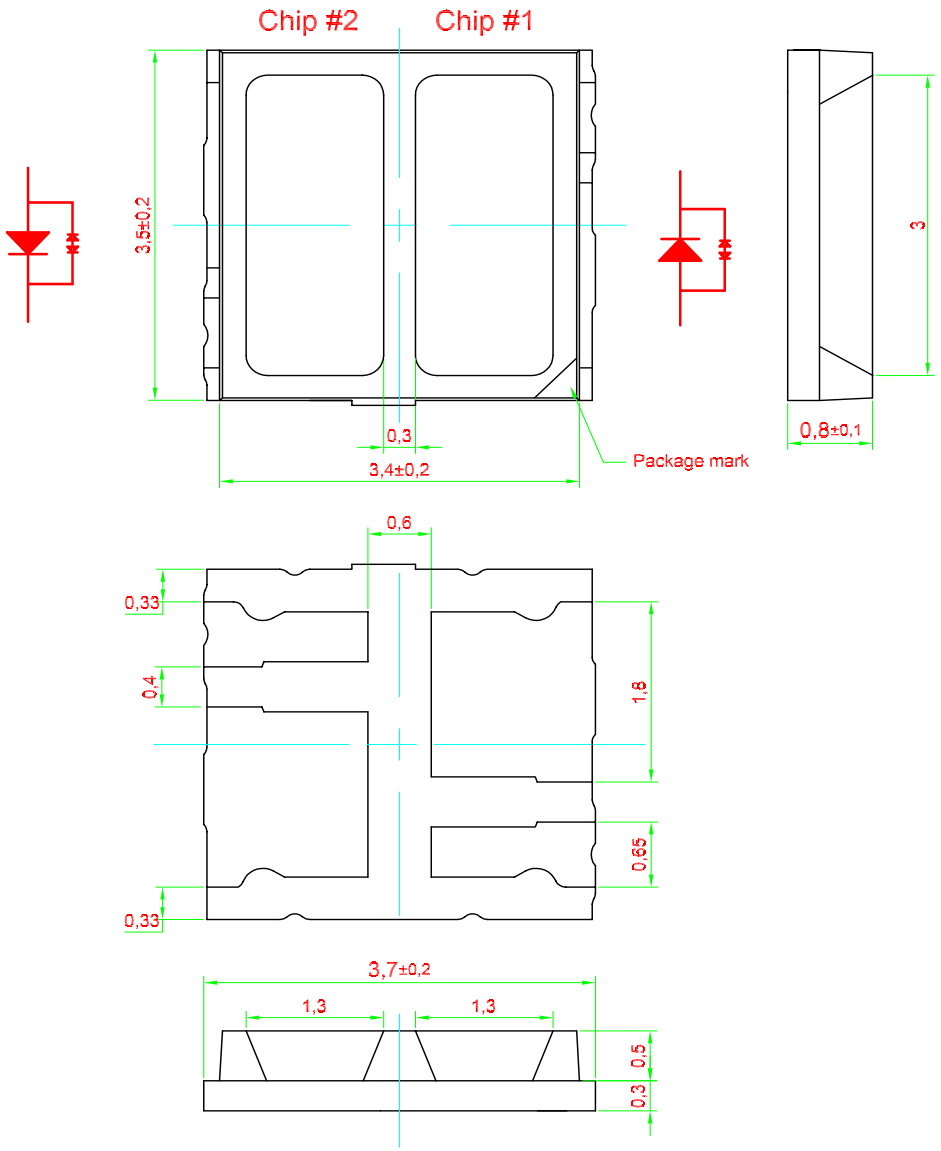


Wavelength Vs Junction Temperature

$\Delta\lambda dom = \lambda dom - \lambda dom\ (25°C) = f(T_j)$; I_F = 140mA



PrimaxPlus Bi Color • AlInGaP: MCxx-VZHG Package Outlines

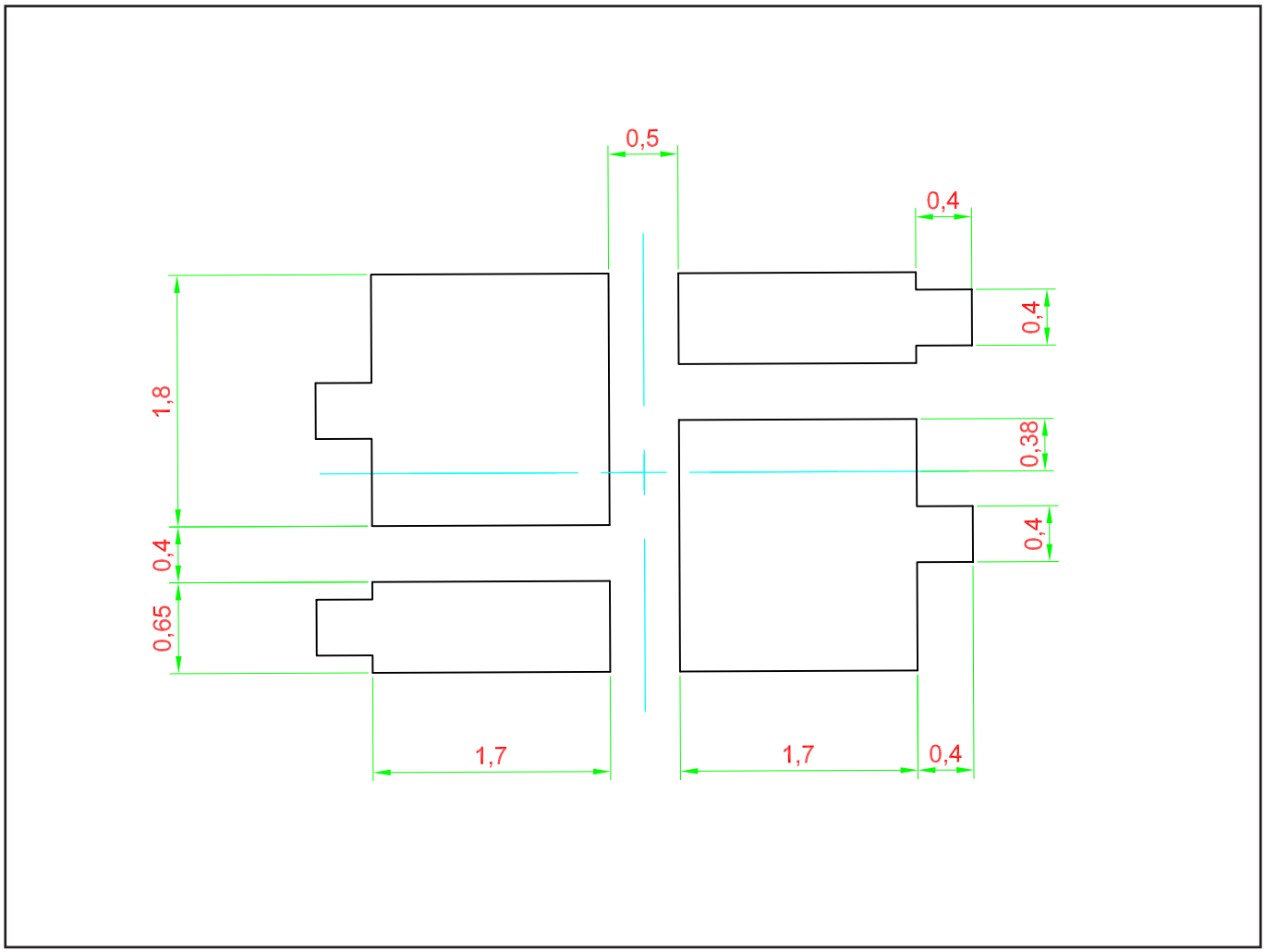


Notes:
Primary thermal path is through Anode lead of LED package.
General tolerance: +/- 0.1mm.

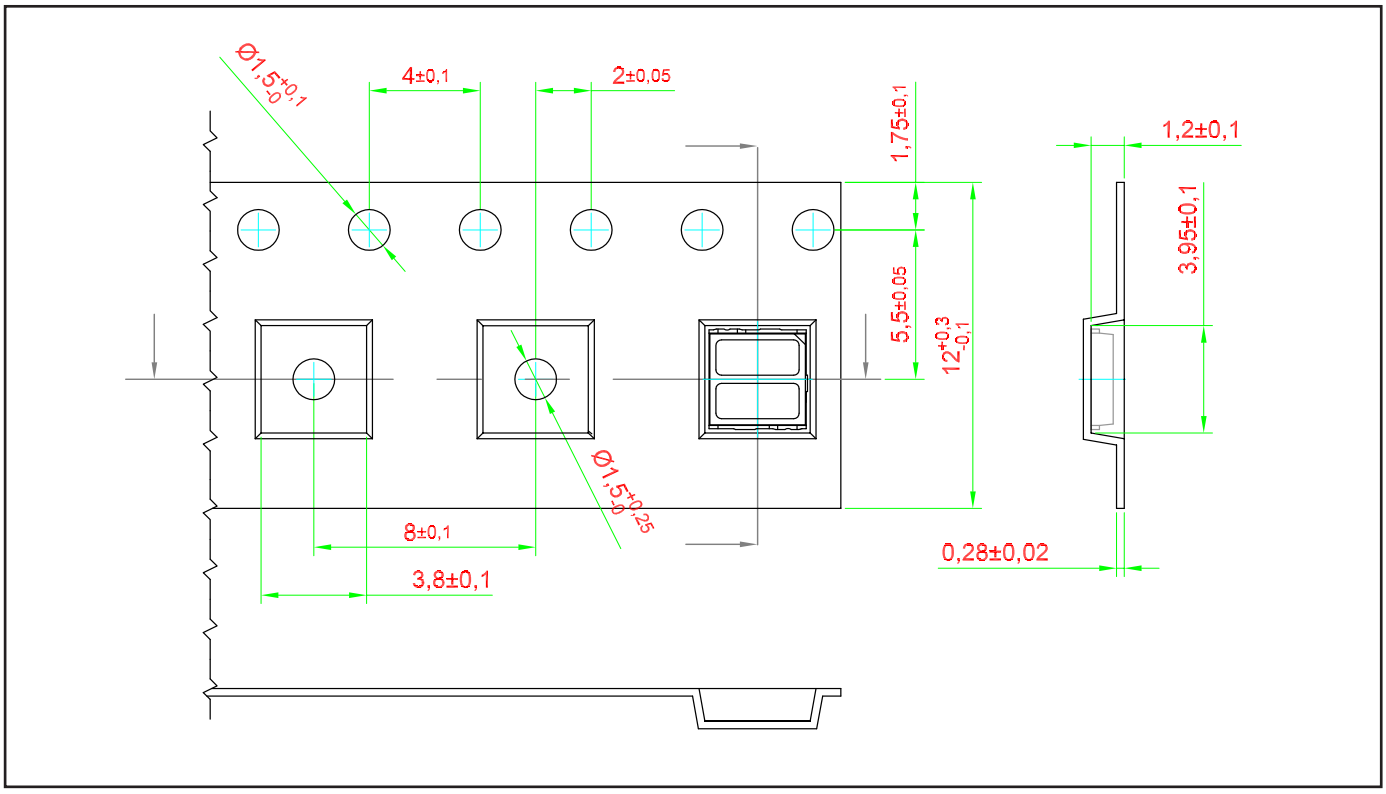
Material

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

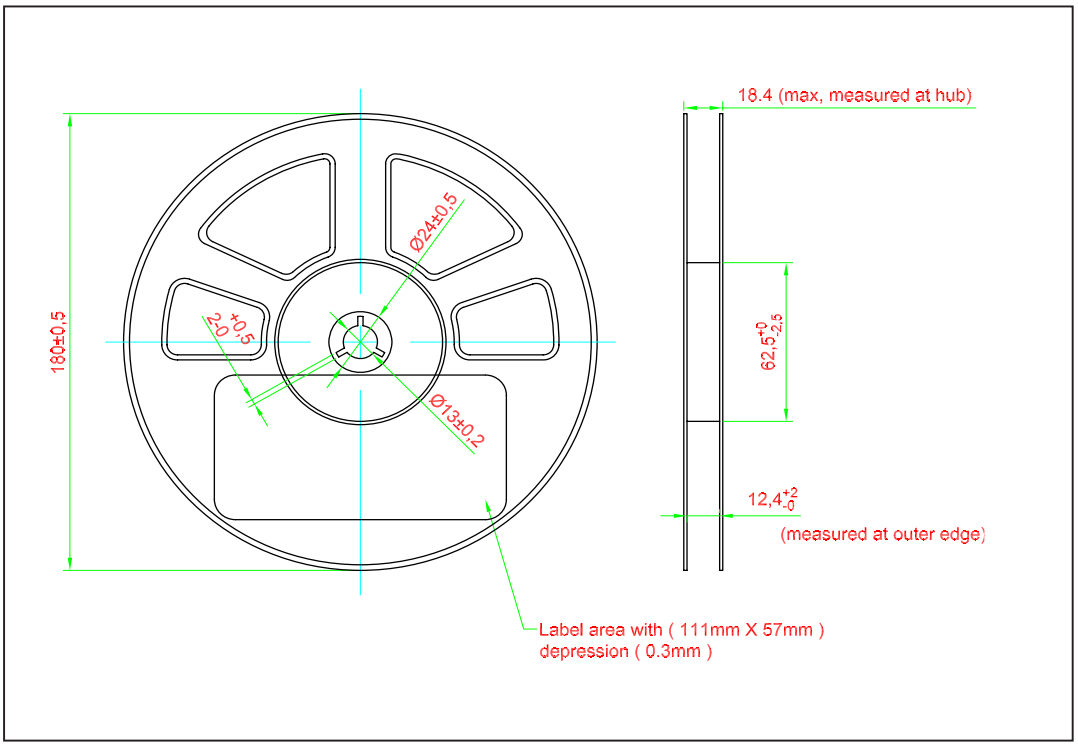
Recommended Solder Pad

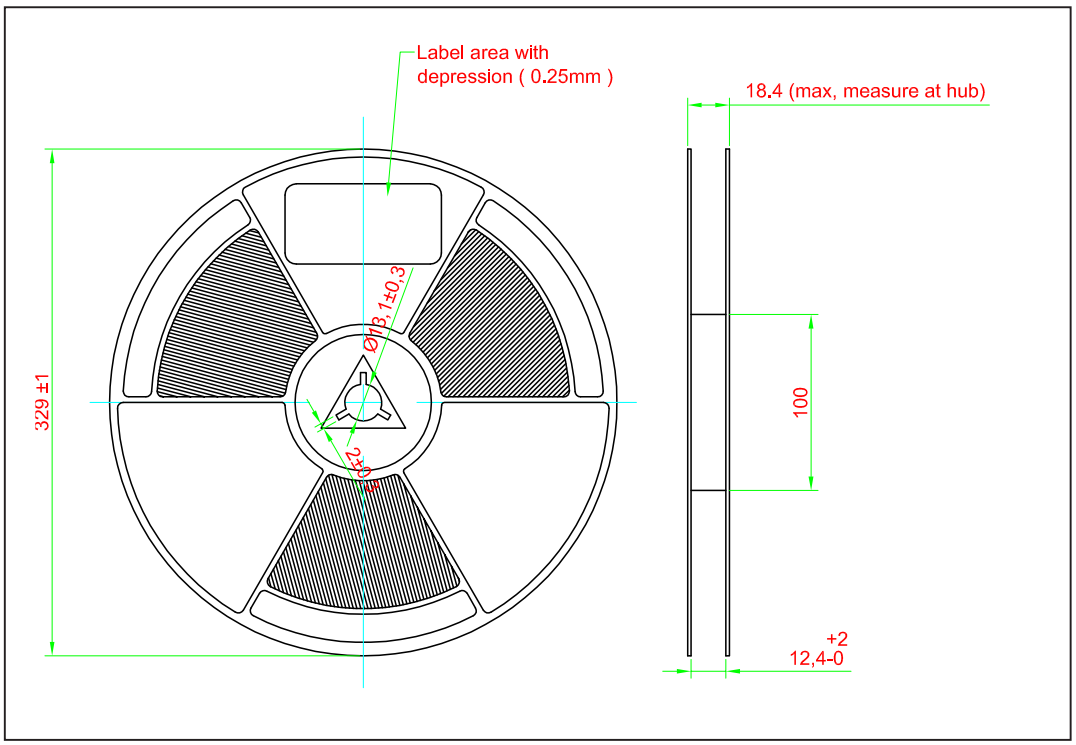


Taping and orientation



Packaging Specification



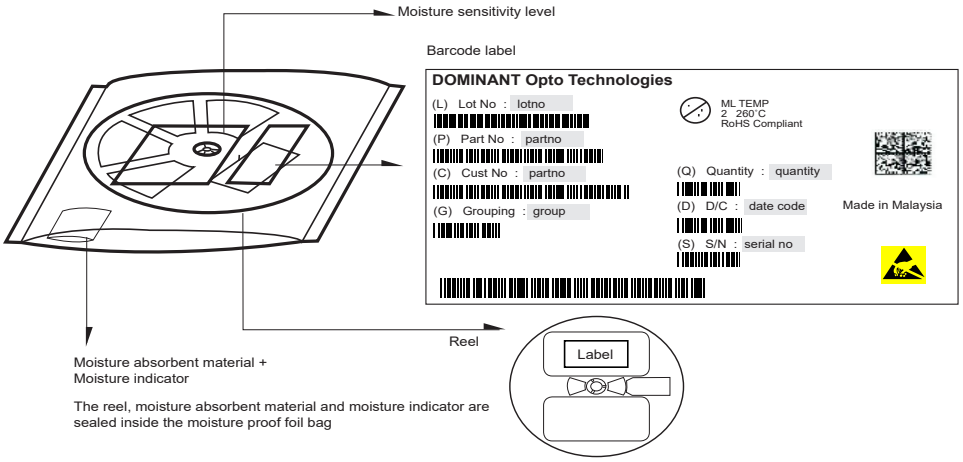


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MCxx-VZHG-xxx+xxx-x+x
Optional Packing	329	5000	MCxx-VZHG-xxx+xxx-x+x-5

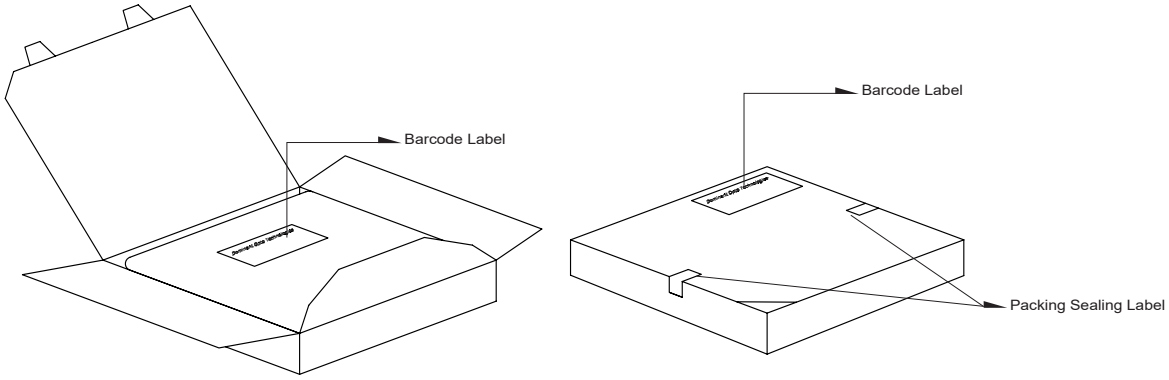
Notes:

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

Packaging Specification



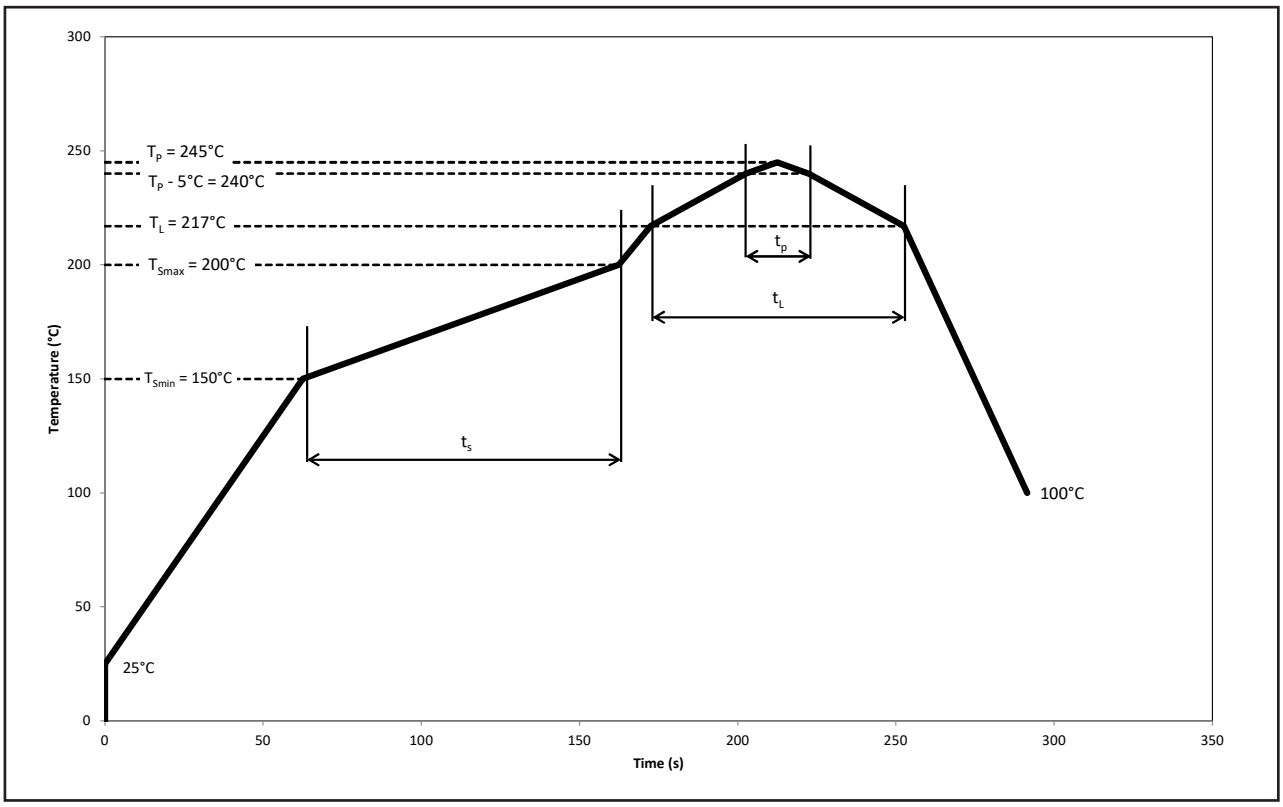
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



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°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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 0.5nm and an expanded uncertainty of ± 1nm (accordingly to GUM with a coverage factor of k=3).

3) Voltage:

3.1 Forward Voltage, Vf is measured when a current pulse of 8 ms(typ) with an internal reproducibility of ± 0.05V and an expanded uncertainty of ± 0.1V (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 In the drawing, normally the tolerances used are at ± 0.1 with the dimension measurement unit in mm.

Revision History

Page	Subjects	Date of Modification
-	Initial Release	28 Jun 2018
1, 2, 7	Update Features Update Thermal resistance Typo Error on Package Outline	10 Jan 2019
7	Typo Error on Package Outline	29 May 2019
10, 11, 12	Update Packaging Specification Update Recommended Pb-free Soldering Profile	21 Mar 2022
10, 11	Update Quantity per Reel: 1000pcs to 1500pcs	14 Nov 2023

NOTE

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Dispose of product is in accordance with local, regional, national and international regulations.

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