DOMINANT™
Opto Technologies
Innovating Illumination

DATA SHEET :

PrimaxPlus Bi-Color

InGaN : 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: Rear Combination Lamp (RCL), Rear Fog Lamp, Reverse Lamp.

Optical Characteristics at Tj=25°C

Part Number	Color		Viewing Angle°	Luminous Flux @ 140mA (lm) Appx. 1.2					
				Chip #1			Chip #2		
	Chip #1	Chip #2		Min.	Typ.	Max.	Min.	Typ.	Max.
MCZYW-VZHG-P3R2+Q3S2-1+1	InGaN Yellow	White	120	26.8	36.0	45.2	34.8	45.0	59.0
● MCZYW-VZHG-PQ3+Q3S2-1+1	InGaN Yellow	White	120	23.5	34.8	39.8	34.8	45.0	59.0

● Not for new design

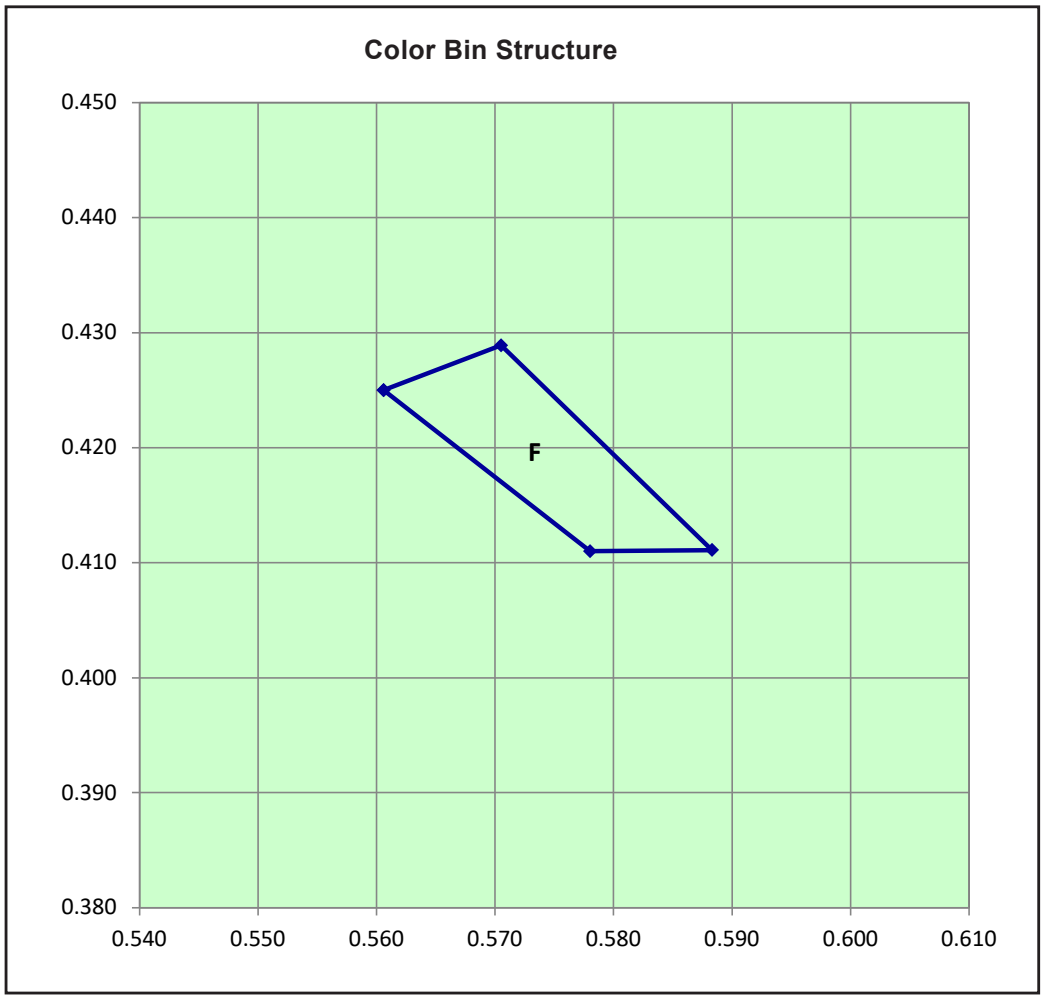
Electrical Characteristics at Tj=25°C

Part Number	Vf @ If = 140 mA Appx. 3.1		
	Min. (V)	Typ. (V)	Max. (V)
MCZYW-VZHG	2.80	3.10	3.40

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	200	mA
Peak pulse current (Ts = 55˚C, tp ≤ 100µs , Duty cycle = 0.03)	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 = 14K/W) - Electrical Thermal Resistance Junction / solder point, $R_{th\ JS\ el}$ (Typ = 12K/W)	 20 18	 K/W K/W

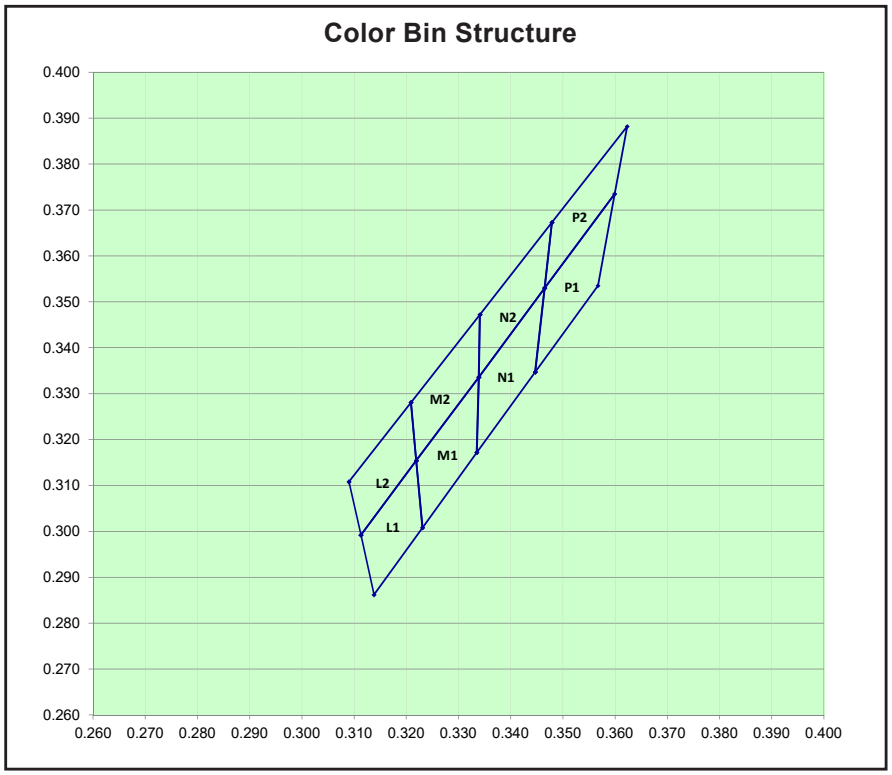
MCxx-VZHG, InGaN Yellow Color Grouping *Appx. 2.1*



Bin		1	2	3	4
F	Cx	0.5606	0.5705	0.5883	0.5780
	Cy	0.4250	0.4289	0.4111	0.4110

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 purposed.

MCxx-VZHG, White Color Grouping *Appx. 2.1*



Bin		1	2	3	4
L1	Cx	0.3113	0.3138	0.3231	0.3219
	Cy	0.2992	0.2862	0.3008	0.3154
L2	Cx	0.3090	0.3113	0.3219	0.3209
	Cy	0.3108	0.2992	0.3154	0.3281
M1	Cx	0.3219	0.3231	0.3335	0.3339
	Cy	0.3154	0.3008	0.3172	0.3336
M2	Cx	0.3209	0.3219	0.3339	0.3341
	Cy	0.3281	0.3154	0.3336	0.3472
N1	Cx	0.3335	0.3339	0.3465	0.3447
	Cy	0.3172	0.3336	0.3530	0.3347
N2	Cx	0.3339	0.3341	0.3479	0.3465
	Cy	0.3336	0.3472	0.3673	0.3530
P1	Cx	0.3447	0.3465	0.3599	0.3567
	Cy	0.3347	0.3530	0.3735	0.3535
P2	Cx	0.3465	0.3479	0.3623	0.3599
	Cy	0.3530	0.3673	0.3882	0.3735

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 purposed.

Luminous Flux at Tj=25^{0}C

Brightness Group	Luminous Flux @ If=140mA (lm) *Appx. 1.2*
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
R3	45.2 ... 51.7
S2	51.7 ... 59.0

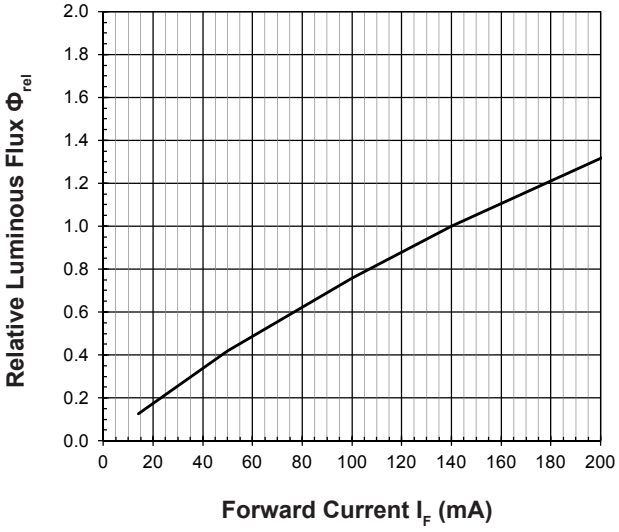
Vf Binning (Optional)

Vf Bin @ 140mA	Forward Voltage (V) *Appx. 3.1*
R7	2.80 ... 3.10
R8	3.10 ... 3.40

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

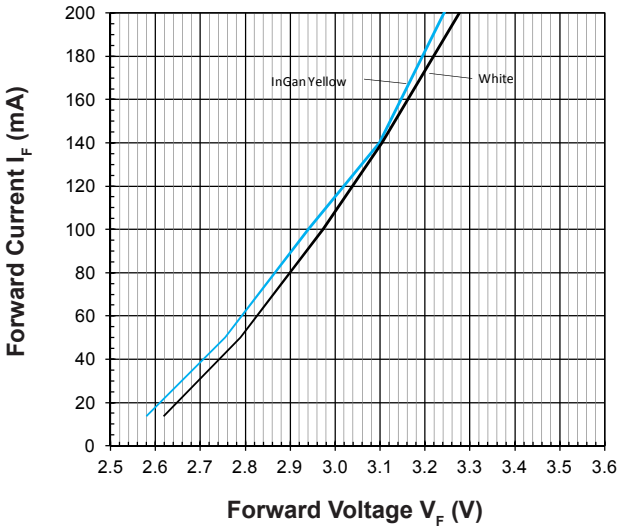
Relative Luminous Flux Vs Forward Current

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



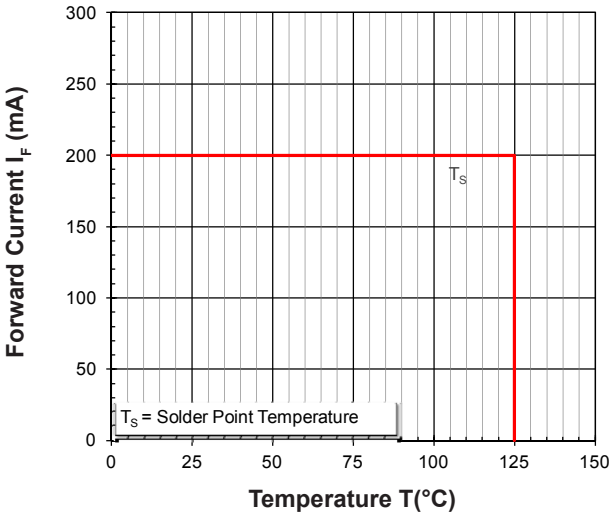
Forward Current Vs Forward Voltage

$I_F = f(V_F)$; $T_j = 25°C$



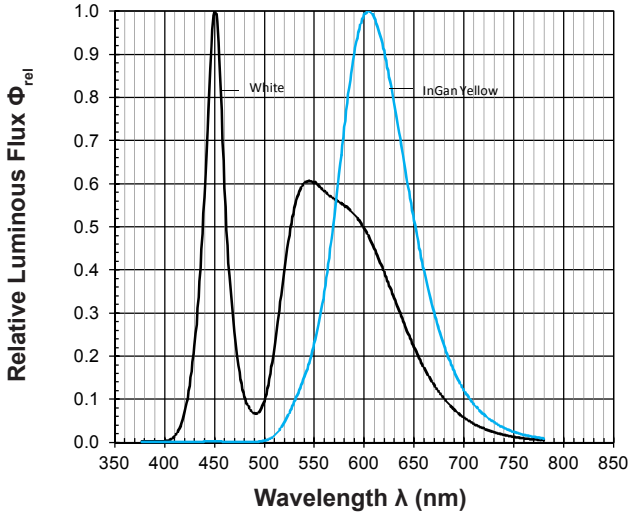
Maximum Current Vs Temperature

$I_F = f(T)$



Relative Spectral Emission

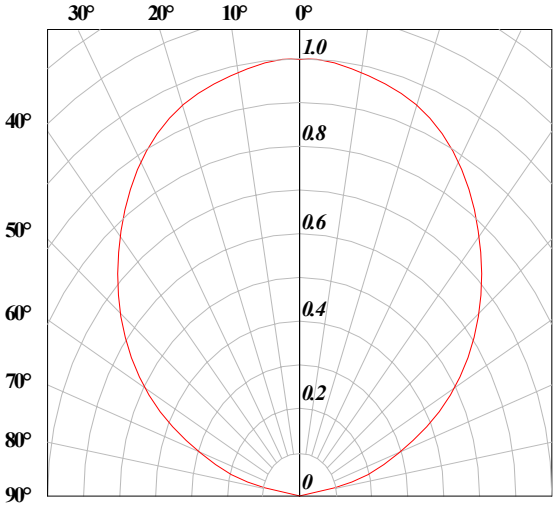
$\Phi_{rel} = f(\lambda)$; $T_j = 25°C$; $I_F = 140mA$



Allowable Forward Current Vs Duty Ratio

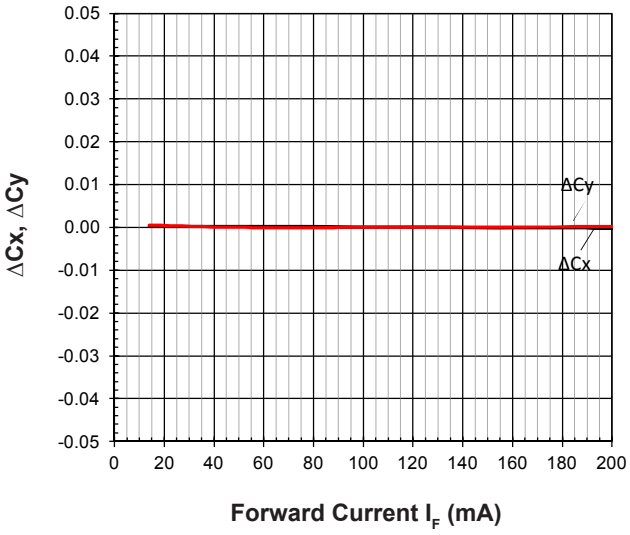
(Ts = 55°C; tp ≤ 100us)

Radiation Pattern



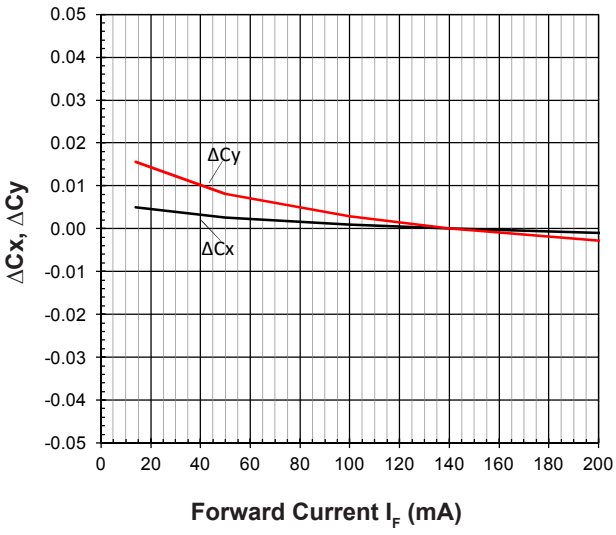
Chromaticity Coordinate Shift Vs Forward Current

$\Delta Cx, \Delta Cy = f(I_F); T_j = 25°C$ (InGaN Yellow)



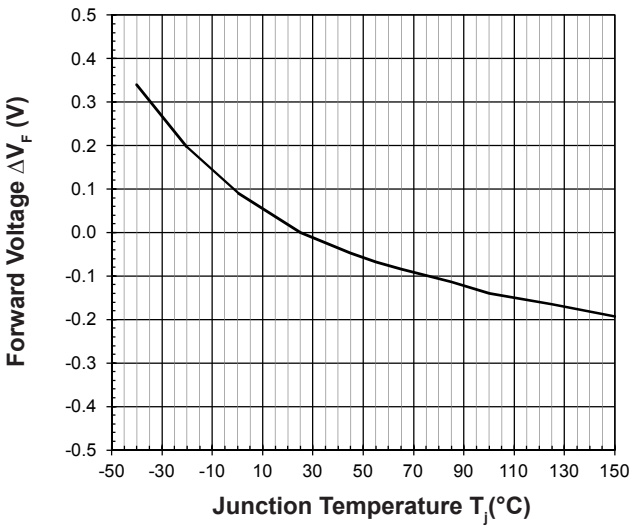
Chromaticity Coordinate Shift Vs Forward Current

$\Delta Cx, \Delta Cy = f(I_F); T_j = 25°C$ (White)



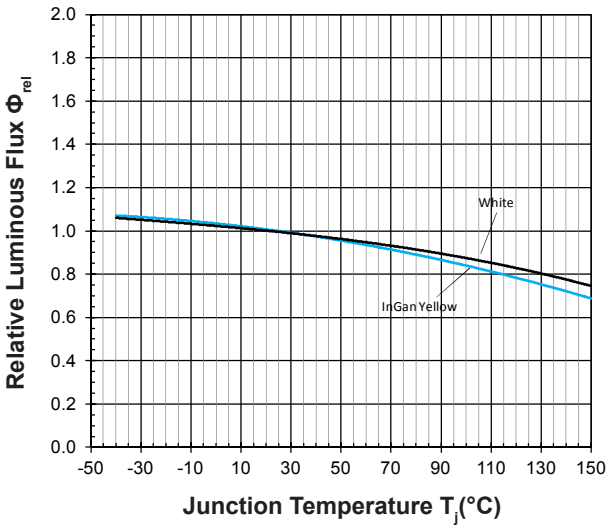
Forward Voltage Vs Junction Temperature

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



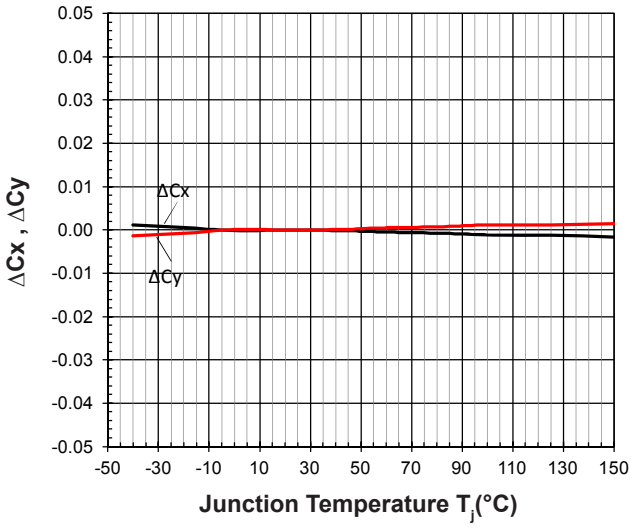
Relative Luminous Flux Vs Junction Temperature

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



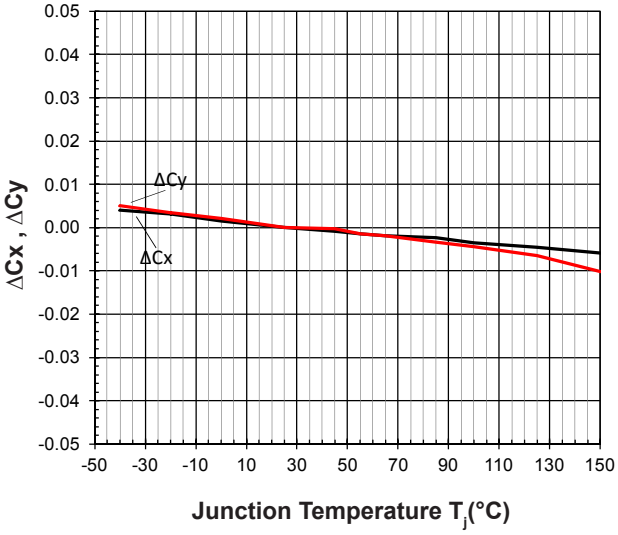
Chromaticity Coordinate Shift Vs Junction Temperature

$\Delta Cx, \Delta Cy = f(T_j); I_F = 140mA$ (InGaN Yellow)

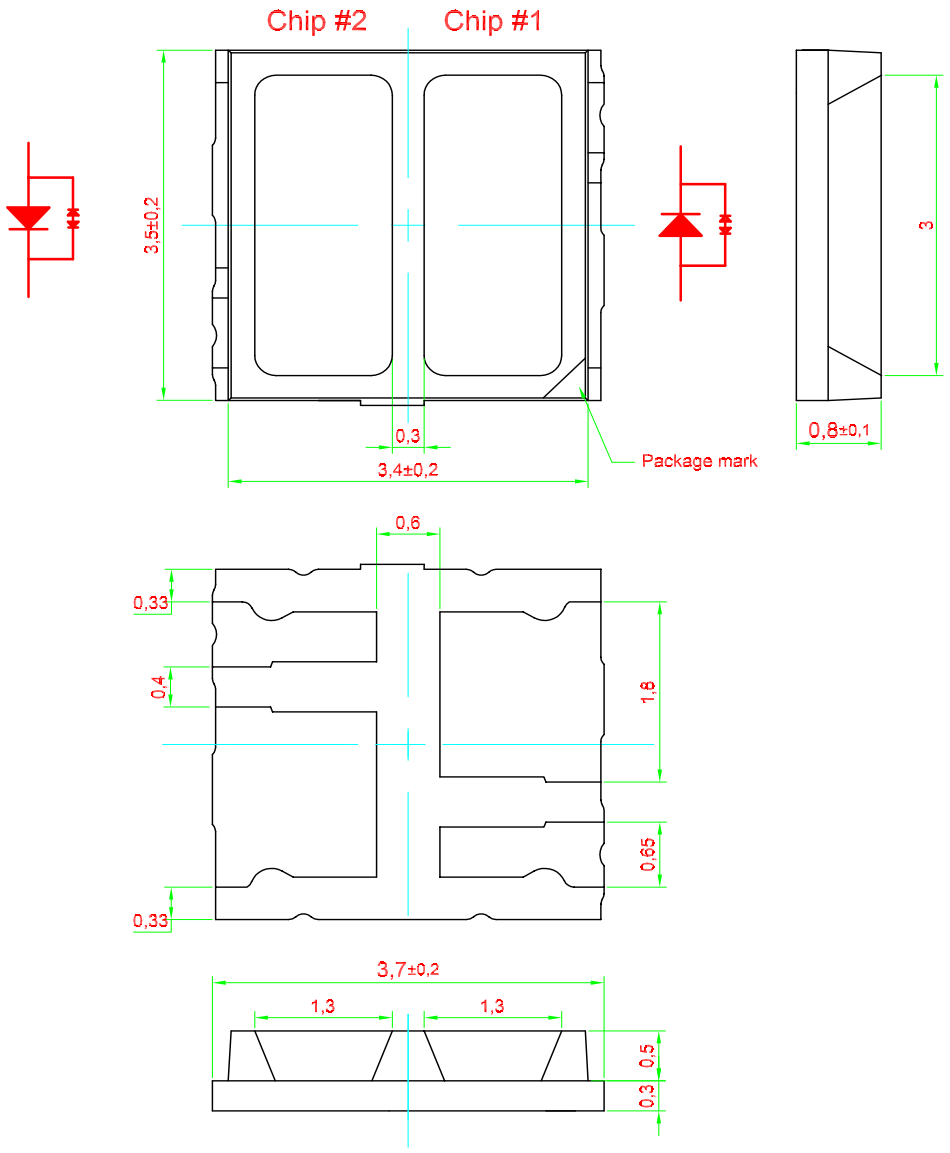


Chromaticity Coordinate Shift Vs Junction Temperature

$\Delta Cx, \Delta Cy = f(T_j); I_F = 140mA$ (White)



PrimaxPlus Bi-Color • InGaN: MCxx-VZHG Package Outlines

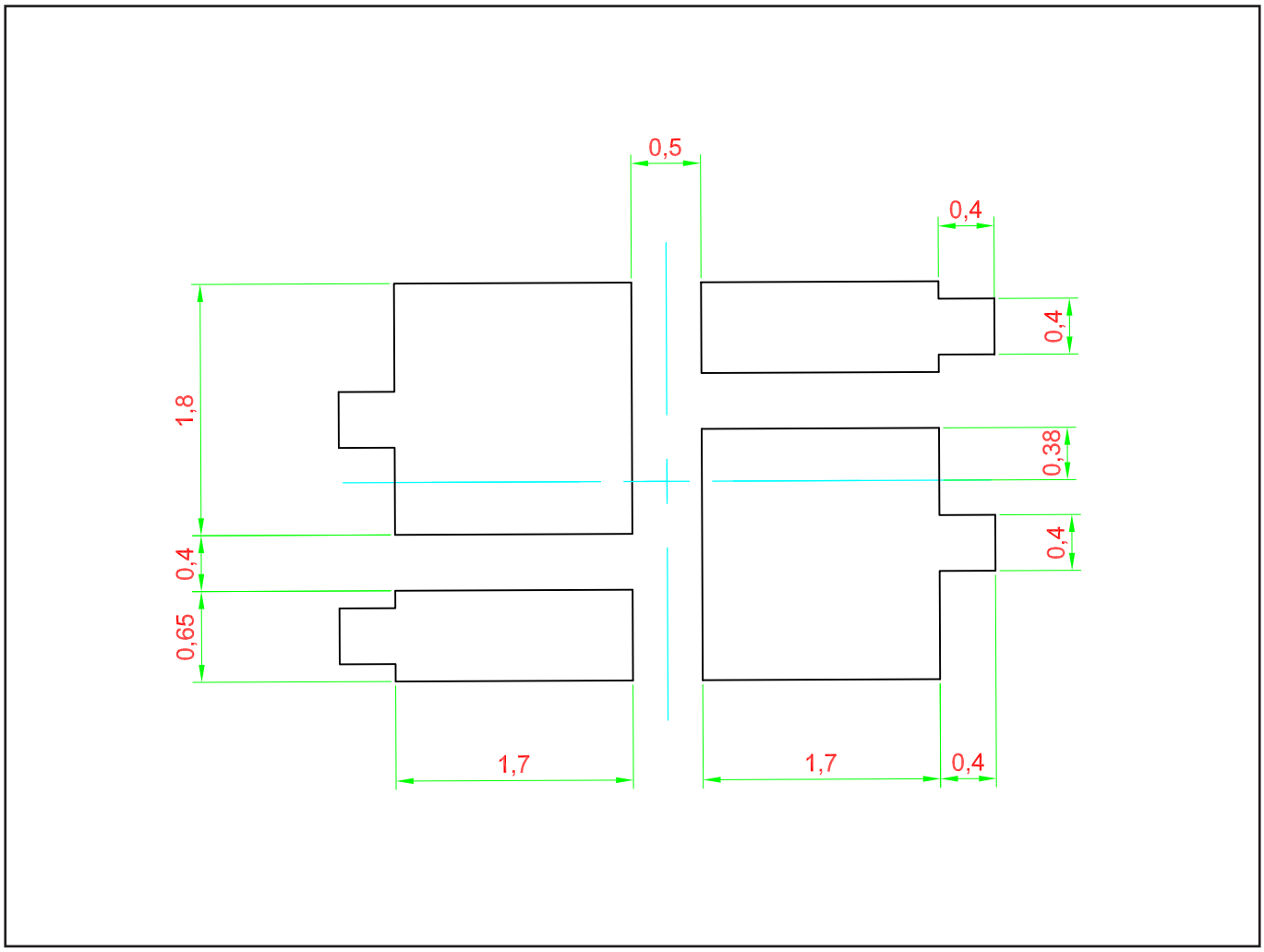


Notes:
Primary thermal path is through Anode lead of LED package.
General tolerance: +/- 0.1mm.

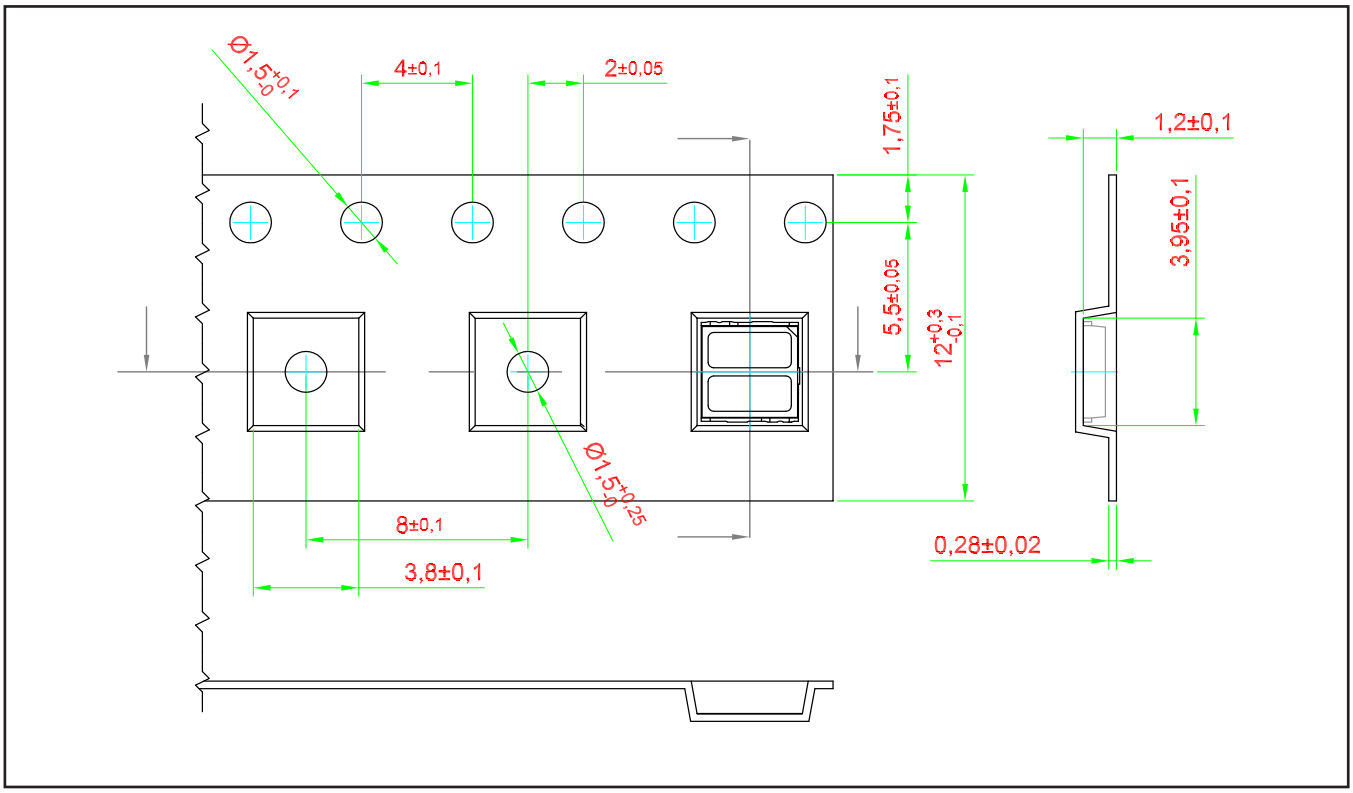
Material

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

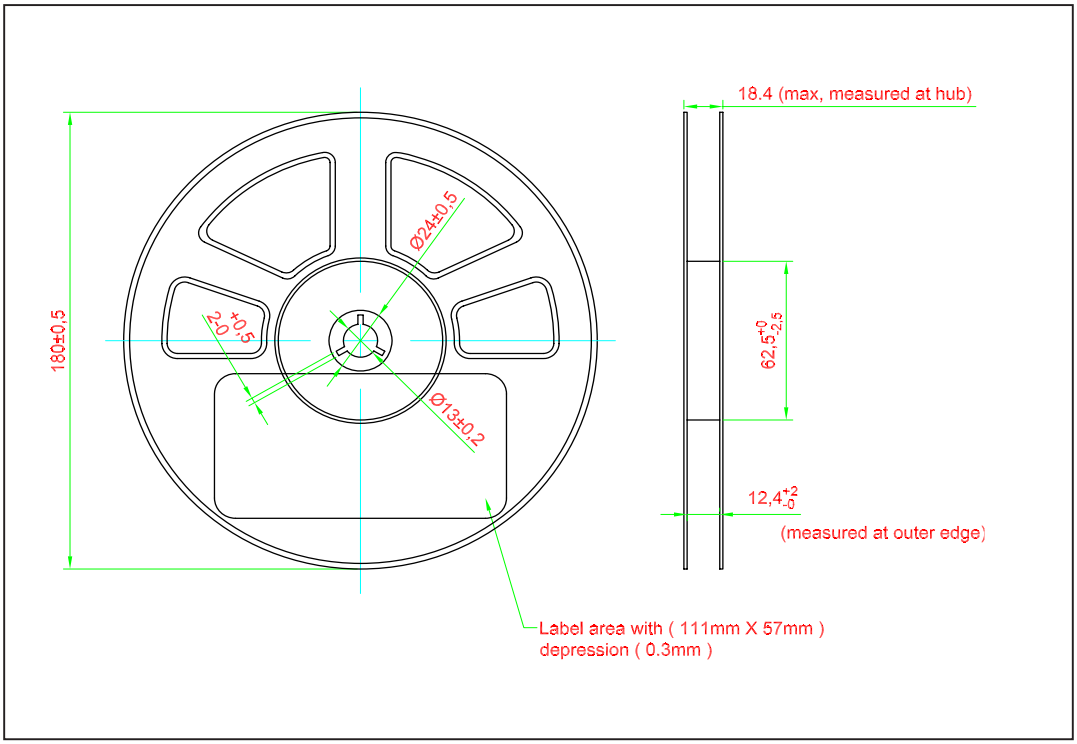
Recommended Solder Pad

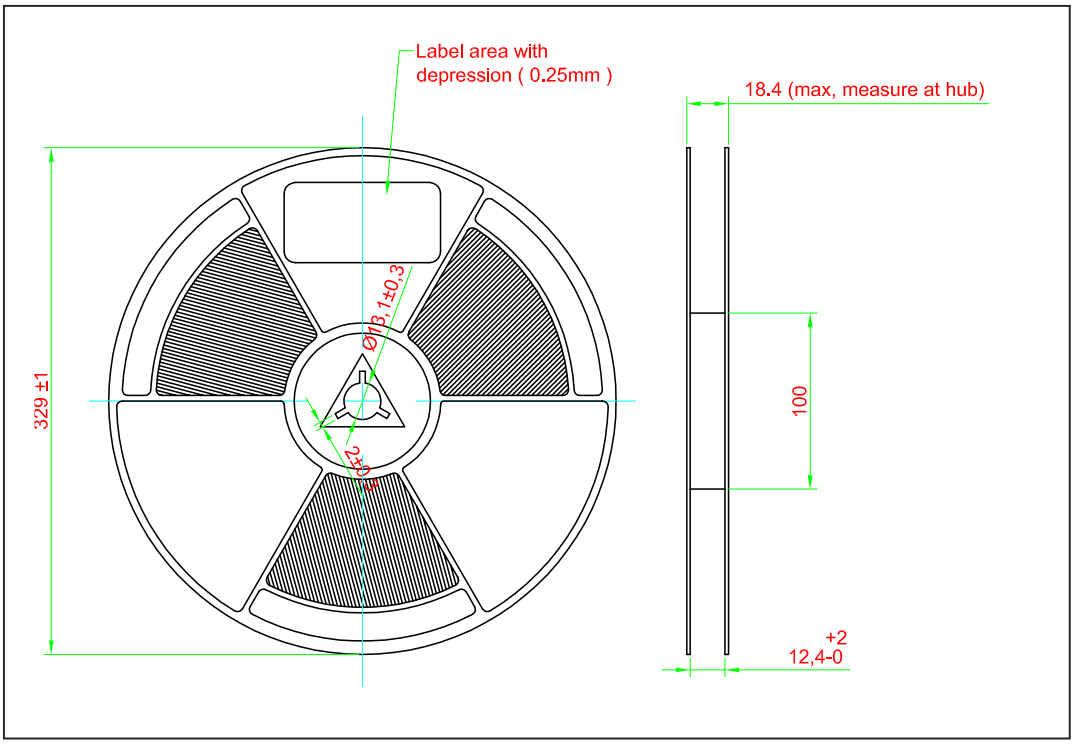


Taping and orientation



Packaging Specification



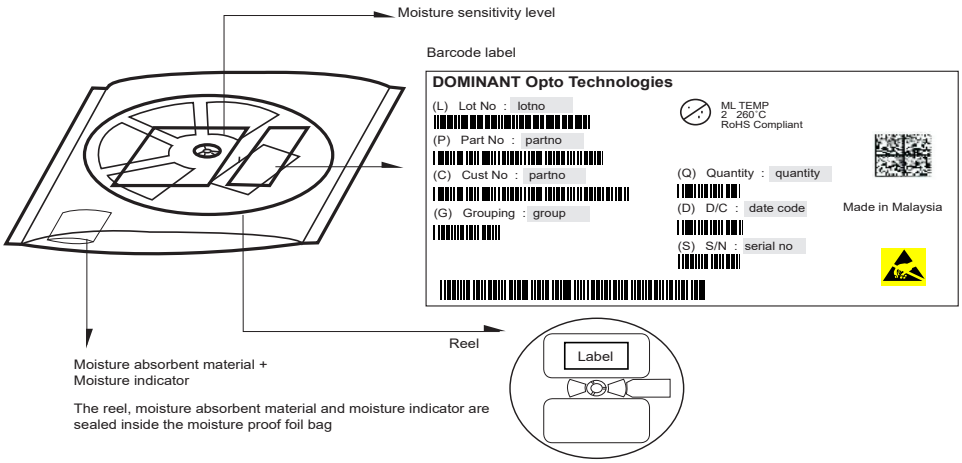


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MCxx-VZHG-xxx+xxx-x+x
Optional Packing	329	5000	MCxx-VZHG-xxx+xxx-x+x-5

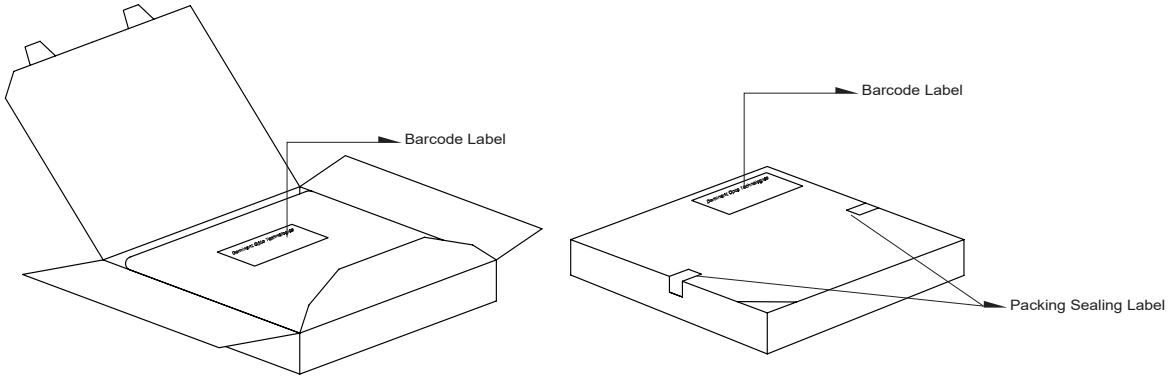
Notes:

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

Packaging Specification



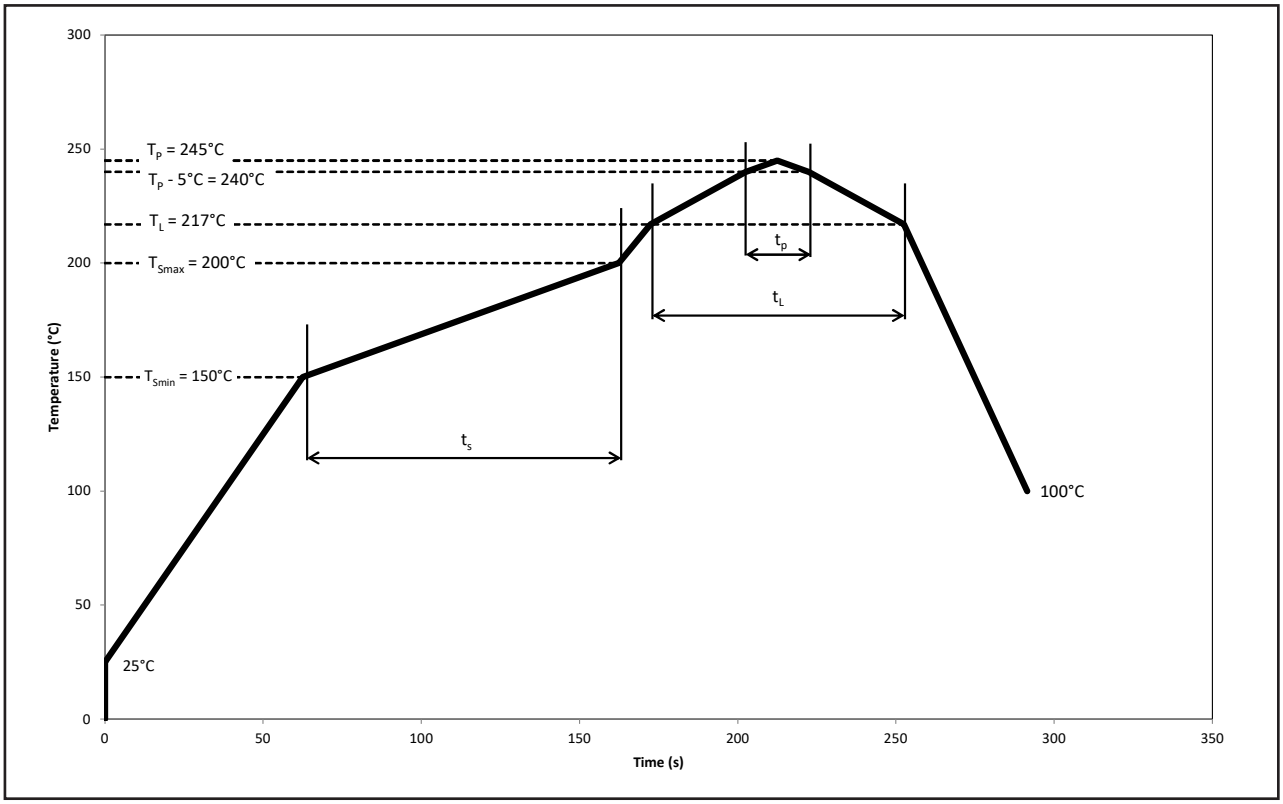
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



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.

6) Corrosion Robustness:

6.1 Test conditions: 40 °C / 90 % rh / 15 ppm H_2S / 336 h.

= Stricter than IEC 60068-2-43 (H_2S) [25 °C / 75% rh / 10 ppm H_2S / 21 days].

Revision History

Page	Subjects	Date of Modification
8	Typo Error on Package Outline	29 May 2019
2, 6, 7, 14	Update Peak Pulse Current Update Graph: Allowable Forward Current Vs Duty Ratio Relative Luminous Flux Vs Junction Temperature Update Appendix	06 Nov 2019
3	Update OEM Spec	08 Jan 2020
6, 13	Update Graph: Maximum Current Vs Temperature Update Recommended Pb-free Soldering Profile	19 Feb 2021
3	Typo Error on Color Bin	19 May 2021
11, 12	Update Packaging Specification	11 Mar 2022
3	Update OEM Spec	12 Sep 2022
2	Add New Partno: MCZYW-VZHG-P3R2+Q3S2-1+1 Not for New Design: MCZYW-VZHG-PQ3+Q3S2-1+1	31 Jul 2023
11, 12	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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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.

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