DOMINANT™
Opto Technologies
Innovating Illumination

DATA SHEET :

PrimaxPlus

InGaN : MAW-KZHG

(Dual Current Binning)

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

Applications:

- > Automotive: Exterior application: eg: DRL, Back up Lamp, Position Lamp.

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Optical Characteristics at Tj=25˚C

Part Number	Color	Viewing Angle˚	Luminous Flux Appx. 1.2 IF = 20mA (lm)			Luminous Flux Appx. 1.2 IF = 250mA (lm)		
			Min.	Typ.	Max.	Min.	Typ.	Max.
MAW-KZHG-HK2-L1AP2A+SU2-L1P2	White	120	4.90	6.30	9.35	51.70	78.00	99.40

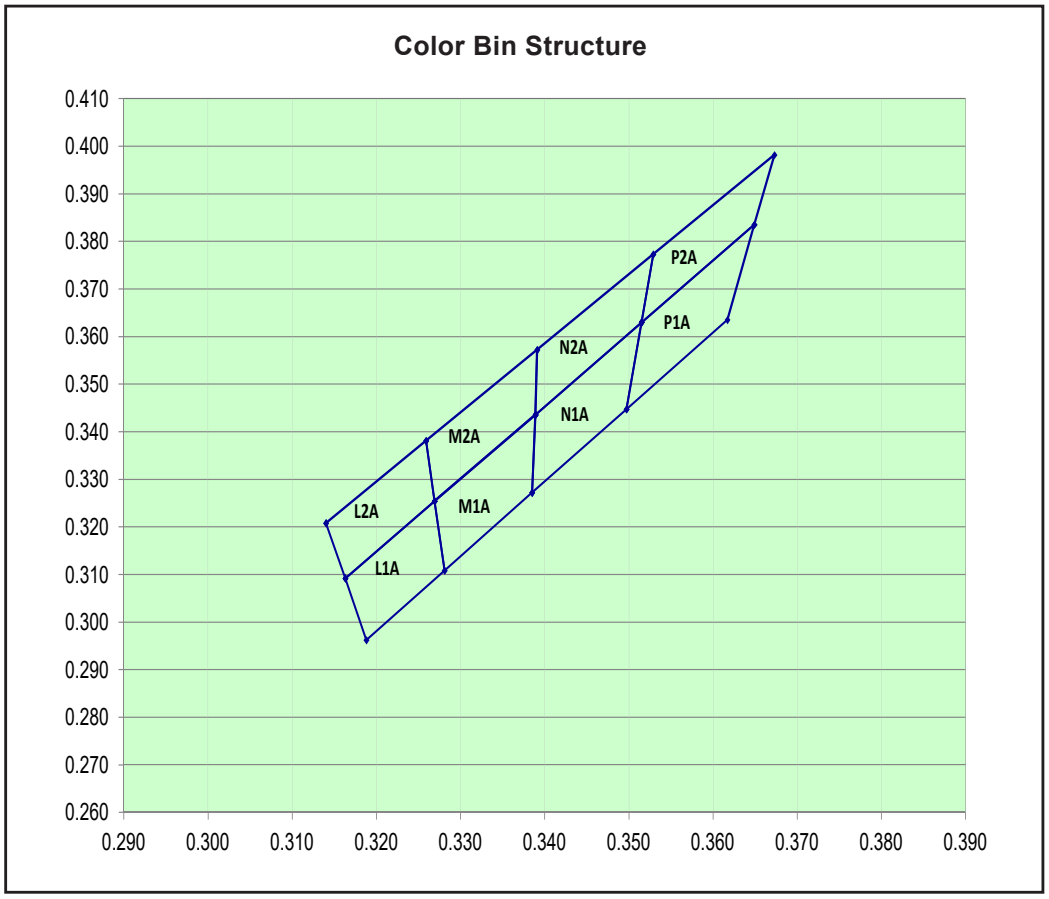
Electrical Characteristics at Tj=25^{0}C

Part Number	Vf @ If = 250 mA Appx. 3.1		
	Min. (V)	Typ. (V)	Max. (V)
MAW-KZHG	2.9	3.1	3.4

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	300	mA
Peak pulse current (tp<=10µs, Duty cycle=0.1)	600	mA
Reverse voltage	Not designed for reverse bias	V
ESD threshold (HBM)	4000	V
LED junction temperature	150	˚C
Operating temperature	-40 … +125	˚C
Storage temperature	-40 … +125	˚C
Thermal resistance - Real Thermal Resistance Junction / solder point, $R_{th\ JS\ real}$ (typ = 20) - Electrical Thermal Resistance Junction / solder point, $R_{th\ JS\ el}$ (typ = 14)	 25 18	 K/W K/W

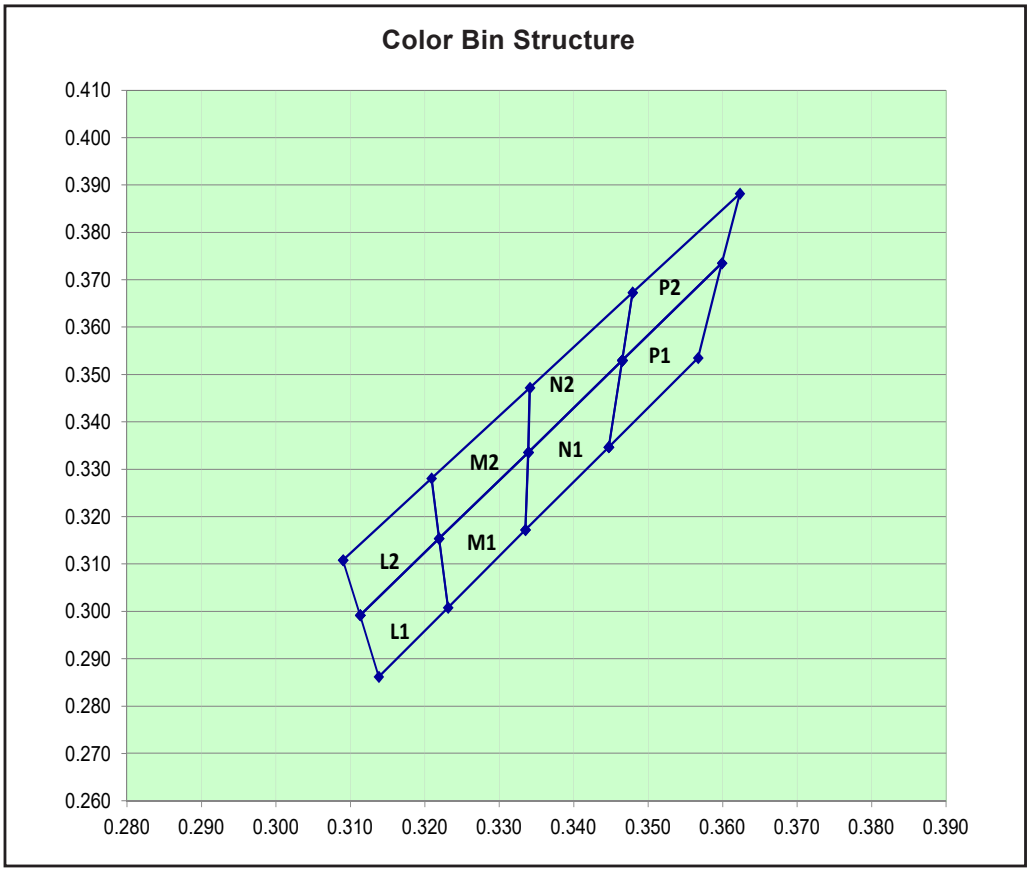
MAW-KZHG, Color Grouping (20mA)



Bin		1	2	3	4
L1A	Cx	0.3163	0.3188	0.3281	0.3269
	Cy	0.3092	0.2962	0.3108	0.3254
L2A	Cx	0.3140	0.3163	0.3269	0.3259
	Cy	0.3208	0.3092	0.3254	0.3381
M1A	Cx	0.3269	0.3281	0.3385	0.3389
	Cy	0.3254	0.3108	0.3272	0.3436
M2A	Cx	0.3259	0.3269	0.3389	0.3391
	Cy	0.3381	0.3254	0.3436	0.3572
N1A	Cx	0.3385	0.3389	0.3515	0.3497
	Cy	0.3272	0.3436	0.3630	0.3447
N2A	Cx	0.3389	0.3391	0.3529	0.3515
	Cy	0.3436	0.3572	0.3773	0.3630
P1A	Cx	0.3497	0.3515	0.3649	0.3617
	Cy	0.3447	0.3630	0.3835	0.3635
P2A	Cx	0.3515	0.3529	0.3673	0.3649
	Cy	0.3630	0.3773	0.3982	0.3835

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.

MAW-KZHG, Color Grouping (250mA) *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 Intensity Group at Tj=25^{0}C

Brightness Group	Luminous Flux @ If=20mA (lm) *Appx. 1.2*
H2	4.90 ... 5.50
H3	5.50 ... 6.30
J2	6.30 ... 7.15
J3	7.15 ... 8.20
K2	8.20 ... 9.35

Brightness Group	Luminous Flux @ If=250mA (lm) *Appx. 1.2*
S2	51.70 ... 59.00
S3	59.00 ... 67.20
T2	67.20 ... 76.50
T3	76.50 ... 87.40
U2	87.40 ... 99.40

Vf Binning (Optional)

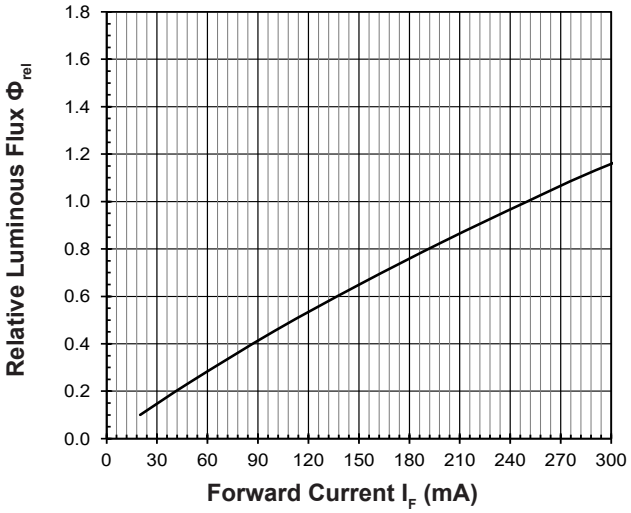
Vf Bin @ 20mA	Forward Voltage (V) *Appx. 3.1*
V28	2.60 ... 2.75
V29	2.75 ... 2.90
V31	2.90 ... 3.05

Vf Bin @ 250mA	Forward Voltage (V) *Appx. 3.1*
V0	2.70 ... 3.00
V1	3.00 ... 3.30
V2	3.30 ... 3.60

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

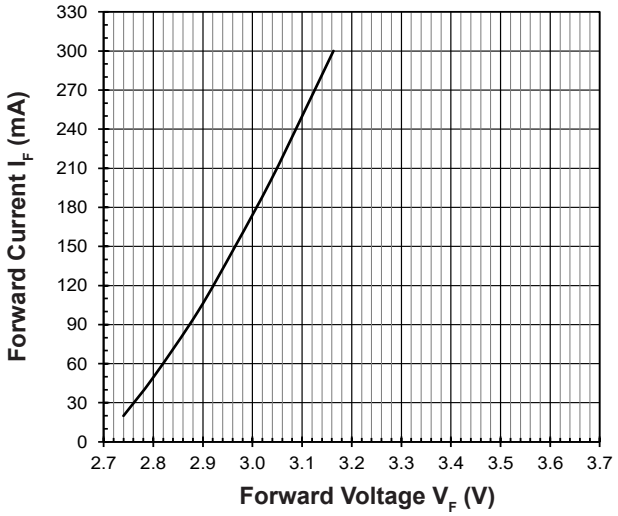
Relative Luminous Flux Vs Forward Current

$\Phi_V/\Phi_V(250mA) = f(I_F); T_j = 25°C$



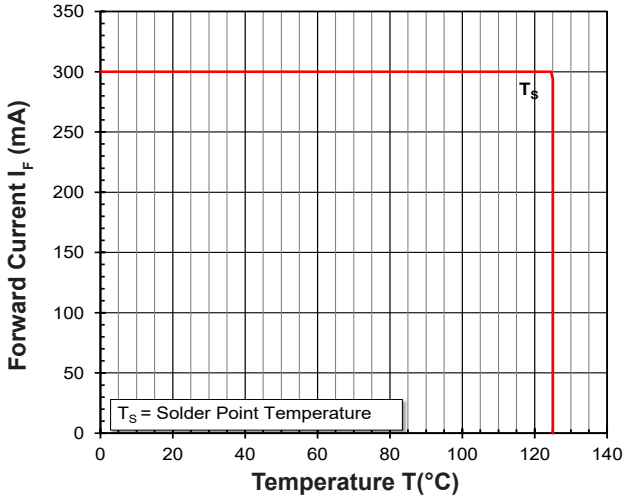
Forward Current Vs Forward Voltage

$I_F = f(V_F); T_j = 25°C$



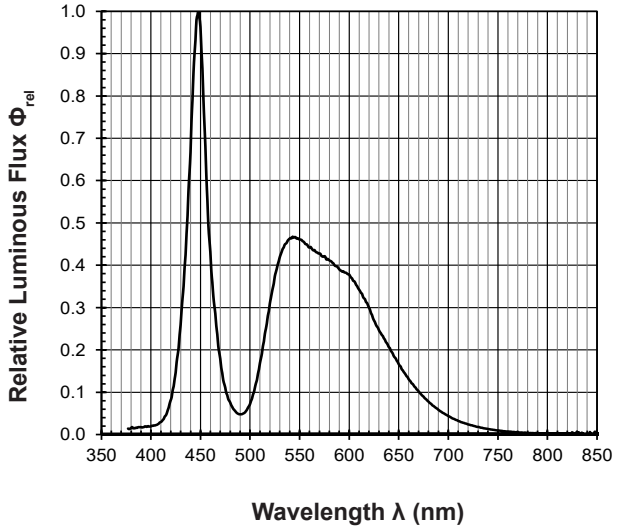
Maximum Current Vs Temperature

$I_F=f(T)$



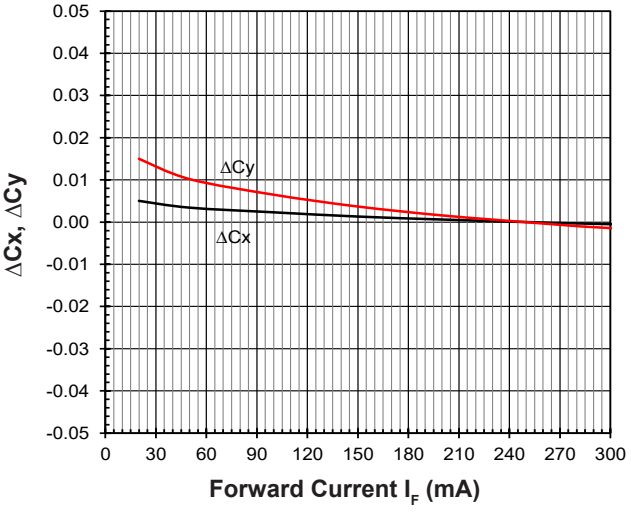
Relative Spectral Emission

$\Phi_{rel} = f(\lambda); T_j = 25°C; I_F = 250mA$



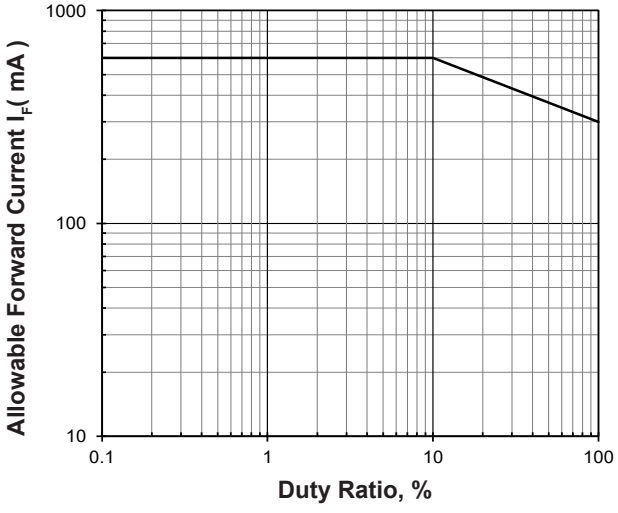
Chromaticity Coordinate Shift Vs Forward Current

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

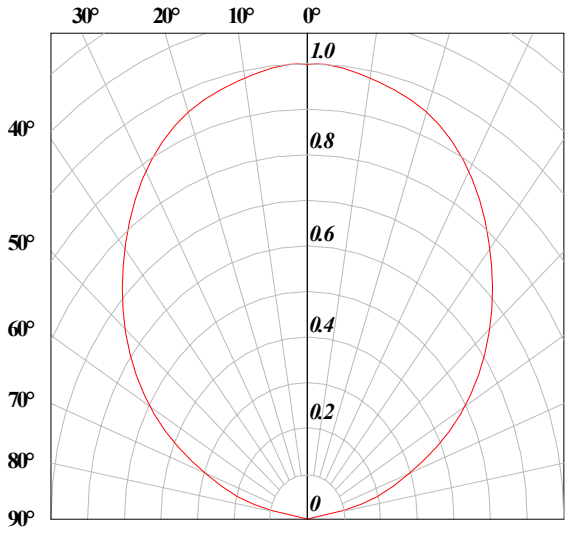


Allowable Forward Current Vs Duty Ratio

($T_j = 25°C; t_p \leq 10\mu s$)

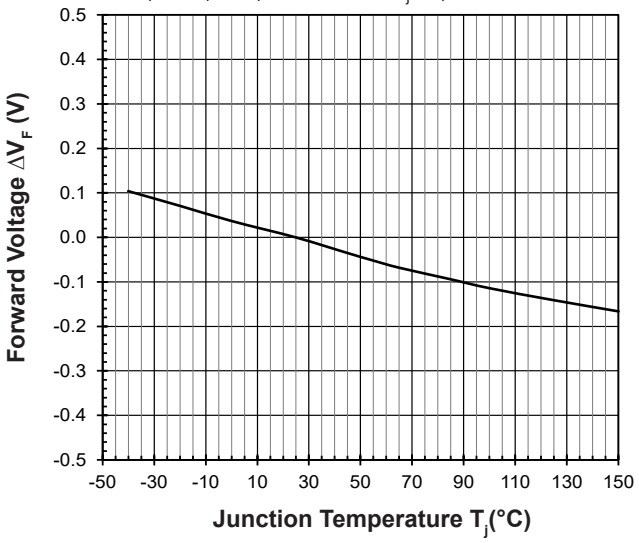


Radiation Pattern



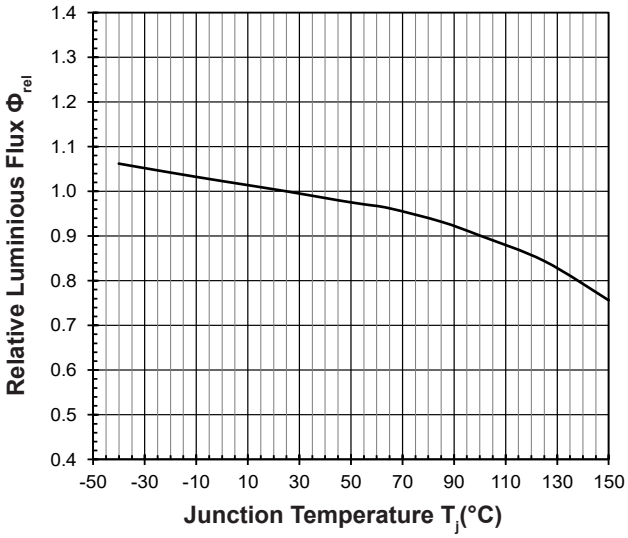
Forward Voltage Vs Junction Temperature

$\Delta V_F = V_F - V_F(25°C) = f(T_j)$; I_F =250mA



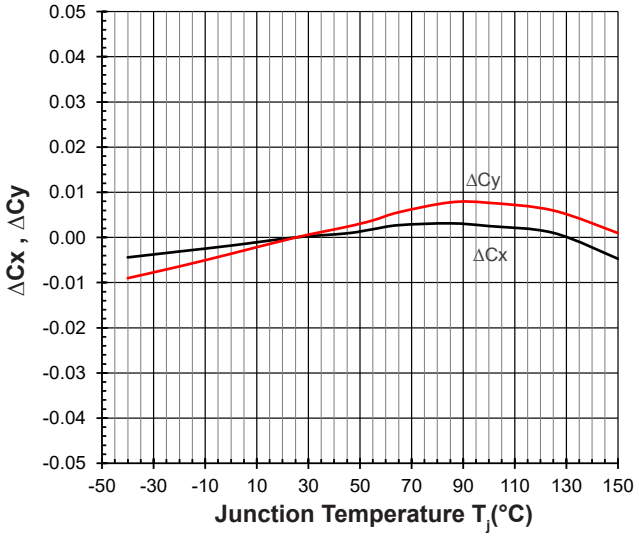
Relative Luminious Flux Vs Junction Temperature

$\Phi V/\Phi V(25°C) = f(T_j)$; I_F = 250mA

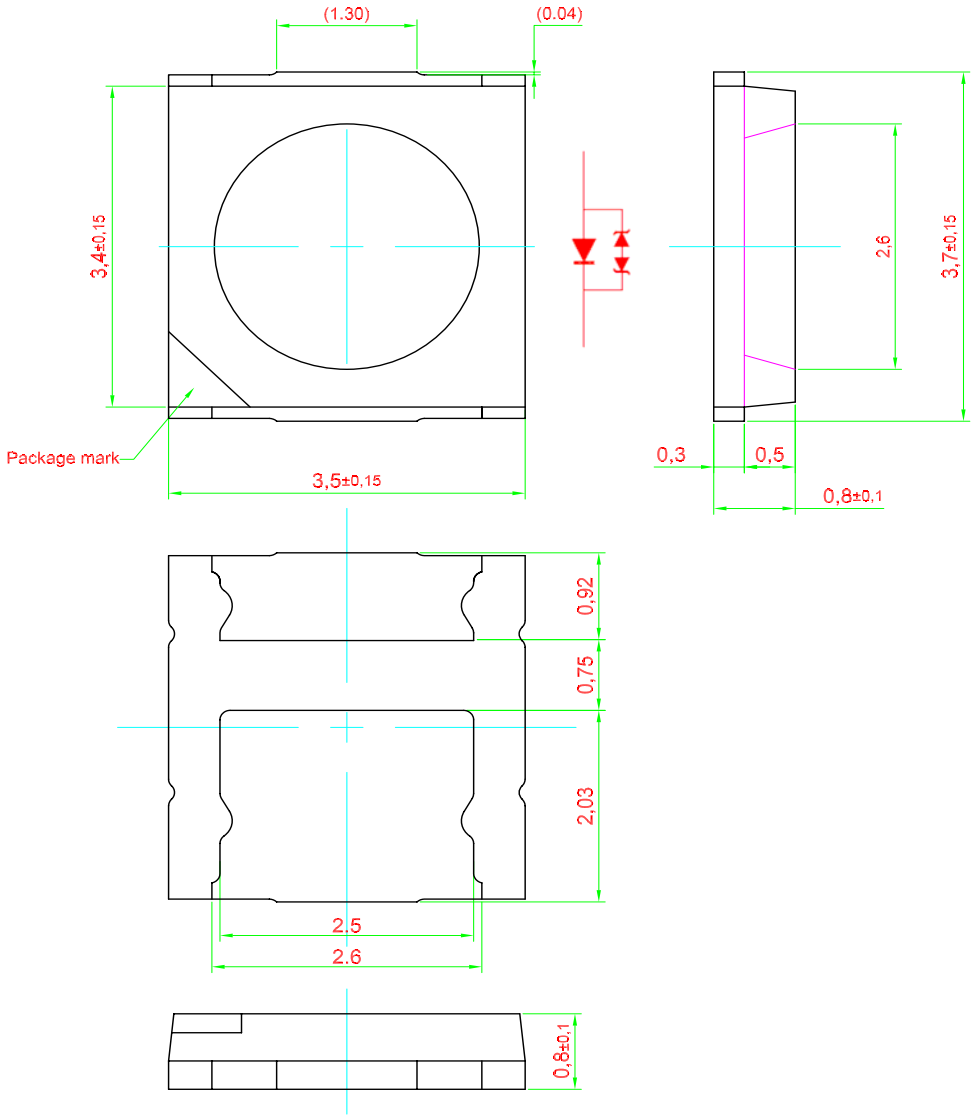


Chromaticity Coordinate Shift Vs Junction Temperature

$\Delta Cx, \Delta Cy = f(T_j)$; I_F = 250mA



PrimaxPlus • InGaN : MAW-KZHG Package Outlines

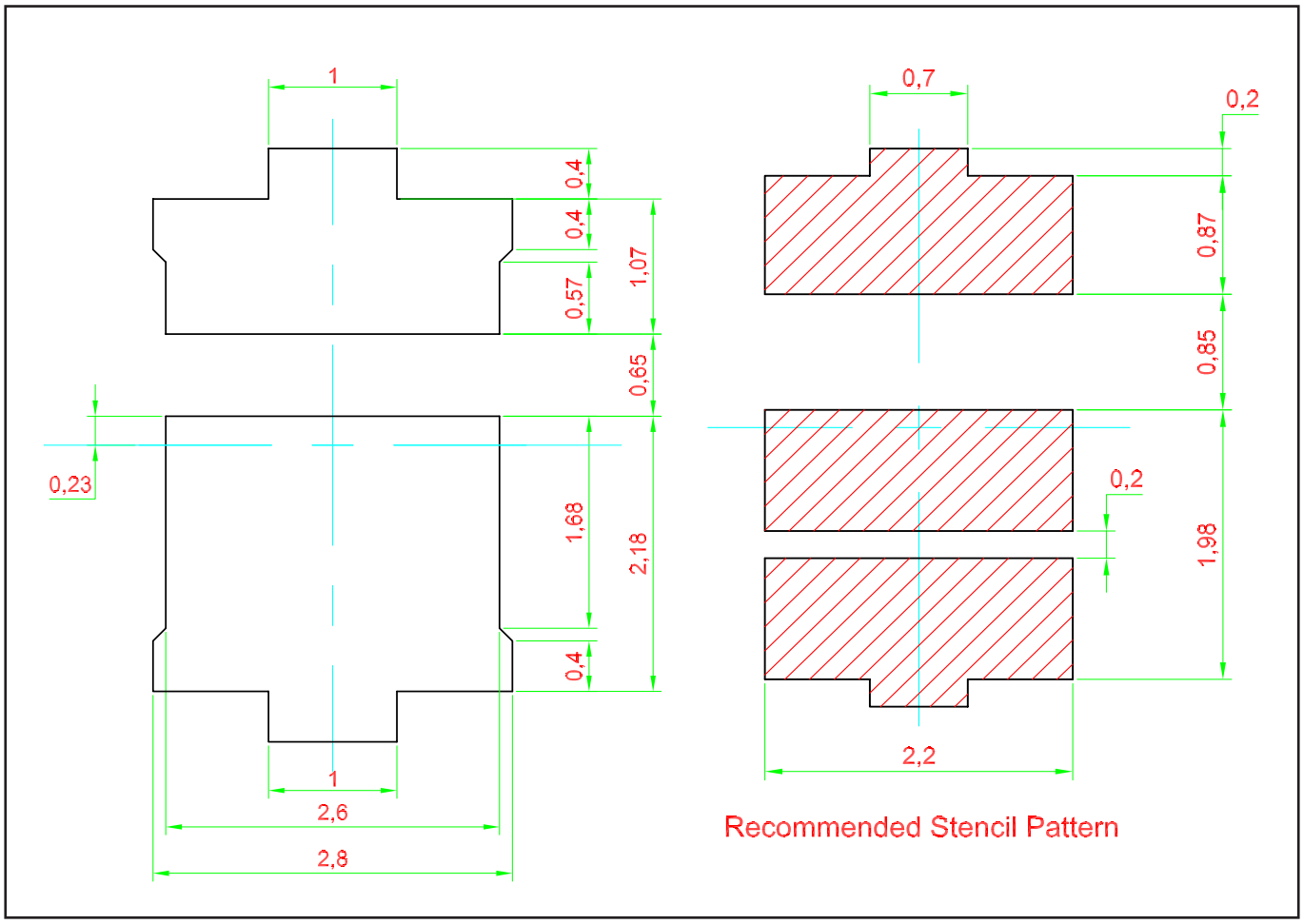


Notes:
Primary thermal path is through Cathode lead of LED package.
General tolerance: +/- 0.1mm.

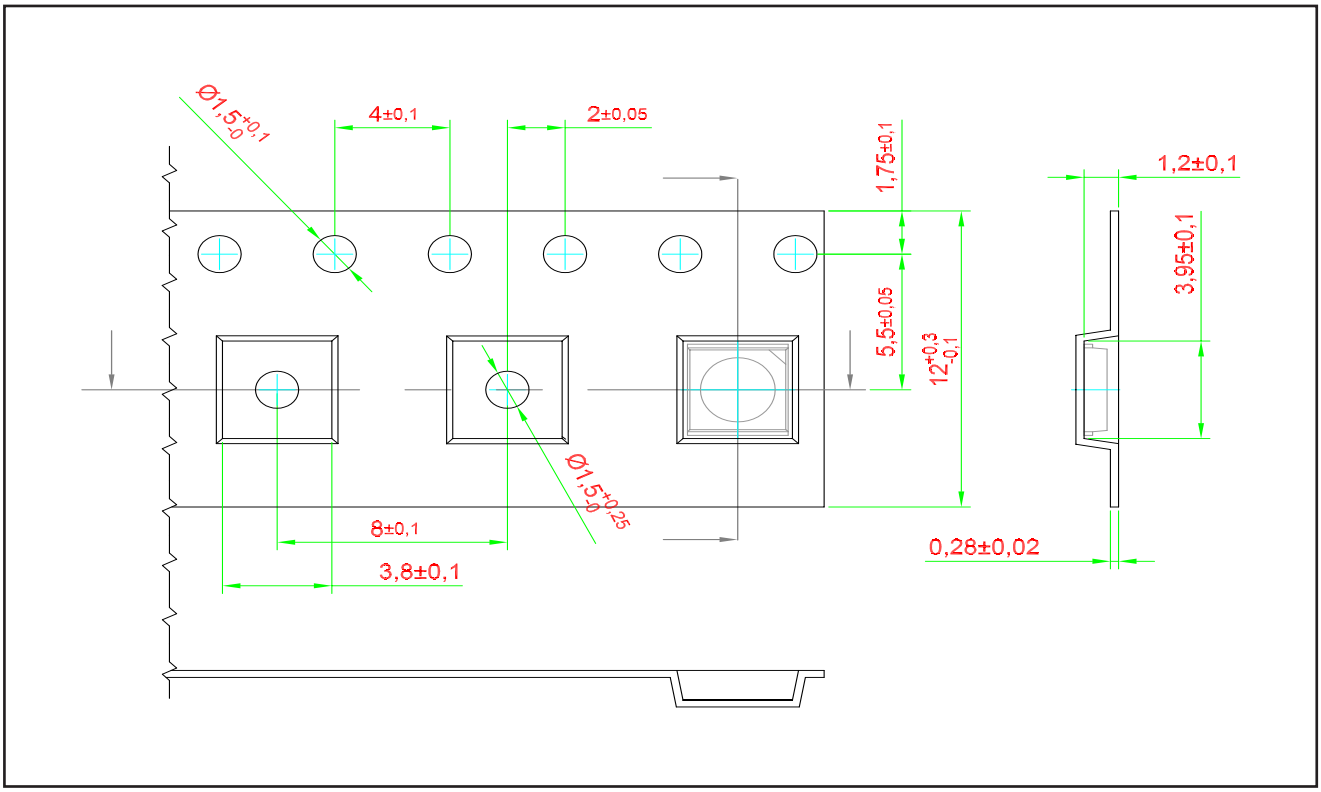
Material

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

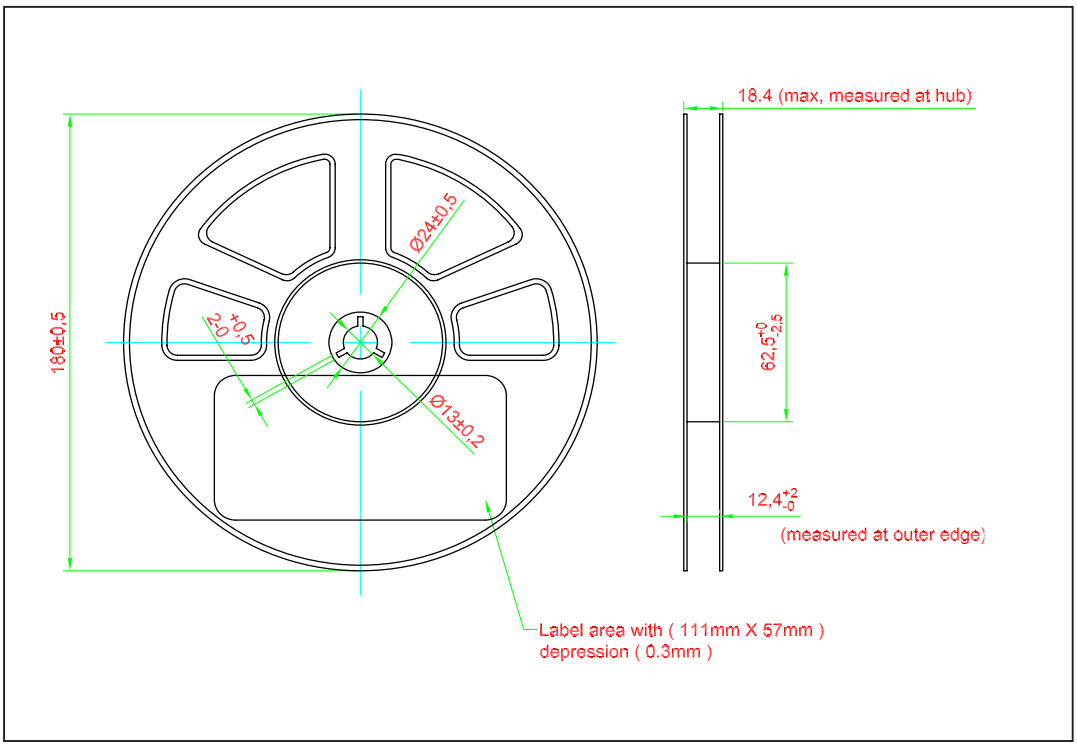
Recommended Solder Pad

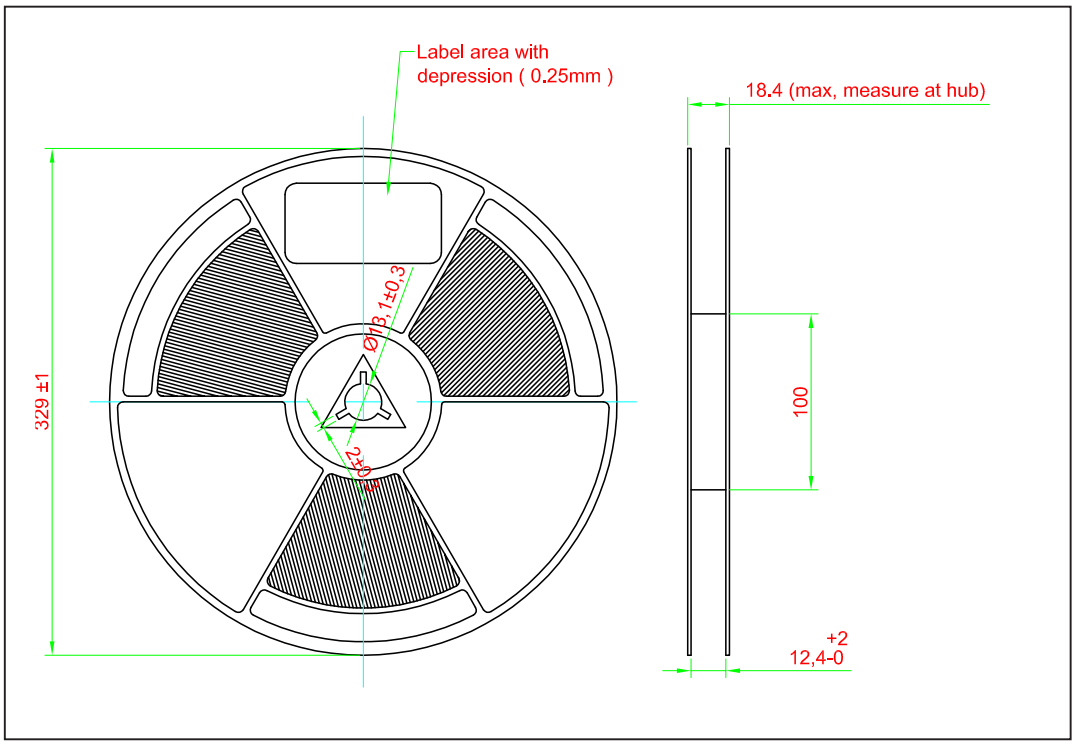


Taping and orientation



Packaging Specification



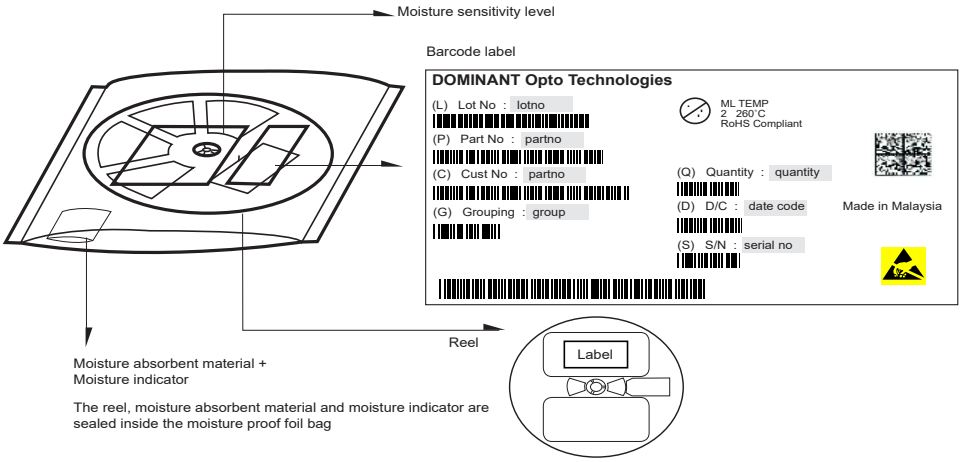


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	1500	MAW-KZHG-xxx-xxx+xxx-xxx
Optional Packing	329	5000	MAW-KZHG-xxx-xxx+xxx-xxx-5

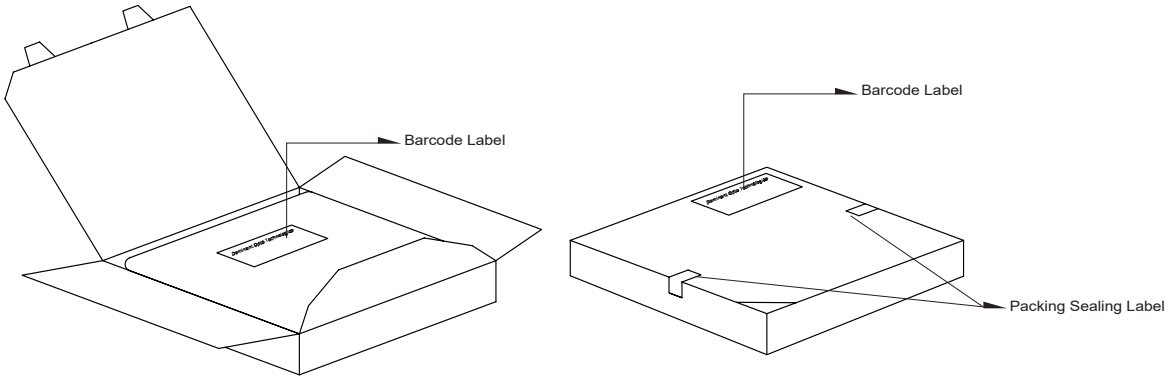
Notes:

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

Packaging Specification



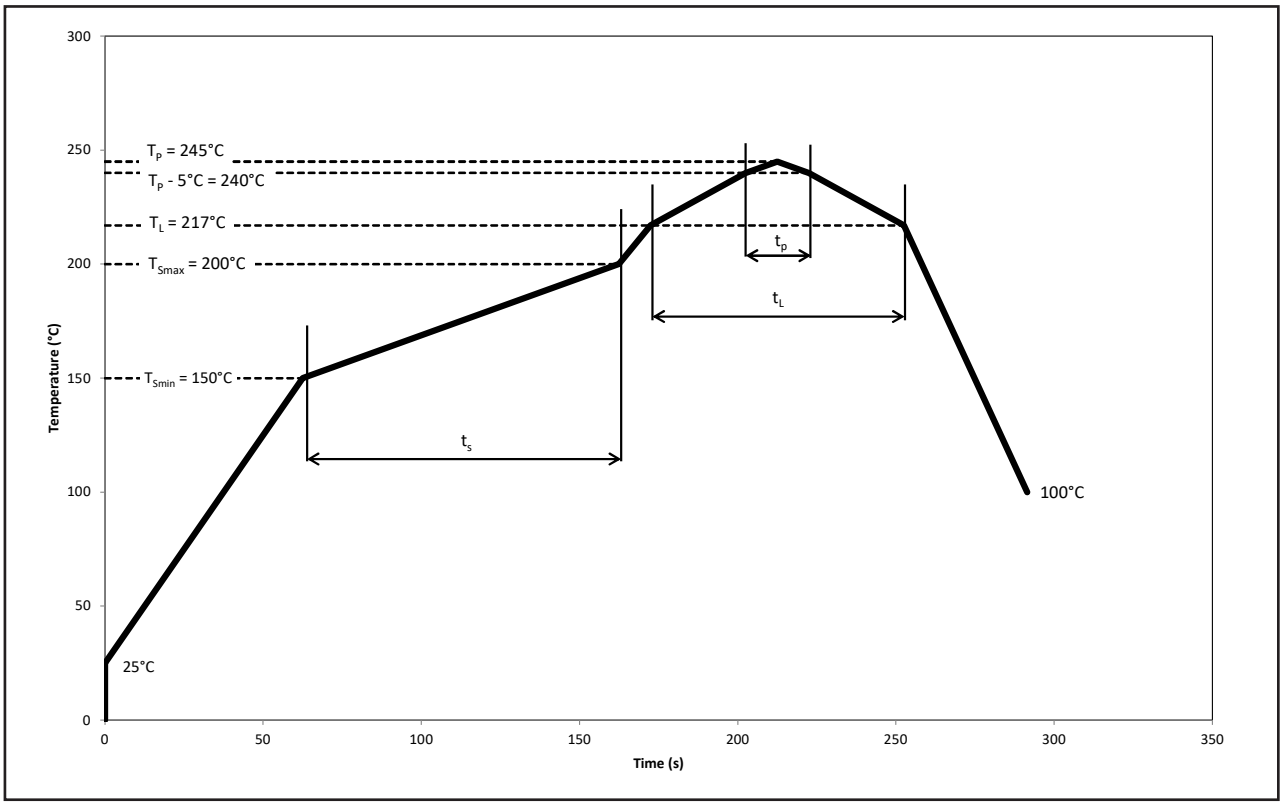
Quantity per bag (pcs)	Average 1pc PrimaxPlus (g)	1 completed bag (g)
1500	0.034	245 ± 10
5000	0.034	1150 ± 10



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 Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimension are specifiec in mm.

Revision History

Page	Subjects	Date of Modification
-	Initial Release	11 Oct 2017
2, 5, 13	Update Peak Pulse Current Update All Maximum Current Graph Update Appendix	09 Nov 2017
10, 11, 12	Update Packaging Specification Update Recommended Pb-free Soldering Profile	28 Mar 2022
10, 11	Update Quantity per Reel: 1000pcs to 1500pcs	01 Nov 2023

NOTE

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

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