

Spice:

Synonymous with function and performance, the new era of high intensity illumination in LED. With its high flux output and high luminous intensity, It transcends today LED lightings technology and how we perceive it.



Features:

- > Super high brightness surface mount LED
- > 120° viewing angle.
- > Compact package outline (LxW) of 3.0 x 1.4 mm.
- > Ultra low height profile - 0.52mm.
- > Low thermal resistance.
- > Build-in ESD protection device.
- > Environmental friendly; RoHS compliance.
- > Compliance to automotive standard; AEC-Q102.
- > Wettable flank design with solder fillet visibility.
- > High NTSC solution for wide color gamut backlight display.



Applications:

- > Automotive: Back-light applications.

Optical Characteristics at Tj=25°C

Part Number	Color	Viewing Angle°	Luminous Flux @ 80mA (lm) <i>Appx. 1.2</i>		
			Min.	Typ.	Max.
● SEW-EZSH-7P8Q-1	White	120	25.1	32.0	37.3

● Not for new design

Notes:

Typ Flux, chromaticity coordinate: Cx 0.287, Cy 0.278.

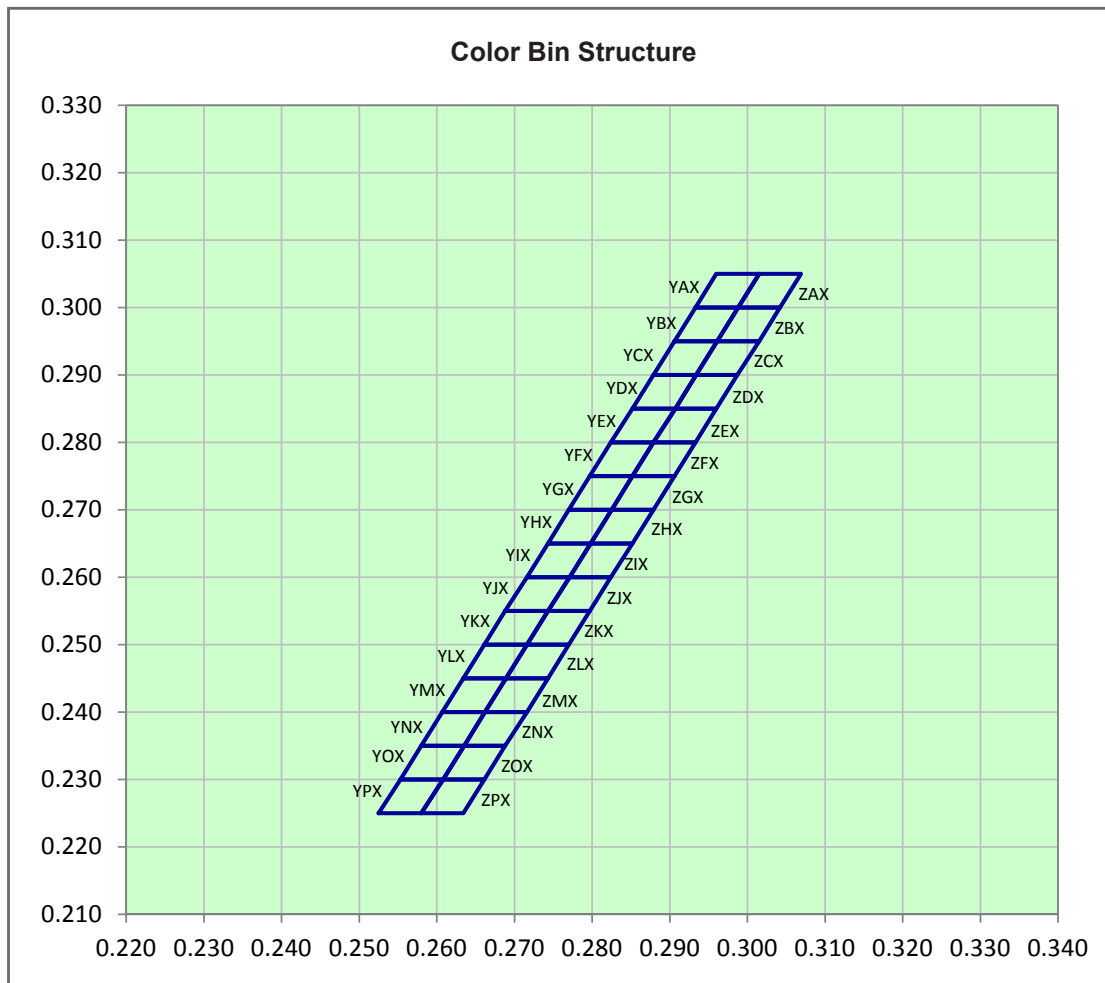
Electrical Characteristics at Tj=25°C

Part Number	Vf @ If = 80mA <i>Appx. 3.1</i>		
	Min. (V)	Typ. (V)	Max. (V)
SEW-EZSH	2.7	2.9	3.2

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	150	mA
Peak pulse current (tp ≤ 100µs, Duty cycle = 0.03)	720	mA
Reverse voltage	Not for reverse bias	V
ESD threshold (HBM)	8000	V
LED junction temperature	125	°C
Operating temperature	-40 ... +100	°C
Storage temperature	-40 ... +100	°C
Power dissipation (at room temperature)	480	mW
Thermal resistance (Rated current = 80mA, Ts = 25°C) <i>Appx. 6.1</i>		
- Junction / solder point, R _{th JS} (typ = 18) (Mounting on DOMINANT standard PCB)	28	K/W

SEW-EZSH, Color Grouping *Appx. 2.1*



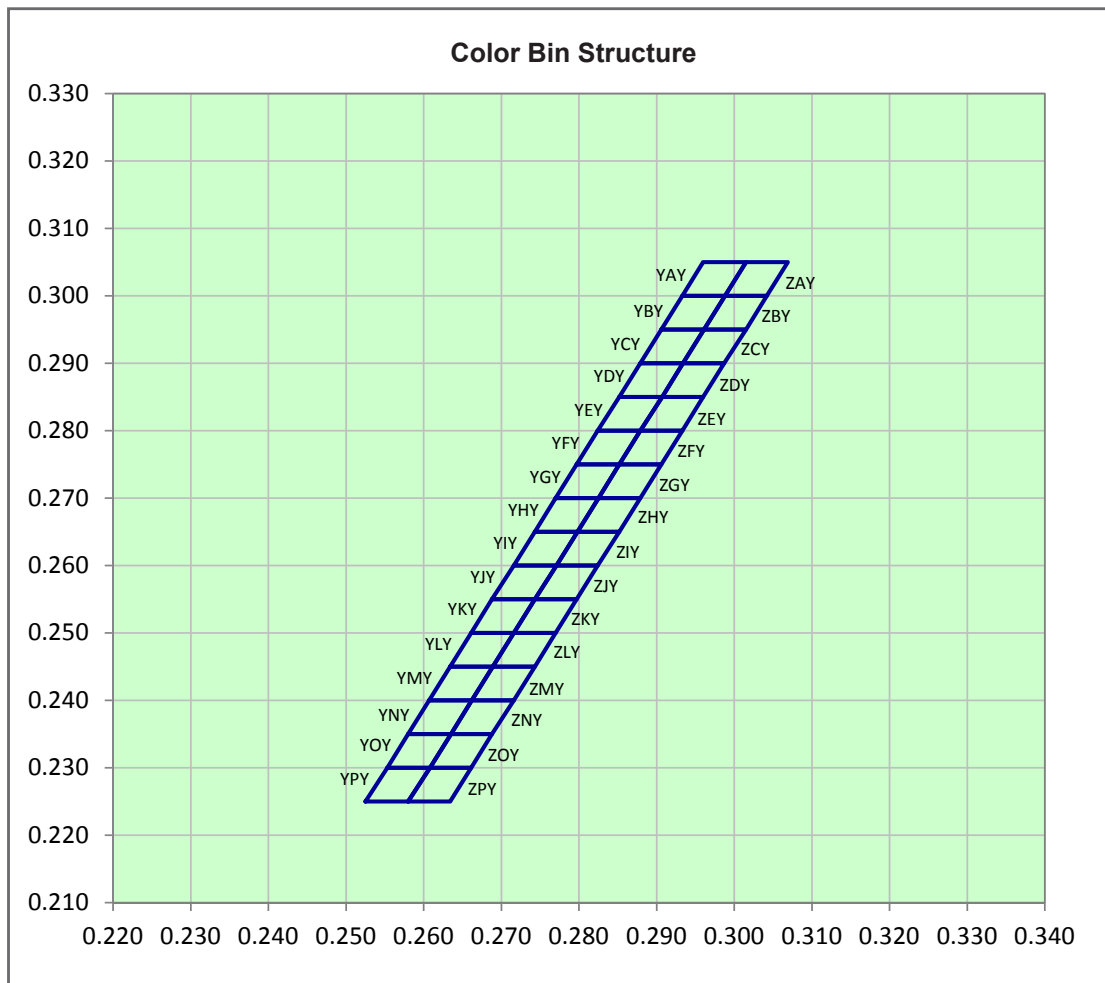
Bin		1	2	3	4
YAX	Cx	0.2933	0.2960	0.3015	0.2988
	Cy	0.3000	0.3050	0.3050	0.3000
YBX	Cx	0.2906	0.2933	0.2988	0.2961
	Cy	0.2950	0.3000	0.3000	0.2950
YCX	Cx	0.2879	0.2906	0.2961	0.2934
	Cy	0.2900	0.2950	0.2950	0.2900
YDX	Cx	0.2852	0.2879	0.2934	0.2907
	Cy	0.2850	0.2900	0.2900	0.2850
YEX	Cx	0.2824	0.2852	0.2907	0.2879
	Cy	0.2800	0.2850	0.2850	0.2800
YFX	Cx	0.2797	0.2824	0.2879	0.2852
	Cy	0.2750	0.2800	0.2800	0.2750
YGX	Cx	0.2770	0.2797	0.2852	0.2825
	Cy	0.2700	0.2750	0.2750	0.2700
YHX	Cx	0.2743	0.2770	0.2825	0.2798
	Cy	0.2650	0.2700	0.2700	0.2650
YIX	Cx	0.2716	0.2743	0.2798	0.2771
	Cy	0.2600	0.2650	0.2650	0.2600
YJX	Cx	0.2688	0.2716	0.2771	0.2743
	Cy	0.2550	0.2600	0.2600	0.2550

Bin		1	2	3	4
YKX	Cx	0.2661	0.2688	0.2743	0.2716
	Cy	0.2500	0.2550	0.2550	0.2500
YLX	Cx	0.2634	0.2661	0.2716	0.2689
	Cy	0.2450	0.2500	0.2500	0.2450
YMX	Cx	0.2607	0.2634	0.2689	0.2662
	Cy	0.2400	0.2450	0.2450	0.2400
YNX	Cx	0.2580	0.2607	0.2662	0.2635
	Cy	0.2350	0.2400	0.2400	0.2350
YOX	Cx	0.2553	0.2580	0.2635	0.2608
	Cy	0.2300	0.2350	0.2350	0.2300
YPX	Cx	0.2525	0.2553	0.2608	0.2580
	Cy	0.2250	0.2300	0.2300	0.2250
ZAX	Cx	0.2988	0.3015	0.3069	0.3042
	Cy	0.3000	0.3050	0.3050	0.3000
ZBX	Cx	0.2961	0.2988	0.3042	0.3015
	Cy	0.2950	0.3000	0.3000	0.2950
ZCX	Cx	0.2934	0.2961	0.3015	0.2987
	Cy	0.2900	0.2950	0.2950	0.2900
ZDX	Cx	0.2907	0.2934	0.2987	0.2960
	Cy	0.2850	0.2900	0.2900	0.2850
ZEX	Cx	0.2879	0.2907	0.2960	0.2933
	Cy	0.2800	0.2850	0.2850	0.2800
ZFX	Cx	0.2852	0.2879	0.2933	0.2906
	Cy	0.2750	0.2800	0.2800	0.2750
ZGX	Cx	0.2825	0.2852	0.2906	0.2879
	Cy	0.2700	0.2750	0.2750	0.2700
ZHX	Cx	0.2798	0.2825	0.2879	0.2852
	Cy	0.2650	0.2700	0.2700	0.2650
ZIX	Cx	0.2771	0.2798	0.2852	0.2824
	Cy	0.2600	0.2650	0.2650	0.2600
ZJX	Cx	0.2743	0.2771	0.2824	0.2797
	Cy	0.2550	0.2600	0.2600	0.2550
ZKX	Cx	0.2716	0.2743	0.2797	0.2770
	Cy	0.2500	0.2550	0.2550	0.2500
ZLX	Cx	0.2689	0.2716	0.2770	0.2743
	Cy	0.2450	0.2500	0.2500	0.2450
ZMX	Cx	0.2662	0.2689	0.2743	0.2716
	Cy	0.2400	0.2450	0.2450	0.2400
ZNX	Cx	0.2635	0.2662	0.2716	0.2688
	Cy	0.2350	0.2400	0.2400	0.2350
ZOX	Cx	0.2608	0.2635	0.2688	0.2661
	Cy	0.2300	0.2350	0.2350	0.2300
ZPX	Cx	0.2580	0.2608	0.2661	0.2634
	Cy	0.2250	0.2300	0.2300	0.2250

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.

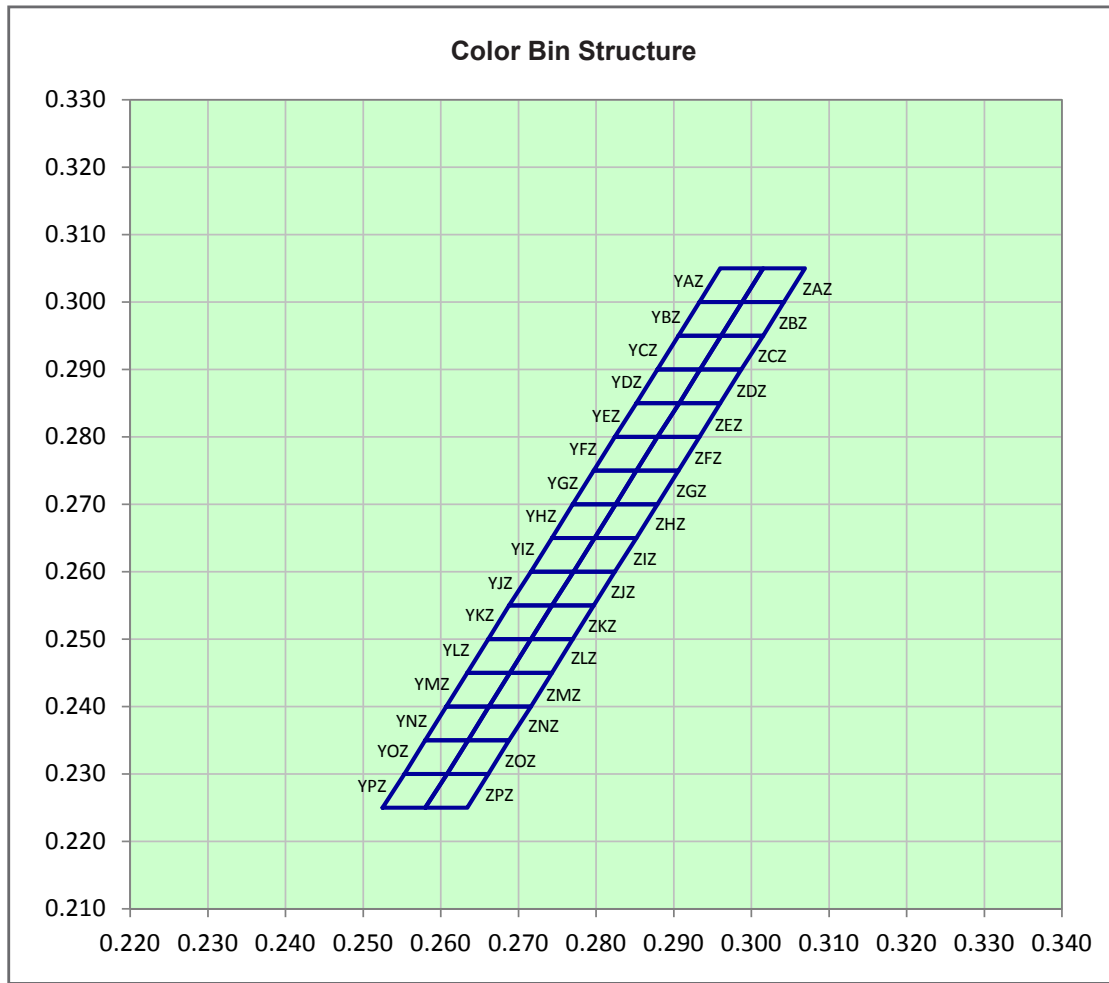
*All above binning is shippable. Dominant reserved the right to determine the combination ratio to ship.

SEW-EZSH, Color Grouping *Appx. 2.1*



Bin		1	2	3	4
YAY	Cx	0.2933	0.2960	0.3015	0.2988
	Cy	0.3000	0.3050	0.3050	0.3000
YBY	Cx	0.2906	0.2933	0.2988	0.2961
	Cy	0.2950	0.3000	0.3000	0.2950
YCY	Cx	0.2879	0.2906	0.2961	0.2934
	Cy	0.2900	0.2950	0.2950	0.2900
YDY	Cx	0.2852	0.2879	0.2934	0.2907
	Cy	0.2850	0.2900	0.2900	0.2850
YDY	Cx	0.2824	0.2852	0.2907	0.2879
	Cy	0.2800	0.2850	0.2850	0.2800
YFY	Cx	0.2797	0.2824	0.2879	0.2852
	Cy	0.2750	0.2800	0.2800	0.2750
YGY	Cx	0.2770	0.2797	0.2852	0.2825
	Cy	0.2700	0.2750	0.2750	0.2700
YHY	Cx	0.2743	0.2770	0.2825	0.2798
	Cy	0.2650	0.2700	0.2700	0.2650
YIY	Cx	0.2716	0.2743	0.2798	0.2771
	Cy	0.2600	0.2650	0.2650	0.2600
YJY	Cx	0.2688	0.2716	0.2771	0.2743
	Cy	0.2550	0.2600	0.2600	0.2550

SEW-EZSH, Color Grouping *Appx. 2.1*



Bin		1	2	3	4
YAZ	Cx	0.2933	0.2960	0.3015	0.2988
	Cy	0.3000	0.3050	0.3050	0.3000
YBZ	Cx	0.2906	0.2933	0.2988	0.2961
	Cy	0.2950	0.3000	0.3000	0.2950
YCZ	Cx	0.2879	0.2906	0.2961	0.2934
	Cy	0.2900	0.2950	0.2950	0.2900
YDZ	Cx	0.2852	0.2879	0.2934	0.2907
	Cy	0.2850	0.2900	0.2900	0.2850
Y EZ	Cx	0.2824	0.2852	0.2907	0.2879
	Cy	0.2800	0.2850	0.2850	0.2800
YFZ	Cx	0.2797	0.2824	0.2879	0.2852
	Cy	0.2750	0.2800	0.2800	0.2750
YGZ	Cx	0.2770	0.2797	0.2852	0.2825
	Cy	0.2700	0.2750	0.2750	0.2700
YHZ	Cx	0.2743	0.2770	0.2825	0.2798
	Cy	0.2650	0.2700	0.2700	0.2650
YIZ	Cx	0.2716	0.2743	0.2798	0.2771
	Cy	0.2600	0.2650	0.2650	0.2600
YJZ	Cx	0.2688	0.2716	0.2771	0.2743
	Cy	0.2550	0.2600	0.2600	0.2550

Bin		1	2	3	4
YKZ	Cx	0.2661	0.2688	0.2743	0.2716
	Cy	0.2500	0.2550	0.2550	0.2500
YLZ	Cx	0.2634	0.2661	0.2716	0.2689
	Cy	0.2450	0.2500	0.2500	0.2450
YMZ	Cx	0.2607	0.2634	0.2689	0.2662
	Cy	0.2400	0.2450	0.2450	0.2400
YNZ	Cx	0.2580	0.2607	0.2662	0.2635
	Cy	0.2350	0.2400	0.2400	0.2350
YOZ	Cx	0.2553	0.2580	0.2635	0.2608
	Cy	0.2300	0.2350	0.2350	0.2300
YPZ	Cx	0.2525	0.2553	0.2608	0.2580
	Cy	0.2250	0.2300	0.2300	0.2250
ZAZ	Cx	0.2988	0.3015	0.3069	0.3042
	Cy	0.3000	0.3050	0.3050	0.3000
ZBZ	Cx	0.2961	0.2988	0.3042	0.3015
	Cy	0.2950	0.3000	0.3000	0.2950
ZCZ	Cx	0.2934	0.2961	0.3015	0.2987
	Cy	0.2900	0.2950	0.2950	0.2900
ZDZ	Cx	0.2907	0.2934	0.2987	0.2960
	Cy	0.2850	0.2900	0.2900	0.2850
ZEZ	Cx	0.2879	0.2907	0.2960	0.2933
	Cy	0.2800	0.2850	0.2850	0.2800
ZFZ	Cx	0.2852	0.2879	0.2933	0.2906
	Cy	0.2750	0.2800	0.2800	0.2750
ZGZ	Cx	0.2825	0.2852	0.2906	0.2879
	Cy	0.2700	0.2750	0.2750	0.2700
ZHZ	Cx	0.2798	0.2825	0.2879	0.2852
	Cy	0.2650	0.2700	0.2700	0.2650
ZIZ	Cx	0.2771	0.2798	0.2852	0.2824
	Cy	0.2600	0.2650	0.2650	0.2600
ZJZ	Cx	0.2743	0.2771	0.2824	0.2797
	Cy	0.2550	0.2600	0.2600	0.2550
ZKZ	Cx	0.2716	0.2743	0.2797	0.2770
	Cy	0.2500	0.2550	0.2550	0.2500
ZLZ	Cx	0.2689	0.2716	0.2770	0.2743
	Cy	0.2450	0.2500	0.2500	0.2450
ZMZ	Cx	0.2662	0.2689	0.2743	0.2716
	Cy	0.2400	0.2450	0.2450	0.2400
ZNZ	Cx	0.2635	0.2662	0.2716	0.2688
	Cy	0.2350	0.2400	0.2400	0.2350
ZOZ	Cx	0.2608	0.2635	0.2688	0.2661
	Cy	0.2300	0.2350	0.2350	0.2300
ZPZ	Cx	0.2580	0.2608	0.2661	0.2634
	Cy	0.2250	0.2300	0.2300	0.2250

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.

*All above binning is shippable. Dominant reserved the right to determine the combination ratio to ship.

Luminous Intensity Group

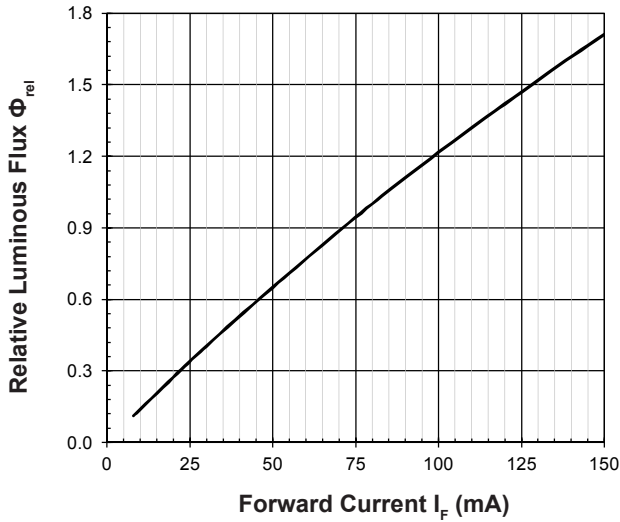
Brightness Group	Luminous Flux ^{Appx. 1.2} (lm)
7P	25.1 ... 26.8
8P	26.8 ... 28.7
9P	28.7 ... 30.6
6Q	30.6 ... 32.7
7Q	32.7 ... 34.8
8Q	34.8 ... 37.3

Vf Binning

Vf Bin @ 80mA	Forward Voltage (V) ^{Appx. 3.1}
VB3	2.70 ... 2.80
VB4	2.80 ... 2.90
VB5	2.90 ... 3.00
VB6	3.00 ... 3.10
VB7	3.10 ... 3.20

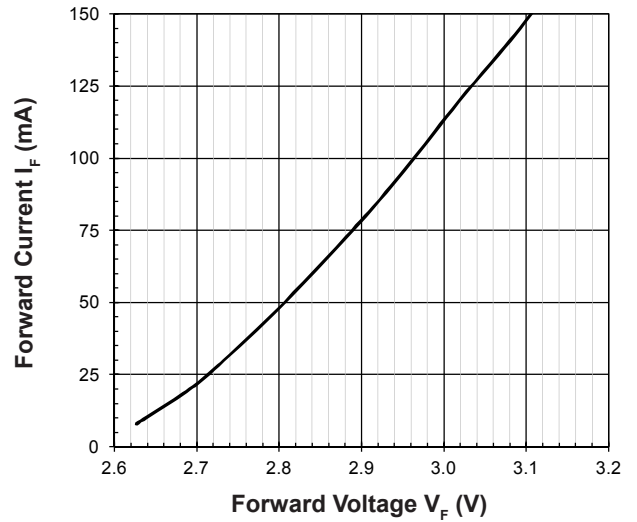
Relative Luminous Flux Vs Forward Current

$\Phi_V/\Phi_V(80\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$



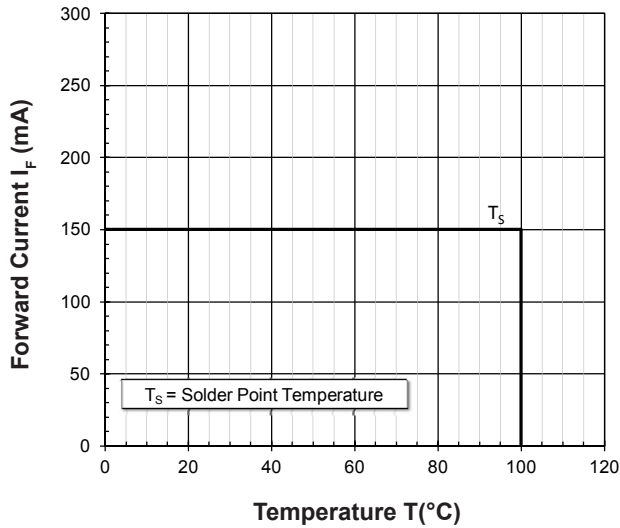
Forward Current Vs Forward Voltage

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



Maximum Current Vs Temperature

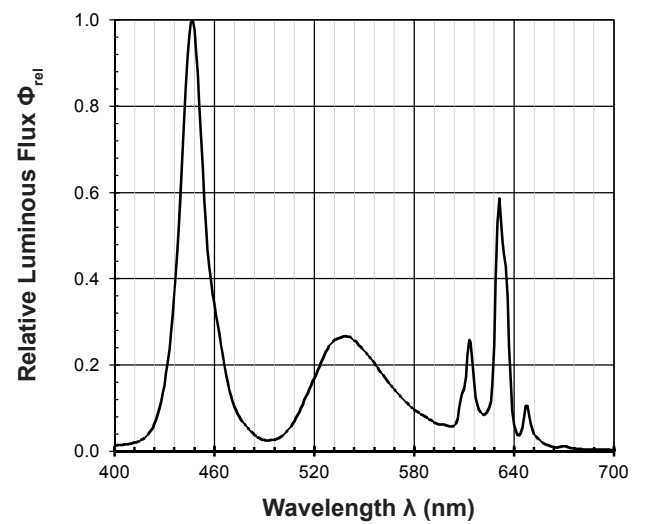
$I_F = f(T)$



Relative Spectral Emission

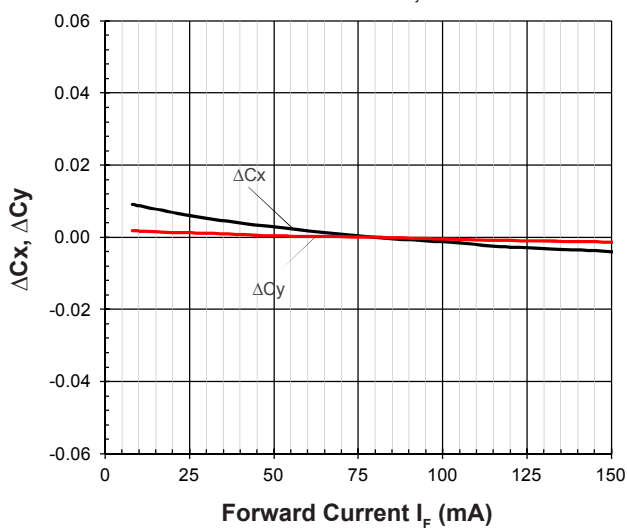
$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 80\text{mA}$

**This LED will have red fluorescence with a delay pulse of about 10ms due to its special red phosphor characteristic. If the LEDs are operated with a pulse current, please ensure a proper design without any issue.*



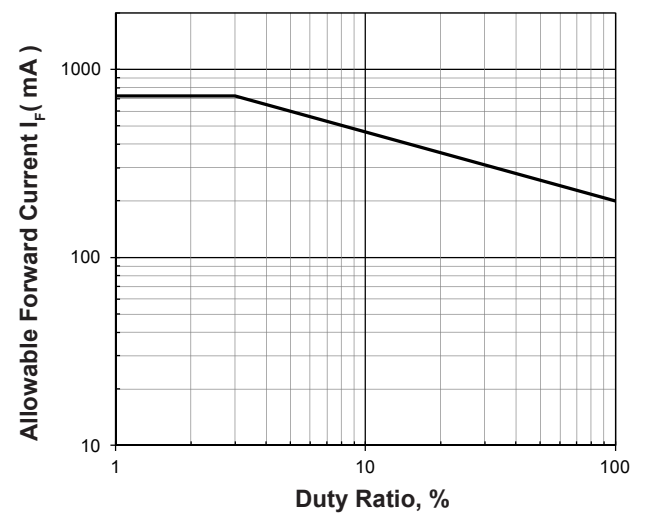
Chromaticity Coordinate Shift Vs Forward Current

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

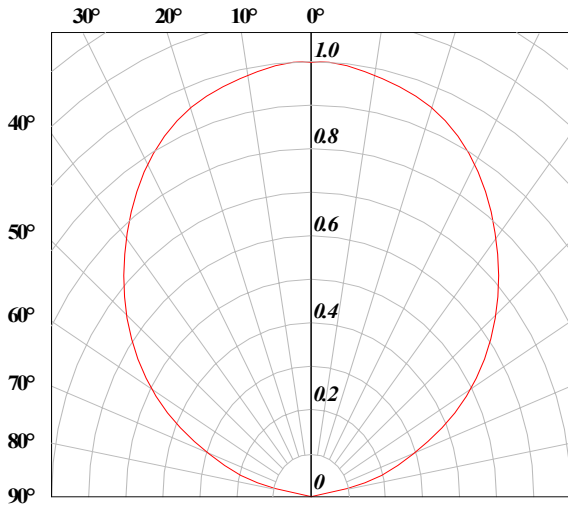


Allowable Forward Current Vs Duty Ratio

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

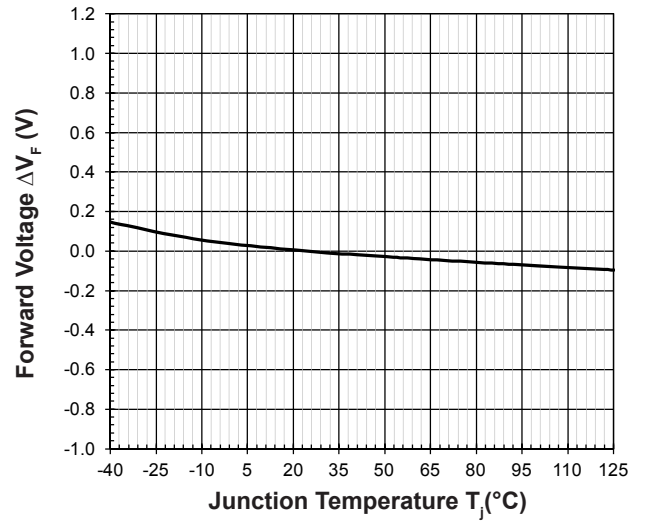


Radiation Pattern



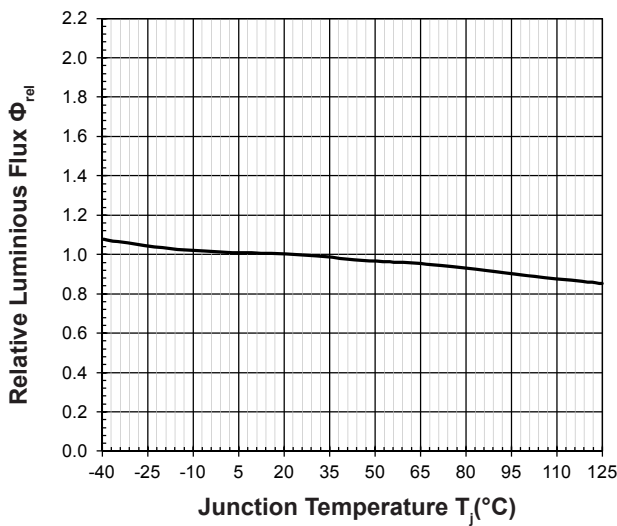
Forward Voltage Vs Junction Temperature

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 80\text{mA}$$



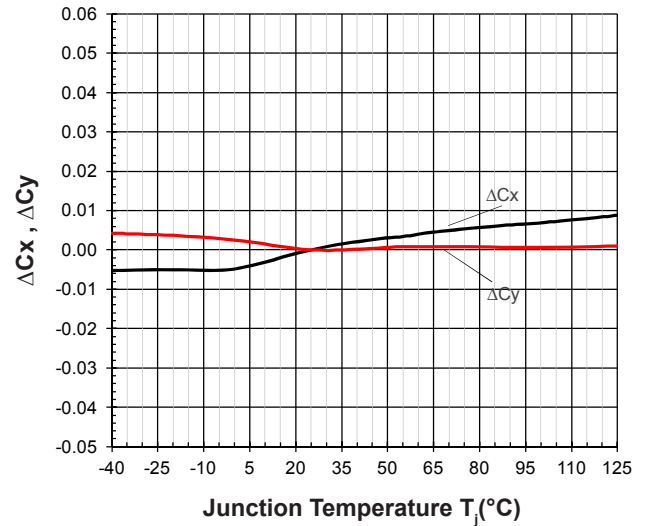
Relative Luminous Flux Vs Junction Temperature

$$\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j); I_F = 80\text{mA}$$

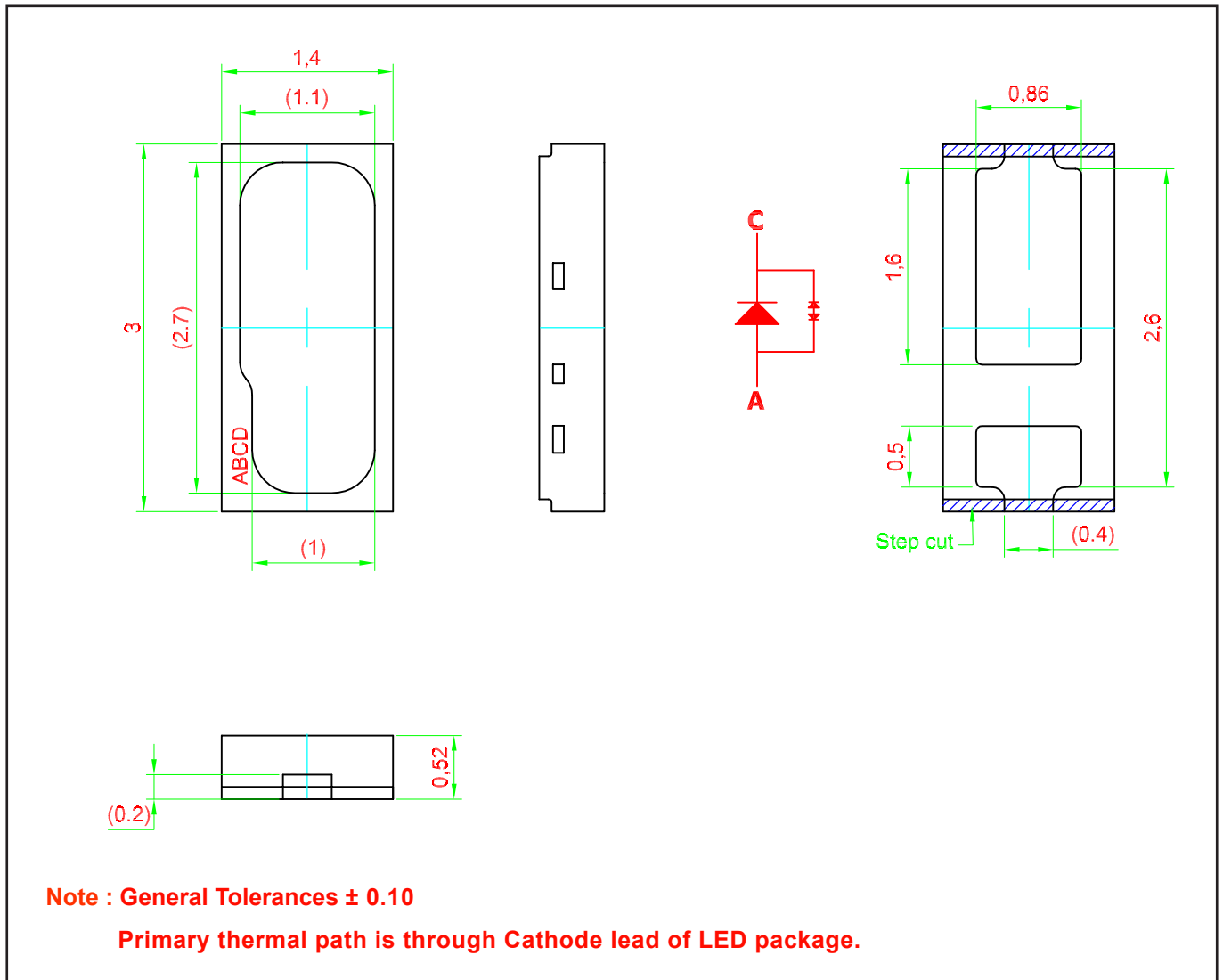


Chromaticity Coordinate Shift Vs Junction Temperature

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 80\text{mA}$$



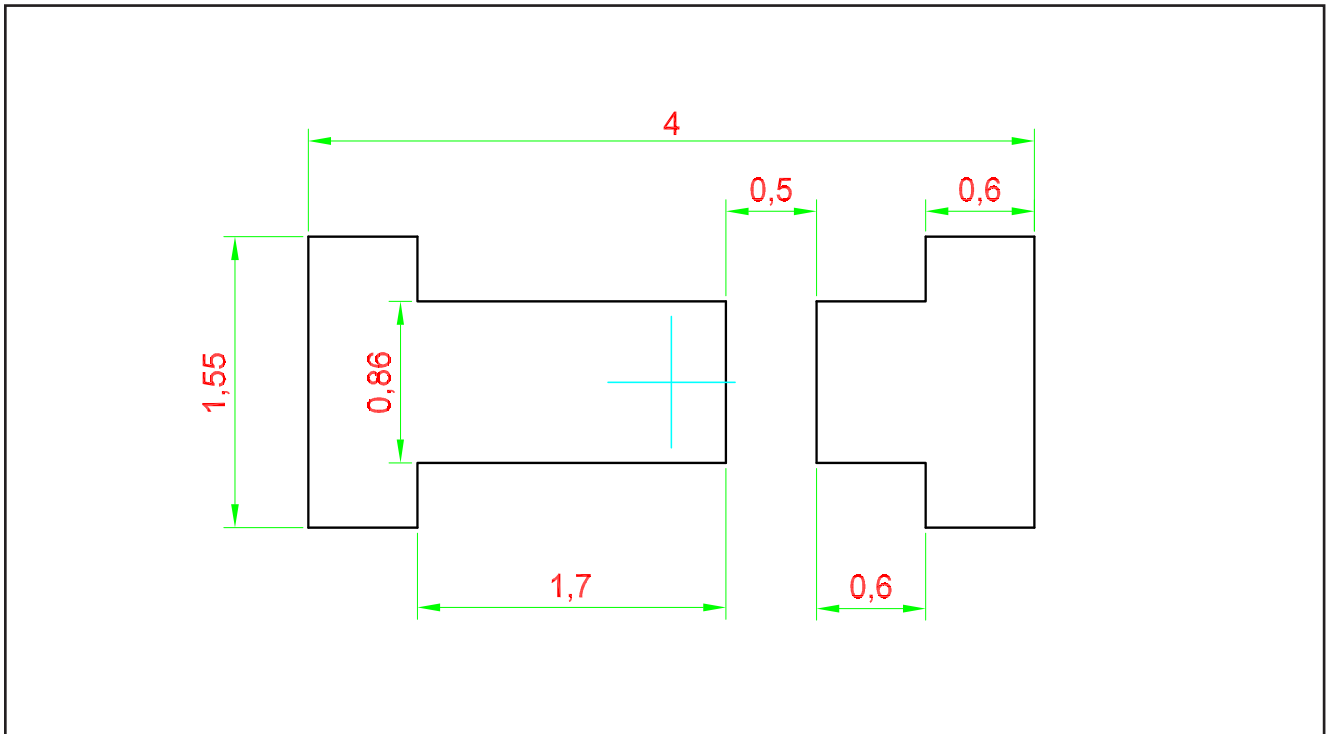
SpicePlus 3014 • InGaN : SEW-EZSH Package Outlines



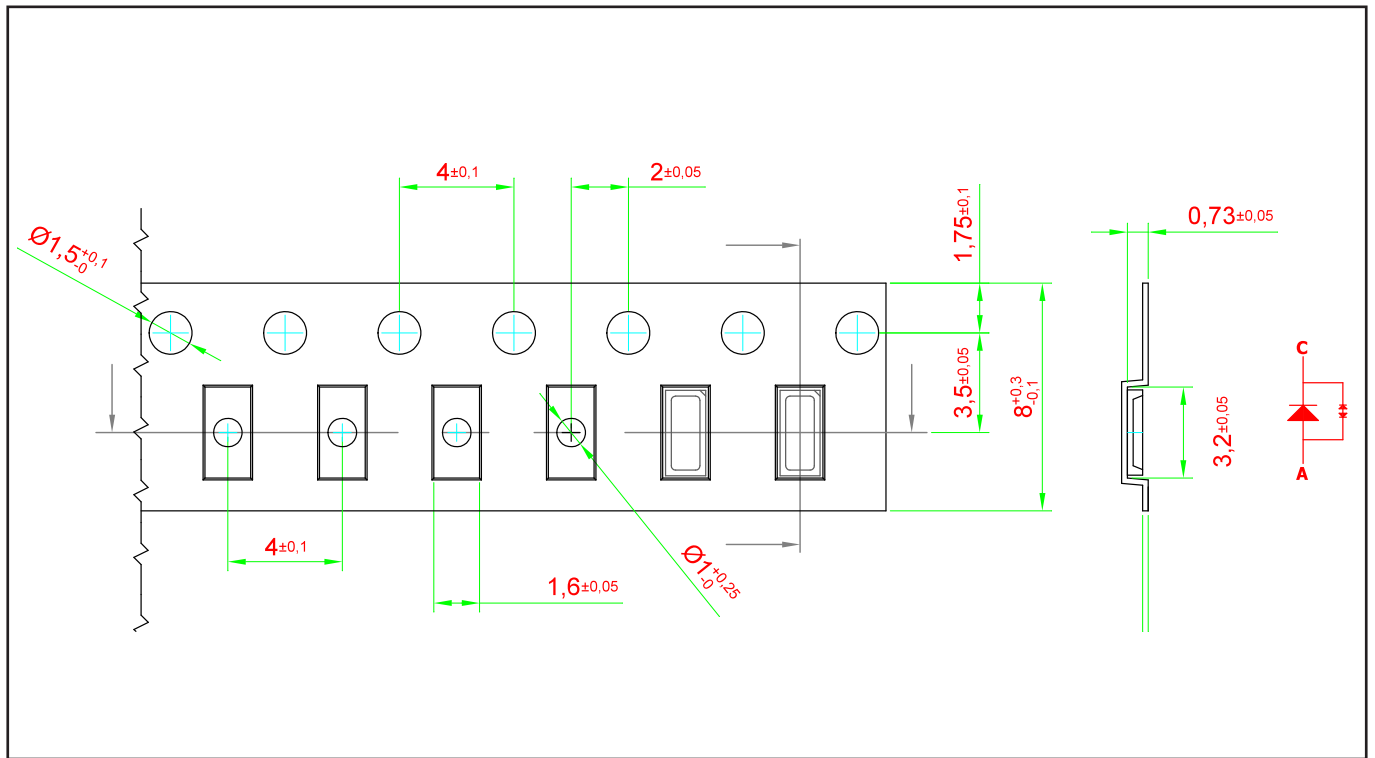
Material

	Material
Lead-frame	Cu Alloy With Ag Plating
Package	Heat Resistant Polymer
Encapsulant	Silicone Resin
Soldering Leads	Sn Plating

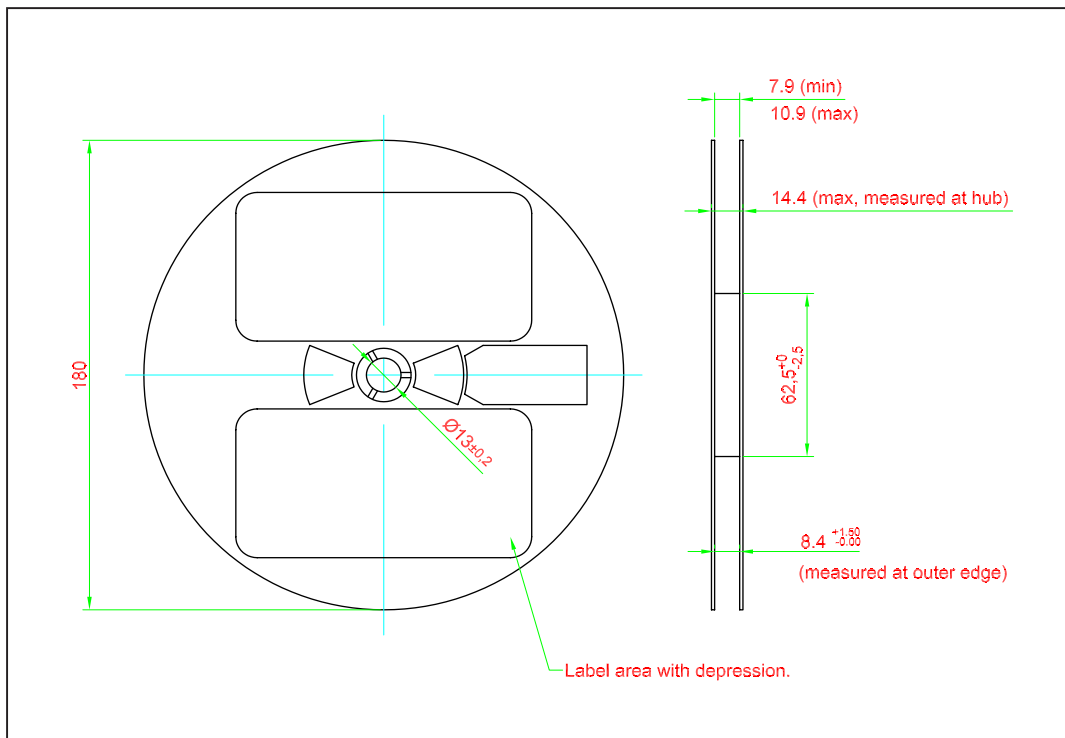
Recommended Solder Pad



Taping and orientation



Packaging Specification

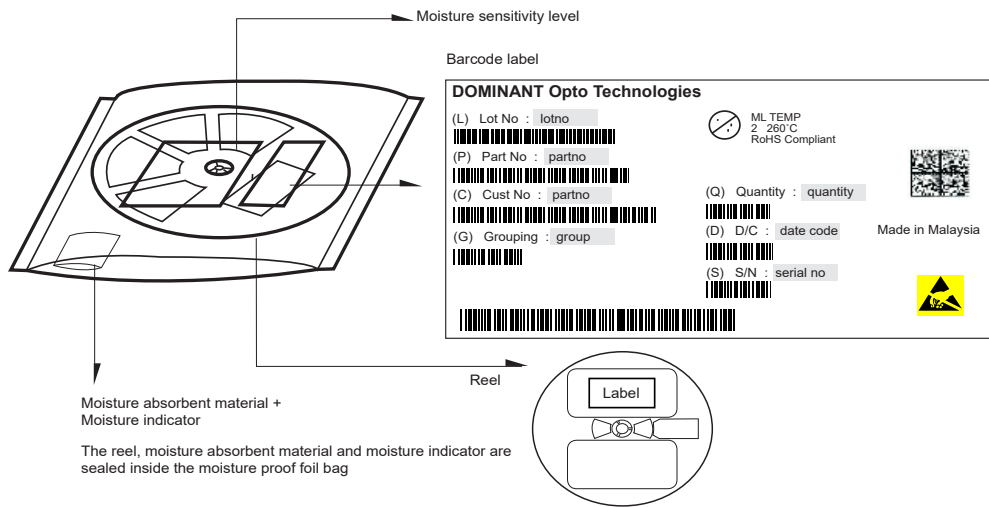


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	5000	SEW-EZSH-xxx-x

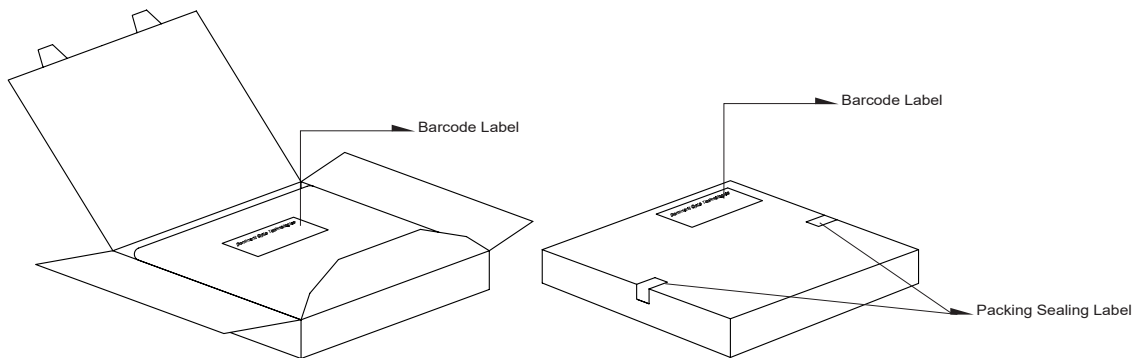
Notes:

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

Packaging Specification



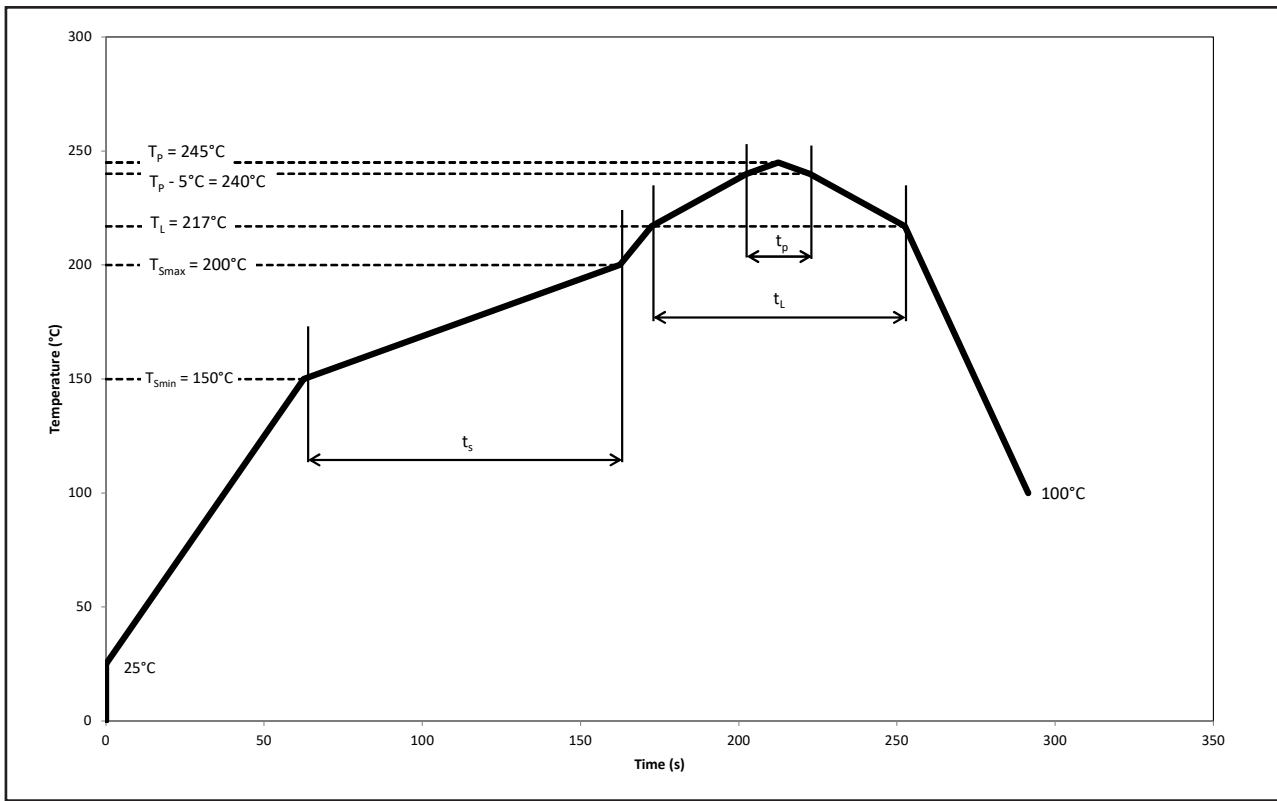
Quantity per bag (pcs)	Average 1pc SpicePlus 3014 (gram)	1 completed bag (gram)
5000	0.007	210 ± 10



Reel Diameter (mm)	Packing Box Dimensions (mm)
180	210 x 210 x 16

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 $T_p - 5^\circ\text{C}$	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 In the drawing, normally the tolerances used are at ± 0.1 with the dimension measurement unit in mm.

6) **Thermal Resistance**

- 6.1 $R_{th \text{ max}}$ is based on statistic values (6σ).

Revision History

Page	Subjects	Date of Modification
-	Initial Release	13 Jul 2020
3, 4, 5, 6, 7, 8, 17	Update Color Bin Structure Update Recommended Pb-free Soldering Profile	14 Sep 2020
16	Update Qty from 3000pcs to 5000pcs	14 Dec 2020
2, 14	Not for New Design: SEW-EZSH-7P8Q-1 Update Taping and orientation	02 Jun 2022

NOTE

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DOMINANT Opto Technologies reserves the right to make changes to any products in order to improve reliability, function or design.

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

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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