6SD4516VGB01MAZ1

◆ **Outline (L* W*H): 4.5*1.6*1.7mm**

◆**Good thermal dissipation & Optical uniformity**

Table of Contents

Features

- Forward current: red&blue&green:≦30mA ,
- Typical view angle 50% Iv: 120°
- Lens color code: white diffused
- EIA STD package
- RoHS2.0 and REACH-compliant
- Preconditioning: accelerate to JEDEC level 2a
- ESD level 2KV(HBM)\
- Reliability Test: AEC Q-102qualified

Applications

- Indoor signage display applications
- Indoor decorating and entertainment design
- Flat backlight for LCD. Switch and symbol
- Indicator and backlighting for all consumer electronics
- Automotive electronics
- Others applications

■ Product Code Method

6 - S - D -4516 - VGB0 - 1 - M - A - Z1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	②	③	④	⑤
Process Type	Category	LED Type	Lead Frame Size	Dice Wavelength &Luminous Rank
6: special product	S: SMD LED	D: PLCC side view	4516: 4.5*1.6mm	V : red G : green B : blue

⑥	⑦	⑧	⑨
Lap Polarity	Cap Color	PCB Module Code	Flow Code
1: common anode	M: white diffused	A :article mode	Z: Zener 1: no expression above meaning for company

■ Maximum Rating(Ta=25°C)

Characteristics	Symbol	Typical	Unit
DC Forward Current	I_F	R&G&B≦30	mA
Pulse Forward Current*3	I_{PF}	80	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_D	G&B: ≦100 / R: ≦80	mW
Junction Temperature	T_J	125	°C
Operating Temperature Range	T_{OP}	-40℃to+105℃	°C
Storage Temperature Range	T_{STG}	-40℃to+105℃	°C
Soldering Temperature*4	T_{SD}	260	°C
Thermal Resistance Junction/ Solder Point	RTH_{J-S}	130	℃/W

Notes 1: There is no maximum or typical voltage parameter

2: For other ambient, limited setting of current will be depended on de-rating curves.

3: Duty 1/10, pulse width 0.1ms

4: The maximum of soldering time is 10 seconds in T_{SD}

■ Typical Product Characteristics(Ta=25℃)

Characteristics	Symbol		Min	Typical	Max	Unit	Test condition
Forward Voltage	V_F	R	1.8	2.1	2.4	V	I_F=20mA
		G	2.9	3.1	3.5		
		B	2.8	3.2	3.6		
Reverse Current	I_R		-	-	10	μA	V_R= 5V
Luminous Intensity	Iv	R	--	650	--	mcd	I_F=20mA
		G	--	1800	--		
		B	--	400	--		
Dominant Wavelength	λd	R	618	-	628	nm	I_F=20mA
		G	520	-	530		
		B	460	-	470		
View Angle	$2\theta_{1/2}$		-	120	-	deg	I_F=20mA

Notes: 1. Measurement Errors:

Forward Voltage: ±0.1V, Luminous Intensity: ±10%Iv, Dominant Wavelength: ±1.0nm

2. Electrical-Optical Characteristics (Ta=25℃)

3. We will amend the Bin code to maintain Bin Code centralize,

■ Range of Bins (Ta=25℃)

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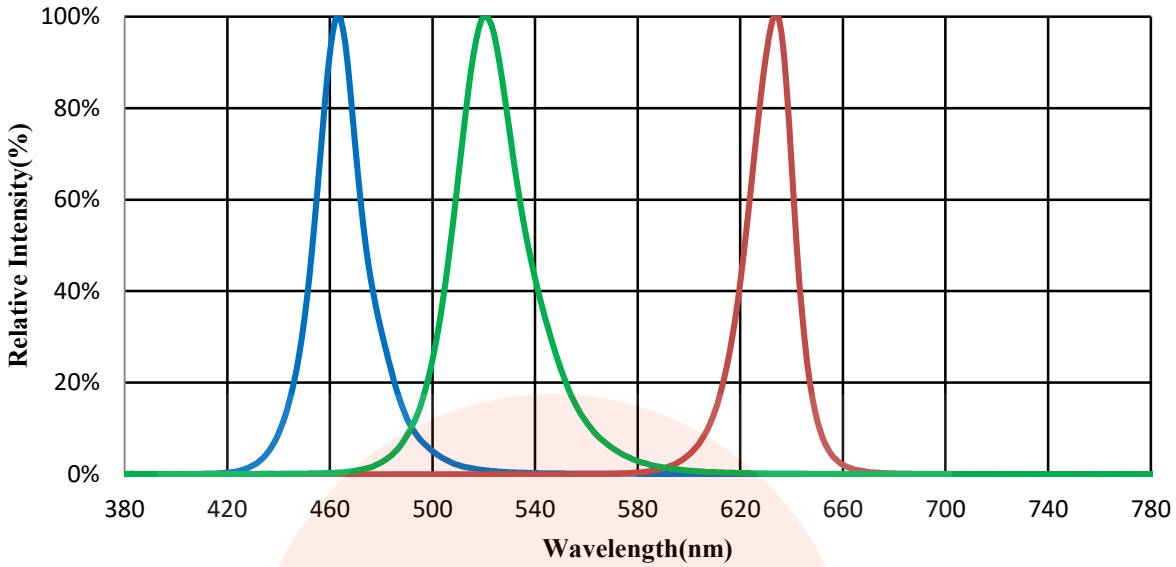
1).Luminous Intensity Bins (I_F=20mA)

Bin code		Min. Iv (mcd)	Max. Iv (mcd)
R	19	500	630
	20	630	800
	21	800	1000
G	23	1250	1600
	24	1600	2000
	25	2000	2500
B	16	250	320
	17	320	400
	18	400	500

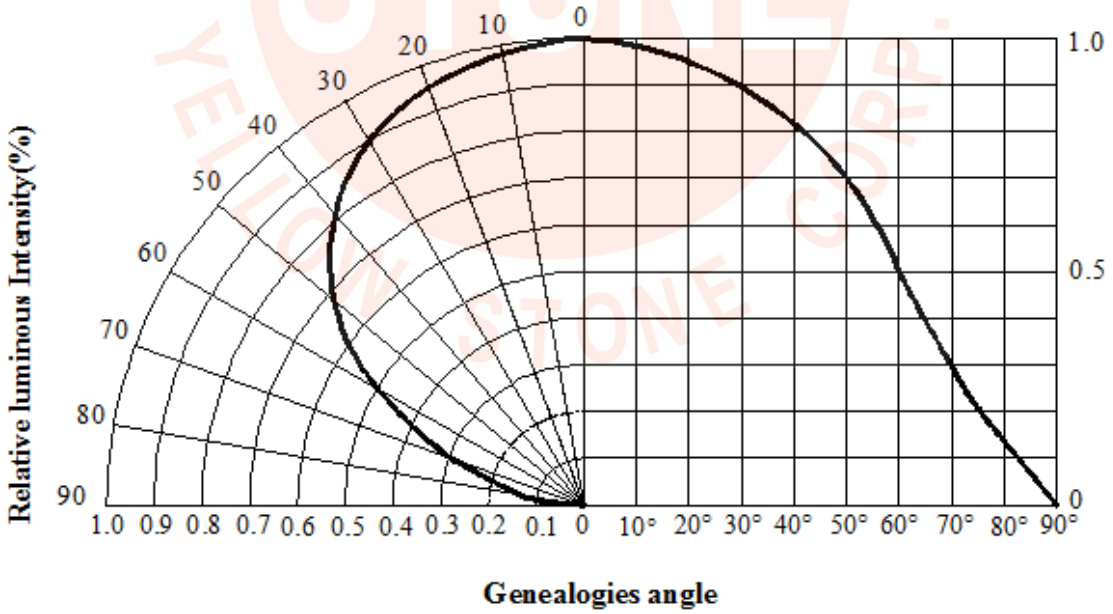
2).Dominant Wavelength Bins (I_F=20mA)

Bin Code		Min. λd (nm)	Max. λd (nm)
R	V1	618	623
	V2	623	628
G	G5	520	525
	G6	525	530
B	B3	460	465
	B4	465	470

■ Relative Spectral Power Distribution

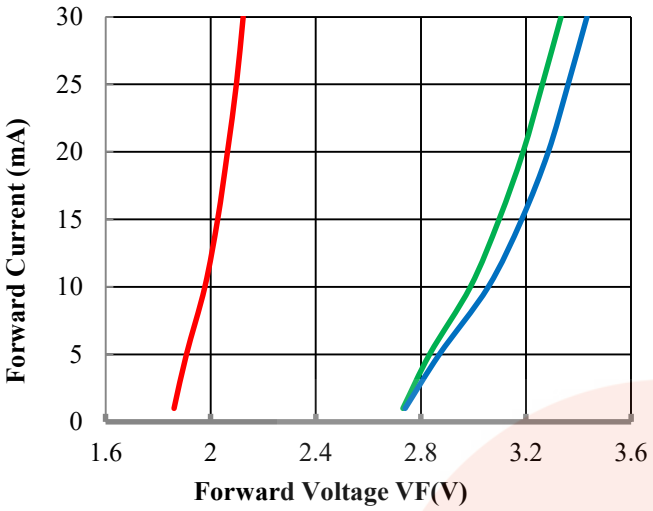


■ Typical Diagram Characteristics of Radiation

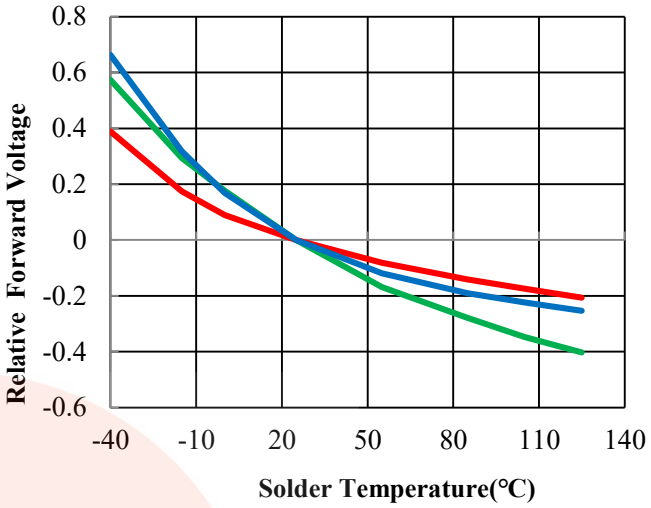


■ Electronic-Optical Characteristics

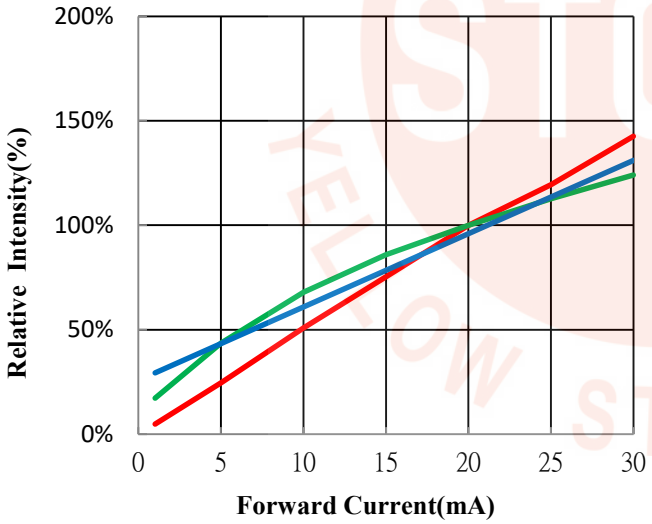
Relative Forward Current vs. Forward Voltage



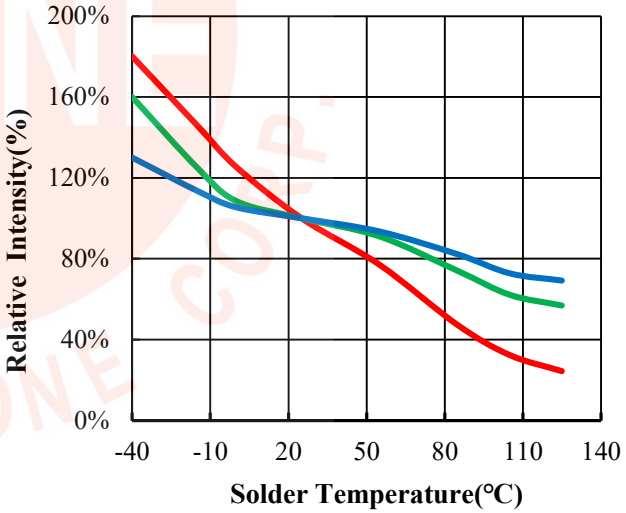
Relative Forward Voltage vs. Solder Temperature



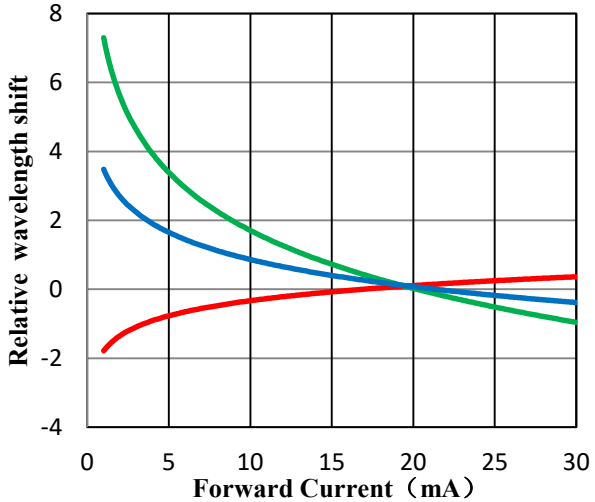
Relative Intensity vs. Forward Current



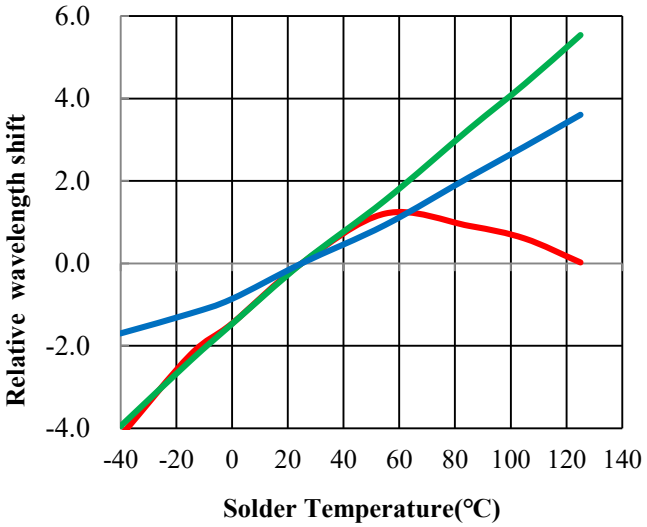
Relative Intensity vs. Solder Temperature



Wavelength shift vs. Forward Current

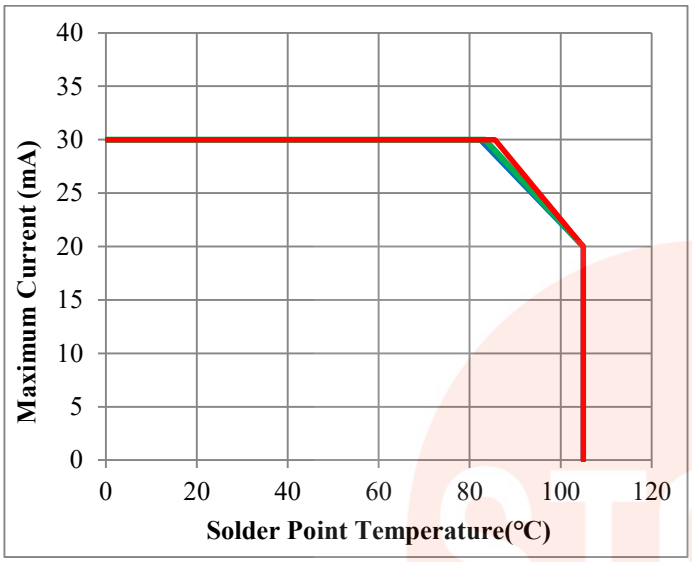


Wavelength shift vs. Solder Temperature

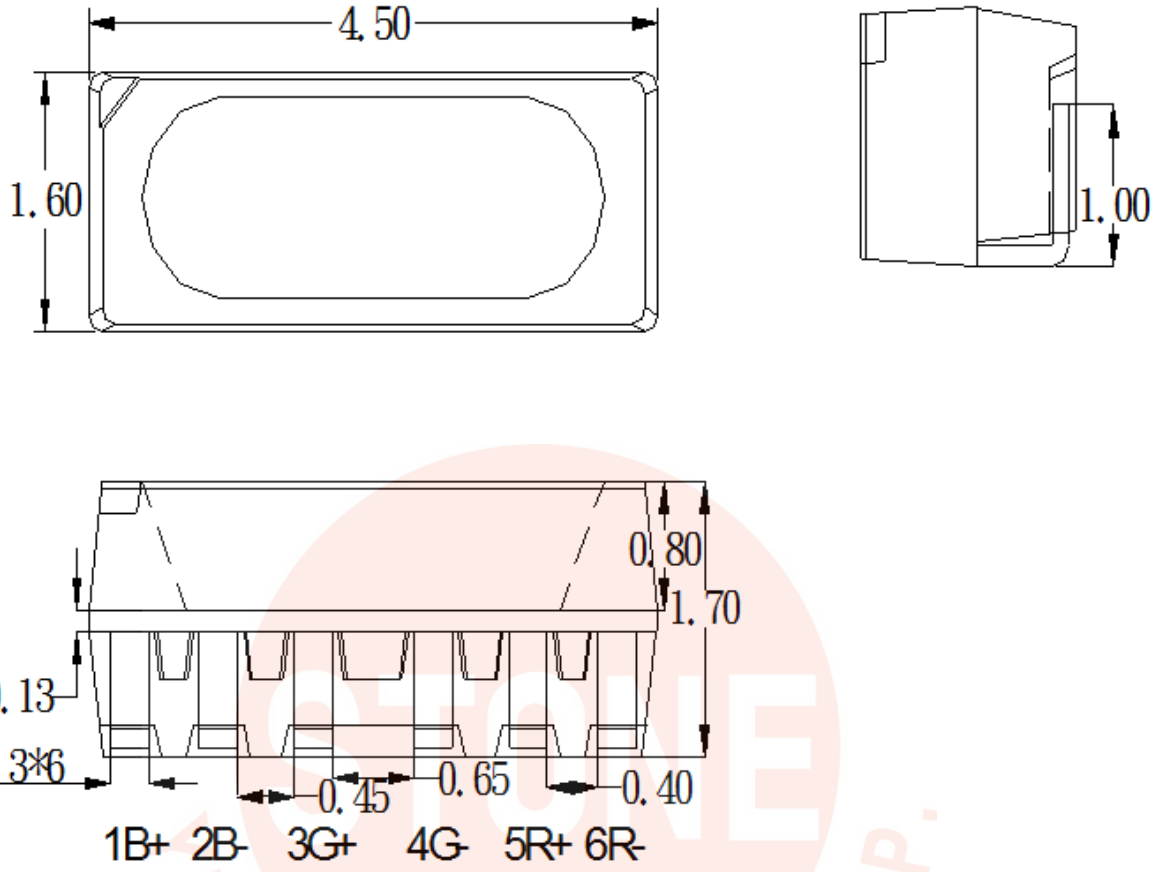


■ Thermal Design for De-rating

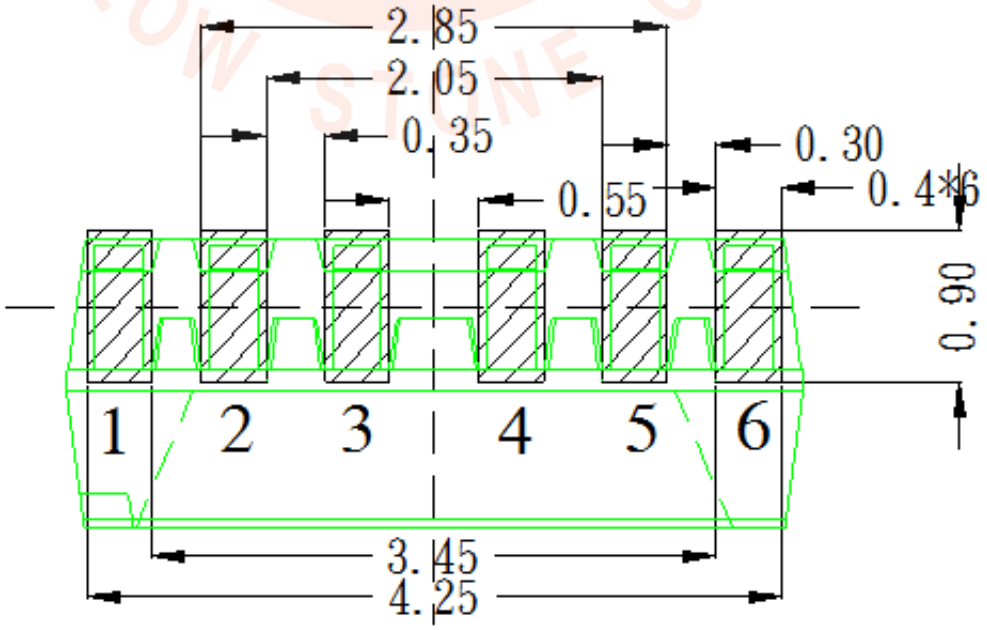
The maximum forward current is determined by the thermal resistance between the LED junction and solder point. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics. The graph is lighting with one chip on board



■ Dimensions

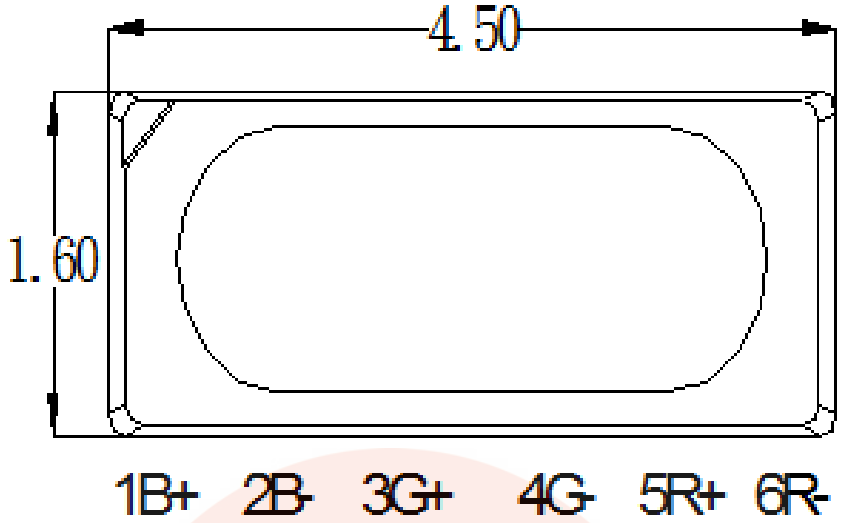


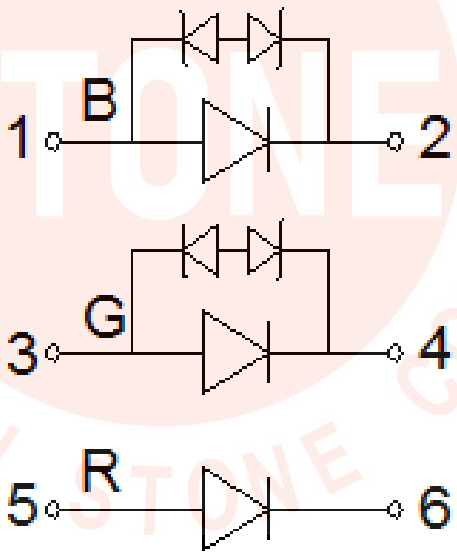
Recommended Pad Layout



§ All dimensions are in millimeters.
§ Tolerance is ±0.1mm unless other specified
§ Specifications are subject to change without notice

■ PIN Configuration



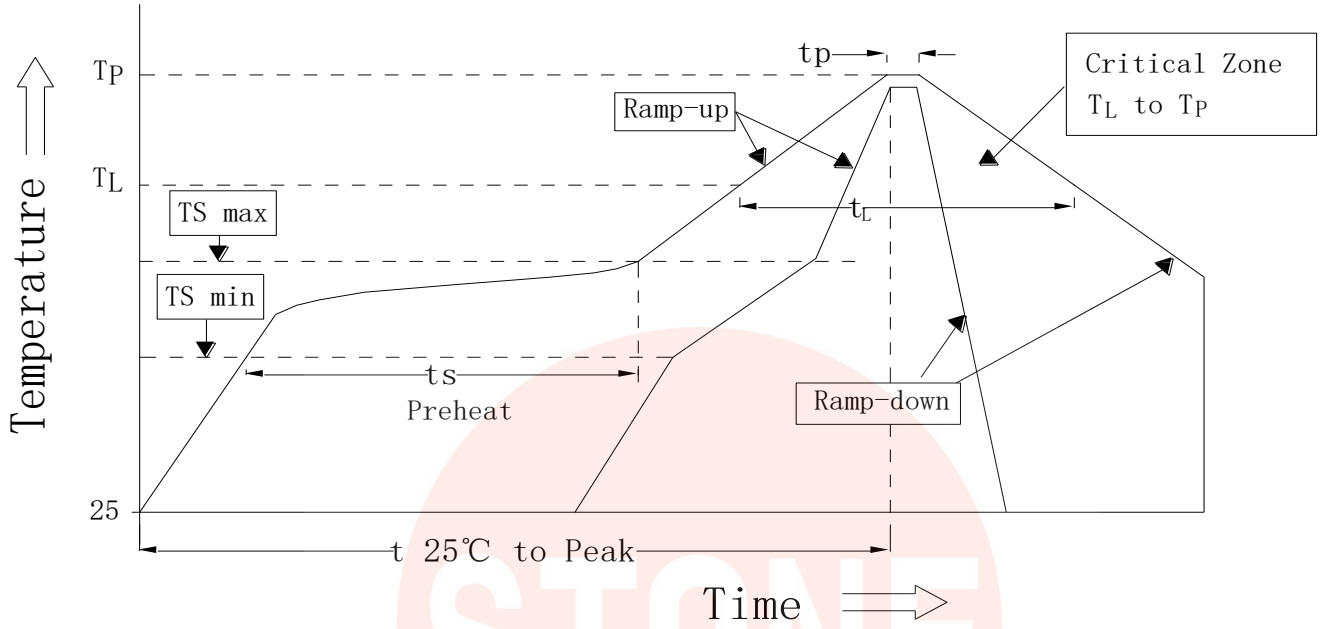


Polarity

No.	Symbol	Function description
1	B led +	Blue led anode
2	B led -	Blue led cathode
3	G led +	Green led anode
4	G led -	Green led cathode
5	R led +	Red led anode
6	R led -	Red led cathode

■ Reflow Profile

SMT Reflow Soldering Profile



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Min.	Recommendation	Max.	
Ramp-up rate to preheat (25°C to 150°C)	-	-	2	3	K/s
Time t_S ($T_{S\ min}$ to $T_{S\ max}$)	t_S	60	100	120	s
Ramp-up rate to peak ($T_{S\ max}$ to T_P)	-	-	2	3	K/s
Liquidus temperature	T_L	-	217	-	°C
Time above liquidus temperature	t_L	-	80	100	s
Peak temperature	T_P	-	245	260	°C
Time within 5 °C of the specified peak temperature T_P - 5 K	t_P	-	-	10	s
Ramp-down Rate (T_P to 100 °C)	-	-	3	4	K/s
Time 25 °C to T_P	-	-	-	480	s

Notes:

1. Do not stress the silicone resin while it is exposed to high temperature.
2. The reflow process should not exceed 3 times.

■ Test Circuit and Handling Precautions

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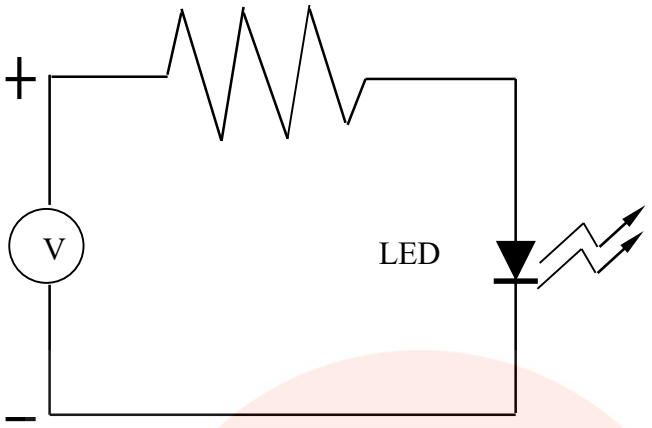
1. Test circuit



2. Handling precautions

2.1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn out will happen).

2.2. Storage

1). It is recommended to store the products in the following conditions:

Humidity: 60% R.H. Max.

Temperature: 5℃~30℃(41℉~86℉)

2). Shelf life in sealed bag: 12 month at ＜5℃~30℃ and ＜60% R.H. after the package is Opened, the products should be used within four weeks or they should be keeping to stored at ≦20%R.H. with zip-lock sealed.

2.3. Baking

If the package has been opened for more than 4 weeks or over than 12 months in sealed bag. it is recommended to bake the products with the following instruction:

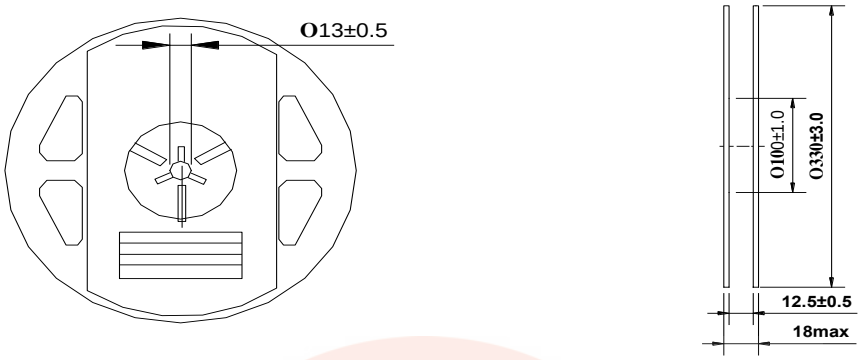
1). for reel type , backing at 60~65℃ for 6 hours

2). for single LED, backing at 125±3℃ for 1hrs,

It shall be normal to see slight color fading of carrier (light yellow) after baking in process

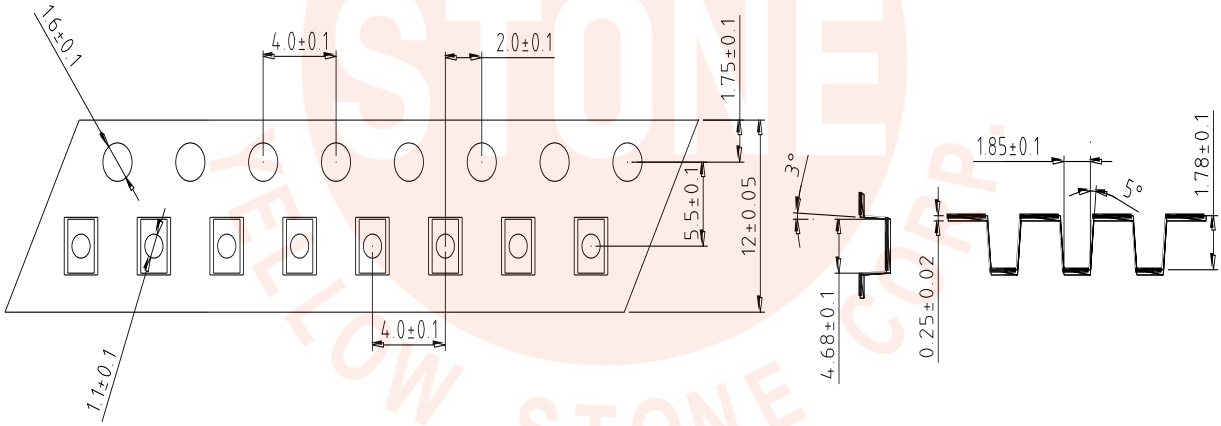
■ Packing

● Dimensions of Reel (Unit: mm)

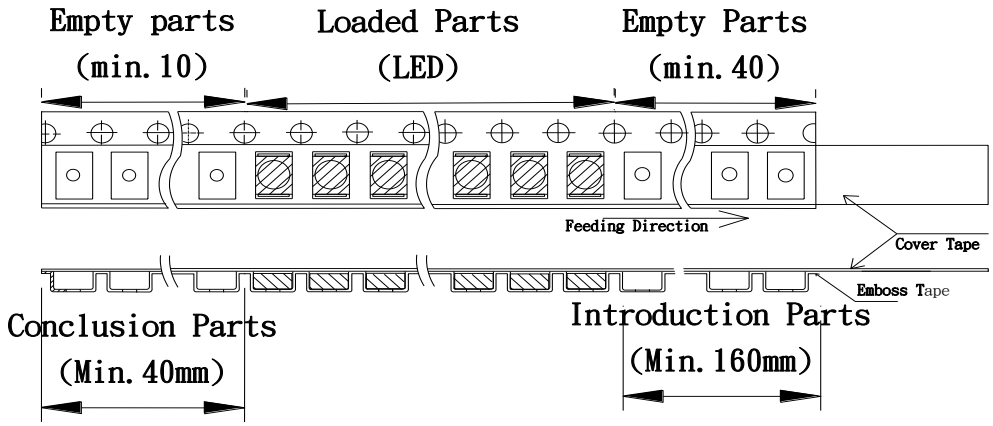


Note: 01.The tolerance unless mentioned is ±0.2mm.
02.The measured unit is "mm".

● Dimensions of Tape (Unit: mm)



■ Arrangement of Tape

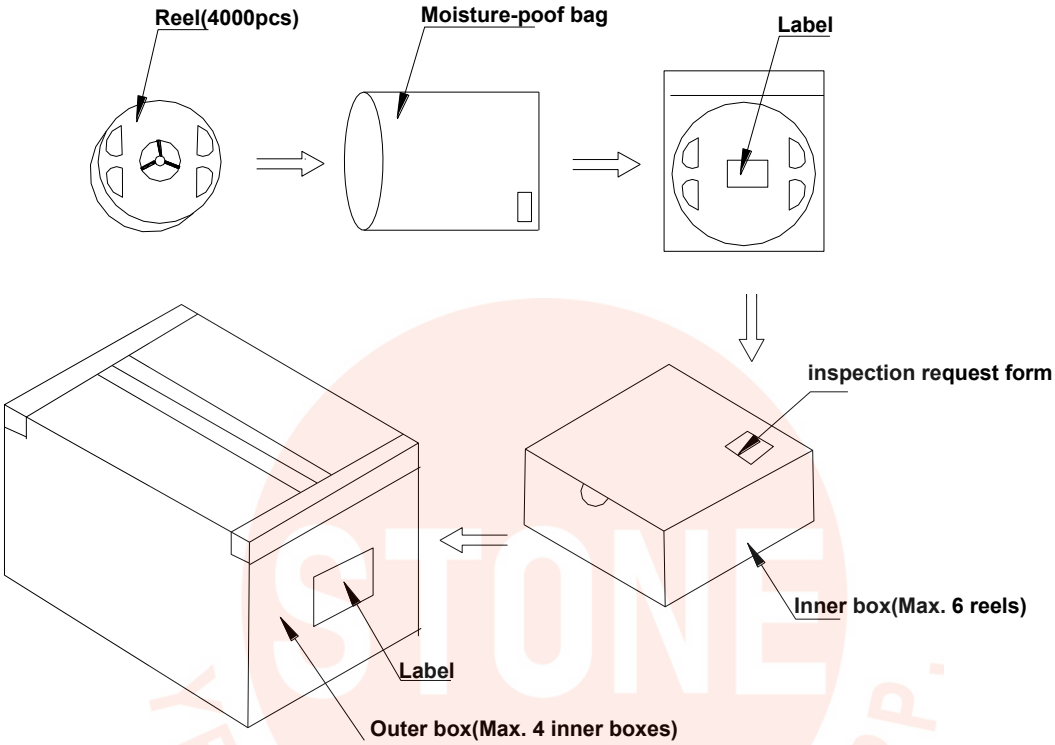


Notes:

1. Empty component pockets sealed with top cover tape
2. The max number of consecutive missing SMD is 2pcs;
3. The cathode is put towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications;
4. 2000 pcs per reel;
5. The remainders will be packed in a multiplication of 500pcs.

■ Packing

- **Packaging Specifications**



Notes:

Reeled product (max. 2000) is packed in a sealed moisture-proof bag. Six bags are packed in an inner box (size: about 260 X 230 X 100 mm) and four inner boxes are in an outer box (size: about 480 X 275 X 215 mm). On the label of moisture-poof bag, there should be the information of Part No., Lot No. and quantity number; also the total quantity number should be on inspection request form on outer box.

■ Precautions

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1. Abnormal situation caused by improper setting of collet

To choose the right collet is the key issue in improving the product's quality. LED is different from other electronic components, which is not only about electrical output but also for optical output. This characteristic made LED more fragile in the process of SMT. If the collet's lowering down height is not well set, it will bring damage to the gold wire at the time of collet's picking up and loading which will cause the LED fail to light up, light up now and then or other quality problems

2. How to choose the collet

During SMT, please choose the collet that has larger outer diameter than the lighting area of lens, in case that improper position of collet will damage the gold wire inside the LED. Different collets fit for different products, please refer to the following pictures cross out

Outer diameter of collet should be larger than the lighting area

Picture 1(√) Picture 2(X)

3. Other points for attention

A. No pressure should be exerted to the epoxy shell of the SMD under high temperature.

B. Do not scratch or wipe the lens since the lens and gold wire inside are rather fragile and cross out easy to break.

C. LED should be used as soon as possible when being taken out of the original package, and should be stored in anti-moisture and anti-ESD package.

4. This usage and handling instruction is only for your reference.

■ Test Items and Results of Reliability

Test Item	Test Conditions	Duration/ Cycle	Number of Damage	Reference
Thermal Shock	–40℃ 30min ↑↓5min 105℃ 30min	1000 cycles	0/26	JESD22 A-106
High Temperature Storage	T_a=105℃	1000 hrs	0/26	JESD22 A-103B
Low Temperature Storage	T_a=-40℃	1000 hrs	0/26	JESD22 A-119
Life Test	T_a=25℃ If=20mA	1000 hrs	0/26	JESD22 A-108
High Humidity Heat Operation	85℃ RH=85% If=20mA	1000 hrs	0/26	JESD22 A-101
High Temperature Operation	T_a=105℃ If=20mA	1000 hrs	0/26	JESD22 A-108C
ESD(HBM)	2KV at 1.5kΩ;100pF	3 times	0/30	ANSI/JEDEC JS-001

Failure Criteria				
Item	**Symbol**	**Condition**	**Criteria for Judgment**	
			Min	**Max**
Forward Voltage	V_F	If=20mA	-	USL^1×1.1
Reverse Current	I_R	V_R =5V	-	10μA
Luminous Intensity	Iv	If=20mA	LSL^2×0.7	-

[Note] USL*[1]: Upper Specification Level

LSL*[2]: Lower Specification Level

Note: Version updates will not be announced and Yellow Stone Corp. will have the final interpretation rights