

V64516VGBMFZ1 Datasheet

4516 Series (L* W*H): 4.5*1.6*1.7mm



Applications

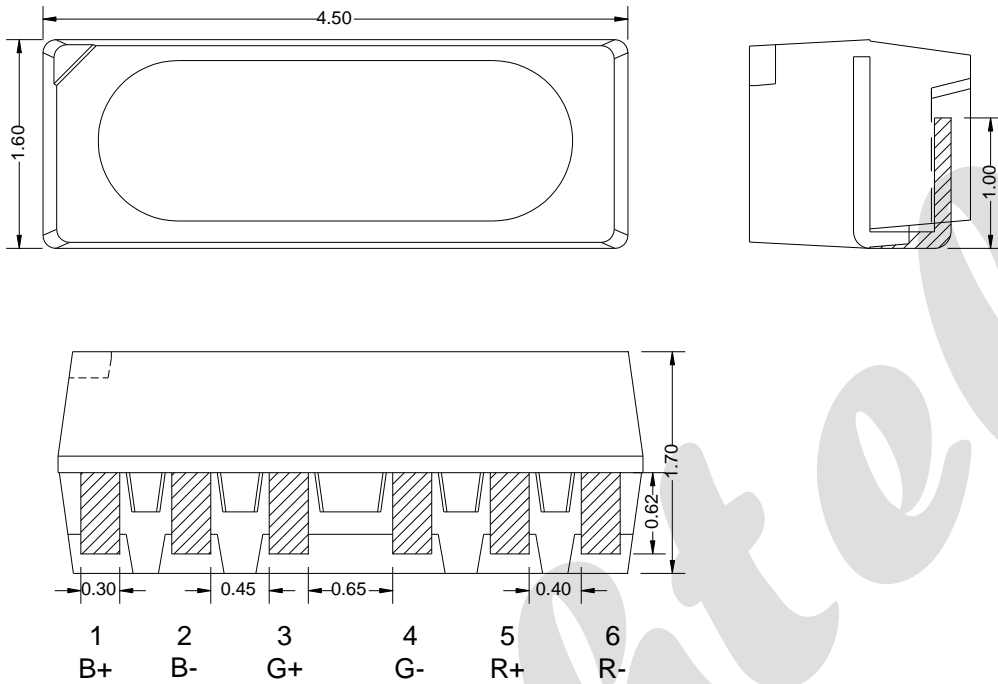
- Automotive interior light

Features

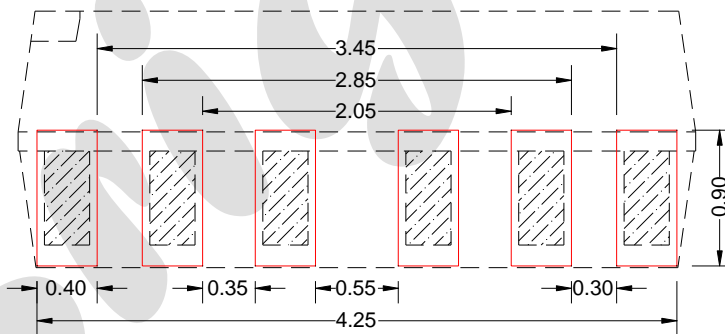
- Forward current: $\leq 30\text{mA}$;
- Typical view angle 50% Iv: 120°
- Preconditioning: accelerate to JEDEC level 2a
- Lens color: White diffused
- RoHS2.0 and REACH-compliant
- ESD level 2kV(HBM)
- Reliability Test: AEC Q-102 qualified

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Dimensional Drawing



Recommended Pad Layout



1. Dimensions are in millimeters.
2. General tolerance is $\pm 0.1\text{mm}$.

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Naming Rule

V6-4516-VGB-M-F-Z1

V6	4516	VGB	M	F	Z1
Type	Package Size	Color	Lens color	Output current	Serial number
V6: Special product	4516: 4.5*1.6mm	V:red G:green B:blue	M:White diffused	F:20mA	Z:Zener 1: Serial number

Maximum Ratings

T_A : 25 °C

Characteristics	Symbol	Typical	Unit						
DC Forward Current	IF	30	mA						
Pulse Forward Current*3	IPF	100	mA						
Reverse Voltage	VR	5	V						
Junction Temperature	TJ	125	°C						
Operating Temperature Range	TOP	-40-105	°C						
Storage Temperature Range	TSTG	-40-105	°C						
Soldering Temperature*4	TSD	260	°C						
Thermal Resistance Junction/ Solder Point	RTHJ-S	<table><tr><td>R</td><td>G</td><td>B</td></tr><tr><td>65</td><td>110</td><td>100</td></tr></table>	R	G	B	65	110	100	°C/W
R	G	B							
65	110	100							

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}.

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Characteristics

IF : 20mA | TA : 25 °C

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test condition	
Forward Voltage	VF	V	1.8	-	2.4	V	IF=20mA
		G	2.8	-	3.4		
		B	2.6	-	3.2		
Reverse Current	IR	-	-	10	μA	VR= 5V	
Luminous Intensity	Iv	V	380	480	600	mcd	IF=20mA
		G	1400	1760	2200		
		B	240	300	380		
Dominant Wavelength	λd	V	630	-	636	nm	IF=20mA
		G	524	-	529		
		B	455	-	460		
View Angle	2θ1/2	-	120	-	deg	IF=20mA	

1. Tolerance of Measure:

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

Bin groups

1. Luminous Intensity (IF=20mA)

Bin code	Min. Iv (mcd)	Max. Iv (mcd)	
V	1	380	480
	2	480	600
G	1	1400	1760
	2	1760	2200
B	1	240	300
	2	300	380

2. Forward Voltage (IF=20mA)

Bin Code	Min. Vf (v)	Max. Vf (v)	
V	A	1.8	2.4
G	B	2.8	3.4
B	C	2.6	3.2

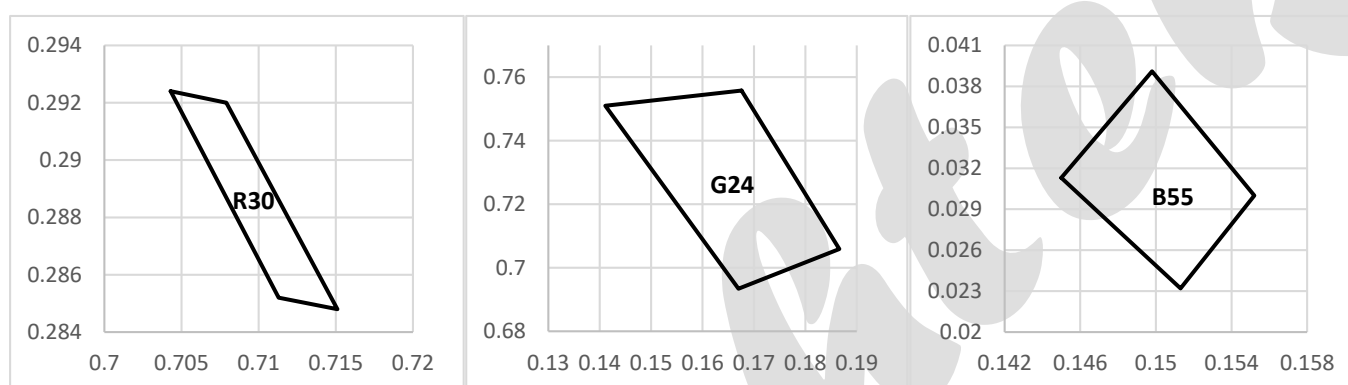
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3. Dominant Wavelength Bins (IF=20mA)

Bin Code		Min. λ_d (nm)	Max. λ_d (nm)
V	A	630	636
G	B	524	529
B	C	455	460

4. Chromaticity Coordinate Groups

VDD:5V | IF : 20mA

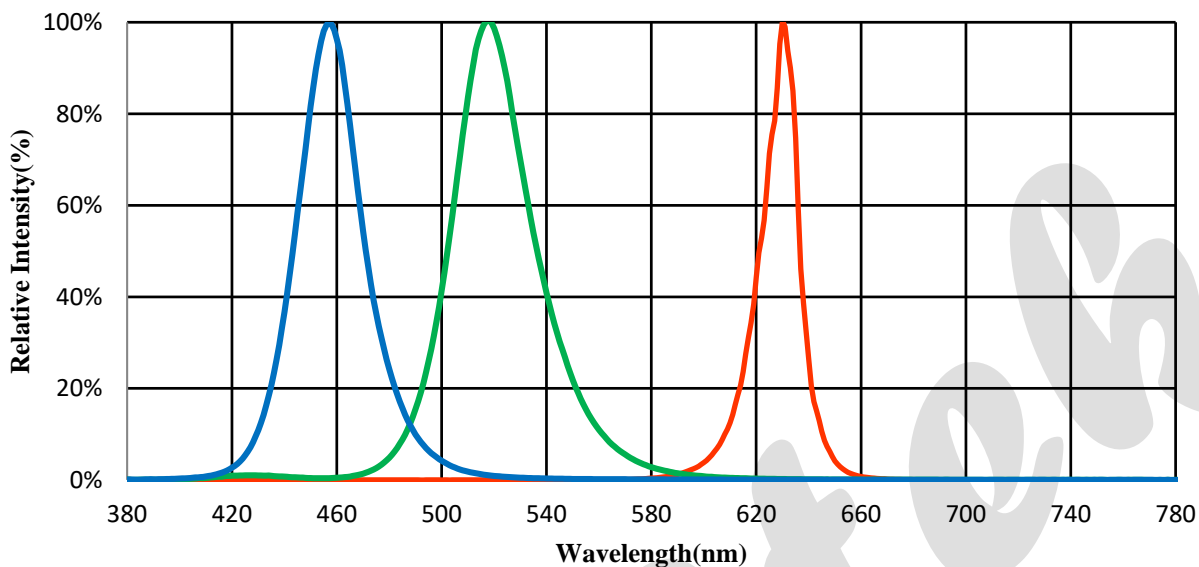


Bin	X	Y	X	Y	X	Y	X	Y
R30	0.7043	0.2924	0.7079	0.292	0.7151	0.2848	0.7113	0.2852
G24	0.1676	0.7558	0.1411	0.751	0.167	0.6934	0.1866	0.7059
B55	0.145	0.0313	0.1513	0.0232	0.1552	0.03	0.1498	0.0391

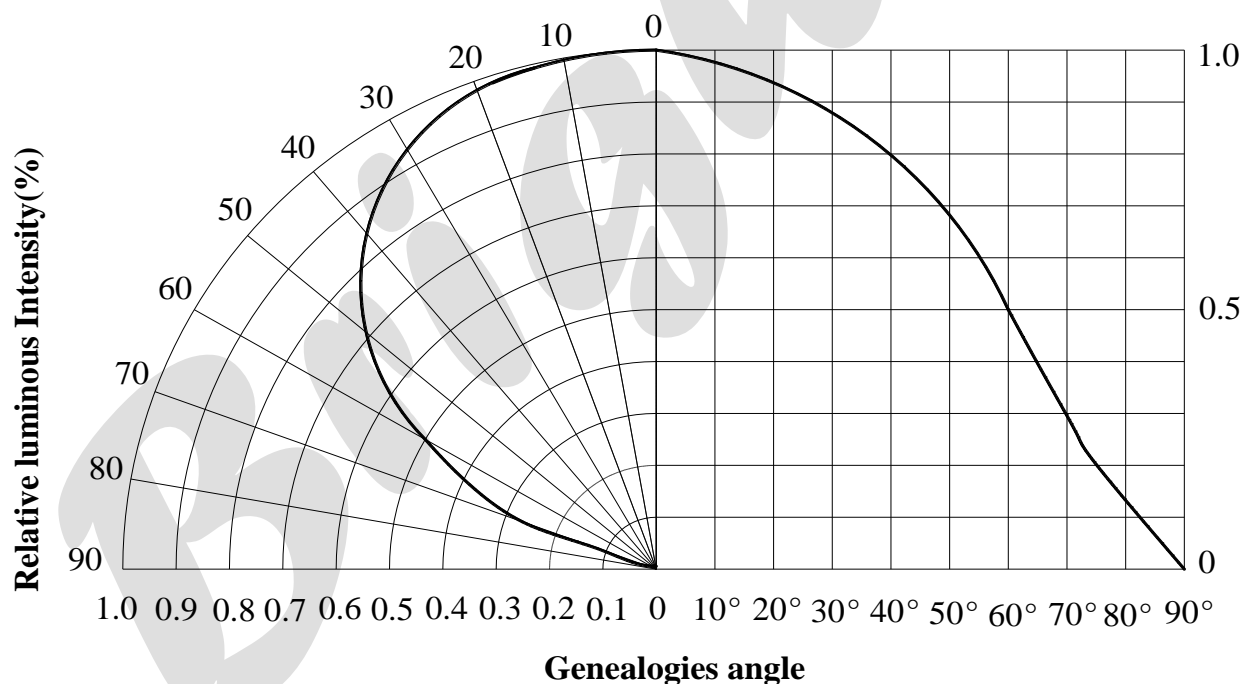
Tolerance of X/Y : ± 0.005

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Relative Spectral Power Distribution



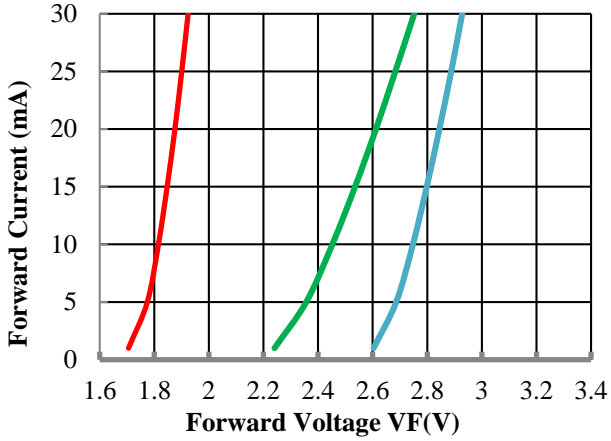
Typical Diagram Characteristics of Radiation



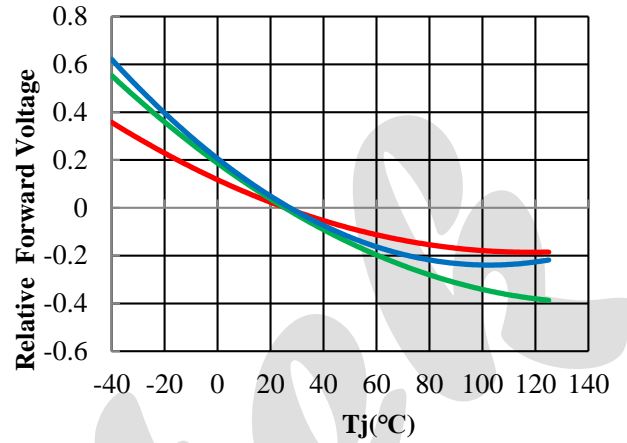
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Electronic-Optical Characteristics

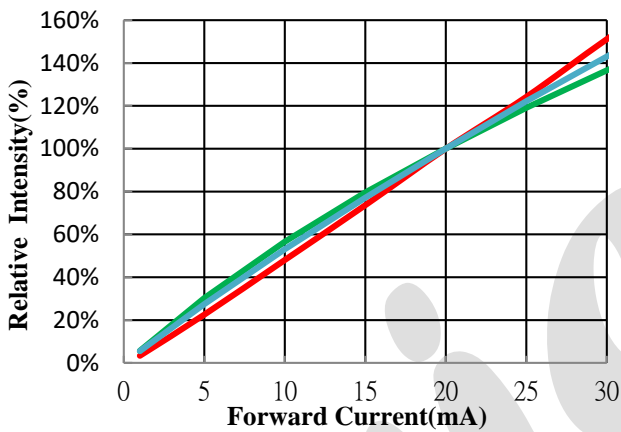
Relative Forward Current vs. Forward Voltage Temperature



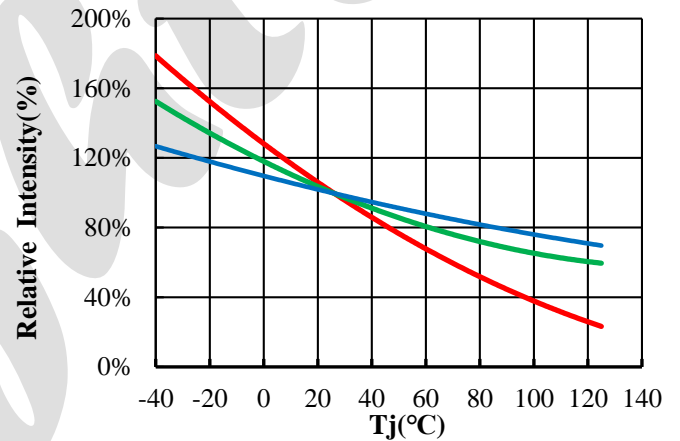
Relative Forward Voltage vs.



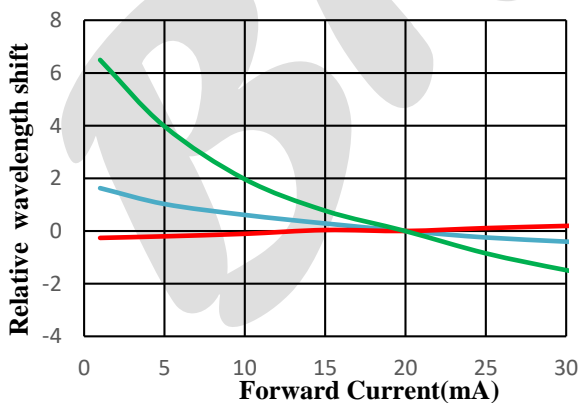
Relative Intensity vs. Forward Current



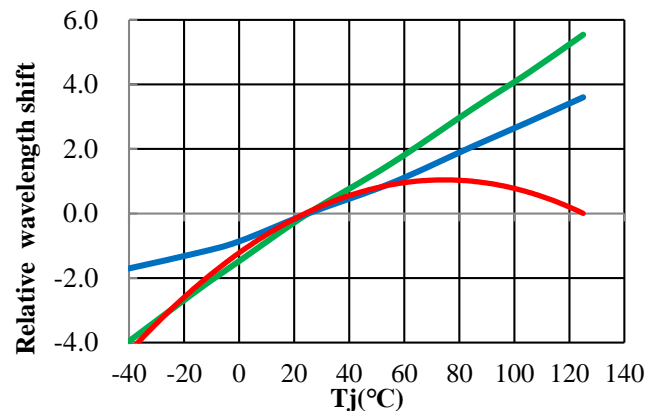
Relative Intensity vs. Temperature



Wavelength shift vs. Forward Current

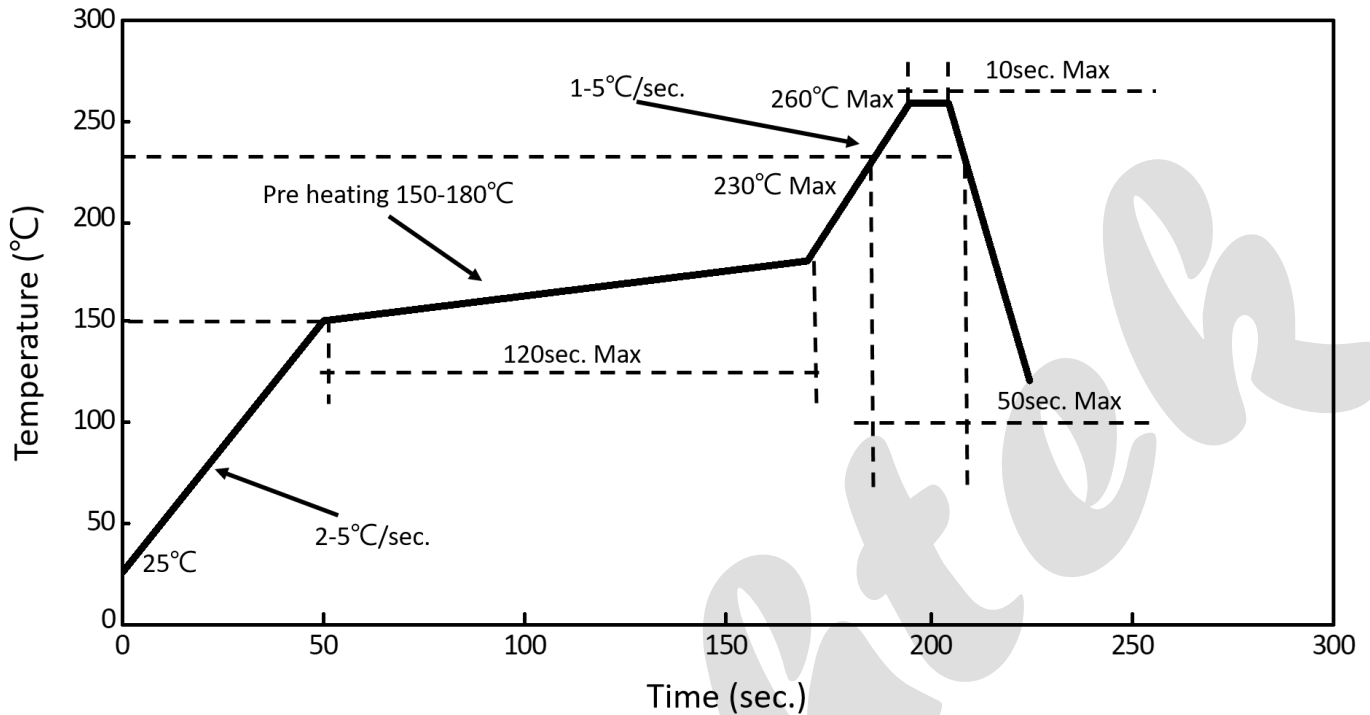


Wavelength shift vs. Temperature



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Reflow Soldering Profile

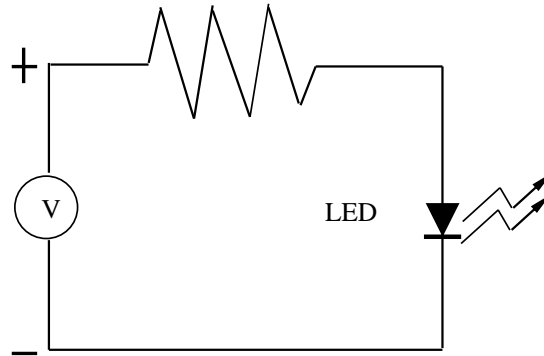


Characteristics	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Min.	Recommendation	Max.	
Ramp-up rate to preheat (25°C to 150°C)	-	-	2	3	K/s
Time tS (TS min to TS max)	tS	60	100	120	s
Ramp-up rate to peak (TS max to TP)	-	-	2	3	K/s
Liquidus temperature	TL	-	217	-	°C
Time above liquidus temperature	tL	-	80	100	s
Peak temperature	TP	-	245	260	°C
Time within 5 °C of the specified peak temperature TP - 5 K	tP	-	-	10	s
Ramp-down Rate (TP to 100 °C)	-	-	3	4	K/s
Time 25 °C to TP	-	-	-	480	s

1. We recommend the reflow temperature 240°C (±5°C).the maximum soldering temperature should be limited to 260°C.
2. Do not stress the silicone resin while it is exposed to high temperature.
3. The reflow process should not exceed 3 times.

Test Circuit and Handling Precautions

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 : $5^{\circ}\text{C} \sim 30^{\circ}\text{C}$ ($41^{\circ}\text{F} \sim 86^{\circ}\text{F}$)

② Shelf life in sealed bag: 12 month at $< 5^{\circ}\text{C} \sim 30^{\circ}\text{C}$ and $< 60\%$ R.H. after the package is Opened, the products should be used within 4 weeks or they should be keeping to storage at $\leq 20\%$ R.H. with zip-lock sealed.

2.3 Baking

Suggest packing open after 4 weeks, before use baking products, conditions as follows:

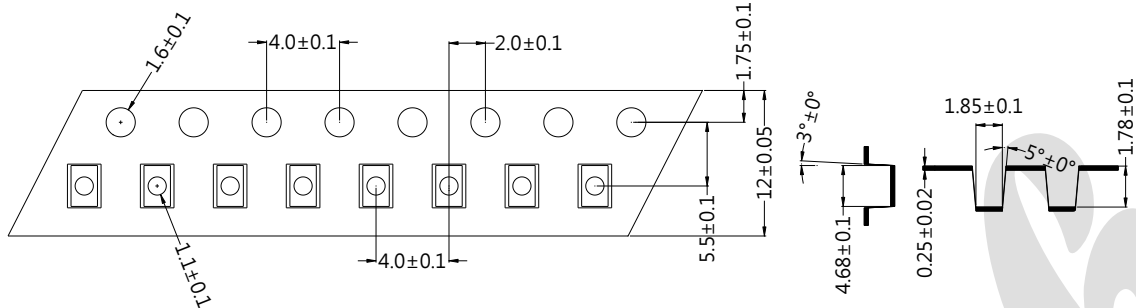
- ① $60 \pm 3^{\circ}\text{C}$ X 6hrs and $< 5\%$ RH, for reel
- ② $125 \pm 3^{\circ}\text{C}$ X 2hrs, for single LED

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

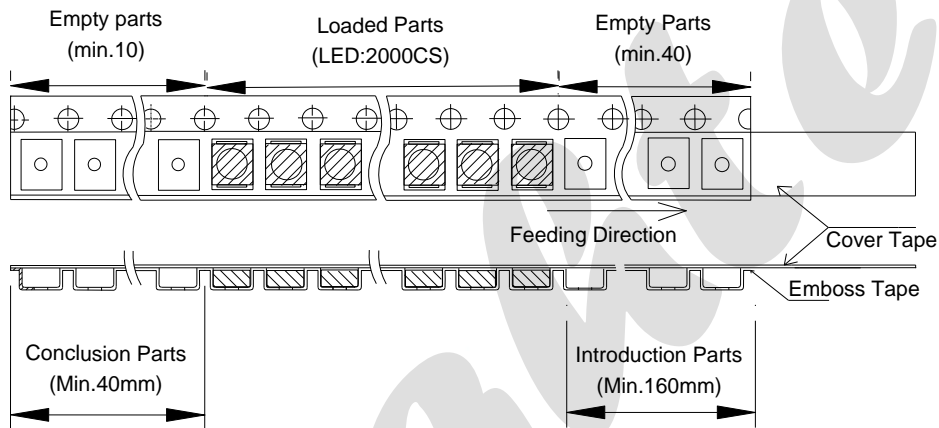
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Tapping

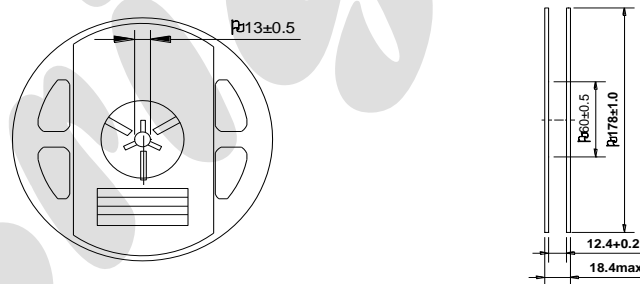
1. Dimensions of Tape (Unit: mm)



2. Arrangement of Tape



3. Dimensions of Reel (Unit: mm)



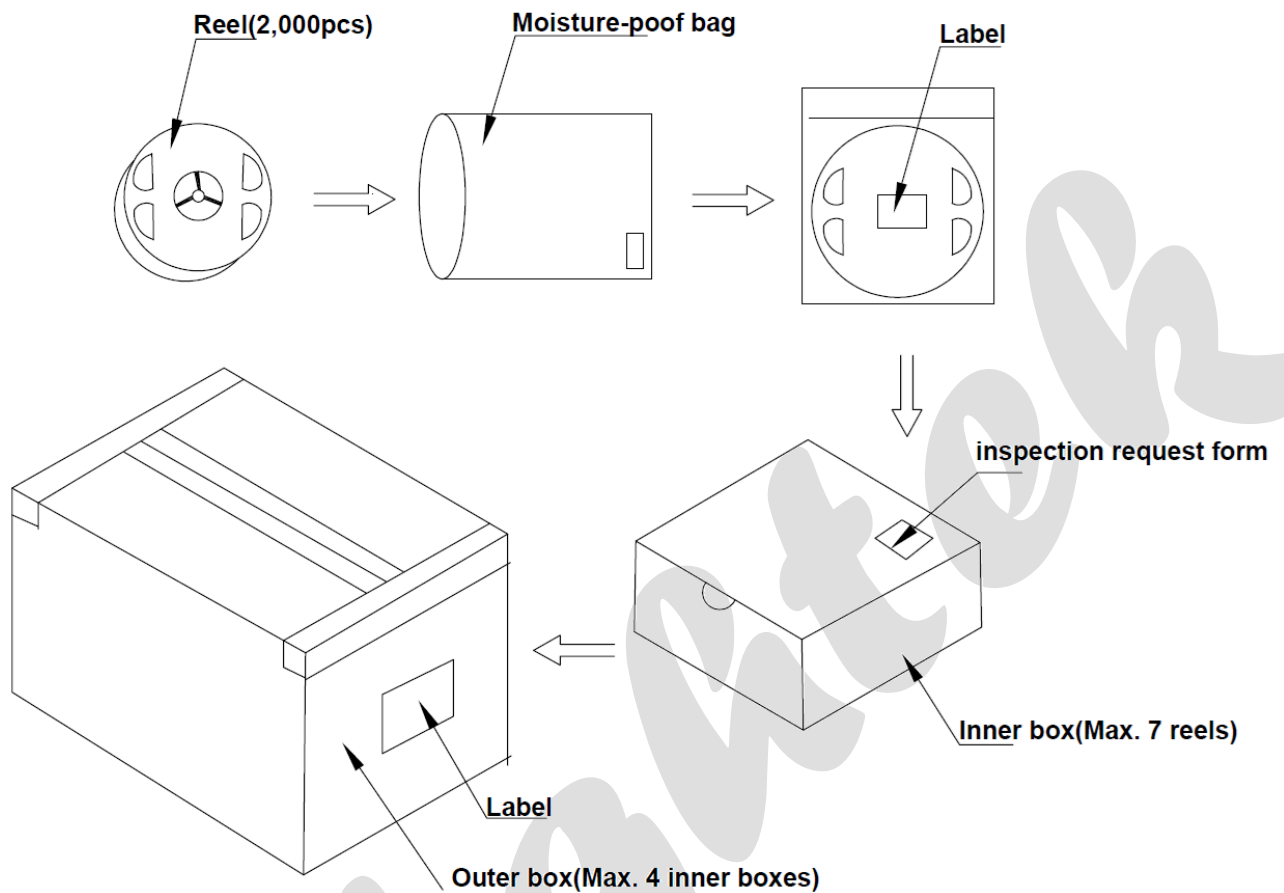
Note: 01.The tolerance unless mentioned is ± 0.1 mm.
02.The measured unit is "mm".

Notes:

1. Empty component pockets are sealed with top cover tape
2. The max loss number of SMD is 2pcs
3. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications
4. 2,000pcs per reel
5. The remainder packing in multiples of 500pcs.

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Packing



Reeled product (max.2,000) is packed in a sealed moisture-proof bag. Seven 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-pooof 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

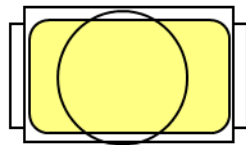
1. Abnormal situation caused by improper setting of collet

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.

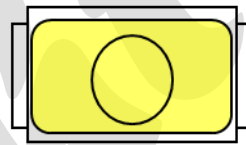
2. How to choose the collet

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

- No pressure should be exerted to the epoxy shell of the SMD under high temperature.
- Do not scratch or wipe the lens since the lens and gold wire inside are rather fragile and cross out easy to break.
- CLED 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.