BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED !

ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

PRODUCT DATASHEET

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

- ▶ PLCC2 SMD
- ▶ 3528 1.9t Series
- ▶ Cool White (6000K)

Release Date: 08 August 2022 Version: A1.1

N0W43S16Z

3528 1.9t Series

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RoHS Compliant

AUTOMOTIVE AEC-Q102

FEATURES:

- **Package:** Top View PLCC2 White SMD Package
- **Forward Current:** 20mA
- **Forward Voltage (typ.):** 3.0V
- **Luminous Intensity (typ.):** 2350mcd@20mA
- **Colour:** Cool White
- **Colour Temperature (CCT):** 6000K
- **Viewing angle:** 120°
- **Materials:**
  - Die: InGaN
  - Resin: Silicon (Yellow Diffused)
  - L/T Finish: Ag plated
- **Operating Temperature:** -40~+105°C
- **Storage Temperature:** -40~+105°C
- **ESD (HBM):** 6kV
- **Grouping parameters:**
  - Forward Voltage
  - Luminous Intensity
  - CIE Chromaticity
- **Soldering methods:** Reflow Soldering
- **Preconditioning:** MSL2a according to J-STD020
- **Packing:** 8mm tape with max.2000/reel, ø180mm (7'')

APPLICATIONS:

- Automotive
- Portable Lighting
- Commercial Lighting
- Indoor Lighting
- Backlight for LCD
- General Lighting

CHARACTERISTICS:

Absolute Maximum Characteristics (Ta=25°C)

Parameter	Symbol	Ratings	Unit
DC Forward Current	I_F	80	mA
Pulse Forward Current @Duty 1/10, 0.1ms	I_{PF}	200	mA
Reverse Voltage	V_R	5	V
Reverse Current @10V	I_R	10	μA
Junction Temperature	T_j	125	°C
Electrostatic Discharge (HBM)	ESD	6000	V
Operating Temperature	T_{OPR}	-40~+105	°C
Storage Temperature	T_{STG}	-40~+105	°C
Soldering Temperature	T_{SOL}	260	°C
Thermal Resistance Junction to Solder Point	R_{thj-s}	150	°C/W
Thermal Resistance Junction to Ambient Point	R_{thj-a}	300	°C/W

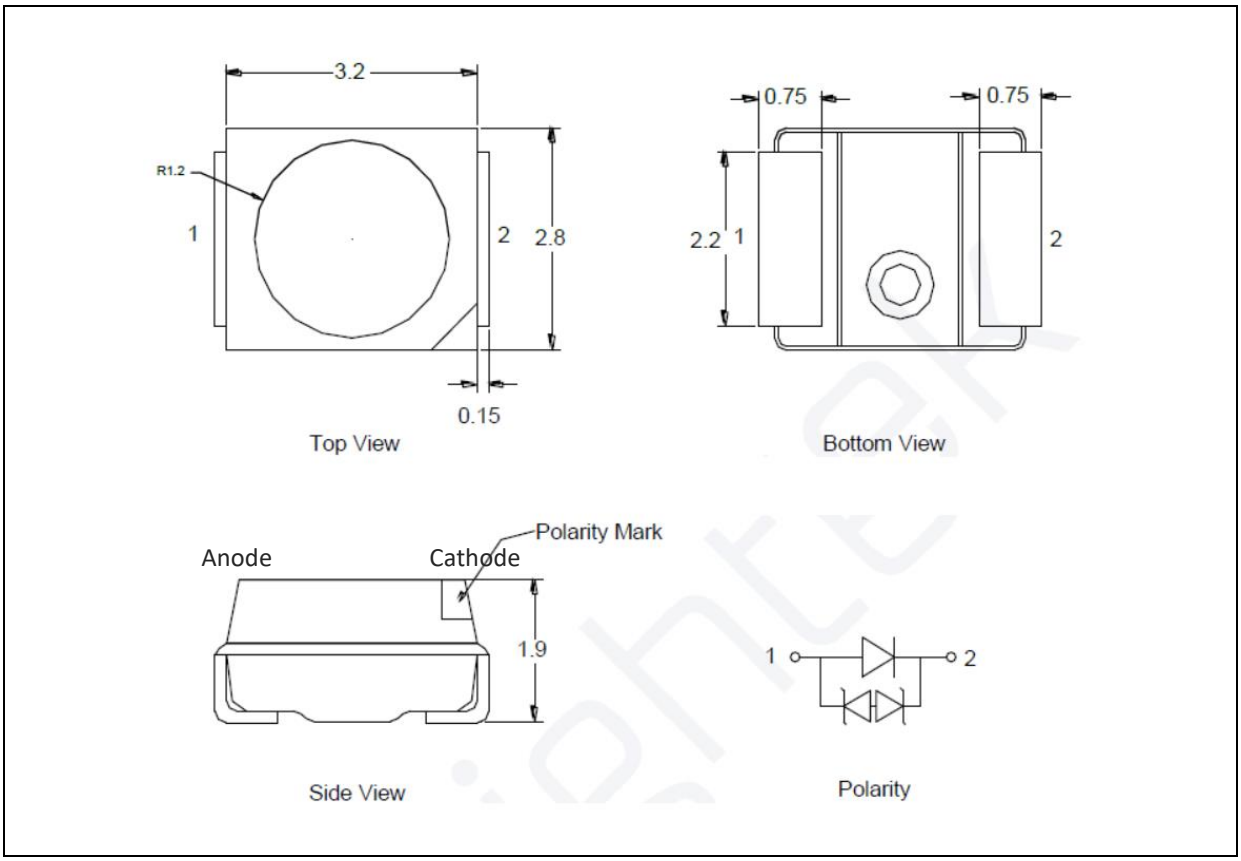
Electrical & Optical Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Forward Voltage	V_F	2.8	3.0	3.4	V	I_F=20mA
Luminous Intensity	I_V	2050	2350	---	mcd	I_F=20mA
Chromaticity Coordinates	X	---	0.3219	---	---	I_F=20mA
	Y	---	0.3280	---		
Colour Temperature	CCT	5450	6000	7400	K	I_F=20mA
Peak Wavelength	λ_p	---	448	---	nm	I_F=20mA
Spectral Width 50%	$\Delta\lambda$	---	21	---	nm	I_F=20mA
Viewing Angle	$2\theta_{1/2}$	---	120	---	deg	I_F=20mA

1. Luminous Intensity (Φ_V) ±10%, Forward Voltage (V_F) ±0.1V, Colour Coordinate: ±0.005, Viewing Angle(2θ1/2) ±5%

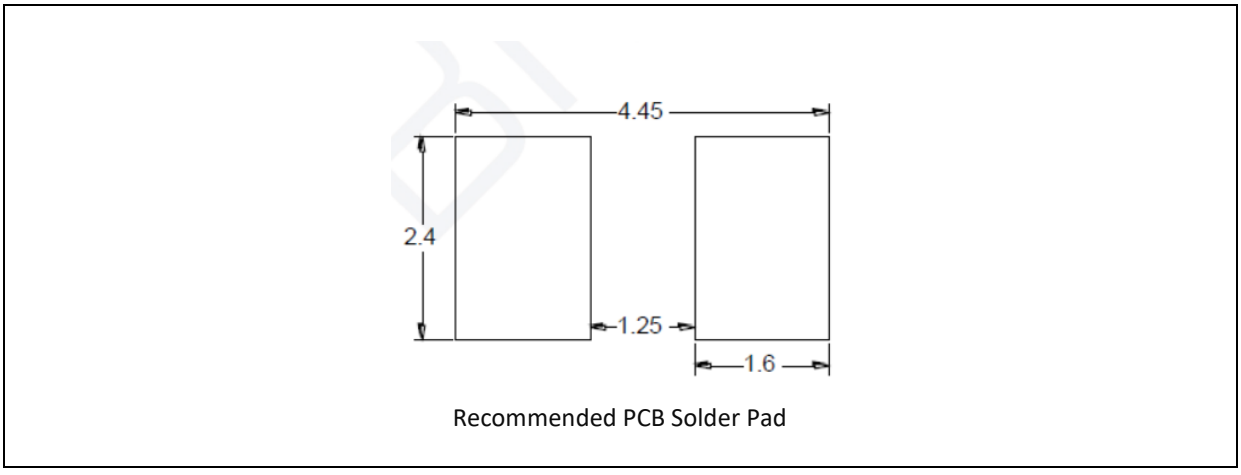
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).
2. Tolerance ±0.13mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



1. Dimensions are in millimetre (mm).
2. Tolerance ±0.1mm with angle tolerance ±0.5°.

BINNING GROUPS:

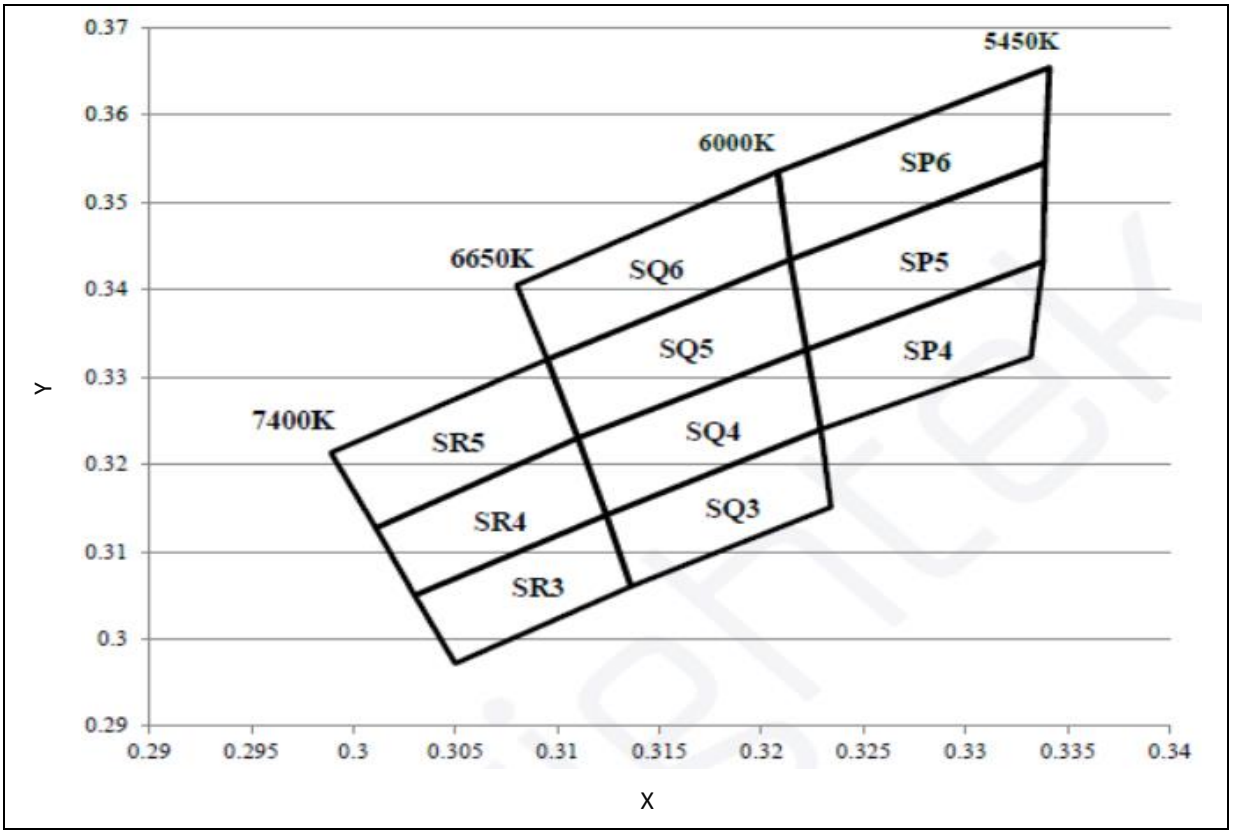
Forward Voltage Classifications (I_F = 20mA):

Code	Min.	Max.	Unit
B	2.8	2.9	V
C	2.9	3.0	
D	3.0	3.1	
E	3.1	3.2	
F	3.2	3.3	
G	3.3	3.4	

Luminous Intensity Classifications (I_F = 20mA):

Code	Min.	Max.	Unit
6	2050	2250	mcd
7	2250	2450	
8	2450	2650	
9	2650	2850	

CIE CHROMATICITY DIAGRAM:

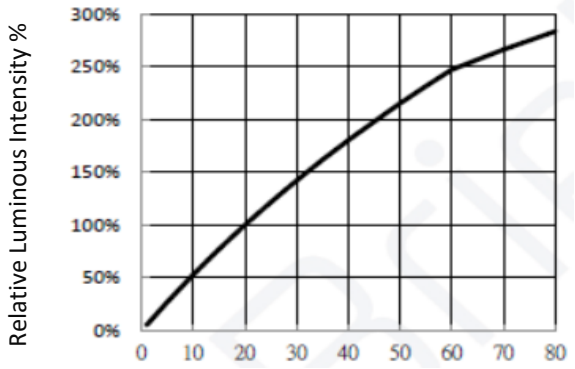


Chromaticity Coordinates Classifications (I_F = 20mA):

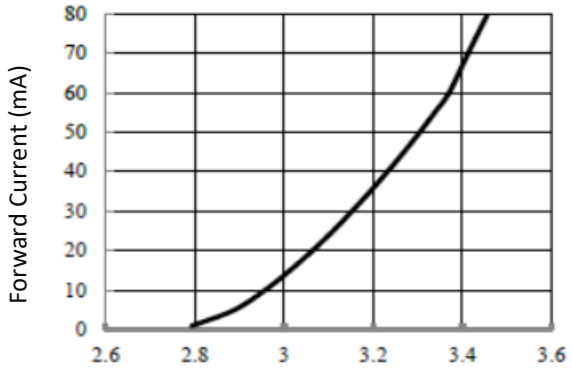
	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
SP6	0.3208	0.3535	0.3214	0.3434	0.3339	0.3545	0.3341	0.3654
SP5	0.3214	0.3434	0.3222	0.3331	0.3338	0.3432	0.3339	0.3545
SP4	0.3222	0.3331	0.3229	0.3240	0.3332	0.3323	0.3338	0.3432
SQ6	0.3080	0.3405	0.3095	0.3320	0.3214	0.3434	0.3208	0.3535
SQ5	0.3095	0.3320	0.3110	0.3230	0.3222	0.3331	0.3214	0.3434
SQ4	0.3110	0.3230	0.3124	0.3142	0.3229	0.3240	0.3222	0.3331
SQ3	0.3124	0.3142	0.3136	0.3060	0.3234	0.3151	0.3229	0.3240
SR5	0.2989	0.3213	0.3011	0.3127	0.3110	0.3230	0.3095	0.3332
S54	0.3011	0.3127	0.3030	0.3050	0.3124	0.3142	0.3110	0.3230
SR3	0.3030	0.3050	0.3050	.2972	0.3136	0.3060	0.3124	0.3142

ELECTRO-OPTICAL CHARACTERISTICS:

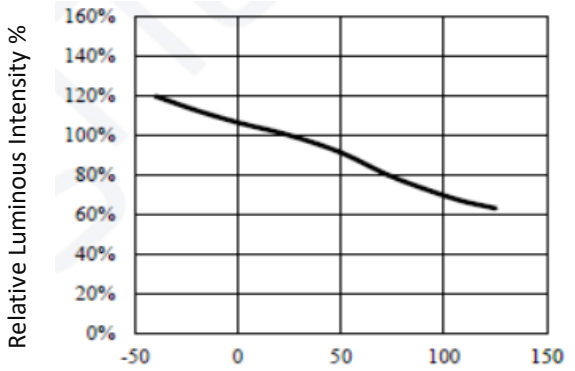
Relative Luminous Intensity v.s. Forward Current



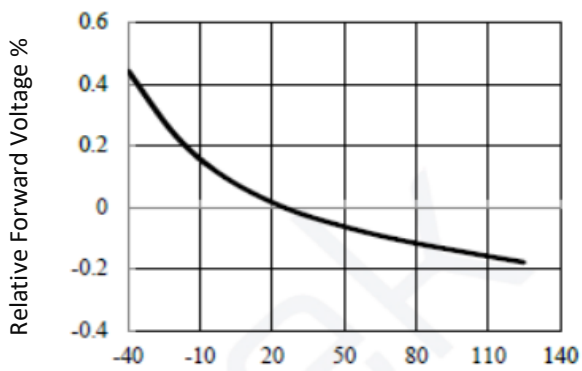
Forward Current v.s. Forward Voltage



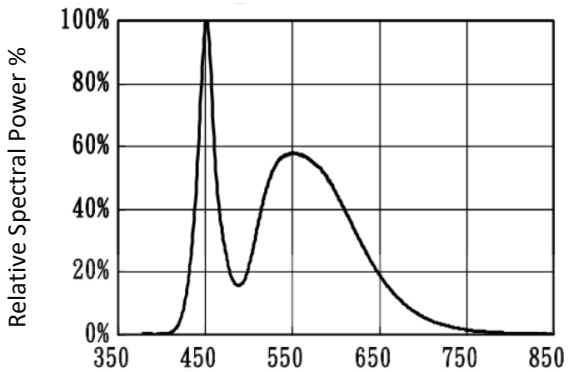
Relative Luminous Intensity v.s. Temperature



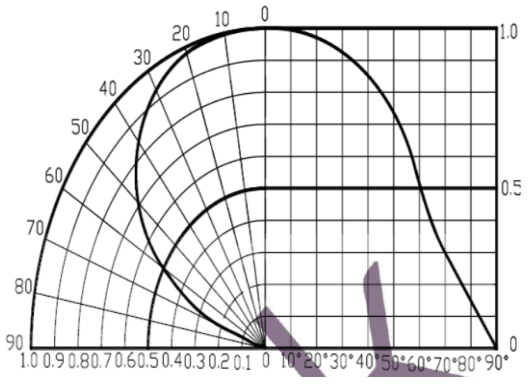
Relative Forward Voltage v.s. Temperature



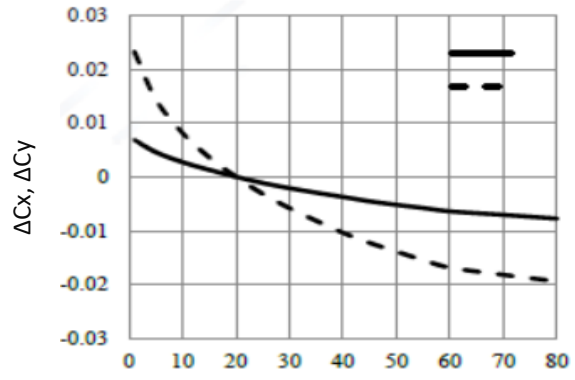
Relative Spectral Power v.s. Wavelength



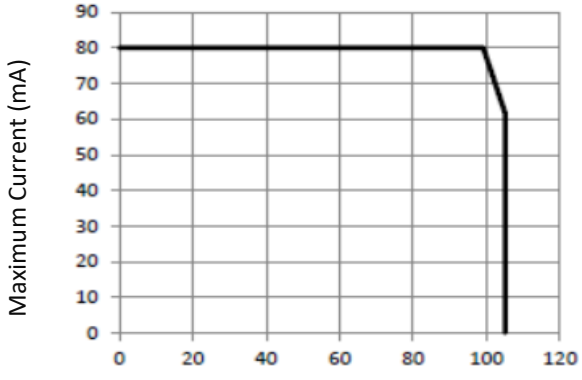
Directive Radiation



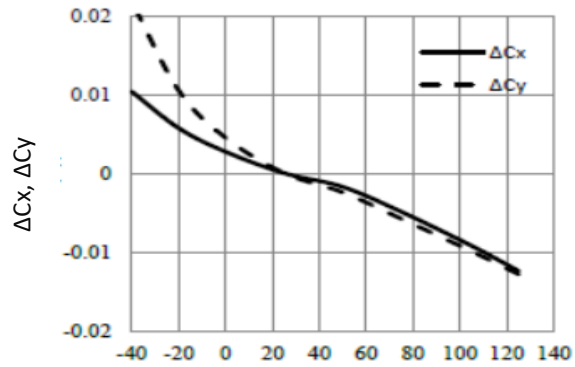
Chromaticity Coordinate v.s. Forward Current



Forward Current Derating Curve

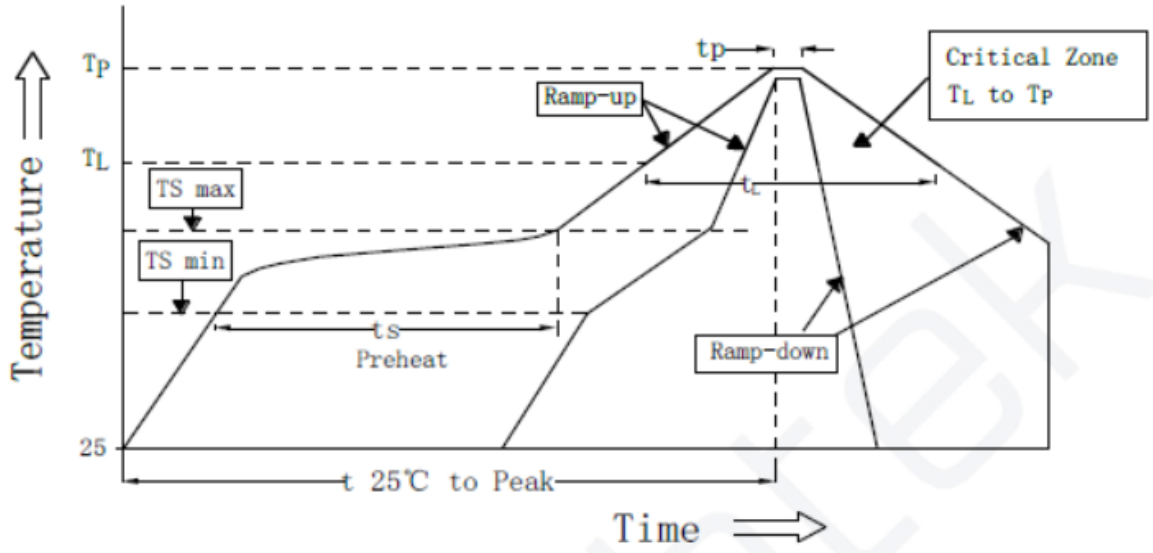


Chromaticity Coordinate v.s. Temperature



RECOMMENDED SOLDERING PROFILE:

IR Reflow Lead-free Solder:



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

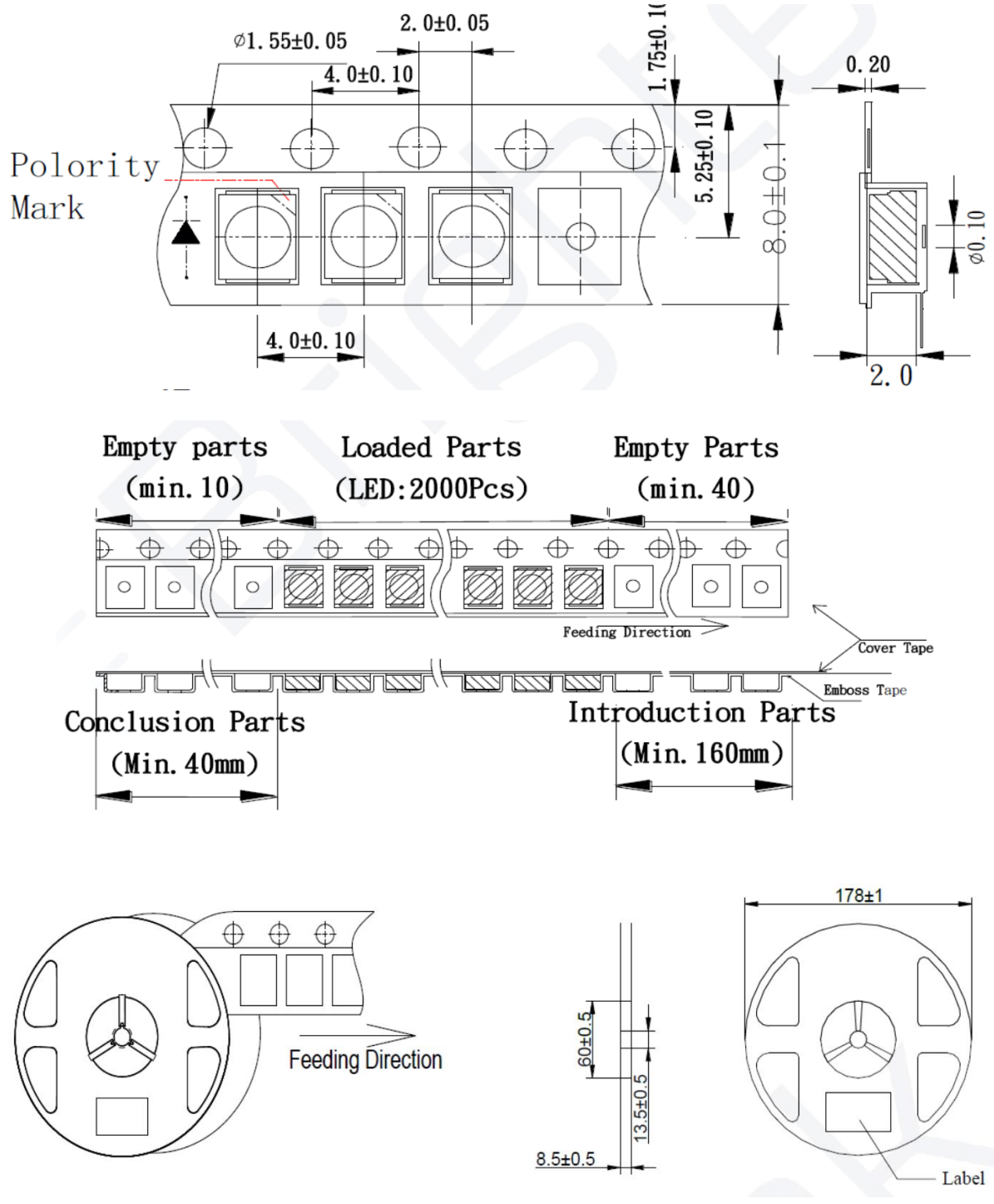
Note:

1. Recommended soldering temperature: 240°C. The maximum soldering temperature should be limited to 260°C.
2. Maximum reflow soldering: 3 times.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

PACKING SPECIFICATION:

Reel Dimension:

2000pcs/reel



PRECAUTIONS OF USE:

Storage:

It is recommended to store the products in the following conditions:

- Humidity: 60% R.H. Max.
- Temperature: 5°C~30°C (41°F ~86°F).

Shelf life in sealed bag: 12 months at 5°C~30°C and <60% R.H.

Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp-proof box with descanting agent <10% R.H. and apply baking before use.

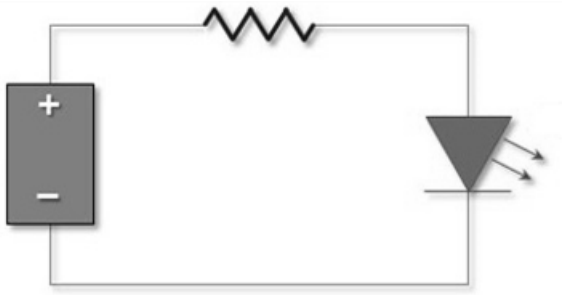
Baking:

It is recommended to bake the LED before soldering if the pack has been unsealed for longer than 24hrs. The suggested baking conditions are as followings:

- 60±3°C x 6hrs and <5%RH, taped / reel package.

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

Testing Circuit:



Must apply resistor(s) for protection (over current proof).

Cleaning:

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED carrier / package. Avoid putting any stress force directly on to the LED lens.

ESD (Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing the LED all time. All devices, equipment, machinery, work tables, and storage racks must be properly grounded.

In the events of manual working in process, make sure the devices are well protected from ESD at any time.

REVISION RECORD:

Version	Date	Summary of Revision
A1.0	27/11/2017	Datasheet set-up.
A1.1	08/08/2022	Revise max. forward current from 60mA to 80mA.