



**BRIGHTTEK**  
**BRIGHTTEK (EUROPE) LIMITED**

*Brighten Up The World With LED!*



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 080000 IECQ HSPM

## PRODUCT DATASHEET



- ▶ PLCC4 SMD
- ▶ 3528 1.8t
- ▶ Red / Green / Blue

NOM03S72BS



Release Date: 25 March 2020 Version: A1.4



### 3528 1.8t Series



#### FEATURES (Red/Green/Blue):

- **Package:** PLCC4 Top View RGB Multichip Black Surface
- **Forward Current:** 20/20/20mA\*
- **Forward Voltage (typ.):** 2.1/3.2/3.2V
- **Luminous Flux (typ.):** 235/1200/350mcd@20mA
- **Colour:** Red/Green/Blue
- **CCT/Wavelength:** 623/525/463nm
- **Viewing angle:** 120/120/120°
- **Materials:**
  - Resin: Silicone (White Diffused)
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+100°C
- **ESD:** 1000V (HBM)
- **Grouping parameters:**
  - Forward voltage
  - Luminous intensity
  - Dominant Wavelength
- **Soldering methods:** Reflow soldering
- **Preconditioning:** MSL 3 according to JEDEC
- **Packing:** 8mm tape with max.2000pcs/reel, ø180mm (7")

\* in order of Red/Green/Blue

#### APPLICATIONS:

- Switch Light
- 3C Application
- Decoration Lighting
- Signal Lighting
- Display

## CHARACTERISTICS:

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### Absolute Maximum Characteristics (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Forward Current	I <sub>F</sub>	50/30/30*	mA
Pulse Forward Current (duty 1/10; width 0.1ms)	I <sub>MAX</sub>	80	mA
Reverse Voltage	V <sub>R</sub>	5/5/5	V
Reverse Current @5V	I <sub>R</sub>	10/10/10	μA
Power Dissipation	P <sub>D</sub>	100/80/80	mW
Electrostatic Discharge (HBM)	ESD	1000	V
Junction Temperature	T <sub>j</sub>	110	°C
Operating Temperature	T <sub>OPR</sub>	-40~+85	°C
Storage Temperature	T <sub>STG</sub>	-40~+100	°C
Soldering Temperature	T <sub>SOL</sub>	260	°C

- \* In the order of Red/Green/Blue.

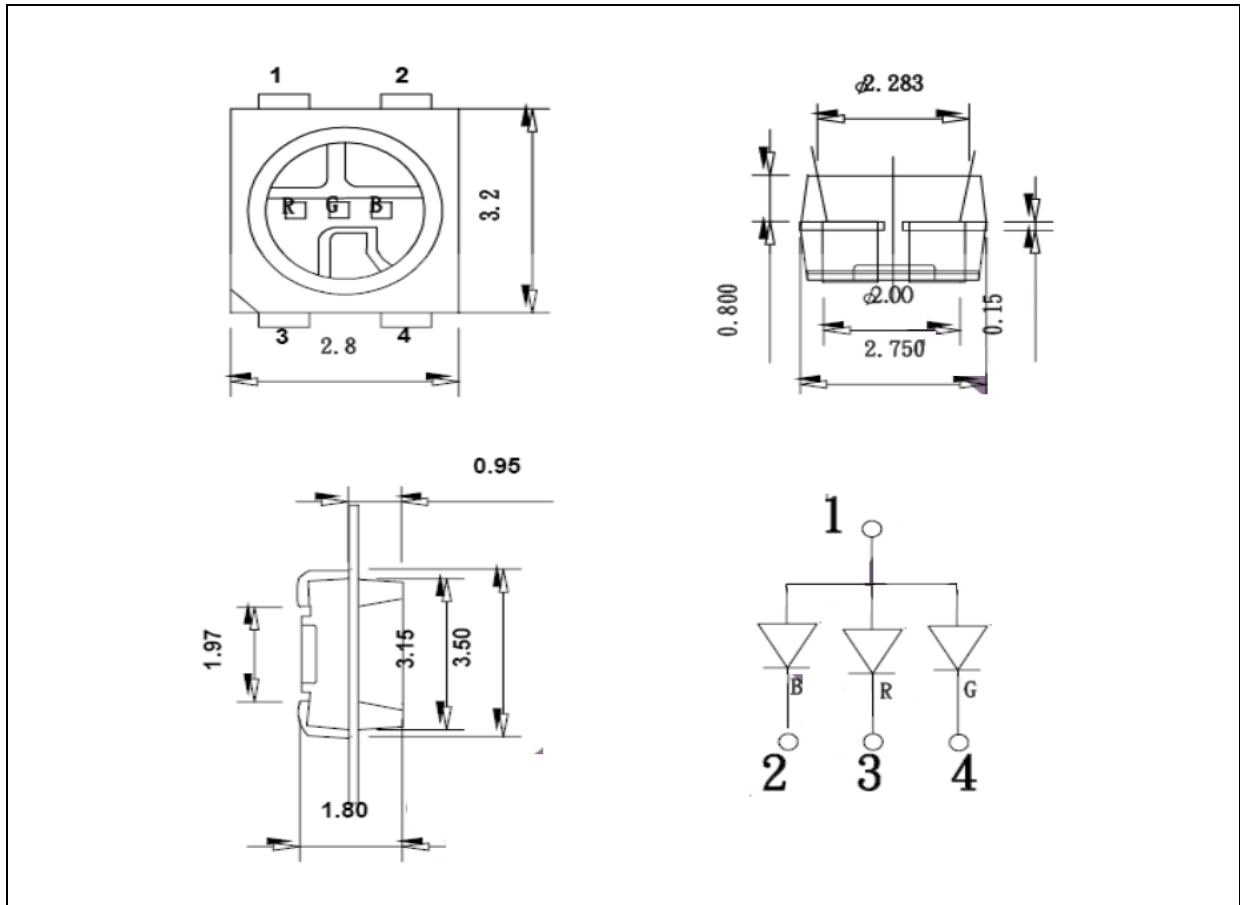
## Electrical &amp; Optical Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Red - Forward Voltage	V <sub>F</sub>	1.8	2.1	2.6	V	I <sub>F</sub> =20mA
Red - Luminous Intensity	I <sub>v</sub>	160	235	310	mcd	I <sub>F</sub> =20mA
Red - Wavelength	W <sub>D</sub>	615	---	630	nm	I <sub>F</sub> =20mA
Green - Forward Voltage	V <sub>F</sub>	2.8	3.2	3.6	V	I <sub>F</sub> =20mA
Green - Luminous Intensity	I <sub>v</sub>	800	1200	1600	mcd	I <sub>F</sub> =20mA
Green - Wavelength	W <sub>D</sub>	519	---	534	nm	I <sub>F</sub> =20mA
Blue - Forward Voltage	V <sub>F</sub>	2.8	3.2	3.6	V	I <sub>F</sub> =20mA
Blue - Luminous Intensity	I <sub>v</sub>	250	350	480	mcd	I <sub>F</sub> =20mA
Blue - Wavelength	W <sub>D</sub>	461	---	476	nm	I <sub>F</sub> =20mA
Viewing Angle	2θ <sub>1/2</sub>	---	120	---	deg	I <sub>F</sub> =20mA

1. Luminous intensity (I<sub>v</sub>) ±10%, Forward Voltage (V<sub>F</sub>) ±0.1V, Viewing angle(2θ<sub>1/2</sub>) ±5%, Wavelength (λ) ±1nm

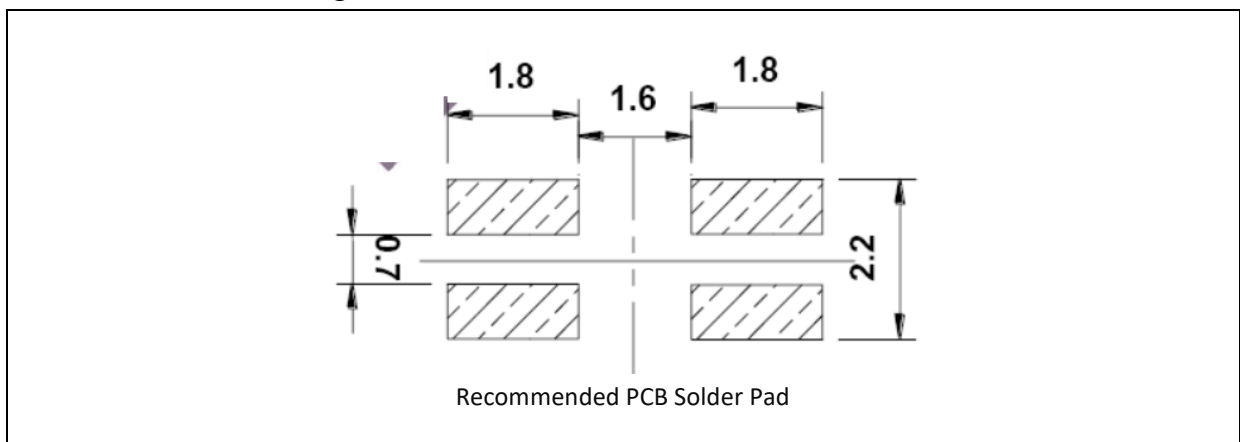
## OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).
2. Tolerance  $\pm 0.1\text{mm}$ , unless otherwise noted.

Recommended Soldering Pad Dimension:



1. Dimensions are in millimetre (mm).
2. Tolerance  $\pm 0.1\text{mm}$  with angle tolerance  $\pm 0.5^\circ$ .

**BINNING GROUPS:**


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 Forward Voltage Classifications ( $I_F = 20\text{mA}$ ):

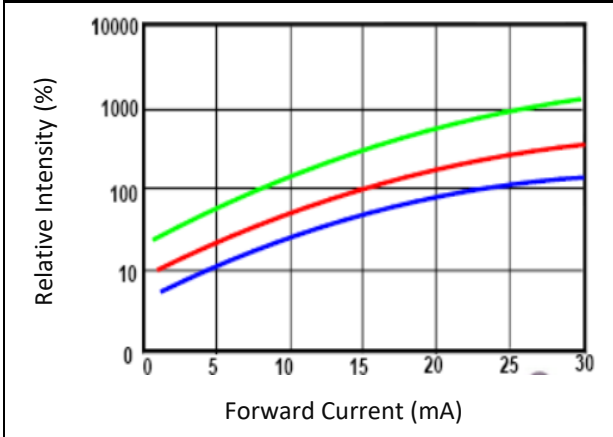
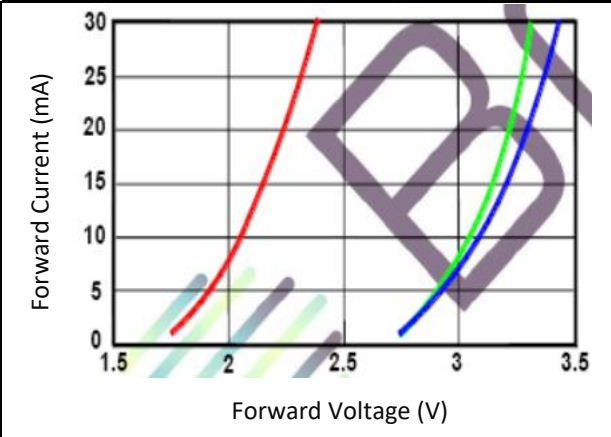
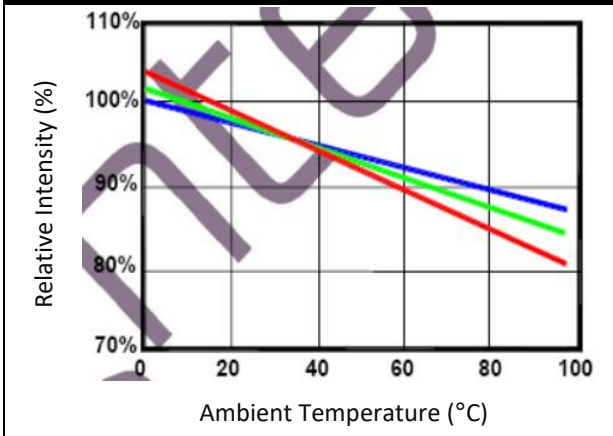
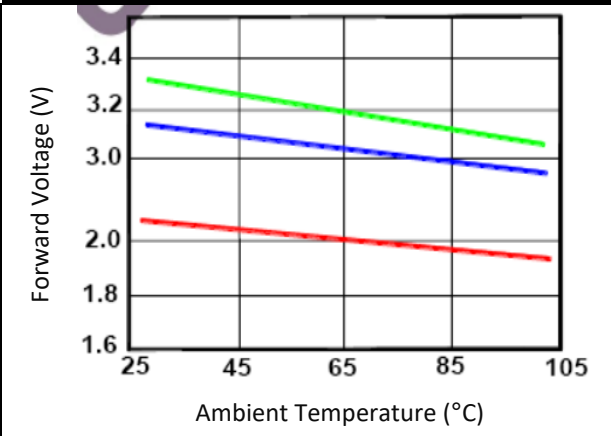
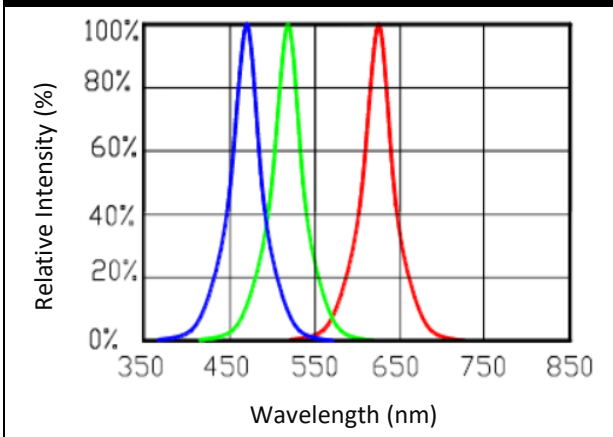
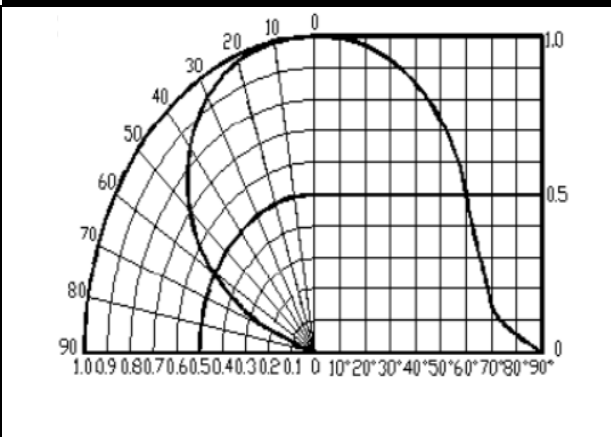
	Code	Min.	Max.	Unit
V	Red	1.8	2.6	V
	Green	2.8	3.6	
	Blue	2.8	3.6	

 Luminous Intensity Classifications ( $I_F = 20\text{mA}$ ):

	Code	Min.	Max.	Unit
LR	7	160	200	mcd
	8	200	250	
	9	250	310	
LG	10	800	1000	mcd
	11	1000	1250	
	12	1250	1600	
LB	9	250	310	mcd
	10	310	388	
	11	388	480	

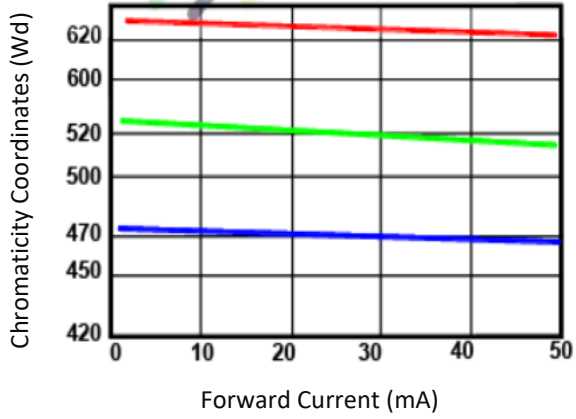
 Wavelength Classifications ( $I_F = 20\text{mA}$ ):

	Code	Min.	Max.	Unit
WR	2	615	620	nm
	3	620	625	
	4	625	630	
WG	2	519	524	nm
	3	524	534	
	4	529	461	
WB	2	461	466	nm
	3	466	471	
	4	471	476	

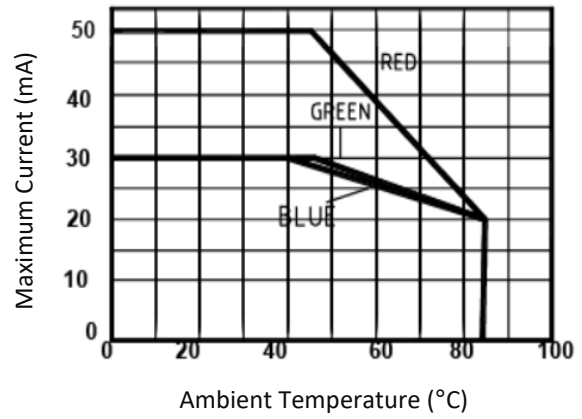
**ELECTRO-OPTICAL CHARACTERISTICS:**
**Relative Intensity v.s. Forward Current**

**Forward Current v.s. Forward Voltage**

**Relative Intensity v.s. Ambient Temperature**

**Forward Voltage v.s. Ambient Temperature**

**Relative Spectral Distribution**

**Directive Radiation**


**ELECTRO-OPTICAL CHARACTERISTICS:**

**Chromaticity Coordinates v.s. Forward Current**

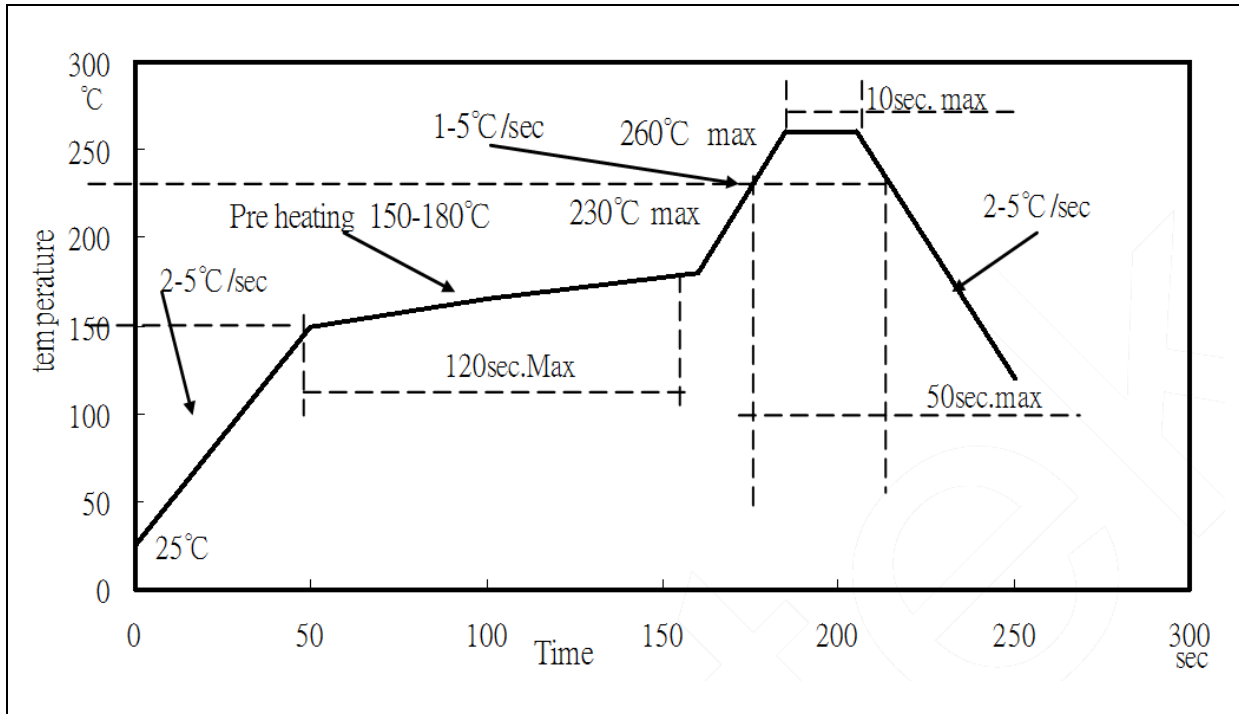


**Max. Forward Current v.s. Temperature**



## RECOMMENDED SOLDERING PROFILE:

Lead-free Solder:



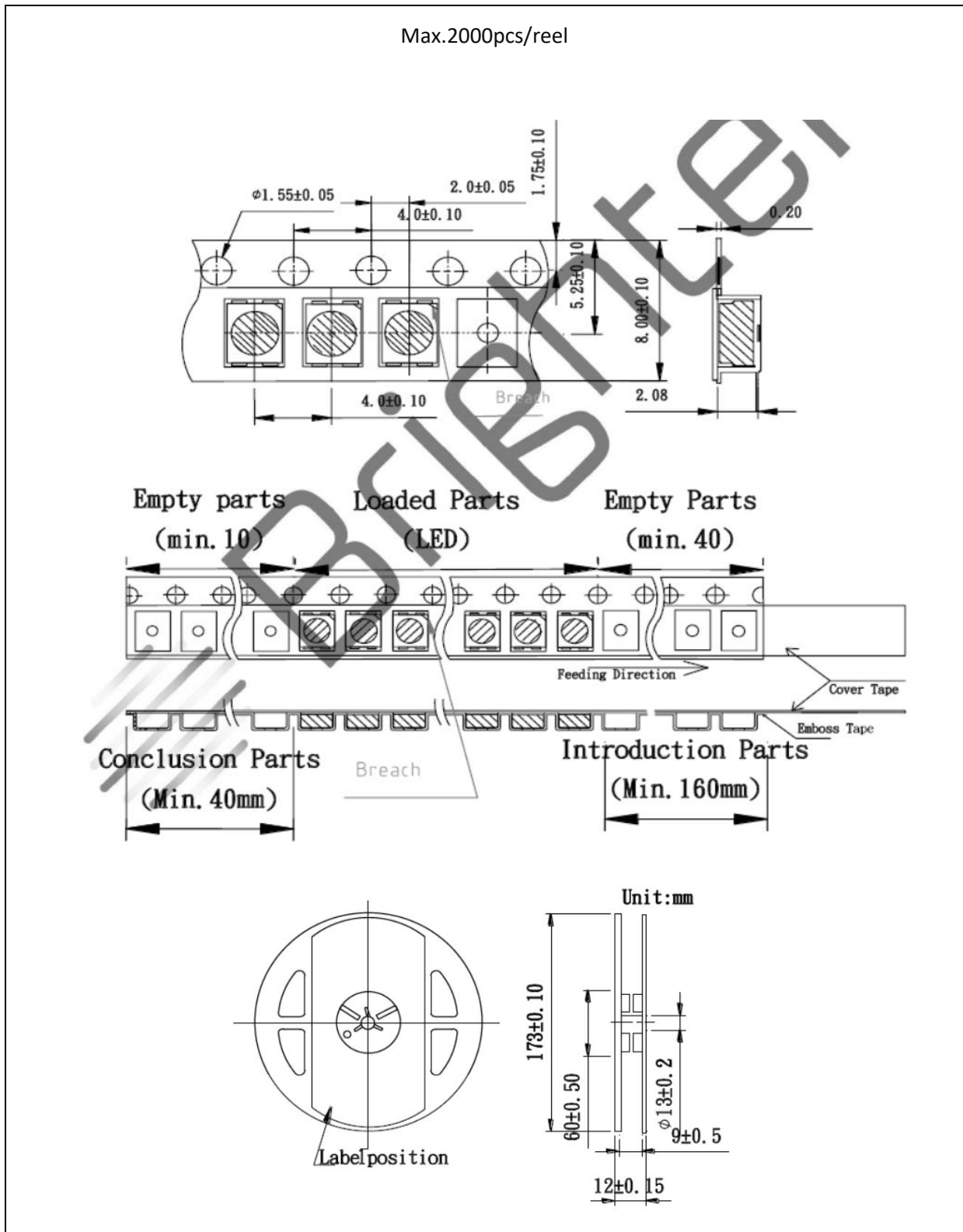
Note:

1. Recommended reflow temperature is 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:



## PRECAUTIONS OF USE:

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### 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 desiccating agent in <10% R.H. storage and apply baking before use.

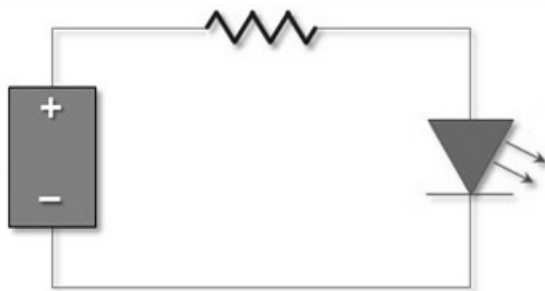
### Baking:

It is required 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-electrostatic glove is recommended when handling 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:**

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Version	Date	Summary of Revision
A1.0	20/05/2016	Datasheet set-up.
A1.1	05/01/2017	Update intensity in range.
A1.2	29/11/2017	Update intensity in range.
A1.3	01/08/2018	Correct part number – PCN N0M03S72BS.
A1.4	25/03/2020	Revise storage and bake condition and upgrade green intensity.