



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



- ▶ EMC SMD Top View
- ▶ 3838 2.21t Series
- ▶ Infrared (IR) 940nm

NOF60S69BF



Release Date: 03 September 2024 Version: A1.1



3838 2.21t Series

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FEATURES:

- **Package:** Black Ceramic Dual Junction SMT Package
- **Forward Current:** 1000~1500mA
- **Pulse Forward Current (max.):** 5A
- **Forward Voltage (typ.):** 3.1V
- **Radiant Power (typ.):** 1400mW@1A; 2100mW@1.5A
- **Radiant Intensity (typ.):** 750mW/sr@1A; 1100mW/sr@1.5A
- **Colour:** Infrared (IR)
- **Peak Wavelength (typ.):** 940nm
- **Viewing angle:** 90°
- **Operating Temperature:** -40~+125°C
- **Storage Temperature:** -40~+125°C
- **Grouping parameters:**
 - Forward Voltage
 - Radiant Power
 - Peak Wavelength
- **Soldering methods:** Reflow
- **Preconditioning:** MSL2 according to J-STD020
- **Corrosion Robustness Class:** 3B
- **Packing:** 12mm tape with max.800/reel, ø178mm (7")

APPLICATIONS:

- Automotive
- Security Camera
- Motion Detection
- Night Viewer
- Surveillance
- Data Communication
- Facial Recognition
- Gesture Recognition

CHARACTERISTICS:

Absolute Maximum Characteristics ($T_a=25^{\circ}\text{C}$)

Parameter	Symbol	Ratings	Unit
DC Forward Current	I_F	1500	mA
Pulse Forward Current	I_{PF}	5	A
Power Consumption	P_{tot}	5.5	W
Reverse Voltage	V_R	5	V
Reverse Current @5V	I_R	10	μA
Junction Temperature	T_j	145	$^{\circ}\text{C}$
Thermal Resistance Junction to Solder Point	R_{th}	typ. 4.5; max. 9	K/W
Electrostatic Discharge (HBM: MIL-STD-883 C 2)	ESD	2	kV
Operating Temperature	T_{OPR}	-40~+125	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-40~+125	$^{\circ}\text{C}$
Soldering Temperature	T_{SOL}	260	$^{\circ}\text{C}$

Electrical & Optical Characteristics ($T_a=25^{\circ}\text{C}$, $I_F=1\text{A}$, $t_p=10\text{ms}$)

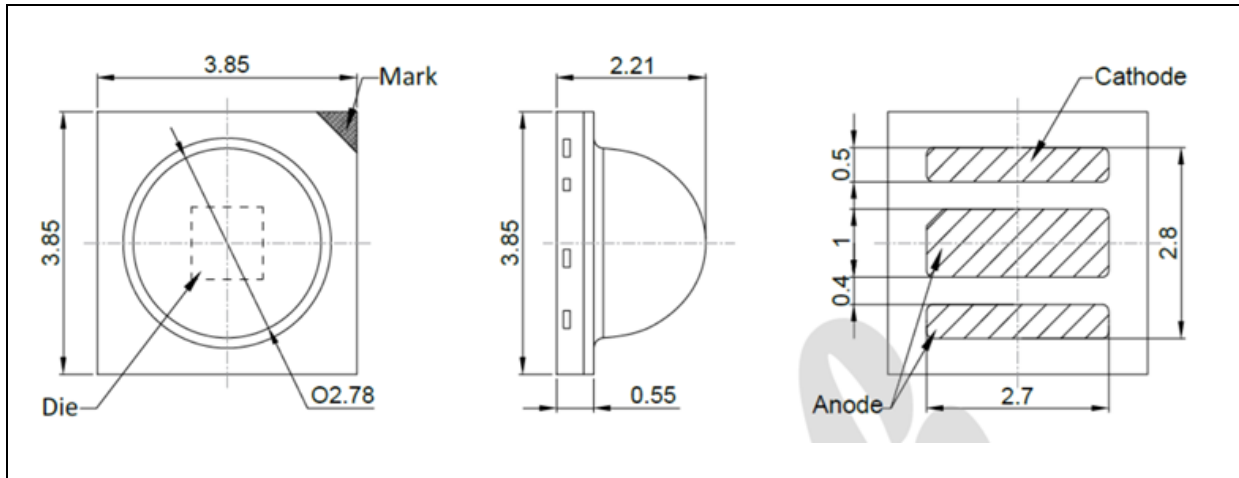
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Forward Voltage	V_F	2.8	3.1	3.6	V	$I_F=1\text{A}$ $t_p=100\mu\text{s}$
		2.85	3.25	3.65		$I_F=1.5\text{A}$ $t_p=100\mu\text{s}$
		---	4.4	5.0		$I_F=5\text{A}$ $t_p=100\mu\text{s}$
Radiant Power	Φ_e	1200	1400	1600	mW	$I_F=1\text{A}$ $t_p=100\mu\text{s}$
		1900	2100	2300		$I_F=1.5\text{A}$ $t_p=100\mu\text{s}$
Radiant Intensity	I_e	650	750	850	mW/sr	$I_F=1\text{A}$ $t_p=100\mu\text{s}$
		1000	1100	1200		$I_F=1.5\text{A}$ $t_p=100\mu\text{s}$
Peak Wavelength	λ_P	---	940	---	nm	$I_F=1\text{A}$
Spectral Bandwidth	$\Delta\lambda$	---	35	---	nm	$I_F=1\text{A}$
Viewing Angle	$2\theta_{1/2}$	---	90	---	deg	$I_F=1\text{A}$

1. Radiant Power (P_o) $\pm 10\%$, Forward Voltage (V_F) $\pm 0.1\text{V}$, Viewing angle($2\theta_{1/2}$) $\pm 10^{\circ}$



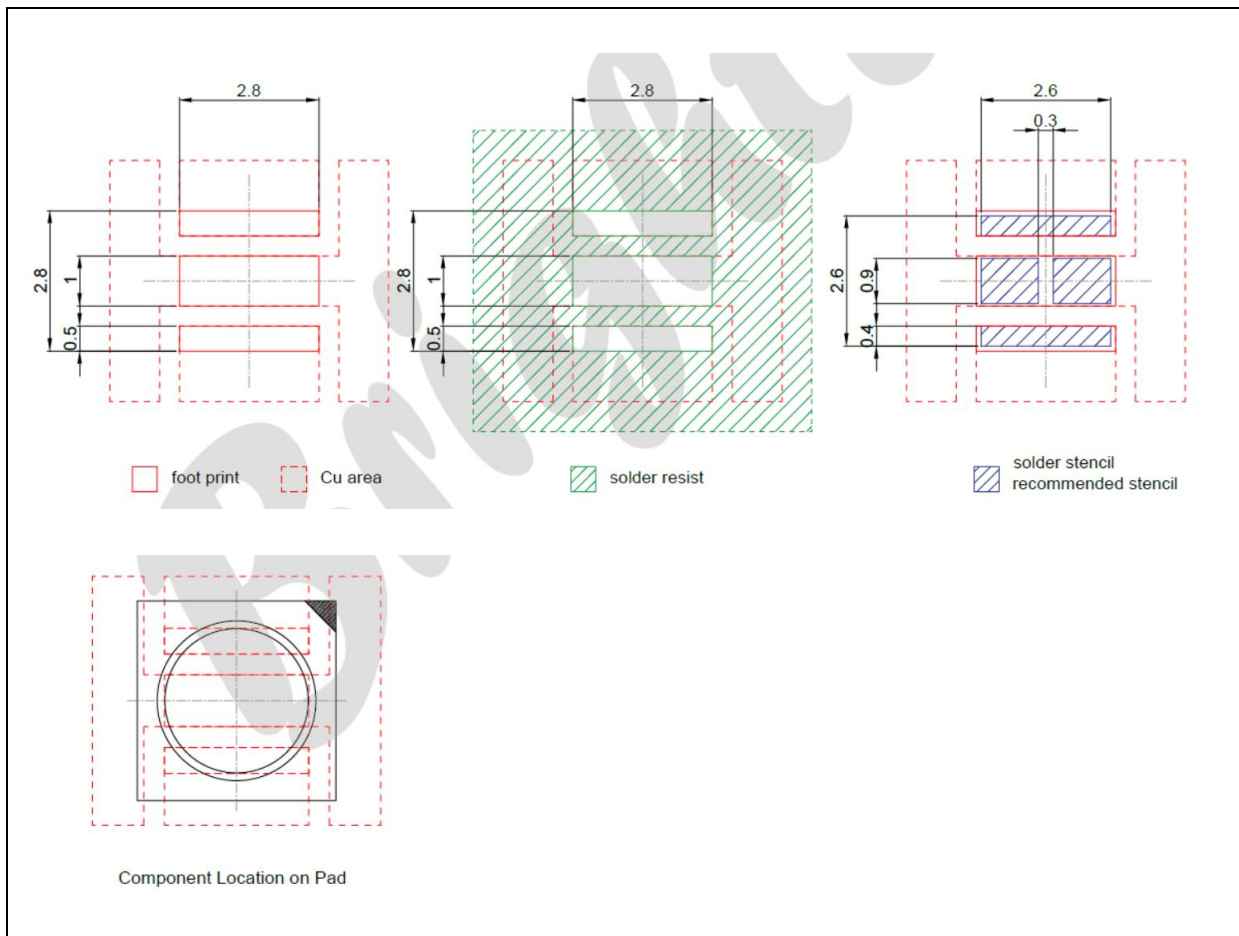
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).
2. Tolerance $\pm 0.13\text{mm}$, 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:

Forward Voltage Classifications ($I_F=1A$; $t_p=10ms$):

Code	Min.	Max.	Unit
KN	2.8	3.6	V

Radiant Power Classifications ($I_F=1A$; $t_p=10ms$):

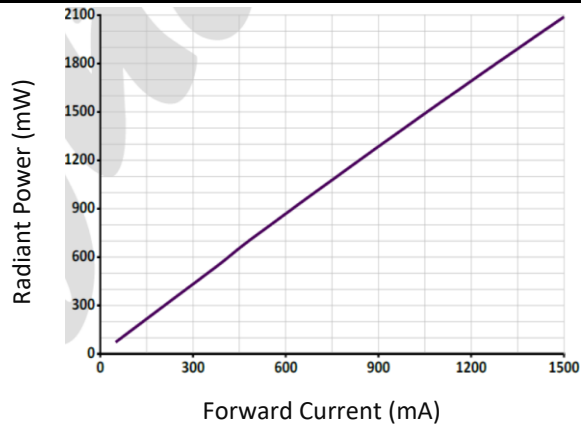
Code	Min.	Max.	Unit
PB2A	1200	1400	mW
PB4A	1400	1600	

Peak Wavelength Classifications ($I_F=1A$; $t_p=10ms$):

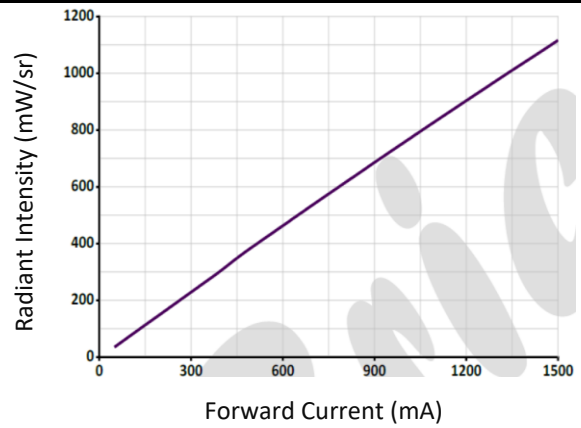
Code	Min.	Max.	Unit
F1	930	950	nm

ELECTRO-OPTICAL CHARACTERISTICS:

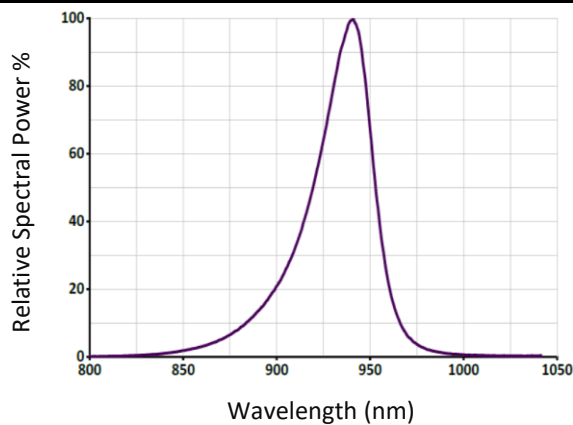
Radiant Power v.s. Forward Current



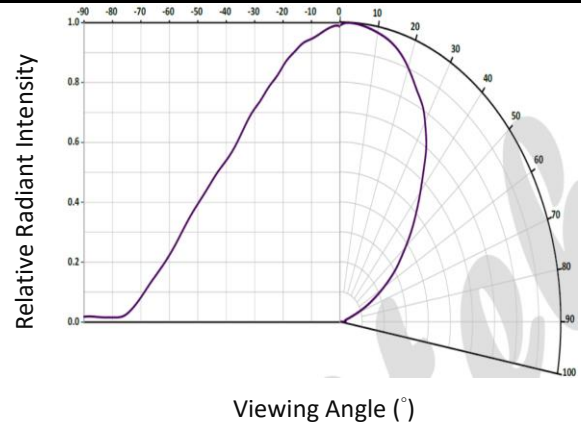
Radiant Intensity v.s. Forward Current



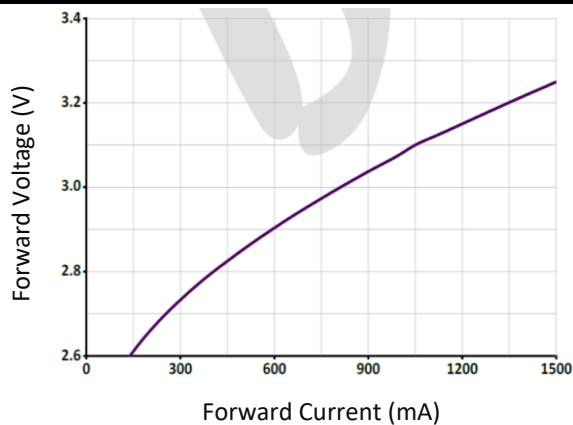
Relative Spectral Power v.s. Wavelength



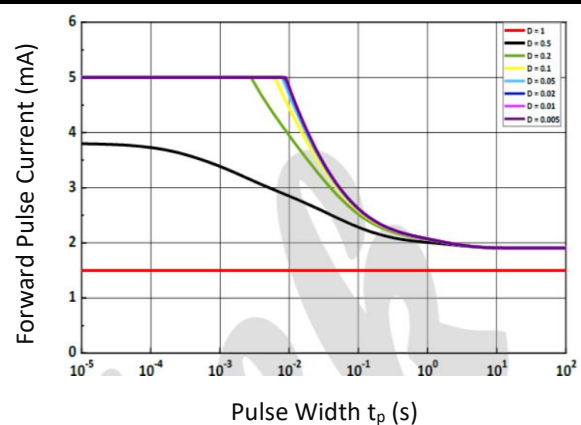
Directive Radiation



Forward Current v.s. Forward Voltage



Permissible Pulse Handling Capability
 $I_F = f(t_p)$; $D = \text{Duty Cycle}$; $T_s = 85^\circ\text{C}$

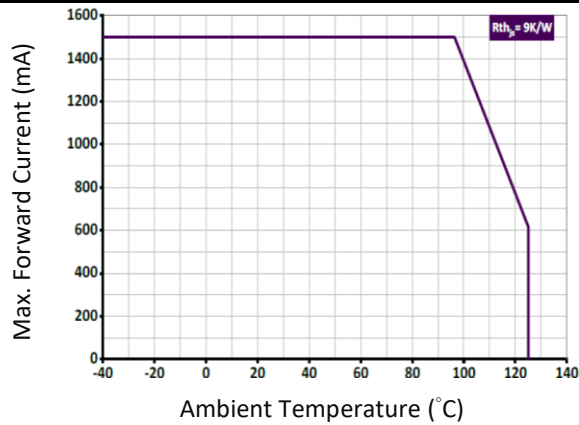




ELECTRO-OPTICAL CHARACTERISTICS:

Permissible Forward Current

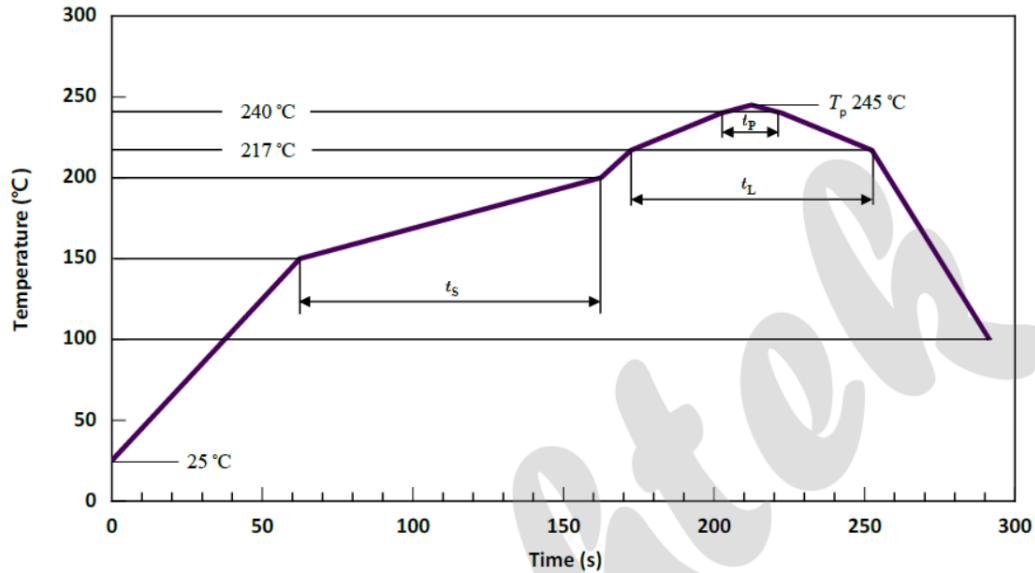
$$I_{F(max)} = f(T_s); R_{thjs} = 9K/W$$





RECOMMENDED SOLDERING PROFILE:

Reflow Lead-free Solder:



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat 25 °C to 150 °C			2	3	K/s
Time ts T _{smin} to T _{smax}	ts	60	100	120	s
Ramp-up rate to peak T _{smax} 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 TP - 5 K	T _P	10	20	30	s
Ramp-down Rate T _P to 100 °C			3	4	K/s
Time 25 °C to T _P				480	s

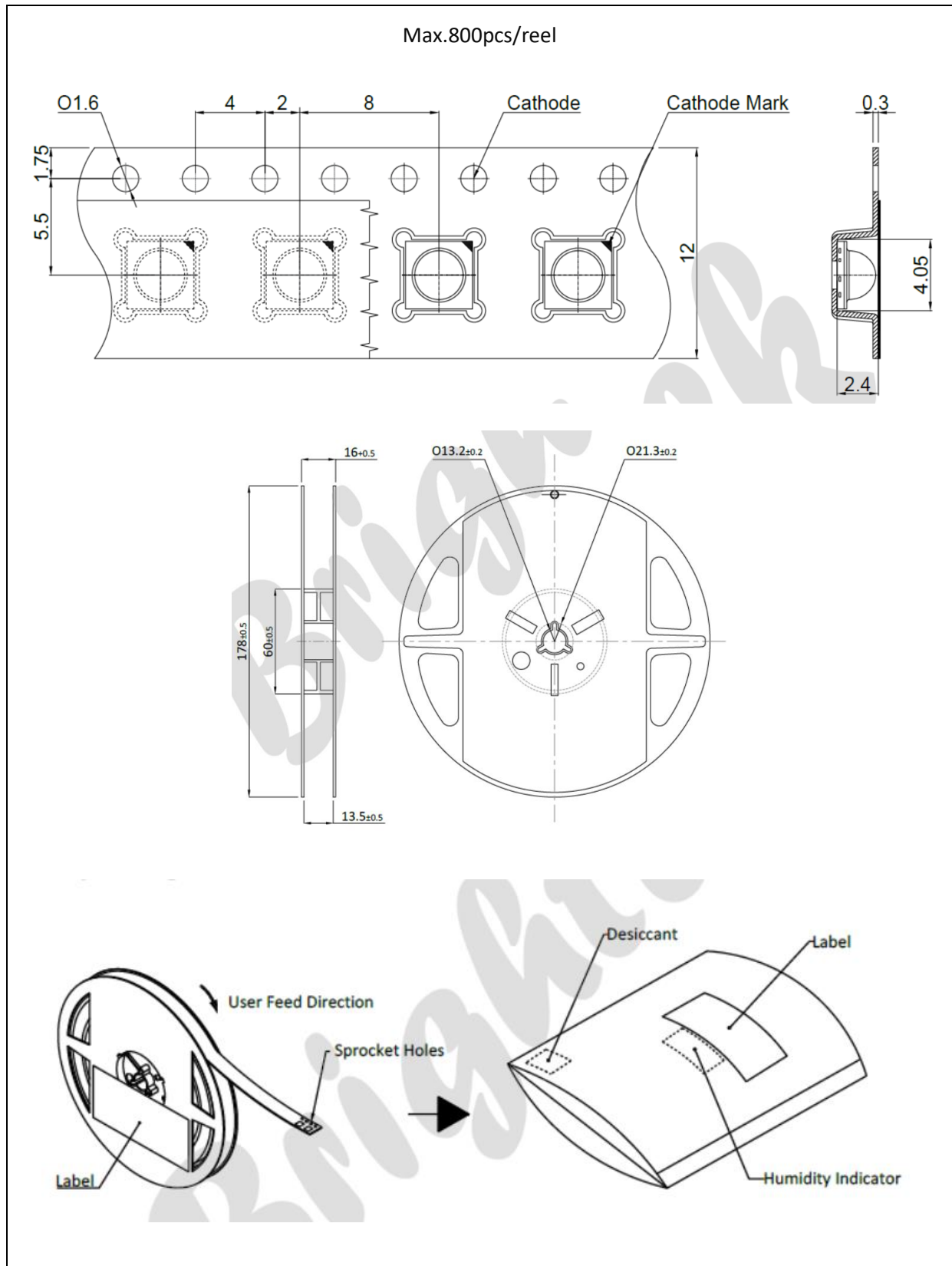
Note:

1. Maximum reflow soldering: 2 times.
2. Recommended soldering temperature is 245°C. The maximum soldering temperature should be limited to 260°C.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.



PACKING SPECIFICATION:

Reel Dimension:



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 desiccating 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 24hrs 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:

Version	Date	Summary of Revision
A1.0	22/05/2022	Datasheet set-up.
A1.1	03/09/2024	Add bin table and packing.