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Top Crystal Technology Inc.,

Power Light Source

Introduction :

TCI UV emitter is one the highest flux LEDs in the world. Due to the special design of chip and package, the TCI UV emitter is designed by particular package for high power LED.



Feature :

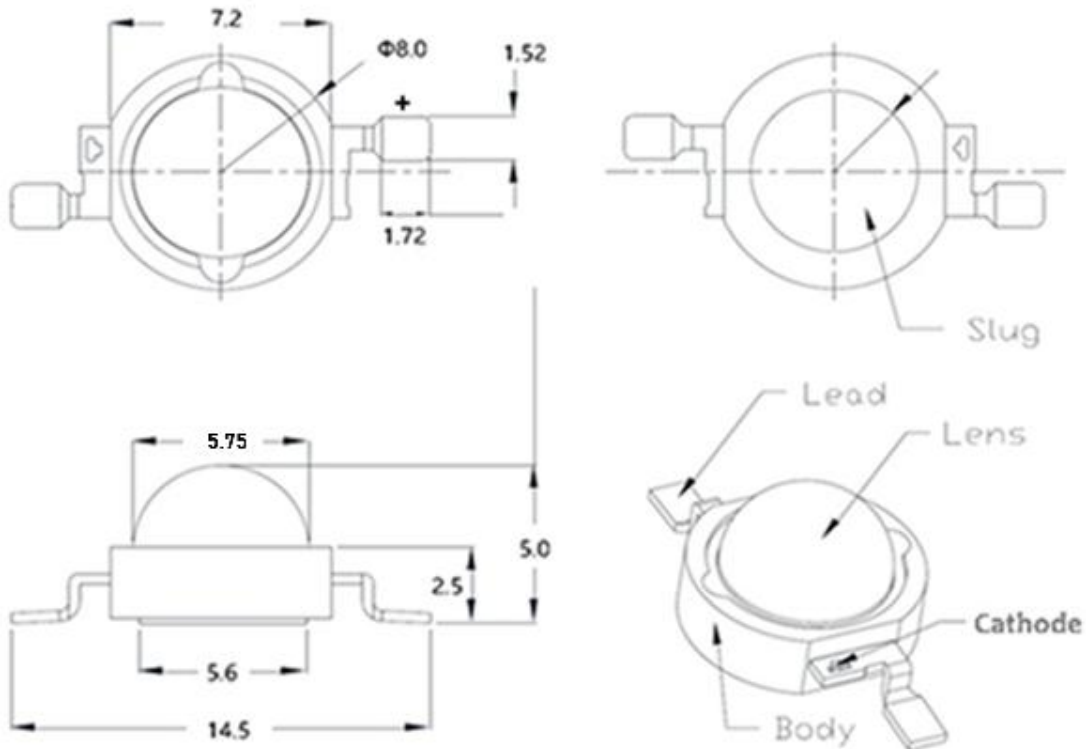
- Instant light (less than 100ns)
- Low-temp. & lead free reflow soldering
- RoHS compliant
- Cool beam, safe to the touch

Typical Applications:

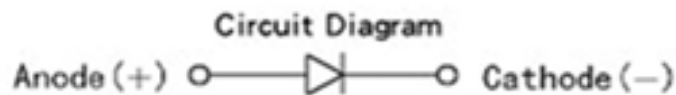
- UV gluing, UV curing, UV marking
- UV drying of printing inks and lacquers
- Currency inspection
- Forensic analysis - urine, protein stains
- Leak detection using fluorescent dyes
- Detects fluorescing minerals and gems
- Indoor Lighting
- Outdoor Lighting



Emitter Mechanical Dimensions



Circuit Diagram:



Notes :

1. Drawings are not to scale.
2. All dimensions are in millimeter.
3. General tolerance is $\pm 0.2\text{mm}$.
4. The polarity of slug at bottom is anode.
5. It is important that the slug can't contact aluminum surface, it is strongly recommended that there should coat a uniform electrically isolated heat dissipation film on the surface.
6. It is strongly recommended that the temperature of lead be not higher than 70°C .



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Absolute Maximum Ratings

Parameter	Conditions
DC Forward Current	350 mA
Peak Pulse Current (mA) (less than 1/10 duty cycle@1KHz)	400 mA
LED Junction Temperature (°C)	110°C
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	2000V HBM
Operating Temperature (°C)	-30~80
Storage Temperature (°C)	-40~80
Soldering Temperature	Manual 220°C (max) 5 seconds
Allowable Reflow Cycles	3
Reverse Voltage	Not design to be driven in reverse bias

Power Characteristics, TJ = 25°C

Radiation Pattern	Color	Part Number	Radiometric Power (mW)		
			Min.	Typ.	Max
Lambertian	UV	THSM-CLU	400	550	--

- Maintains a tolerance of $\pm 7\%$ on flux and power measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Electrical Characteristics, TJ = 25°C

Color	Forward Voltage VF (V)			Thermal Resistance Junction to Slug (°C/ W)
	Min.	Typ.	Max.	
UV	3.0	3.2	3.5	10

- Maintains a tolerance of $\pm 0.1V$ for Voltage measurements.

Optical Characteristics at 700mA, TJ = 25°C

Radiation Pattern	Color	Dominant Wavelength λ_P			Viewingc Angle (degrees)
		Min.	Typ.	Max.	
Lambertian	UV	390 nm	400 nm	410 nm	140

- maintains a tolerance of $\pm 1nm$ for dominant wavelength measurements.



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RELIABILITY ITEMS and SPECTIONS

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life (RTOL)	25°C, $I_F = \text{max DC}$ (Note 1)	1000 hours	Note 2
Wet High Temperature Operating Life (WHTOL)	85°C/60%RH, $I_F = \text{max DC}$ (Note 1)	1000 hours	Note 2
Wet High Temperature Storage Life (WHTSL)	85°C/85%RH, non-operating	1000 hours	Note 2
High Temperature Storage Life (HTSL)	110°C, non-operating	1000 hours	Note 2
Low Temperature Storage Life (LTSL)	-40°C, non-operating	1000 hours	Note 2
Non-operating Temperature Cycle (TMCL)	-40°C to 120°C, 30 min. dwell, <5 min. transfer	200 cycles	Note 2
Mechanical Shock	1500 G, 0.5 msec. pulse, 5 shocks each 6 axis		Note 3
Natural Drop	On concrete from 1.2 m, 3X		Note 3
Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20 G about 1 min., 1.5 mm, 3X/axis		Note 3
Solder Heat Resistance (SHR)	260°C $\pm$ 5°C, 10 sec.		Note 3
Solderability	Steam age for 16 hrs., then solder dip at 260°C for 5 sec.		Solder coverage on lead

Notes:

1. Depending on the maximum derating curve.

2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	$I_F = \text{max DC}$	-	Initial Level x 1.1
Luminous Flux or Radiometric Power (Φ_V)	$I_F = \text{max DC}$	Initial Level x 0.7	-

* The test is performed after the LED is cooled down to the room temperature.

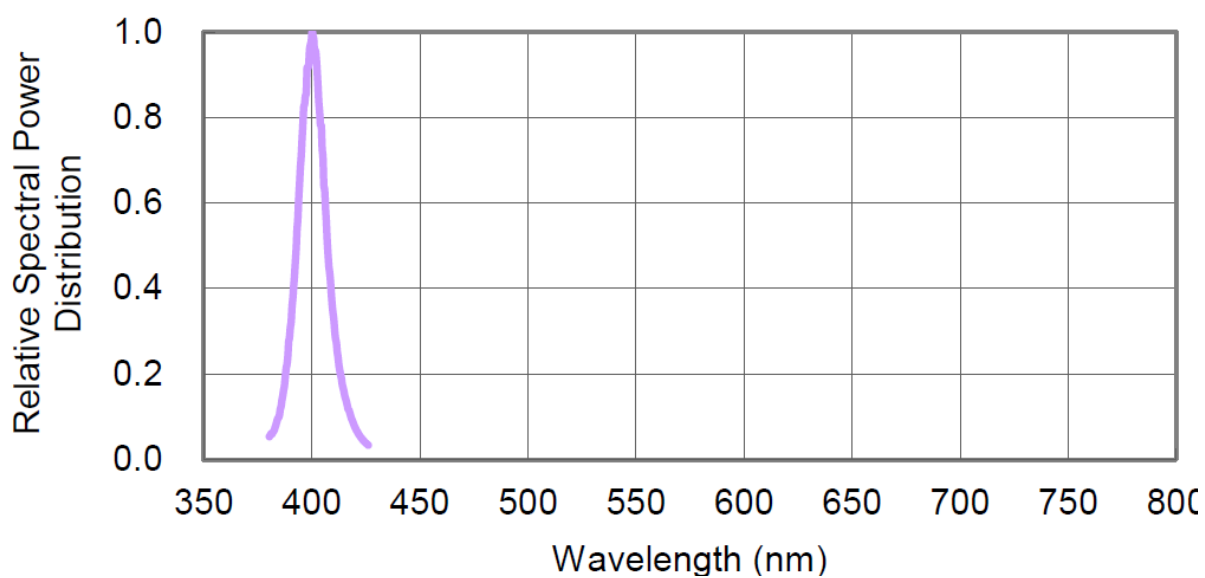
* A failure is an LED that is open or shorted.



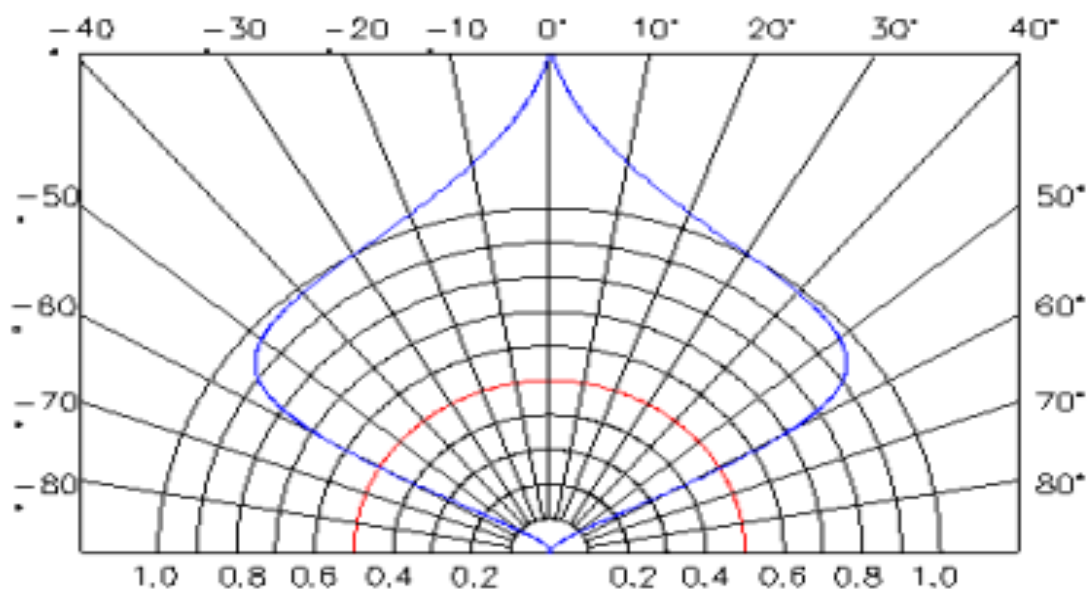
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Wavelength Spectrum, $T_j=25^{\circ}\text{C}$



Typical Polar Radiation Pattern





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Forward Current Characteristics, $T_J = 25^\circ\text{C}$

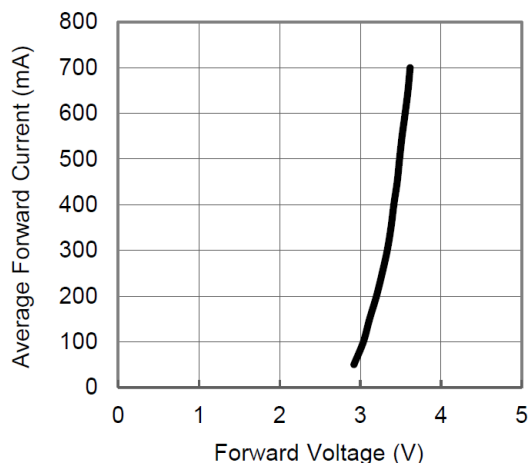


Fig 1. Forward Current vs.
Forward Voltage

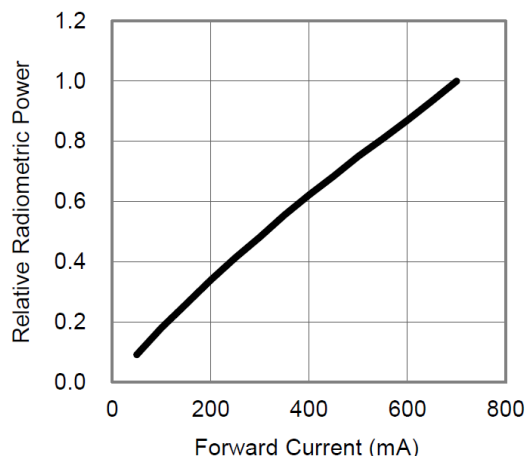
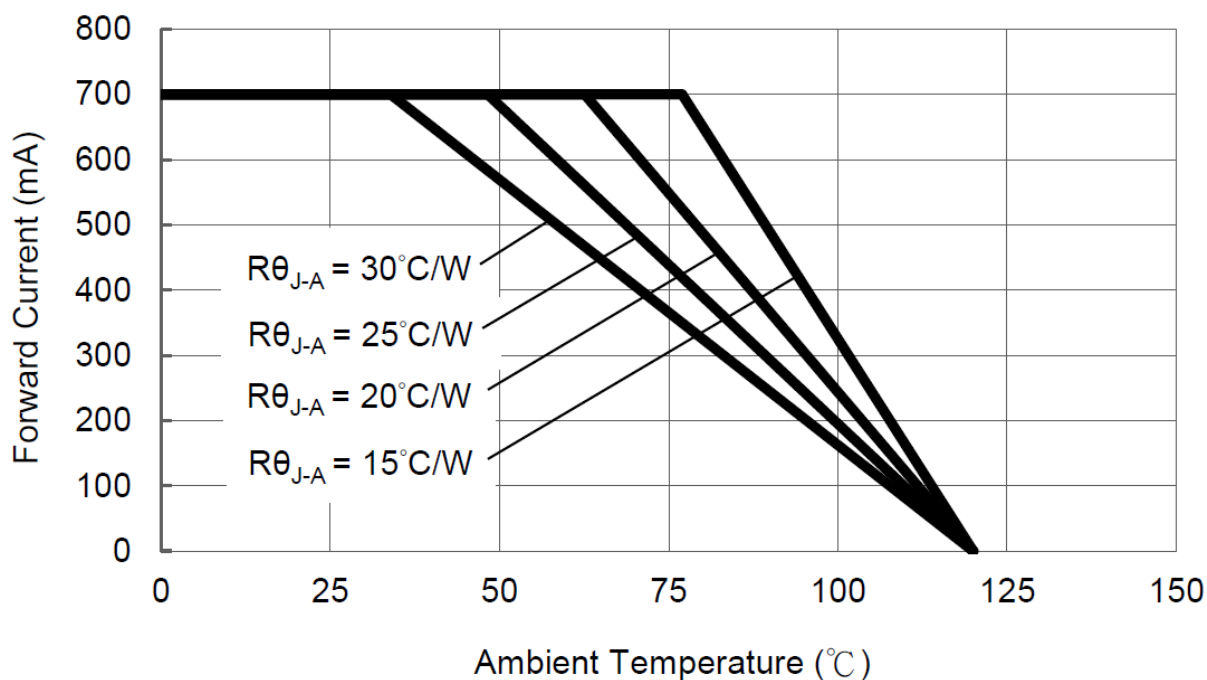


Fig 2. Relative Radiometric Power vs.
Forward Current at $T_J = 25^\circ\text{C}$ maintained.

Ambient Temperature vs. Maximum Forward Current

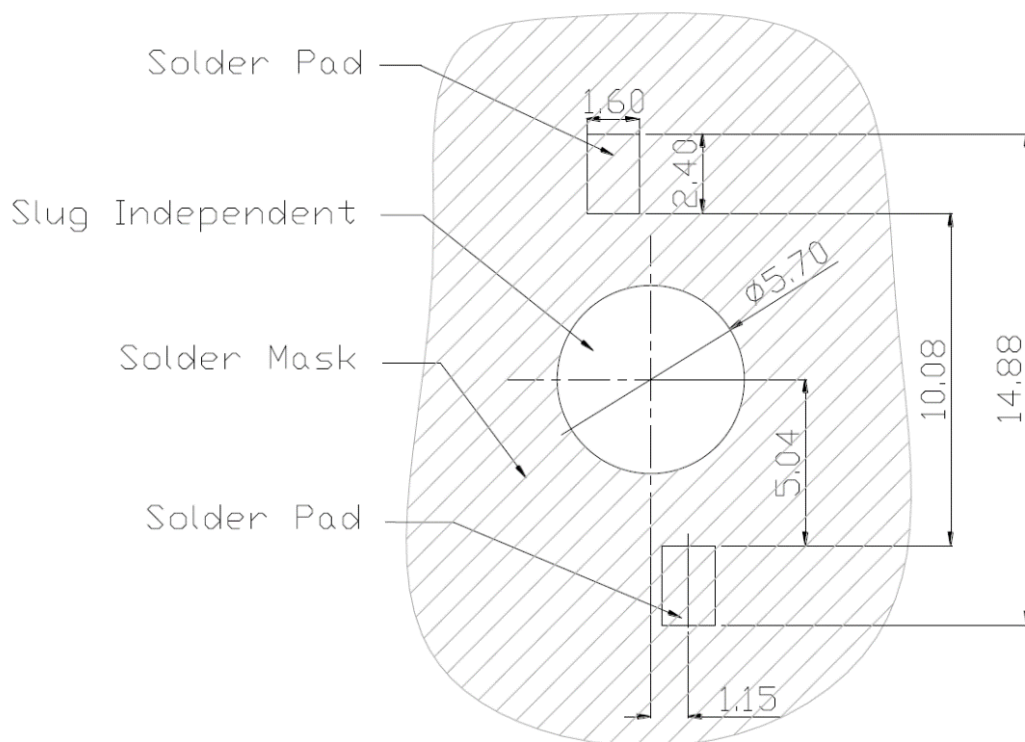




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Recommended Solder Pad Design



Notes :

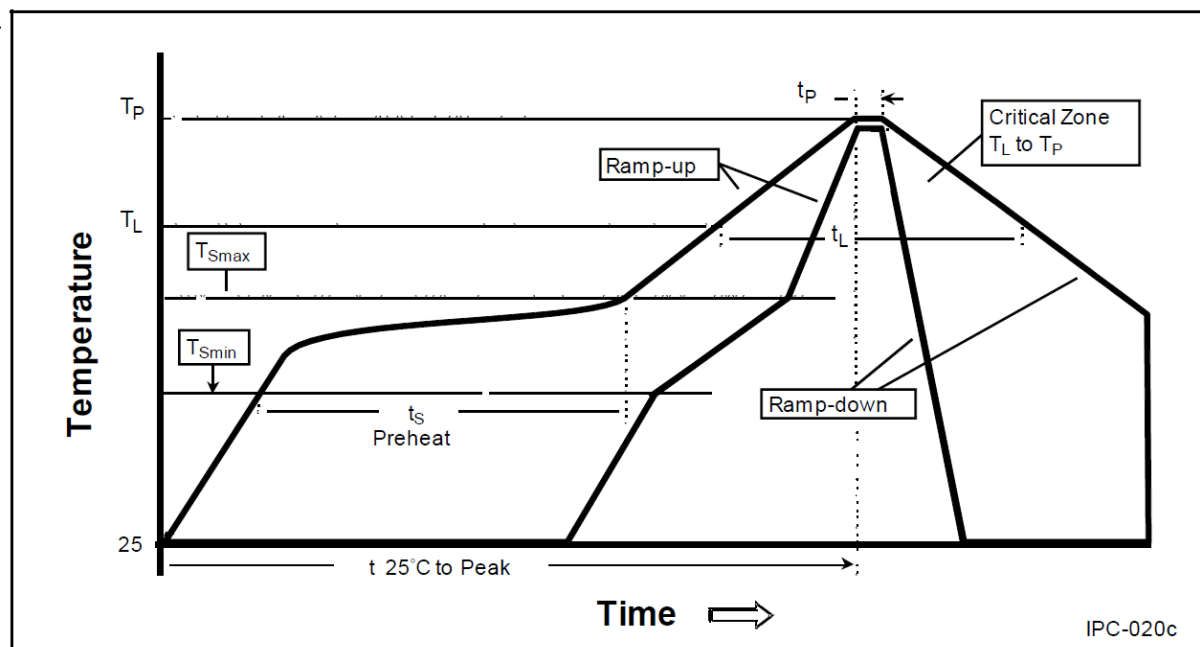
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Solder pad can't be connected to slug



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Recommended Soldering Profile



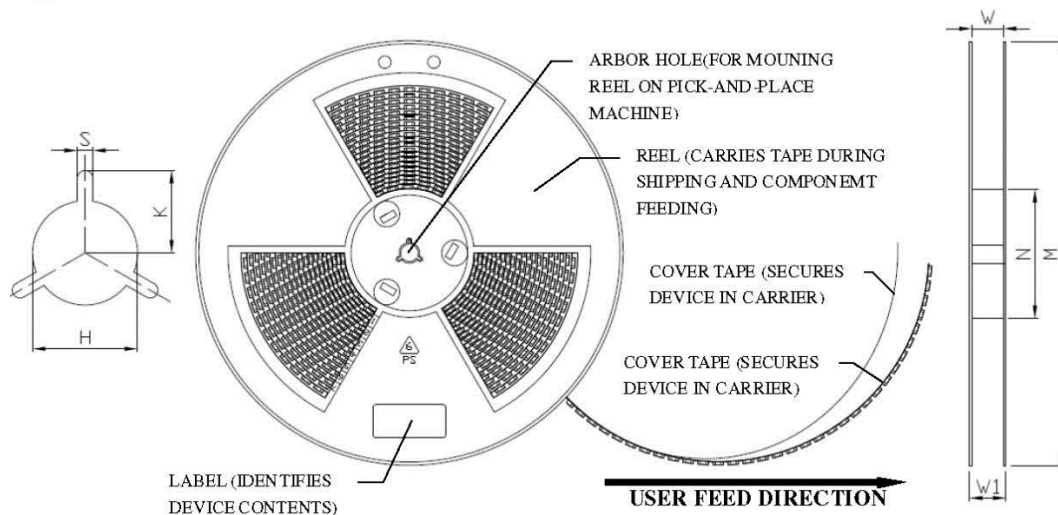
Profile Feature	Sn-Pb Eutectic Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max.
Preheat –Temperature Min (T_{Smin}) –Temperature Max (T_{Smax}) –Time (t_{Smin} to t_{Smax})	100°C 150°C 60-120 seconds
Time maintained above: –Temperature (T_L) –Time (t_L)	183°C 60-150 seconds
Peak/Classification Temperature (T_P)	220°C
Time Within 5°C of Actual Peak Temperature (t_P)	10-30 seconds
Ramp-Down Rate	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.

- All temperatures refer to topside of the package, measured on the package body surface.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- Reflow soldering should not be done more than three times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.



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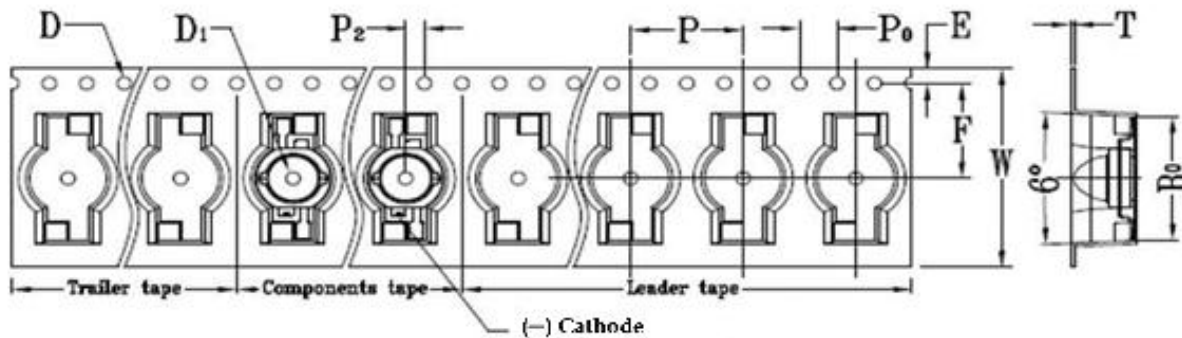
Tape and Reel Packaging Specifications



Unit : mm

M	N	W	W1	H	K	S
Φ330.0	Φ99.5	24.4	29	Φ13.5	10.75	2.5
±1.0	±1.0	±1.0	±1.0	±0.5	±0.5	±0.5

Carrier tape dimensions



Unit : mm

W	P	E	F	P ₂	D	D ₁	P ₀	A ₀	B ₀	K ₀	T
24.0	12.0	1.75	11.5	2.0	1.5	1.5	4.0	8.2	15.0	6.7	0.4
±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.25	±0.1	±0.1	±0.1	±0.1	±0.05



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Notice

1. Unavailable directly touch the colloid surface and squeeze
2. Use tweezers to pick up the external sides of the housing part carefully. Do not grab, puncture or push the emitting region. Over stress on the lens may cause the damage of component and raise the risk to break the wire inside the package.
3. In order to avoid absorption of moisture, it is recommended that the products are stored in the dry box (or desiccators) with a desiccants. Alternatively the following environment is recommended: Storage temperature : 5°C~30°C Humidity:60% HR max.
4. If the storage conditions are of high humidity the product should be dried before use. Recommended drying conditions: 12 hours at 60°C±5°C
5. Any mechanical force or any excess vibration should be avoid during the cooling process after soldering.
6. Reflow rapidly cooling should be avoided.
7. Components should not be mounted on distorted Printed Circuit Boards.
8. Devices should not contact with any types of fluid, such as water , oil , organic solvents.... etc.
9. The maximum ambient temperature should be taken into consideration when determining the operating current.

