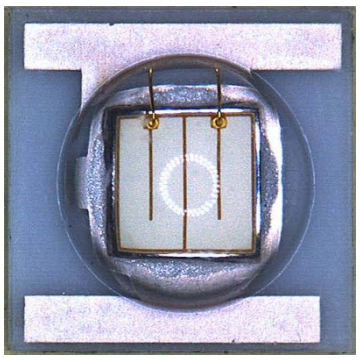
台宙晶體科技股份有限公司
Top Crystal Technology Inc.,

Power Light Source

Introduction：

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



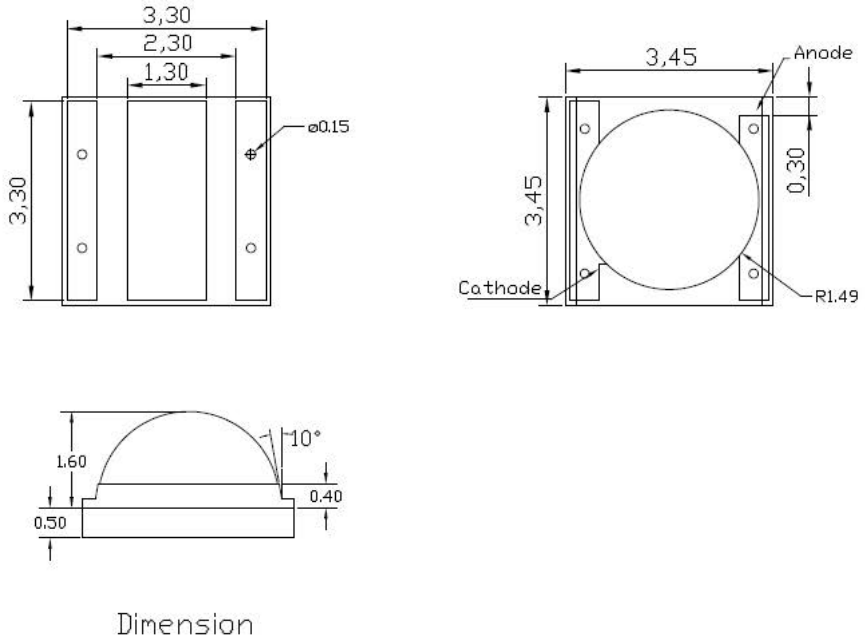
Feature：

- Long operating life
- Energy efficiency
- Low thermal resistance
- Compact design
- Instant light
- Fully dimmable
- No UV
- Superior ESD protection
- ROHS compatibility

Typical Applications:

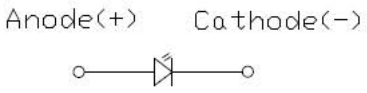
- Reading lights
- Portable light
- Orientation
- Entertainment
- Garden
- Security light
- Ceiling light
- Architectural lighting
- General lighting
- Jewel display illumination

Package Dimensions:



Dimension

Circuit Diagram



Notes :
1. All dimensions are in millimeters
2. Tolerance is ±0.25mm

Absolute Maximum Ratings

Parameter		Conditions
DC Forward Current	1W	350mA
	3W	700 mA
Peak Pulse Current (mA)	1W	400 mA
(less than 1/10 duty cycle@1KHz)	3W	800 mA
LED Junction Temperature (℃)		120℃
Operating Temperature (℃)		-30~80
Storage Temperature (℃)		-40~100
Soldering Temperature		Manual 240℃(max) 5 seconds
Reverse Voltage		Not design to be driven in reverse bias

Optical Characteristics (Tj=25℃)

Color	Dominant Wavelength λd		Viewing Angle Degree
	Min.	Max.	$2\theta_{1/2}$
Royal Blue	450nm	460nm	125

TCI maintains a tolerance of ±1nm for dominant wavelength measurements.

(1) The peak wavelength of 660nm should contain the dominant wavelength of around 640nm.

Flux Characteristics (Tj=25℃)

Color	Forward current	Part Number	Minimum Luminous Flux	Typical Luminous Flux	Maximum Luminous Flux	Beam Pattern
Royal Blue	350mA	THCA-CLY	515mW	620mW	--	Lambertian
	700mA	THCA-DLY	880 mW	1100mW	--	

- TCI maintains a tolerance of ±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℃)

Color	Forward current	Part Number	Forward Voltage V_F(V)			Thermal Resistance Junction to slug (℃/W)
			Min.	Typ.	Max.	
Royal Blue	350mA	THCA-CLY	2.85	3.1	3.6	8
	700mA	THCA-DLY	3.0	3.5	4.0	

Notes:

1. V_F ±0.1V tester tolerance.

RELIABILITY ITEMS and SPECTIONS

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life (RTOL)	25°C, I_F = max DC (Note 1)	1000 hours	Note 2
Wet High Temperature Operating Life (WHTOL)	85°C/60%RH, I_F = 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 ± 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:

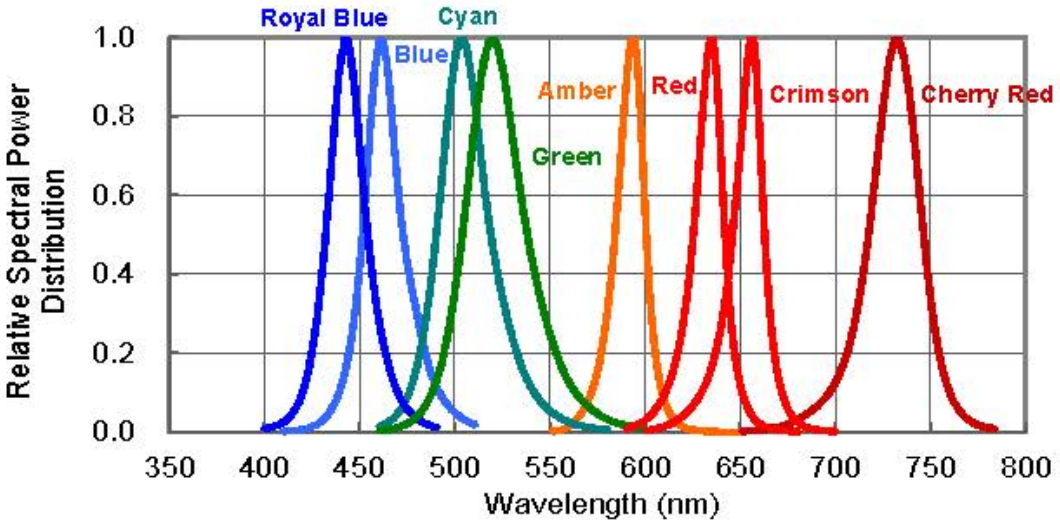
1. Depending on the maximum derating curve.
2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	I_F = max DC	--	Initial Level x 1.1
Luminous Flux or	I_F = max DC	Initial Level x 0.7	--
Reverse Current (I_R)	V_R = 5V	--	50 μA

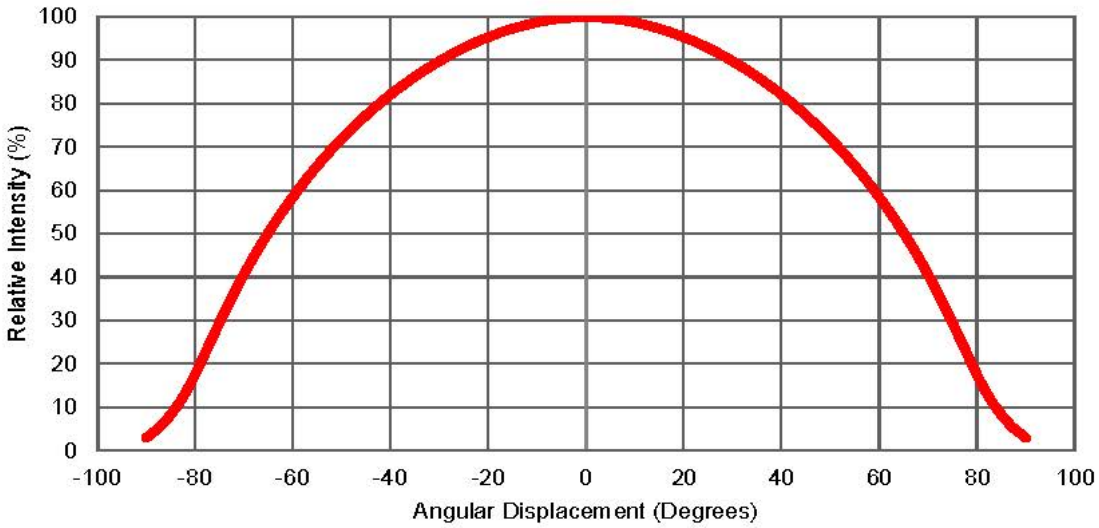
* The test is performed after the LED is cooled down to the room temperature.

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

Color Spectrum, TJ = 25°C

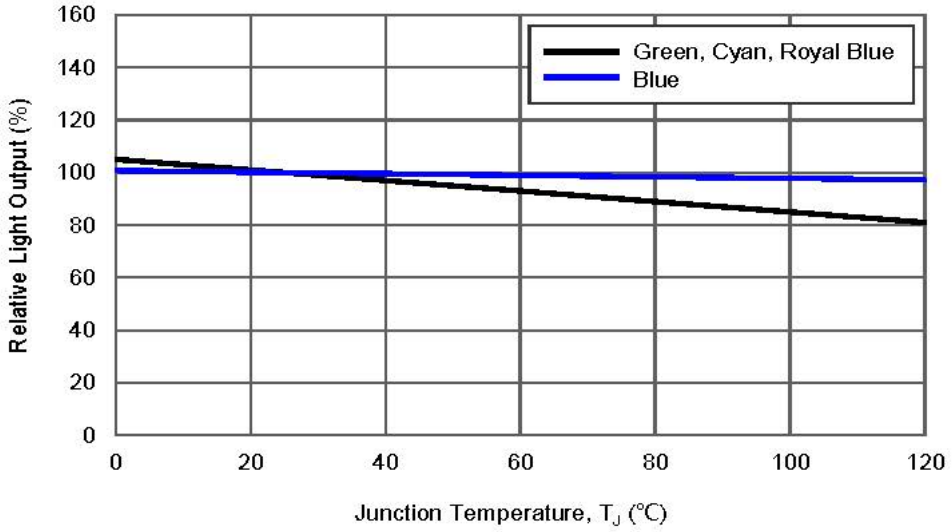


Typical Spatial Radiation Pattern



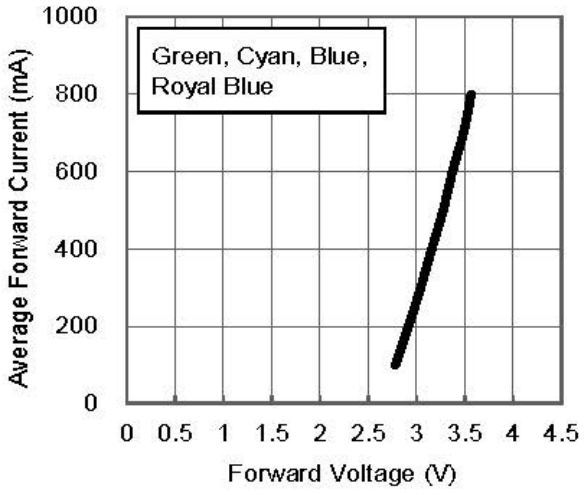
Light Output Characteristics

Relative Light Output vs. Junction Temperature at 700mA

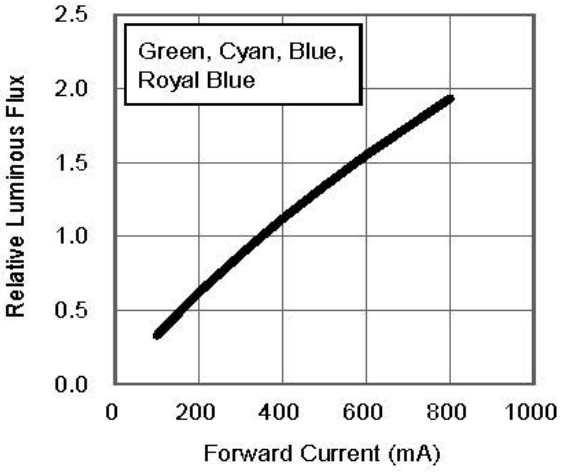


Forward Current Characteristics, TJ = 25°C

Forward Voltage vs. Forward Current



Forward Current vs. Normalized Relative Luminous Flux



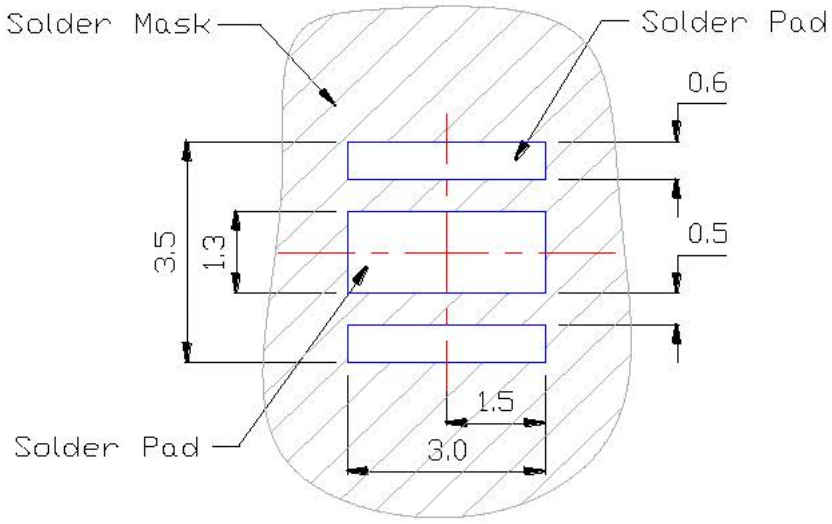
RHMoisture Sensitivity Level -JEDEC Leve 3

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
3	168 hours	≦30/60%	192+5/-0	30/60	40+1/-0	60/60

- **The standard soak time includes a default value of 24 hours for semiconductor manufature's exposure time (MET) between bake and bag and includes the maximum time allowed out of the bag at the distributor's facility.**
- **Table below presents the moisture sensitivity level definitions per IPC/JEDEC's J-STD-020C.**

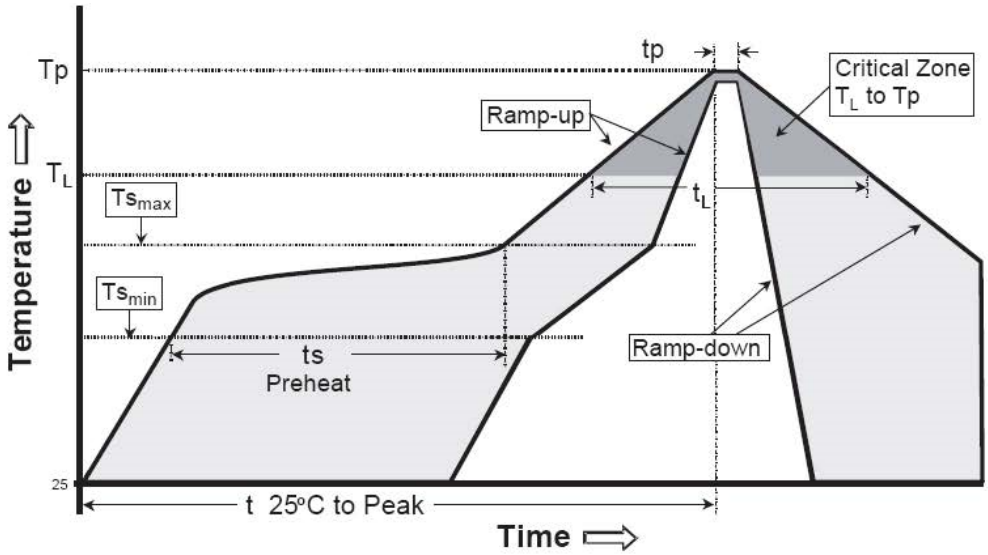
Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≤30˚C / 85% RH	168 +5/-0	85˚C / 85% RH	NA	NA
2	1 year	≤30˚C / 60% RH	168 +5/-0	85˚C / 60% RH	NA	NA
2a	4 weeks	≤30˚C / 60% RH	696 +5/-0	30˚C / 60% RH	120 +1/-0	60˚C / 60% RH
3	168 hours	≤30˚C / 60% RH	192 +5/-0	30˚C / 60% RH	40 +1/-0	60˚C / 60% RH
4	72 hours	≤30˚C / 60% RH	96 +2/-0	30˚C / 60% RH	20 +0.5/-0	60˚C / 60% RH
5	48 hours	≤30˚C / 60% RH	72 +2/-0	30˚C / 60% RH	15 +0.5/-0	60˚C / 60% RH
5a	24 hours	≤30˚C / 60% RH	48 +2/-0	30˚C / 60% RH	10 +0.5/-0	60˚C / 60% RH
6	Time on Label (TOL)	≤30˚C / 60% RH	Time on Label (TOL)	30˚C / 60% RH	NA	NA

Recommended Solder Pad Design



- All dimensions are in millimeters.
- Electrical isolation is required between Slug and Solder Pad

Reflow Soldering Temperature Profile

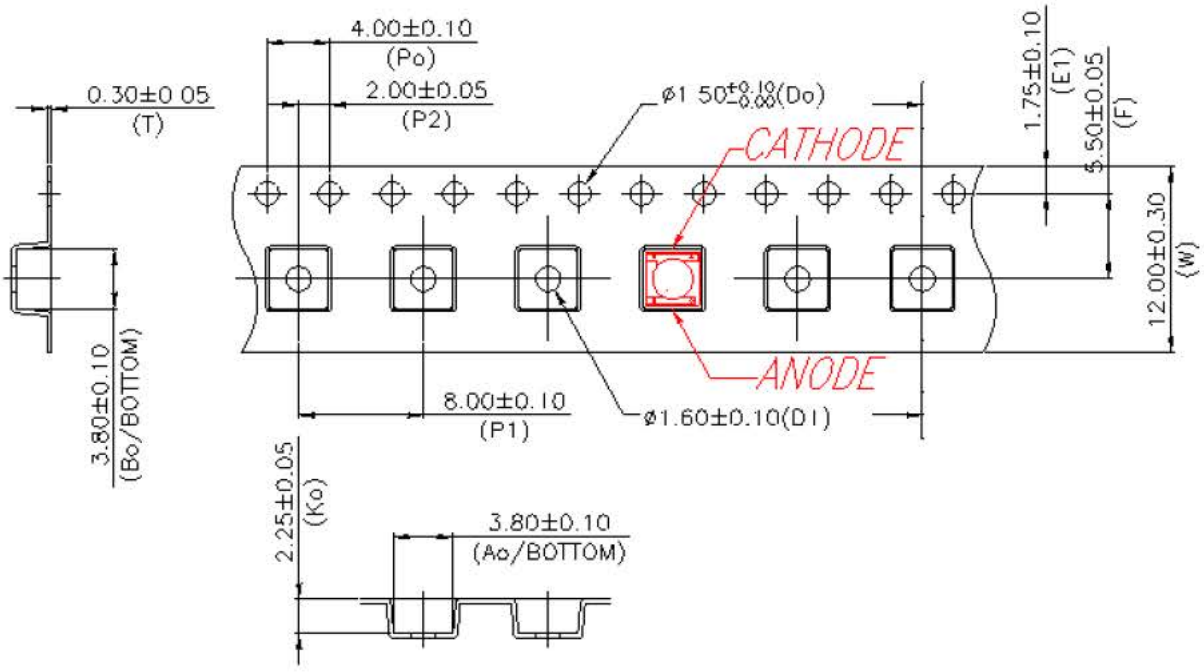


Profile Feature	Typical parameters
Average Ramp-Up Rate (Ts_{max} to Tp)	3 ℃/second max.
Preheat Temperature Min (Ts_{min})	150 ℃
Preheat Temperature Max (Ts_{max})	200 ℃
Time (Ts_{min} to Ts_{max})	60-180 seconds
Time maintained above Temperature (TL)	217 ℃
Time maintained above Time (TL)	60-150 seconds
Peak/Classification Temperature (Tp)	240 ℃
Time within 5 ℃ of Actual Peak Temperature (Tp)	5 seconds
Ramp-Down Rate	6 ℃/second max.
Time 25 ℃ to Peak Temperature	8 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.

Tape and Reel Packaging Specifications

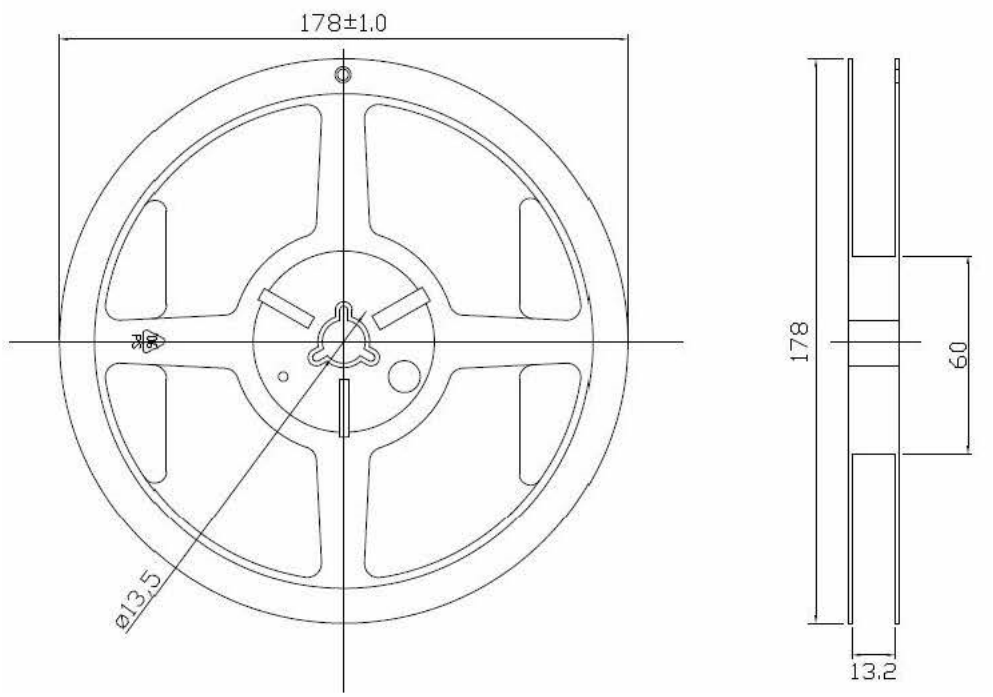
- Carrier Tape Dimensions



Notes:

1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.10mm.

- Reel Dimensions



Notes:

1. Empty component pockets sealed with top cover tape.
2. 1000 pieces per reel.
3. Drawing not to scale.
4. All dimensions are in millimeters

Notice

- 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.
- 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.
- Any mechanical force or any excess vibration should be avoid during the cooling process after soldering.
- Reflow rapidly cooling should be avoided.
- Components should not be mounted on distorted Printed Circuit Boards.
- Devices should not contact with any types of fluid, such as water , oil , organic solvents…. etc.
- The maximum ambient temperature should be taken into consideration when determining the operating current.
- Devices should be soldered within 7 days after opening the moisture-proof packing.
- Repack unused product in anti-moisture packing, fold to close any opening and store in a dry place.
- The appearance and specifications of devices may be modified for improvement without notice.
- ESD Precautions Static Electricity and surge damages LEDs. It is recommended that wrist bands or anti-electrostatic gloves be used when handing the LEDs . All devices, equipment and machinery should be properly grounded.
- This product must be driven by constant power supplier.

Handling of Silicone Lens LEDs

Notes for handling of silicone lens LEDs

- Please do not use a force of over 0.3kgf impact or pressure on the silicone lens, otherwise it will cause a catastrophic failure.
- The LEDs should only be picked up by making contact with the sides of the LED body.
- Avoid touching the silicone lens especially by sharp tools such as Tweezers.
- Avoid leaving fingerprints on the silicone lens.
- Please store the LEDs away from dusty areas or seal the product against dust.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the silicone lens must be prevented.
- Please do not mold over the silicone lens with another resin. (epoxy, urethane, etc)