



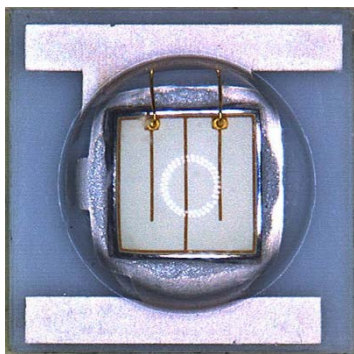
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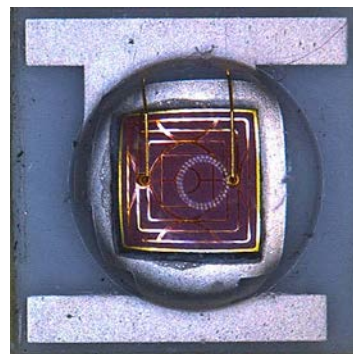
Power Light Source

Introduction :

THCA-CLx is one the highest flux LEDs in the world. THCA-CLx LED has offered extended solid-state lighting design possibilities. Due to the special design of chip and package, the THCA-CLx is designed by particular package for high power LED.



Blue 、 Cyan 、 Green



Amber 、 Red 、 Crimson

Feature :

- Long operating life
- Energy efficiency
- Low thermal resistance
- Compact design
- Instant light
- Fully dimmable
- Superior ESD protection
- ROHS compatibility

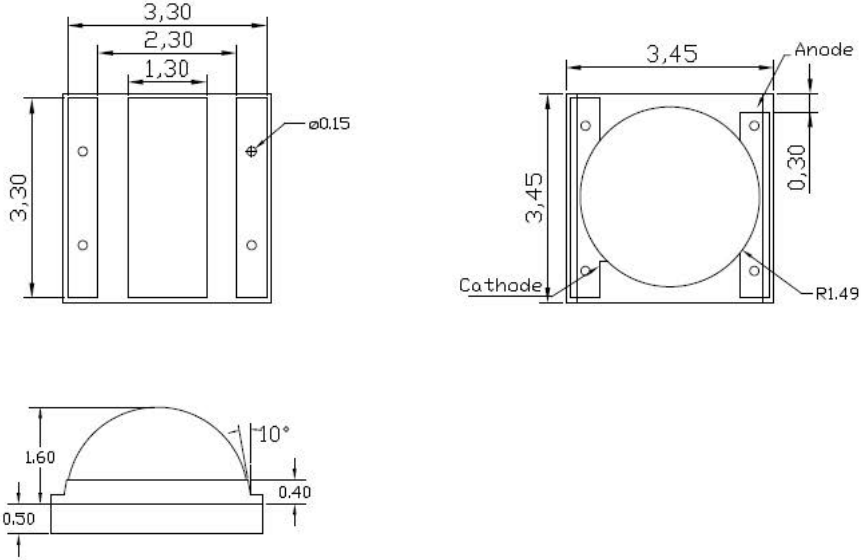
Typical Applications:

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



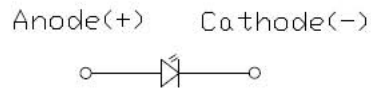
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Package Dimensions



Dimension

Circuit Diagram



Notes :

1. All dimensions are in millimeters
2. Tolerance is $\pm 0.25\text{mm}$



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Absolute Maximum Ratings

Parameter	Rating
DC Forward Current (mA)	350
Max Pulsed Forward Current[1] <small>I_{F(Max Pulsed)}</small>	400
LED Junction Temperature (°C)	120
Operating Board Temperature (°C)	-30~90
Storage Temperature (°C)	-40~110
Soldering Temperature	Manual 240°C (max) 5 seconds
Reverse Voltage (V _R)	Not designed to be driven in reverse bias

Notes :

[1]. less than 1/10 duty cycle@1KHz

Optical Characteristics@350mA, T_J= 25°C

Color	Dominant Wavelength λD			Viewing Angle (degrees) 2θ1/2	Radiation Pattern
	Min.	Typ.	Max.		
Red	613.5 nm	623 nm	631 nm	125	Lambertian
Amber	587 nm	592 nm	597 nm		
Green	515 nm	525 nm	535 nm		
Cyan	495nm	505nm	515nm		
Blue	455 nm	465 nm	475 nm		
Royal Blue	450nm	455nm	460nm		
Crimson(1)	650nm	660nm	670nm		
Cherry Red(1)	720nm	730nm	740nm		

- Maintains a tolerance of ± 1nm for dominant wavelength measurements.

(1)Crimson, Cherry Red product is binned by peak wavelength rather than dominant wavelength.



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Flux Characteristics @350mA, T_J= 25°C Electrical

Radiation Pattern	Color	Part Number Emitter	Luminous Flux ΦV(lm)	
			Minimum	Typical
Lambertian	Red	THCA-CLR	50lm	65lm
	Amber	THCA-CLA	50lm	70lm
	Green	THCA-CLG	90lm	135lm
	Cyan	THCA-CLC	70lm	80lm
	Blue	THCA-CLB	23lm	30lm
	Royal Blue	THCA-CLY	515mW	620mW
	Crimson	THCA-CLP	400mW	450mW
	Cherry Red	THCA-CLI	300mW	380mW

- 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 @350mA, T_J= 25°C Optical

Color	Forward Voltage V _F (V)			Thermal Resistance
	Min.	Typ.	Max.	Junction to Slug (°C/W)
Red	1.75	2.2	3.0	8
Amber	1.75	2.2	3.0	8
Green	2.6	3.1	3.6	8
Cyan	2.6	3.1	3.6	8
Blue	2.85	3.1	3.6	8
Royal Blue	2.85	3.1	3.6	8
Crimson	1.75	2.2	2.5	8
Cherry Red	1.80	2.1	2.4	8

- Maintains a tolerance of ±0.1V for Voltage measurements.



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

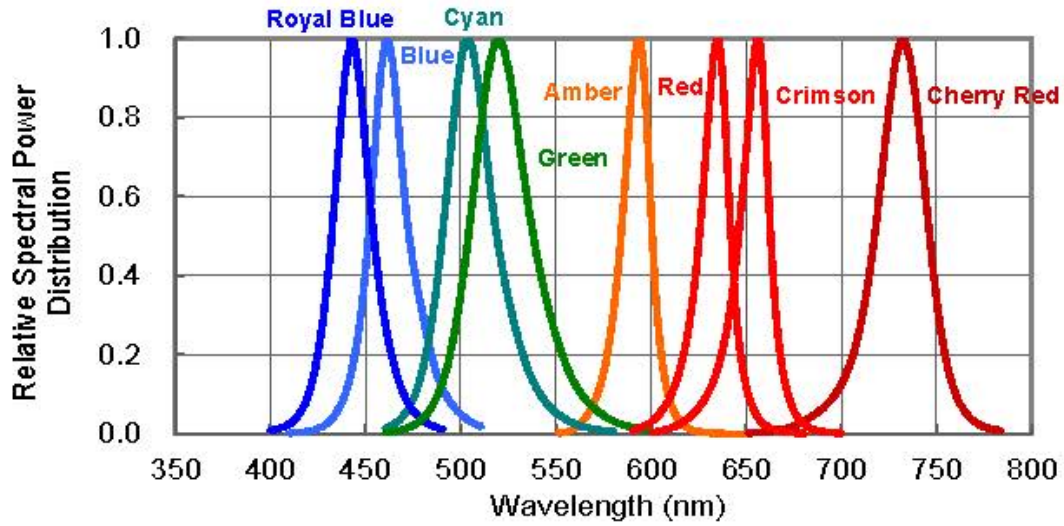
* The test is performed after the LED is cooled down to the room temperature.

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

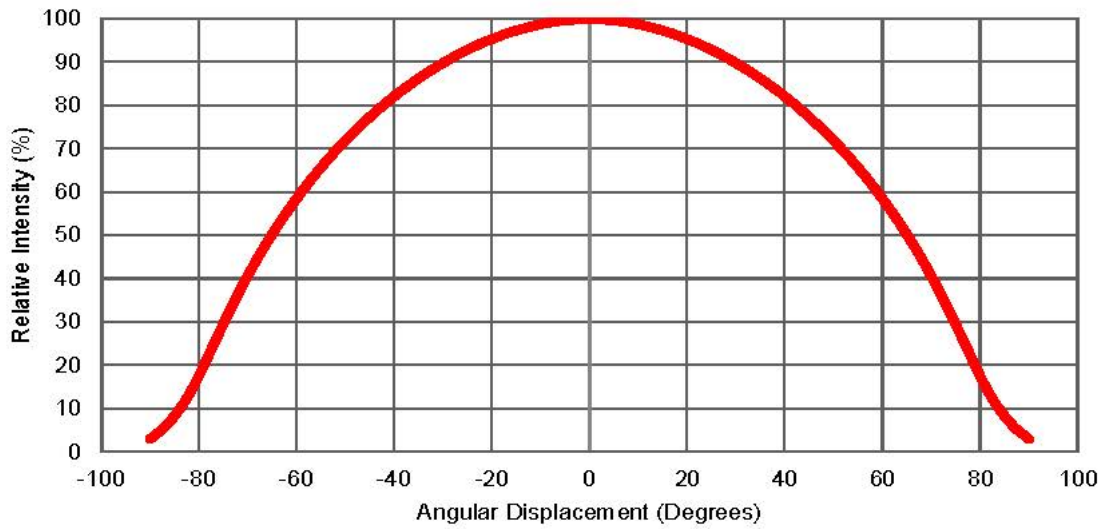


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Color Spectrum, $T_J = 25^\circ\text{C}$



Typical Spatial Radiation Pattern



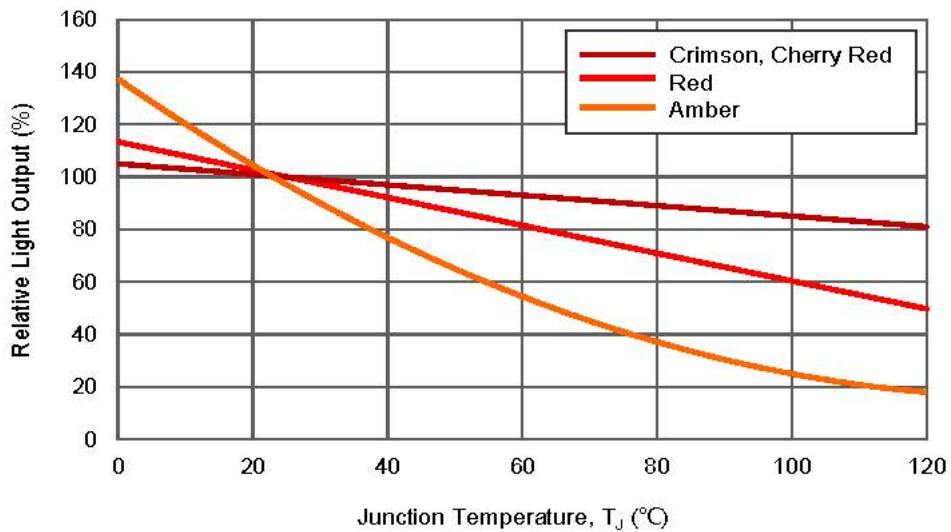
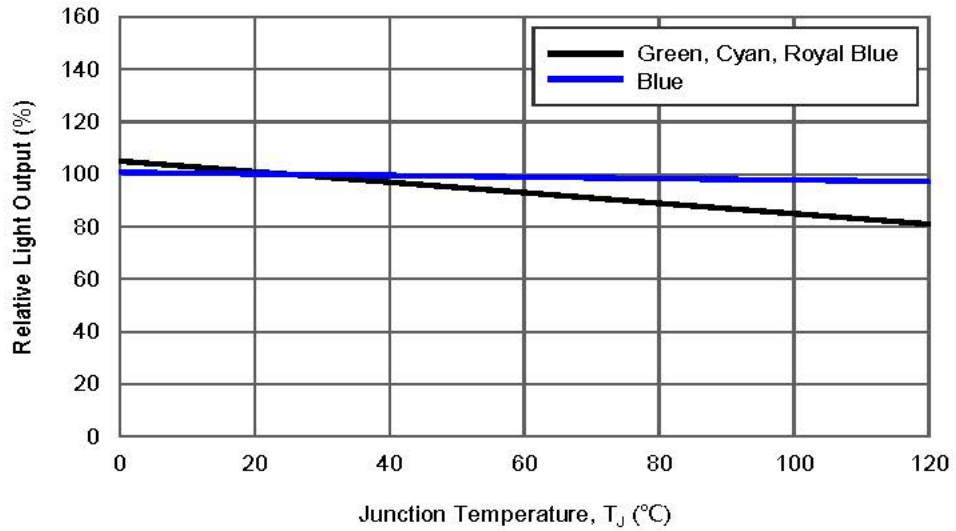


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Light Output Characteristics

Relative Light Output vs. Junction Temperature at 350mA

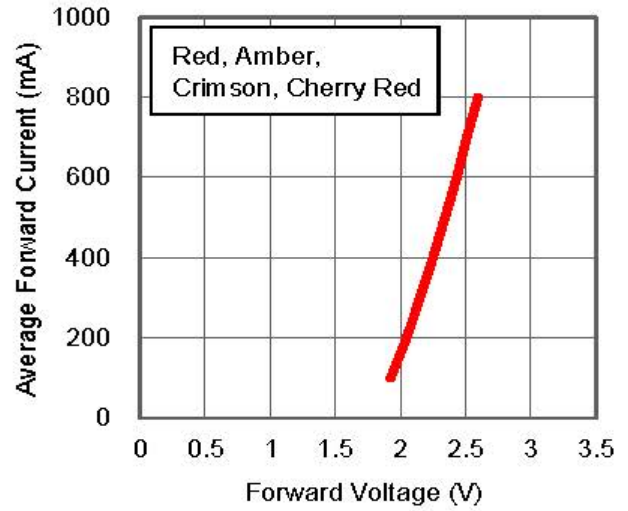
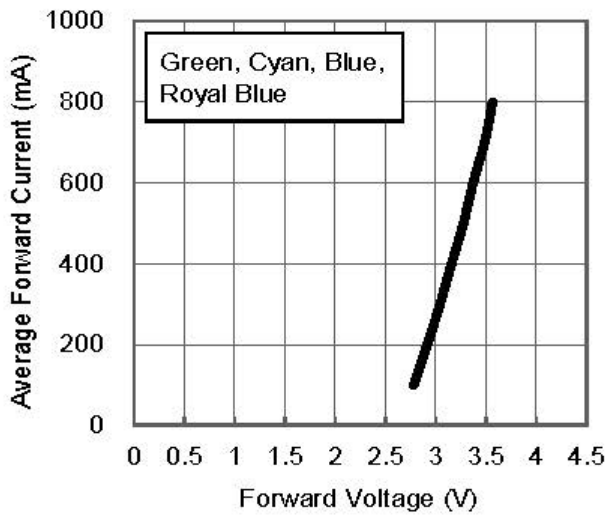




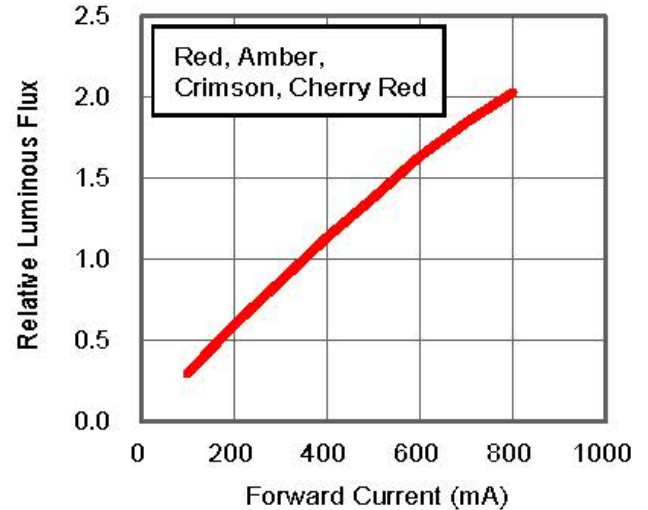
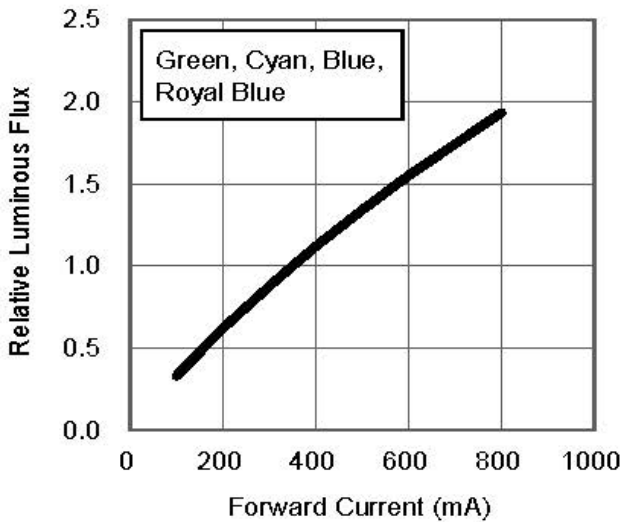
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Forward Current Characteristics, $T_J = 25^\circ\text{C}$

Forward Voltage vs. Forward Current



Forward Current vs. Normalized Relative Luminous Flux





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RHMoisture Sensitivity Level -JEDEC Level 3

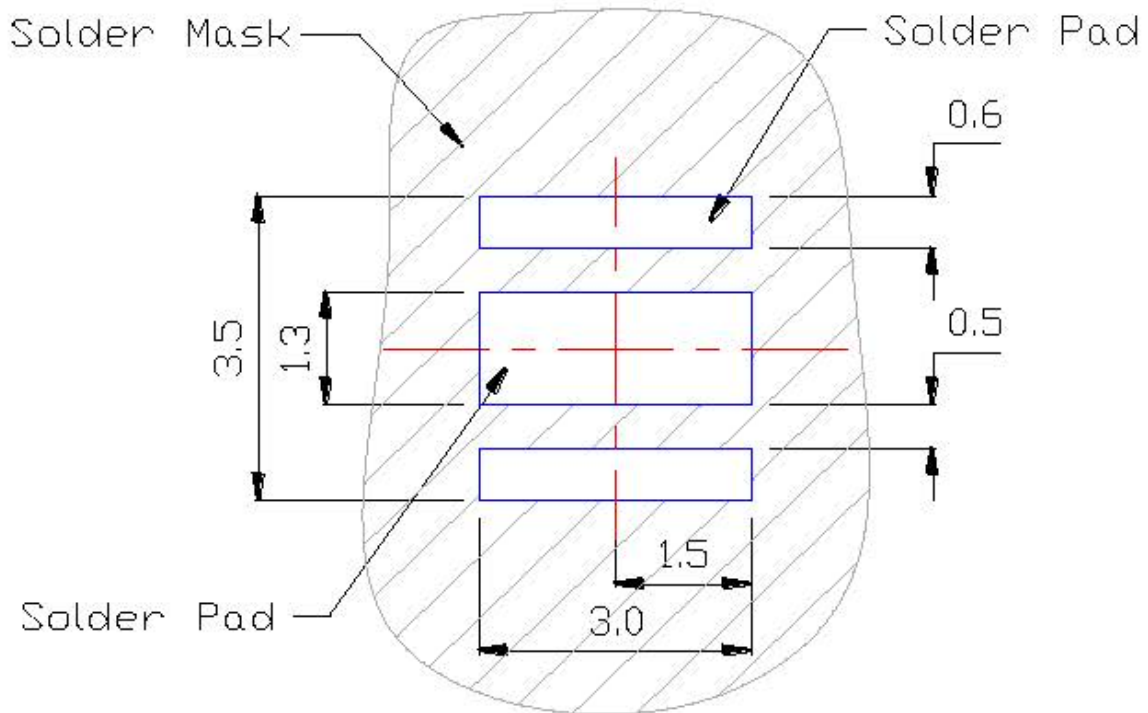
Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
3	168 hours	≤30/60%	192+5/-0	30/60	40+1/-0	60/60

- The standard soak time includes a default value of 24 hours for semiconductor manufacture'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



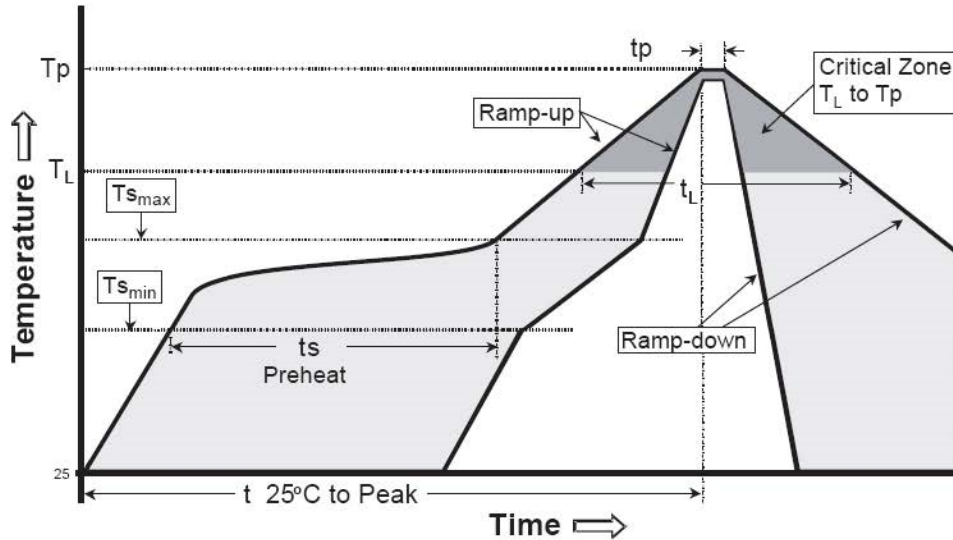
- All dimensions are in millimeters.
- Electrical isolation is required between Slug and Solder Pad.



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Reflow Soldering Temperature Profile



Profile Feature	Typical parameters
Average Ramp-Up Rate ($T_{s_{max}}$ to T_p)	3 °C/second max.
Preheat Temperature Min ($T_{s_{min}}$)	150 °C
Preheat Temperature Max ($T_{s_{max}}$)	200 °C
Time ($T_{s_{min}}$ to $T_{s_{max}}$)	60-180 seconds
Time maintained above Temperature (T_L)	217 °C
Time maintained above Time (T_L)	60-150 seconds
Peak/Classification Temperature (T_p)	240 °C
Time within 5 °C of Actual Peak Temperature (T_p)	5 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

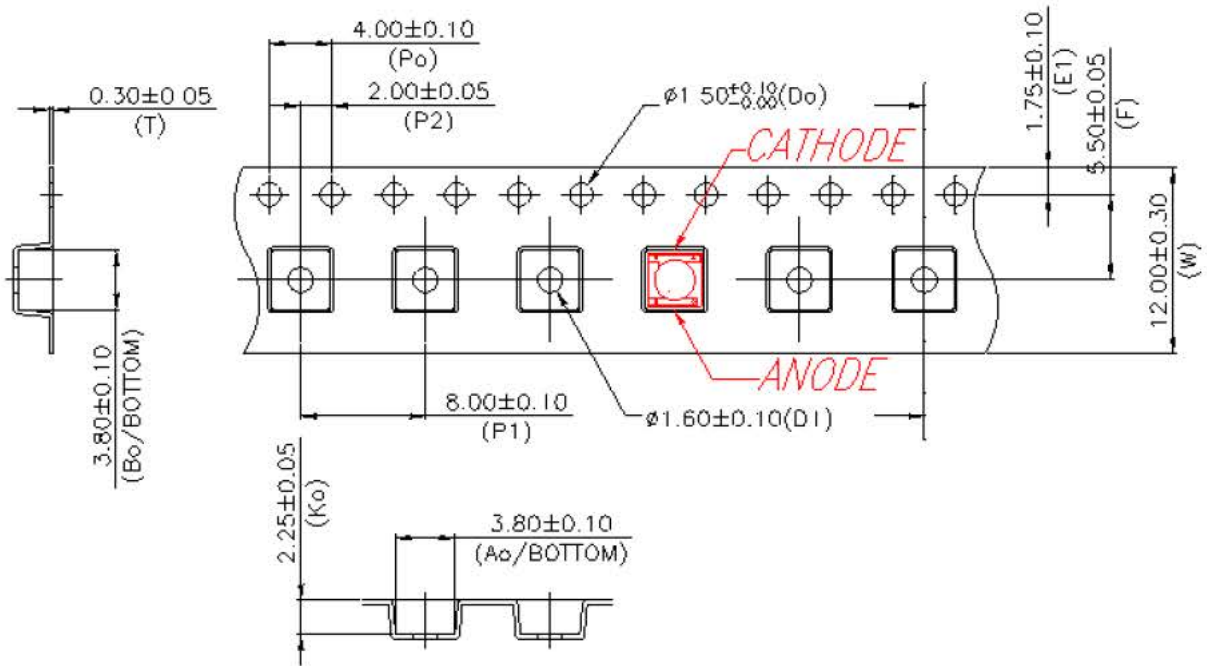
- All temperatures refer to topside of the package, measured on the package body surface.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the 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.



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Tape and Reel Packaging Specifications

- Carrier Tape Dimensions



Notes:

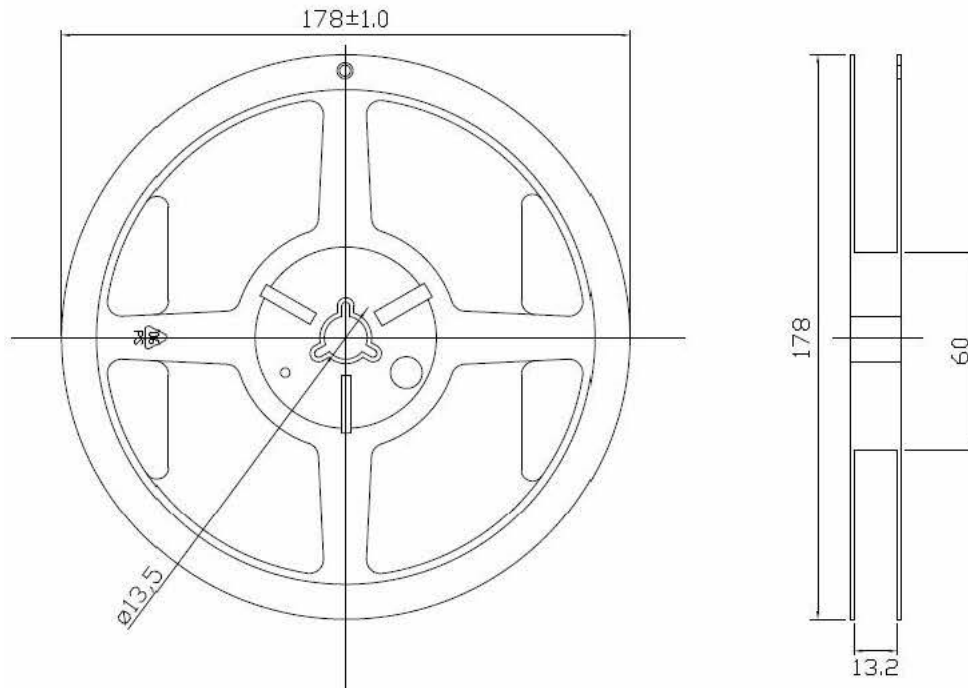
1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.10 mm.



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- 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



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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)

