

# SPECIFICATIONS FOR T19 SERIES

## Mono Colour LED

Model: Ceramic 3535

Part No: T19\*\*011A-xxxxxx

## Features

- \* High luminous flux output and efficacy
- \* Designed For High Current Operation
- \* Low Thermal Resistance
- \* Pb-free Reflow Soldering Application



## Applications

- \* Outdoor Lighting
- \* Architectural Lighting
- \* Horticulture Lighting
- \* Stage lights
- \* Signal Lamp
- \* Rear Lamp

## Part Numbering System

T  $\frac{\square\square}{X1}$   $\frac{\square\square}{X2}$   $\frac{\square}{X3}$   $\frac{\square}{X4}$   $\frac{\square}{X5}$   $\frac{\square}{X6}$  -  $\frac{\square}{X7}$   $\frac{\square\square}{X8}$   $\frac{\square\square}{X9}$   $\frac{\square}{X10}$

Item Number Code	Description	Content
X1	Type code	1S:1010; 1A:1919; 20:2016; 3B:3014; 28:2835 34:3020; 3C:3030; 5C:5050; 7C:7070; 1D:100100; 19: Ceramic 3535; 15: Ceramic 5050; 11: Ceramic 1616.
X2	CCT code	BL: blue ; GR : green; YE : yellow; RE : red; PA: PC Amber ; CW:RGB; FW: RGBW
X3	Color Rendering	Color : 0
X4	No. of serial chip	1-Z.
X5	No. of parallel chip	1-Z.
X6	Component code	A-Z.
X7	Color Code	M:ANSI; F:ERP; R:85°C ANSI; T:105°C ANSI; B:Backlighting; Q:Others;AT:Tospo
X8	Internal code1	\
X9	Internal code2	\
X10	Spare code	\

### Absolute Maximum Ratings at Ta=25°C

Item	Symbol	Absolute Maximum Rating	Unit
Forward current	I <sub>F-Red</sub>	700	mA
	I <sub>F-Green</sub>	1000	mA
	I <sub>F-Blue</sub>	1000	mA
Pulse Forward current	I <sub>FP-Red</sub>	800	mA
	I <sub>FP-Green</sub>	1500	mA
	I <sub>FP-Blue</sub>	1500	mA
Power Dissipation	P <sub>D-Red</sub>	1820	mW
	P <sub>D-Green</sub>	3600	mW
	P <sub>D-Blue</sub>	3600	mW
Reverse Voltage	V <sub>R</sub>	5	V
Operating Temperature	T <sub>opr</sub>	-40~+105	°C
Storage Temperature	T <sub>stg</sub>	-40~+105	°C
Junction Temperature	T <sub>j-Red</sub>	105	°C
	T <sub>j-Green</sub>	125	°C
	T <sub>j-Blue</sub>	125	°C
Soldering Temperature	T <sub>sld</sub>	Reflow Soldering: 230°C or 260°C for 10sec	

\* I<sub>FP</sub> condition with Pulse: Width≤100μs, Duty cycle≤1/10.

\* LED's properties might be different from suggested values like above and below tables if operation condition will be exceeded our parameter range. Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

\* All measurements were made under the standardized environment of Lightning LED.

### Electrical/Optical Characteristics at Ta=25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V <sub>F-Red</sub>	1.8	-	2.6	V	I <sub>F</sub> =350mA
	V <sub>F-Greed</sub>	2.8	-	3.6	V	
	V <sub>F-Blue</sub>	2.8	-	3.6	V	
Dominant Wavelenth	λ -Red	615	-	630	nm	IF=350mA
	λ -Green	520	-	535	nm	
	λ -Blue	450	-	460	nm	
Reverse Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> =5V
View Angle	2θ <sub>1/2</sub>	-	120	-	°	I <sub>F</sub> =350mA
Thermal resistance	(R <sub>th j-sp</sub> )	-	5	-	°C/W	I <sub>F</sub> =350mA
Electrostatic Discharge	ESD	2000	-	-	V	HBM

\* Tolerance of measurements of the Forward Voltage is ±0.1V.

\* Tolerance of measurements of the Luminous Flux is ±7%.

\* 2θ<sub>1/2</sub> is the off-axis where the luminous intensity is 1/2 of the peak intensity.

\* Tolerance of measurements of the Wavelenth is ±2.0nm

\* R<sub>th j-sp</sub> is the thermal resistance from LED junction to solder point on MCPCB with electrical power.

## Bin Structure

### Diomant Wavelength Ranks, IF =350mA, Ta =25°C

Colour	Code	Min.	Max.	Unit
Red	R6	615	620	nm
	R1	620	625	nm
	R2	625	630	nm
Green	GF	520	525	nm
	GG	525	530	nm
	G8	530	535	nm
Blue	B2	450	455	nm
	B3	455	460	nm

\* Tolerance of measurements of the WD is  $\pm 2.0\text{nm}$ .

### Luminous Flux Ranks, IF = 350mA, Ta =25°C

Color	Code	Min.	Max.	Unit
Red	AP	51	58	lm
	AQ	58	65	lm
	AR	65	72	lm
	AS	72	80	lm
	AT	80	88	lm
Green	AZ	112	120	lm
	BA	120	130	lm
	BB	130	140	lm
	BC	140	150	lm
	BD	150	160	lm
Blue	AH	18	22	lm
	AJ	22	26	lm
	AK	26	30	lm
	AL	30	37	lm

\* Tolerance of measurements of the Luminous Flux is  $\pm 7\%$ .

### Forward Voltage Ranks, IF =350mA, Ta =25°C

Code	Min.	Max.	Code	Min.	Max.	Code	Min.	Max.	Unit
C3	1.8	2.0	F3	2.4	2.6	J3	3.0	3.2	V
D3	2.0	2.2	G3	2.6	2.8	K3	3.2	3.4	V
E3	2.2	2.4	H3	2.8	3.0	L3	3.4	3.6	V

\* Tolerance of measurements of the Forward Voltage is  $\pm 0.1\text{V}$ .

## Typical Characteristics Curves

Fig 1. Color Spectrum, Ta = 25°C

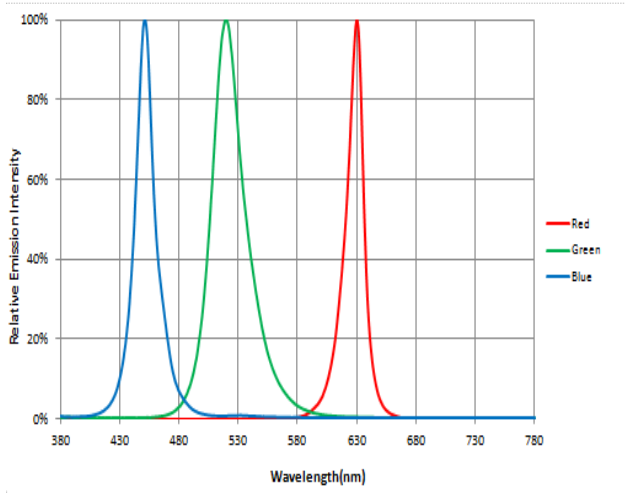


Fig 2. Ambient Temperature vs. Wavelength, Ta = 25°C

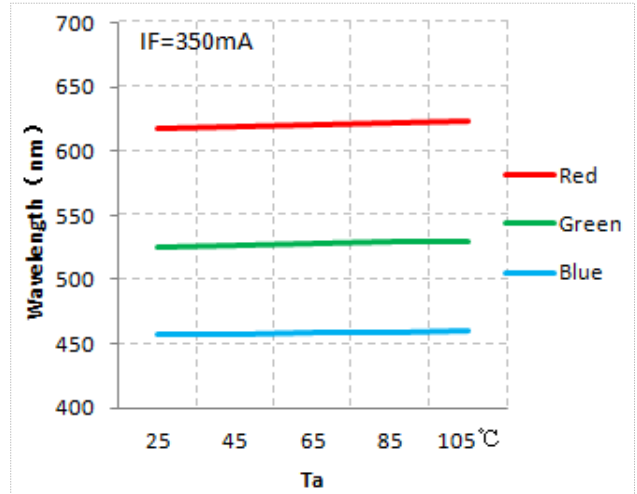


Fig 3. Forward Current vs. Relative Intensity, Ta = 25°C

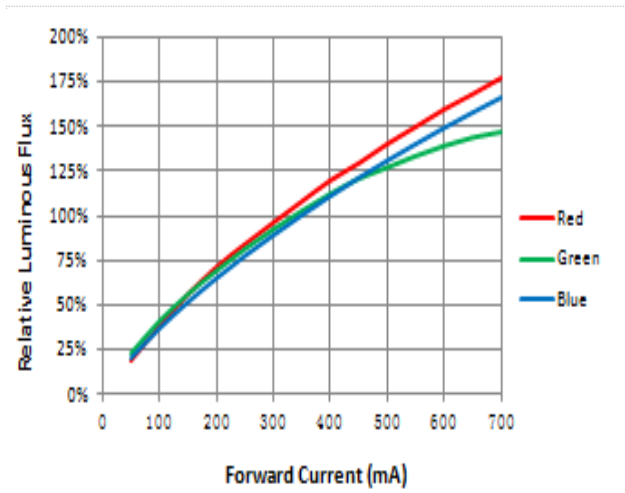


Fig 4. Forward Current vs. Forward Voltage, Ta = 25°C

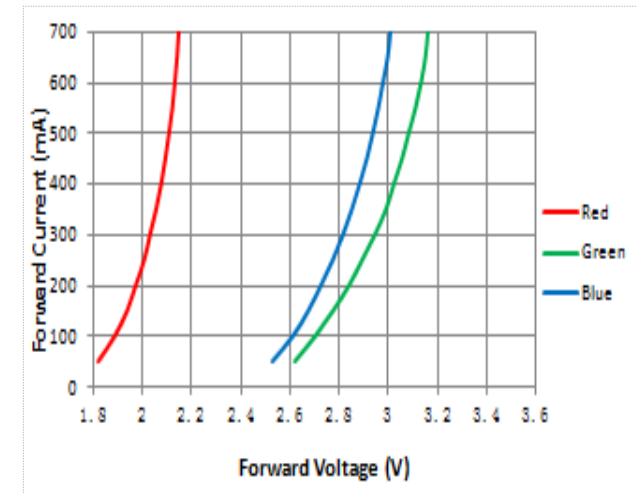


Fig 5. Ambient Temperature vs. Relative Luminous flux

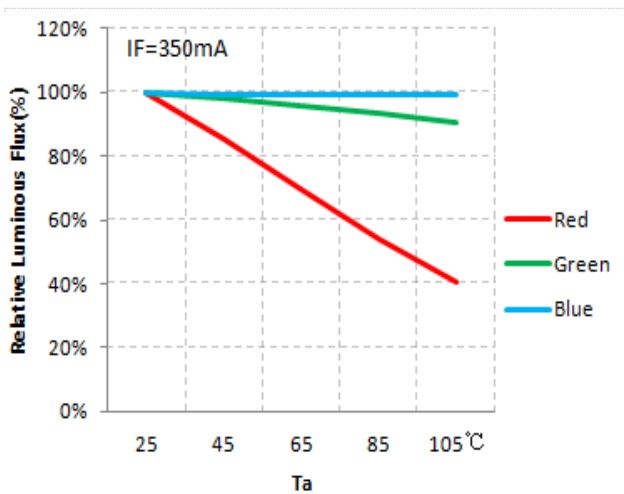


Fig 6. Ambient Temperature vs. Relative Forward Voltage

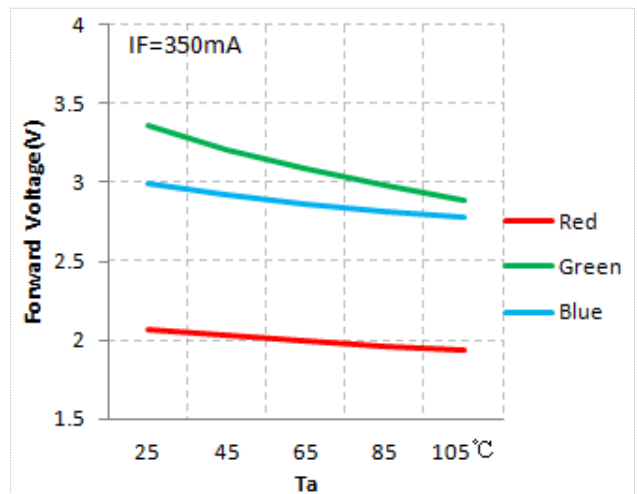


Fig 7. Typical Viewing Angle =120° , Ta = 25°C

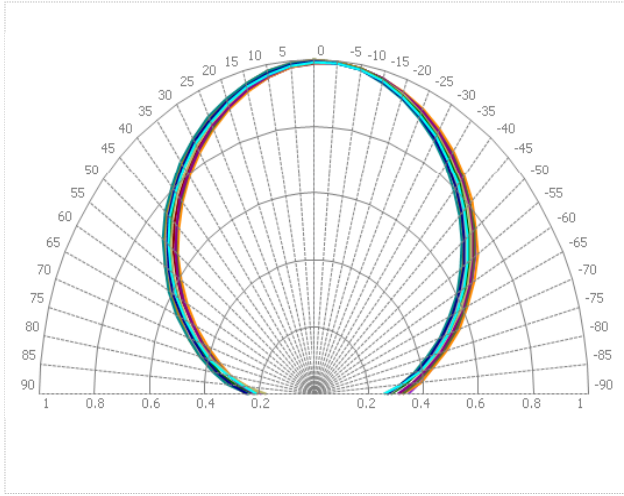


Fig 9. Ambient Temperature vs.Maximum Forward Current - Green

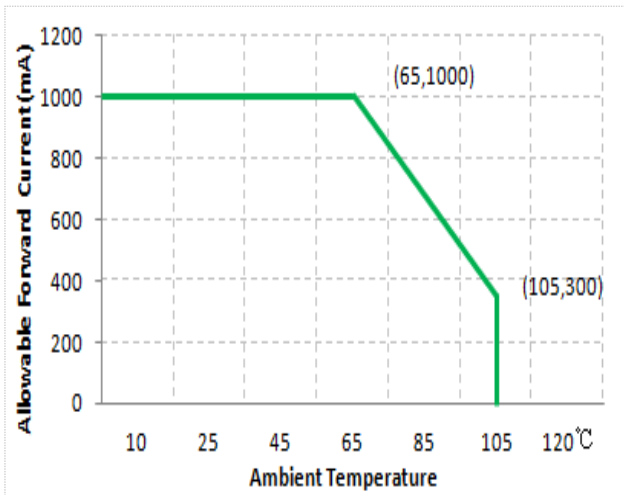


Fig 8. Ambient Temperature vs.Maximum Forward Current - Red

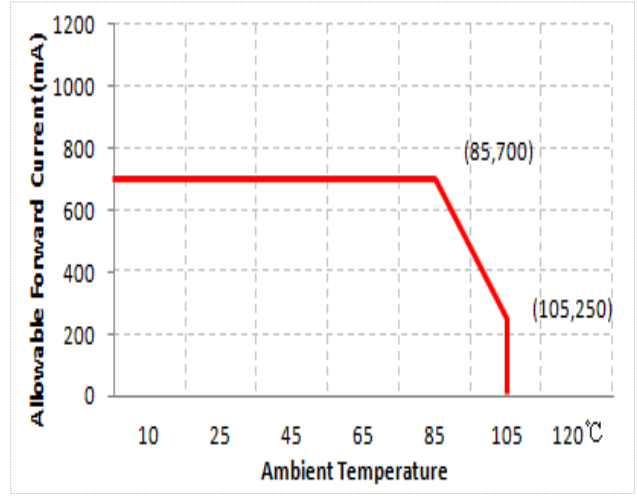
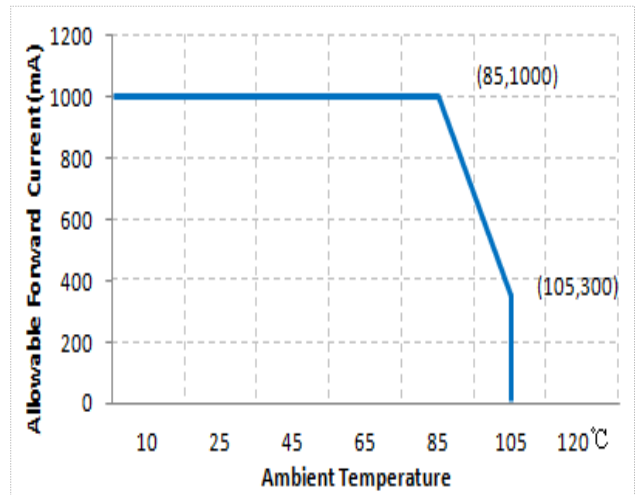
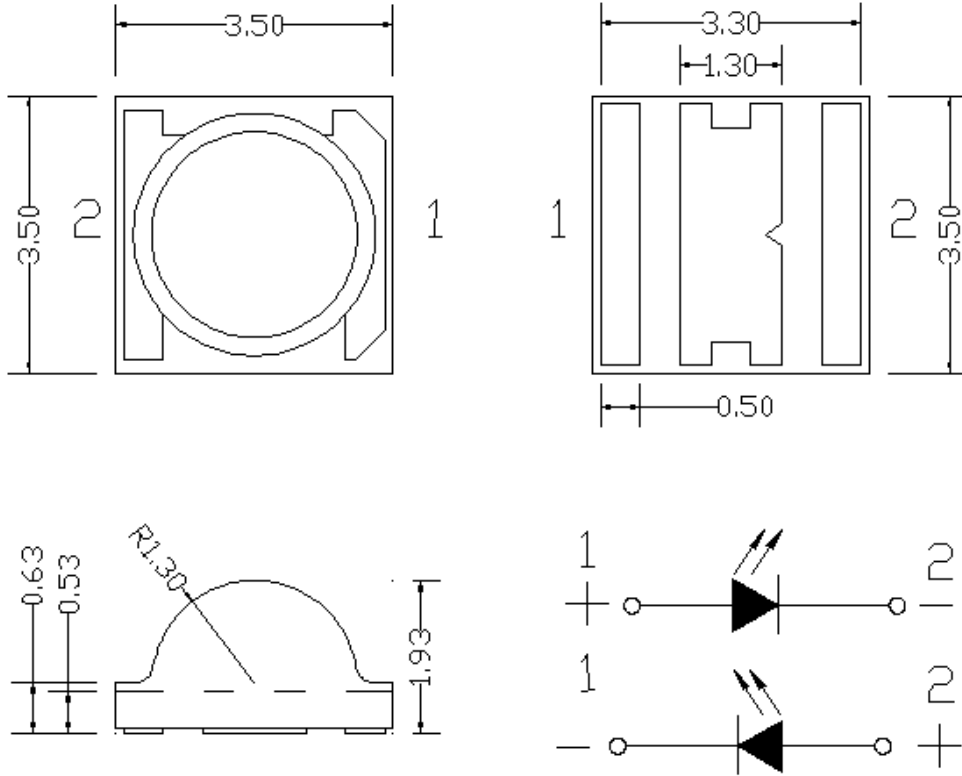


Fig 10. Ambient Temperature vs.Maximum Forward Current - Blue

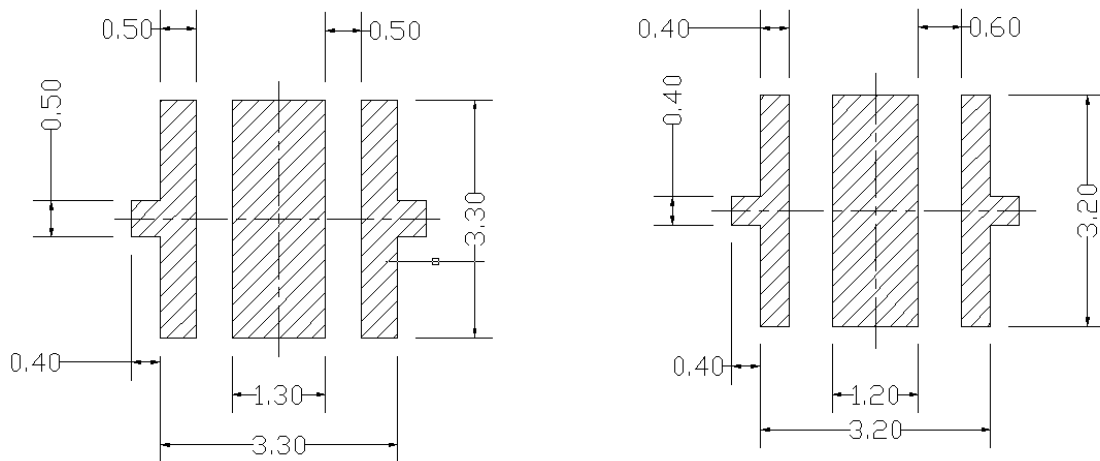


## Package Dimensions



- \* Green / Blue : 1, anode; 2, cathode ;
- \* Red : 2, anode; 1, cathode .
- \* The tolerance unless mentioned is  $\pm 0.2\text{mm}$ , unit = mm

### Recommended Solder Pad



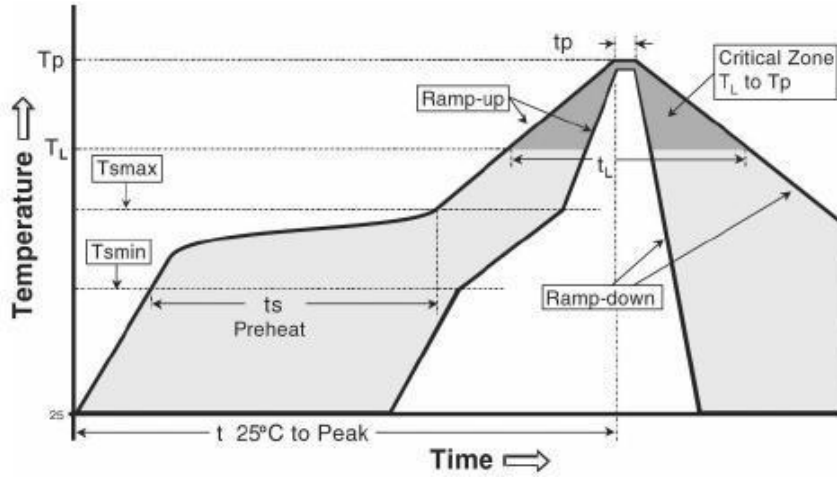
Recommended PCB Solder Pad

Recommended Stencil Pattern

- \* The tolerance unless mentioned is  $\pm 0.1\text{mm}$ , unit = mm

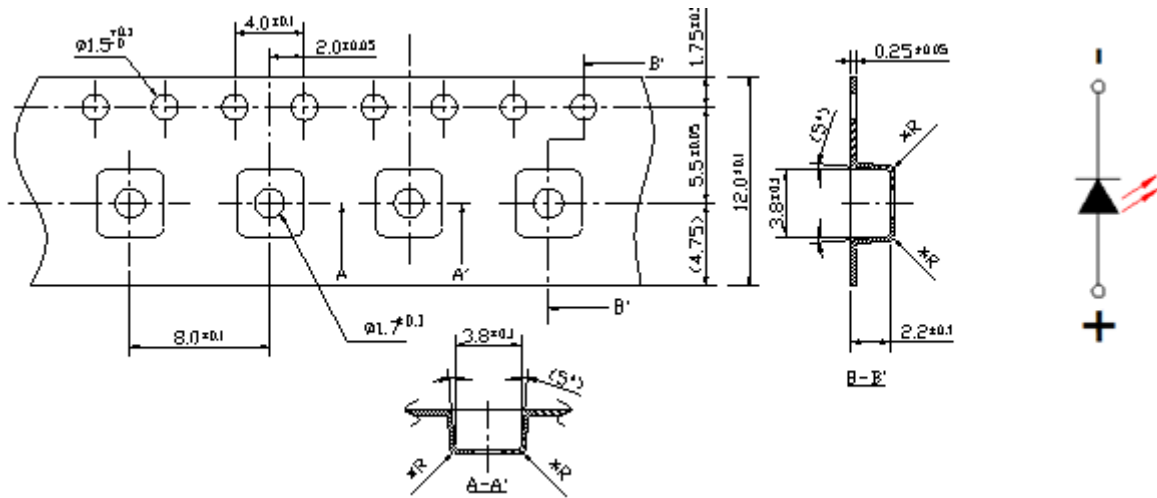


## Reflow Soldering Characteristics



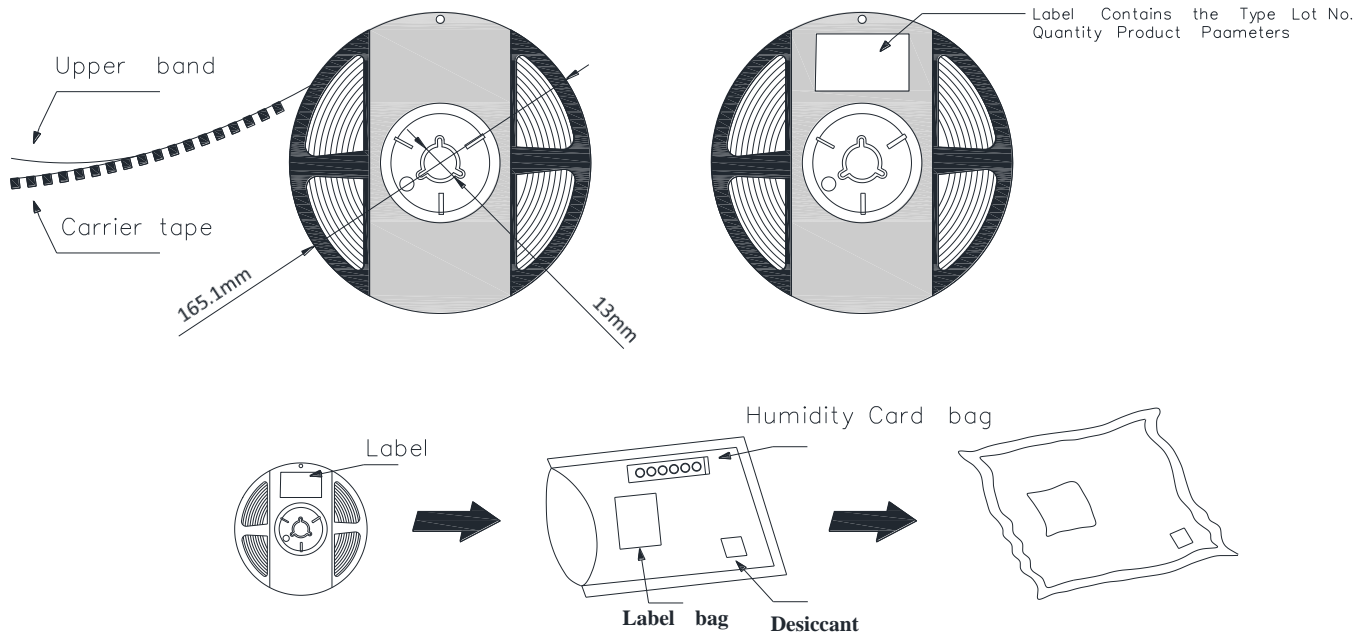
Reflow soldering	
Temperature Min (Tsmmin)	150° C
Temperature Max (Tsmmax)	200° C
Time(ts)from ( Tsmmin to Tsmmax)	60-120 seconds.
Ramp-up rate (TL to Tp)	3° C/seconds max.
Liquidous temperature( TL)	217° C
Time(tL) maintained above TL	60-150 seconds
Peak package body temperature( Tp)	260° C max
Time (tp) within 5° C of the specified classification temperature (Tc).	30 seconds max
Ramp-down rate (Tp to TL)	6° C/second max
Time 25 ° C to peak temperature	8 min max

## Package Dimensions of Tape

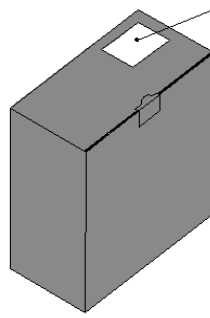
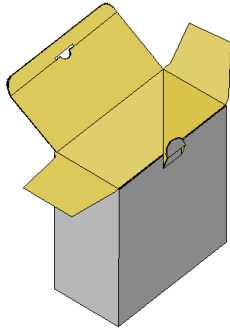


- \* Quantity : Max 1000pcs/Reel
- \* Cumulative Tolerance : Cumulative Tolerance/10 pitches to be  $\pm 0.25\text{mm}$
- \* Package : P/N, Manufacturing data Code No. and Quantity to be indicated on a damp proof Package.
- \* unit = mm

## Package Dimensions of Reel

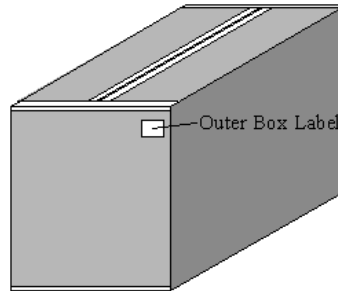
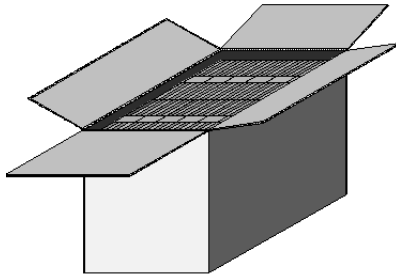


## Package Box



Label: Contains Type,  
Lot NO, Quantity, Product  
Parameters.

\* Capacity 4 or 8 reels per box.



Outer Box Label

\* Capacity 48 or 64 reels per box.

## Label

**福建天电光电有限公司**

**FUJIAN LIGHTNING OPTOELECTRONIC CO.,LTD**

型号 Type: T\*\*\*\*\*\_\*\*\*\*\*



光通量  $\Phi$ @ \*\*\*mA: \*\*\* - \*\*\* LM

主波长  $\lambda$ @ \*\*\*mA: \*\*\* - \*\*\* nm

电压  $V_f$ @ \*\*\* mA: \*\* - \*\* V

Lot No.: AN\*\*\*\*\*\_\*\*\_\*\*\*\*\*

数量 QTY: \*\*\* PCS



## Caution

1. Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
2. Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.

## Notes on Lightning Ceramic Series soldering

1. Recommend to use reflow machine.
2. Recommend to use heating plate soldering.
3. Manual soldering is not recommended.

## Notes on reflow process

1. To confirm whether the actual temperature curve in the reflow soldering conditions comply with recommended conditions. LEDs are guaranteed for one time reflow.
2. During reflow process do not apply force on LED active area.
3. After reflow process, PCB board should be cooled down before packing or storage.

## Precaution for use

### Storage

1. Before opening the package: The LED should be kept at 30°C or less and 90%RH or less.
2. After opening the package: The LED's floor life is 168Hrs under 30°C or less and 60%RH or less. If unused LED remain, it should be stored in moisture proof packages JEDEC (MSL 3).
3. If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions:  
Baking treatment: 60±5°C for 24 hours.