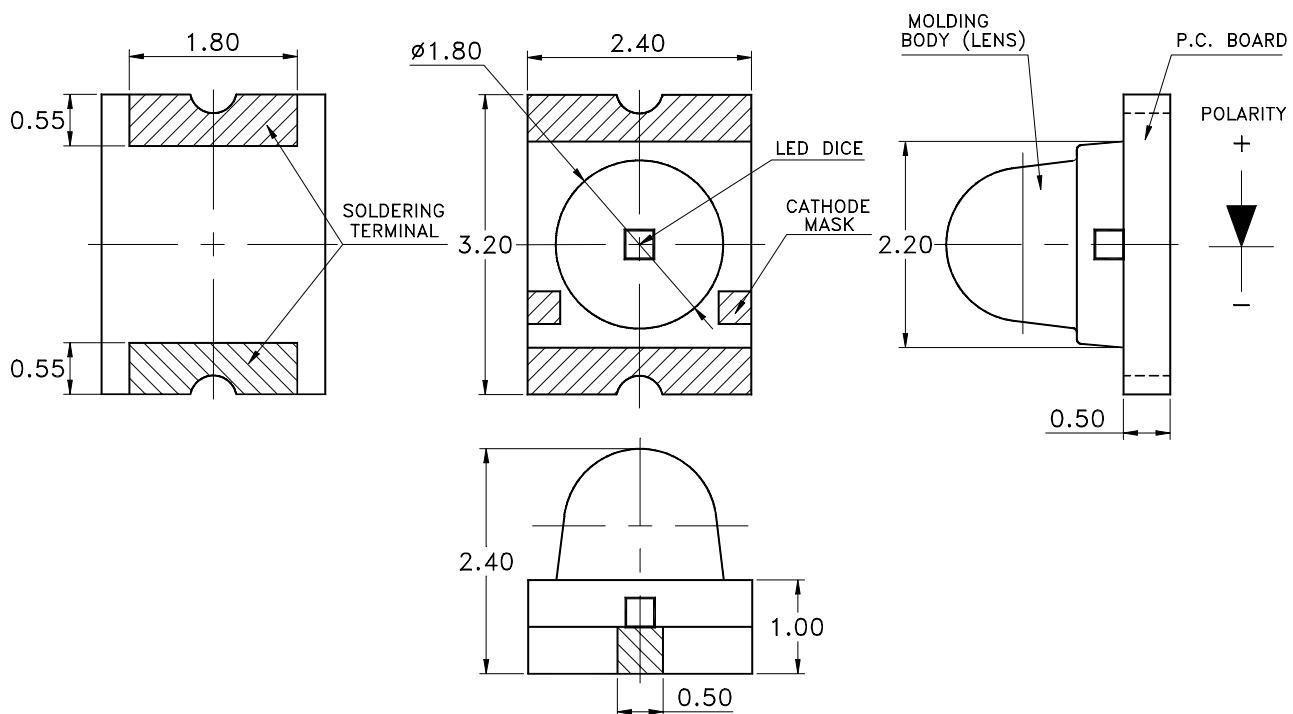


**Features**

- \* Dome lens Chip LED.
- \* Package in 8mm tape on 7" diameter reels.
- \* Compatible with automatic placement equipment.
- \* Compatible with infrared and vapor phase reflow solder process.
- \* EIA STD Package.
- \* I.C. Compatible.

**Package Dimensions**

Part no.	Lens	Source Color
LTST-C930TBKT	Water Clear	InGaN Blue

**Notes:**

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.10$  mm (.004") unless otherwise noted.

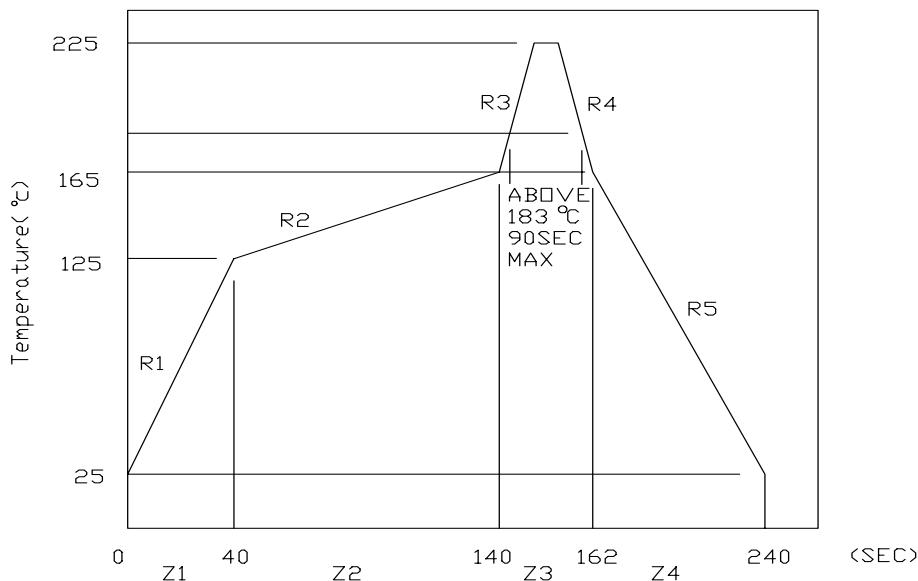
**Absolute Maximum Ratings At Ta=25**

Parameter	LTST-C930TBKT	Unit
Power Dissipation	120	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
Continuous Forward Current	20	mA
Derating Linear From 25	0.25	mA/
Reverse Voltage	5	V
Electrostatic Discharge Threshold(HBM) <sup>Note A</sup>	300	V
Operating Temperature Range	-20°C to + 80°C	
Storage Temperature Range	-30°C to + 100°C	
Wave Soldering Condition	260°C For 5 Seconds	
Infrared Soldering Condition	260°C For 5 Seconds	
Vapor Phase Soldering Condition	215°C For 3 Minutes	

Note A :

HBM : Human Body Model. Seller gives no other assurances regarding the ability of to withstand ESD.

Suggest IR Reflow Condition :





## Electrical Optical Characteristics At Ta=25

Parameter	Symbol	Part No. LTST-	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	C930TBKT	180.0	450.0		mcd	IF = 20mA Note 1
Viewing Angle	2 1/2	C930TBKT		25		deg	Note 2 (Fig.6)
Peak Emission Wavelength	Peak	C930TBKT		468		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	d	C930TBKT	465	-	475	nm	IF = 20mA Note 3
Spectral Line Half-Width		C930TBKT		25		nm	
Forward Voltage	VF	C930TBKT		3.4	3.8	V	IF = 20mA
Reverse Current	IR	C930TBKT			100	µ A	VR = 5V

Notes: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the

CIE eye-response curve.

2. 1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

3. The dominant wavelength, d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

4. Caution in ESD:

Static Electricity and surge damages the LED. It is recommend to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.

**Bin Code List**

Forward Voltage		Unit: V @20mA
Bin Code	Min.	Max.
D7	2.80	3.00
D8	3.00	3.20
D9	3.20	3.40
D10	3.40	3.60
D11	3.60	3.80

Tolerance on each Forward Voltage bin is +/-0.1 volt

Luminous Intensity		Unit : mcd @20mA
Bin Code	Min.	Max.
S1	180.0	224.0
S2	224.0	280.0
T1	280.0	355.0
T2	355.0	450.0
U1	450.0	560.0
U2	560.0	710.0

Tolerance on each Intensity bin is +/-15%

Dominant Wavelength		Unit : nm @20mA
Bin Code	Min.	Max.
AC	465.0	470.0
AD	470.0	475.0

Tolerance for each Dominate Wavelength bin is +/- 1nm

## Typical Electrical / Optical Characteristics Curves

(25 Ambient Temperature Unless Otherwise Noted)

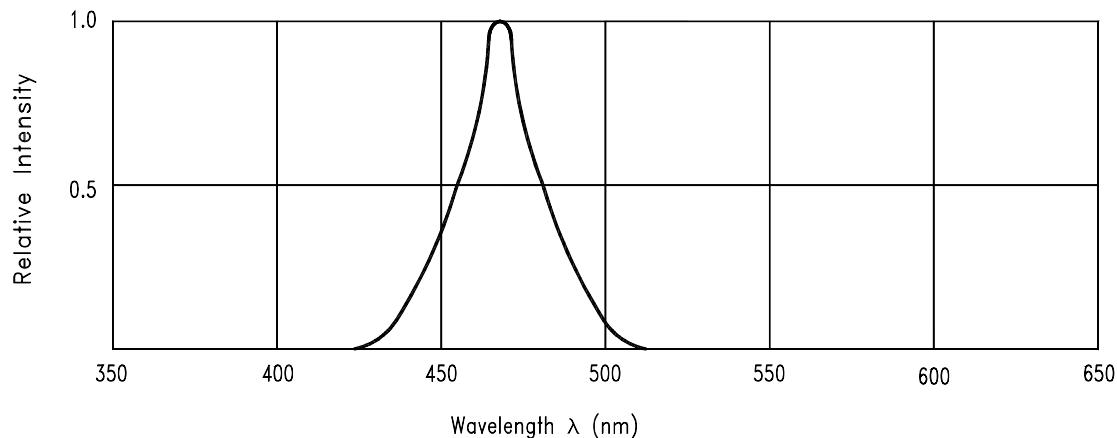


Fig.1 Relative Intensity vs. Wavelength

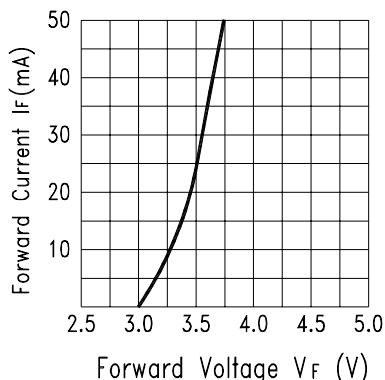


Fig.2 Forward Current vs. Forward Voltage

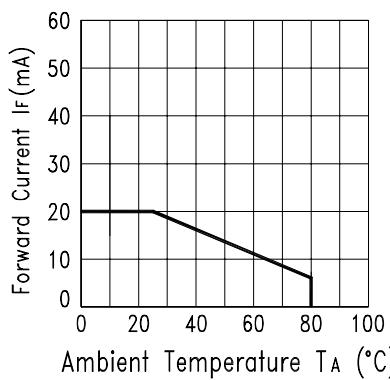


Fig.3 Forward Current Derating Curve

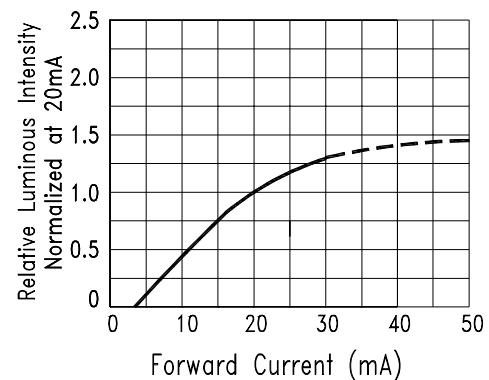


Fig.4 Relative Luminous Intensity vs. Forward Current

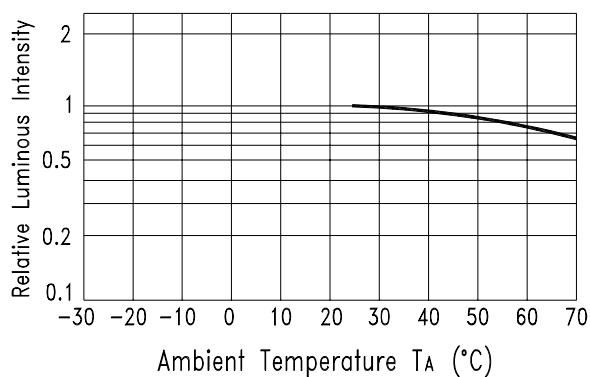


Fig.5 Luminous Intensity vs. Ambient Temperature

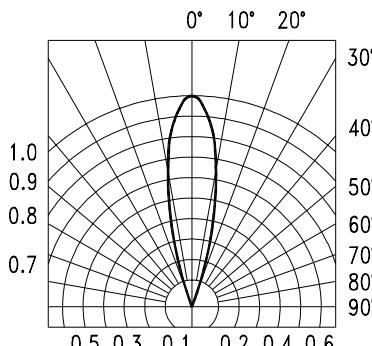
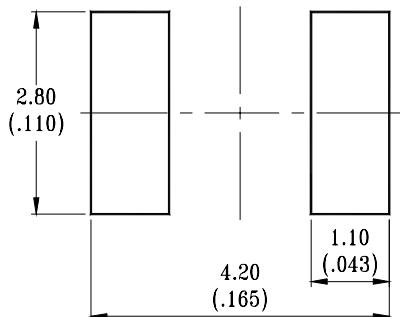
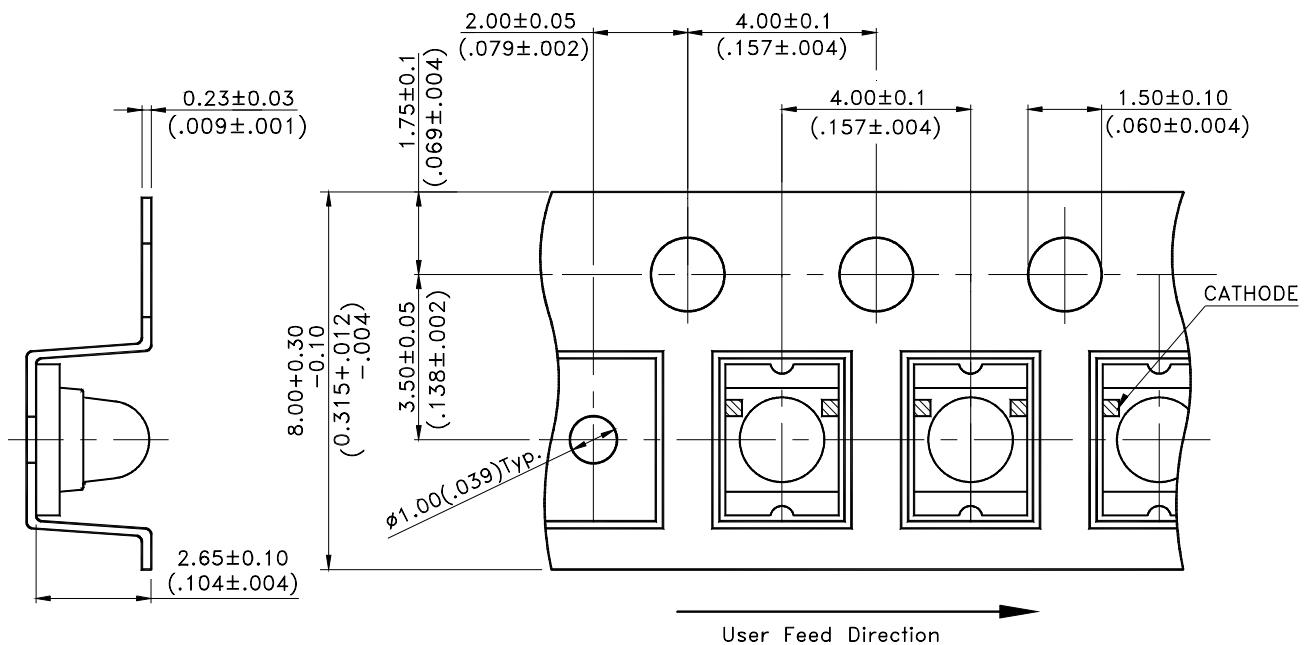


Fig.6 Spatial Distribution

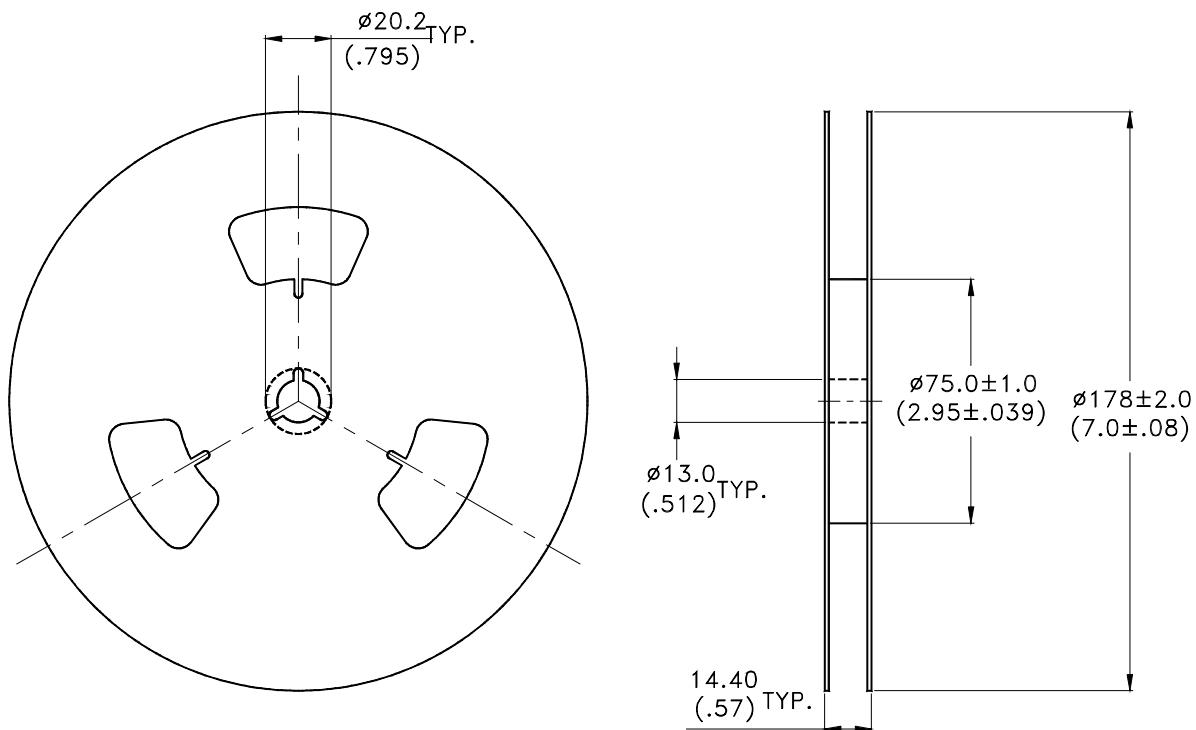
**Cleaning**

Do not use unspecified chemical liquid to clean LED they could harm the package.

If clean is necessary, immerse the LED in ethyl alcohol or in isopropyl alcohol at normal temperature for less one minute.

**Suggest Soldering Pad Dimensions****Package Dimensions Of Tape And Reel****Notes:**

1. All dimensions are in millimeters (inches).



## Notes:

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel-1500 pieces per reel.
3. Minimum packing quantity is 500 pcs for remainders.
4. The maximum number of consecutive missing lamps is two.
5. In accordance with ANSI/EIA 481-1-A-1994 specifications.

## CAUTIONS

### 1. Application limitation

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household application.) Consult Liteon's sales in advance for information on application in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as airplanes, automobiles, traffic control equipment, life support system and safety devices).

### 2. Storage

After opening the package. The LEDs should be kept at 30°C or less and 70%RH or less. The LEDs should be soldered within 168 hours(7 days) after opening the package. If unused LEDs remain, they should be stored in moisture proof package, such as sealed containers with packages of moisture absorbent material (silica gel). It is also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again.

If LEDs have exceeded the storage time, baking treatment should be performed with 60±5°C more than 24 hours.

Please avoid rapid transitions in ambient temperature in high humidity environments where condensation may occur.

### 3. Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED.

### 4. Soldering

Do not apply any stress to the lead frame during soldering while the LED is at high temperature.

Recommended soldering condition

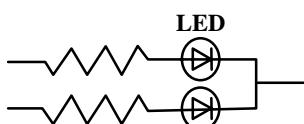
Reflow soldering		Soldering iron		Wave soldering	
Pre-heat	120~150°C	Temperature	300°C Max.	Pre-heat	100°C Max.
Pre-heat time	120 sec. Max.	Soldering time	3 sec. Max.	Pre-heat time	60 sec. Max.
Peak temperature	240°C Max.		(one time only)	Solder wave	260°C Max.
Soldering time	10 sec. Max.			Soldering time	10 sec. Max.

### 5. Drive Method

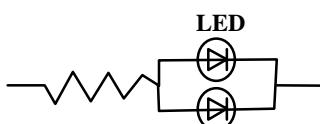
LED is a current operated device, and therefore, requires some kind of current limiting incorporated into the drive circuit. This current limiting typically takes the form of a current limiter resistor placed in series with the LED.

Consider worst case voltage variations that could occur across the current limiting resistor. The forward current should not be allowed to change by more than 40% of its desired value.

**Circuit model A**



**Circuit model B**



(A) Recommended circuit.

(B) The difference of brightness between LEDs could be found due to the Vf-If characteristics of LED.

**6. 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 these LED. All devices, equipment and machinery must be properly grounded.

**7. Reliability Test**

Classification	Test Item	Test Condition	Reference Standard
Endurance Test	Operation Life	Ta= Under Room Temperature As Per Data Sheet Maximum Rating *Test Time= 1000HRS (-24HRS,+72HRS)*@20mA.	MIL-STD-750D:1026 (1995) MIL-STD-883D:1005 (1991) JIS C 7021:B-1 (1982)
	High Temperature High Humidity Storage	IR-Reflow In-Board, 2 Times Ta= $65 \pm 5$ ,RH= 90 95% *Test Time= 240HRS $\pm$ 2HRS	MIL-STD-202F:103B(1980) JIS C 7021:B-11(1982)
	High Temperature Storage	Ta= $105 \pm 5$ *Test Time= 1000HRS (-24HRS,+72HRS)	MIL-STD-883D:1008 (1991) JIS C 7021:B-10 (1982)
	Low Temperature Storage	Ta= $-55 \pm 5$ *Test Time=1000HRS (-24HRS,+72HRS)	JIS C 7021:B-12 (1982)
Environmental Test	Temperature Cycling	105 25 -55 25 30mins 5mins 30mins 5mins 10 Cycles	MIL-STD-202F:107D (1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1010 (1991) JIS C 7021:A-4(1982)
	Thermal Shock	IR-Reflow In-Board, 2 Times $105 \pm 5$ -55 $\pm 5$ 10mins 10mins 10 Cycles	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011 (1991)
	Solder Resistance	T.sol= $260 \pm 5$ Dwell Time= $10 \pm 1$ secs	MIL-STD-202F:210A(1980) MIL-STD-750D:2031(1995) JIS C 7021:A-1(1982)
	IR-Reflow	Ramp-up rate(183 to Peak) +3 second max Temp. maintain at $125(\pm 25)$ 120 seconds max Temp. maintain above 183 60-150 seconds Peak temperature range 235 $\pm 5$ Time within 5°C of actual Peak Temperature (tp) 10-30 seconds Ramp-down rate +6 /second max	MIL-STD-750D:2031.2(1995) J-STD-020(1999)
	Solderability	T.sol= $235 \pm 5$ Immersion time $2 \pm 0.5$ sec Immersion rate $25 \pm 2.5$ mm/sec Immersion rate $25 \pm 2.5$ mm/sec Coverage 95% of the dipped surface	MIL-STD-202F:208D(1980) MIL-STD-750D:2026(1995) MIL-STD-883D:2003(1991) IEC 68 Part 2-20 JIS C 7021:A-2(1982)

**8. Others**

The appearance and specifications of the product may be modified for improvement without notice.