

## Lite-On Technology Corporation

### SMD LAMP LED

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## L T S T - T 6 7 0 K R L

## DATA SHEET

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PAGE : 0

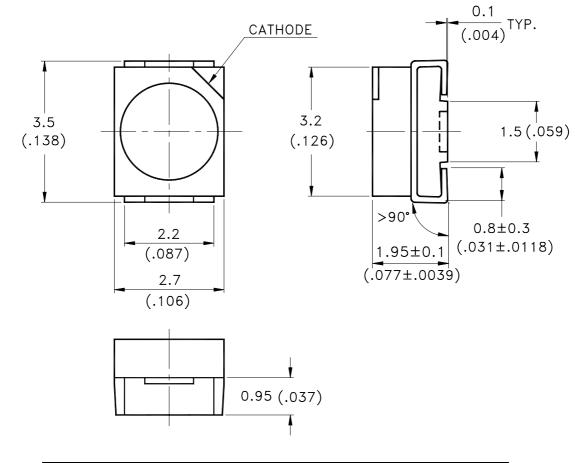
BNS-OD-C132/A4

#### Property of Lite-On Only

#### Features

- \* 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.
- \* Lead-Free package (According to RoHS).

#### Package Dimensions



Part No.	Lens Color	Source Color
LTST-T670KRL	Water Clear	AlInGaP Red

Notes:

1. All dimensions are in millimeters (inches).

2. Tolerance is  $\pm 0.2$  mm (.008") unless otherwise noted.

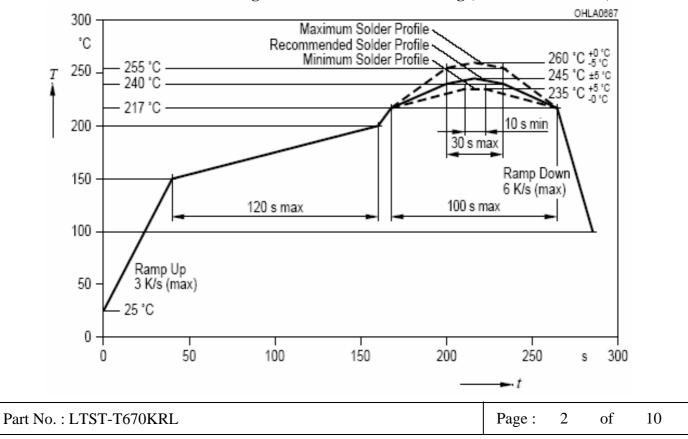
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#### Property of Lite-On Only

#### Absolute Maximum Ratings at Ta=25℃

Parameter	LTST-T670KRL	Unit
Power Dissipation	75	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	80	mA
DC Forward Current	30	mA
Derating Linear From 50°C	0.4	mA/°C
Reverse Voltage	3	V
Operating Temperature Range	$-55^{\circ}$ C to $+100^{\circ}$ C	
Storage Temperature Range	$-55^{\circ}$ C to $+100^{\circ}$ C	

Suggest IR Reflow Condition For Pb Free Process:



IR-Reflow Soldering Profile for lead free soldering (Acc. to J-STD-020B)

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

Parameter	Symbol	Part No. LTST-	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	T670KRL	45.0		140.0	mcd	IF = 20mA Note 1
Viewing Angle	<b>20</b> 1/2	T670KRL		120		deg	Note 2 (Fig.6)
Peak Emission Wavelength	λΡ	T670KRL		639		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	T670KRL		631		nm	Note 3
Spectral Line Half-Width	Δλ	T670KRL		20		nm	
Forward Voltage	VF	T670KRL		2.0	2.4	V	IF = 20mA
Reverse Current	IR	T670KRL			100	$\mu$ A	VR = 5V
Capacitance	С	T670KRL		40		PF	VF=0, f=1MHZ

NOTE: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

- 2.  $\theta$  1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- 3. The dominant wavelength,  $\lambda$  d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- 4. Forward Voltage Tolerance is +/- 0.1 volt.

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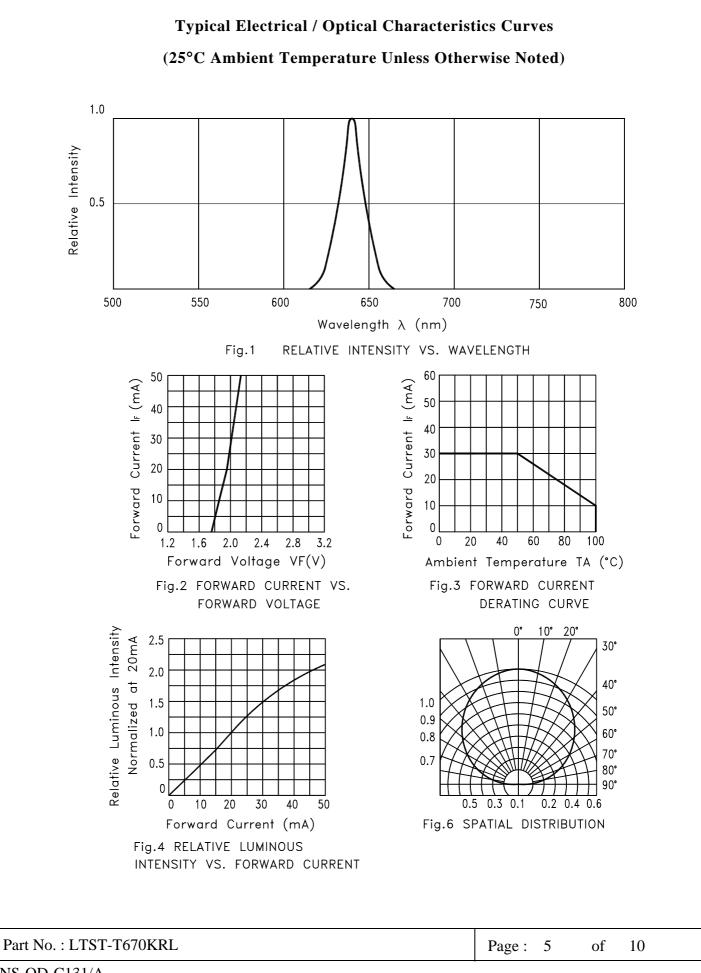
### **Bin Code List**

Luminous Inte	tensity Unit : mcd @20mA		
Bin Code	Min.	Max.	
P1	45.0	56.0	
P2	56.0	71.0	
Q1	71.0	90.0	
Q2	90.0	112.0	
R1	112.0	140.0	

Tolerance on each Intensity bin is +/-15%

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#### Property of Lite-On Only

#### User Guide

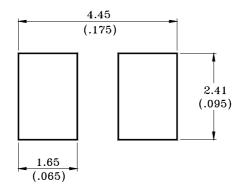
#### Cleaning

Do not use unspecified chemical liquid to clean LED they could harm the package. If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less one minute.

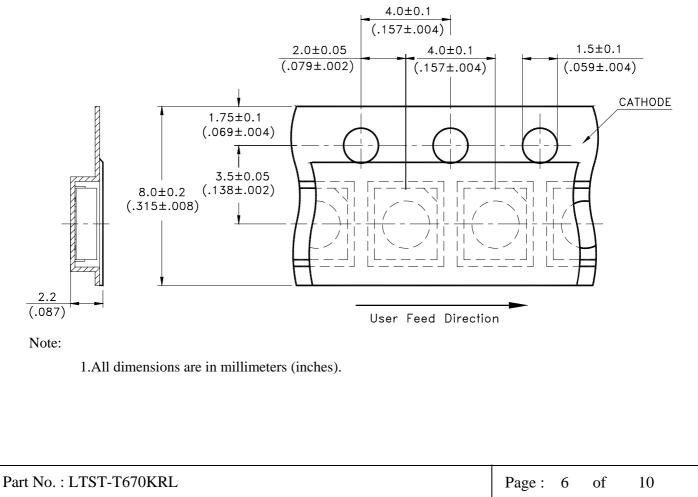
#### **Recommend Printed Circuit Board Attachment Pad**

Infrared / vapor phase

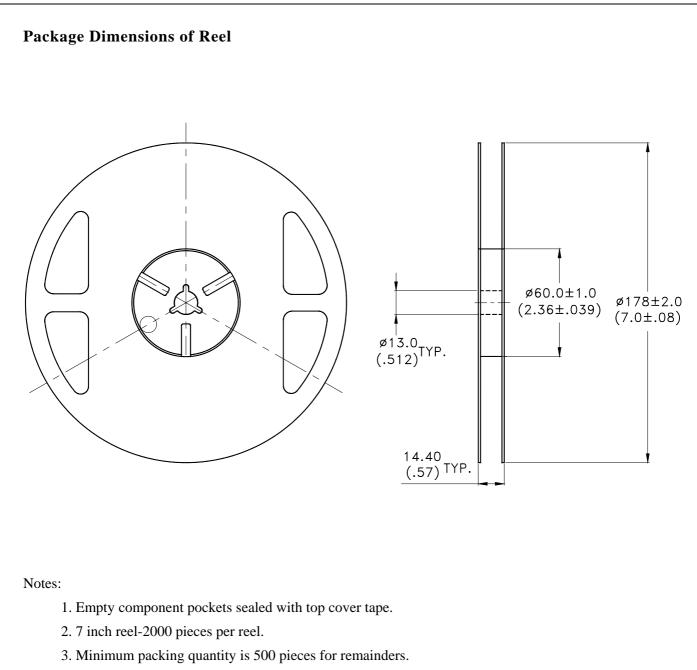
**Reflow Soldering** 



#### Package Dimensions Of Tape And Reel



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- 4. The maximum number of consecutive missing lamps is two.
- 5. In accordance with EIA-481-1-B specifications.

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## CAUTIONS

#### 1. Application

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

### 2. Storage

The storage ambient for the LEDs should not exceed 85°C temperature or 60% relative humidity. It is recommended that LEDs out of their original packaging are IR-reflowed within one week. For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant, or in a desiccators with nitrogen ambient. LEDs stored out of their original packaging for more than a week should be baked at about 60 deg C for at least 24 hours before solder assembly.

### 3. Cleaning

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

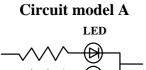
### 4. Soldering

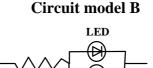
Recommended soldering conditions:

Reflow so	oldering	dering Wave Soldering		Solderi	ng iron
Peak temperature	260°C Max.	Pre-heat time Solder wave		Soldering time	300°C Max. 3 sec. Max. (one time only)

### 5. Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.





- (A) Recommended circuit.
- (B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

### 6. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

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ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no lightup" at low currents.

To verify for ESD damage, check for "lightup" and Vf of the suspect LEDs at low currents. The Vf of "good" LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.

#### 7. Reliability Test

Classification	Test Item	Test Condition	Reference Standard
	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)
Endurance Test	High Temperature High Humidity Storage	IR-Reflow In-Board, 2 Times Ta= 65±5°C,RH= 90~95% *Test Time= 240HRS±2HRS	MIL-STD-202F:103B(1980) JIS C 7021:B-11(1982)
	High Temperature Storage	Ta= 105±5°C *Test Time= 1000HRS (-24HRS,+72HRS)	MIL-STD-883D:1008 (1991) JIS C 7021:B-10 (1982)
	Low Temperature StorageTa= -55 $\pm$ 5°C *Test Time=1000HRS (-24HRS,+72H RS)Temperature Cycling105°C ~ 25°C ~ -55°C ~ 25°C 30mins 5mins		JIS C 7021:B-12 (1982)
	Temperature Cycling		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 $85 \pm 5^{\circ}$ C $\sim -40^{\circ}$ C $\pm 5^{\circ}$ C10mins10mins100 Cycles	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011 (1991)
Environmental Test	IR-Reflow	Ramp-up rate(217°C to Peak) +3°C/ second max Temp. maintain at 175( $\pm$ 25)°C 180 seconds max Temp. maintain above 217°C 60-150 seconds Peak temperature range 260°C+0/-5°C Time within 5°C of actual Peak Temperature (tp) 20-40 seconds Ramp-down rate +6°C/second max	MIL-STD-750D:2031.2(1995) J-STD-020B(2002)
	Solderability	T.sol= $235 \pm 5^{\circ}$ C Immersion time $2\pm 0.5$ sec Immersion rate $25\pm 2.5$ mm/sec Immersion rate $25\pm 2.5$ mm/sec Coverage $\geq 95\%$ 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 prior notice.

#### 9. Quality Guarantee

LiteOn guarantee DPPM level of function failure is smaller and equal to 50 DPPM. (Based on 100k usage)

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#### **10. Suggested Checking List**

Training and Certification

- 1. Everyone working in a static-safe area is ESD-certified?
- 2. Training records kept and re-certification dates monitored?

Static-Safe Workstation & Work Areas

- 1. Static-safe workstation or work-areas have ESD signs?
- 2. All surfaces and objects at all static-safe workstation and within 1 ft measure less than 100V?
- 3. All ionizer activated, positioned towards the units?
- 4. Each work surface mats grounding is good?

#### Personnel Grounding

- 1. Every person (including visitors) handling ESD sensitive (ESDS) items wears wrist strap, heel strap or conductive shoes with conductive flooring?
- 2. If conductive footwear used, conductive flooring also present where operator stand or walk?
- 3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V\*?
- 4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
- 5. All wrist strap or heel strap checkers calibration up to date? Note: \*50V for Blue LED.

#### **Device Handling**

- 1. Every ESDS items identified by EIA-471 labels on item or packaging?
- 2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
- 3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
- 4. All flexible conductive and dissipative package materials inspected before reuse or recycles?

#### Others

- 1. Audit result reported to entity ESD control coordinator?
- 2. Corrective action from previous audits completed?
- 3. Are audit records complete and on file?

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