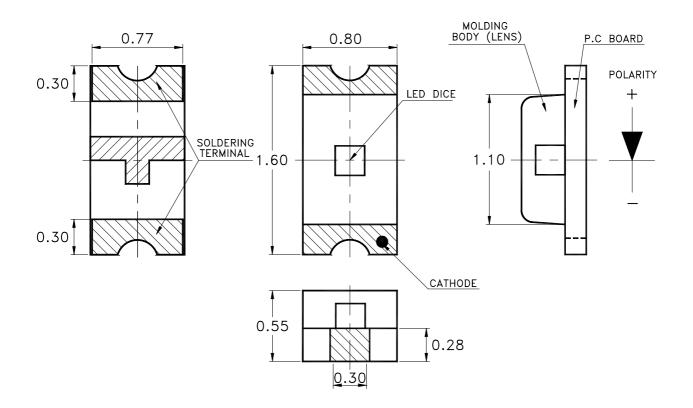


#### Property of Lite-On Only

#### **Features**

- \* Super thin (0.55H mm) Chip LED.
- \* Ultra bright InGaN White 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	Emitted Color		
LTW-C191TL5	Yellow	InGaN White		

#### Notes:

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

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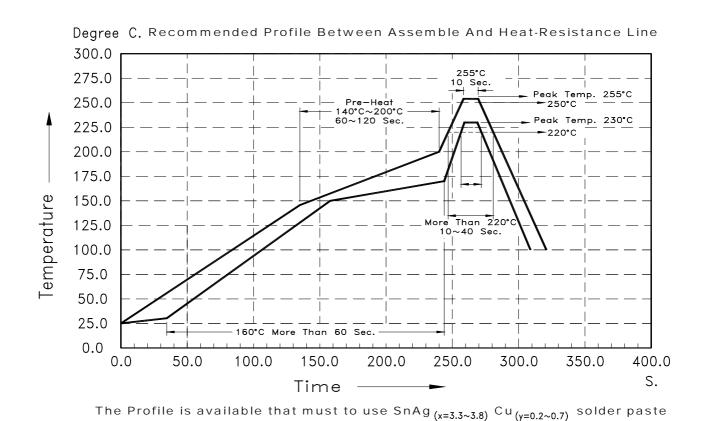


Property of Lite-On Only

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

Parameter	LTW-C191TL5	Unit	
Power Dissipation	70	mW	
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA	
DC Forward Current	20	mA	
Derating Linear From 25°C	0.25	mA/°C	
Reverse Voltage	5	V	
Operating Temperature Range	-20°C to + 80°C		
Storage Temperature Range	-55°C to + 105°C		
Wave Soldering Condition	260°C For 5 Seconds		

#### Suggest IR Reflow Condition:



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#### Property of Lite-On Only

#### Electrical Optical Characteristics At Ta=25°C

Parameter	Symbol	Part No. LTW-	Min.	Тур.	Max.	Unit	Test Condition	
Luminous Intensity	IV	C191TL5	28.0		112.0	mcd	IF = 5mA Note 1, 2, 5	
Viewing Angle	2 θ 1/2	C191TL5		130		deg	Fig.6	
Chromaticity Coordinates	X	C191TL5		0.31			IF = 5mA Note 3, 5	
emomaticity coordinates	у	CITIES		0.32			Fig.1	
Forward Voltage	VF	C191TL5	2.70		3.15	V	IF = 5mA	
Reverse Current	IR	C191TL5			10	μΑ	VR = 5V	

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

- 2. Iv classification code is marked on each packing bag.
- 3. The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
- 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.

- 5. Tester
  - CAS 140B is for the chromaticity coordinates (x, y) and Iv.
- 6. The chromaticity coordinates (x, y) guarantee should be added  $\pm 0.01$  tolerance.

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Property of Lite-On Only

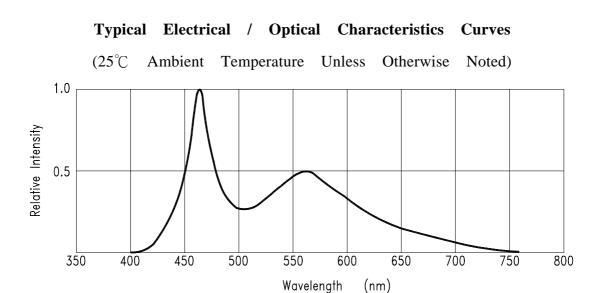
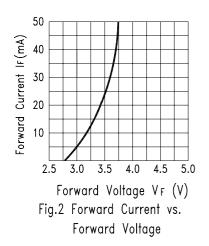
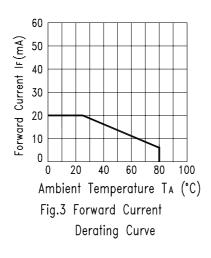
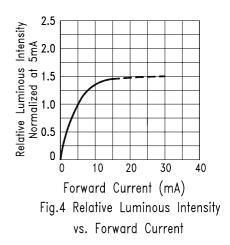
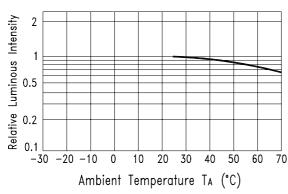


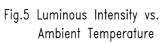
Fig.1 RELATIVE INTENSITY VS. WAVELENGTH











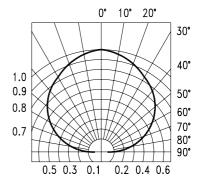


Fig.6 Spatial Distribution

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#### Property of Lite-On Only

#### **Bin Code List**

VF Spec. Table

VF Bin	Forward Voltage (V) at $IF = 5mA$		
VI DIII	Min.	Max.	
A	2.70	2.85	
В	2.85	3.00	
С	3.00	3.15	

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

IV Spec. Table

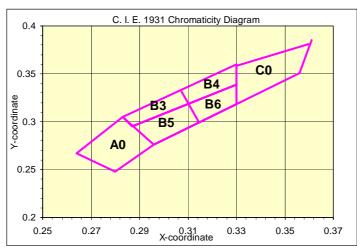
IV Bin	Luminous Intensity (mcd) at IF = 5mA		
I V DIII	Min.	Max.	
N	28.0	45.0	
P	45.0	71.0	
Q	71.0	112.0	

Tolerance on each Luminous Intensity bin is +/- 15%.

Hue Spec. Table

Hue Bin	Color bin limits at IF = 5mA						
nue biii	CIE 1931Chromaticity coordinates						
A0	X	0.280	0.296	0.283	0.264		
AU	у	0.248	0.276	0.305	0.267		
В3	X	0.287	0.307	0.304	0.283		
БЗ	у	0.295	0.315	0.330	0.305		
B4	X	0.307	0.330	0.330	0.304		
D4	у	0.315	0.339	0.360	0.330		
B5	X	0.296	0.311	0.307	0.287		
БЗ	у	0.276	0.294	0.315	0.295		
В6	X	0.311	0.330	0.330	0.307		
ъо	у	0.294	0.318	0.339	0.315		
C0	X	0.330	0.356	0.361	0.330		
Co	у	0.318	0.351	0.385	0.360		

Tolerance on each Hue (x, y) bin is  $\pm -0.01$ .



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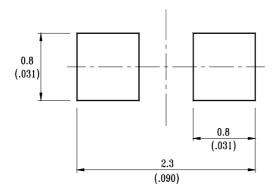
Property of Lite-On Only

#### Cleaning

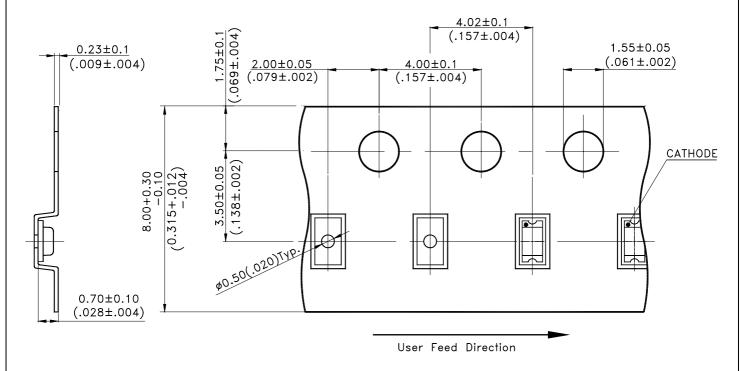
Do not use unspecified chemical liquid to clean LED they could harm the package.

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:

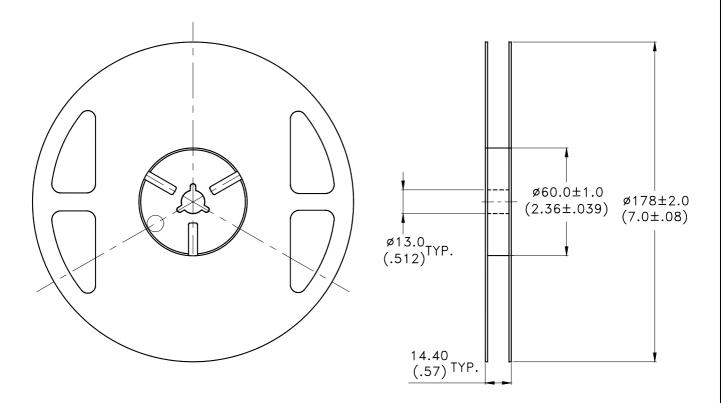
1. All dimensions are in millimeters (inches).

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Property of Lite-On Only

#### **Package Dimensions of Reel**



#### Notes:

- 1. Empty component pockets sealed with top cover tape.
- 2. 7 inch reel-3000 pieces per reel.
- 3. Minimum packing quantity is 500 pieces for remainders.
- 4. The maximum number of consecutive missing lamps is two.
- 5. In accordance with ANSI/EIA 481-1-A-1994 specifications.

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Property of Lite-On Only







#### Notes:

- 1. There are 3 moisture barrier bags or less in inner carton.
- 2. There are 21 inner carton or less in a master carton.

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Property of Lite-On Only

#### **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 30°C temperature or 70% 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

#### 3. Cleaning

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

#### 4. Soldering

Recommended soldering conditions:

for at least 24 hours before solder assembly.

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

#### 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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#### Property of Lite-On Only

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 >2.0 V@0.1 mA for InGaN product and >1.4 V@0.1 mA 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 Storage	Ta= -55±5°C *Test Time=1000HRS (-24HRS,+72H RS)	JIS C 7021:B-12 (1982)
	Temperature Cycling	$105^{\circ}\text{C} \sim 25^{\circ}\text{C} \sim -55^{\circ}\text{C} \sim 25^{\circ}\text{C}$ 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 $85 \pm 5^{\circ}\text{C} \sim -40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 10mins 10 Cycles	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011 (1991)
Engine manufal	Solder Resistance	T.sol= $260 \pm 5$ °C Dwell Time= $10 \pm 1$ secs	MIL-STD-202F:210A(1980) MIL-STD-750D:2031(1995) JIS C 7021:A-1(1982)
Environmental Test	IR-Reflow	Ramp-up rate( $217^{\circ}$ C to Peak) $+3^{\circ}$ C/ second max Temp. maintain at $175(\pm 25)^{\circ}$ C 180 seconds max Temp. maintain above $217^{\circ}$ C 60-150 seconds Peak temperature range $260^{\circ}$ C $+0/-5^{\circ}$ C Time within $5^{\circ}$ C of actual Peak Temperature (tp) 20-40 seconds Ramp-down rate $+6^{\circ}$ C/second max	MIL-STD-750D:2031.2(1995) J-STD-020(1999)
	Solderability	T.sol= $235 \pm 5^{\circ}$ C Immersion time $2\pm0.5$ sec Immersion rate $25\pm2.5$ 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.

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#### Property of Lite-On Only

#### 9. 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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Lite-On:

#### **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

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