



# **SMD LED**

## **Product Data Sheet**

### **LTST-020QRL**

Spec No.: DS22-2008-0001

Effective Date: 09/26/2014

Revision: C

**LITE-ON DCC**

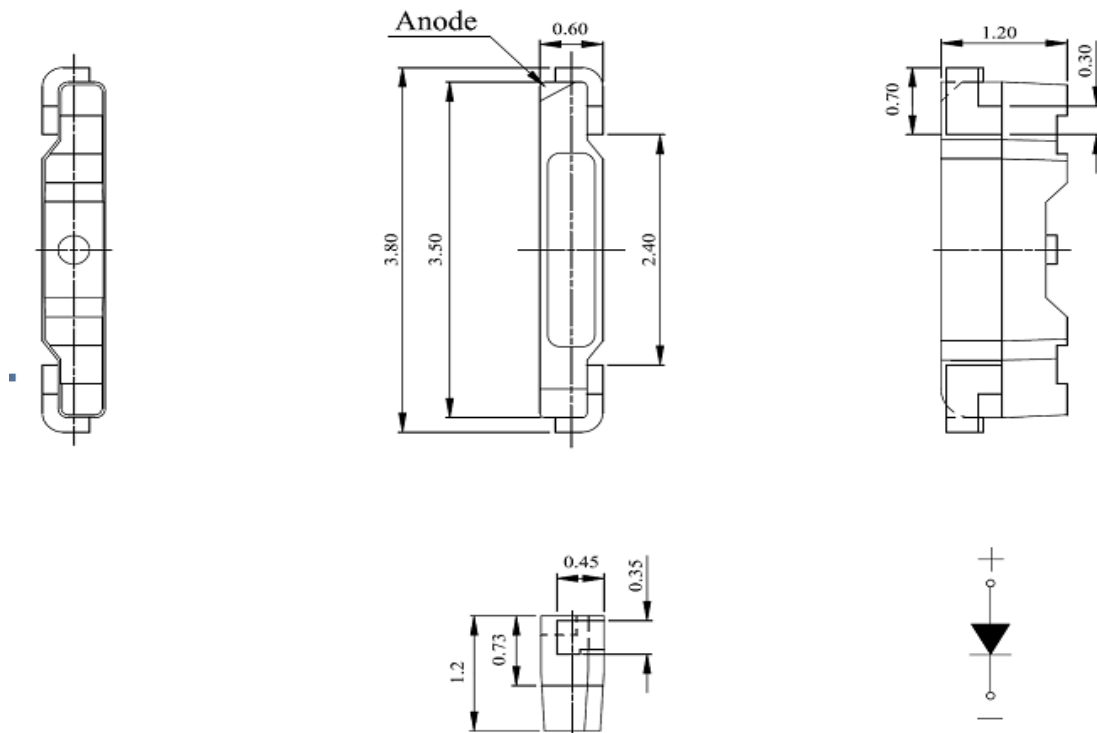
**RELEASE**

**BNS-OD-FC001/A4**

### Features

- \* Package in 12mm 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.
- \* Meet green product and Pb-free(According to RoHS)

### Package Dimensions

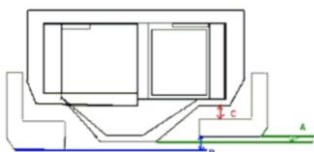


Part No.	Lens Color	Source Color
LTST-020QRL	Water Clear	AlGaInP Red

#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.1$  mm (.004") unless otherwise noted.

### Definition of Distance Between of PAD and Reflector



- A: The distance between pad's bottom and reflector.  
 B: The tolerance between right and left pad.  
 C: The distance between pad and reflector.

Symbol	Dimension (mm)			
A	0	min	0.05	max
B	0	min	0.03	max
C	0	min	0.05	max

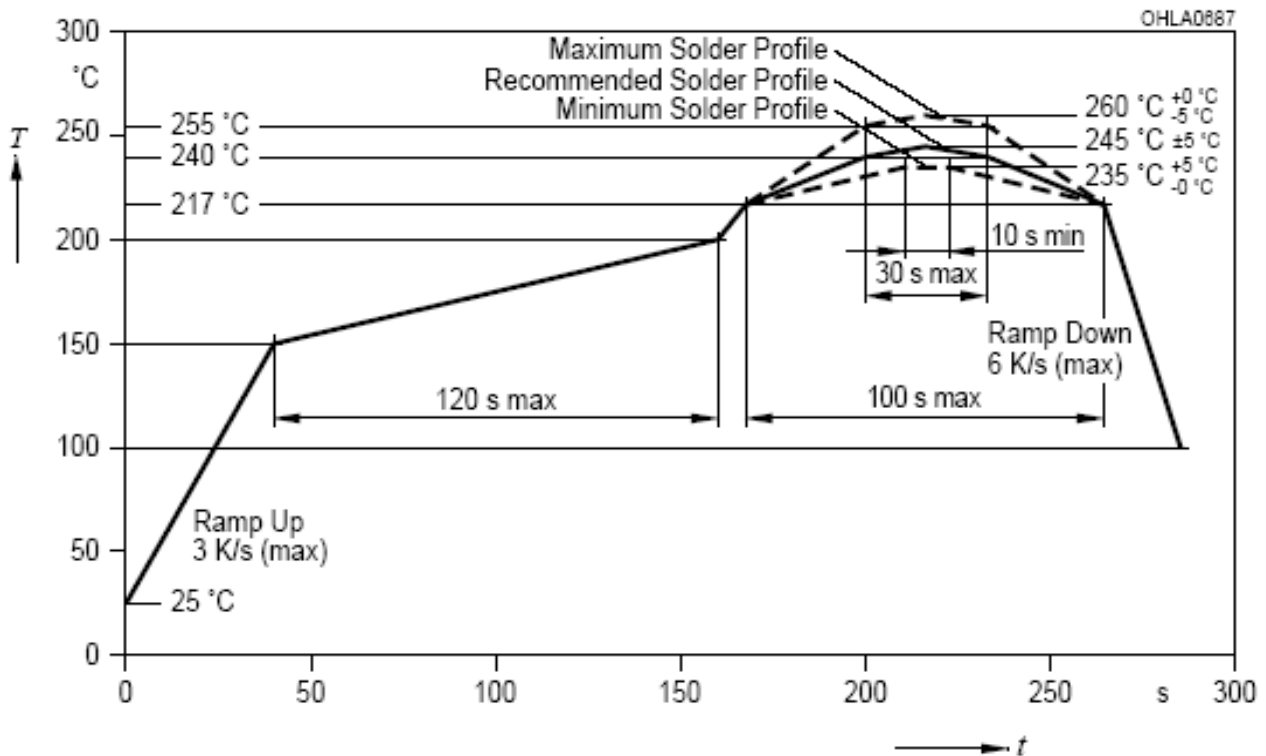
## Property of Lite-On Only

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

Parameter	LTST-020QRL	Unit
Power Dissipation	120	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
DC Forward Current	30	mA
Reverse Voltage	5	V
Operating Temperature Range	-30°C to + 85°C	
Storage Temperature Range	-40°C to + 100°C	
Reflow Soldering Condition	260°C For 10 Seconds	

Suggest IR Reflow Condition :

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



## Property of Lite-On Only

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

Parameter	Symbol	Part No. LTW-	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	020QRL	200	-	400	mcd	IF = 20mA Note 1, 2, 4
Viewing Angle	2 $\theta$ 1/2	020QRL		110		deg	Fig.6
Dominant Wavelength	$\lambda_d$	020QRL	619	-	629	nm	IF = 20mA Note 2, 5 Fig.1
Forward Voltage	VF	020QRL	-	2.0	2.4	V	IF = 20mA
ESD-Withstand Voltage	ESD	020QRL	2K			V	HBM

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. 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.

4. CAS140B is the test standard for the Dominant Wavelength & IV.

5. The Dominant Wavelength guarantee should be added +/- 2nm tolerance.

## Property of Lite-On Only

### Bin Code List

VF Spec. Table		
VF Bin	Forward Voltage (V) at IF = 20mA	
	Min.	Max.
VA1	1.8	1.9
VA2	1.9	2.0
VB1	2.0	2.1
VB2	2.1	2.2
VC1	2.2	2.3
VC2	2.3	2.4

Tolerance on each Forward Voltage bin is +/-0.10 volt

IV Spec. Table		
IV Bin	Luminous Intensity (mcd) at IF = 20mA	
	Min.	Max.
P1	200	300
P2	300	400
Q1	400	500
Q2	500	600
R1	700	800

Tolerance on each Luminous Intensity bin is +/- 10%.

**Property of Lite-On Only**

**Typical Electrical / Optical Characteristics Curves**  
**(25°C Ambient Temperature Unless Otherwise Noted)**

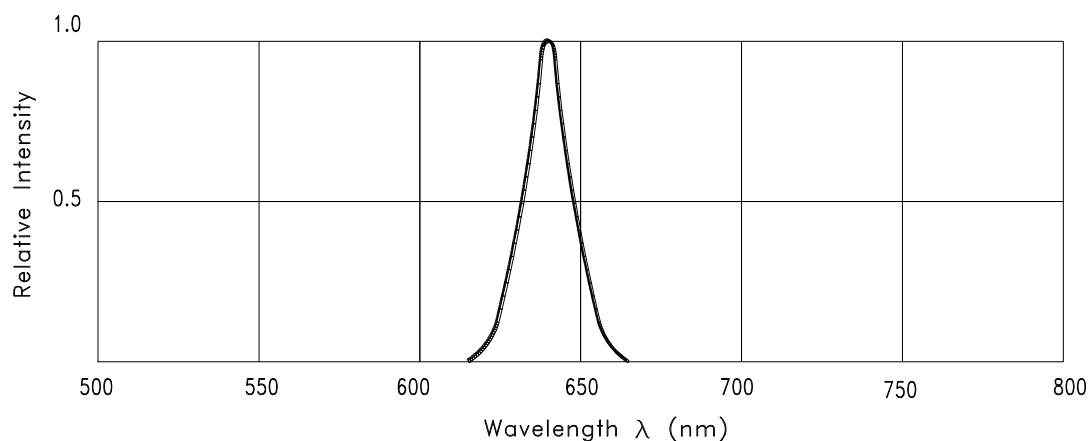


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

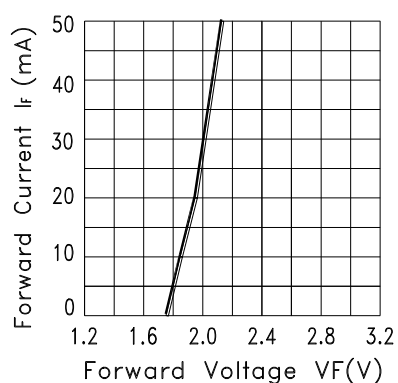


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

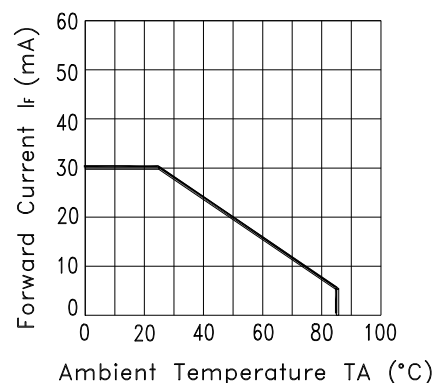


Fig.3 FORWARD CURRENT DERATING CURVE

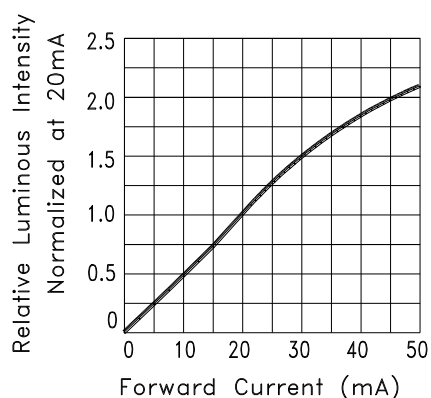


Fig.4 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

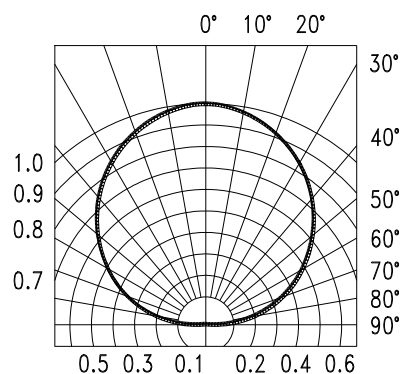


Fig.5 Spatial Distribution

# User Guide

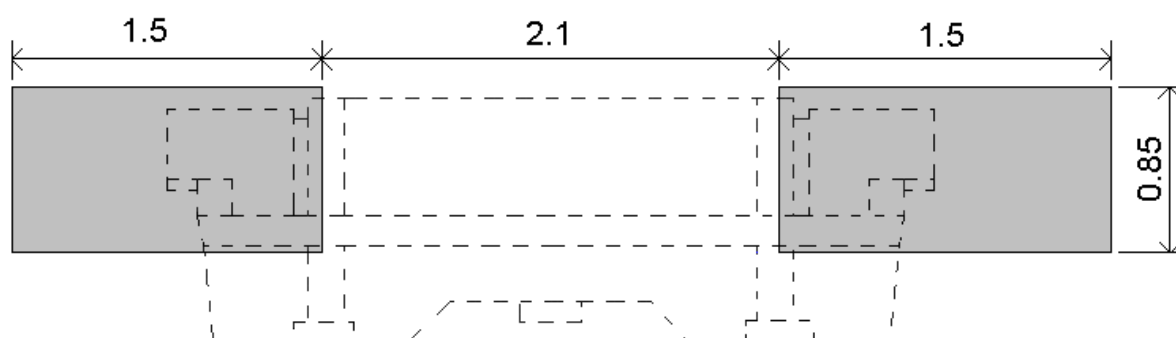
## Cleaning

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.

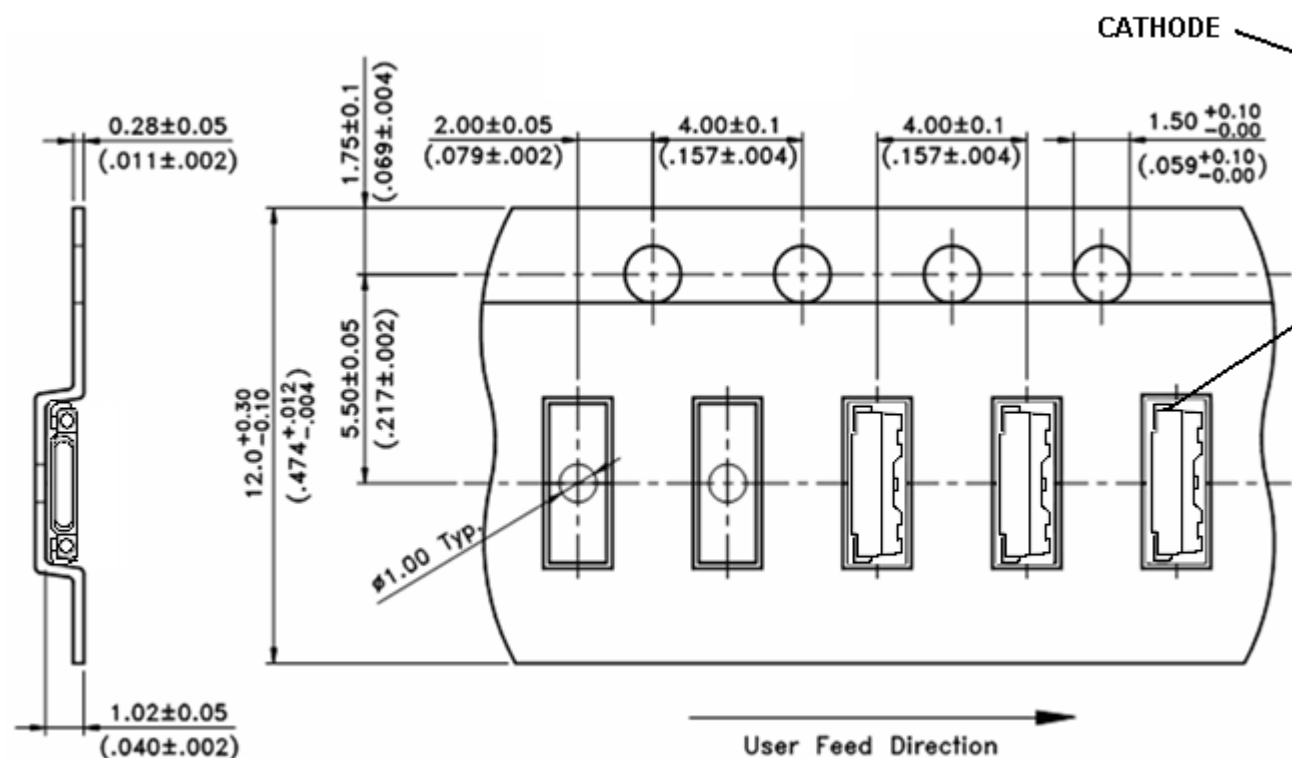
**Recommend Printed Circuit Board Attachment Pad**

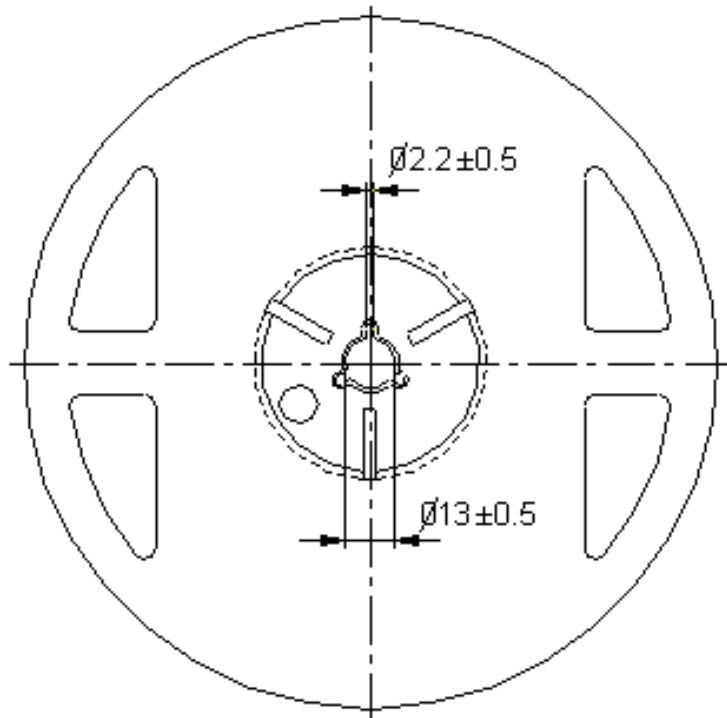
Infrared / vapor phase

## Reflow Soldering

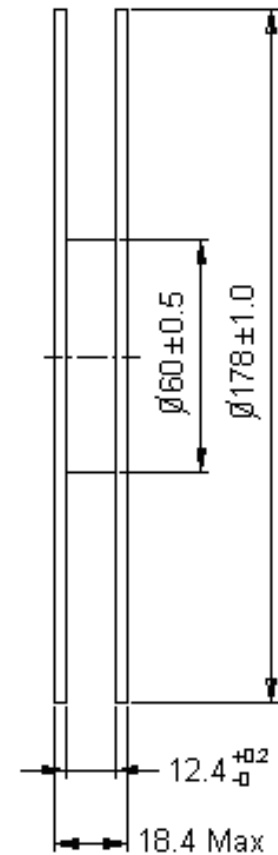


### Package Dimensions of Tape



**Package Dimensions of Reel**


Note: 01. The tolerance unless mentioned is  $\pm 0.1$  mm  
 02. The measured unit is "mm"


**Notes:**

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel-2000 pieces per reel.
3. The maximum number of consecutive missing lamps is two.
4. In accordance with ANSI/EIA 481 specifications.
5. Vacate 20 cm (min) on start of packing tape and vacate 50 cm (min) on last of packing tape.



## 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 package is sealed:

The LEDs should be stored at 30°C or less and 70%RH or less. And the LEDs are limited to use within one year, while the LEDs is packed in moisture-proof package with the desiccants inside.

The package is opened:

The storage ambient for the LEDs should not exceed 30°C temperature and 60% relative humidity.

It is recommended that LEDs out of their original packaging are IR-reflowed within 168hrs.

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 168hrs should be baked at about 60 deg C for at least 48 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 soldering		Soldering iron	
Pre-heat	150~200°C	Temperature	300°C Max.
Pre-heat time	120 sec. Max.	Soldering time	3 sec. Max.
Peak temperature	260°C Max.		(one time only)
Soldering time	10 sec. Max.(Max. two times)		

#### Soldering notes:

Because different board designs use different number and types of devices, solder pastes, reflow ovens, and circuit boards, no single temperature profile works for all possible combinations.

However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific characterization.

LITE-ON Runs both component-level verification using in-house **KYRAMX98** reflow chambers and board-level assembly.

The results of this testing are verified through post-reflow reliability testing.

Profiles used at LITE-ON are based on JEDEC standards to ensure that all packages can be successfully and reliably surface mounted.

Figure on page3 shows a sample temperature profile compliant to JEDEC standards.

You can use this example as a generic target to set up your reflow process.

You should adhere to the JEDEC profile limits as well as specifications and recommendations from the solder paste manufacturer to avoid damaging the device and create a reliable solder joint.

## 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  $>2.0V@0.1mA$  for InGaN product

### 7.1 Reliability Test

Test Item	Test Condition	Reference Standard	Note	Number of Damaged
Steady State Operating Life Condition	Ta= 25 °C, IF=20mA	1000 hrs	0/25	0
High Temperature Storage	Ta= 105 °C	1000 hrs	0/25	0
Low Temperature Storage	Ta= -55 °C	1000 hrs	0/25	0
Temperature Humidity Storage	Ta= 65 °C, RH= 90%	1000 hrs	0/25	0
Thermal Cycle	-55 °C ~25 °C ~105 °C~ 25 °C 30min 5min 30min 5min	100 cycles	0/25	0
Thermal Shock	-40 °C ~ 85 °C 10min 10min	100 cycles	0/25	0
Solder Resistance	Tsld=260+/- 5°C, 10sec (Lead Free Solder Profile)	1 time	0/25	0
IR-REFLOW	Tsld=250+/- 5°C, 20~40sec (Lead Free Solder Profile)	3 time	0/25	0

### 7.2 Criteria for Judging the Damage

Item	Symbol	Test Conditions	Criteria for Judgment	
			Min.	Max.
Forward Voltage	VF	IF=20mA	-	U.S.L.*) $\times$ 1.1
Reverse Current	IR	VR=5V	-	U.S.L.*) $\times$ 2.0
Luminous Intensity	IV	IF=20mA	U.S.L.***) $\times$ 0.7	-

**8. Others**

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

**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 wear 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 recycle?

**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?