

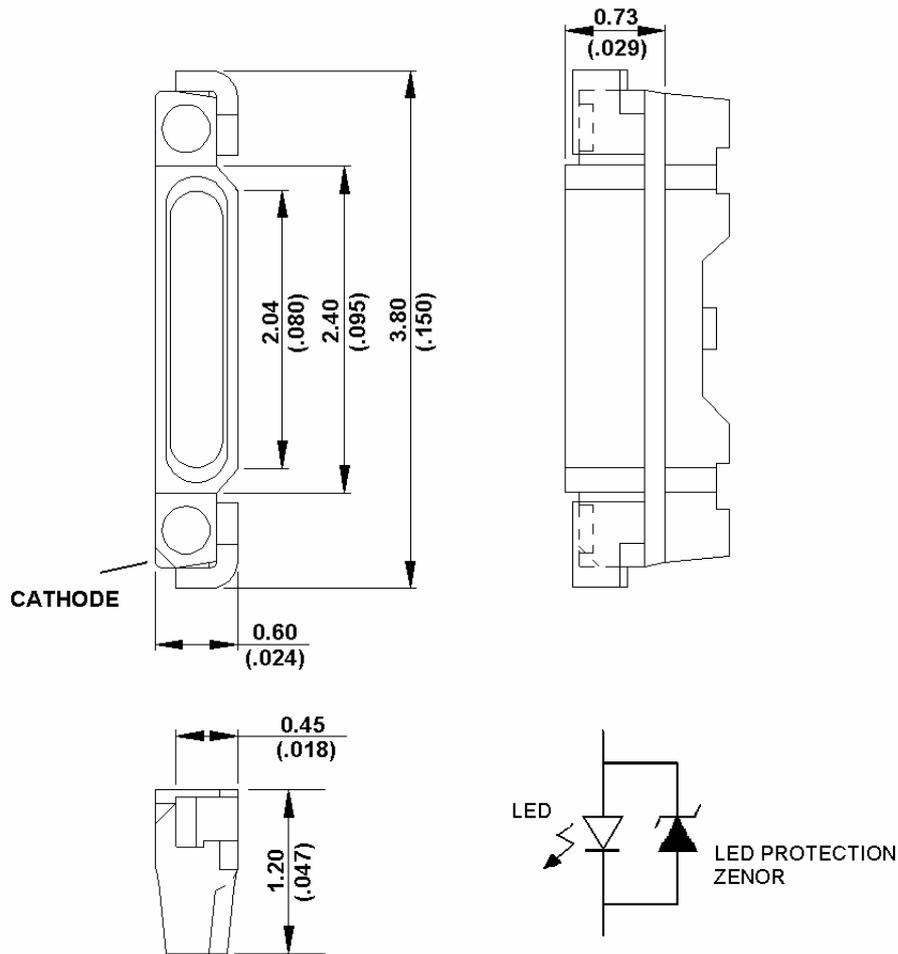
Property of Lite-On Only

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.
- * Meet green product and Pb-free(According to RoHS)



Package Dimensions



| Part No. | Lens Color | Source Color |
|-------------|------------|--------------|
| LTW-020ZGCG | Yellow | InGaN White |

Notes:

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

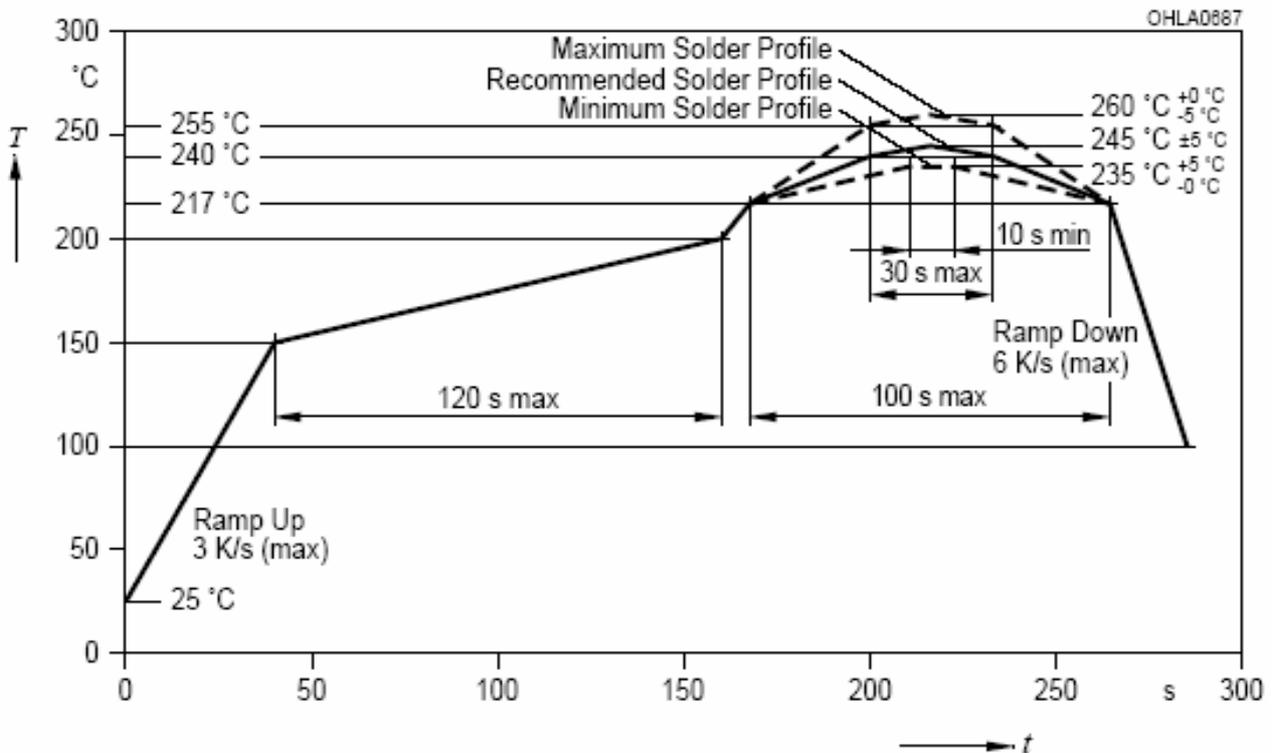
Property of Lite-On Only

Absolute Maximum Ratings at Ta=25°C

| Parameter | LTW-020ZGCG | 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 | 020ZGCG | | 1100 | | mcd | IF = 20mA Note 1, 2, 5 |
| Viewing Angle | 2θ 1/2 | 020ZGCG | | 110 | | deg | Fig.6 |
| Chromaticity Coordinates | x | 020ZGCG | | 0.300 | | | IF = 20mA Note 3, 5 Fig.1 |
| | y | | | 0.290 | | | |
| Forward Voltage | VF | 020ZGCG | | 3.3 | | V | IF = 20mA |
| Forward Voltage | VF3 | 020ZGCG | 2.2 | 2.3 | - | V | IF = 0.5uA |
| ESD-Withstand Voltage | ESD | 020ZGCG | 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. 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. CAS140B is the test standard for the chromaticity coordinates (x, y) & IV.

6. The chromaticity coordinates (x, y) guarantee should be added +/- 0.01 tolerance.

Property of Lite-On Only

Bin Code List

| VF Spec. Table | | |
|----------------|----------------------------------|------|
| VF Bin | Forward Voltage (V) at IF = 20mA | |
| | Min. | Max. |
| V0 | 2.9 | 3.0 |
| V1 | 3.0 | 3.1 |
| V2 | 3.1 | 3.2 |
| V3 | 3.2 | 3.3 |
| V4 | 3.3 | 3.4 |
| V5 | 3.4 | 3.5 |
| V6 | 3.5 | 3.6 |

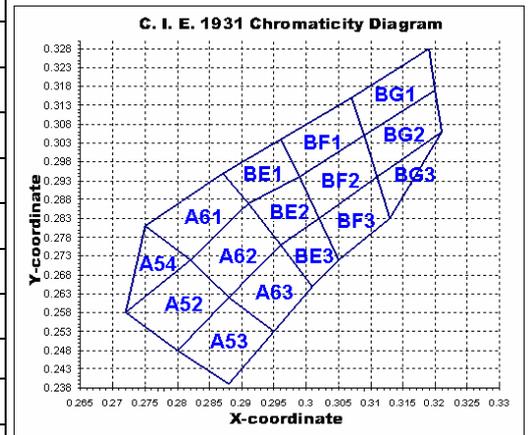
Tolerance on each Forward Voltage bin is +/-0.10 volt

| IV Spec. Table | | | |
|----------------|-----|---------------------------------------|------|
| IV Bin | | Luminous Intensity (mcd) at IF = 20mA | |
| | | Min. | Max. |
| T2 | T21 | 870 | 900 |
| | T22 | 900 | 930 |
| | T23 | 930 | 960 |
| | T24 | 960 | 990 |
| | T24 | 990 | 1020 |
| U1 | U11 | 1020 | 1050 |
| | U12 | 1050 | 1080 |
| | U13 | 1080 | 1110 |
| | U14 | 1110 | 1140 |
| | U15 | 1140 | 1170 |
| | U16 | 1170 | 1200 |
| U2 | U21 | 1200 | 1230 |
| | U22 | 1230 | 1260 |
| | U23 | 1260 | 1290 |
| | U24 | 1290 | 1320 |
| | U25 | 1320 | 1350 |
| | U26 | 1350 | 1380 |
| | U27 | 1380 | 1410 |
| | U28 | 1410 | 1440 |

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

Property of Lite-On Only

| Color Ranks Table | | | | | |
|-------------------|-----------------------------------|-------|-------|-------|-------|
| Ranks | Color bin limits at IF = 20mA | | | | |
| | CIE 1931 Chromaticity coordinates | | | | |
| A52 | x | 0.280 | 0.272 | 0.282 | 0.288 |
| | y | 0.248 | 0.258 | 0.272 | 0.262 |
| A53 | x | 0.288 | 0.280 | 0.288 | 0.295 |
| | y | 0.239 | 0.248 | 0.262 | 0.253 |
| A54 | x | 0.272 | 0.275 | 0.282 | |
| | y | 0.258 | 0.281 | 0.272 | |
| A61 | x | 0.282 | 0.275 | 0.287 | 0.291 |
| | y | 0.272 | 0.281 | 0.295 | 0.287 |
| A62 | x | 0.288 | 0.282 | 0.291 | 0.296 |
| | y | 0.262 | 0.272 | 0.287 | 0.276 |
| A63 | x | 0.295 | 0.288 | 0.296 | 0.301 |
| | y | 0.253 | 0.262 | 0.276 | 0.265 |
| BE1 | x | 0.291 | 0.287 | 0.296 | 0.299 |
| | y | 0.287 | 0.295 | 0.304 | 0.294 |
| BE2 | x | 0.296 | 0.291 | 0.299 | 0.302 |
| | y | 0.276 | 0.287 | 0.294 | 0.283 |
| BE3 | x | 0.301 | 0.296 | 0.302 | 0.305 |
| | y | 0.265 | 0.276 | 0.283 | 0.272 |
| BF1 | x | 0.299 | 0.296 | 0.307 | 0.309 |
| | y | 0.294 | 0.304 | 0.315 | 0.305 |
| BF2 | x | 0.302 | 0.299 | 0.309 | 0.311 |
| | y | 0.283 | 0.294 | 0.305 | 0.294 |
| BF3 | x | 0.305 | 0.302 | 0.311 | 0.313 |
| | y | 0.272 | 0.283 | 0.294 | 0.283 |
| BG1 | x | 0.309 | 0.307 | 0.319 | 0.320 |
| | y | 0.305 | 0.315 | 0.328 | 0.317 |
| BG2 | x | 0.311 | 0.309 | 0.320 | 0.321 |
| | y | 0.294 | 0.305 | 0.317 | 0.306 |
| BG3 | x | 0.313 | 0.311 | 0.321 | |
| | y | 0.283 | 0.294 | 0.306 | |



Tolerance on each Hue (x, y) bin is +/- 0.01.

* Color Coordinates Measurement allowance is ±0.01

Property of Lite-On Only

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

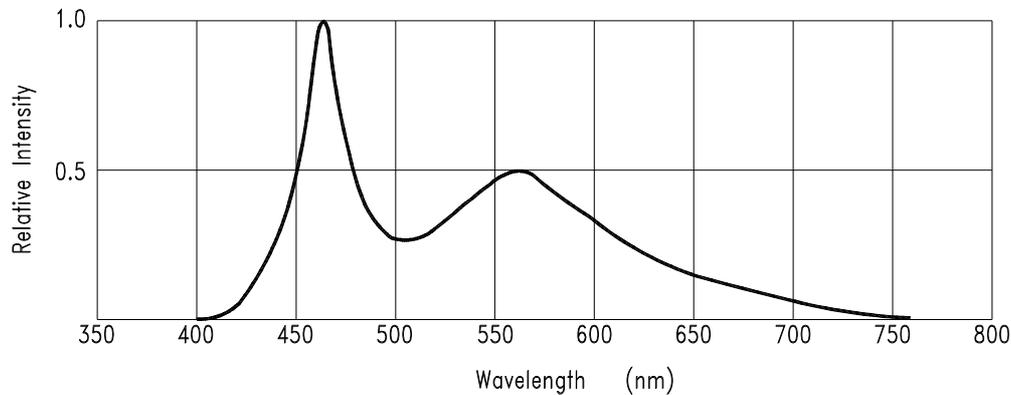


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

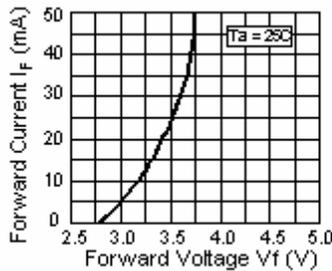


Fig.2 Forward Current vs. Forward Voltage

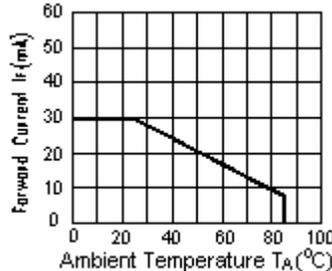


Fig.3 Forward Current Derating Curve

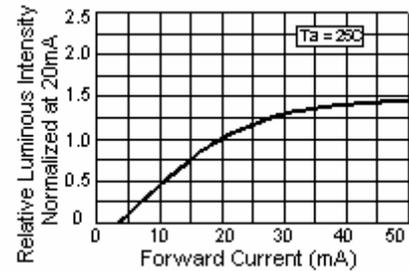


Fig.4 Relative Luminous Intensity vs. Forward Current

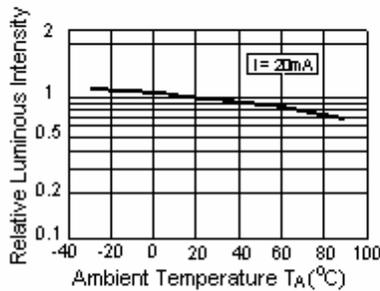


Fig.5 Luminous Intensity vs. Ambient Temperature

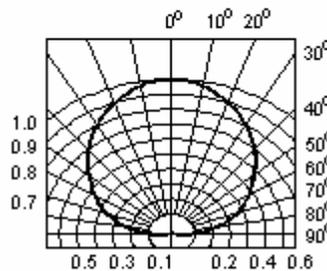


Fig.6 Spatial Distribution

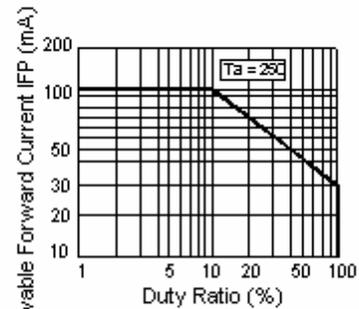


Fig.7 Duty Ratio vs. Allowable Forward Current

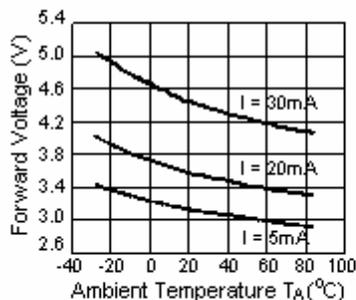


Fig.8 Ambient Temperature vs. Forward Voltage

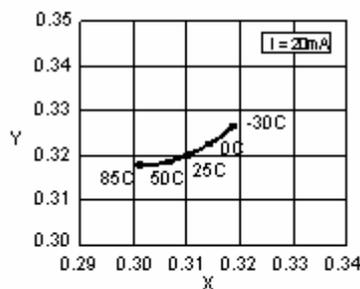


Fig.9 Ambient Temperature vs. Chromaticity Coordinate

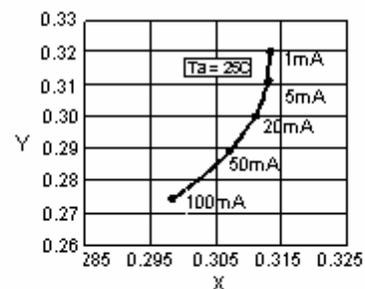
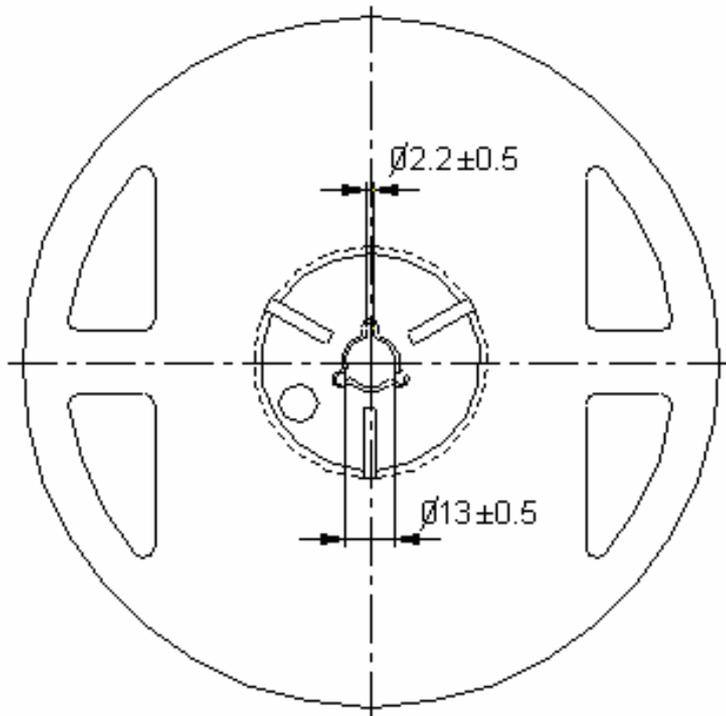
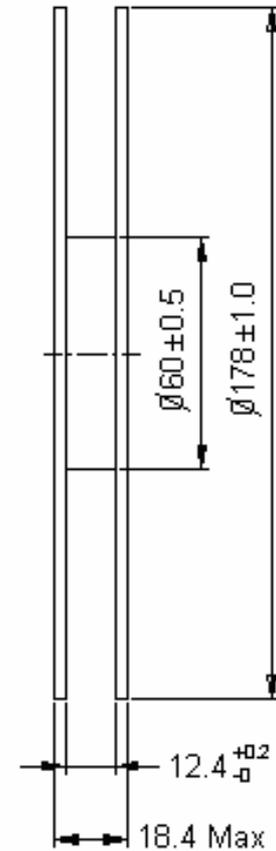


Fig.10 Forward Current vs. Chromaticity Coordinate

Property of Lite-On Only

Package Dimensions of Reel

Note: 01. The tolerance unless mentioned is ± 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. Minimum packing quantity is 200 pieces for remainders.
4. The maximum number of consecutive missing lamps is two.
5. In accordance with EIA-481-1-B specifications.

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

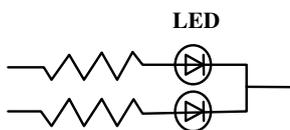
Recommended soldering conditions:

| Reflow soldering | | Soldering iron | |
|------------------|---------------|----------------|-----------------|
| Pre-heat | 120~150°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 | 30 sec. Max. | | |

5. Drive Method

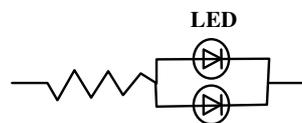
An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



(A) Recommended circuit.

Circuit model B



(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.

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 |
|---|---|--------------------------|--------------------|-------------------|
| Resistance to Soldering Heat (Reflow Soldering) | Tsld=260°C, 10sec. (Pre treatment 30°C,70%,168hrs.) | JEITA ED-4701 300 301 | 2 times | 0/50 |
| Solderability (Reflow Soldering) | Tsld=245±5°C, 3sec. (Lead Free Solder) | JEITA ED-4701 300 303 | 1 time Over 95% | 0/50 |
| Thermal Shock | 0°C ~ 100°C 15sec. 15sec. . | JEITA ED-4701 300 307 | 20 cycles | 0/50 |
| Temperature Cycle | -40°C ~ 25°C ~ 100°C ~ 25°C 30min. 5min. 30min. 5min. | JEITA ED-4701 100 105 | 100 cycles | 0/50 |
| Moisture Resistance Cyclic | 25°C ~ 65°C ~ -10°C 90%RH 24HRS./1cycle | JEITA ED-4701 200 203 | 10 cycles | 0/50 |
| High Temperature Storage | Ta=100°C | JEITA ED-4701 200 201 | 1000 hrs. | 0/50 |
| Temperature Humidity Storage | Ta=60°C, RH=90% | JEITA ED-4701 100 103 | 1000 hrs. | 0/50 |
| Low Temperature Storage | Ta=-40°C | JEITA ED-4701 200 202 | 1000 hrs. | 0/50 |
| Steady State Operating Life Condition 1 | Ta=25°C, IF=20mA | | 1000 hrs. | 0/50 |
| Steady State Operating Life Condition 2 | Ta=25°C, IF=30mA | | 500 hrs. | 0/50 |
| Steady State Operating Life of High Temperature | Ta=85°C, IF=5mA | | 1000 hrs. | 0/50 |
| Steady State Operating Life of High Humidity Heat | 60°C, RH=90%, IF=15mA | | 500 hrs. | 0/50 |
| Steady State Operating Life of low Temperature | Ta=-30°C, IF=20mA | | 1000 hrs. | 0/50 |
| Vibration | 100~2000~100Hz Sweep 4 min. 200m/s ² 3 direction, 4 cycles | JEITA ED-4701 400 403 | 48 min. | 0/50 |
| Substrate Bending | 3 mm, 5±1 sec. | JEITA ED-4702 | 1 time | 0/50 |
| Stick | 5N, 10±1 sec. | JEITA ED-4702 | 1 time | 0/50 |

7.2 Criteria for Judging the Damage

| Item | Symbol | Test Conditions | Criteria for Judgment | |
|--------------------|--------|-----------------|-----------------------|----------------|
| | | | Min. | Max. |
| Forward Voltage | VF | IF=20mA | - | U.S.L.*) × 1.1 |
| Reverse Current | IR | VR=5V | - | U.S.L.*) × 2.0 |
| Luminous Intensity | IV | IF=20mA | U.S.L.**)) × 0.85 | - |

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?