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LED SMD



Lead-Free Parts

LG-020WK-DT-J-N12

DATA SHEET

DOC. NO : QW0905-LG-020WK-DT-J-N12

REV. : A

DATE : 18 - May - 2006

Features:

1. Side view white LED.
2. white SMT package.
3. Leadframe package with individual 2 pin.
4. Wide viewing angle.
5. Soldering methods: IR reflow soldering.
6. Feature of the device: more light due to higher optical efficiency; extremely wide viewing angle; ideal for backlighting and coupling in light guide.
7. ESD protection.
8. Pb free

Descriptions:

The LG-020 SMD has wide viewing angle, low power consumption and white LEDs are devices which are materialized by combining blue LEDs and special phosphors. This feature makes the LED ideal for light guide application.

Applications:

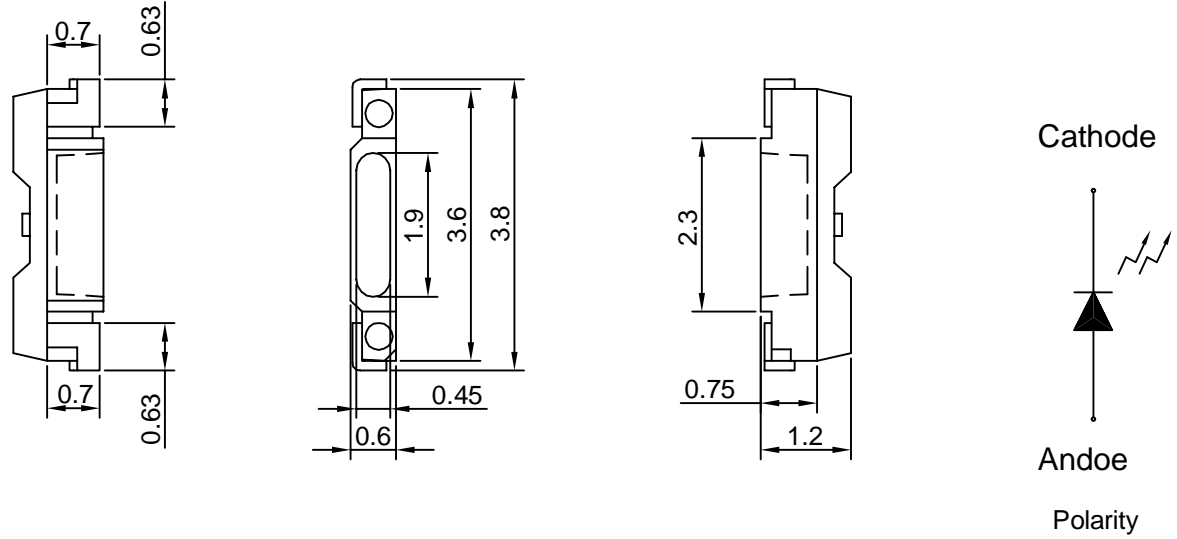
1. LCD back light.
2. Mobile phones.
3. Indicators.
4. Switch lights.

Device Selection Guide:

| PART NO | MATERIAL | COLOR | |
|-------------------|-----------|---------|-----------------|
| | | Emitted | Lens |
| LG-020WK-DT-J-N12 | InGaN/GaN | White | Yellow Diffused |

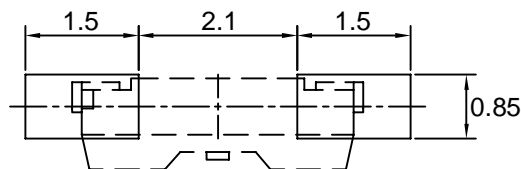


Package Dimensions



Note : 1.All dimension are in millimeter tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.
2.Specifications are subject to change without notice.

Recommended Soldering Pad Dimensions



Note : The tolerances unless mentioned is $\pm 0.1\text{mm}$, Angle ± 0.5 . Unit=mm.

**Absolute Maximum Ratings at Ta=25**

| Parameter | Symbol | Ratings | UNIT |
|---|--------|-----------------------|------|
| Power Dissipation | PD | 80 | mW |
| Peak Forward Current Duty 1/10@10KHz | IFP | 100 | mA |
| Forward Current | IF | 20 | mA |
| Reverse Current @5V | Ir | 50 | μ A |
| Electrostatic Discharge | ESD | ± 2000 | V |
| Operating Temperature | Topr | -40 ~ +85 | |
| Storage Temperature | Tstg | -40 ~ +90 | |
| Soldering Temperature | Tsol | Max 260 for 5 sec Max | |

Typical Electrical & Optical Characteristics (Ta=25)

| Items | Symbol | Min. | Typ. | Max. | Unit | Condition |
|--------------------------|----------------|------|------|------|------|-----------|
| Chromaticity Coordinates | CIE_x | ---- | 0.3 | ---- | ---- | IF=20mA |
| | CIE_y | ---- | 0.29 | ---- | ---- | |
| Luminous Intensity | Iv | 960 | 1200 | ---- | mcd | IF=20mA |
| Forward Voltage | V _F | ---- | 3.3 | ---- | V | IF=20mA |
| Viewing Angle | 2 1/2 | ---- | 110 | ---- | deg | IF=20mA |

Note : 1.The forward voltage data did not including ±0.1V testing tolerance.
2. The luminous intensity data did not including ±10% testing tolerance.



Luminous Intensity Classification (at 20mA)

| BIN CODE | Iv(mvd) | |
|----------|---------|------|
| | Min. | Max. |
| V-2 | 960 | 1160 |
| W-1 | 1160 | 1400 |

Forward Voltage Classification (at 20mA)

| BIN CODE | Vf(v) | |
|----------|-------|------|
| | Min. | Max. |
| 1 | 2.8 | 3.0 |
| 2 | 3.0 | 3.2 |
| 3 | 3.2 | 3.4 |
| 4 | 3.4 | 3.6 |



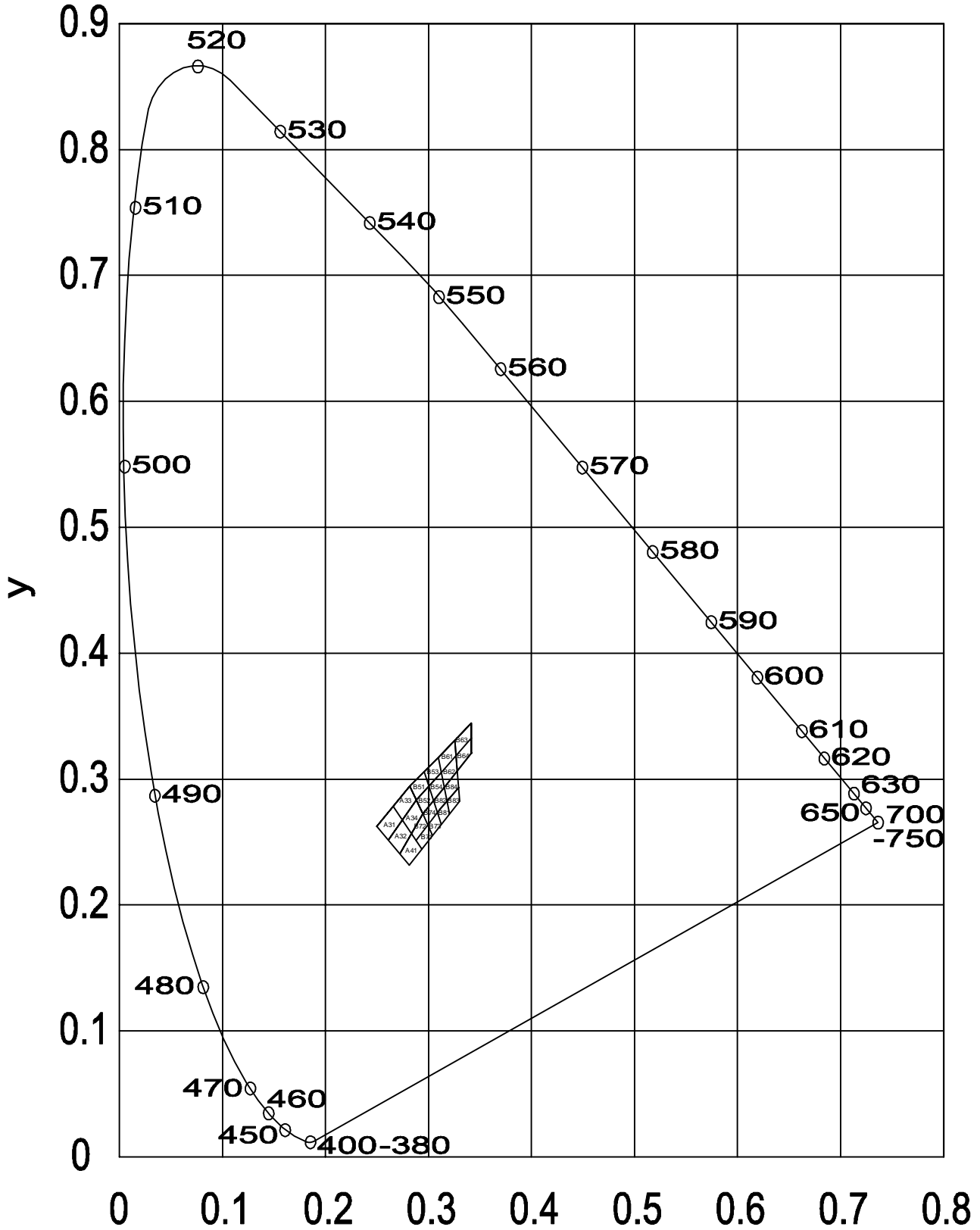
Chromaticity Coordinates Specifications For Bin Grading

| CIE BLOCK | | | Coordinate | | | | |
|-----------|-----|-----|------------|--------|-------|-------|-------|
| | | | LEFT | BOTTOM | RIGHT | TOP | |
| N1 | A31 | x | 0.264 | 0.272 | 0.282 | 0.276 | |
| | | y | 0.267 | 0.258 | 0.272 | 0.281 | |
| | A33 | x | 0.276 | 0.282 | 0.292 | 0.287 | |
| | | y | 0.281 | 0.272 | 0.286 | 0.295 | |
| | B51 | x | 0.287 | 0.292 | 0.3 | 0.297 | |
| | | y | 0.295 | 0.286 | 0.295 | 0.305 | |
| | B53 | x | 0.297 | 0.3 | 0.309 | 0.307 | |
| | | y | 0.305 | 0.295 | 0.305 | 0.315 | |
| | B61 | x | 0.307 | 0.309 | 0.319 | 0.319 | |
| | | y | 0.315 | 0.305 | 0.316 | 0.327 | |
| | B63 | x | 0.319 | 0.319 | 0.33 | 0.33 | |
| | | y | 0.327 | 0.316 | 0.329 | 0.339 | |
| | N1 | A32 | x | 0.272 | 0.28 | 0.288 | 0.282 |
| | | | y | 0.258 | 0.248 | 0.262 | 0.272 |
| A34 | | x | 0.282 | 0.288 | 0.296 | 0.292 | |
| | | y | 0.272 | 0.262 | 0.276 | 0.286 | |
| B52 | | x | 0.292 | 0.296 | 0.304 | 0.3 | |
| | | y | 0.286 | 0.276 | 0.285 | 0.295 | |
| B54 | | x | 0.3 | 0.304 | 0.311 | 0.309 | |
| | | y | 0.295 | 0.285 | 0.294 | 0.305 | |
| B62 | | x | 0.309 | 0.311 | 0.32 | 0.319 | |
| | | y | 0.305 | 0.294 | 0.305 | 0.316 | |
| B64 | | x | 0.319 | 0.32 | 0.33 | 0.33 | |
| | | y | 0.316 | 0.305 | 0.318 | 0.329 | |

| CIE BLOCK | | | Coordinate | | | | |
|-----------|-----|-----|------------|--------|-------|-------|-------|
| | | | LEFT | BOTTOM | RIGHT | TOP | |
| N2 | B72 | x | 0.288 | 0.291 | 0.3 | 0.296 | |
| | | y | 0.262 | 0.257 | 0.268 | 0.276 | |
| | B74 | x | 0.296 | 0.3 | 0.306 | 0.304 | |
| | | y | 0.276 | 0.268 | 0.277 | 0.285 | |
| | B82 | x | 0.304 | 0.306 | 0.313 | 0.311 | |
| | | y | 0.285 | 0.277 | 0.285 | 0.294 | |
| | B84 | x | 0.311 | 0.313 | 0.321 | 0.32 | |
| | | y | 0.294 | 0.285 | 0.294 | 0.305 | |
| | N2 | A41 | x | 0.28 | 0.287 | 0.295 | 0.288 |
| | | | y | 0.248 | 0.24 | 0.251 | 0.262 |
| | | B71 | x | 0.291 | 0.295 | 0.303 | 0.3 |
| | | | y | 0.257 | 0.251 | 0.261 | 0.268 |
| B73 | | x | 0.3 | 0.303 | 0.309 | 0.306 | |
| | | y | 0.268 | 0.261 | 0.268 | 0.277 | |
| B81 | | x | 0.306 | 0.309 | 0.315 | 0.313 | |
| | | y | 0.277 | 0.268 | 0.276 | 0.285 | |
| B83 | | x | 0.313 | 0.315 | 0.322 | 0.321 | |
| | | y | 0.285 | 0.276 | 0.285 | 0.294 | |



CIE Chromaticity Diagram



Notes:

X

1.Tolerance of CIE Chromaticity coordinate(x,y) ±0.003.

Typical Electro-Optical Characteristics Curve

WK CHIP

Fig.1 Forward current vs. Forward Voltage

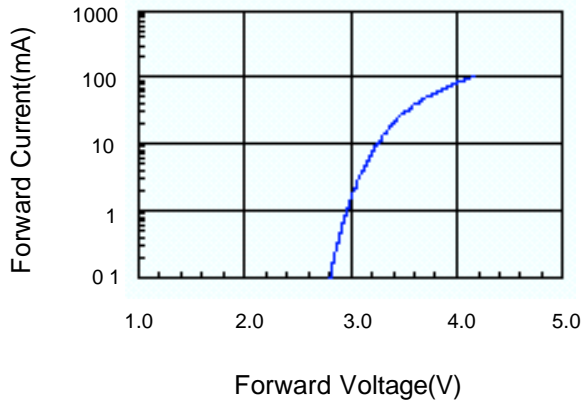


Fig.2 Relative Intensity vs. Forward Current

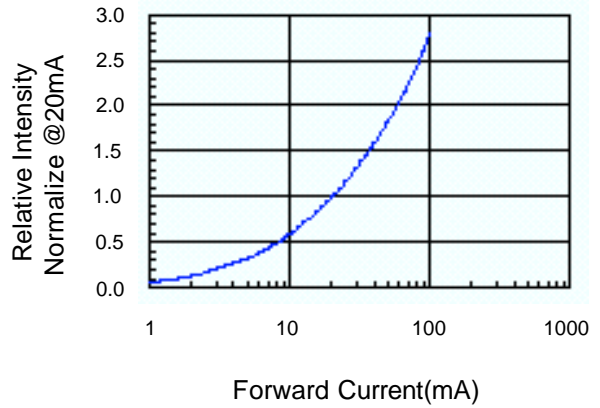


Fig.3 Forward Voltage vs. Temperature

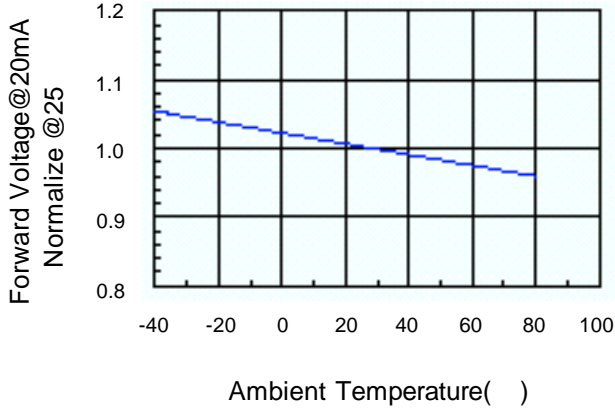


Fig.4 Relative Intensity vs. Temperature

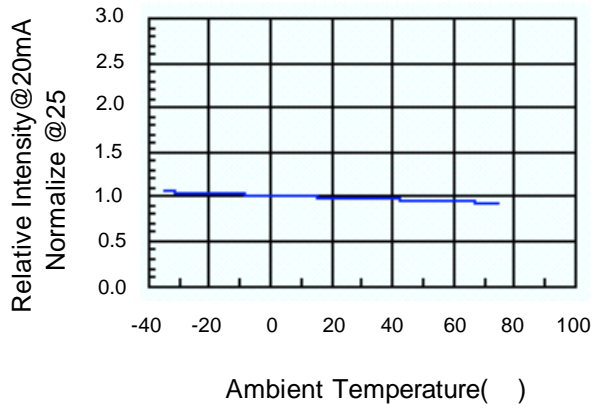
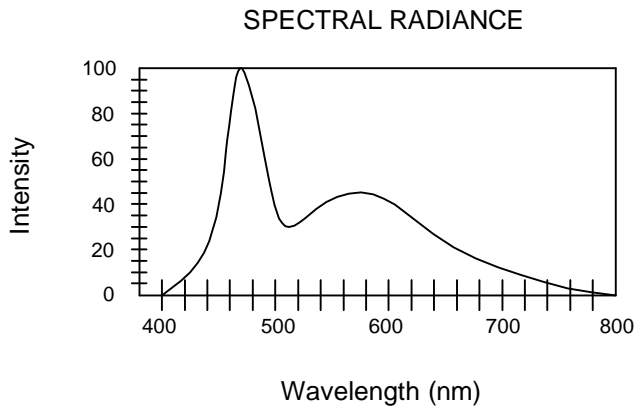


Fig.5 Luminous Spectrum (Ta=25 °C)







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Label Explanation

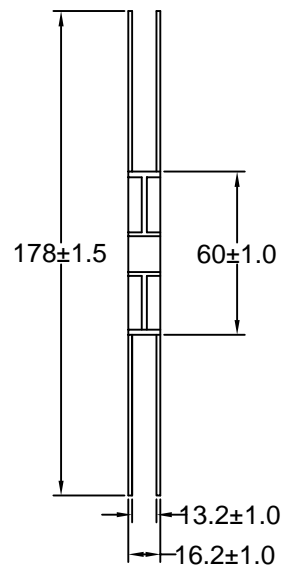
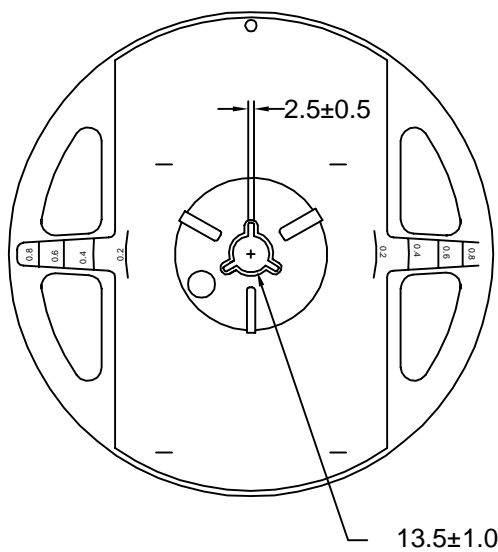
| | | |
|---|--------------|---|
|  立碁電子工業股份有限公司 LIGITEK ELECTRONICS CO., LTD. | |  |
| PART NO. : LG-020WK-DT-J-N12 | | |
| LOT NO. : 93000499 | | |
| Q'TY(PCS) : 5000 PCS | | |
| BIN/HUE : W-1 / B52 | Vf:3.0 - 3.2 | |

BIN : Luminous Intensity

HUE : Chromaticity Coordinates
(CIE_x , CIE_y)

3.0 - 3.2 : Forward Voltage

Reel Dimensions





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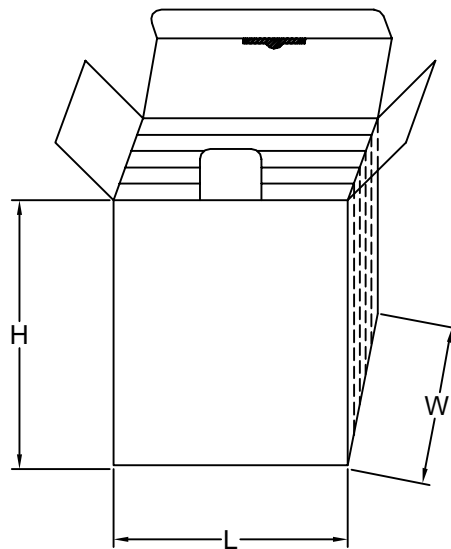
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PART NO. LG-008WK-DT-J-N12

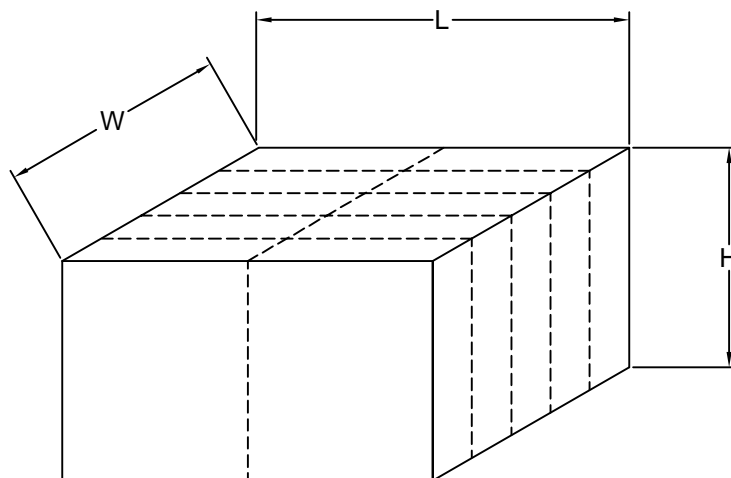
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Box Explanation

1. 5 BAG / INNER BOX
2. INNER BOX SIZE : L X W X H 23cm X 8.5cm x 26cm



3. 10 INNER BOXES / CARTON
4. CARTON SIZE : L X W X H 49cm X 46cm x 29cm

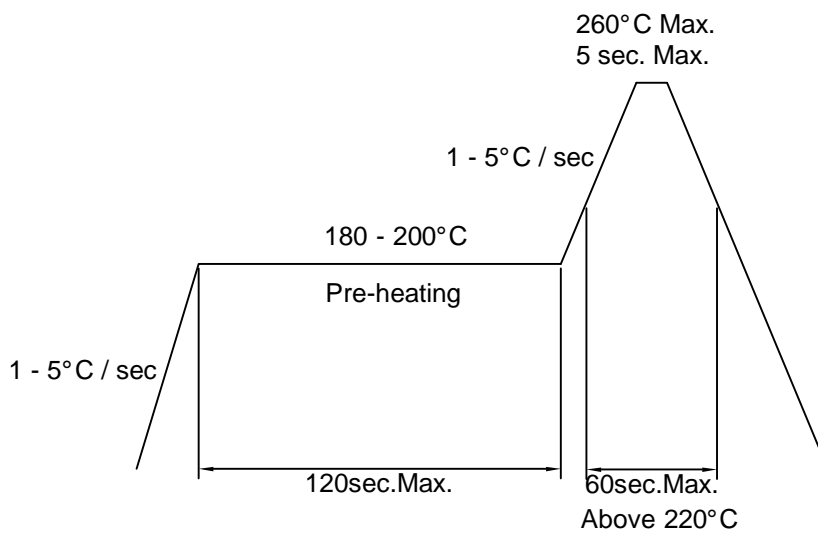




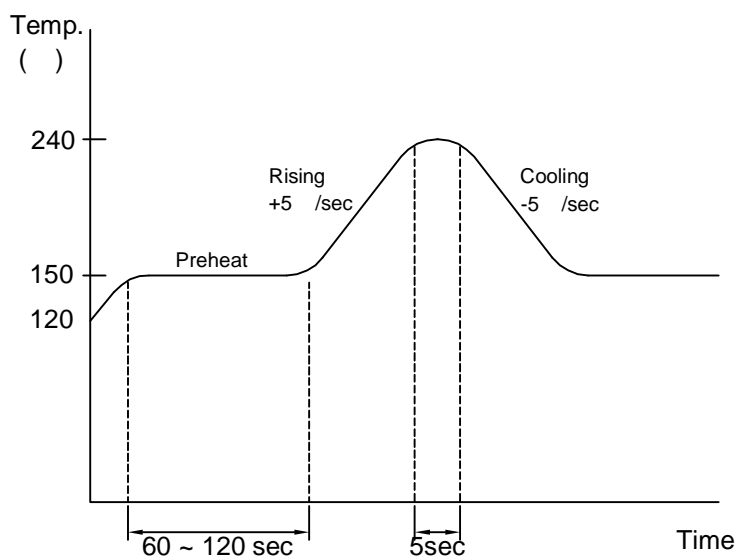
Soldering Iron:

Basic spec is 5 seconds when 260 .
Power dissipation of iron should be smaller than 25W, and temperature should be controllable.
Surface temperature of the device should be under 280 for 3 seconds.

Reflow Temp/Time(Pb-free)



Reflow Temp/Time(Lead solder)



Note:

- 1.Reflow soldering should not be done more than two times.
- 2.When soldering,do not put stress on the LEDs during heating.
- 3.After soldering,do not warp the circuit board.



Precautions For Use:

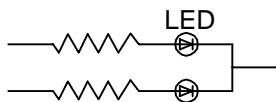
Storage time:

- 1.The operation of Temperatures and RH are : 5 ~35 ,RH60%.
- 2.Once the package is opened, the products should be used within a week.
Otherwise, they should be kept in a damp proof box with desiccating agent.
Considering the tape life, we suggest our customers to use our products within a year(from production date).
- 3.If opened more than one week in an atmosphere 5 ~ 35 ,RH60%,
they should be treated at 60 ±5 for 15hrs.

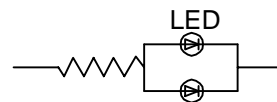
Drive Method:

LED is a current operated device, and therefore, requires some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED.
Consider worst case voltage variations than 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 LED could be found due to the VF-IF characteristics of LED.

Cleaning:

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

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.



Reliability Test:

(1)Test items and results

| Classification | Test Item | Test Condition | Sample Size |
|--------------------|---|--|-------------|
| Endurance Test | Operating Life Test | 1.Ta=Under Room Temperature As Per Data Sheet Maximum Rating. 2.If=20mA 3.t=1000 hrs | 22 |
| | High Temperature Storage Test | 1.Ta=105 ±5 2.t=500 hrs | 22 |
| | Low Temperature Storage Test | 1.Ta=-40 ±5 2.t=1000 hrs | 22 |
| | High Temperature High Humidity Storage Test | 1.IR-Reflow In-Board, 2 Times 2.Ta=85 ±5 3.RH=90%~95% 4.t=500hrs±2hrs | 22 |
| Environmental Test | Thermal Shock Test | 1.IR-Reflow In-Board,2 times 2.Ta=105 ±5 & -40 ±5 (30min) (30min) 3.total 100 cycles | 22 |
| | Reflow Soldering Test | 1.T.Sol=260 ±5 2.Dwell Time= 10 Max. | 22 |
| | Temperature Cycling | 1.105 ~ 25 ~ -40 30mins 15mins 30mins 2.100 Cyeles | 22 |

(2)Criteria for judging the damage

| Item | Symbol | Test Conditions | Criteria for Judgement | |
|--------------------|--------|-----------------|------------------------|------------|
| | | | Min. | Max. |
| Forward Voltage | Vf | If=20mA | - | U.S.L x1.2 |
| Reverse Current | Ir | Vr=5V | - | U.S.L x2.0 |
| Luminous Intensity | Iv | If=20mA | L.S.L x 0.5 | - |

Note:

- 1.U.S.L.:Upper Standard Level.
- 2.L.S.L.:Lower Standard Level.