

*Customer:

SPECIFICATION

| | |
|--------------|------------------------|
| ITEM | TOP LED DEVICE |
| MODEL | SSC-PHBMGSRT722 |

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1. Features

- Pb-free Reflow Soldering application
- RoHS Compliant
- Material : InGaN(Blue) / InGaN(Green) / AlGaInP(Red)
- 6-Pin (R,G,B separate) type
- Suitable for all SMT assembly methods ; Suitable for all soldering methods
- White colored SMT package and colorless clear window
- Encapsulating Resin : Epoxy Resin

2. Application

- Indoor and outdoor displays
- LCD Backlights etc.
- R G B – displays
- Automotive
- Signage and Channel letter
- Indicator

3. Absolute Maximum Ratings ^{*1}

($T_a=25^{\circ}\text{C}$)

| Parameter | Symbol | Value | | | Unit |
|--|-----------|-------------------|-------------------|-------------------|------|
| | | Red | Green | Blue | |
| Forward Current | I_F | 30 | 30 | 30 | mA |
| Forward Peak Surge Current ^{*2} | I_{FM} | 100 | 100 | 100 | mA |
| Reverse Voltage (per die) | V_R | 5 | | | V |
| Power Dissipation | P_d | 81 ^{*3} | 120 ^{*3} | 114 ^{*3} | mW |
| | | 263 ^{*4} | | | |
| Operating Temperature | T_{opr} | -40 ~ +100 | | | °C |
| Storage Temperature | T_{stg} | -40 ~ +100 | | | °C |

^{*1} Care is to be taken that power dissipation does not exceed the absolute maximum rating of the product.

^{*2} I_{FM} was measured at $T_W \leq 0.1$ msec of pulse width and $D \leq 1/10$ of duty ratio.

^{*3} The value for one LED device.(Single color)

^{*4} The value for total power dissipation when two and more devices are lit simultaneously.

4. Electro-Optical Characteristics

($T_a=25^\circ\text{C}$)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|------------------------|---------|--------------------------------|-----|-----|-----|---------------|
| Forward Voltage | Red | $I_F=20\text{mA}$ | 1.6 | 2.2 | 2.5 | V |
| | Green | | 2.8 | 3.3 | 4.0 | |
| | Blue | | 2.8 | 3.3 | 3.8 | |
| Reverse Current | Red | $V_R=5\text{V}$ (per die) | - | - | 10 | μA |
| | Green | | - | - | 10 | |
| | Blue | | - | - | 10 | |
| Luminance Intensity *1 | Red | $I_F=20\text{mA}$ | 100 | 200 | - | mcd |
| | Green | | 400 | 800 | - | |
| | Blue | | 100 | 195 | - | |
| Peak Wavelength | Red | $I_F=20\text{mA}$ | - | 634 | - | nm |
| | Green | | - | 520 | - | |
| | Blue | | - | 459 | - | |
| Dominant Wavelength | Red | $I_F=20\text{mA}$ | 617 | 625 | 631 | nm |
| | Green | | 519 | 527 | 537 | |
| | Blue | | 464 | 470 | 477 | |
| Spectral Bandwidth | Red | $I_F=20\text{mA}$ | - | 20 | - | nm |
| | Green | | - | 35 | - | |
| | Blue | | - | 26 | - | |
| Viewing Angle *2 | R, G, B | $I_F=20\text{mA}$ (per die) | - | 120 | - | deg. |

*1 The luminous intensity I_V was measured at the peak of the spatial pattern which may not be aligned with the mechanical axis of the LED package.
Luminous Intensity Measurement allowance is $\pm 10\%$

*2 $2\theta_{1/2}$ is the off-axis where the luminous intensity is 1/2 of the peak intensity.

[Note] All measurements were made under the standardized environment of SSC.

5. Rank of PHBMGSRT722

1) Special binning (White balance)

| | | | | |
|----------------|----------------|----------------|----------------|----------------|
| X ₁ | X ₂ | X ₃ | X ₄ | X ₅ |
| Iv | Iv | λd | W-Color Rank | |

2) General binning (RGB balance binning)

| | | |
|----------------|----------------|----------------|
| X ₁ | X ₂ | X ₃ |
| Iv | Iv | λd |

▣ Luminous Intensity [Iv]

| Rank Name | R | | Rank Name | G | | Rank Name | B | | Rank Name | Total Iv | |
|-----------|-----|-----|-----------|-----|------|-----------|-----|-----|-----------|----------|------|
| | MIN | MAX | | MIN | MAX | | MIN | MAX | | MIN | MAX |
| N | 100 | 140 | N | 400 | 590 | N | 100 | 150 | TN | 600 | 880 |
| O | 140 | 210 | O | 590 | 820 | O | 150 | 210 | TO | 880 | 1240 |
| P | 210 | 300 | P | 820 | 1200 | P | 210 | 290 | TP | 1240 | 1790 |

| Mix Rank Name | R | G | B |
|---------------|---|---|---|
| NN | N | N | N |
| OO | O | O | O |
| PP | P | P | P |
| NO | O | N | N |
| | N | O | N |
| | N | N | O |
| ON | N | O | O |
| | O | N | O |
| | O | O | N |
| OP | P | O | O |
| | O | P | O |
| | O | O | P |
| PO | O | P | P |
| | P | O | P |
| | P | P | O |

| Mix Rank Name | R | G | B |
|---------------|---|---|---|
| NP | P | N | N |
| | N | P | N |
| | N | N | P |
| PN | N | P | P |
| | P | N | P |
| | P | P | N |
| XX | N | O | P |
| | P | N | O |
| | O | P | N |

▣ Dominant Wavelength [λd]

| Rank Name | R | | G | | B | |
|-----------|-----|-----|-----|-----|-------|-----|
| | MIN | MAX | MIN | MAX | MIN | MAX |
| A | 617 | 631 | 520 | 527 | 467.5 | 472 |
| B | 617 | 631 | 530 | 537 | 472.5 | 477 |
| C | 617 | 631 | 520 | 537 | 465 | 477 |

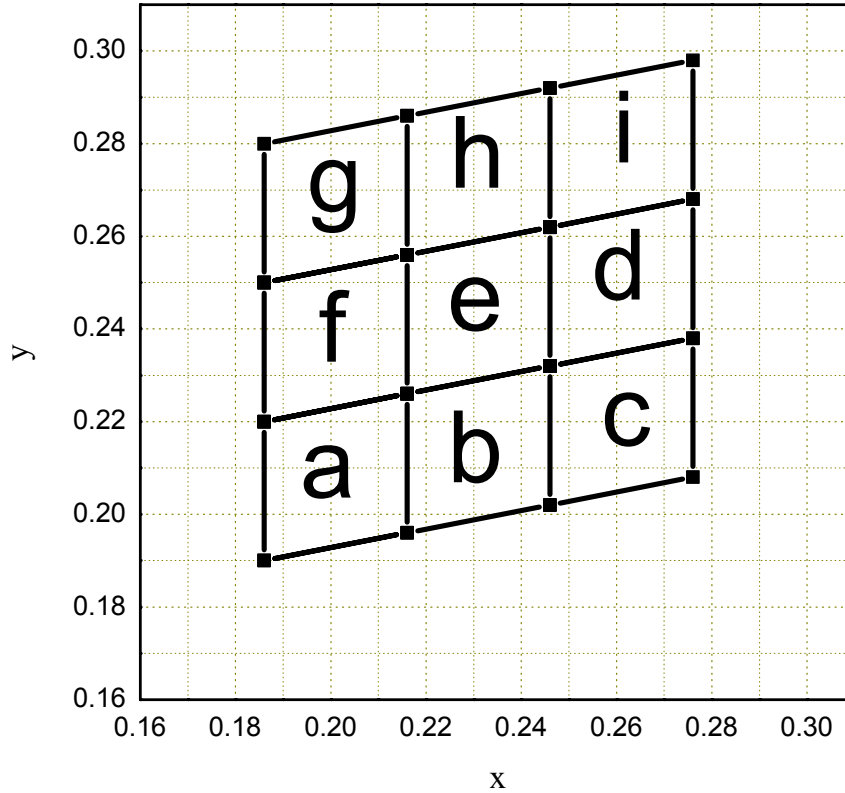
▣ Forward Voltage

| R | | G | | B | |
|-----|-----|-----|-----|-----|-----|
| MIN | MAX | MIN | MAX | MIN | MAX |
| 1.6 | 2.5 | 2.8 | 4.0 | 2.8 | 3.9 |

6. White balance Color Rank

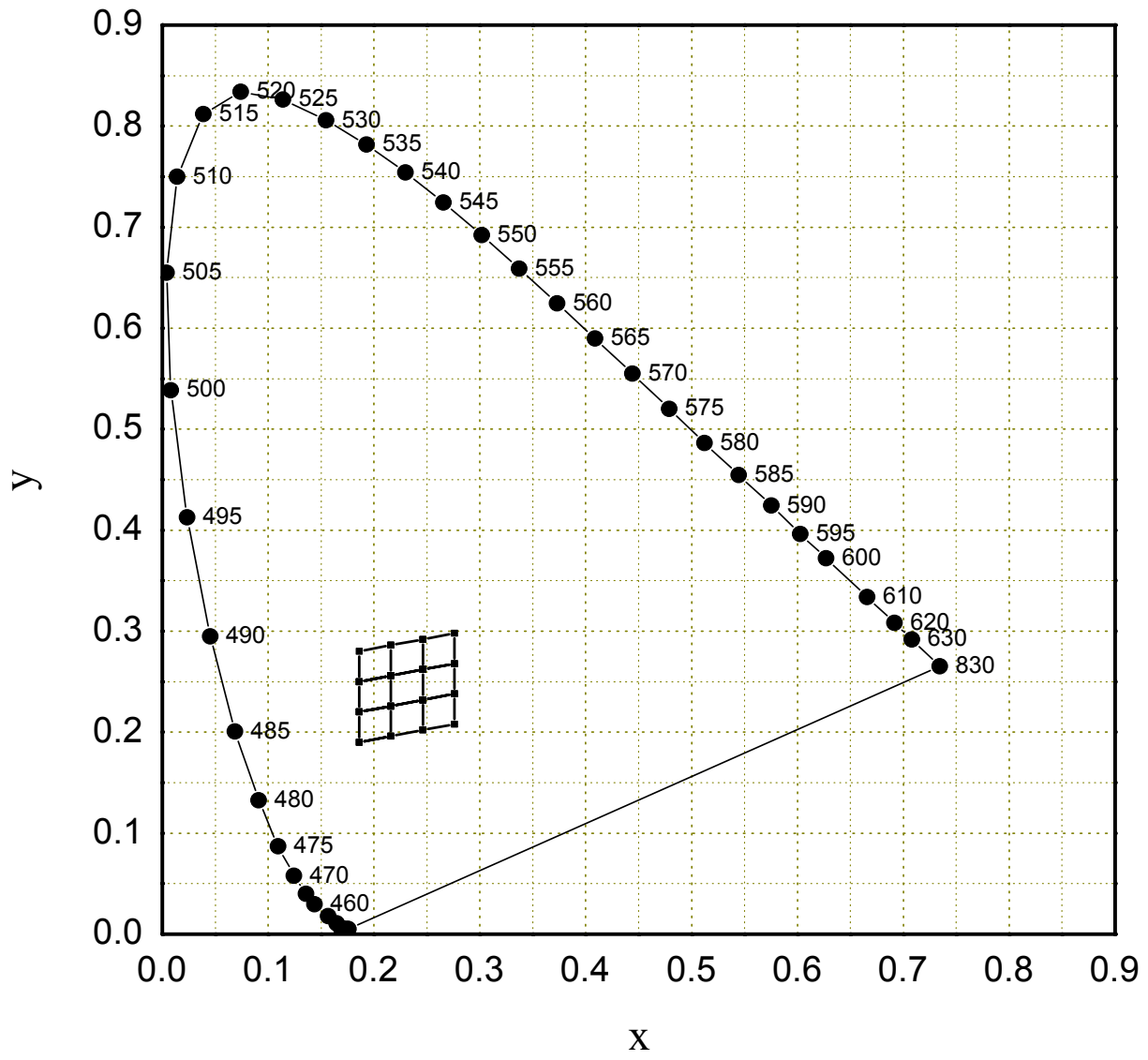
◆ Default Group (Select Group) : Bluish White

- Color Coordinates (typ.): x 0.231 , y 0.244
- IF Condition = 16mA for Red / 16mA for Green / 16mA for Blue
- Color Rank : a, b, c, d, e, f, g, h, i (9 BIN)
- *1Bin Cell Size : x0.03, y0.036
- *9Bin Total Cell Size : x0.09, y0.108



| a | | b | | c | | d | | e | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| x | y | x | y | x | y | x | y | x | y |
| 0.186 | 0.190 | 0.216 | 0.196 | 0.246 | 0.202 | 0.246 | 0.232 | 0.216 | 0.226 |
| 0.216 | 0.196 | 0.246 | 0.202 | 0.276 | 0.208 | 0.276 | 0.238 | 0.246 | 0.232 |
| 0.216 | 0.226 | 0.246 | 0.232 | 0.276 | 0.238 | 0.276 | 0.268 | 0.246 | 0.262 |
| 0.186 | 0.220 | 0.216 | 0.226 | 0.246 | 0.232 | 0.246 | 0.262 | 0.216 | 0.256 |

| f | | g | | h | | i | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| x | y | x | y | x | y | x | y |
| 0.186 | 0.220 | 0.186 | 0.250 | 0.216 | 0.256 | 0.246 | 0.262 |
| 0.216 | 0.226 | 0.216 | 0.256 | 0.246 | 0.262 | 0.276 | 0.268 |
| 0.216 | 0.256 | 0.216 | 0.286 | 0.246 | 0.292 | 0.276 | 0.298 |
| 0.186 | 0.250 | 0.186 | 0.280 | 0.216 | 0.286 | 0.246 | 0.292 |



7. Rank Name Table

1) Special binning (White balance)

| | | | |
|--------|--------|-----------------|--------------|
| X_1 | X_2 | X_3 | X_4 |
| Mix Iv | Mix Iv | Mix λ d | W-Color Rank |

| Label Name | Rank Name | Label Name | Rank Name | Label Name | Rank Name |
|------------|-----------|------------|-----------|------------|-----------|
| 1 | TNCa | 10 | TOCa | 19 | TPCa |
| 2 | TNCb | 11 | TOCb | 20 | TPCb |
| 3 | TNCc | 12 | TOCc | 21 | TPCc |
| 4 | TNCd | 13 | TOCd | 22 | TPCd |
| 5 | TNCe | 14 | TOCe | 23 | TPCe |
| 6 | TNCf | 15 | TOCf | 24 | TPCf |
| 7 | TNCg | 16 | TOCg | 25 | TPCg |
| 8 | TNCh | 17 | TOCh | 26 | TPCh |
| 9 | TNCi | 18 | TOCi | 27 | TPCi |

2) General binning (RGB balance binning)

| | | |
|--------|--------|-----------------|
| X_1 | X_2 | X_3 |
| Mix Iv | Mix Iv | Mix λ d |

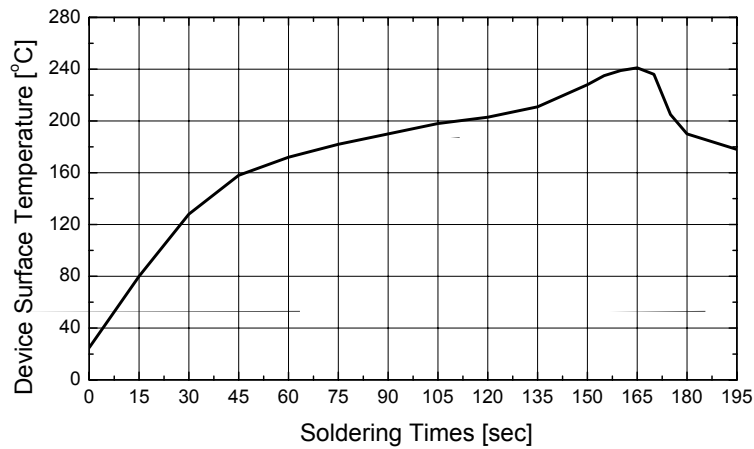
| Label Name | Rank Name | Label Name | Rank Name | Label Name | Rank Name |
|------------|-----------|------------|-----------|------------|-----------|
| 28 | NNA | 38 | NNB | 48 | NNC |
| 29 | OOA | 39 | OOB | 49 | OOC |
| 30 | PPA | 40 | PPB | 50 | PPC |
| 31 | NOA | 41 | NOB | 51 | NOC |
| 32 | ONA | 42 | ONB | 52 | ONC |
| 33 | OPA | 43 | OPB | 53 | OPC |
| 34 | POA | 44 | POB | 54 | POC |
| 35 | NPA | 45 | NPB | 55 | NPC |
| 36 | PNA | 46 | PNB | 56 | PNC |
| 37 | XXA | 47 | XXB | 57 | XXC |

8. Soldering Profile

(1) Reflow Soldering Conditions / Profile

~~Preliminary heat to be at maximum 210°C for maximum 2 minutes.~~

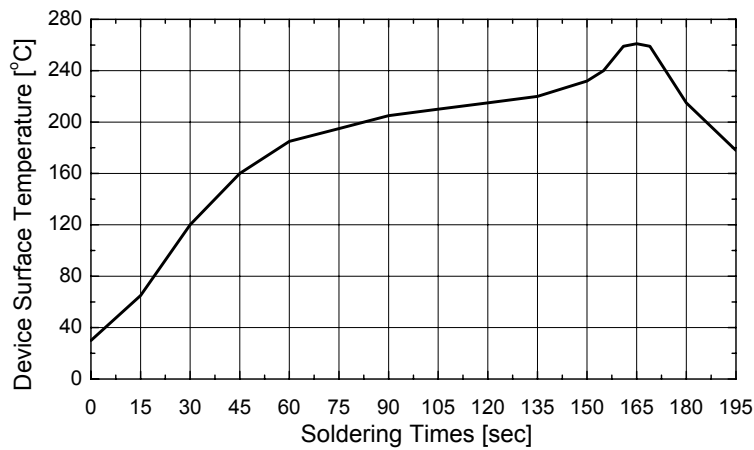
Soldering heat to be at maximum 240°C for maximum 10 seconds.



(2) Lead-free solder

Preliminary heating to be at maximum 220°C for maximum 2 minutes.

Soldering heat to be at maximum 260°C for maximum 10 seconds.

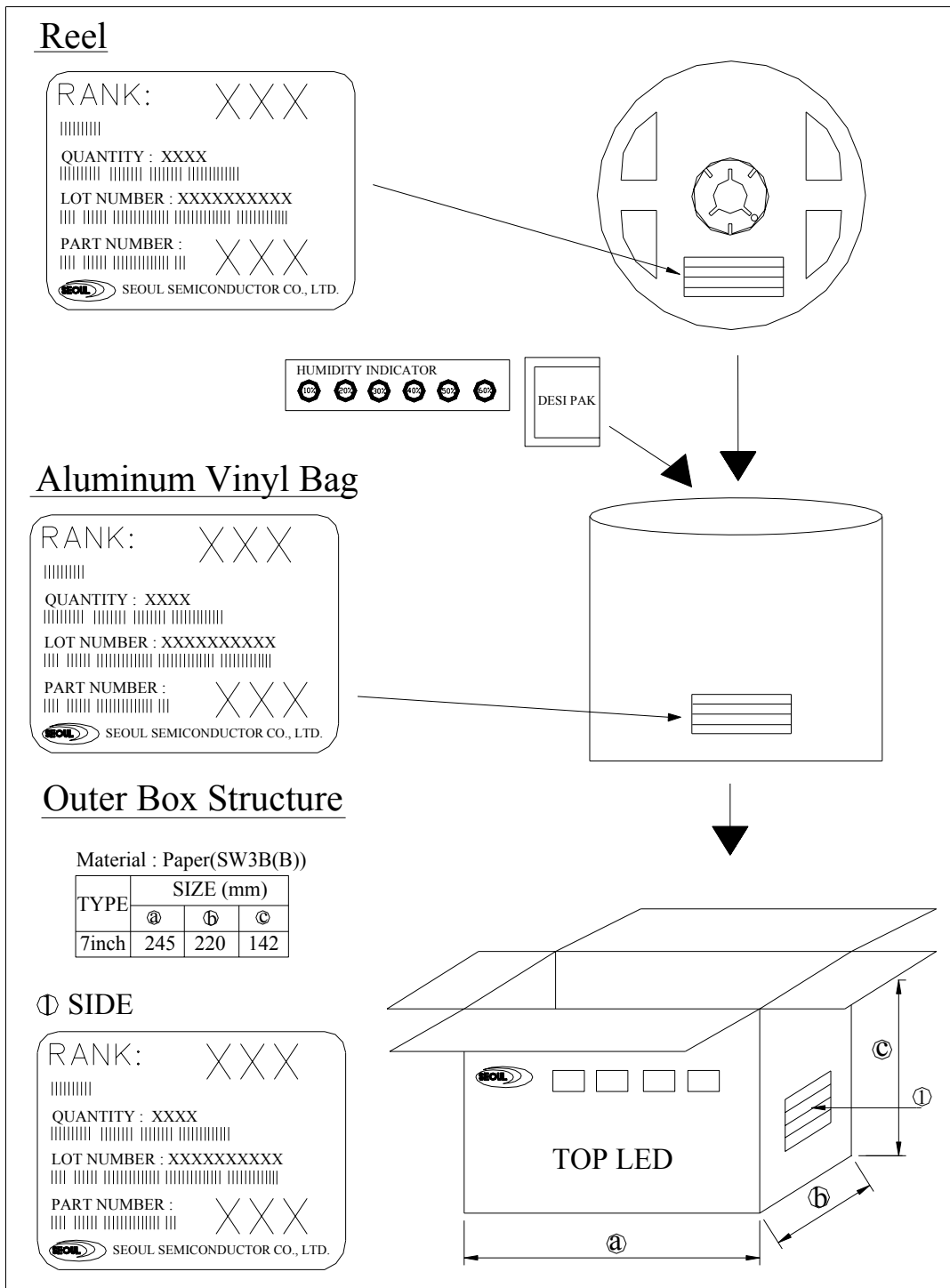


(3) Hand Soldering conditions

Do not exceed 3 seconds at maximum 300°C under soldering iron.

Note : In case that the soldered products are reused in soldering process, we don't guarantee the products

11. Reel Packing Structure



12. Precaution for use

(1) Storage

In order to avoid the absorption of moisture, it is recommended to store in a dry box (or a desiccator) with a desiccant. Otherwise, to store them in the following environment is recommended.

Temperature : 5°C ~30°C Humidity : maximum 65%RH

(2) Attention after open.

LED is correspond to SMD, when LED be soldered dip, interfacial separation may affect the light transmission efficiency, causing the light intensity to drop. Attention in followed;

a. After opened and mounted the soldering shall be quickly.

b. Keeping of a fraction

Temperature : 5 ~ 40°C Humidity : less than 30%

(3) In the case of more than 1 week passed after opening or change color of indicator on desiccant, components shall be dried 10-12hr. at 60±5°C.

(4) In the case of that the components is humided, the components shall be dried;

24Hr at 80±5°C or 12Hr at 100±5°C.

(5) Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temperature after soldering.

(6) Quick cooling shall be avoided.

(7) Components shall not be mounted on warped direction of PCB.

(8) Anti radioactive ray design is not considered for the products.

(9) This device should not be used in any type of fluid such as water, oil, organic solvent etc. When washing is required, IPA should be used.

(10) When the LEDs are illuminating, operating current should be decided after considering the ambient maximum temperature.

(11) LEDs must be stored to maintain a clean atmosphere. If the LEDs are stored for 3 months or more after being shipped from SSC, a sealed container with a nitrogen atmosphere should be used for storage.

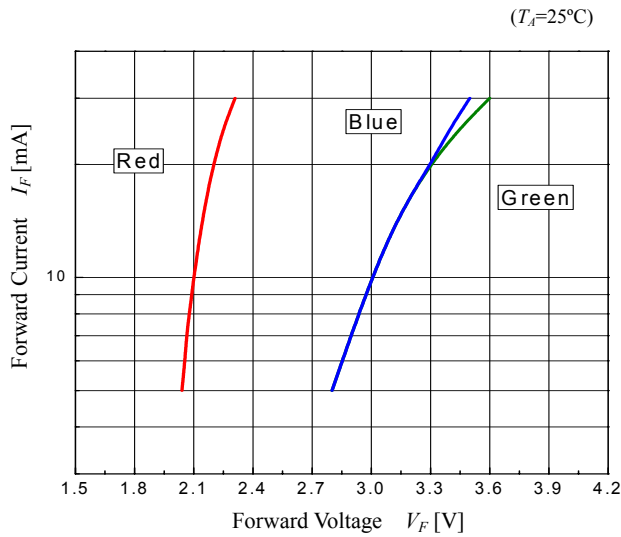
(12) The LEDs must be soldered within seven days after opening the moisture-proof packing.

(13) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.

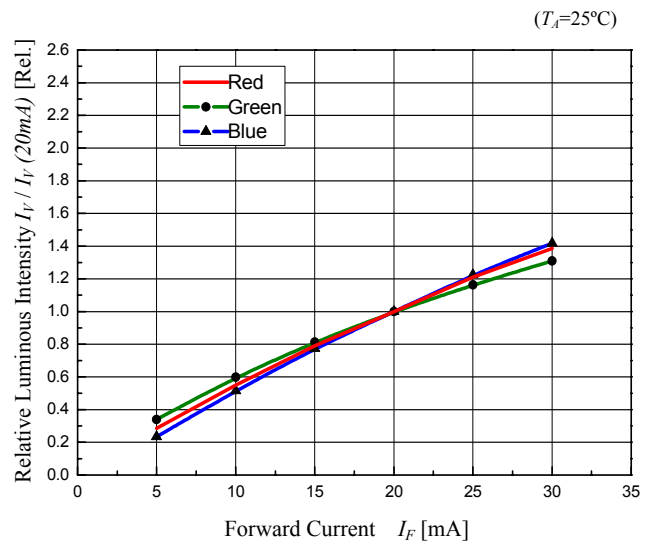
(14) The appearance and specifications of the product may be modified for improvement without notice.

13. Characteristic Diagram

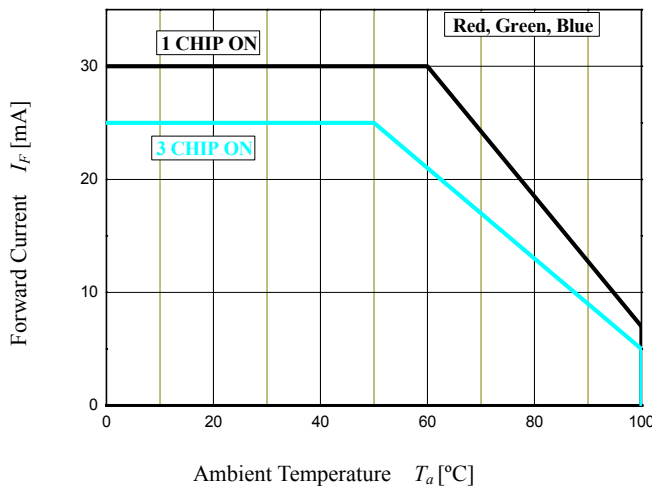
Forward Current vs. Forward Voltage



Relative Luminous Intensity vs. Forward Current



Forward Current Derating Curve



Radiation Diagram

