

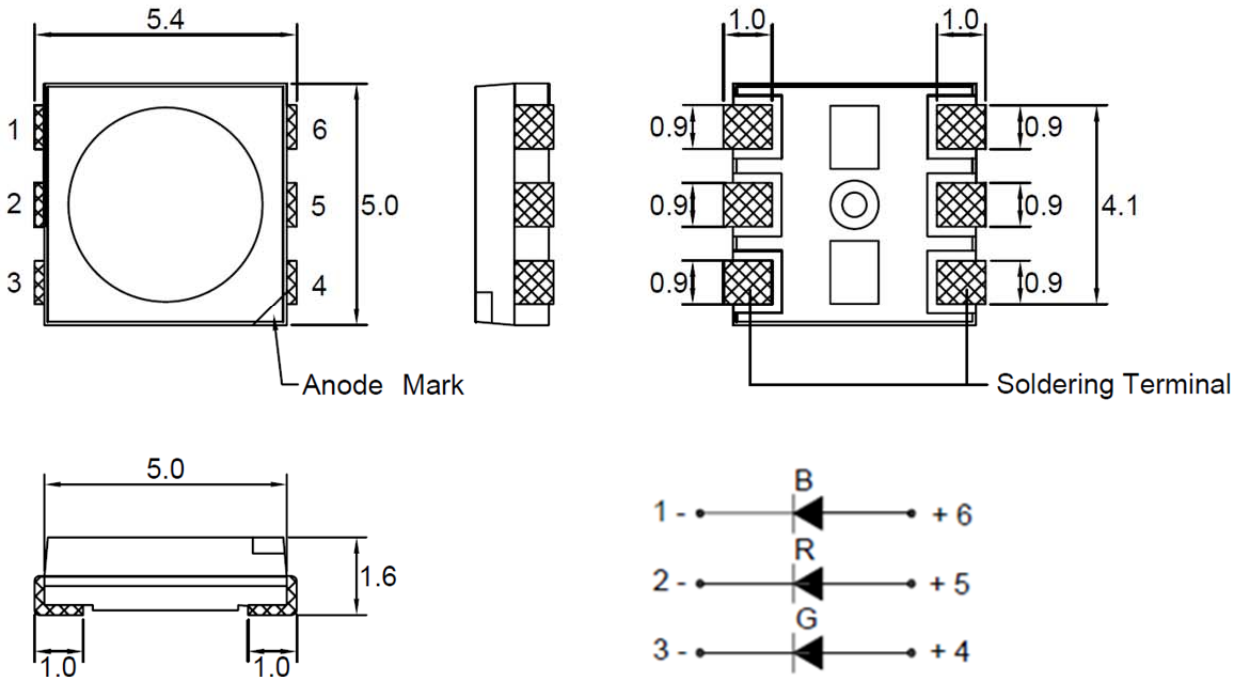


# American Opto Plus LED Corp.

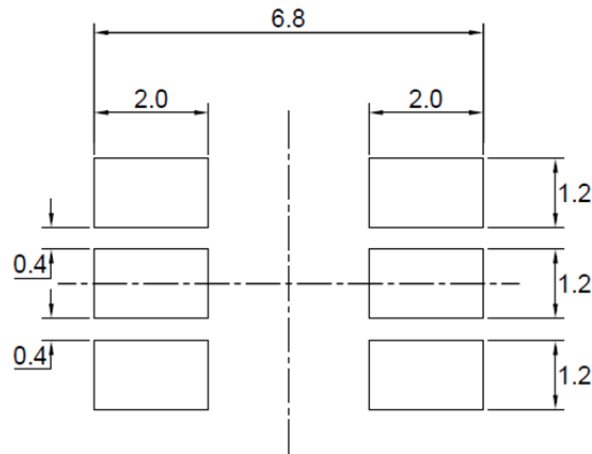
## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### PACKAGE SPECIFICATIONS



### RECOMMENDED SOLDER PATTERN



Notes:

1. All dimensions in mm.
2. Tolerance is  $\pm 0.2$  mm unless otherwise noted.

| Part No.       | Emission Color | Material | Lens        |
|----------------|----------------|----------|-------------|
| L950L-LBLEUPGC | Red            | AlGaInP  | Water Clear |
|                | Blue           | InGaN    |             |
|                | Pure Green     | InGaN    |             |



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| Parameter                           | Symbol           | Ratings    |     |     | Unit |
|-------------------------------------|------------------|------------|-----|-----|------|
|                                     |                  | R          | G   | B   |      |
| Forward Current                     | I <sub>F</sub>   | 50         | 30  | 30  | mA   |
| Peak Pulsed Current Duty 1/10@10KHz | I <sub>FP</sub>  | 90         | 100 | 100 | mA   |
| Power Dissipation                   | P <sub>D</sub>   | 130        | 108 | 108 | mW   |
| Reverse Current @ 5V                | I <sub>R</sub>   | 10         | 50  | 50  | μA   |
| Electrostatic Discharge             | ESD              | 2000       | 500 | 500 | V    |
| Operating temperature               | T <sub>OPR</sub> | -20 ~ +80  |     |     | °C   |
| Storage temperature                 | T <sub>STG</sub> | -30 ~ +100 |     |     | °C   |

### OPTICAL-ELECTRICAL CHARACTERISTICS

(Ta=25°C)

| Parameter                | Symbol            | Condition            | Min | Typ  | Max  | Unit |     |
|--------------------------|-------------------|----------------------|-----|------|------|------|-----|
| Luminous Intensity       | I <sub>v</sub>    | I <sub>F</sub> =20mA | R   | 500  | 800  | --   | mcd |
|                          |                   |                      | PG  | 1000 | 1600 |      |     |
|                          |                   |                      | B   | 200  | 400  |      |     |
| Dominant Wavelength      | λ <sub>D</sub>    |                      | R   | --   | 624  | --   | nm  |
|                          |                   |                      | PG  | --   | 525  |      |     |
|                          |                   |                      | B   | --   | 470  |      |     |
| Spectral Line Half-Width | Δλ                | R                    | --  | 20   | --   | nm   |     |
|                          |                   | PG                   | --  | 36   |      |      |     |
|                          |                   | B                    | --  | 30   |      |      |     |
| Forward Voltage          | V <sub>F</sub>    | R                    | 1.7 | --   | 2.6  | V    |     |
|                          |                   | PG                   | 2.8 | --   | 3.6  |      |     |
|                          |                   | B                    | 2.8 | --   | 3.6  |      |     |
| Viewing Angle            | 2θ <sub>1/2</sub> | All                  | --  | 120  | --   | deg  |     |

#### Notes:

1. Forward voltage tolerance: ±0.1V
2. Luminous intensity tolerance: ±15%



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### LUMINOUS INTENSITY CLASSIFICATION

| BIN CODE |     | lv(mcd) @ 20mA |      |
|----------|-----|----------------|------|
|          |     | Min            | Max  |
| Red      | U   | 500            | 800  |
|          | V-1 | 800            | 1000 |
|          | V-2 | 1000           | 1250 |

| BIN CODE   |     | lv(mcd) @ 20mA |      |
|------------|-----|----------------|------|
|            |     | Min            | Max  |
| Pure Green | V-2 | 1000           | 1250 |
|            | W-1 | 1250           | 1600 |
|            | W-2 | 1600           | 2000 |

| BIN CODE |   | lv(mcd) @ 20mA |     |
|----------|---|----------------|-----|
|          |   | Min            | Max |
| Blue     | S | 200            | 320 |
|          | T | 320            | 500 |
|          | U | 500            | 800 |



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### DOMINANT WAVELENGTH CLASSIFICATION

| BIN CODE |    | $\lambda_D(\text{nm}) @ 20\text{mA}$ |     |
|----------|----|--------------------------------------|-----|
|          |    | Min                                  | Max |
| Red      | 27 | 618                                  | 621 |
|          | 28 | 621                                  | 624 |
|          | 29 | 624                                  | 627 |
|          | 30 | 627                                  | 630 |

| BIN CODE   |    | $\lambda_D(\text{nm}) @ 20\text{mA}$ |     |
|------------|----|--------------------------------------|-----|
|            |    | Min                                  | Max |
| Pure Green | 1O | 519                                  | 522 |
|            | 1P | 522                                  | 525 |
|            | 1Q | 525                                  | 528 |
|            | 1R | 528                                  | 531 |

| BIN CODE |    | $\lambda_D(\text{nm}) @ 20\text{mA}$ |     |
|----------|----|--------------------------------------|-----|
|          |    | Min                                  | Max |
| Blue     | 0E | 462                                  | 465 |
|          | 0D | 465                                  | 468 |
|          | 0C | 468                                  | 471 |



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### TYPICAL ELECTRICAL-OPTICAL CHARACTERISTIC CURVES (RED)

Fig.1 Forward current vs. Forward Voltage

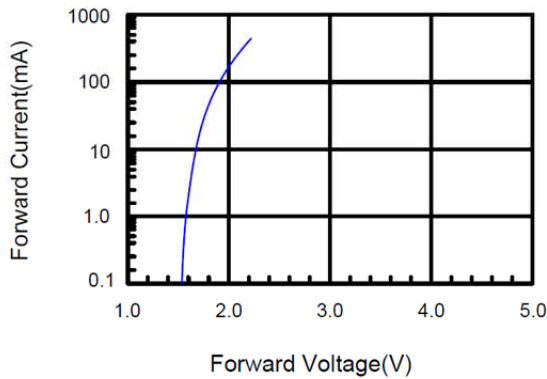


Fig.2 Relative Intensity vs. Forward Current

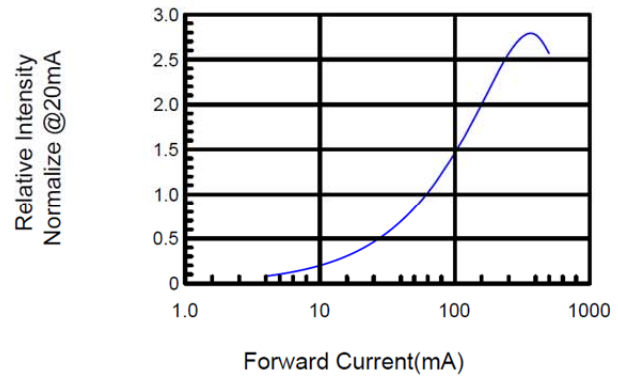


Fig.3 Forward Voltage vs. Temperature

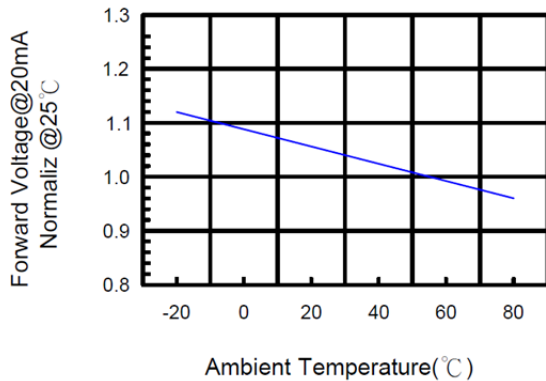


Fig.4 Relative Intensity vs. Temperature

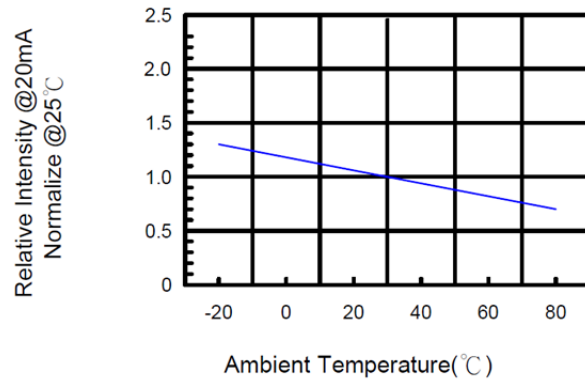


Fig.5 Relative Intensity vs. Wavelength

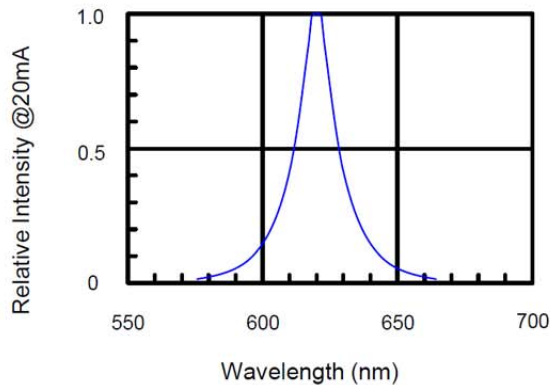
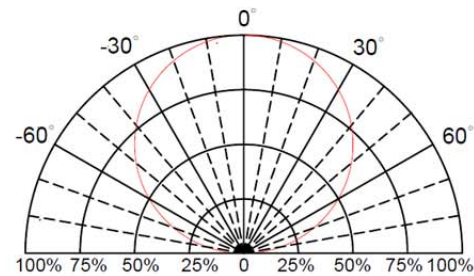


Fig.6 Directive Radiation





# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### TYPICAL ELECTRICAL-OPTICAL CHARACTERISTIC CURVES (PURE GREEN)

Fig.1 Forward current vs. Forward Voltage

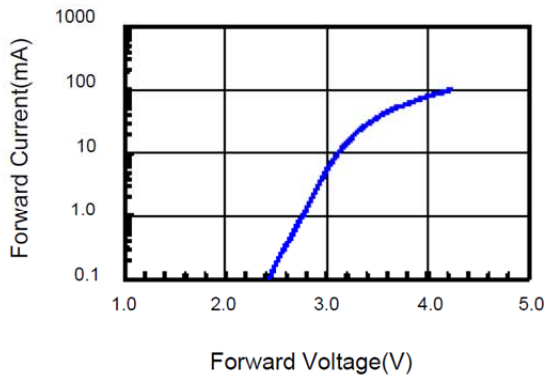


Fig.2 Relative Intensity vs. Forward Current

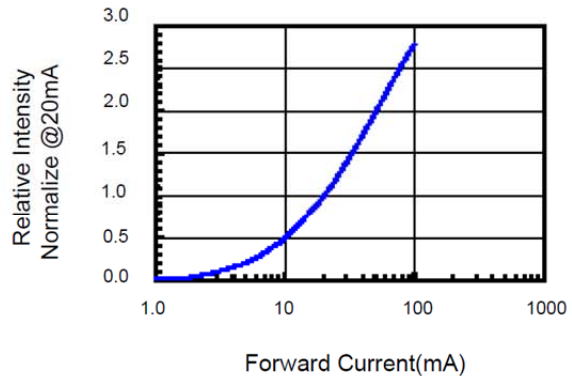


Fig.3 Forward Voltage vs. Temperature

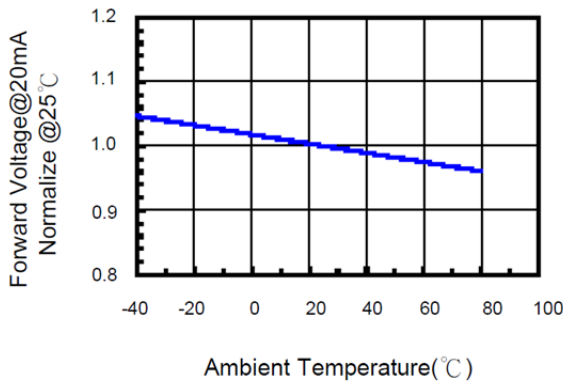


Fig.4 Relative Intensity vs. Temperature

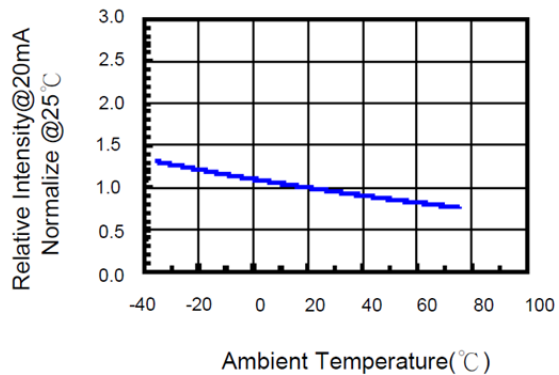


Fig.5 Relative Intensity vs. Wavelength

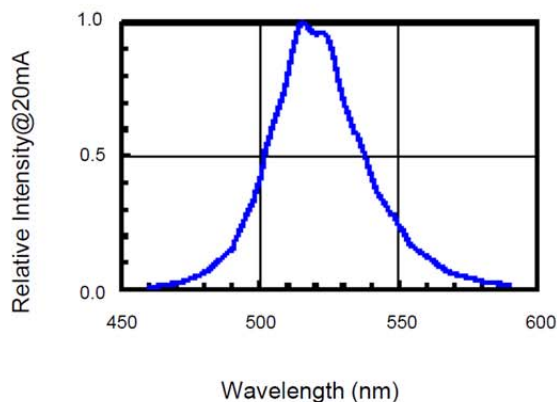
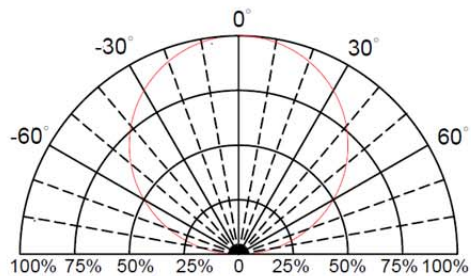


Fig.6 Directive Radiation





# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### TYPICAL ELECTRICAL-OPTICAL CHARACTERISTIC CURVES (BLUE)

Fig.1 Forward current vs. Forward Voltage

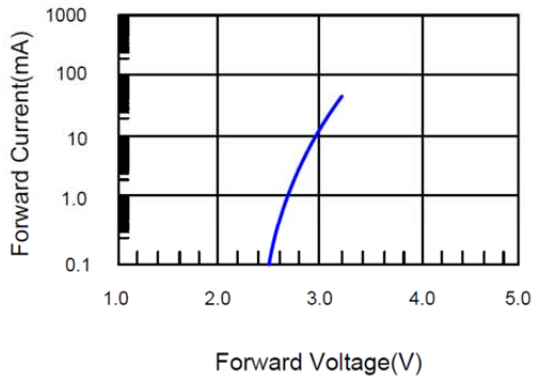


Fig.2 Relative Intensity vs. Forward Current

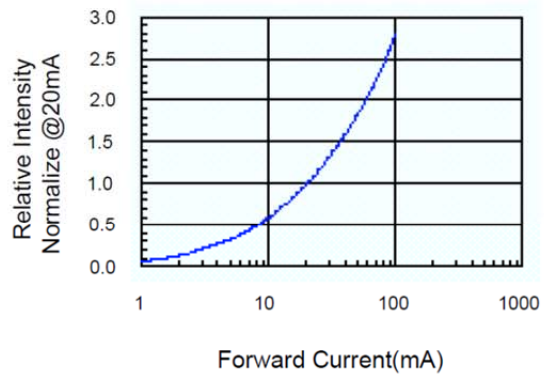


Fig.3 Forward Voltage vs. Temperature

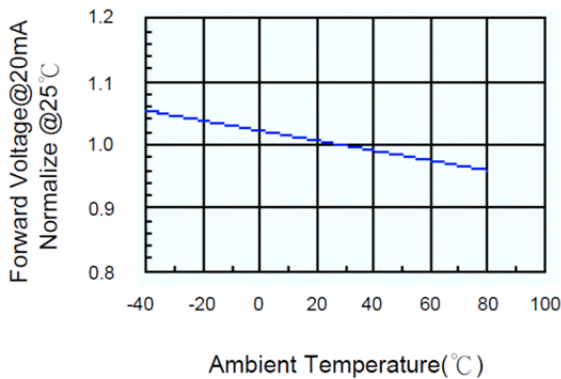


Fig.4 Relative Intensity vs. Temperature

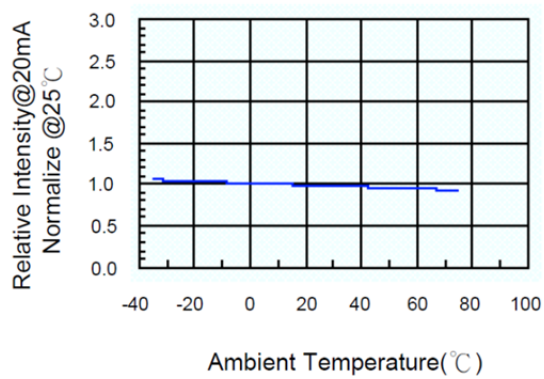


Fig.5 Relative Intensity vs. Wavelength

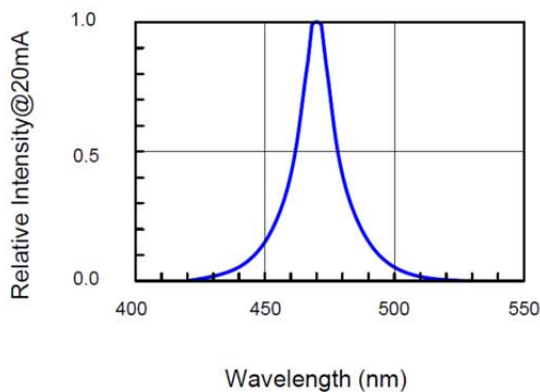
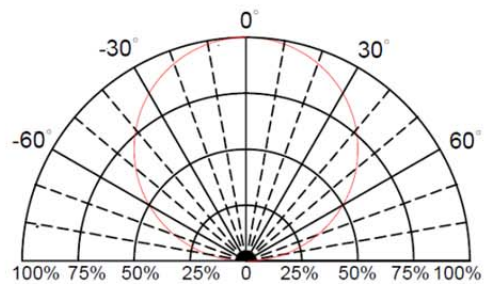


Fig.6 Directive Radiation







**American Opto Plus LED Corp.**

**L950L-LBLEUPGC**

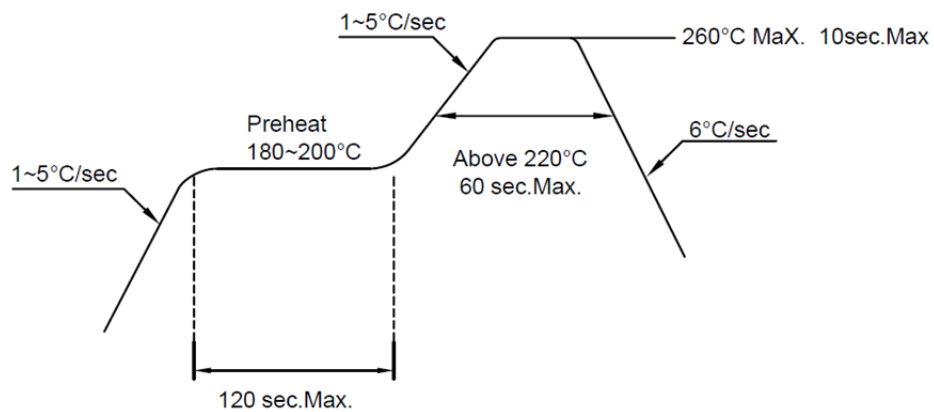
**5.4 x 5.0 x 1.6 mm RGB SMD LED**

## SOLDERING CONDITIONS

### 1. Hand Solder

Basic spec is  $\leq 320^{\circ}\text{C}$  3 sec one time only.

### 2. PB-Free Reflow 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.



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### PRECAUTIONS FOR USE

#### Storage Time:

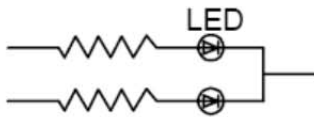
1. The operation of temperatures and RH are: 5°C~35°C, RH60%.
2. Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp proof box with desiccating agent. Considering the tape life, we suggest our customers to use our products within a year <30°C and <90% RH (from production date).
3. If opened more than one week in an atmosphere 5°C~35°C, RH60%, they should be treated at 60°C±5°C for 15hrs.

#### Drive Method:

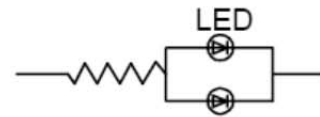
LED is a current operated device, and therefore, require some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in a series with the LED.

Consider worst case voltage variations that 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 LEDs. All devices and machinery must be properly grounded.



# American Opto Plus LED Corp.

## L950L-LBLEUPGC

5.4 x 5.0 x 1.6 mm RGB SMD LED

### RELIABILITY TEST

| Classification     | Test Item                                   | Test Condition   | Reference Standard  |
|--------------------|---|--|---|
| Endurance Test     | Operating Life Test                         | 1. Ta=Under Room Temperature As Per Data Sheet Maximum Rating.<br>2. If=20mA<br>3. t=1000 hrs (-24hrs, +72hrs) | MIL-STD-750D: 1026<br>MIL-STD-883D: 1005<br>JIS C 7021: B-1   |
|                    | High Temperature Storage Test               | 1. Ta=105°C±5°C<br>2. t=1000 hrs (-24hrs, +72hrs)  | MIL-STD-883D:1008<br>JIS C 7021: B-10   |
|                    | Low Temperature Storage Test                | 1. Ta=-40°C±5°C<br>2. t=1000 hrs (-24hrs, +72hrs)  | JIS C 7021: B-12  |
|                    | High Temperature High Humidity Storage Test | 1. Ta=65°C±5°C<br>2. RH=90%~95%<br>3. t=1000hrs±2hrs   | MIL-STD-202F:103B<br>JIS C 7021: B-11   |
| Environmental Test | Thermal Shock Test                          | 1. Ta=105°C±5°C & -40°C±5°C<br>(10min) (10min)<br>2. total 10 cycles   | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1011  |
|                    | Solderability Test                          | 1. T.Sol=235°C±5°C<br>2. Immersion time 2±0.5sec<br>3. Coverage ≥ 95% of the dipped surface                    | MIL-STD-202F: 208D<br>MIL-STD-750D: 2026<br>MIL-STD-883D: 2003<br>IEC 68 Part 2-20<br>JIS C 7021: A-2 |
|                    | Temperature Cycling                         | 1. 105°C ~ 25°C ~ -55°C ~ 25°C<br>30mins 5mins 30mins 5mins<br>2. 10 Cycles                                    | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1010<br>JIS C 7021: A-4                     |
|                    | IR Reflow                                   | 1. T=260°C Max. 10sec.Max.<br>2. 6 Min   | MIL-STD-750D:2031.2<br>J-STD-020  |