

## CV94A-FGC: PLCC6 3 in 1 SMD LED



### PRODUCT DESCRIPTION

This SMD LED features an IPx8 water resistant rating in a PLCC6 package. These high performance tricolor SMT LEDs are designed to work in a wide range of applications.

The encapsulation resin contains UV inhibitors to minimize the effects of long-term exposure to direct sunlight, resulting in stable light output over the life of the LED. This PLCC6 package has an increased package height to ease in the manufacturing process.

### FEATURES

- Size (mm): 9.4 x 4.2 x 4.0
- Dominant Wavelength
  - Red (619 - 624nm)
  - Green (520 - 540nm)
  - Blue (460 - 480nm)
- Luminous Intensity (mcd)
  - Red (1120 - 2520)
  - Green (1800 - 4025)
  - Blue (403 - 900)
- Water-Resistant (IPx8)\*
- Moisture Sensitivity Level: 5a
- Lead-Free
- RoHS Compliant

### APPLICATIONS

- Electronic Signs & Signals (ESS)
- Full Color Video Screen
- Digital Billboards
- Motorway Signs
- Variable Message Sign (VMS)
- Advertising Signs
- Petrol Signs

\*:This part is tested under the condition of assembling it on a PCB with isolating the electrical path by silicone. The leads area of the LED is not IPx8 rated and it's required to insulate for moisture by customer in outdoor application.

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

| Items  | Symbol     | Absolute Maximum Rating |     |     | Unit               |
|--|------------|-------------------------|-----|-----|--------------------|
|  |            | R                       | G   | B   |                    |
| Forward Current <sup>Note 1</sup>                    | $I_F$      | 50                      | 35  | 35  | mA                 |
| Peak Forward Current <sup>Note 2</sup>               | $I_{FP}$   | 100                     | 100 | 100 | mA                 |
| Reverse Voltage                                      | $V_R$      | 5                       | 5   | 5   | V                  |
| Power Dissipation                                    | $P_D$      | 140                     | 126 | 126 | mW                 |
| Operation Temperature                                | $T_{opr}$  | -40 ~ +85               |     |     | $^\circ\text{C}$   |
| Storage Temperature                                  | $T_{stg}$  | -40 ~ +100              |     |     | $^\circ\text{C}$   |
| Junction Temperature                                 | $T_J$      | 110                     | 110 | 110 | $^\circ\text{C}$   |
| Junction/ambient                                     | $R_{THJA}$ | 280                     | 380 | 300 | $^\circ\text{C/W}$ |
| Junction/solder point                                | $R_{THJS}$ | 100                     | 200 | 140 | $^\circ\text{C/W}$ |
| Electrostatic Discharge Classification(MIL-STD-883E) | ESD        | 1000V                   |     |     |                    |

Note:

1. Single-color light
2. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| Characteristics                                | Condition  | Symbol                 | Values  |         |         | Unit          |
|--|--|------------------------|---------|---------|---------|---------------|
|  |  |                        | R       | G       | B       |               |
| Dominant Wavelength                            | $I_F = 15\text{mA(R)}$<br>$I_F = 10\text{mA(G)}$<br>$I_F = 10\text{mA(B)}$ | $\lambda_{\text{DOM}}$ | 619~624 | 520~540 | 460~480 | nm            |
| Spectral bandwidth at 50% $I_{\text{REL}}$ max | $I_F = 15\text{mA(R)}$<br>$I_F = 10\text{mA(G)}$<br>$I_F = 10\text{mA(B)}$ | $\Delta \lambda$       | 24      | 38      | 28      | nm            |
| Forward Voltage                                | $I_F = 15\text{mA(R)}$<br>$I_F = 10\text{mA(G)}$<br>$I_F = 10\text{mA(B)}$ | $V_{F(\text{avg})}$    | 2.1     | 2.6     | 2.7     | V             |
|  |  | $V_{F(\text{max})}$    | 2.8     | 3.6     | 3.6     | V             |
| Luminous Intensity                             | $I_F = 15\text{mA(R)}$<br>$I_F = 10\text{mA(G)}$<br>$I_F = 10\text{mA(B)}$ | $I_{V(\text{min})}$    | 1120    | 1800    | 403     | mcd           |
|  |  | $I_{V(\text{avg})}$    | 1600    | 2800    | 560     | mcd           |
| Luminous Intensity(Reference)                  | $I_F = 20\text{mA(R/G/B)}$   | $I_{V(\text{avg})}$    | 2200    | 4800    | 1000    | mcd           |
| Reverse Current (max)                          | $V_R = 5 \text{ V}$  | $I_R$                  | 10      | 10      | 10      | $\mu\text{A}$ |

\* Continuous reverse voltage can cause LED damage.

## INTENSITY BIN LIMIT

| Red (15 mA) |           |           | Green (10 mA) |           |           | Blue (10 mA) |           |           |
|-------------|-----------|-----------|---------------|-----------|-----------|--------------|-----------|-----------|
| Bin Code    | Min.(mcd) | Max.(mcd) | Bin Code      | Min.(mcd) | Max.(mcd) | Bin Code     | Min.(mcd) | Max.(mcd) |
| P           | 1120      | 1400      | R             | 1800      | 2240      | hj           | 403       | 505       |
| vw          | 1260      | 1600      | z1a           | 2020      | 2520      | J            | 450       | 560       |
| Q           | 1400      | 1800      | S             | 2240      | 2800      | km           | 505       | 635       |
| xy          | 1600      | 2020      | 1b1c          | 2520      | 3175      | K            | 560       | 710       |
| R           | 1800      | 2240      | T             | 2800      | 3550      | np           | 635       | 805       |
| z1a         | 2020      | 2520      | 1d1e          | 3175      | 4025      | M            | 710       | 900       |

\* Tolerance of measurement of luminous intensity is  $\pm 10\%$ .

## COLOR BIN LIMIT

| Red (15 mA) |          |          | Green (10 mA) |          |          | Blue (10 mA) |          |          |
|-------------|----------|----------|---------------|----------|----------|--------------|----------|----------|
| Bin Code    | Min.(nm) | Max.(nm) | Bin Code      | Min.(nm) | Max.(nm) | Bin Code     | Min.(nm) | Max.(nm) |
| RB          | 619      | 624      | G7            | 520      | 525      | B3           | 460      | 465      |
|             |          |          | G23           | 522.5    | 527.5    | B23          | 462.5    | 467.5    |
|             |          |          | G8            | 525      | 530      | B4           | 465      | 470      |
|             |          |          | G45           | 527.5    | 532.5    | B45          | 467.5    | 472.5    |
|             |          |          | G9            | 530      | 535      | B5           | 470      | 475      |
|             |          |          | G67           | 532.5    | 537.5    | B67          | 472.5    | 477.5    |
|             |          |          | Ga            | 535      | 540      | B6           | 475      | 480      |

\* Tolerance of measurement of dominant wavelength is  $\pm 1$  nm.

## ORDER CODE TABLE

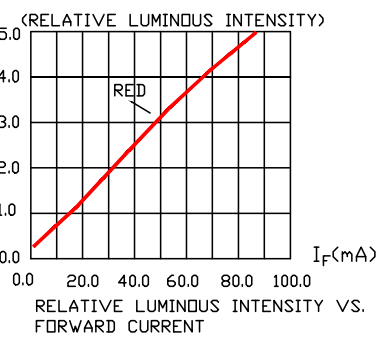
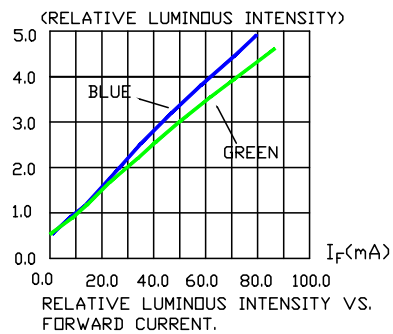
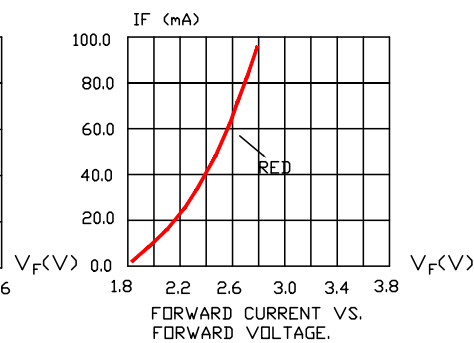
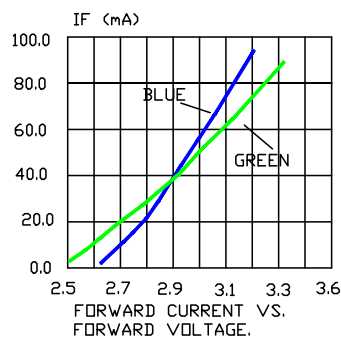
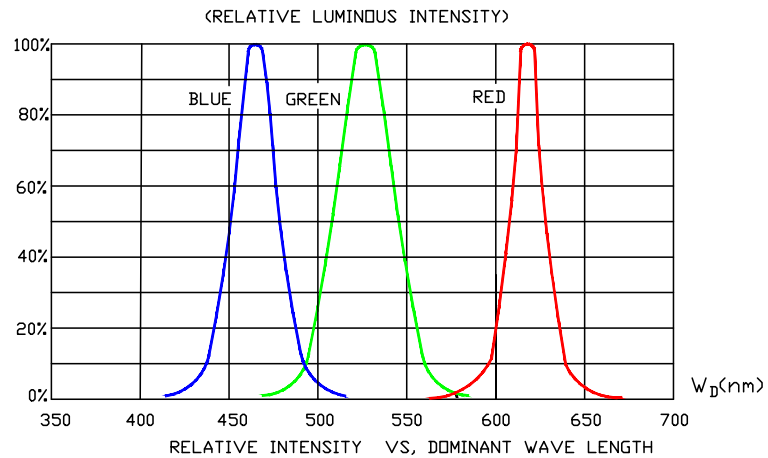
| Kit Number                     | Color | Luminous Intensity (mcd)                      |      | Dominant Wavelength (nm)           |          |           |           | Package |
|--------------------------------|-------|---|------|------------------------------------|----------|-----------|-----------|---------|
|                                |       | Min.  | Max. | Color Bin                          | Min.(nm) | Color Bin | Max. (nm) |         |
| CV94A-FGC-CPz1aR1d1ehjMBB7a363 | Red   | 1120  | 2520 | RB                                 | 619      | RB        | 624       | Reel    |
|                                | Green | 1800  | 4025 | G7                                 | 520      | Ga        | 540       | Reel    |
|                                | Blue  | 403   | 900  | B3                                 | 460      | B6        | 480       | Reel    |
| CV94A-FGC-CP1R1hj1BB7D3D3      | Red   | Any 1 Intensity bin from P(1120) - z1a(2520)  |      | RB                                 | 619      | RB        | 624       | Reel    |
|                                | Green | Any 1 Intensity bin from R(1800) - 1d1e(4025) |      | Any 1 hue bin from G7(520)-Ga(540) |          |           |           | Reel    |
|                                | Blue  | Any 1 Intensity bin from hj(403) - M(900)     |      | Any 1 hue bin from B3(460)-B6(480) |          |           |           | Reel    |

### Notes:

- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- Please refer to the [HB LED Lamp Reliability Test Standards](#) document for reliability test conditions.
- Please refer to the [HB LED Lamp Soldering & Handling](#) document for information about how to use this LED product safely.

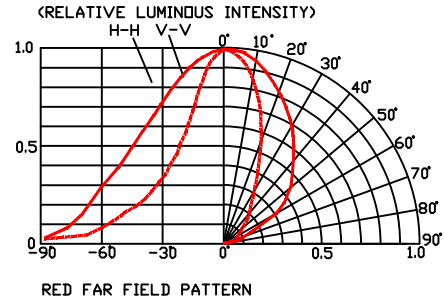
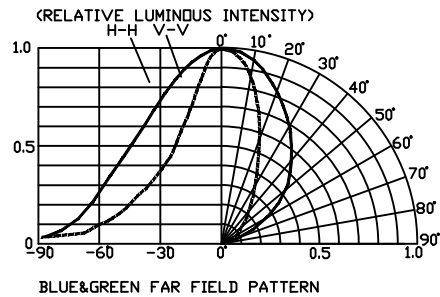
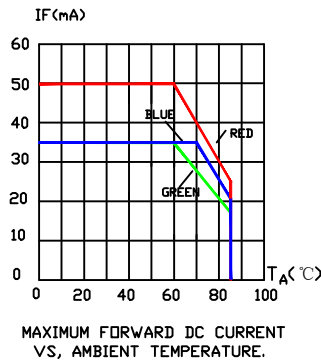
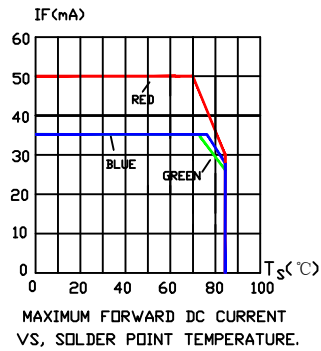
## GRAPHS

The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



## GRAPHS

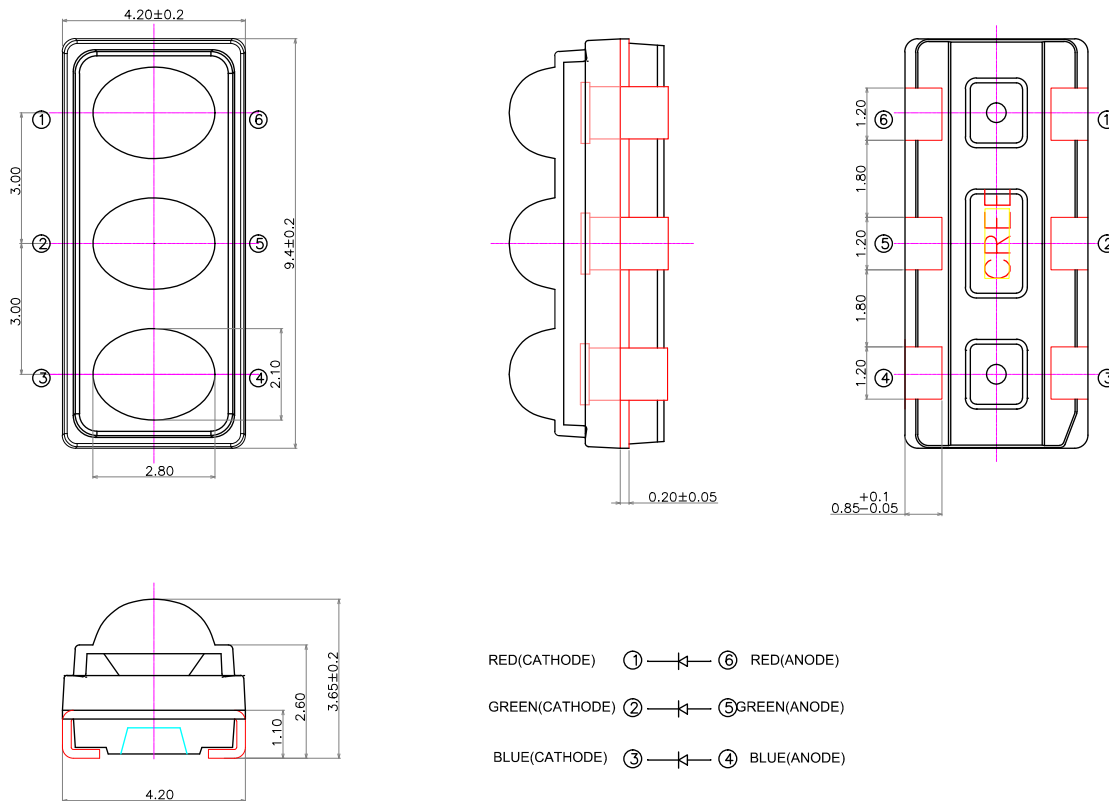
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



## MECHANICAL DIMENSIONS

All dimensions are in mm.

Tolerance of measurement of the dimension is  $\pm 0.1$ .



## NOTES

### RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree LED representative or from the [Product Ecology](#) section of the Cree LED website.

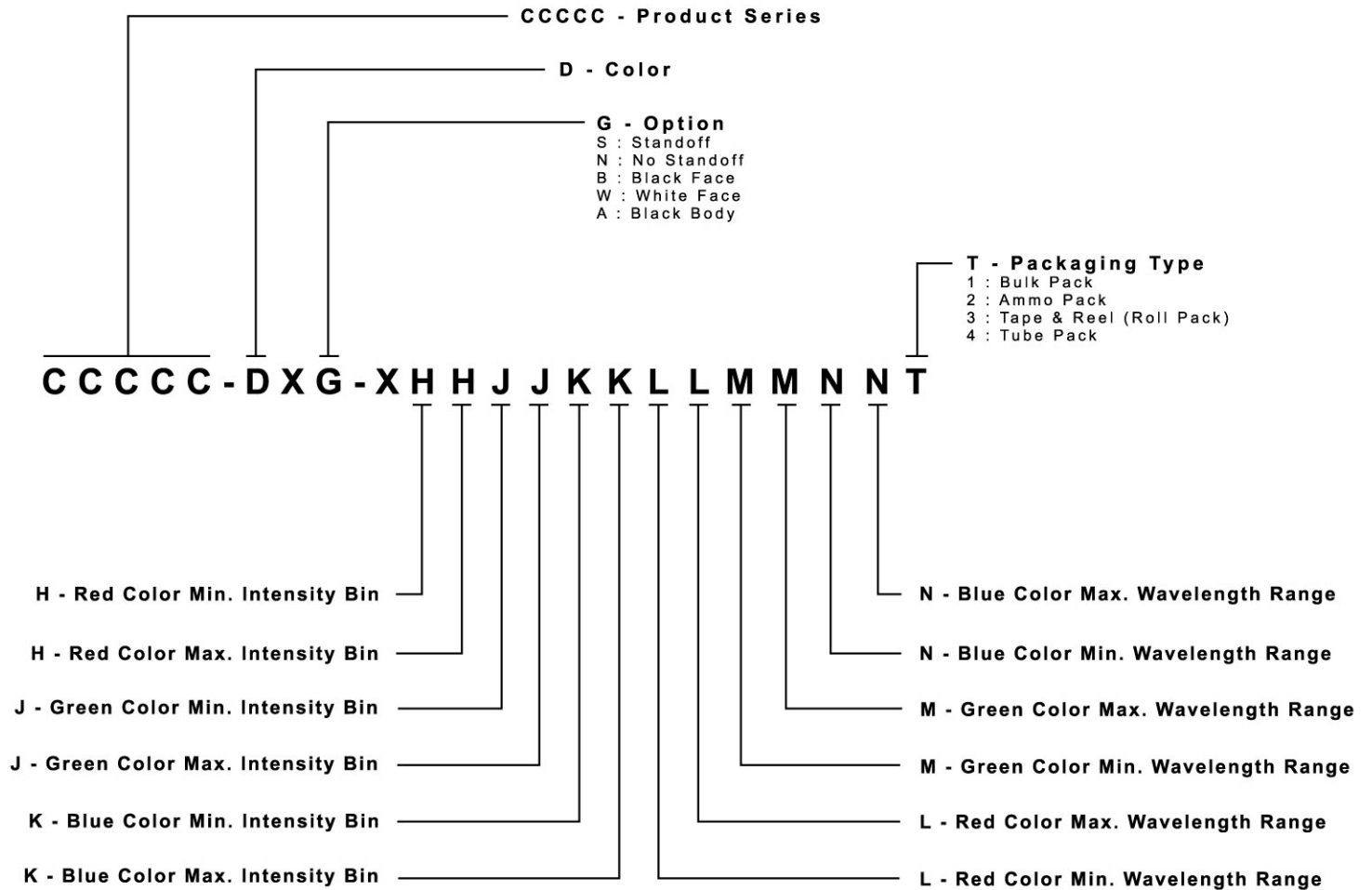
### Vision Advisory

**WARNING:** Do not look at an exposed lamp in operation. Eye injury can result.

## KIT NUMBER SYSTEM

Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness.

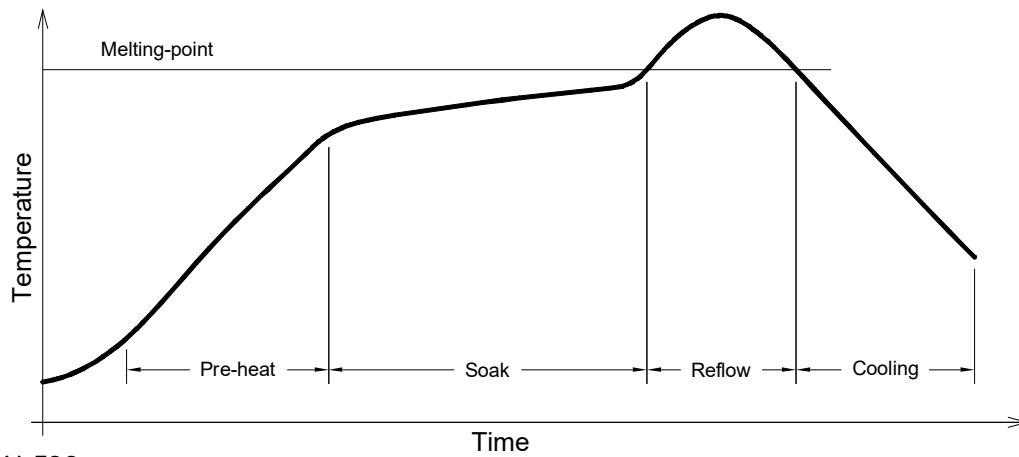
Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:





## REFLOW SOLDERING

- The CV94A-FGC is rated as a MSL 5a product.
- The recommended floor life out of bag is 24hrs.
- The temperature profile is as below

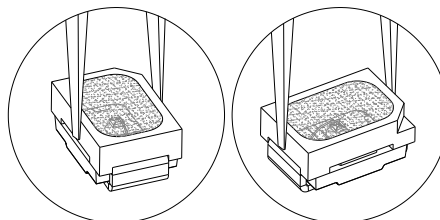


Use only with CV94A-FGC

| Solder   |
|--|
| Average ramp-up rate = 4 °C/second max.                |
| Soak temperature = 150°C-200°C                         |
| Soak time = 120 seconds max.                           |
| Duration above 217 °C = 60 seconds max.                |
| Peak temperature = 250°C max                           |
| Time within 5 °C of peak temperature = 10 seconds max. |
| Ramp-down rate = 6 °C/second max.                      |

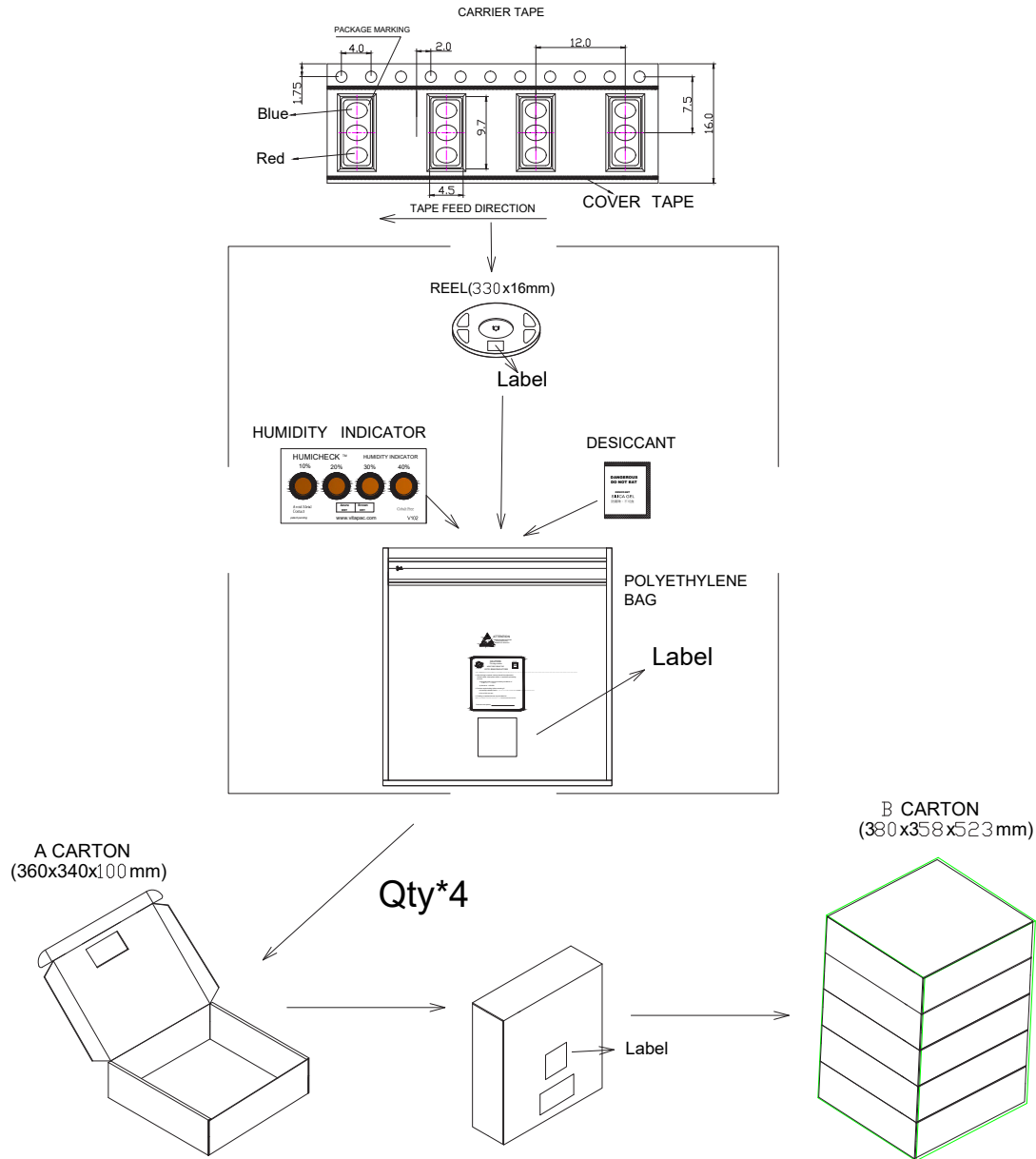
## NOTES

- The packaging sizes of these SMD products are very small and the resin is still soft after solidification. Users are required to handle with care. Never touch the resin surface of SMD products.
- To avoid damaging the product's surface and interior device, it is recommended to choose a special nozzle to pick up the SMD products during the process of SMT production. If handling is necessary, take special care when picking up these products. The following method is necessary:



## PACKAGING

- The boxes are not water resistant and they must be kept away from water and moisture.
- The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags.
- Cardboard boxes will be used to protect the LEDs from mechanical shocks during transportation.
- The reel pack is applied in SMD LED.
- Max 1200 pcs per reel.



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Cree LED:

[CV94A-FGC-CP1R1HJ1BB7D3D3](#) [CV94A-FGC-CPZ1AR1D1EHJMBB7A363](#)