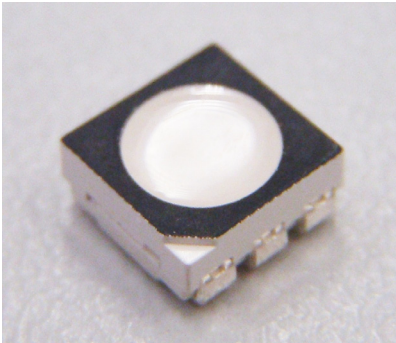


CLV6F-FKB: PLCC6 3 in 1 SMD LED



PRODUCT DESCRIPTION

These SMD LEDs are packaged in an industry standard PLCC6 package.

These high performance tricolor SMT LEDs are designed to work in a wide range of applications. A wide viewing angle and high brightness make these LEDs suitable for various full color 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.

FEATURES

- Size (mm): 5.5 x 5.5
- Dominant Wavelength
Red (619 - 624nm)
Green (520 - 540nm)
Blue (460 - 480nm)
- Luminous Intensity (mcd)
Red (805 - 1600)
Green (1600 - 3175)
Blue (355 - 805)
- Moisture Sensitivity Level: 5a
- Lead-Free
- RoHS Compliant

APPLICATIONS

- Decorative Lighting
- Amusement

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

| Items | Symbol | Absolute Maximum Rating | | | Unit |
|--|------------|-------------------------|-----|-----|---------------------------|
| | | R | G | B | |
| Forward Current ^{Note 1} | I_F | 50 | 35 | 35 | mA |
| Peak Forward Current ^{Note 2} | I_{FP} | 200 | 100 | 100 | mA |
| Reverse Voltage | V_R | 5 | 5 | 5 | V |
| Power Dissipation | P_D | 130 | 126 | 140 | 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} | 450 | 400 | 450 | $^\circ\text{C}/\text{W}$ |
| Junction/solder point | R_{THJS} | 230 | 230 | 200 | $^\circ\text{C}/\text{W}$ |
| Electrostatic Discharge Classification(MIL-STD-883E) | ESD | 1000V | | | |

Note:

1. Single-color light
2. Pulse width ≤ 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 | $I_F = 20\text{mA}$ | λ_{DOM} | 619~624 | 520~540 | 460~480 | nm |
| Spectral bandwidth at 50% $I_{REL\ max}$ | $I_F = 20\text{mA}$ | $\Delta \lambda$ | 24 | 38 | 28 | nm |
| Forward Voltage | $I_F = 20\text{mA}$ | $V_{F(avg)}$ | 2.1 | 2.9 | 3.2 | V |
| | | $V_{F(max)}$ | 2.6 | 3.6 | 4.0 | V |
| Luminous Intensity | $I_F = 20\text{mA}$ | $I_{V(min)}$ | 805 | 1600 | 355 | mcd |
| | | $I_{V(avg)}$ | 1100 | 2600 | 600 | mcd |
| Reverse Current (max) | $V_R = 5\text{V}$ | I_R | 10 | 10 | 10 | μA |

* Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT

| Red (20 mA) | | | Green (20 mA) | | | Blue (20 mA) | | |
|-------------|-----------|-----------|---------------|-----------|-----------|--------------|-----------|-----------|
| Bin Code | Min.(mcd) | Max.(mcd) | Bin Code | Min.(mcd) | Max.(mcd) | Bin Code | Min.(mcd) | Max.(mcd) |
| qr | 805 | 1010 | xy | 1600 | 2020 | H | 355 | 450 |
| N | 900 | 1120 | R | 1800 | 2240 | hj | 403 | 505 |
| st | 1010 | 1260 | z1a | 2020 | 2520 | J | 450 | 560 |
| P | 1120 | 1400 | S | 2240 | 2800 | km | 505 | 635 |
| vw | 1260 | 1600 | 1b1c | 2520 | 3175 | K | 560 | 710 |
| | | | | | | np | 635 | 805 |

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

COLOR BIN LIMIT

| Red (20 mA) | | | Green (20 mA) | | | Blue (20 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 ± 1 nm.

ORDER CODE TABLE

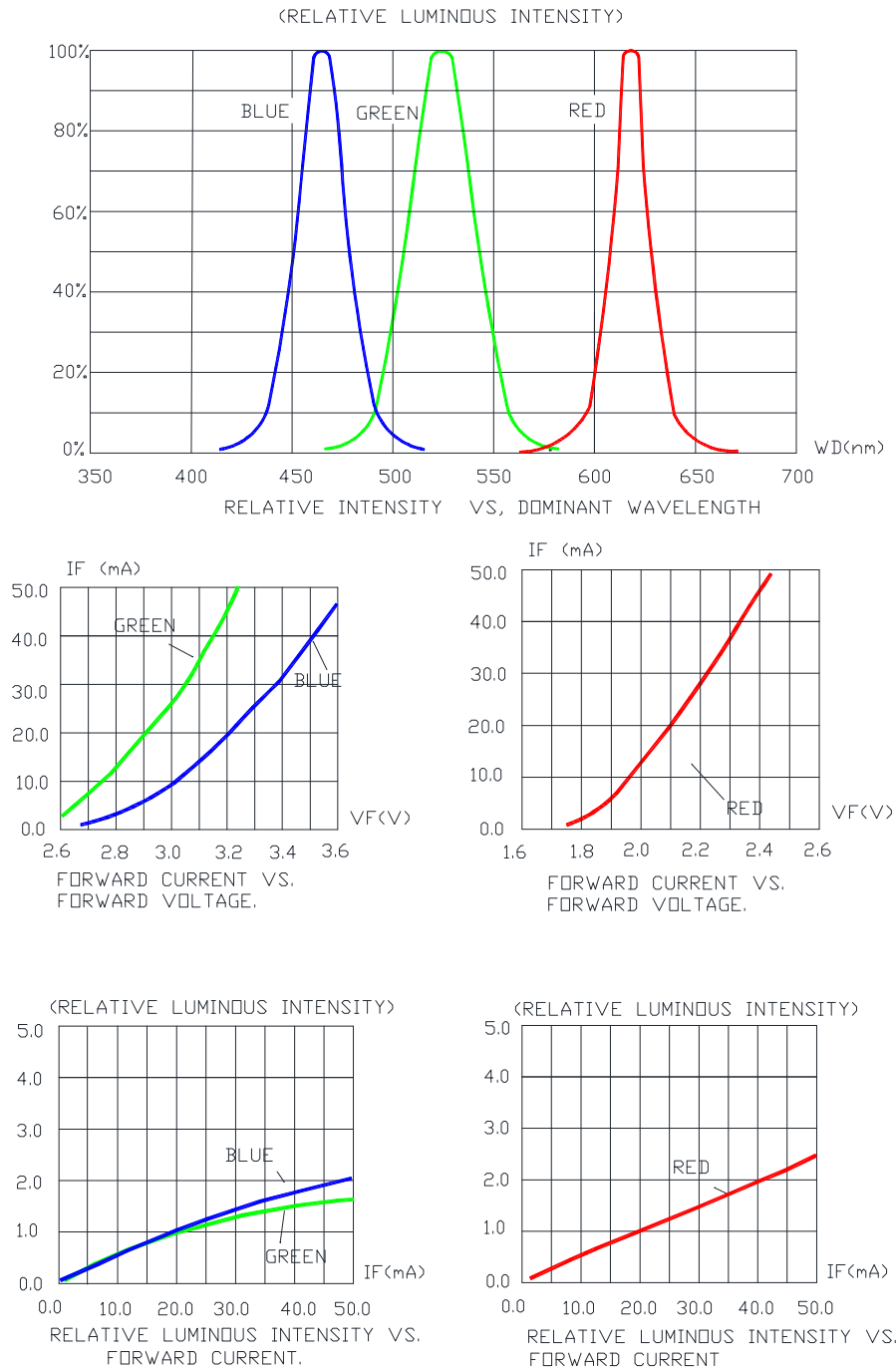
| Kit Number | Color | Luminous Intensity (mcd) | | Dominant Wavelength (nm) | | | | Package |
|--------------------------------|-------|--|------|------------------------------------|----------|-----------|-----------|---------|
| | | Min. | Max. | Color Bin | Min.(nm) | Color Bin | Max. (nm) | |
| CLV6F-FKB-Cqrvwxy1b1cHnpBB7a36 | Red | 805 | 1600 | RB | 619 | RB | 624 | Reel |
| | Green | 1600 | 3175 | G7 | 520 | Ga | 540 | Reel |
| | Blue | 355 | 805 | B3 | 460 | B6 | 480 | Reel |
| CLV6F-FKB-Cqr1xy1H1BB7D3D3 | Red | Any 1 Intensity bin from qr(805) - vw(1600) | | RB | 619 | RB | 624 | Reel |
| | Green | Any 1 Intensity bin from xy(1600) - 1b1c(3175) | | Any 1 hue bin from G7(520)-Ga(540) | | | | Reel |
| | Blue | Any 1 Intensity bin from H(355) - np(805) | | 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.

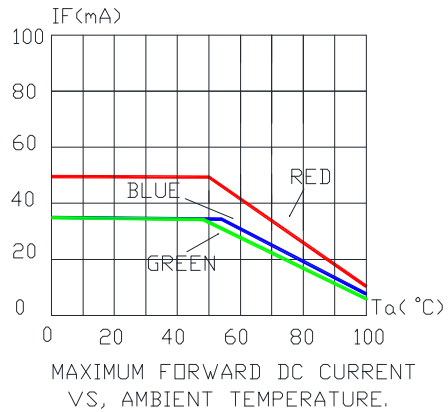
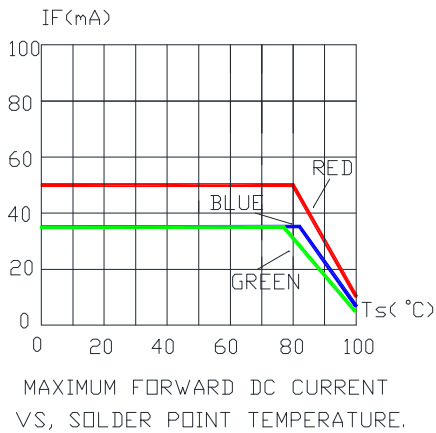
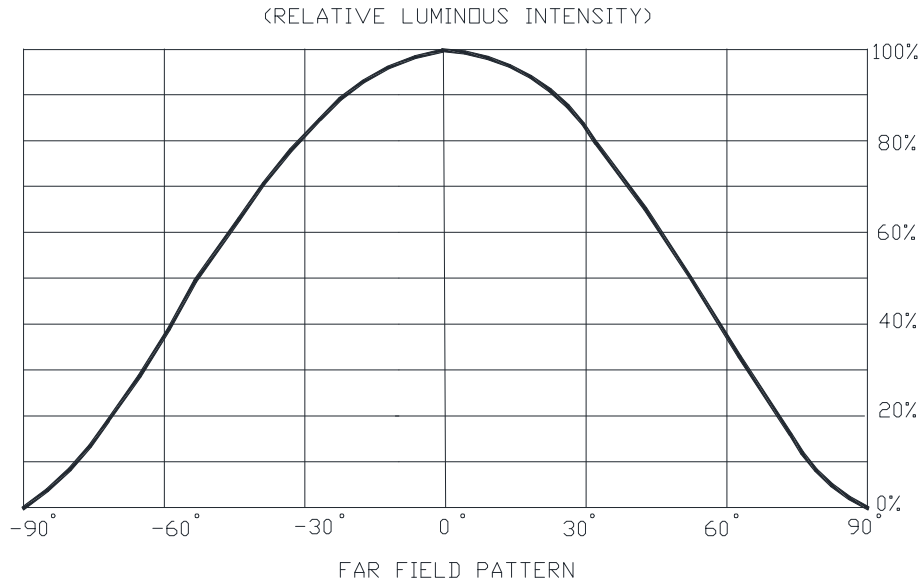
GRAPHS

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

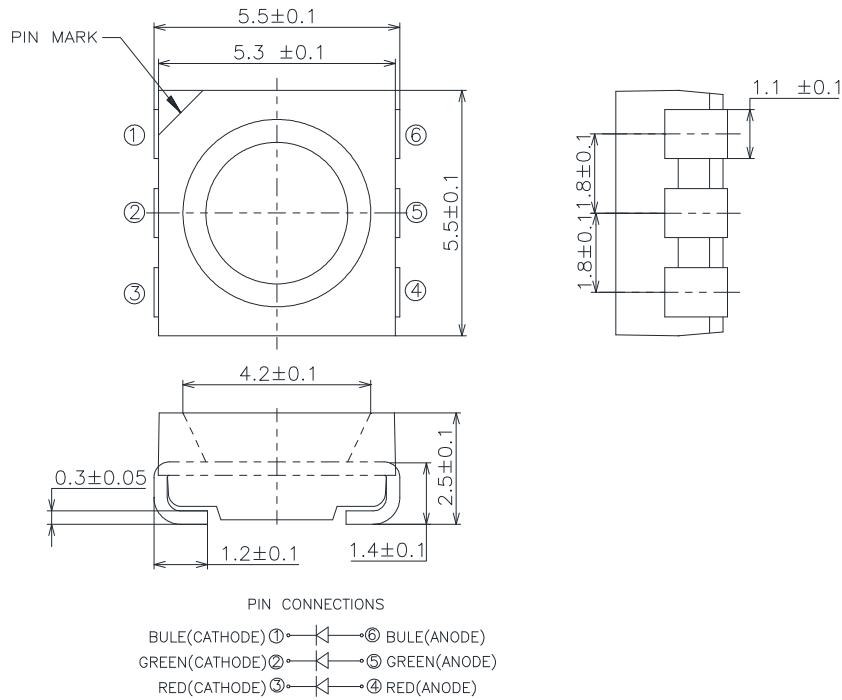
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



MECHANICAL DIMENSIONS

All dimensions are in mm.

Tolerance of measurement of the dimension is ± 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.

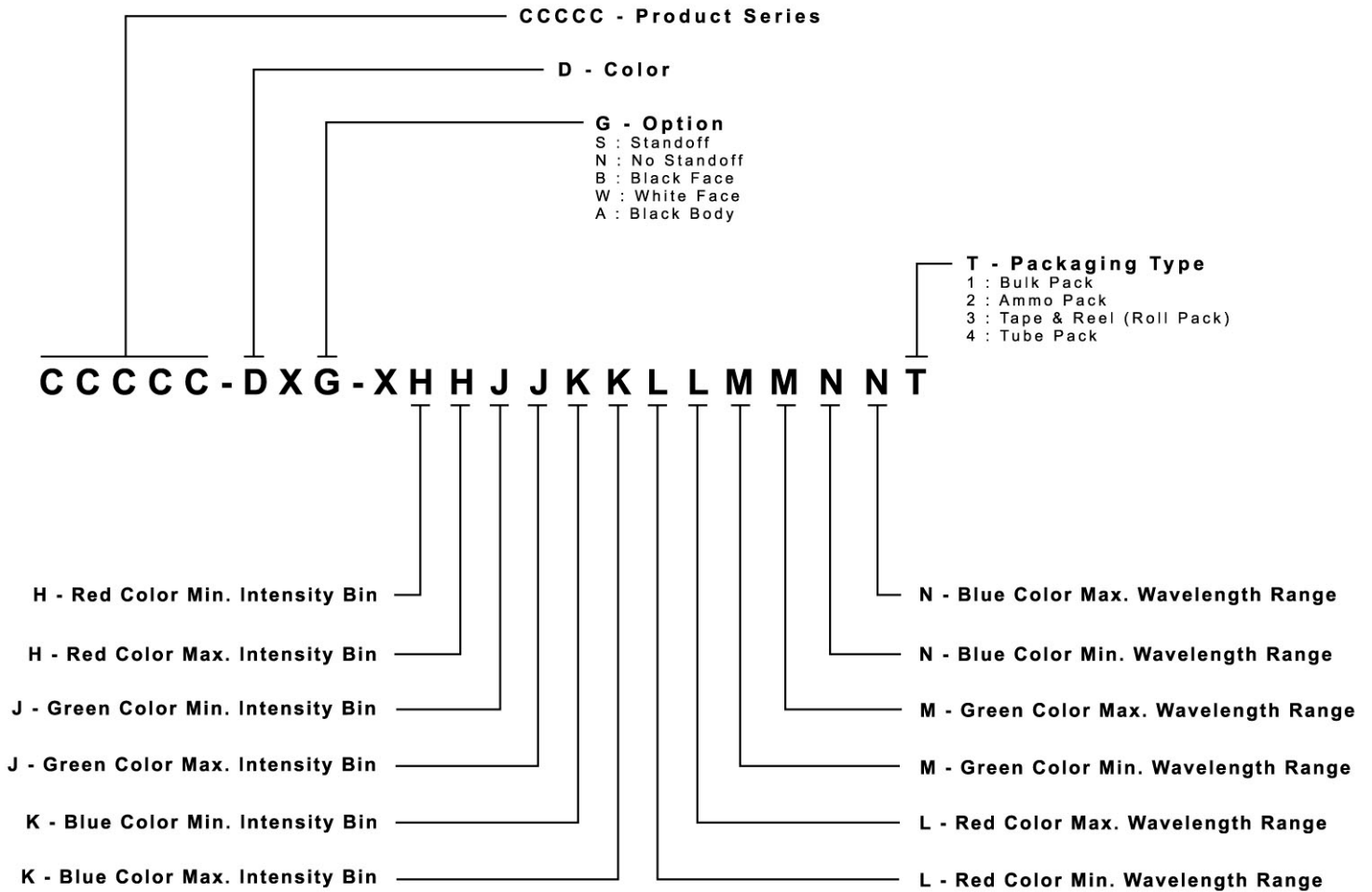
Vision Advisory

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:



RELIABILITY

Tests and Results

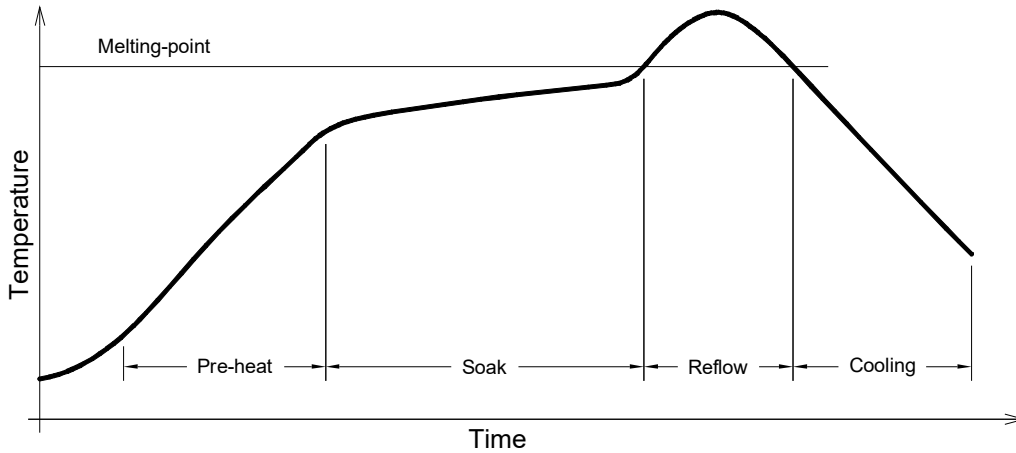
| Test | Applicable Standards | Test Condition | Note | Number of Damaged |
|--|----------------------------|--|------------|-------------------|
| Temperature Cycle | JEITA ED-4701 100 105 | -40°C~25°C~100°C~25°C 30 mins, 5 mins, 30 mins, 5 mins | 100 cycles | 0/45 |
| Thermal Shock | MIL-STD-202G | -40°C~100°C 30 mins, 30 mins | 100 cycles | 0/45 |
| Moisture Resistance | JEITA ED-4701 200 203 | 25°C~65°C~ 90%RH 24hrs/1cycle | 10 cycles | 0/45 |
| High Temperature Storage | JEITA ED-4701 200 201 | T _A =100°C | 500 hrs | 0/45 |
| Temperature Humidity Storage | JEITA ED-4701 100 103 | T _A =60°C RH=90% | 500 hrs | 0/45 |
| Low Temperature Storage | JEITA ED-4701 200 202 | T _A =-40°C | 500 hrs | 0/45 |
| High Temperature Life Test | - | T _A =85°C I _F =15 mA | 1000 hrs | 0/45 |
| Life Test | - | T _A =25°C IF: R=30mA G=35mA B=20mA | 1000 hrs | 0/45 |
| High Humidity Heat Life Test | - | 60°C RH=90% I _F =15 mA | 500 hrs | 0/45 |
| Low Temperature Life Test | - | T _A =-40°C IF: R=30mA G=35mA B=20mA | 500 hrs | 0/45 |
| Resistance to Soldering Heat(Reflow Soldering) | JEITA ED-4701 300 301 | T _{sol} =235°C,10sec (Pre treatment 30°C,70%,168hrs) | 2 times | 0/45 |
| Vibration-variable Frequency | MIL-STE-883 Method 2007 | 20G min, 20 to 2000Hz, 4cycles, 4mins, Each x,y,z | / | 0/45 |
| Electrostatic Discharge Test | AEC(Q101-001) | Human body model 1000 V (Forward and reverse current conduct electricity each 1time) | / | 0/45 |

Failure Criteria

| Item | Symbol | Test Condition | Criteria for Judgment | |
|------------------------------|----------------|------------------------|---------------------------------|--------------------|
| | | | Min. | Max. |
| Forward Voltage | V _F | I _F = 20 mA | - | Initial Data x 1.1 |
| Reverse Current | I _R | V _R = 5 V | - | 10 μA |
| Luminous Flux/Intensity | Φ _V | I _F = 20 mA | Initial Data x 0.7 | - |
| Resistance to Soldering Heat | - | I _F = 20 mA | No dead lamps and visual damage | |
| Vibration-variable Frequency | - | I _F = 20 mA | No dead lamps and visual damage | |

REFLOW SOLDERING

- The CLV6F-FKB is rated as a MSL 5a product.
- The recommended floor life out of bag is 24hrs.
- The temperature profile is as below.

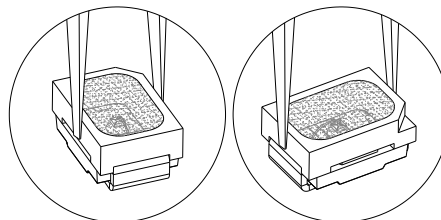


Use only with CLV6F-FKB

| Solder |
|--|
| Average ramp-up rate = 4°C/s max |
| Preheat temperature = 150°C ~200°C |
| Preheat time = 120s max |
| Ramp-down rate = 6°C/s max |
| Peak temperature = 250°C max |
| Time within 5°C of actual Peak Temperature = 10s max |
| Duration above 217°C is 60s 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 3000 pcs per reel.

