

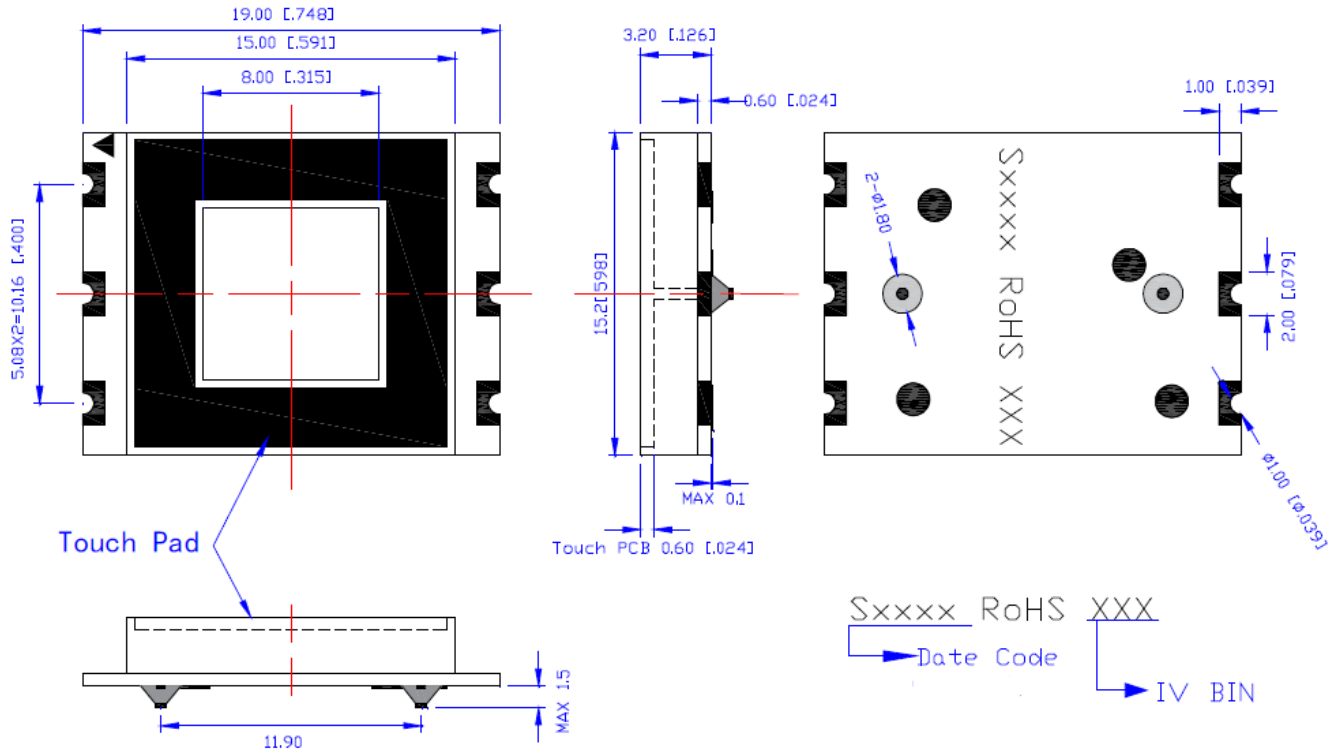


American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

MECHANICAL DIMENSIONS



- Notes: 1. Dimension in millimeter [inch], tolerance is ± 0.25 [.010] unless otherwise noted.
 2. Bending \leq Length*1.0%

| Chip Material | Emitted color | Segment Resin | Description |
|---------------|---------------|---------------|---------------|
| AlGaInP | Red | White | Touch Display |
| InGaN | Green | | |
| InGaN | Blue | | |

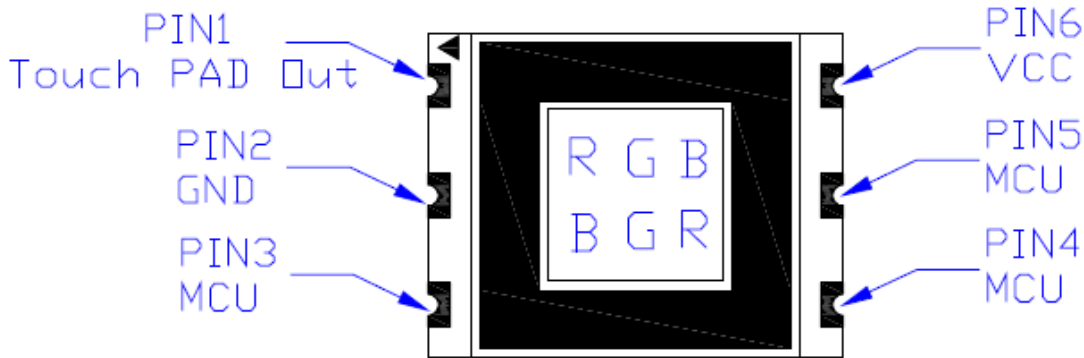


American Opto Plus LED Corp.

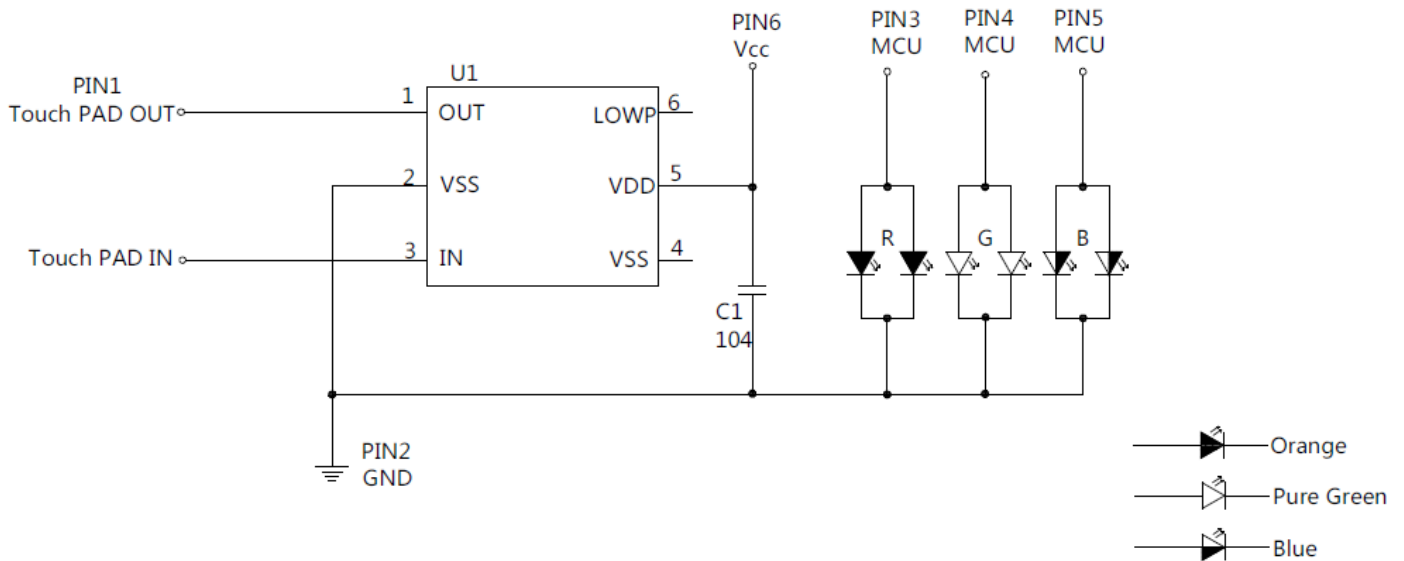
SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

ALL LIGHT ON SEGMENTS FEATURE & PAD POSITION



INTERNAL CIRCUIT DIAGRAMS





American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

TOUCH IC ELECTRO-OPTICAL CHARACTERISTICS

(Ta=25°C)

| Parameter | Condition | Symbol | Min. | Typ. | Max. | Unit |
|--|--|------------------|------|------|------|------|
| Supply Voltage | - | V _{DD} | 2.0 | - | 5.5 | V |
| High Level Input Voltage | V _{DD} = 5V | V _{IH} | 3.5 | - | 5 | V |
| Low Level Input Voltage | V _{DD} = 5V | V _{IL} | 0 | - | 1.5 | V |
| Operating Current | V _{DD} = 5V No load | I _{DD1} | - | 16 | - | μA |
| | V _{DD} = 3V No load | | - | 3.5 | - | |
| Operating Current (SLRT = V _{DD}) | V _{DD} = 5V No load | I _{DD2} | - | 10.5 | - | μA |
| | V _{DD} = 3V No load | | - | 2.5 | - | |
| Low Level Output Current | V _{DD} = 3V V _{OL} = 1V | I _{OL} | - | 30 | - | mA |
| High Level Output Current | V _{DD} = 3V V _{OH} = 2V | I _{OH} | - | 80 | - | mA |

ABSOLUTE MAXIMUM RATING

(Ta=25°C)

| Parameter | Symbol | Color | Rating | Unit |
|--|----------------------|-------------|------------|---------|
| Power Dissipation (Per Dice) | P _D | R | 70 | mW |
| | | G | 114 | |
| | | B | 114 | |
| Continuous Forward Current (Per Dice) | I _F | R | 25 | mA |
| | | G | 30 | |
| | | B | 30 | |
| Peak Current (Per Dice, duty cycle 1/10,1KHz) | I _{FP} | R | 90 | mA |
| | | G | 100 | |
| | | B | 100 | |
| Derating Liner from 25°C (Per Dice) | ΔI _f / ΔT | R | 0.33 | mA / °C |
| | | G | 0.4 | |
| | | B | 0.4 | |
| Reverse Voltage (Per Dice) | V _R | R G B | 5 | V |
| Electrostatic discharge(HBM) | ESD | R | - | V |
| | | G | 1000 | |
| | | B | 1500 | |
| Operating Temp. | T _{OPR} | R G B | -40 ~ +105 | °C |
| Storage Temp. | T _{STG} | R G B | -40 ~ +105 | °C |
| Hand Soldering Temperature | T _{SOL} | R G B | 350 | °C |

Version 1.0 Date: 9-12-2018 Specifications are subject to change without notice.

American Opto Plus LED Corp. 1206 E. Lexington Ave. , Pomona CA 91766 Tel: 909-465-0080 Fax: 909-465-0130 www.aopled.com



American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

ELECTRO-OPTICAL CHARACTERISTICS

(Ta=25°C)

| Parameter | Symbol | Color | Min. | Typ. | Max. | Unit | Condition |
|-----------------------------------|------------------|-------------|------|------|------|---------|------------|
| Forward Voltage | VF | R | - | 2 | 2.8 | V | IF = 20 mA |
| | | G | | 3.2 | 3.8 | | |
| | | B | | 3.2 | 3.8 | | |
| Luminous Intensity | IV | R | - | 95 | - | mcd | IF = 20 mA |
| | | G | | 550 | | | |
| | | B | | 130 | | | |
| Peak Emission Wavelength | λ_p | R | - | 632 | - | nm | IF = 20 mA |
| | | G | | - | | | |
| | | B | | - | | | |
| Dominant Wavelength | λ_D | R | - | 625 | - | nm | IF = 20 mA |
| | | G | | 525 | | | |
| | | B | | 470 | | | |
| Spectrum Radiation Bandwidth | $\Delta \lambda$ | R | - | 20 | - | nm | IF = 20 mA |
| | | G | | 30 | | | |
| | | B | | 30 | | | |
| Reverse Current | IR | R | - | - | 100 | μ A | VR = 5V |
| | | G | | | 50 | | |
| | | B | | | 50 | | |
| Luminous Intensity Matching Ratio | lv-m | R G B | - | - | 2:1 | - | IF = 20 mA |



American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

LUMINOUS GENERAL I_v BIN GRADE

(I_f = 20mA)

Red

| | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|----------|----------|----------|-----------|
| A | B | C | D | E | F | G | H | J | K | L | M |
| 0.155 | 0.249 | 0.399 | 0.640 | 1.025 | 1.641 | 2.627 | 4.204 | 6.727 | 10.764 | 17.224 | 27.559 |
| 0.248 | 0.398 | 0.639 | 1.024 | 1.640 | 2.626 | 4.203 | 6.726 | 10.763 | 17.223 | 27.558 | 44.095 |
| N | P | Q | R | S | T | U | V | W | X | Y | 1 |
| 44.096 | 70.555 | 112.889 | 180.622 | 288.997 | 462.397 | 739.836 | 1183.738 | 1893.982 | 3030.372 | 4848.597 | 7757.756 |
| 70.554 | 112.888 | 180.622 | 288.996 | 462.396 | 739.835 | 1183.737 | 1893.981 | 3030.371 | 4848.596 | 7757.755 | 12412.409 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | |
| 4034.034 | 19859.858 | 31775.773 | 50841.238 | 81345.982 | 130153.573 | 208245.718 | 333193.149 | | | | |
| 19859.857 | 31775.772 | 50841.237 | 81345.981 | 130153.572 | 208245.717 | 333193.148 | 533109.039 | | | | |

Green

| | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|----------|----------|----------|-----------|
| A | B | C | D | E | F | G | H | J | K | L | M |
| 0.155 | 0.249 | 0.399 | 0.640 | 1.025 | 1.641 | 2.627 | 4.204 | 6.727 | 10.764 | 17.224 | 27.559 |
| 0.248 | 0.398 | 0.639 | 1.024 | 1.640 | 2.626 | 4.203 | 6.726 | 10.763 | 17.223 | 27.558 | 44.095 |
| N | P | Q | R | S | T | U | V | W | X | Y | 1 |
| 44.096 | 70.555 | 112.889 | 180.622 | 288.997 | 462.397 | 739.836 | 1183.738 | 1893.982 | 3030.372 | 4848.597 | 7757.756 |
| 70.554 | 112.888 | 180.622 | 288.996 | 462.396 | 739.835 | 1183.737 | 1893.981 | 3030.371 | 4848.596 | 7757.755 | 12412.409 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | |
| 4034.034 | 19859.858 | 31775.773 | 50841.238 | 81345.982 | 130153.573 | 208245.718 | 333193.149 | | | | |
| 19859.857 | 31775.772 | 50841.237 | 81345.981 | 130153.572 | 208245.717 | 333193.148 | 533109.039 | | | | |

Blue

| | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|----------|----------|----------|-----------|
| A | B | C | D | E | F | G | H | J | K | L | M |
| 0.155 | 0.249 | 0.399 | 0.640 | 1.025 | 1.641 | 2.627 | 4.204 | 6.727 | 10.764 | 17.224 | 27.559 |
| 0.248 | 0.398 | 0.639 | 1.024 | 1.640 | 2.626 | 4.203 | 6.726 | 10.763 | 17.223 | 27.558 | 44.095 |
| N | P | Q | R | S | T | U | V | W | X | Y | 1 |
| 44.096 | 70.555 | 112.889 | 180.622 | 288.997 | 462.397 | 739.836 | 1183.738 | 1893.982 | 3030.372 | 4848.597 | 7757.756 |
| 70.554 | 112.888 | 180.622 | 288.996 | 462.396 | 739.835 | 1183.737 | 1893.981 | 3030.371 | 4848.596 | 7757.755 | 12412.409 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | |
| 4034.034 | 19859.858 | 31775.773 | 50841.238 | 81345.982 | 130153.573 | 208245.718 | 333193.149 | | | | |
| 19859.857 | 31775.772 | 50841.237 | 81345.981 | 130153.572 | 208245.717 | 333193.148 | 533109.039 | | | | |

1. Unit = mcd
2. Tolerance: ±20%

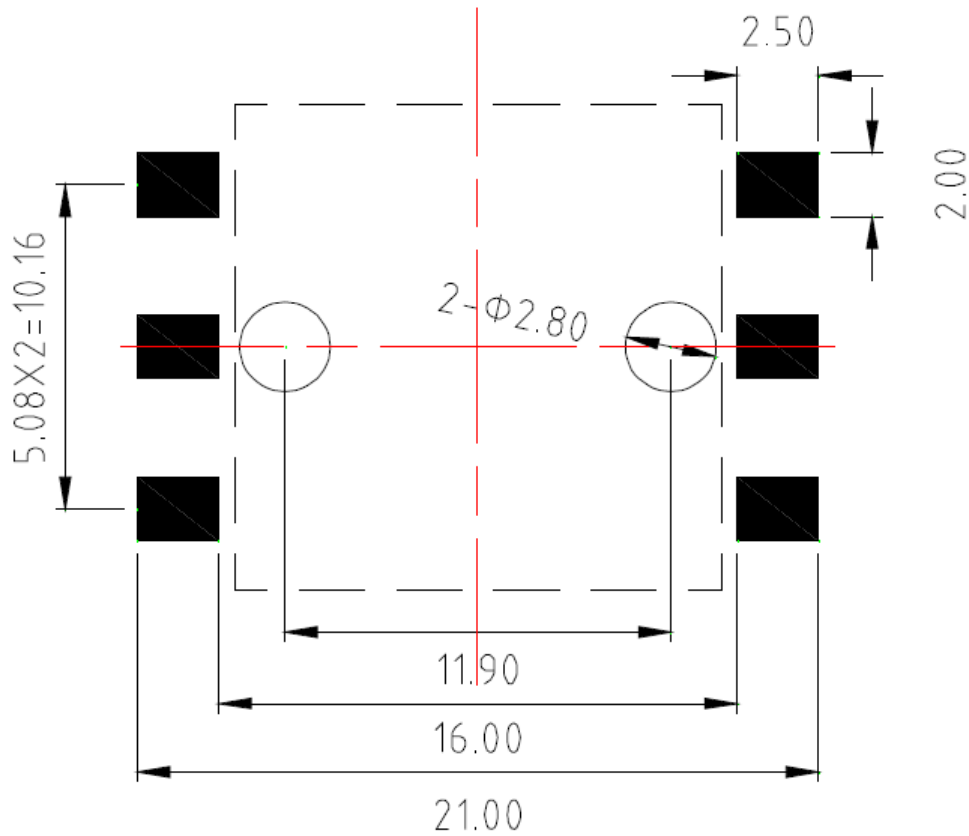


American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

SOLDERING PAD SIZE





ELECTRICAL/OPTICAL CHARACTERISTICS CURVES –Red

(Ta=25°C)

(Ta = 25°C Unless Otherwise Noted)

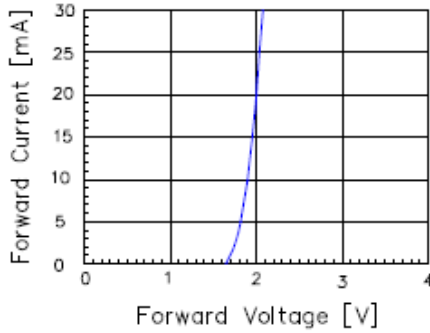


Fig 1. Forward Current vs. Forward Voltage

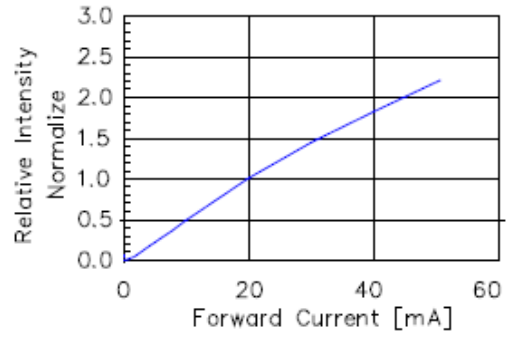


Fig 2. Relative Intensity vs. Forward Current

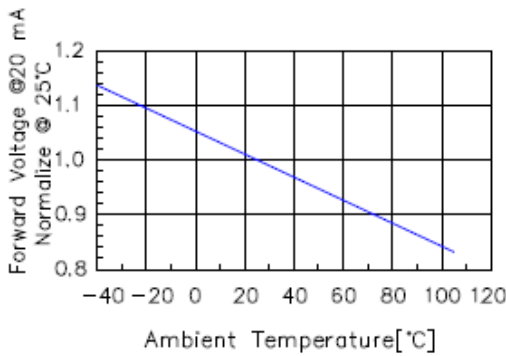


Fig 3. Forward Voltage vs. Temperature

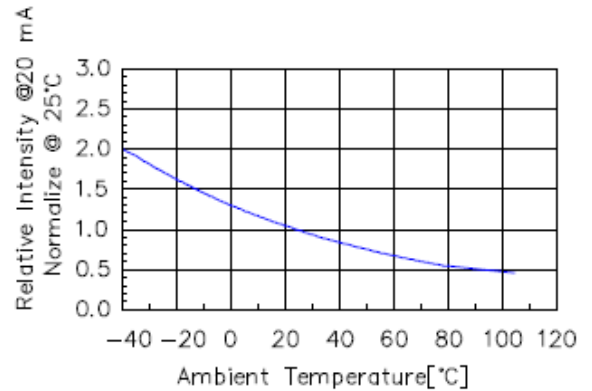


Fig 4. Relative Intensity vs. Temperature

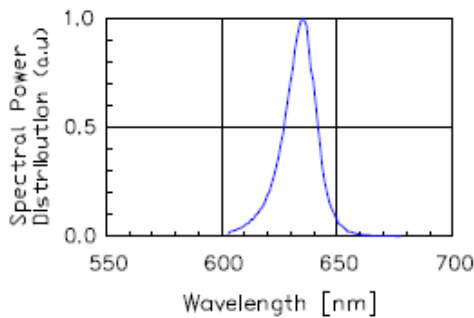


Fig 5. Spectral Power Distribution vs. Wavelength

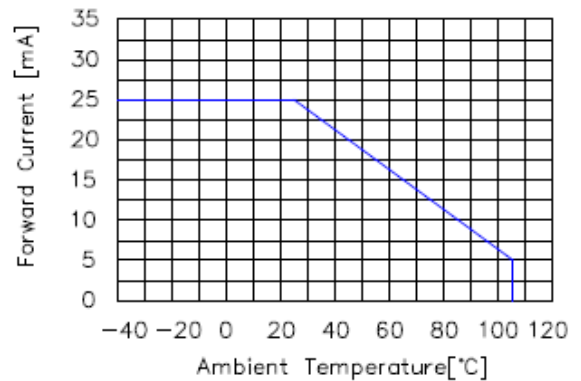


Fig 6. Forward current vs. Temperature



American Opto Plus LED Corp.

SMD-CT591QEGBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

ELECTRICAL/OPTICAL CHARACTERISTICS CURVES –Green

(Ta=25°C)

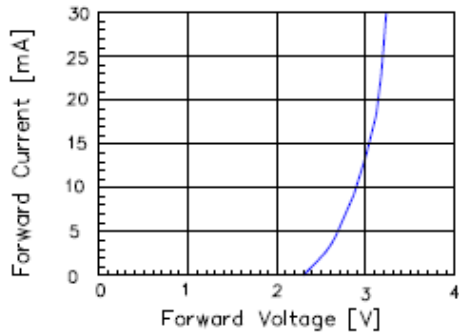


Fig 1. Forward Current vs. Forward Voltage

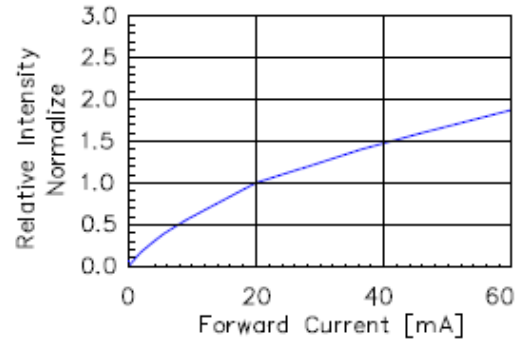


Fig 2. Relative Intensity vs. Forward Current

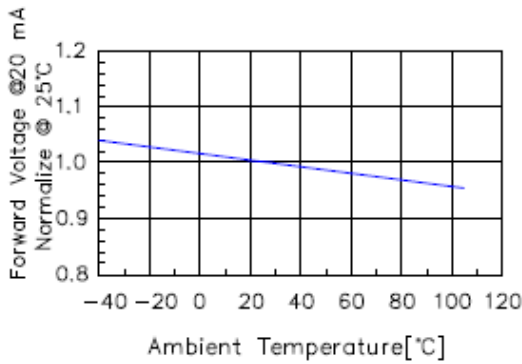


Fig 3. Forward Voltage vs. Temperature

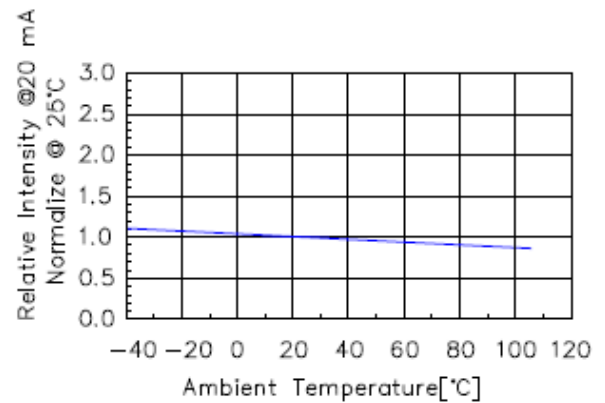


Fig 4. Relative Intensity vs. Temperature

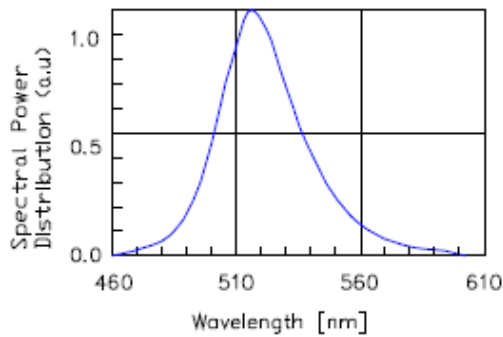


Fig 5. Spectral Power Distribution vs. Wavelength

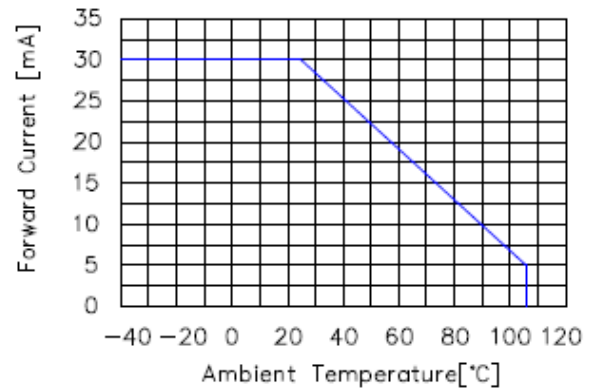


Fig 6. Forward current vs. Temperature



American Opto Plus LED Corp.

SMD-CT591QEGBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

ELECTRICAL/OPTICAL CHARACTERISTICS CURVES –Blue (Ta=25°C)

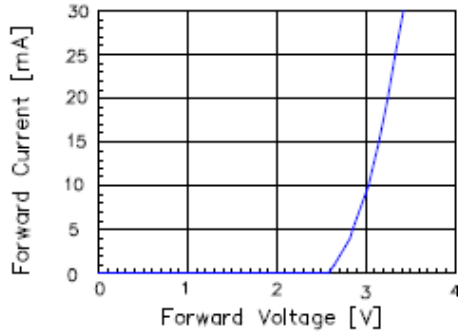


Fig 1. Forward Current vs. Forward Voltage

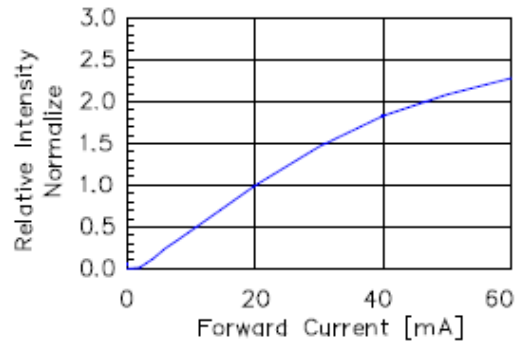


Fig 2. Relative Intensity vs. Forward Current

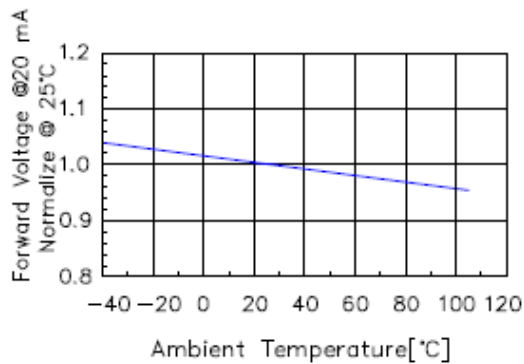


Fig 3. Forward Voltage vs. Temperature

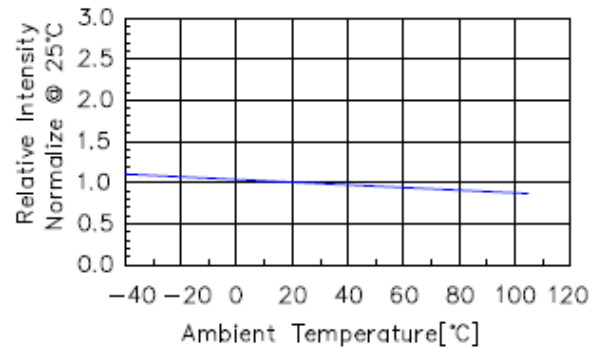


Fig 4. Relative Intensity vs. Temperature

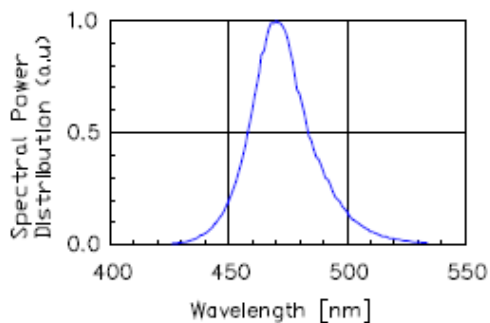


Fig 5. Spectral Power Distribution vs. Wavelength

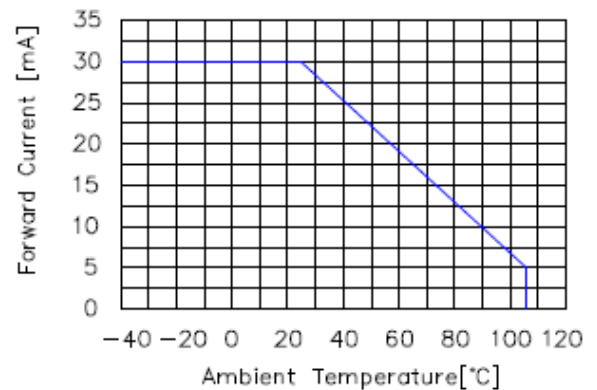


Fig 6. Forward current vs. Temperature



American Opto Plus LED Corp.

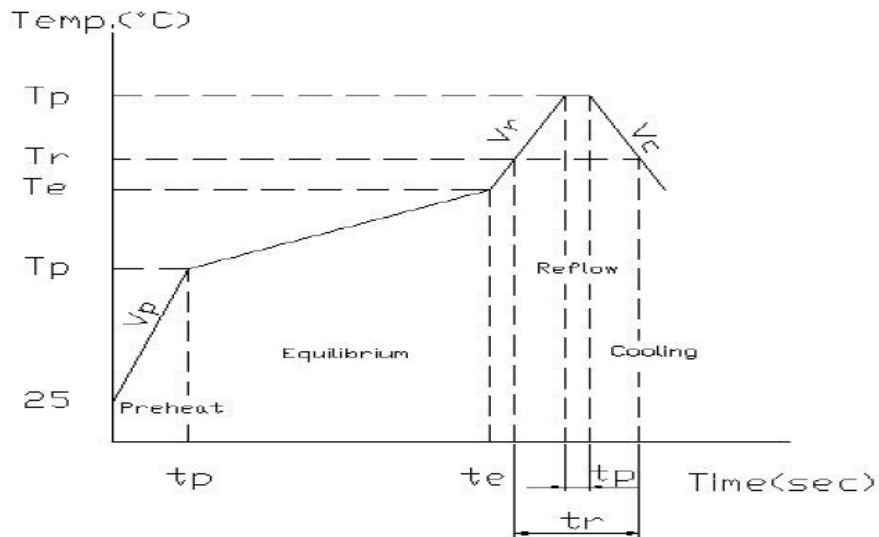
SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

SOLDERING CHARACTERISTICS

1. IR-reflow Condition (Pb free)

| Area | Title | Symbol | Min | Max | Unit |
|----------------|------------------|----------|-----|-----|--------|
| (1)Preheat | Ramp-up Rate | V_P | 1 | 5 | °C/sec |
| | Temperature | T_P | 150 | - | °C |
| | Time | t_p | - | - | sec |
| (2)Equilibrium | Ramp-up Rate | V_E | - | - | °C/sec |
| | Temperature | T_E | 150 | 200 | °C |
| | Time | t_e | 60 | 120 | sec |
| (3)Reflow | Ramp-up Rate | V_R | 1 | 5 | °C/sec |
| | Temperature | T_R | 220 | - | °C |
| | Time | t_r | - | 60 | sec |
| | Peak Temperature | T_{RP} | - | 260 | °C |
| | Peak Time | t_{rp} | - | 10 | sec |
| (4)Cooling | Ramp-down Rate | V_C | 3 | 6 | °C/sec |



2. Hand Soldering (Iron Condition)

Soldering Iron: 30W Max

Temperature 350°C Max

Soldering Time: 3 Seconds Max (One Time)

Distance: 1.6mm min (From Seating Plane)

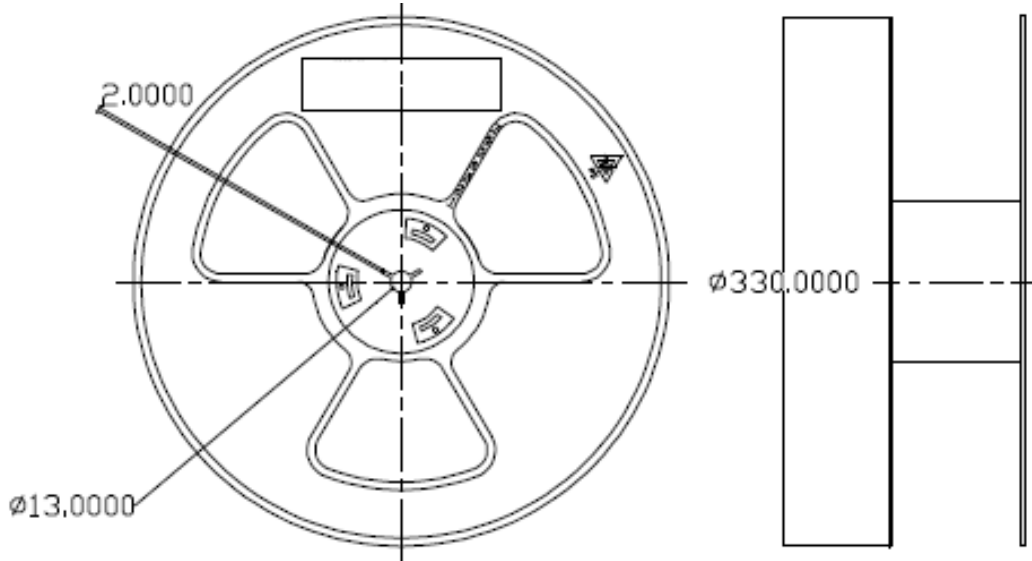


American Opto Plus LED Corp.

SMD-CT591QEPCBW

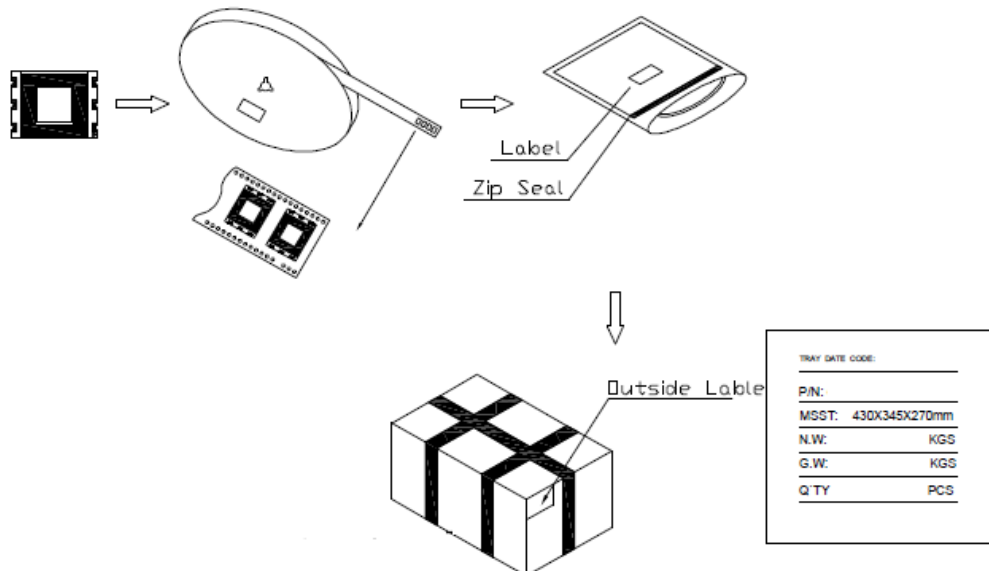
19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

REEL DIMENSION



Note: 750pcs per reel.

PACKING AND LABEL SPECIFICATION



| | |
|-----------------|---------------|
| TRAY DATE CODE: | _____ |
| P/N: | _____ |
| MSST: | 430X345X270mm |
| N.W: | KGS |
| G.W: | KGS |
| QTY: | PCS |

| Package | Size | Unit | Amount | Unit | Amount | Unit |
|-----------|----------------|------|--------|------|--------|------|
| Reel | Ø330 | mm | 1 | Reel | 750 | Pcs |
| Bag | L450*W430 | | 1 | Reel | 750 | |
| Outer Box | L430*W345*H270 | | 5 | Bag | 3750 | |



American Opto Plus LED Corp.

SMD-CT591QEPCBW

19.0 x 15.2 x 3.2mm RGB SMD Display w/Drive IC

STORAGE METHOD

- **Storage Conditions**

A. Before opening the package:

The LEDs should be kept at $-40^{\circ}\text{C} \sim 105^{\circ}\text{C}$ and RH: 45% ~ 85%. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material (silica gel) is recommended.

B. After opening the package:

The LEDs should be kept at $\leq 30^{\circ}\text{C}$ and $\leq 70\%RH$. The LEDs should be soldered within 168 hours (7) after opening the package. If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with packages of moisture absorbent material (silica gel).

It is also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again.

- If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment: more than 24 hours at $65 \pm 5^{\circ}\text{C}$