

# ASMC-PxB9-Txxxx Envisium Power PLCC-4 Surface Mount LED Data Sheet

## Envisium

Envisium is the premier class of mid-Power LEDs from Agilent and Lumileds utilizing the very best solid-state lighting technologies from these two industry leaders. Envisium LEDs offer unparalleled performance, engineering and design flexibility. For the very first time, customers have options for mid-power LEDs.

## Description

The Envisium Power PLCC-4 SMT LED is an extension of Agilent's PLCC-4 SMT LEDs. The package can be driven at high current due to its superior package design. The product is able to dissipate the heat more efficiently compared to the conventional PLCC-2 SMT LEDs. These LEDs produce higher light output with better flux performance compared to the conventional PLCC-4 SMT LEDs.

The Envisium Power PLCC-4 SMT LEDs are designed for higher reliability, better performance, and operate under a wide range of environmental conditions. The performance characteristics of these new mid-power LEDs make them uniquely suitable for use in harsh conditions such as in automotive applications, and in electronics signs and signals.

To facilitate easy pick and place assembly, the LEDs are packed in EIA-compliant tape and reel. Every reel is shipped in single intensity and color bin (except for red), to provide close uniformity. These LEDs are compatible with the IR solder reflow process. Due to the high reliability feature of these products, they also can be mounted using through-the-wave soldering process.

The Envisium Power PLCC-4 SMT LED is available in 3 colors, red, red-orange and amber.

## Features

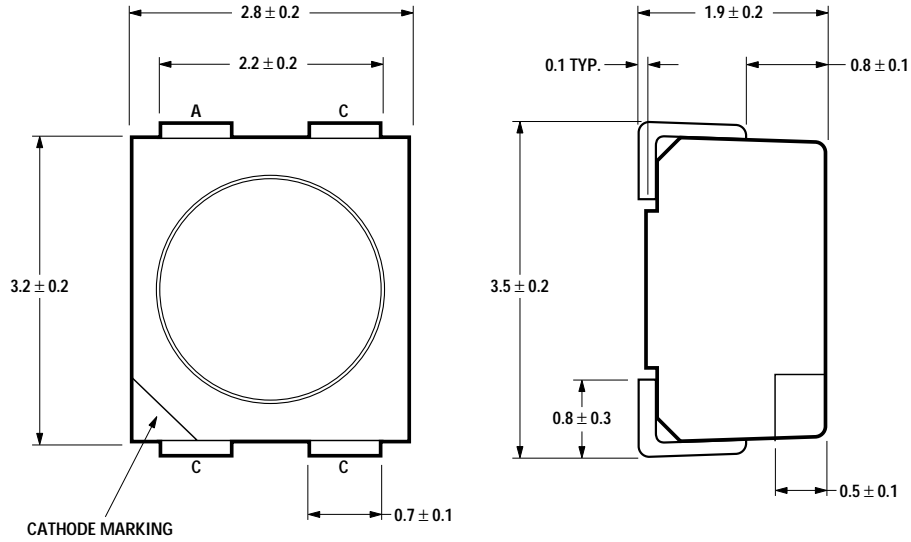
- Industry standard PLCC-4 (Plastic Leaded Chip Carrier)
- High reliability LED package
- Mid-Power intensity brightness with optimum flux performance using TS AlInGaP dice technologies
- Available in Red, Red Orange and Amber colors
- High optical efficiency
- Higher ambient temperature at the same current possible compared to PLCC-2
- Super wide viewing angle at 120°
- Available in 8 mm carrier tape on 7-inch reel
- Compatible with both IR and TTW soldering process

## Applications

- **Interior automotive**
  - Instrument panel backlighting
  - Central console backlighting
  - Navigation and audio system
  - Push button backlighting
- **Exterior automotive**
  - Turn signals
  - Side repeaters
  - CHMSL
  - Rear combination lamp
  - Puddle light
- **Electronic signs and signals**
  - Channel lettering
  - Contour lighting
  - Indoor variable message sign
- **Office automation, home appliances, industrial equipment**
  - Front panel backlighting
  - Push button backlighting
  - Display backlighting



## Package Dimensions



NOTE: ALL DIMENSIONS IN mm.

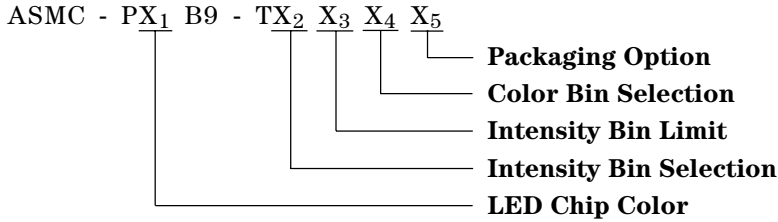
## Device Selection Guide

| Color      | Part Number     | Intensity Bin | Min. $I_V$ (mcd) | Max. $I_V$ (mcd) | Total Flux $\Phi_V$ (lm) <sup>[2,3]</sup> | Test Current (mA) | Dice Technology |
|------------|-----------------|---------------|------------------|------------------|---|-------------------|-----------------|
|            |                 |               |                  |                  | Typ.                                      |                   |                 |
| Red        | ASMC-PRB9-TV005 | V1            | 630.00           | 1000.00          | 2600.00                                   | 50                | AlInGaP         |
|            |                 | V2            | 790.00           | 1260.00          | 3300.00                                   |                   |                 |
|            |                 | W1            | 1000.00          | 1600.00          | -   |                   |                 |
| Red Orange | ASMC-PHB9-TW005 | W1            | 1000.00          | 1600.00          | 4300.00                                   | 50                | AlInGaP         |
|            |                 | W2            | 1200.00          | 2020.00          | 5000.00                                   |                   |                 |
|            |                 | X1            | 1580.00          | 2500.00          | -   |                   |                 |
| Amber      | ASMC-PAB9-TV005 | V1            | 630.00           | 1000.00          | 3000.00                                   | 50                | AlInGaP         |
|            |                 | V2            | 790.00           | 1260.00          | 3800.00                                   |                   |                 |
|            |                 | W1            | 1000.00          | 1600.00          | -   |                   |                 |

### Notes:

1. The luminous intensity,  $I_V$ , is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2.  $\Phi_V$  is the total luminous flux output as measured with an integrating sphere after the device has stabilized.
3. Flux tested at mono pulse conditions.

## Part Numbering System



## Absolute Maximum Ratings (T<sub>A</sub> = 25°C)

| Parameters                          | ASMC-PxB9-Txxxx        |
|-------------------------------------|------------------------|
| DC Forward Current <sup>[1]</sup>   | 70 mA <sup>[3,4]</sup> |
| Peak Forward Current <sup>[2]</sup> | 200 mA                 |
| Power Dissipation                   | 240 mW                 |
| Reverse Voltage                     | 5 V                    |
| Junction Temperature                | 125°C                  |
| Operating Temperature               | -40°C to +100°C        |
| Storage Temperature                 | -40°C to +100°C        |

### Notes:

- Derate linearly as shown in figure 4.
- Duty factor = 10%, Frequency = 1 kHz.
- Drive current between 10 mA and 70 mA is recommended for best long-term performance.
- Operation at currents below 5 mA is not recommended.

## Optical Characteristics (T<sub>A</sub> = 25°C)

| Color      | Part Number     | Dice Technology | Peak Wavelength        | Dominant Wavelength                | Viewing Angle 2θ <sup>1/2</sup> <sup>[2]</sup> | Luminous Efficacy η <sub>V</sub> <sup>[3]</sup> | Luminous Intensity/ Total Flux                             |
|------------|-----------------|-----------------|------------------------|------------------------------------|--|---|--|
|            |                 |                 | λ <sub>PEAK</sub> (nm) | λ <sub>D</sub> <sup>[1]</sup> (nm) | (Degrees)                                      | (lm/W)  | I <sub>V</sub> (mcd)/ Φ <sub>V</sub> <sup>[4,5]</sup> (lm) |
|            |                 |                 | Typ.                   | Typ.                               | Typ.   | Typ.  | Typ.   |
| Red        | ASMC-PRB9-Txxx5 | AlInGaP         | 639.0                  | 630.0                              | 120  | 155   | 0.30   |
| Red Orange | ASMC-PHB9-Txxx5 | AlInGaP         | 623.0                  | 617.0                              | 120  | 263   | 0.29   |
| Amber      | ASMC-PAB9-Txxx5 | AlInGaP         | 594.0                  | 592.0                              | 120  | 500   | 0.26   |

### Notes:

- The dominant wavelength, λ<sub>D</sub>, is derived from the CIE Chromaticity Diagram and represents the color of the device.
- θ<sup>1/2</sup> is the off-axis angle where the luminous intensity is 1/2 the peak intensity.
- Radiant intensity, I<sub>e</sub> in watts/steradian, may be calculated from the equation I<sub>e</sub> = I<sub>V</sub>/η<sub>V</sub>, where I<sub>V</sub> is the luminous intensity in candelas and η<sub>V</sub> is the luminous efficacy in lumens/watt.
- Φ<sub>V</sub> is the total luminous flux output as measured with an integrating sphere after the device has stabilized.
- Flux tested at mono pulse conditions.

## Electrical Characteristics (T<sub>A</sub> = 25°C)

| Part Number     | Forward Voltage V <sub>F</sub> (Volts) @ I <sub>F</sub> = 50 mA |      | Reverse Voltage V <sub>R</sub> @ 100 μA |
|-----------------|---|------|---|
|                 | Typ.  | Max. | Min.                                    |
| ASMC-PxB9-Txxx5 | 2.8   | 3.4  | 5                                       |

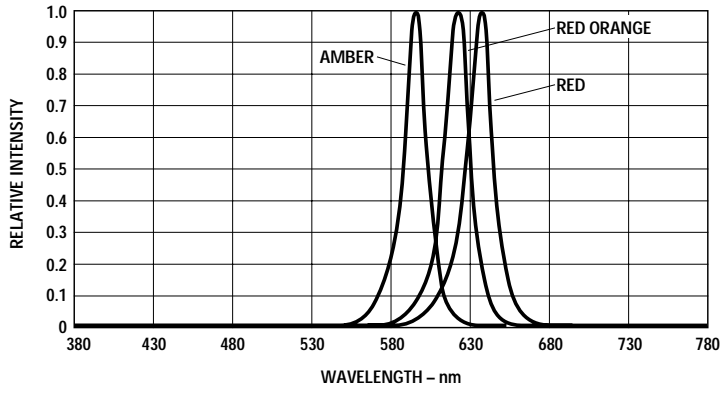


Figure 1. Relative intensity vs. wavelength.

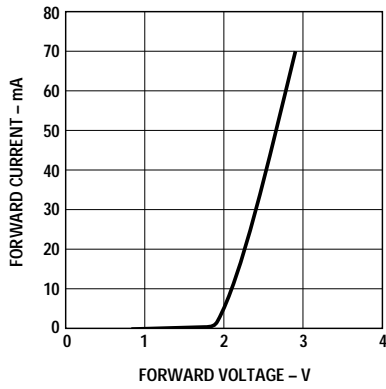


Figure 2. Forward current vs. forward voltage.

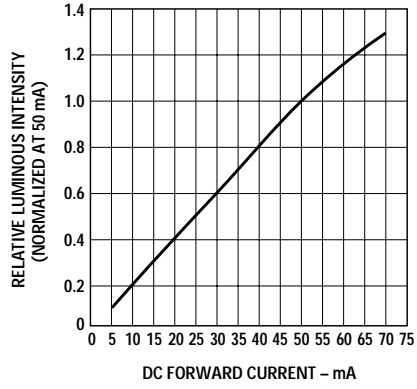


Figure 3. Relative intensity vs. forward current.

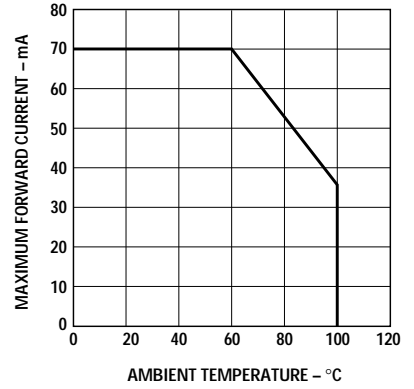


Figure 4. Maximum forward current vs. ambient temperature. Derated based on  $T_{jMAX} = 125^{\circ}C$ ,  $R_{\theta JA} = 300^{\circ}C/W$ .

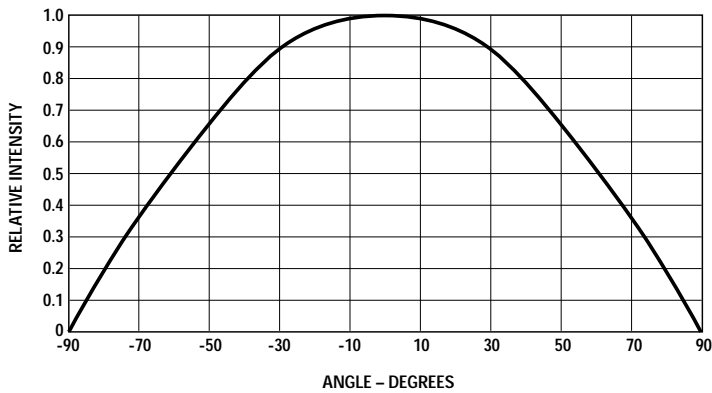


Figure 5. Radiation pattern.

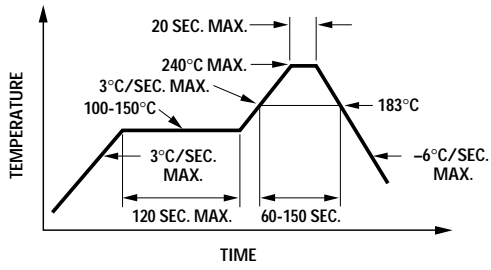
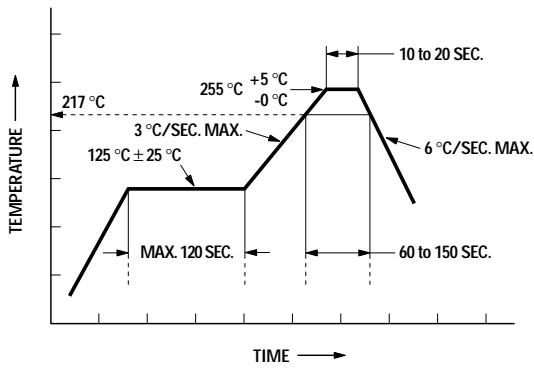


Figure 6a. Recommended Sn-Pb reflow soldering profile.



\* THE TIME FROM 25 °C TO PEAK TEMPERATURE = 6 MINUTES MAX.

Figure 6b. Recommended Pb-free reflow soldering profile.

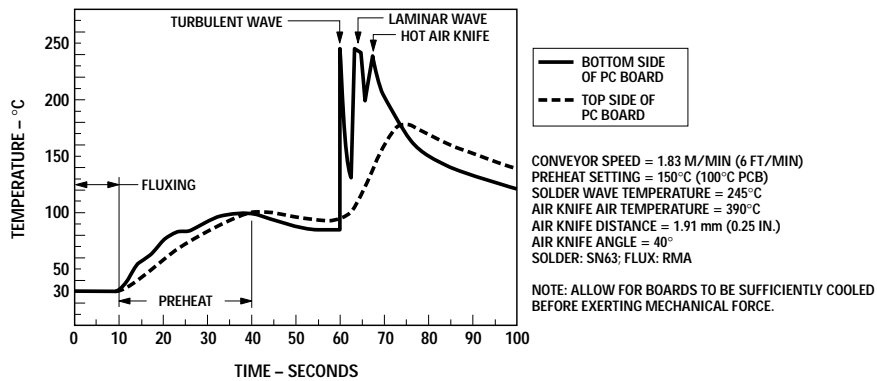


Figure 7. Recommended wave soldering profile.

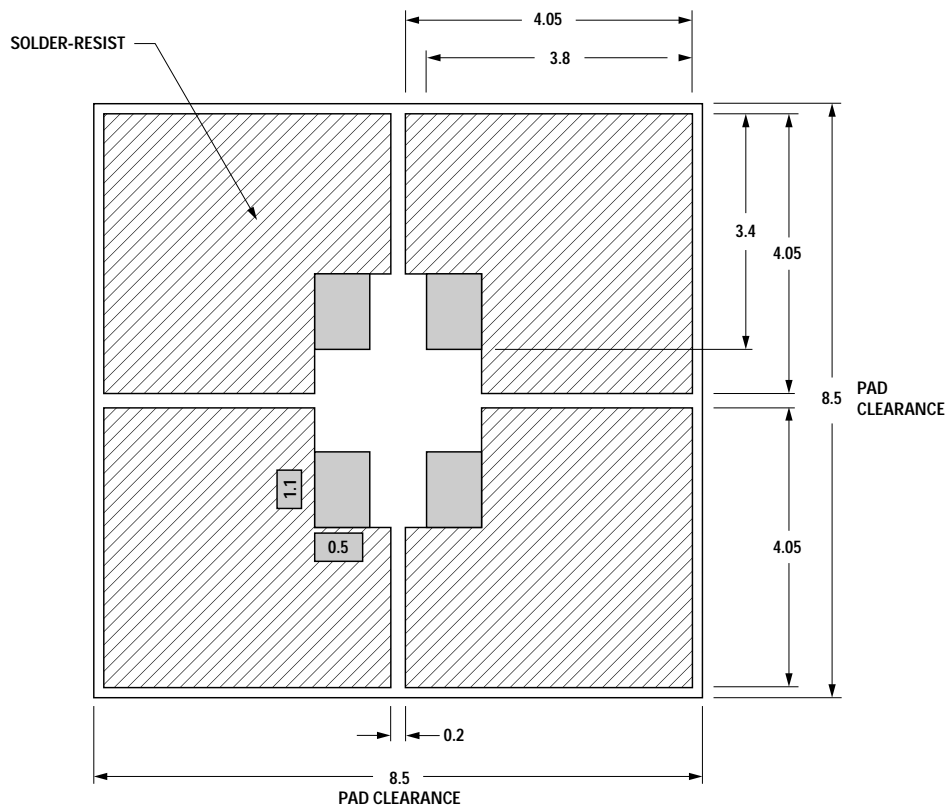


Figure 8. Recommended soldering pad pattern.

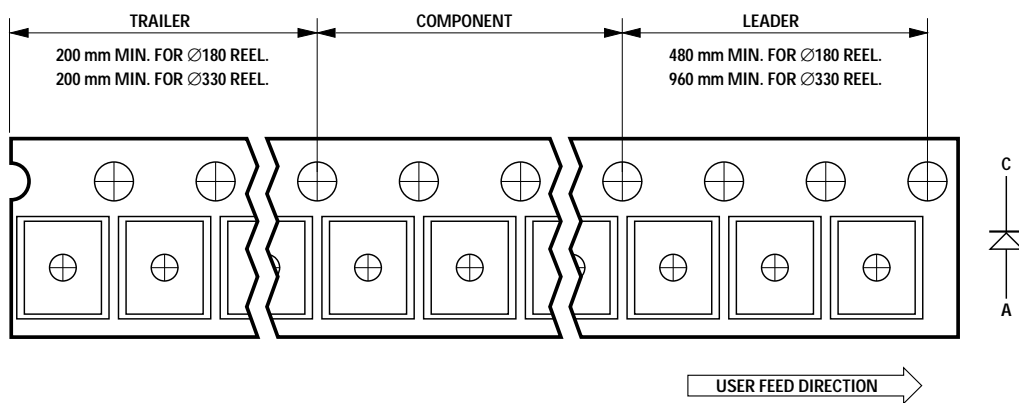


Figure 9. Tape leader and trailer dimensions.

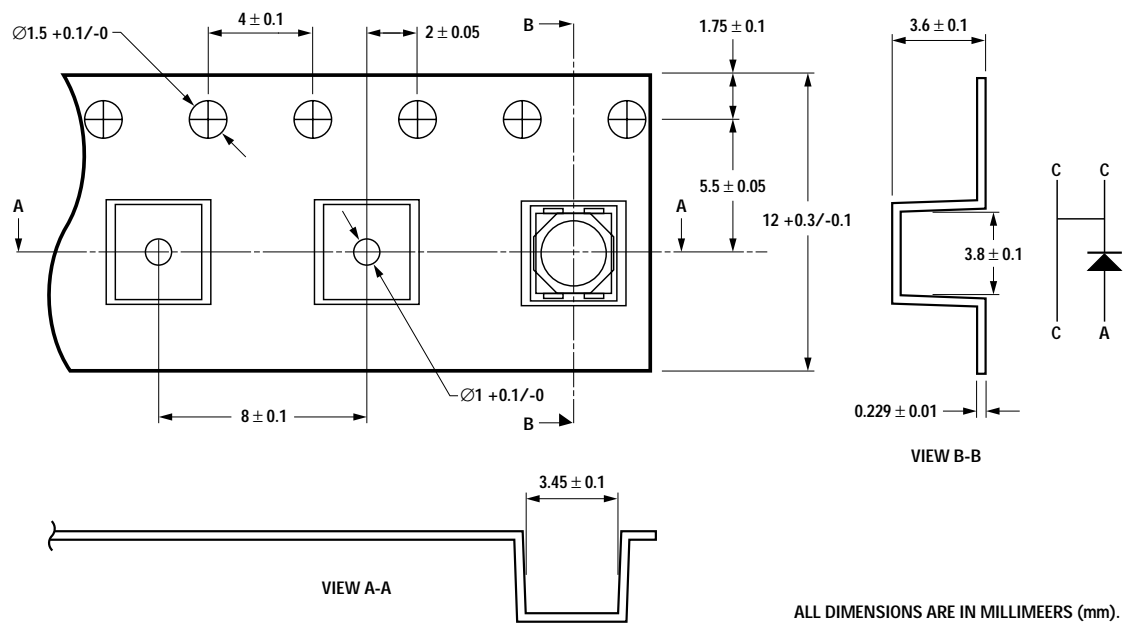


Figure 10. Tape dimensions.

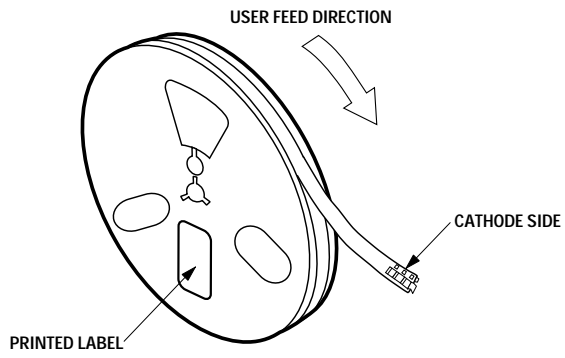


Figure 11. Reeling orientation.

**Intensity Bin Select (X<sub>2</sub>X<sub>3</sub>)**  
Individual reel will contain parts from one half bin only

| X <sub>2</sub>       | Min I <sub>v</sub> Bin                     |
|----------------------|--|
| <hr/>                |  |
| <b>X<sub>3</sub></b> |  |
| 0                    | Full Distribution                          |
| 3                    | 3 half bins starting from X <sub>6</sub> 1 |
| 4                    | 4 half bins starting from X <sub>6</sub> 1 |
| 5                    | 5 half bins starting from X <sub>6</sub> 1 |
| 7                    | 3 half bins starting from X <sub>6</sub> 2 |
| 8                    | 4 half bins starting from X <sub>6</sub> 2 |
| 9                    | 5 half bins starting from X <sub>6</sub> 2 |

**Intensity Bin Limits & Typical Flux**

| Bin ID | Min. (mcd) | Max. (mcd) |
|--------|------------|------------|
| V1     | 715.00     | 900.00     |
| V2     | 900.00     | 1125.00    |
| W1     | 1125.00    | 1400.00    |
| W2     | 1400.00    | 1800.00    |
| X1     | 1800.00    | 2240.00    |
| X2     | 2240.00    | 2850.00    |

Tolerance of each bin limit = ±12%.

**Color Bin Select (X<sub>4</sub>)**  
Individual reel will contain parts from one full bin only.

| X <sub>4</sub> |                        |
|----------------|------------------------|
| 0              | Full Distribution      |
| A              | 1 and 2 only           |
| B              | 2 and 3 only           |
| C              | 3 and 4 only           |
| D              | 4 and 5 only           |
| E              | 5 and 6 only           |
| G              | 1, 2 and 3 only        |
| H              | 2, 3 and 4 only        |
| J              | 3, 4 and 5 only        |
| K              | 4, 5 and 6 only        |
| M              | 1, 2, 3 and 4 only     |
| N              | 2, 3, 4 and 5 only     |
| P              | 3, 4, 5 and 6 only     |
| R              | 1, 2, 3, 4, and 5 only |
| S              | 2, 3, 4, 5 and 6 only  |

**Packaging Option (X<sub>5</sub>)**

| Option | Test Current | Package Type | Reel Size |
|--------|--------------|--------------|-----------|
| 5      | 50 mA        | Top Mount    | 7 inch    |

**Color Bin Limits**

| Amber/<br>Yellow | Min. (nm) | Max. (nm) |
|------------------|-----------|-----------|
| 1                | 582.0     | 584.5     |
| 2                | 584.5     | 587.0     |
| 3                | 587.0     | 589.5     |
| 4                | 589.5     | 592.0     |
| 5                | 592.0     | 594.5     |
| 6                | 594.5     | 597.0     |

| Red<br>Orange | Min. (nm) | Max. (nm) |
|---------------|-----------|-----------|
| 1             | 611.0     | 616.0     |
| 2             | 616.0     | 620.0     |

| Red               | Min. (nm) | Max. (nm) |
|-------------------|-----------|-----------|
| Full Distribution |           |           |

Tolerance of each bin limit = ± 1 nm.



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