

# HDSM-541x/543x

## 0.56" (14.22mm)

### Dual digit surface mount LED display



## Data Sheet

### Description

The HDSM-541x/543x is a dual digit display of 0.56" (14.22mm) height. This device utilizes AlInGaP / GaAs chips and has a grey top surface with white segments.

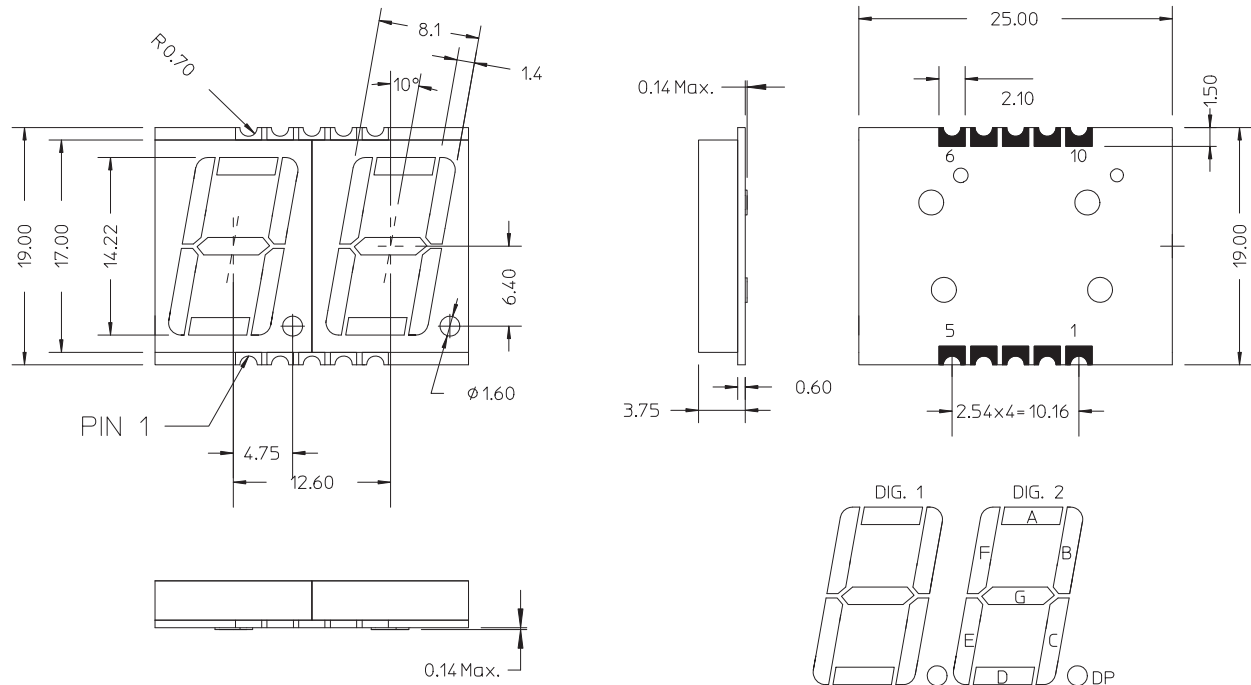
### Features

- 0.56" digit height
- Low current operation
- Excellent characters appearance
- Available in CA and CC
- 500 pieces per reel
- Moisture sensitivity level: Level 3
- RoHS compliant

### Ordering Information

| Red       | Green     | Yellow    | Orange    | Description                        |
|-----------|-----------|-----------|-----------|------------------------------------|
| HDSM-541C | HDSM-541H | HDSM-541F | HDSM-541L | Common Anode, Right Hand Decimal   |
| HDSM-543C | HDSM-543H | HDSM-543F | HDSM-543L | Common Cathode, Right Hand Decimal |

### Package Dimensions



#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance are 0.25 mm (0.01") unless otherwise noted.

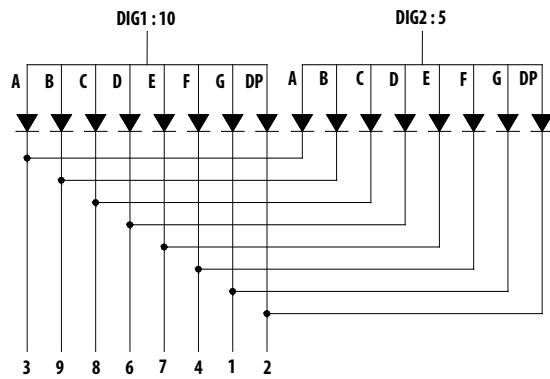
### Pin Connection (Common Anode)

| PIN No | Connection        |
|--------|-------------------|
| 1      | CATHODE G         |
| 2      | CATHODE DP        |
| 3      | CATHODE A         |
| 4      | CATHODE F         |
| 5      | COMMON ANODE DIG2 |
| 6      | CATHODE D         |
| 7      | CATHODE E         |
| 8      | CATHODE C         |
| 9      | CATHODE B         |
| 10     | COMMON ANODE DIG1 |

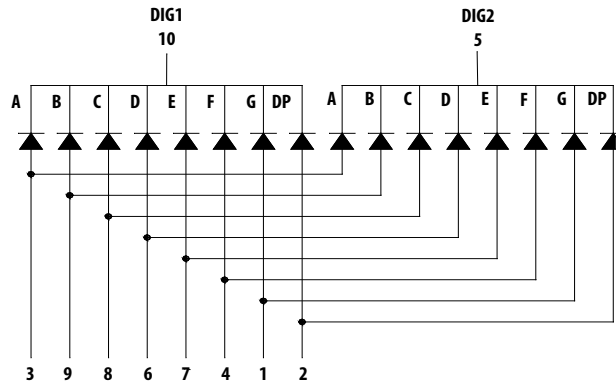
### Pin Connection (Common Cathode)

| PIN No | Connection           |
|--------|----------------------|
| 1      | ANODE G              |
| 2      | ANODE DP             |
| 3      | ANODE A              |
| 4      | ANODE F              |
| 5      | COMMON CATHODE DIG2  |
| 6      | ANODE D              |
| 7      | ANODE E              |
| 8      | ANODE C              |
| 9      | ANODE B              |
| 10     | COMMON CATHODE DIG 1 |

### Internal Circuit Diagram (Common Anode)



### Internal Circuit Diagram (Common Cathode)



### Absolute Maximum Ratings @ $T_A=25^\circ$

| Parameter                                                                         | Green/Yellow/Red/Orange | Unit        |
|-----------------------------------------------------------------------------------|-------------------------|-------------|
| Power Dissipation Per Segment                                                     | 65                      | mW          |
| Peak Forward Current Per Segment<br>(1/10 Duty Cycle, .01ms pulse width)          | 100                     | mA          |
| Continuous Forward Current Per Segment<br>Derating Linearly From 25°C Per Segment | 25<br>0.25              | mA<br>mA/°C |
| Reverse Voltage Per Segment                                                       | 5                       | V           |
| Operating Temperature Range                                                       | -40°C to +105°C         |             |
| Storage Temperature Range                                                         | -40°C to +105°C         |             |

## Electrical / Optical Characteristics @ T<sub>A</sub>=25°C

### Green

| Parameters                        | Symbol                         | Min | Typ     | Max | Unit | Test Condition        |
|-----------------------------------|--------------------------------|-----|---------|-----|------|-----------------------|
| Average Luminous Intensity        | I <sub>V</sub>                 | 5.4 | 10.5    | -   | mcd  | I <sub>F</sub> = 10mA |
| Emissions Wavelength              | λ <sub>p</sub> /λ <sub>d</sub> | -   | 572/571 | -   | nm   | I <sub>F</sub> = 20mA |
| Spectral Line Half-Width          | Δλ                             | -   | 20      | -   | nm   | I <sub>F</sub> = 20mA |
| Forward Voltage, Per Segment      | V <sub>F</sub>                 | -   | 2.1     | 2.6 | V    | I <sub>F</sub> = 20mA |
| Reverse Current, Per Segment      | I <sub>R</sub>                 | -   |         | 100 | μA   | V <sub>R</sub> = 5V   |
| Luminous Intensity Matching Ratio | I <sub>V-M</sub>               | -   | -       | 2:1 | -    | I <sub>F</sub> = 10mA |

### Yellow

| Parameters                        | Symbol                         | Min | Typ     | Max | Unit | Test Condition        |
|-----------------------------------|--------------------------------|-----|---------|-----|------|-----------------------|
| Average Luminous Intensity        | I <sub>V</sub>                 | 8.6 | 20      | -   | mcd  | I <sub>F</sub> = 10mA |
| Emissions Wavelength              | λ <sub>p</sub> /λ <sub>d</sub> | -   | 591/589 | -   | nm   | I <sub>F</sub> = 20mA |
| Spectral Line Half-Width          | Δλ                             | -   | 15      | -   | nm   | I <sub>F</sub> = 20mA |
| Forward Voltage, Per Segment      | V <sub>F</sub>                 | -   | 2.1     | 2.6 | V    | I <sub>F</sub> = 20mA |
| Reverse Current, Per Segment      | I <sub>R</sub>                 | -   |         | 100 | μA   | V <sub>R</sub> = 5V   |
| Luminous Intensity Matching Ratio | I <sub>V-M</sub>               | -   | -       | 2:1 | -    | I <sub>F</sub> = 10mA |

### Red

| Parameters                        | Symbol                         | Min | Typ     | Max | Unit | Test Condition        |
|-----------------------------------|--------------------------------|-----|---------|-----|------|-----------------------|
| Average Luminous Intensity        | I <sub>V</sub>                 | 8.6 | 16.0    | -   | mcd  | I <sub>F</sub> = 10mA |
| Emissions Wavelength              | λ <sub>p</sub> /λ <sub>d</sub> | -   | 632/624 | -   | nm   | I <sub>F</sub> = 20mA |
| Spectral Line Half-Width          | Δλ                             | -   | 20      | -   | nm   | I <sub>F</sub> = 20mA |
| Forward Voltage, Per Segment      | V <sub>F</sub>                 | -   | 2.0     | 2.6 | V    | I <sub>F</sub> = 20mA |
| Reverse Current, Per Segment      | I <sub>R</sub>                 | -   |         | 100 | μA   | V <sub>R</sub> = 5V   |
| Luminous Intensity Matching Ratio | I <sub>V-M</sub>               | -   | -       | 2:1 | -    | I <sub>F</sub> = 10mA |

### Orange

| Parameters                        | Symbol                         | Min | Typ     | Max | Unit | Test Condition        |
|-----------------------------------|--------------------------------|-----|---------|-----|------|-----------------------|
| Average Luminous Intensity        | I <sub>V</sub>                 | 8.6 | 19.5    | -   | mcd  | I <sub>F</sub> = 10mA |
| Emissions Wavelength              | λ <sub>p</sub> /λ <sub>d</sub> | -   | 611/605 | -   | nm   | I <sub>F</sub> = 20mA |
| Spectral Line Half-Width          | Δλ                             | -   | 17      | -   | nm   | I <sub>F</sub> = 20mA |
| Forward Voltage, Per Segment      | V <sub>F</sub>                 | -   | 2.1     | 2.6 | V    | I <sub>F</sub> = 20mA |
| Reverse Current, Per Segment      | I <sub>R</sub>                 | -   |         | 100 | μA   | V <sub>R</sub> = 5V   |
| Luminous Intensity Matching Ratio | I <sub>V-M</sub>               | -   | -       | 2:1 | -    | I <sub>F</sub> = 10mA |

## Typical Electrical / Optical characteristic curves @ $T_A=25^{\circ}\text{C}$

Green

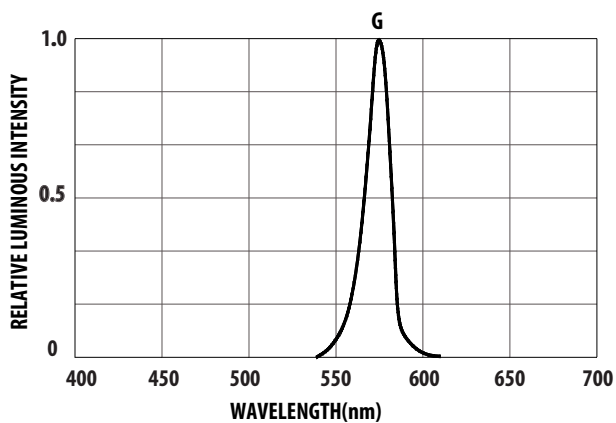


Figure 1. Relative Luminous Intensity vs. Wavelength

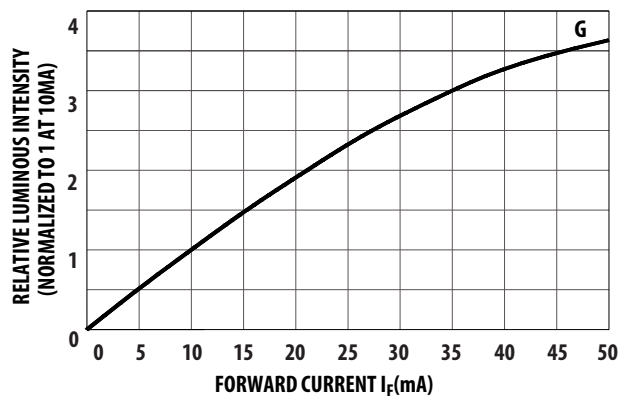


Figure 2. Relative Luminous Intensity vs. Forward Current

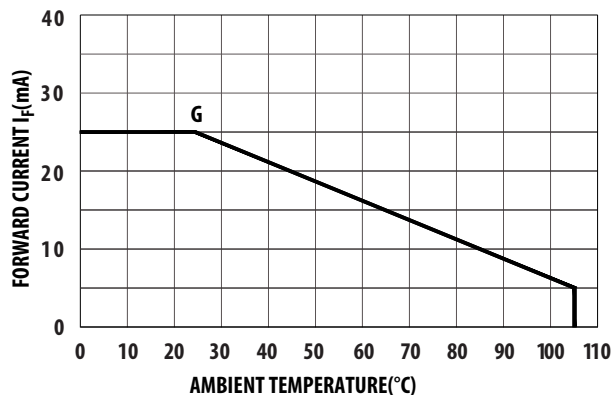


Figure 3. Allowable DC Current vs. Ambient Temperature

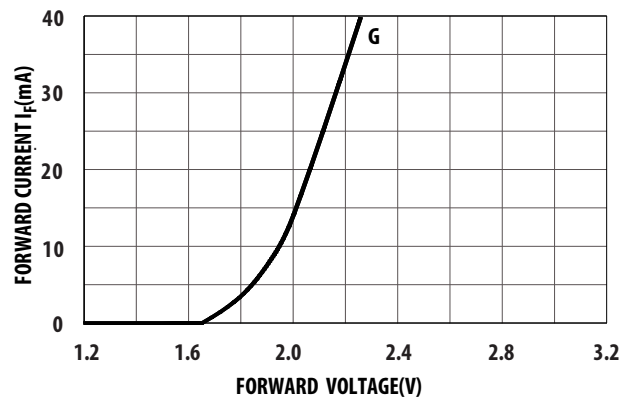


Figure 4. Forward Current vs. Forward Voltage

## Yellow

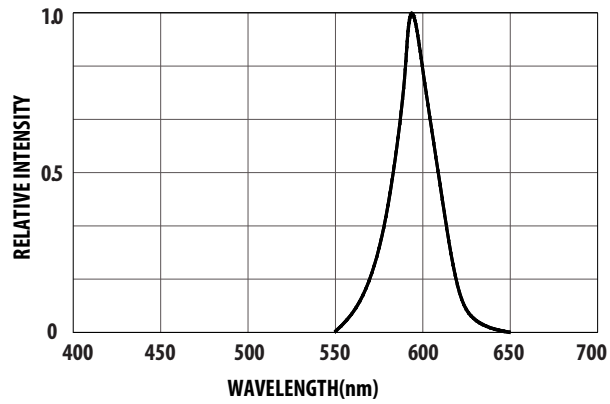


Figure 1. Relative Intensity vs. Wavelength

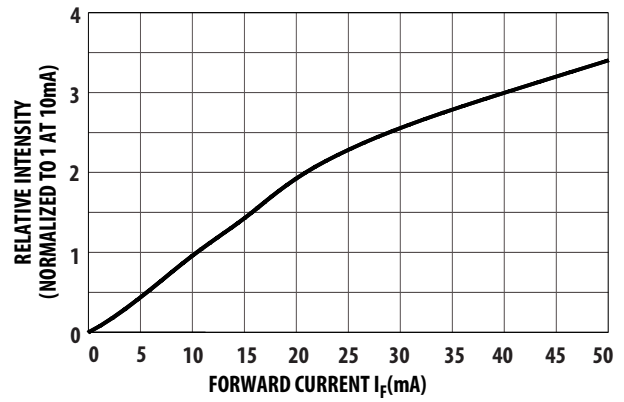


Figure 2. Relative Intensity vs. Forward Current

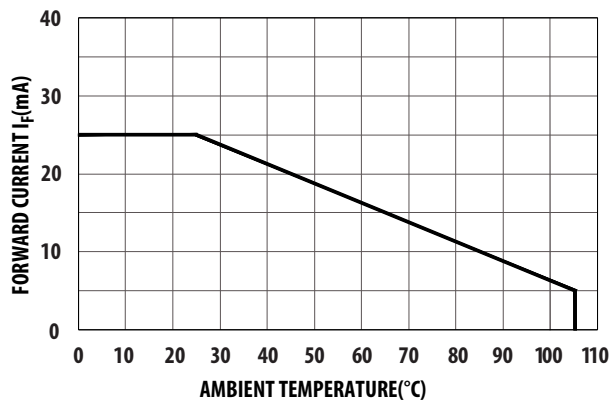


Figure 3. Allowable DC Current vs. Ambient Temperature

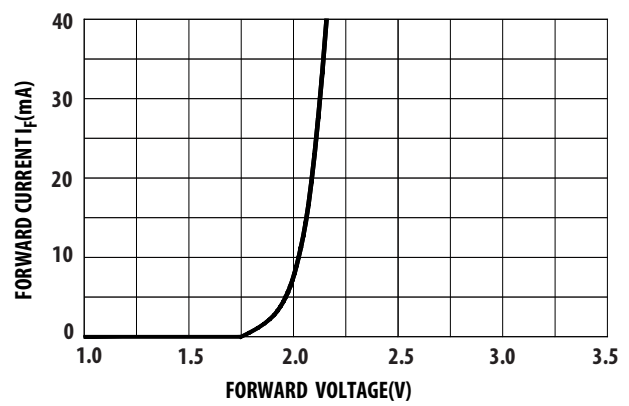


Figure 4. Forward Current vs. Forward Voltage

Red

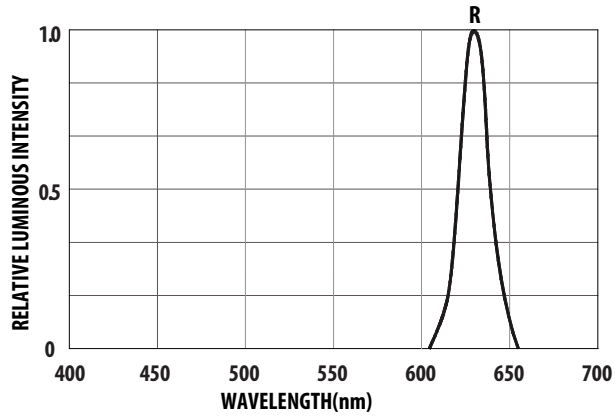


Figure 1. Relative Luminous Intensity vs. Wavelength

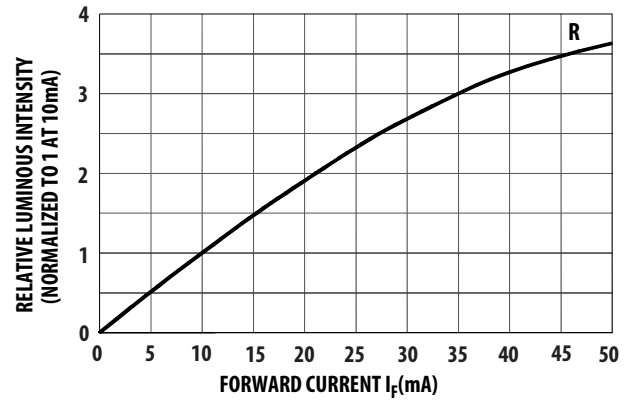


Figure 2. Relative Luminous Intensity vs. Forward Current

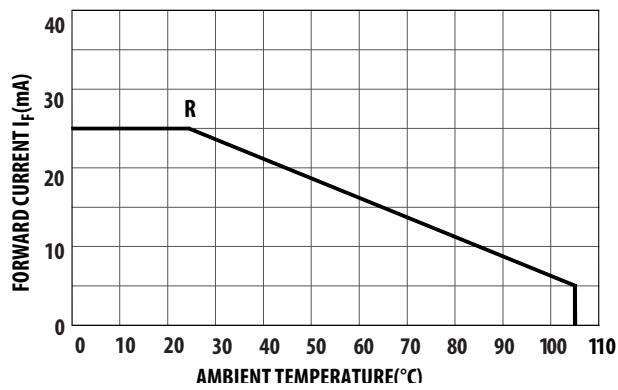


Figure 3. Allowable DC Current vs. Ambient Temperature

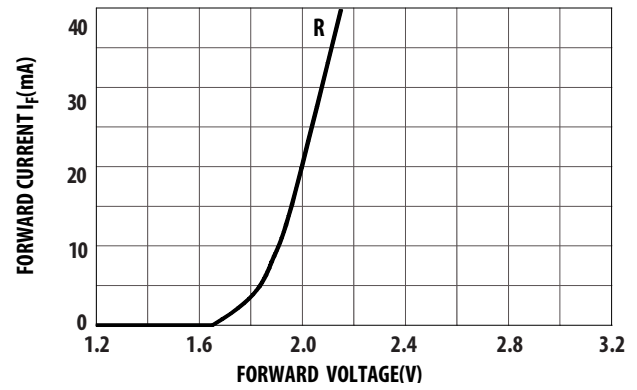


Figure 4. Forward Current vs. Forward Voltage

## Orange

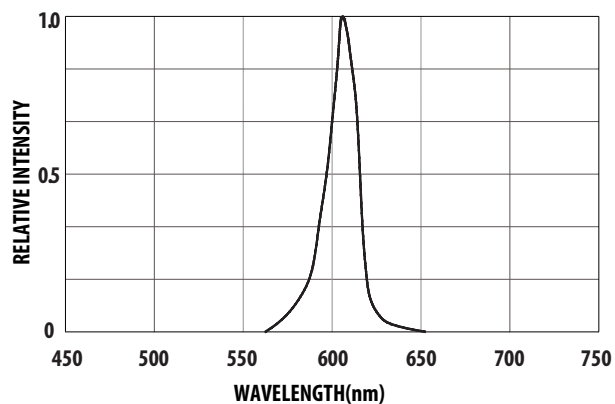


Figure 1. Relative Intensity vs. Wavelength

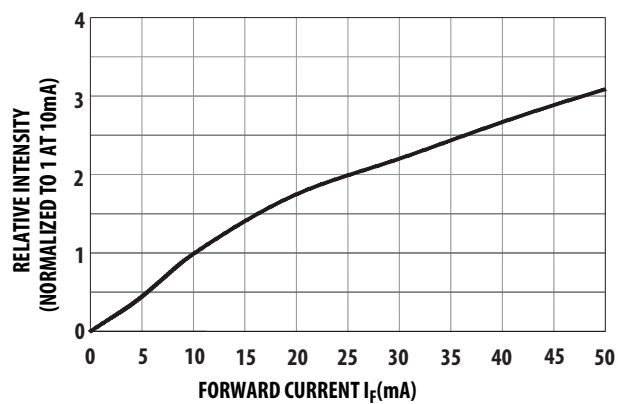


Figure 2. Relative Intensity vs. Forward Current

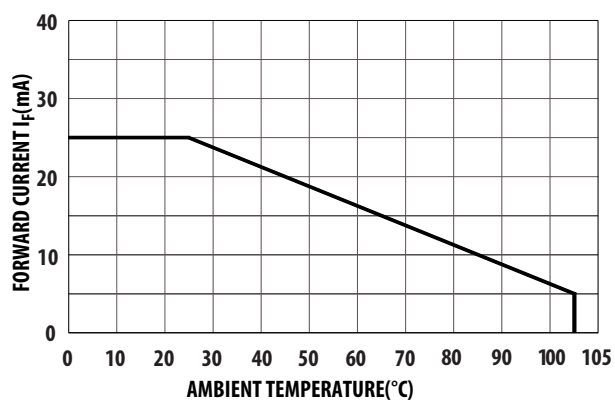


Figure 3. Allowable DC Current vs. Ambient Temperature

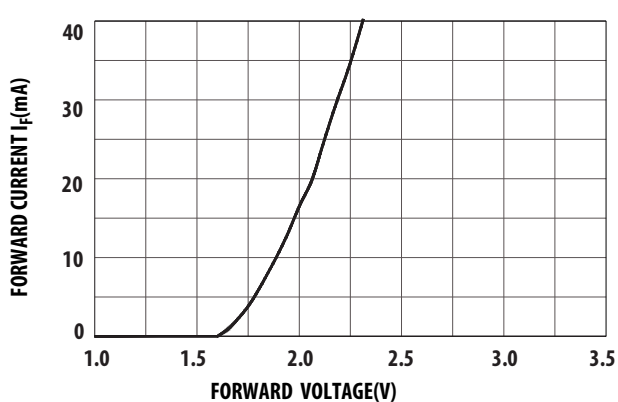


Figure 4. Forward Current vs. Forward Voltage

## Intensity Bin Limits (mcd)

### Green

| IV Bin Category | Min.   | Max    |
|-----------------|--------|--------|
| M               | 5.401  | 8.600  |
| N               | 8.601  | 13.700 |
| P               | 13.701 | 21.800 |
| Q               | 21.801 | 34.700 |

Tolerance:  $\pm 15\%$

### Yellow / Red / Orange

| IV Bin Category | Min.   | Max    |
|-----------------|--------|--------|
| N               | 8.601  | 13.700 |
| P               | 13.701 | 21.800 |
| Q               | 21.801 | 34.700 |
| R               | 34.701 | 55.200 |

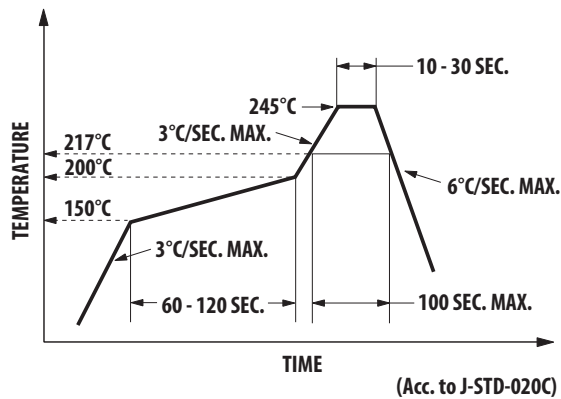
Tolerance:  $\pm 15\%$

Note:

- Bin categories are established for classification of products. Products may not be available in all categories. Please contact your Avago representative for information on currently available bins.

## SMT Soldering Profile

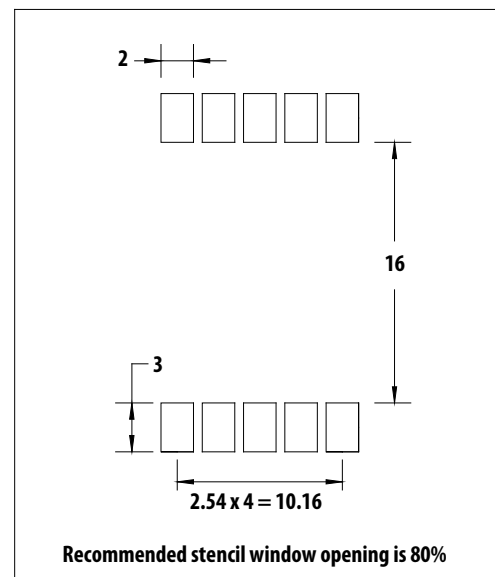
### Pb free reflow soldering Profile



Notes:

- The peak temperature refers to the peak package body temperature.
- Number of reflow process shall be limited to maximum 2 times only. Cooling process to normal temperature is required between first and second soldering process.

## Recommended soldering pattern (unit: mm)



Technical drawing of a rectangular plate with dimensions and tolerances. The drawing includes a top view and a side view. The top view shows a plate with a width of  $44^{+0.300}_{-0.100}$  and a length of  $40.4 \pm 0.1$ . There are four rectangular cutouts, each with a width of  $4 \pm 0.1$  and a height of  $20.2 \pm 0.1$ . The distance between the centers of the first and second cutouts is  $2.4 \pm 0.1$ . The distance from the left edge to the center of the first cutout is  $1.75 \pm 0.1$ . The distance from the center of the first cutout to the center of the second cutout is  $4 \pm 0.1$ . The distance from the center of the second cutout to the center of the third cutout is  $2.4 \pm 0.1$ . The distance from the center of the third cutout to the center of the fourth cutout is  $4 \pm 0.1$ . The distance from the center of the fourth cutout to the right edge is  $1.75 \pm 0.1$ . The plate has a thickness of  $0.35$ . The top view also shows a series of small circles along the edges, with a diameter of  $\phi 1.5^{+0.1}_{-0.0}$  and a hole diameter of  $\phi 2$ .



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