

HDSM-531x, HDSM-533x

0.56 in. (14.22 mm) Single-Digit Surface-Mount LED Display

Description

The Broadcom® HDSM-531x/533x is a 0.56 in. (14.22 mm) height single-digit display. This device uses an AlInGaP/ GaAs chip. This device has a gray top surface and white segments.

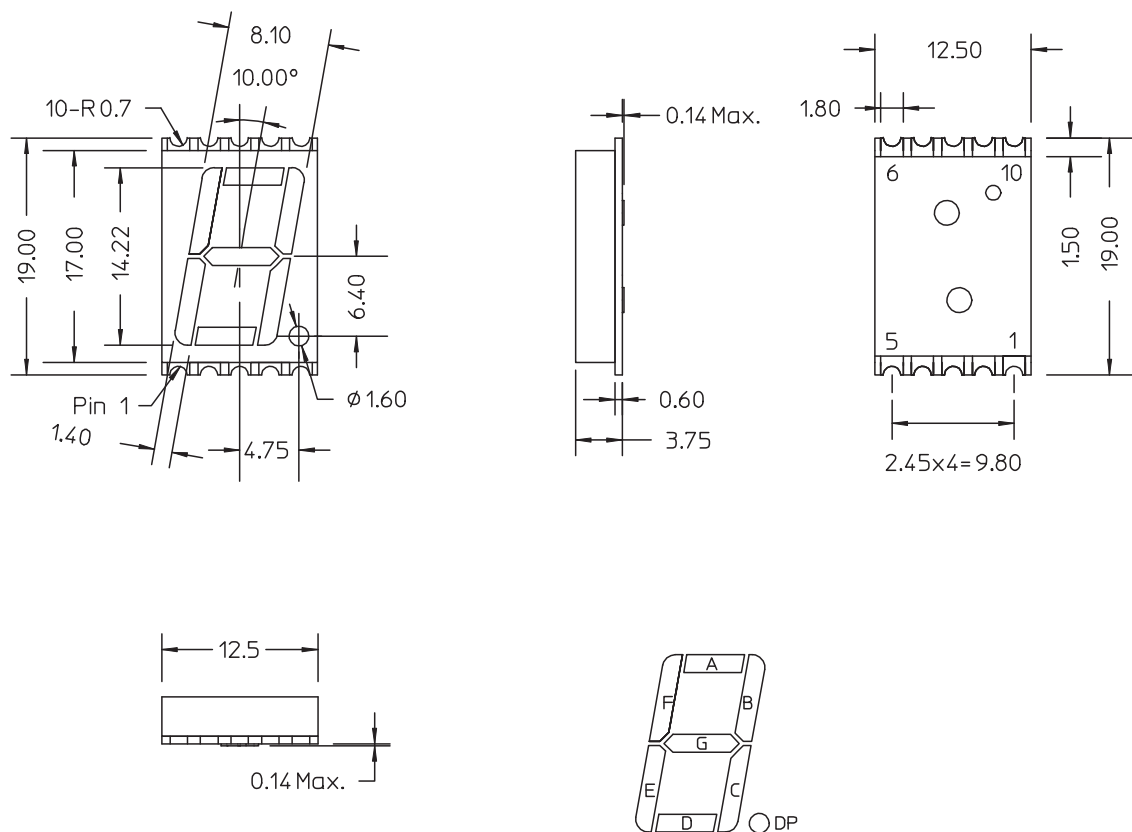
Features

- 0.56 in. digit height
- Low current operation
- Excellent characters appearance
- Available in CA and CC
- 1000 pieces per reel
- Moisture sensitivity level: Level 3
- RoHS compliant

Ordering Information

Red	Green	Yellow	Orange	Description
HDSM-531C	HDSM-531H	HDSM-531F	HDSM-531L	Common Anode, Right Hand Decimal
HDSM-533C	HDSM-533H	HDSM-533F	HDSM-533L	Common Cathode, Right Hand Decimal

Package Dimensions



NOTE:

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

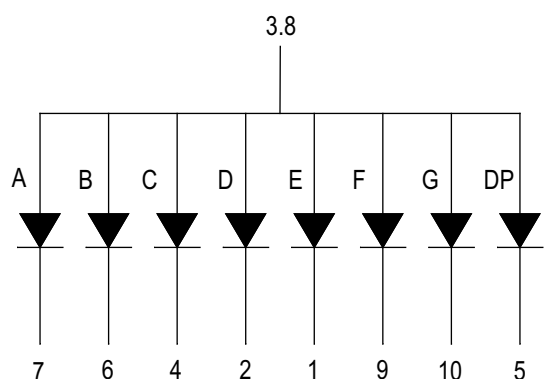
Pin Connection (Common Anode)

Pin Number	Connection
1	CATHODE E
2	CATHODE D
3	COMMON ANODE
4	CATHODE C
5	CATHODE DP
6	CATHODE B
7	CATHODE A
8	COMMON ANODE
9	CATHODE F
10	CATHODE G

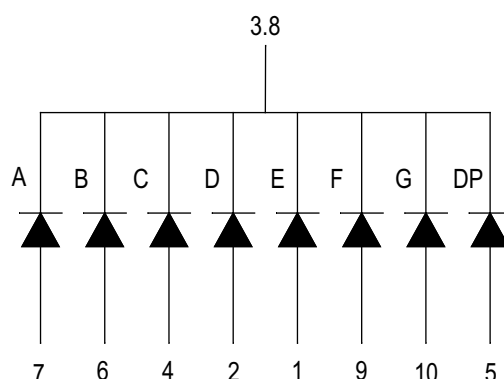
Pin Connection (Common Cathode)

Pin Number	Connection
1	ANODE E
2	ANODE D
3	COMMON CATHODE
4	ANODE C
5	ANODE DP
6	ANODE B
7	ANODE A
8	COMMON CATHODE
9	ANODE F
10	ANODE G

Internal Circuit Diagram (Common Anode)



Internal Circuit Diagram (Common Cathode)



Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

Parameter	Green/Yellow/Red/Orange	Units
Power Dissipation Per Segment	65	mW
Peak Forward Current Per Segment (1/10 Duty Cycle, 0.1-ms pulse width)	100	mA
Continuous Forward Current Per Segment	25	mA
Derating Linearly From 25°C Per Segment	0.25	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 at $T_A = 25^\circ\text{C}$

Green

Parameters	Symbol	Min.	Typ.	Max.	Units	Test Condition
Average Luminous Intensity	I_V	5.4	10.5	—	mcd	$I_F = 10\text{ mA}$
Emissions Wavelength	λ_p/λ_d	—	572/571	—	nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$	—	20	—	nm	$I_F = 20\text{ mA}$
Forward Voltage, Per Segment	V_F	—	2.1	2.6	V	$I_F = 20\text{ mA}$
Reverse Current, Per Segment	I_R	—	—	100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	I_{V-M}	—	—	2:1		$I_F = 10\text{ mA}$

Yellow

Parameters	Symbol	Min.	Typ.	Max.	Units	Test Condition
Average Luminous Intensity	I_V	8.6	20	—	mcd	$I_F = 10\text{ mA}$
Emissions Wavelength	λ_p/λ_d	—	591/589	—	nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$	—	15	—	nm	$I_F = 20\text{ mA}$
Forward Voltage, Per Segment	V_F	—	2.1	2.6	V	$I_F = 20\text{ mA}$
Reverse Current, Per Segment	I_R	—	—	100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	I_{V-M}	—	—	2:1		$I_F = 10\text{ mA}$

Red

Parameters	Symbol	Min.	Typ.	Max.	Units	Test Condition
Average Luminous Intensity	I_V	8.6	16	—	mcd	$I_F = 10\text{ mA}$
Emissions Wavelength	λ_p/λ_d	—	644/630	—	nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$	—	20	—	nm	$I_F = 20\text{ mA}$
Forward Voltage, Per Segment	V_F	—	2.0	2.6	V	$I_F = 20\text{ mA}$
Reverse Current, Per Segment	I_R	—	—	100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	I_{V-M}	—	—	2:1		$I_F = 10\text{ mA}$

Orange

Parameters	Symbol	Min.	Typ.	Max.	Units	Test Condition
Average Luminous Intensity	I_V	8.6	19.5	—	mcd	$I_F = 10\text{ mA}$
Emissions Wavelength	λ_p/λ_d	—	611/605	—	nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$	—	17	—	nm	$I_F = 20\text{ mA}$
Forward Voltage, Per Segment	V_F	—	2.1	2.6	V	$I_F = 20\text{ mA}$
Reverse Current, Per Segment	I_R	—	—	100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	I_{V-M}	—	—	2:1		$I_F = 10\text{ mA}$

Typical Electrical/Optical Characteristic Curves at T_A = 25°C

Green

Figure 1: Relative Luminous Intensity vs. Wavelength

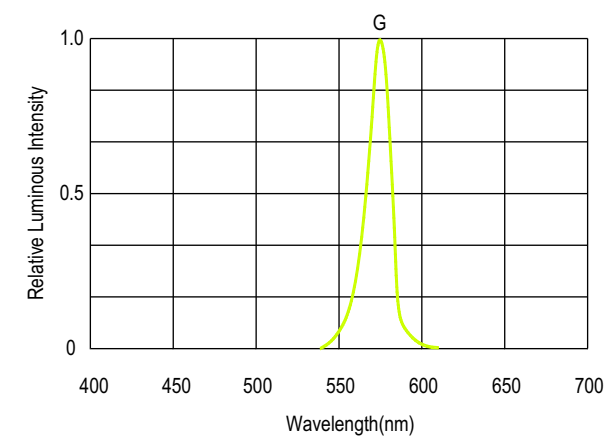


Figure 2: Relative Luminous Intensity vs. Forward Current

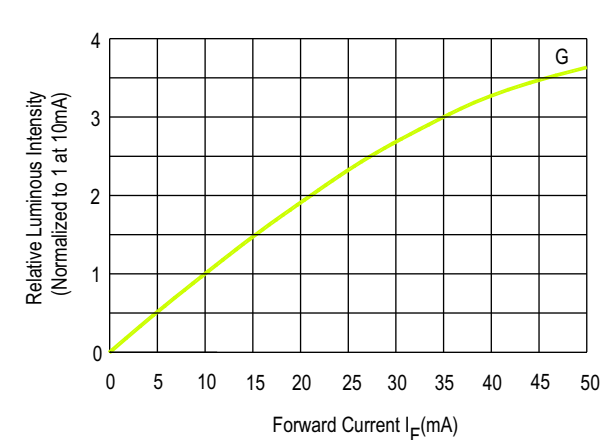


Figure 3: Allowable DC Current vs. Ambient Temperature

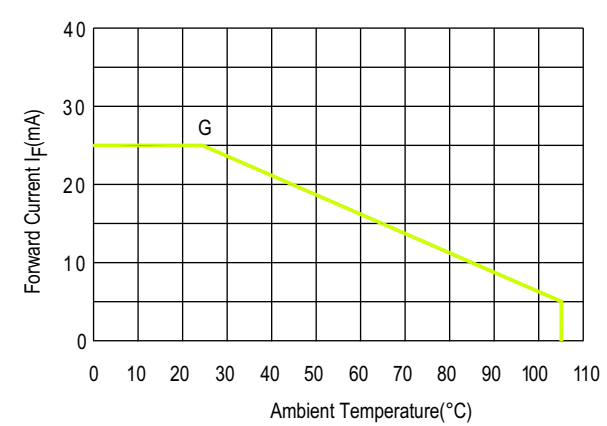
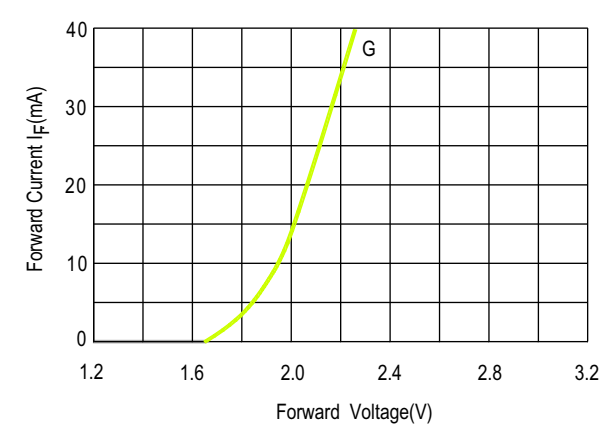


Figure 4: Forward Current vs. Forward Voltage



Typical Electrical/Optical Characteristic Curves at T_A = 25°C

Yellow

Figure 5: Relative Intensity vs. Wavelength

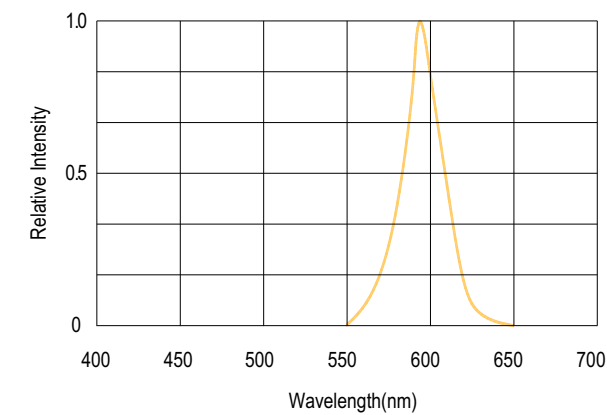


Figure 6: Relative Intensity vs. Forward Current

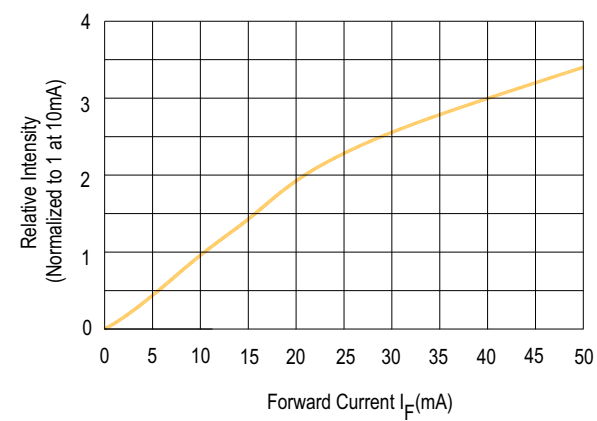


Figure 7: Allowable DC Current vs. Ambient Temperature

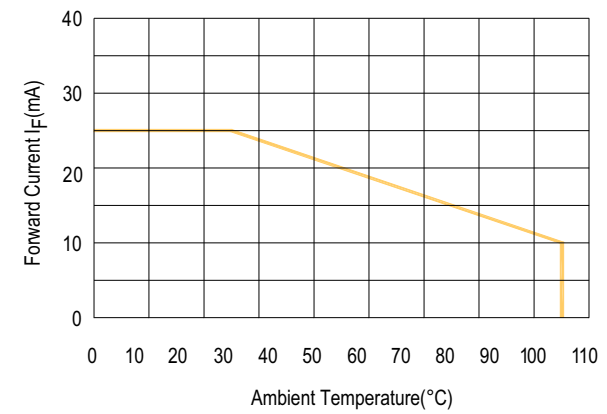
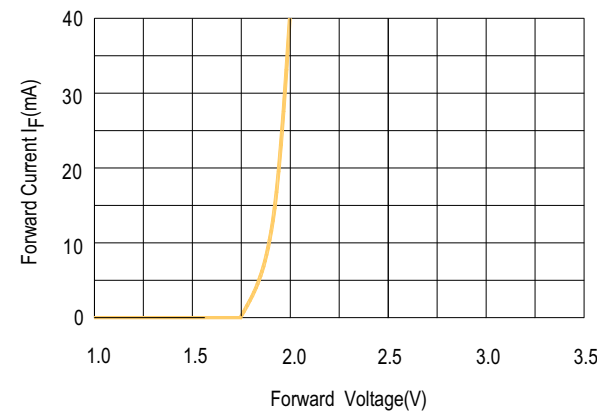


Figure 8: Forward Current vs. Forward Voltage



Typical Electrical/Optical Characteristic Curves at T_A = 25°C

Red

Figure 9: Relative Luminous Intensity vs. Wavelength

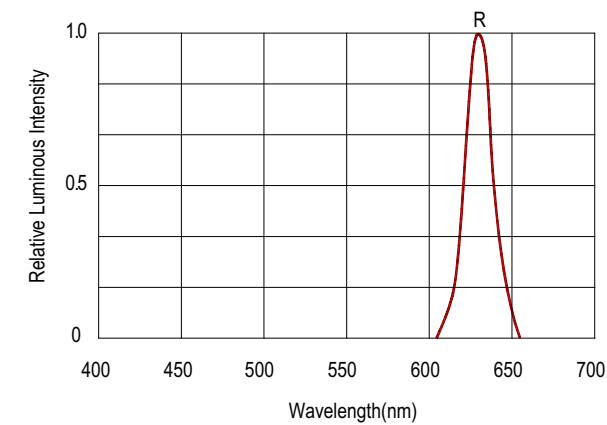


Figure 10: Relative Luminous Intensity vs. Forward Current

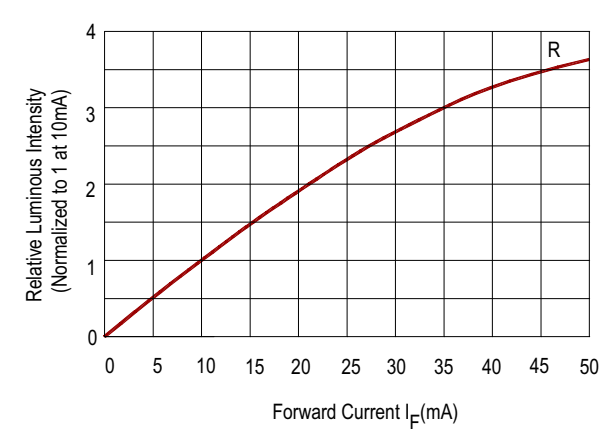


Figure 11: Allowable DC Current vs. Ambient Temperature

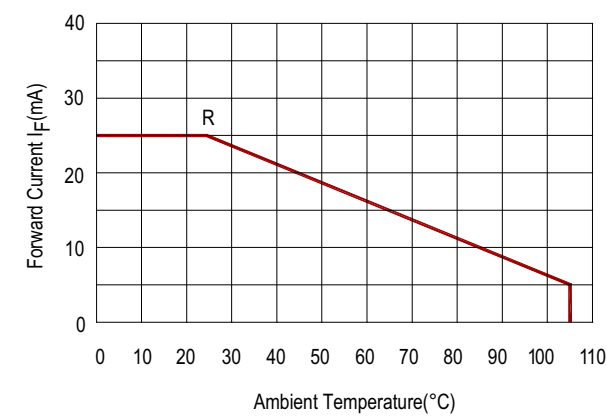
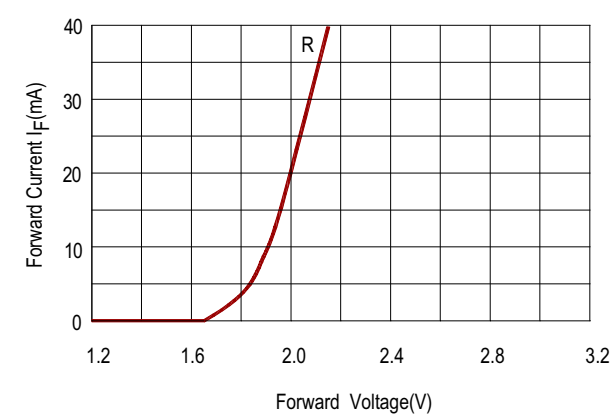


Figure 12: Forward Current vs. Forward Voltage



Typical Electrical/Optical Characteristic Curves at T_A = 25°C

Orange

Figure 13: Relative Intensity vs. Wavelength

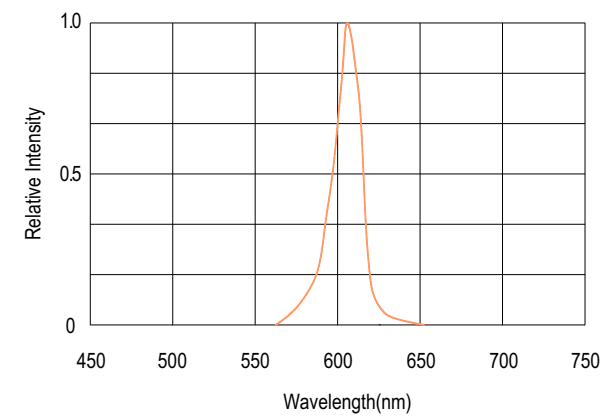


Figure 14: Relative Intensity vs. Forward Current

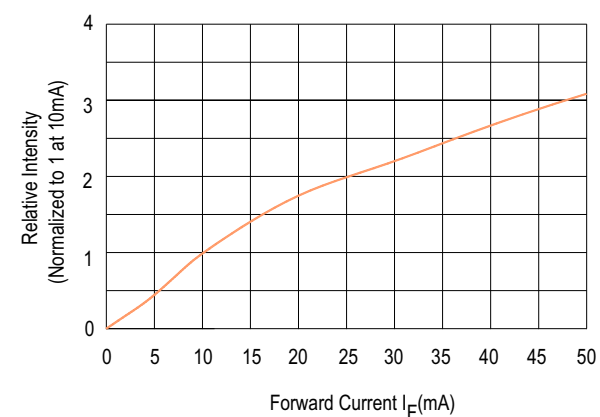


Figure 15: Allowable DC Current vs. Ambient Temperature

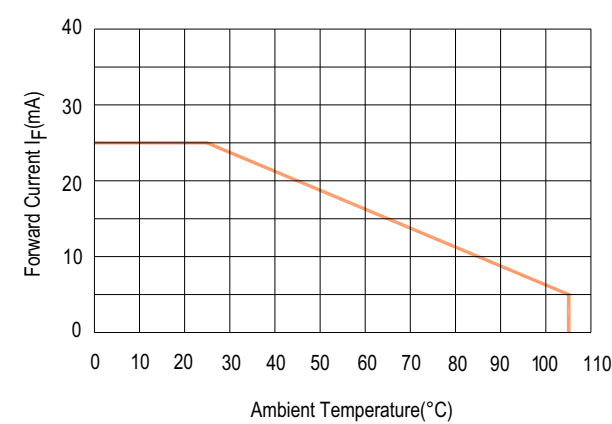
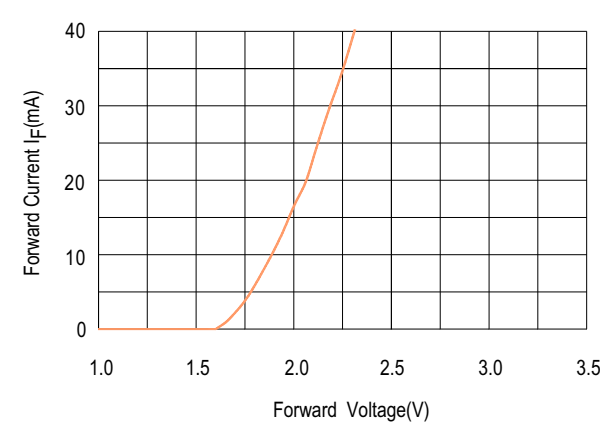


Figure 16: Forward Current vs. Forward Voltage



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	37.400

Tolerance: ± 15%.

NOTE: Bin categories are established for classification of products. Products may not be available in all categories. Contact your Broadcom representative for information on currently available bins.

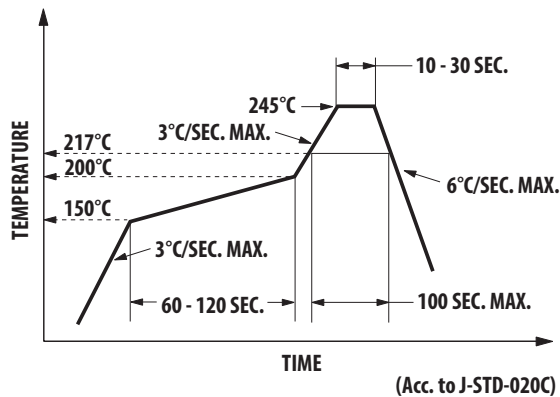
Yellow/Red/Orange

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: ± 15%.

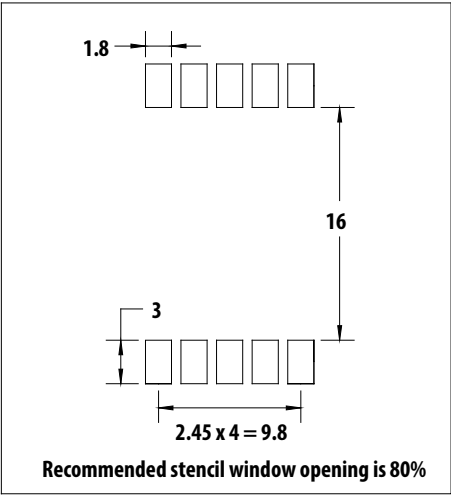
SMT Soldering Profile

Pb-Free Reflow Soldering Profile

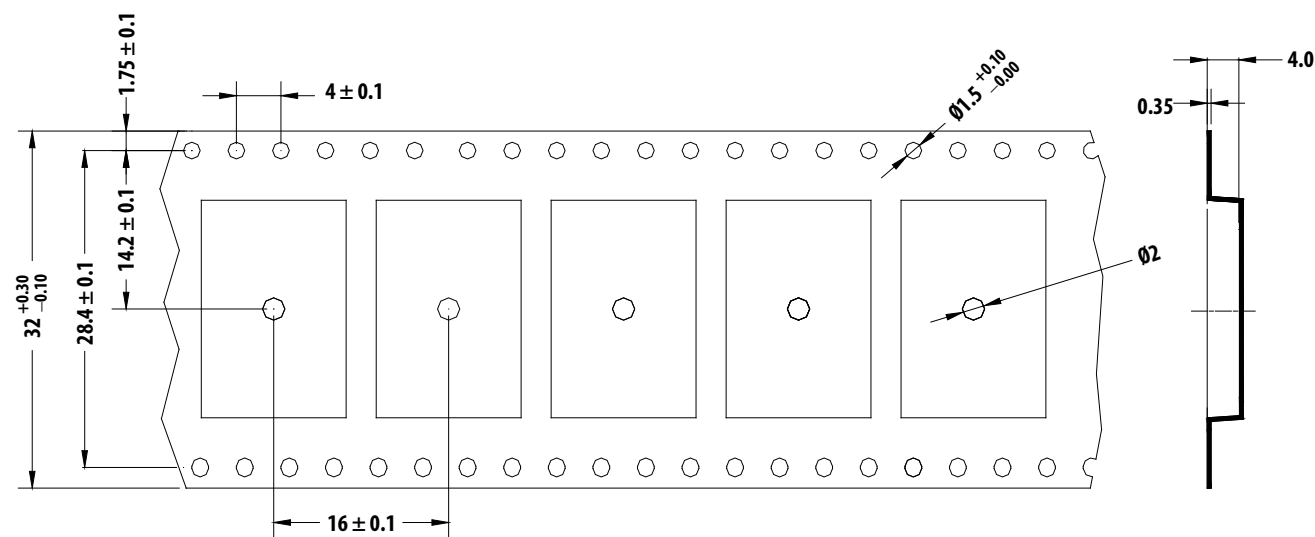


- NOTE:**
1. The peak temperature refers to the peak package body temperature.
 2. The number of reflow processes shall be limited to a maximum of twice only. A cooling process to normal temperature is required between the first and second soldering processes.

Recommended Soldering Pattern (Unit: mm)



Tape Specification (Unit: mm)



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