



## Features

- RoHS compliant\*
- Zener voltages 2.0 V to 39 V
- Fits SOD323 and SOD523



This series is currently available, but not recommended for new designs.

## CD0603/1005-Z Surface Mount Zener Diode Series

### General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

Bourns offers Zener Diodes for voltage reference applications, in compact chip package 0603 and 1005 size format, which offer PCB real estate savings and are considerably smaller than most competitive parts. The Zener Diodes have a zener voltage range between 2.0 V and 39 V.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle on standard pick and place equipment and their flat configuration minimizes roll away.

### Electrical and Thermal Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Parameter                                                                                               | Symbol           | CD1005-Z    | CD0603-Z    | Unit |
|---------------------------------------------------------------------------------------------------------|------------------|-------------|-------------|------|
| Power Dissipation @ T=25 °C                                                                             | P <sub>D</sub>   | 200         | 150         | mW   |
| Peak Forward Surge Current 8.3 ms<br>Single Half Sine-wave Superimposed on<br>Rated Load (JEDEC Method) | I <sub>FSM</sub> | 2.0         | 2.0         | A    |
| Operating and Storage Temperature Range                                                                 | T <sub>J</sub>   | -55 to +125 | -55 to +125 | °C   |

#### Notes:

1. Pulse test width PW=300 µsec, 1 % duty cycle.
2. Mounted on P.C. board with 0.2 x 0.2 " (5.0 x 5.0 mm) copper pad areas.

### How To Order

**CD 0603 - Z 2V2**

Common Code \_\_\_\_\_  
Chip Diode

Package \_\_\_\_\_  
• 0603  
• 1005

Model \_\_\_\_\_  
Z = Zener Diode

Nominal Zener Voltage \_\_\_\_\_  
2V2 = 2.2 Volts  
39 = 39 Volts

# BOURNS®

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[www.bourns.com](http://www.bourns.com)

\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

Specifications are subject to change without notice.

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## Applications

- DC-DC converters
- Portable electronics
- Industrial controllers
- Desktop PCs and notebooks

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Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

| Part Number |        | Part Marking | Zener Voltage  |        |                     | Zener Impedance |                |                 |                | Reverse Current |     |
|-------------|--------|--------------|----------------|--------|---------------------|-----------------|----------------|-----------------|----------------|-----------------|-----|
|             |        |              | V <sub>Z</sub> |        |                     | Z <sub>ZT</sub> | I <sub>Z</sub> | Z <sub>ZK</sub> | I <sub>Z</sub> | I <sub>R</sub>  |     |
| CD0603      | CD1005 |              | Min. V         | Max. V | I <sub>Z</sub> (mA) | Ohms            | mA             | Ohms            | mA             | μA              | VR  |
| -Z2         | -Z2    | Z0           | 1.90           | 2.1    | 5                   | 100             | 5              | 600             | 1              | 100             | 1   |
| -Z2V2       | -Z2V2  | Z1           | 2.09           | 2.31   | 5                   | 100             | 5              | 600             | 1              | 100             | 1   |
| -Z2V4       | -Z2V4  | Z2           | 2.28           | 2.52   | 5                   | 85              | 5              | 600             | 1              | 100             | 1   |
| -Z2V7       | -Z2V7  | Z3           | 2.57           | 2.84   | 5                   | 83              | 5              | 500             | 1              | 75              | 1   |
| -Z3         | -Z3    | Z4           | 2.85           | 3.15   | 5                   | 95              | 5              | 500             | 1              | 50              | 1   |
| -Z3V3       | -Z3V3  | Z5           | 3.14           | 3.47   | 5                   | 95              | 5              | 500             | 1              | 25              | 1   |
| -Z3V6       | -Z3V6  | Z6           | 3.42           | 3.78   | 5                   | 95              | 5              | 500             | 1              | 15              | 1   |
| -Z3V9       | -Z3V9  | Z7           | 3.71           | 4.10   | 5                   | 95              | 5              | 500             | 1              | 10              | 1   |
| -Z4V3       | -Z4V3  | Z8           | 4.09           | 4.52   | 5                   | 95              | 5              | 500             | 1              | 5               | 1   |
| -Z4V7       | -Z4V7  | Z9           | 4.47           | 4.94   | 5                   | 78              | 5              | 500             | 1              | 5               | 2   |
| -Z5V1       | -Z5V1  | ZA           | 4.85           | 5.36   | 5                   | 60              | 5              | 480             | 1              | 0.1             | 0.8 |
| -Z5V6       | -Z5V6  | ZB           | 5.32           | 5.88   | 5                   | 40              | 5              | 400             | 1              | 0.1             | 1   |
| -Z6V2       | -Z6V2  | ZC           | 5.89           | 6.51   | 5                   | 10              | 5              | 200             | 1              | 0.1             | 2   |
| -Z6V8       | -Z6V8  | ZE           | 6.46           | 7.14   | 5                   | 8               | 5              | 150             | 1              | 0.1             | 3   |
| -Z7V5       | -Z7V5  | ZF           | 7.13           | 7.88   | 5                   | 7               | 5              | 50              | 1              | 0.1             | 5   |
| -Z8V2       | -Z8V2  | ZG           | 7.79           | 8.61   | 5                   | 7               | 5              | 50              | 1              | 0.1             | 6   |
| -Z9V1       | -Z9V1  | ZH           | 8.65           | 9.56   | 5                   | 10              | 5              | 50              | 1              | 0.1             | 7   |
| -Z10        | -Z10   | ZJ           | 9.50           | 10.50  | 5                   | 15              | 5              | 70              | 1              | 0.1             | 7.5 |
| -Z11        | -Z11   | ZK           | 10.45          | 11.55  | 5                   | 20              | 5              | 70              | 1              | 0.1             | 8.5 |
| -Z12        | -Z12   | ZM           | 11.40          | 12.60  | 5                   | 20              | 5              | 90              | 1              | 0.1             | 9   |
| -Z13        | -Z13   | ZN           | 12.35          | 13.65  | 5                   | 25              | 5              | 110             | 1              | 0.1             | 10  |
| -Z15        | -Z15   | ZP           | 14.25          | 15.75  | 5                   | 30              | 5              | 110             | 1              | 0.1             | 11  |
| -Z16        | -Z16   | ZQ           | 15.20          | 16.80  | 5                   | 40              | 5              | 170             | 1              | 0.1             | 12  |
| -Z18        | -Z18   | ZR           | 17.10          | 18.90  | 5                   | 50              | 5              | 170             | 1              | 0.1             | 14  |
| -Z20        | -Z20   | ZS           | 19.00          | 21.00  | 5                   | 50              | 5              | 220             | 1              | 0.1             | 15  |
| -Z22        | -Z22   | ZT           | 20.90          | 23.10  | 5                   | 55              | 5              | 220             | 1              | 0.1             | 17  |
| -Z24        | -Z24   | ZU           | 22.80          | 25.20  | 5                   | 80              | 5              | 220             | 1              | 0.1             | 18  |
| -Z27        | -Z27   | ZV           | 25.65          | 28.35  | 5                   | 80              | 5              | 250             | 1              | 0.1             | 20  |
| -Z30        | -Z30   | ZW           | 28.50          | 31.50  | 5                   | 80              | 5              | 250             | 1              | 0.1             | 23  |
| -Z33        | -Z33   | ZX           | 31.35          | 34.65  | 5                   | 80              | 5              | 250             | 1              | 0.1             | 25  |
| -Z36        | -Z36   | ZY           | 34.20          | 37.80  | 5                   | 90              | 5              | 250             | 1              | 0.1             | 27  |
| -Z39        | -Z39   | ZZ           | 37.05          | 40.95  | 5                   | 90              | 5              | 300             | 1              | 0.1             | 39  |

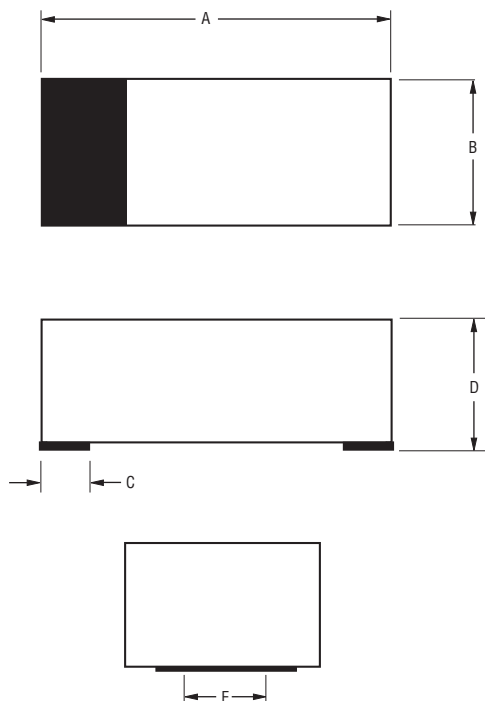
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# CD0603/1005-Z Surface Mount Zener Diode Series

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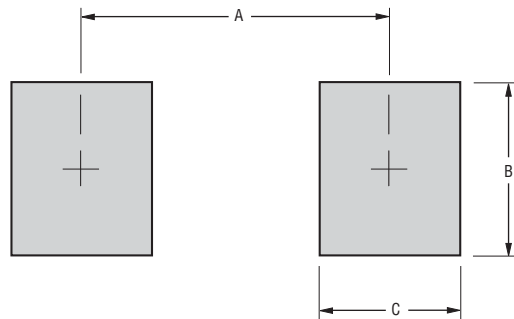
## Product Dimensions



| Dimension | 0603                                  | 1005                                  |
|-----------|---------------------------------------|---------------------------------------|
| A         | $\frac{1.60 - 1.80}{(0.063 - 0.071)}$ | $\frac{2.40 - 2.60}{(0.095 - 0.102)}$ |
| B         | $\frac{0.80 - 1.00}{(0.031 - 0.039)}$ | $\frac{1.10 - 1.30}{(0.043 - 0.051)}$ |
| C         | $\frac{0.45}{(0.018)}$ Typ.           | $\frac{0.50}{(0.020)}$ Typ.           |
| D         | $\frac{0.70 - 0.85}{(0.027 - 0.033)}$ | $\frac{0.70 - 0.90}{(0.027 - 0.035)}$ |
| E         | $\frac{0.70}{(0.028)}$ Typ.           | $\frac{1.00}{(0.039)}$ Typ.           |

DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Recommended Pad Layout



| Dimension | 0603                   | 1005                   |
|-----------|------------------------|------------------------|
| A (Max.)  | $\frac{1.25}{(0.049)}$ | $\frac{2.00}{(0.079)}$ |
| B (Min.)  | $\frac{1.00}{(0.039)}$ | $\frac{1.3}{(0.051)}$  |
| C (Min.)  | $\frac{0.6}{(0.024)}$  | $\frac{0.7}{(0.028)}$  |

DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Physical Specifications

Case .....0603(1608) / 1005(2512) Molded plastic  
 Terminals .....Gold plated, solderable per MIL-STD-750,  
 Method 2026  
 Polarity .....Indicated by cathode band  
 Mounting Position .....Any

Specifications are subject to change without notice.

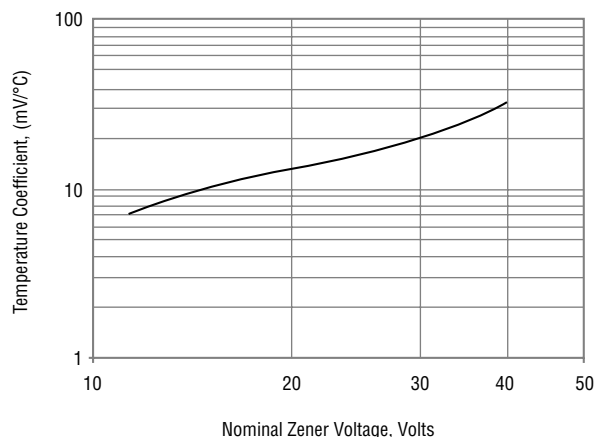
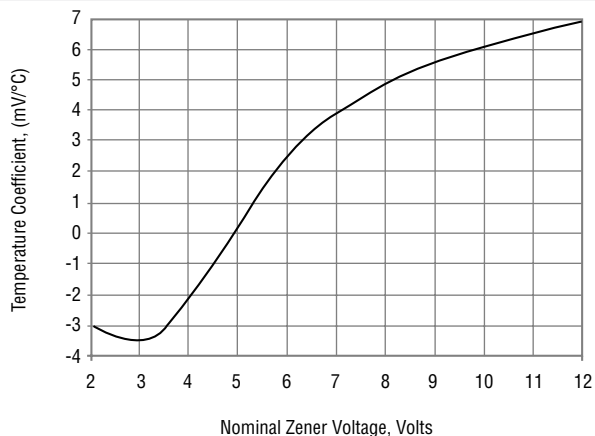
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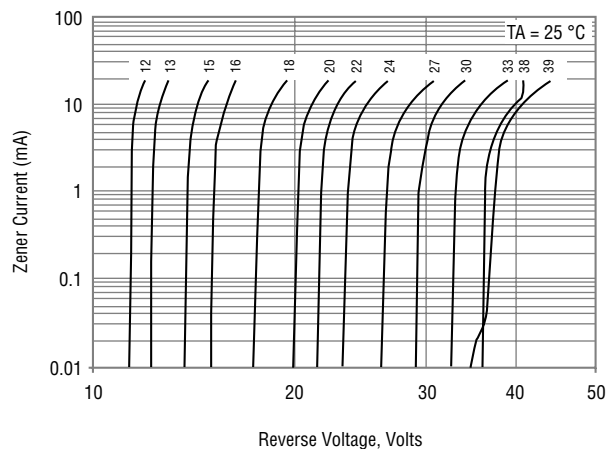
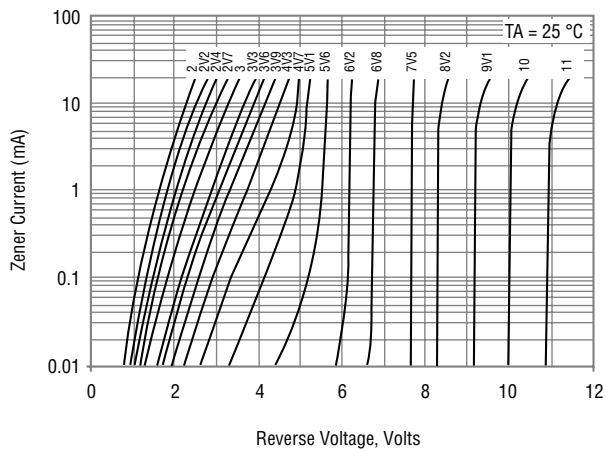
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## Rating and Characteristic Curves

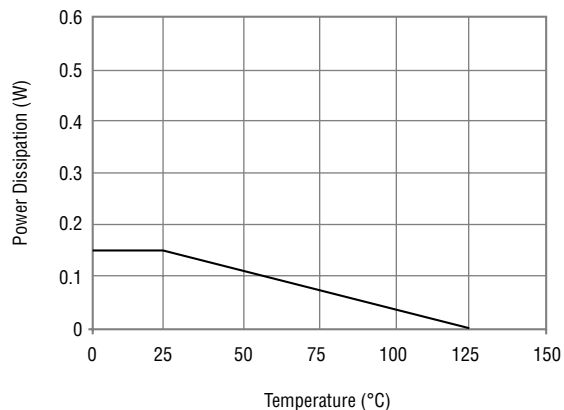
### Temperature Sensitivity



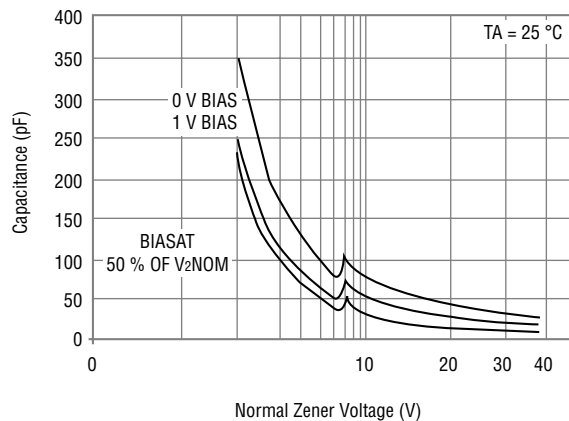
### Zener Current vs. Zener Voltage Characteristics



### Derating Curve



### Typical Junction Capacitance



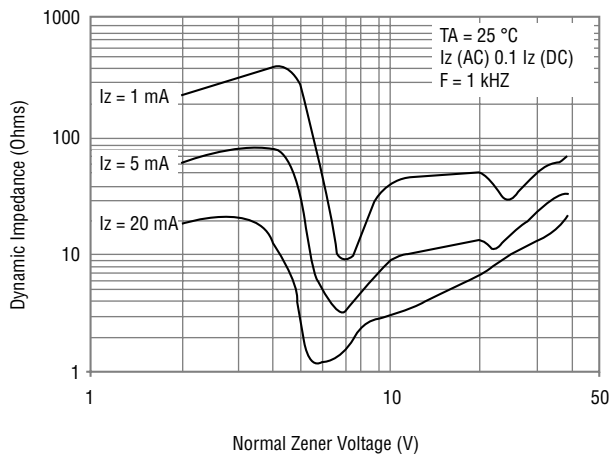
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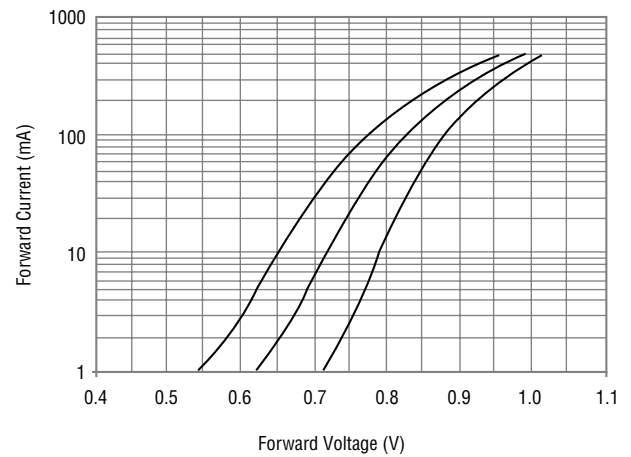
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### Rating and Characteristic Curves:

#### Zener Impedance vs. Voltage



#### Forward Current vs. Voltage



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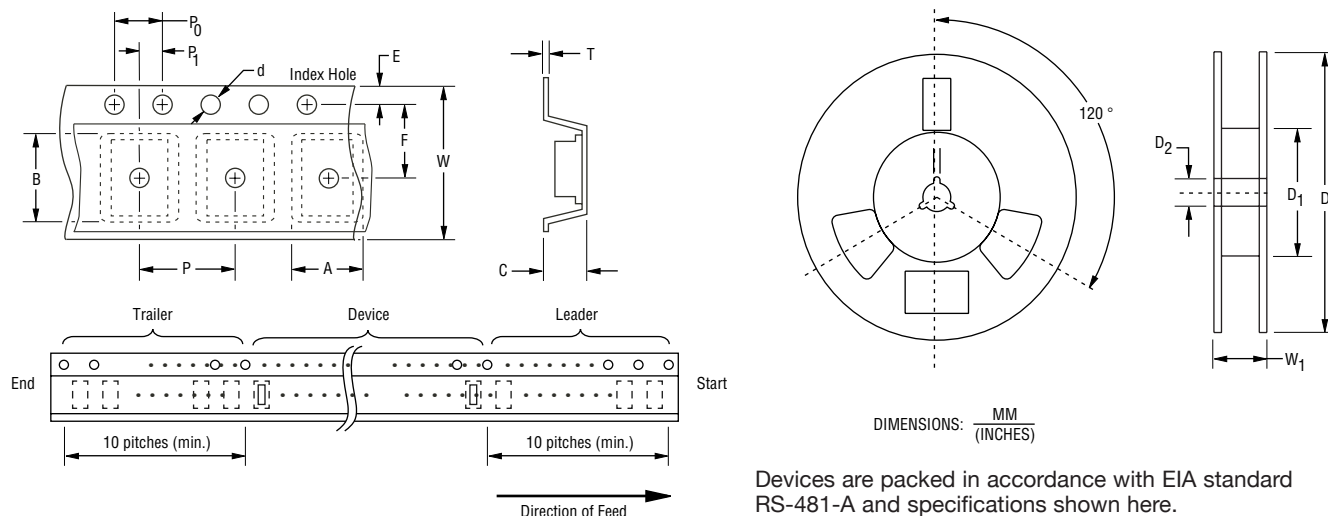
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# CD0603/1005-Z Surface Mount Zener Diode Series

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## Packaging Information

The product will be dispensed in Tape and Reel format (see diagram below).



| Item                   | Symbol         | 0603                               | 1005                               |
|------------------------|----------------|------------------------------------|------------------------------------|
| Carrier Width          | A              | $1.00 \pm 0.10$<br>(0.039 - 0.004) | $1.55 \pm 0.10$<br>(0.061 - 0.004) |
| Carrier Length         | B              | $1.85 \pm 0.10$<br>(0.073 - 0.004) | $2.65 \pm 0.10$<br>(0.104 - 0.004) |
| Carrier Depth          | C              | $1.00 \pm 0.10$<br>(0.039 - 0.004) | $1.05 \pm 0.10$<br>(0.041 - 0.004) |
| Sprocket Hole          | d              | $1.55 \pm 0.05$<br>(0.061 - 0.002) | $1.55 \pm 0.10$<br>(0.061 - 0.004) |
| Reel Outside Diameter  | D              | $178$<br>(7.008)                   | $178$<br>(7.008)                   |
| Reel Inner Diameter    | D <sub>1</sub> | $60.0$<br>(2.362) MIN.             | $60.0$<br>(2.362) MIN.             |
| Feed Hole Diameter     | D <sub>2</sub> | $13.0 \pm 0.20$<br>(0.512 - 0.008) | $13.0 \pm 0.20$<br>(0.512 - 0.008) |
| Sprocket Hole Position | E              | $1.75 \pm 0.10$<br>(0.069 - 0.004) | $1.75 \pm 0.10$<br>(0.069 - 0.004) |
| Punch Hole Position    | F              | $3.50 \pm 0.05$<br>(0.138 - 0.002) | $3.50 \pm 0.05$<br>(0.138 - 0.002) |
| Punch Hole Pitch       | P              | $4.00 \pm 0.10$<br>(0.157 - 0.004) | $4.00 \pm 0.10$<br>(0.157 - 0.004) |
| Sprocket Hole Pitch    | P <sub>0</sub> | $4.00 \pm 0.10$<br>(0.157 - 0.004) | $4.00 \pm 0.10$<br>(0.157 - 0.004) |
| Embossment Center      | P <sub>1</sub> | $2.00 \pm 0.05$<br>(0.079 - 0.002) | $2.00 \pm 0.05$<br>(0.079 - 0.002) |
| Overall Tape Thickness | T              | $0.20 \pm 0.05$<br>(0.008 - 0.002) | $0.25 \pm 0.05$<br>(0.010 - 0.002) |
| Tape Width             | W              | $8.00 \pm 0.20$<br>(0.315 - 0.008) | $8.00 \pm 0.20$<br>(0.315 - 0.008) |
| Reel Width             | W <sub>1</sub> | $13.5$<br>(0.531) MAX.             | $13.5$<br>(0.531) MAX.             |
| Quantity per Reel      | --             | 4,000                              | 4,000                              |

REV. 10/15

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