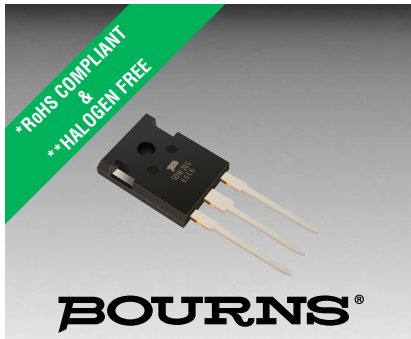




## Features

- High efficiency with low power loss
- Low reverse leakage current
- High peak forward surge current capability  
 $I_{FSM}$
- Reduced EMI
- Maximum operating  $T_J$  up to 175 °C
- Epoxy compound is flame retardant to the 94V-0 standard

- RoHS compliant\*, Pb free and halogen free\*\*

## Applications

- Switched-Mode Power Supplies (SMPS)
- Power Factor Correction (PFC)
- PV inverters
- DC-DC converters
- Telecommunications
- Motor drives

# BSDW20S65C6 Silicon Carbide Schottky Diode

## General Information

Bourns® Model BSDW20S65C6 Silicon Carbide (SiC) Schottky Diode provides excellent current carrying capacity. This advanced, high efficiency power component is suitable for applications such as converters requiring a high peak forward surge capability, low forward voltage drop, reduced thermal resistance and low power loss.

Bourns offers Silicon Carbide Schottky Diodes for rectification applications in assorted styles. The Model BSDW20S65C6 is available in a TO247-3 package, well-suited for high frequency Switched-Mode Power Supplies.

## Additional Information

Click these links for more information:



## Absolute Maximum Ratings (@ $T_J = 25\text{ °C}$ Unless Otherwise Noted)

| Parameter                                                                                                                                                                    | Symbol      | BSDW20S65C6 | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|------|
| Repetitive Peak Reverse Voltage                                                                                                                                              | $V_{RRM}$   | 650         | V    |
| Average Forward Current<br>(Square Wave Pulse, $D = 0.5$ , $T_{mb} \leq 140\text{ °C}$ , dual diodes conducting, <a href="#">Fig. Zth(J-mb)</a> )                            | $I_{F(AV)}$ | 20          | A    |
| Repetitive Peak Forward Current<br>(Square Wave Pulse, $D = 0.5$ , $T_{mb} \leq 144\text{ °C}$ , $t_p = 25\text{ }\mu\text{s}$ , per diode, <a href="#">Fig. Zth(J-mb)</a> ) | $I_{FRM}$   | 20          | A    |
| Non-Repetitive Peak Forward Surge Current<br>(10 ms, Single Sine-Wave Pulse, per diode)                                                                                      | $I_{FSM}$   | 85          | A    |
| Total Power Dissipation (Dual diodes conducting, per device)                                                                                                                 | $P_{tot}$   | 187.5       | W    |
| Operating Junction Temperature Range                                                                                                                                         | $T_J$       | -55 to +175 | °C   |
| Storage Temperature                                                                                                                                                          | $T_{STG}$   | -55 to +175 | °C   |

## Thermal Characteristics

| Parameter          | Symbol             | Condition or Model                             | Min. | Typ. | Max. | Unit |
|--------------------|--------------------|------------------------------------------------|------|------|------|------|
| Thermal Resistance | $R_{\theta(J-A)}$  | Junction to Ambient                            |      | 40   |      | °C/W |
|                    |                    | In ambient air                                 |      |      |      |      |
|                    |                    | Transient thermal impedance curves, per diode  |      | 1.15 | 1.4  |      |
|                    | $R_{\theta(J-mb)}$ | Transient thermal impedance curves, per device |      |      | 0.8  |      |

## Electrical Characteristics (@ $T_J = 25\text{ °C}$ Unless Otherwise Noted)

| Parameter                 | Symbol | Condition or Model                                                                                                  | Min. | Typ.         | Max.         | Unit          |
|---------------------------|--------|---------------------------------------------------------------------------------------------------------------------|------|--------------|--------------|---------------|
| Forward Voltage           | $V_F$  | $I_F = 10\text{ A}$ , $T_J = 25\text{ °C}$ , per diode<br>$I_F = 10\text{ A}$ , $T_J = 175\text{ °C}$ , per diode   |      | 1.29<br>1.47 | 1.45<br>1.65 | V             |
| Reverse Leakage Current   | $I_R$  | $V_R = 650\text{ V}$ , $T_J = 25\text{ °C}$ , per diode<br>$V_R = 650\text{ V}$ , $T_J = 175\text{ °C}$ , per diode |      | 1<br>15      | 50<br>200    | $\mu\text{A}$ |
| Recovered Charge          | $Q_r$  | $dI_F/dt = 500\text{ A}/\mu\text{s}$ , $V_R = 400\text{ V}$ , $I_F = 10\text{ A}$ , per diode                       |      | 24           |              | nC            |
| Diode Capacitance         | $C_d$  | $V_R = 1\text{ V}$ , $f = 1\text{ MHz}$ , per diode                                                                 |      | 500          |              | pF            |
| Capacitance Stored Energy | $E_c$  | $V_R = 400\text{ V}$                                                                                                |      | 5.1          |              | $\mu\text{J}$ |



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

\*\*Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

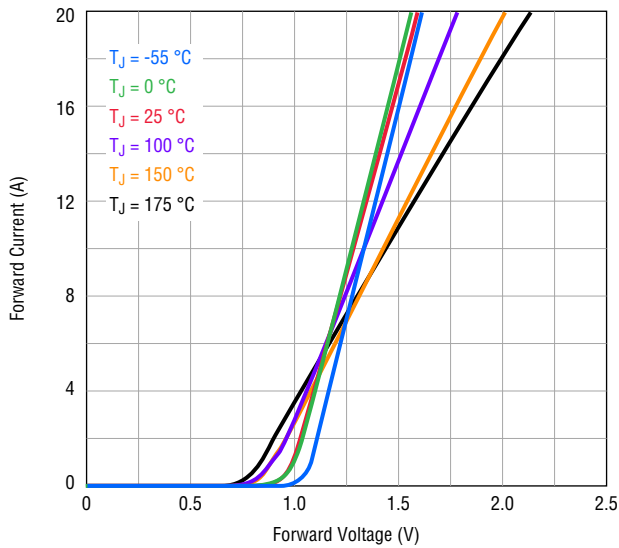
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# BSDW20S65C6 Silicon Carbide Schottky Diode

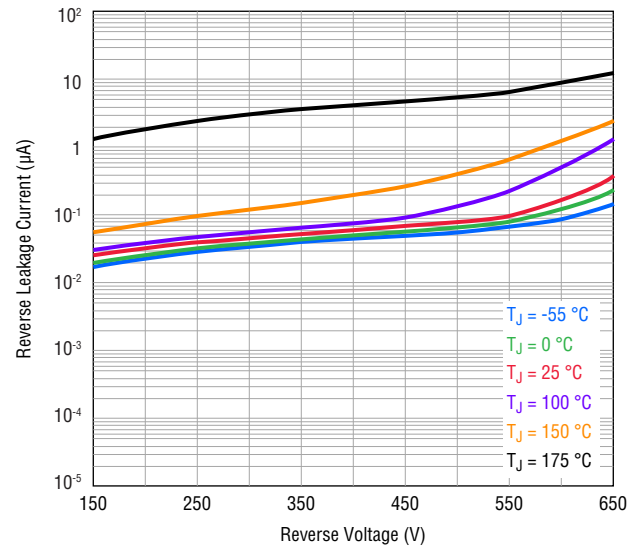
**BOURNS®**

Rating and Characteristic Curves ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

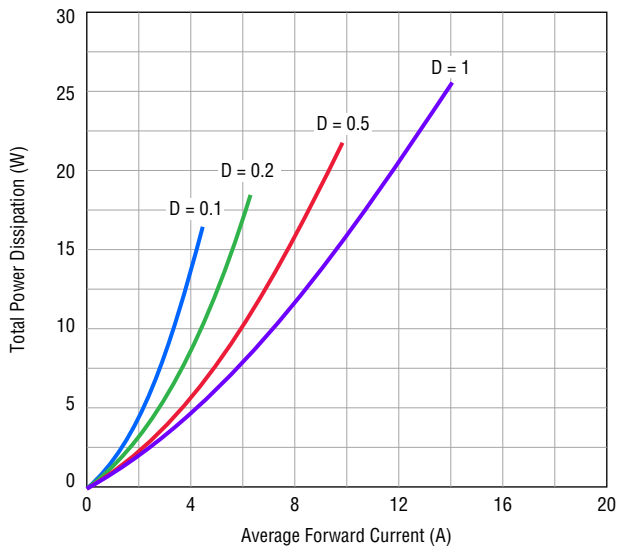
Typical Forward Characteristics, per Diode



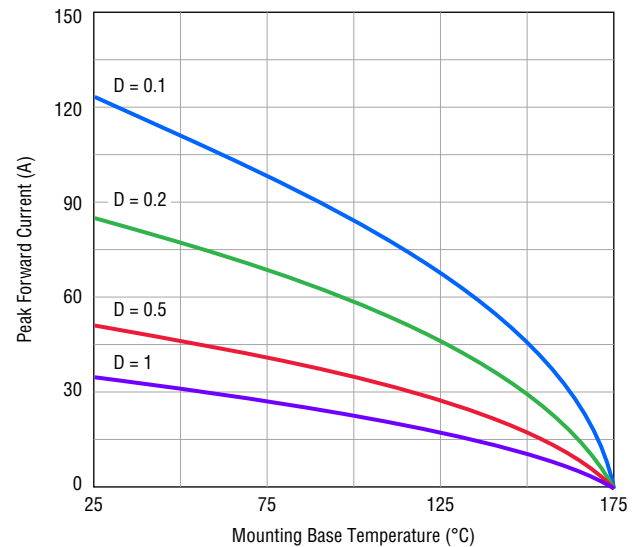
Typical Reverse Characteristics, per Diode



Forward Power Dissipation, per Diode



Forward Current Derating, per Diode



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

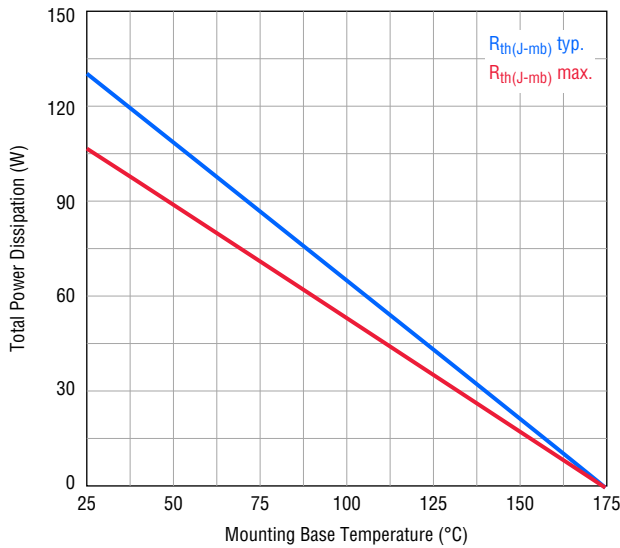
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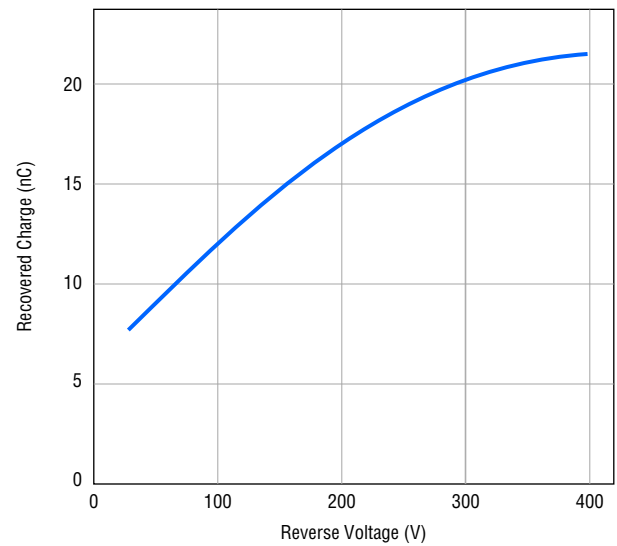
**BOURNS®**

## Rating and Characteristic Curves (Continued)

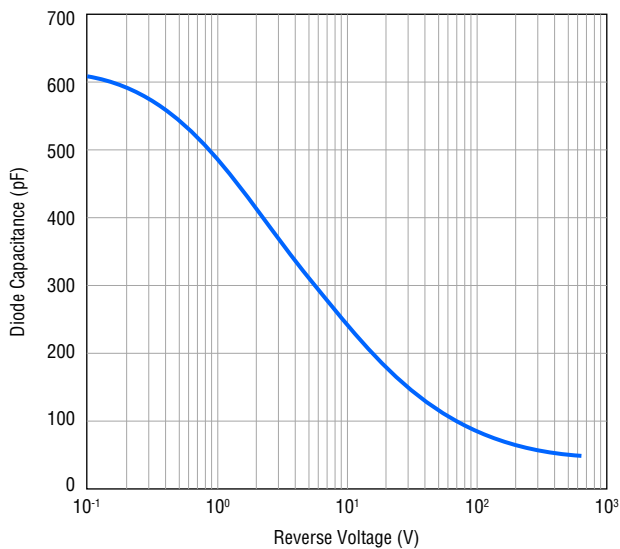
### Power Derating, per Diode



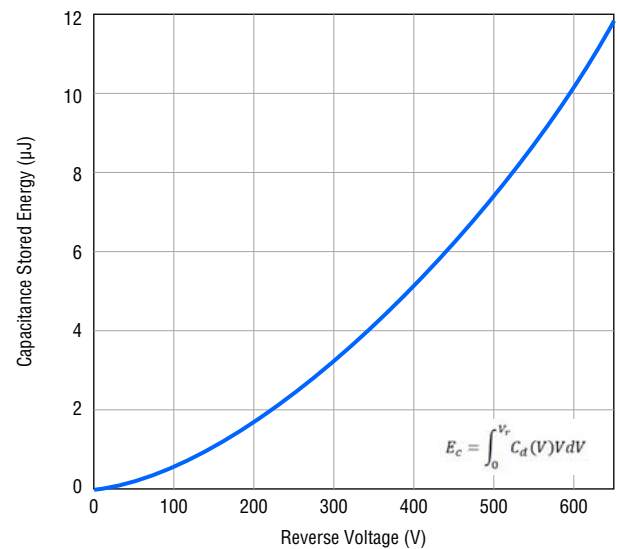
### Typical Recovered Charge vs $V_R$ , per Diode



### Typical Diode Capacitance vs $V_R$ , per Diode



### Typical Capacitance Stored Energy vs $V_R$ , per Diode



Specifications are subject to change without notice.

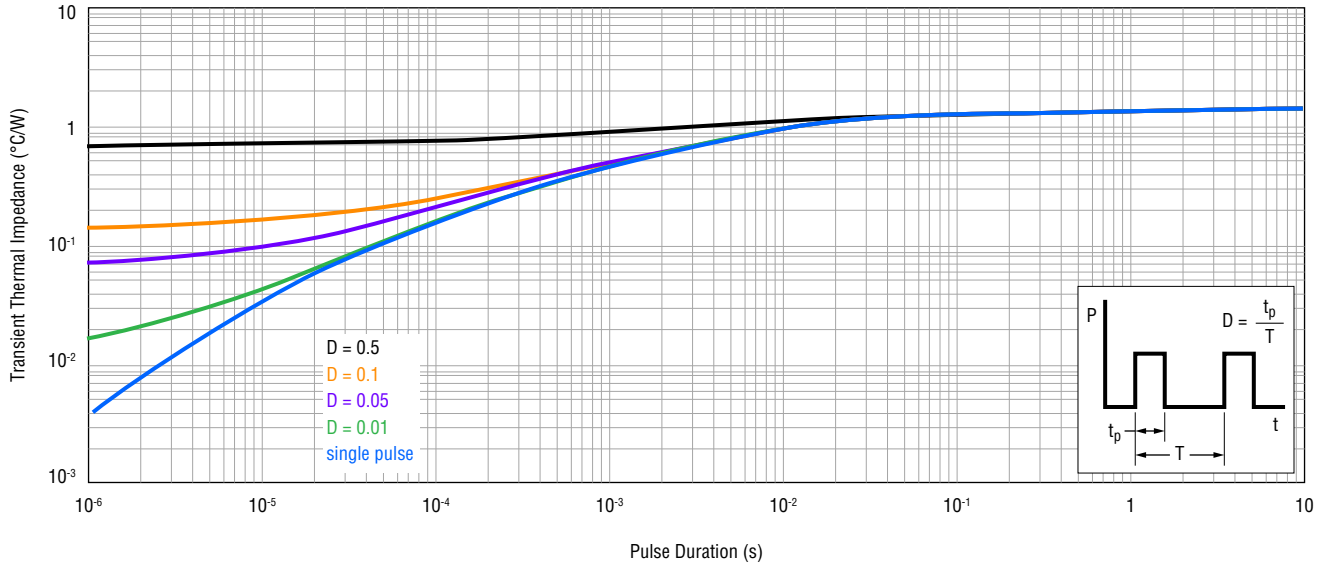
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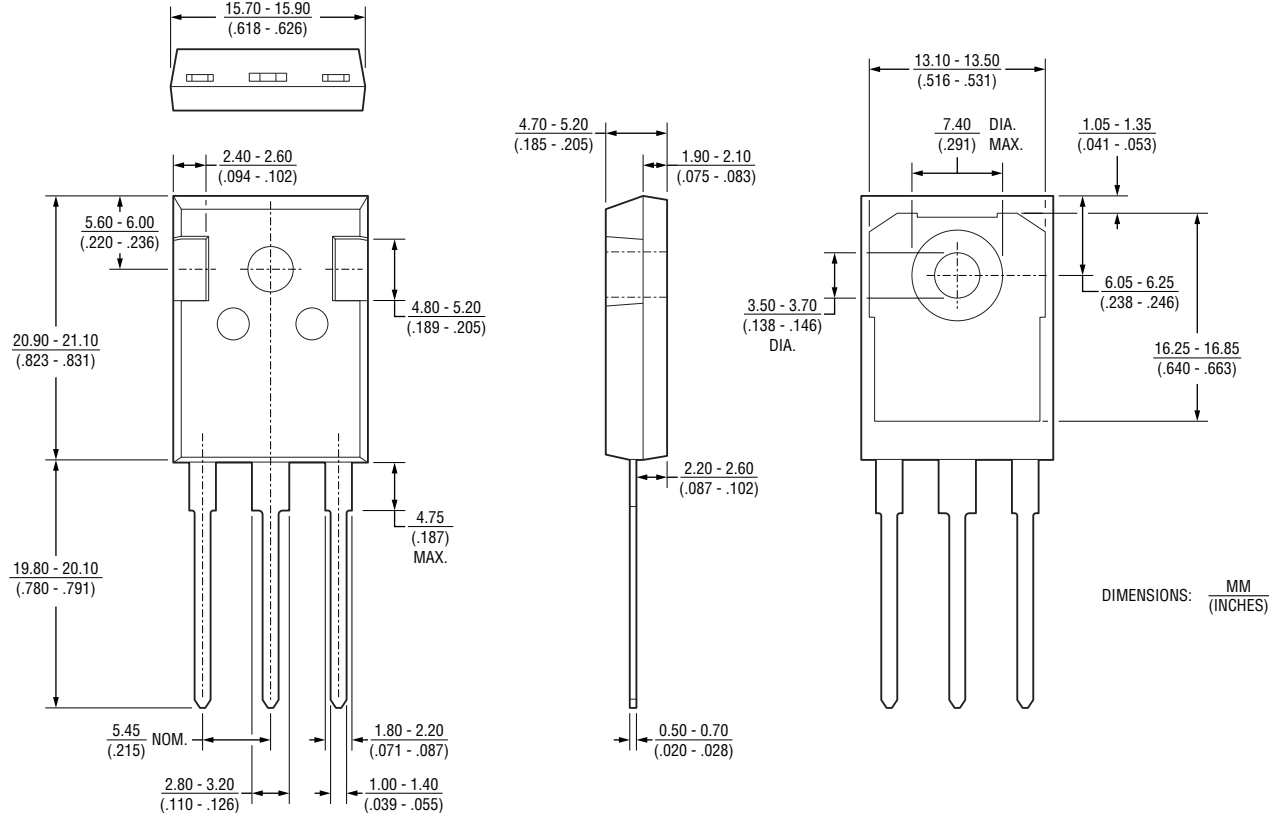
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## Transient Thermal Impedance, $Z_{th(J-mb)}$ , per Diode



## Product Dimensions

Package Version: TO247N-3



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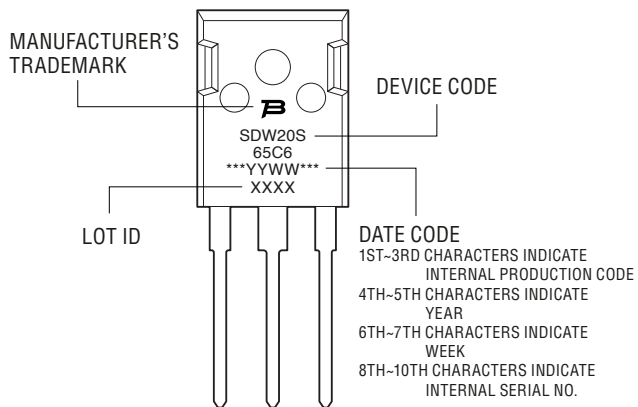
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# BSDW20S65C6 Silicon Carbide Schottky Diode

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## Typical Part Marking



## Environmental Specifications

ESD Classification (HBM).....3B

## How to Order

|                    |          |           |          |           |          |           |          |          |
|--------------------|----------|-----------|----------|-----------|----------|-----------|----------|----------|
|                    | <b>B</b> | <b>SD</b> | <b>W</b> | <b>20</b> | <b>S</b> | <b>65</b> | <b>C</b> | <b>6</b> |
| Manufacturer       |          |           |          |           |          |           |          |          |
| B = Bourns         |          |           |          |           |          |           |          |          |
| Product Type       |          |           |          |           |          |           |          |          |
| SD = SiC Diodes    |          |           |          |           |          |           |          |          |
| Package Code       |          |           |          |           |          |           |          |          |
| W = TO247-3        |          |           |          |           |          |           |          |          |
| Current Rating     |          |           |          |           |          |           |          |          |
| 20 = 20 A          |          |           |          |           |          |           |          |          |
| Device Type        |          |           |          |           |          |           |          |          |
| S = Low $V_F$      |          |           |          |           |          |           |          |          |
| Nominal Voltage    |          |           |          |           |          |           |          |          |
| 65 = 650 V         |          |           |          |           |          |           |          |          |
| Configuration      |          |           |          |           |          |           |          |          |
| C = Common Cathode |          |           |          |           |          |           |          |          |
| Version Number     |          |           |          |           |          |           |          |          |

**BOURNS®**

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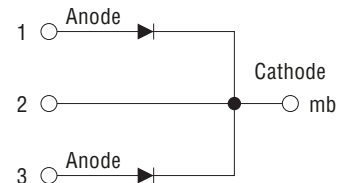
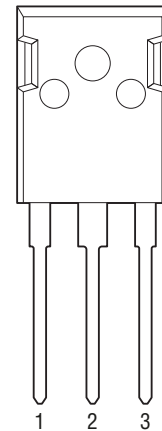
**The Americas:** Tel: +1-951 781-5500

Email: [americus@bourns.com](mailto:americus@bourns.com)

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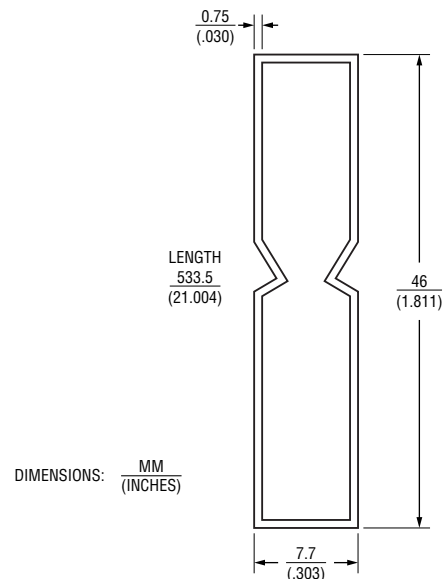
## Pin Information

MOUNTING BASE (mb)



## Packaging Specifications

30 pcs./tube



REV. 06/23

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