

Powerex General Purpose Rectifier Diode Elements are for low forward voltage drop to minimize conduction losses. They are made with molybdenum anode and cathode contacts to minimize thermal stresses during operation. They can be mounted directly to an air or water cooled heat exchangers to achieve high current handling capability.

### FEATURES:

- Low On-State Voltage
- Excellent Surge and  $I^2t$  Ratings

### APPLICATIONS:

- DC Power Supplies
- Welding Supplies
- Plating Supplies

### ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.  
Example: R9XSMD0463XX is a 400V 6300A Welder diode element with a typical reverse recovery time of 25 $\mu$ s.

| PART   | Voltage Rating<br>$V_{DRM}-V_{RRM}$ | Voltage Code | Current Rating<br>$I_{avg}$ | Current Code | Reverse Recovery<br>$t_{RR}$ | Lead Code |
|--------|-------------------------------------|--------------|-----------------------------|--------------|------------------------------|-----------|
| R9XSMD | 400V                                | 04           | 6300                        | 63           | XX                           | 00        |
|        |                                     |              |                             |              | 25 $\mu$ s typical           |           |
|        |                                     |              |                             |              |                              |           |
|        |                                     |              |                             |              |                              |           |
|        |                                     |              |                             |              |                              |           |
|        |                                     |              |                             |              |                              |           |

Revised: 11/30/2010

**Absolute Maximum Ratings**

| Characteristic                                      | Symbol        | Rating        | Units                |
|---|---------------|---------------|----------------------|
| Repetitive Peak Reverse Voltage                     | $V_{RRM}$     | 400           | Volts                |
| Average On-State Current, $T_S=40^\circ\text{C}$    | $I_{F(Avg.)}$ | 6300          | A                    |
| RMS On-State Current, $T_S=40^\circ\text{C}$        | $I_{F(RMS)}$  | 9896          | A                    |
| Average On-State Current, $T_S=84^\circ\text{C}$    | $I_{F(Avg.)}$ | 4875          | A                    |
| RMS On-State Current, $T_S=84^\circ\text{C}$        | $I_{F(RMS)}$  | 7658          | A                    |
| Peak One Cycle Surge Current, 60Hz, $V_R=V_{RRM}$   | $I_{FSM}$     | 35,000        | A                    |
| Fuse Coordination $I^2t$ , 60Hz                     | $I^2t$        | 5.10E+06      | $\text{A}^2\text{s}$ |
| Peak One Cycle Surge Current, 50Hz, $V_R=0\text{V}$ | $I_{FSM}$     | 33,600        | A                    |
| Fuse Coordination $I^2t$ , 50Hz                     | $I^2t$        | 5.64E+06      | $\text{A}^2\text{s}$ |
| Operating Temperature                               | $T_j$         | -40 to+175    | $^\circ\text{C}$     |
| Storage Temperature                                 | $T_{Stg.}$    | -50 to+200*   | $^\circ\text{C}$     |
| * Limit to 50 $^\circ\text{C}$ prior to assembly.   |               |               |                      |
| Approximate Weight                                  |               | 0.2           | lb                   |
|   |               | 0.08          | Kg                   |
| Mounting Force                                      |               | 5,000 - 6,000 | lbs                  |
|   |               | 22.2 - 26.7   | Knewtons             |

**Mounting Recommendations**

Contact surfaces of this diode element are subject to oxidation at high temperatures. It is recommended that these elements be sealed in the assembly using an o-ring or similar sealing mechanism. Contacts can be further protected by coating with a thin layer of high temperature silicon based oil.

Information presented is based upon manufacturers testing and projected capabilities. This information is subject to change without notice. The manufacturer makes no claim as to suitability for use, reliability, capability or future availability of this product.

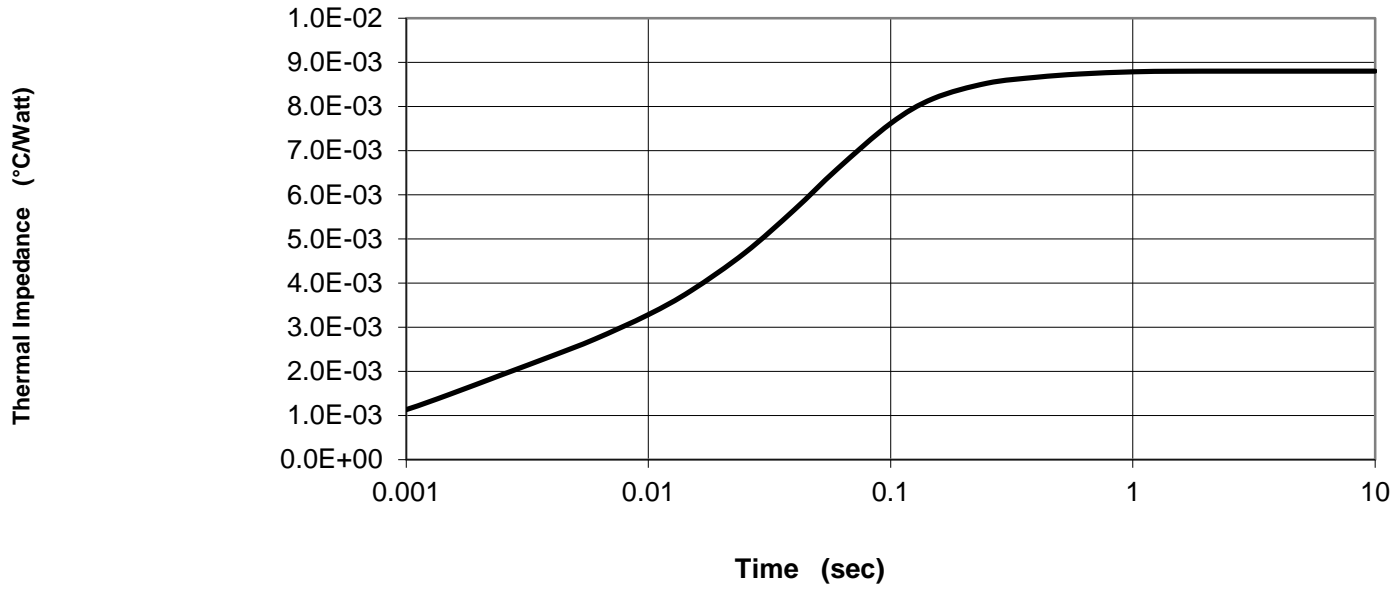
**Electrical Characteristics, Tj=25°C unless otherwise specified**

| Characteristic                              | Symbol    | Test Conditions   | Rating |     |           | Units |
|---|-----------|---|--------|-----|-----------|-------|
|   |           |   | min    | typ | max       |       |
| Repetitive Peak Reverse Leakage Current     | $I_{RRM}$ | Tj=175°C, $V_{RRM}$ =Rated                                      |        | 15  | 75        | ma    |
| Peak On-State Voltage                       | $V_{FM}$  | Tj=25°C, $I_{FM}$ =4000A  |        |     | 1.10      | V     |
| $V_{FM}$ Model, Low Level                   | $V_0$     | Tj=175°C  |        |     | 0.701     | V     |
| $V_{FM} = V_0 + r \cdot I_{FM}$             | r         | 15% $I_{FM} - \pi \cdot I_{FM}$                                 |        |     | 5.30E-02  | mΩ    |
| $V_{FM}$ Model, 4-Term                      | A         | Tj=175°C  |        |     | 0.395     |       |
| $V_{FM} = A + B \cdot \ln(I_{FM}) +$        | B         | 15% $I_{FM} - I_{FSM}$  |        |     | 0.0453    |       |
| $C \cdot (I_{FM}) + D \cdot (I_{FM})^{1/2}$ | C         |   |        |     | 0.0000548 |       |
|   | D         |   |        |     | -0.00124  |       |
| Reverse Recovery Time                       | $t_{RR}$  | Tj=25°C, $I_{FM}$ =400A<br>$di_R/dt = 25 \text{ A}/\mu\text{s}$ |        | 25  |           | μs    |

**Thermal Characteristics**

| Characteristic  | Symbol         | Test Conditions    | Rating   |          |          | Units    |          |
|---|----------------|--------------------|----------|----------|----------|----------|----------|
|   |                |                    | min      | typ      | max      |          |          |
| Thermal Resistance  |                |                    |          |          |          |          |          |
| Junction to Case  | $R\theta_{jc}$ | Double side cooled |          |          | 0.009    | °C/Watt  |          |
| Case to Sink  | $R\theta_{cs}$ | Double side cooled |          |          | 0.005    | °C/Watt  |          |
| Thermal Impedance Model   | $Z\theta_{jc}$ | Double side cooled |          |          |          |          |          |
| $Z\theta_{jc}(t) = \sum(A(N) \cdot (1 - \exp(-t/\text{Tau}(N))))$ |                | where:             | N =      | 1        | 2        | 3        | 4        |
|   |                |                    | A(N) =   | 1.42E-03 | 8.35E-04 | 5.95E-03 | 5.84E-03 |
|   |                |                    | Tau(N) = | 1.11E-03 | 4.48E-03 | 4.89E-02 | 2.71E-01 |

### MAXIMUM TRANSIENT THERMAL IMPEDANCE, $R\theta_{JC}$



### Maximum On-State Voltage Drop

