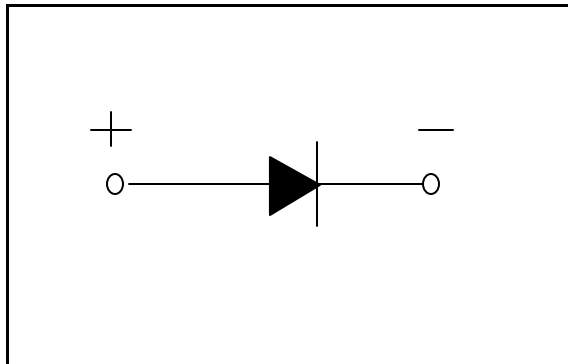


Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwr.com

POW-R-BLOK™
Single Diode Isolated Module
1400 Amperes / Up to 5000 Volts



Ordering Information:

Select the complete eight-digit module part number from the table below.

Example: PS415014 is a 5000 Volt, 1400A Average Single Diode Isolated POW-R-BLOK™ Module

| Type | Voltage Volts (x100) | Current Amperes (x100) |
|------|-------------------------|------------------------------|
| PS41 | 45 | 14 |
| | 50 | |

Description:

Powerex Single Diode Modules are designed for use in applications requiring rectification and isolated packaging. The modules are isolated for easy mounting with other components on a common heatsink.

Features:

- Electrically Isolated Heatsinking
- Compression Bonded Elements
- Metal Baseplate
- Low Thermal Impedance for Improved Current Capability

Benefits:

- No Additional Insulation Components Required
- Easy Installation
- No Clamping Components Required
- Reduce Engineering Time

Applications:

- Bridge Circuits
- AC & DC Motor Drives
- Battery Supplies
- Power Supplies
- Large IGBT Circuit Front Ends

Absolute Maximum Ratings

| Characteristics | Conditions | Symbol | | Units |
|---|--|--|--|--|
| Repetitive Peak Reverse Blocking Voltage Derate V_{RRM} at $T_j < 25C$ – Consult Factory | | V_{RRM} | Up to 5000 | V |
| Non-Repetitive Peak Blocking Voltage ($t < 5$ msec) Derate V_{RSM} at $T_j < 25C$ - Consult Factory | | V_{RSM} | $V_{RRM} + 100V$ | V |
| RMS Current Per Diode (180° Conduction) | 180° Conduction, $T_C=67°C$ 180° Conduction, $T_C=91°C$ 180° Conduction, $T_C=113°C$ | $I_{F(RMS)}$ $I_{F(RMS)}$ $I_{F(RMS)}$ | 2820 2200 1570 | A A A |
| Average Forward Current Per Diode (180° Conduction) | 180° Conduction, $T_C=67°C$ 180° Conduction, $T_C=91°C$ 180° Conduction, $T_C=113°C$ | $I_{F(AV)}$ $I_{F(AV)}$ $I_{F(AV)}$ | 1800 1400 1000 | A A A |
| Peak One Cycle Surge Current, Non-Repetitive $T_j = 25C, V_r = 0$ | 60 Hz 50 Hz | I_{FSM} I_{FSM} | 41,760 37,930 | A A |
| Peak One Cycle Surge Current, Non-Repetitive $T_j = 25C, V_r = V_{RRM}$ | 60 Hz 50 Hz | I_{FSM} I_{FSM} | 27,840 25,290 | A A |
| Peak One Cycle Surge Current, Non-Repetitive $T_j = 125C, V_r = 0$ | 60 Hz 50 Hz | I_{FSM} I_{FSM} | 36,000 32,700 | A A |
| Peak One Cycle Surge Current, Non-Repetitive $T_j = 125C, V_r = V_{RRM}$ | 60 Hz 50 Hz | I_{FSM} I_{FSM} | 24,000 21,800 | A A |
| Peak Three Cycle Surge Current, Non-Repetitive | 60 Hz, $T_j = 125C, V_r = V_{RRM}$ | I_{FSM} | 19,270 | A |
| Peak Ten Cycle Surge Current, Non-Repetitive | 60 Hz, $T_j = 125C, V_r = V_{RRM}$ | I_{FSM} | 15,140 | A |
| I^2t for Fusing for One Cycle $T_j = 125C, V_r = V_{RRM}$ | 8.3 milliseconds 10 milliseconds | I^2t I^2t | 2.39×10^6 2.38×10^6 | $A^2 \text{ sec}$ $A^2 \text{ sec}$ |
| I^2t for Fusing for One Cycle $T_j = 25C, V_r = 0$ | 8.3 milliseconds 10 milliseconds | I^2t I^2t | 7.24×10^6 7.19×10^6 | $A^2 \text{ sec}$ $A^2 \text{ sec}$ |
| Operating Temperature | | T_J | -40 to +150 | °C |
| Storage Temperature | | T_{stg} | -40 to +150 | °C |
| Max. Mounting Torque, M6 Mounting Screw | | | 132 15 | in. – Lb. Nm |
| Max. Mounting Torque, M10 Terminal Screw | | | 106 12 | in. – Lb. Nm |
| Module Weight, Typical | | | 5.33 11.75 | kg lb |
| V Isolation @ 25C | 60Hz V_{rms} 60 sec | V_{rms} | 4000 | V |

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 of use, reliability, capability,
 or future availability of this product.

Electrical Characteristics, $T_J=25^\circ\text{C}$ unless otherwise specified

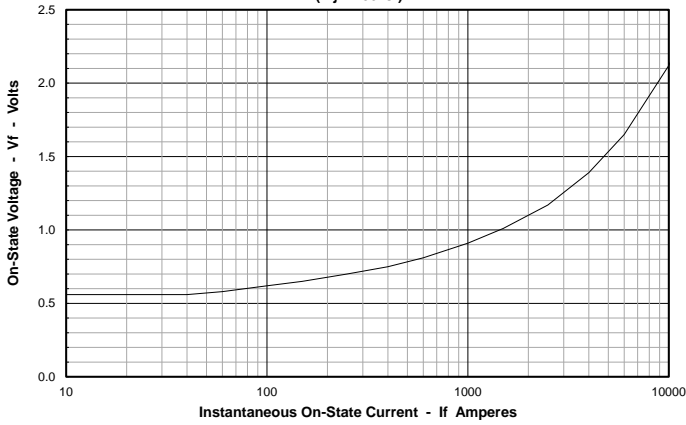
| Characteristics | Symbol | Test Conditions | Min. | Max. | Units |
|---|-------------|--|------|-----------|------------------|
| Repetitive Peak Reverse Leakage Current | I_{RRM} | Up to 5000V, $T_J=150^\circ\text{C}$ | | 400 | mA |
| Peak On-State Voltage | V_{FM} | $I_{FM}=3000\text{A}$, $T_J=150^\circ\text{C}$ | | 1.30 | V |
| Threshold Voltage, Low-level | $V_{(TO)1}$ | $T_J = 150^\circ\text{C}$, $I = 15\%I_{T(AV)}$ to $1I_{T(AV)}$ | | 0.710 | V |
| Slope Resistance, Low-level | r_{T1} | | | 0.170 | $\text{m}\Omega$ |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_J = 150^\circ\text{C}$, $I = 1I_{T(AV)}$ to I_{TSM} | | 0.956 | V |
| Slope Resistance, High-level | r_{T2} | | | 0.120 | $\text{m}\Omega$ |
| V_{FM} Coefficients, Full Range | | $T_J = 150^\circ\text{C}$, $I = 50\text{A}$ to 10kA | A = | 0.5357 | |
| | | | B = | -0.00112 | |
| | | $V_{FM} = A + B \ln I + C I + D \text{Sqrt } I$ | C = | 6.68 E-05 | |
| | | | D = | 9.29 E-03 | |
| Typical Reverse Recovery Time | t_{rr} | $T_J = 25^\circ\text{C}$, $I_{fm} = 1500\text{A}$. $di/dt = 25 \text{ A/us}$, $t_p = 190 \text{ us}$ | | 30 | us |

Thermal Characteristics

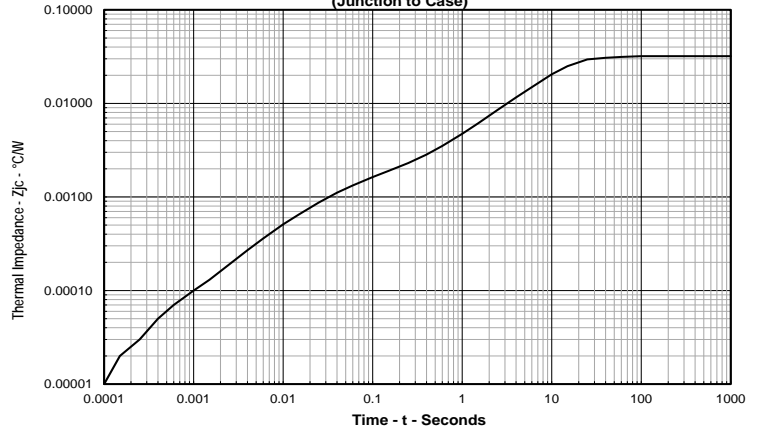
| Characteristics | Symbol | | Max. | Units |
|---|------------------|---|--|--|
| Thermal Resistance, Junction to Case | $R_{\Theta J-C}$ | Per Module | 0.032 | $^\circ\text{C/W}$ |
| Thermal Impedance Coefficients | $Z_{\Theta J-C}$ | $Z_{\Theta J-C} = K_1 (1 - \exp(-t/\tau_1))$ $+ K_2 (1 - \exp(-t/\tau_2))$ $+ K_3 (1 - \exp(-t/\tau_3))$ $+ K_4 (1 - \exp(-t/\tau_4))$ | $K_1 = 8.58 \text{ E-}04$ $K_2 = 9.78 \text{ E-}04$ $K_3 = 2.92 \text{ E-}02$ $K_4 = 9.72 \text{ E-}04$ | $\tau_1 = 1.36 \text{ E-}02$ $\tau_2 = 1.80 \text{ E-}01$ $\tau_3 = 9.86$ $\tau_4 = 59.4$ |
| Thermal Resistance, Case to Sink Lubricated | $R_{\Theta C-S}$ | Per Module | 0.009 | $^\circ\text{C/W}$ |

POW-R-BLOK[™]
Single Diode Isolated Module
1400 Amperes / Up to 5000 Volts

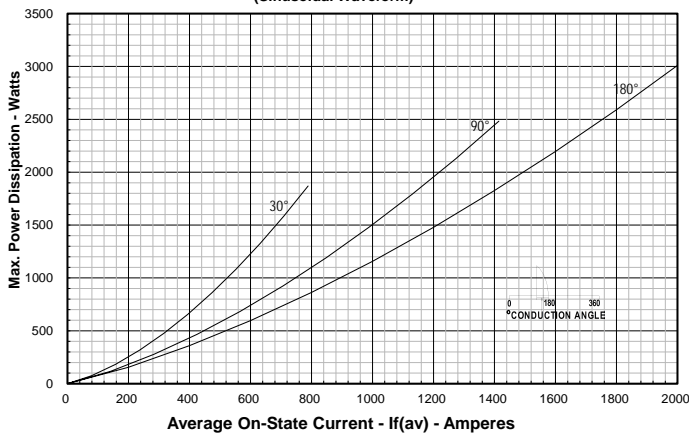
Maximum On-State Forward Voltage Drop
($T_j = 150^\circ\text{C}$)



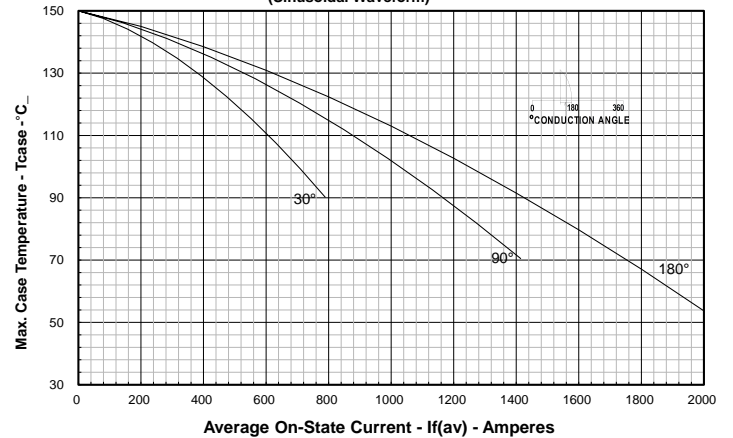
Maximum Transient Thermal Impedance
(Junction to Case)



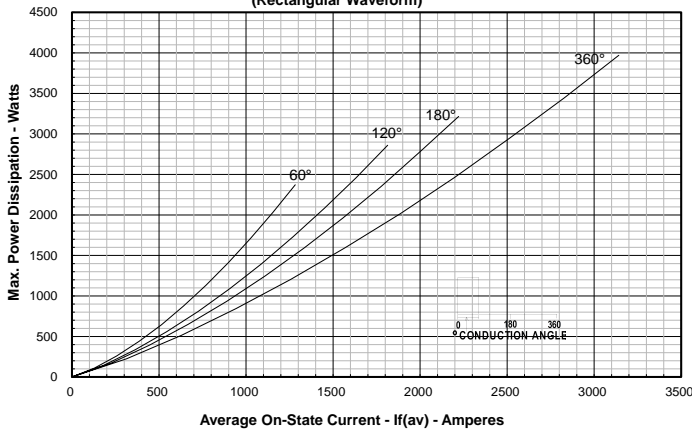
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



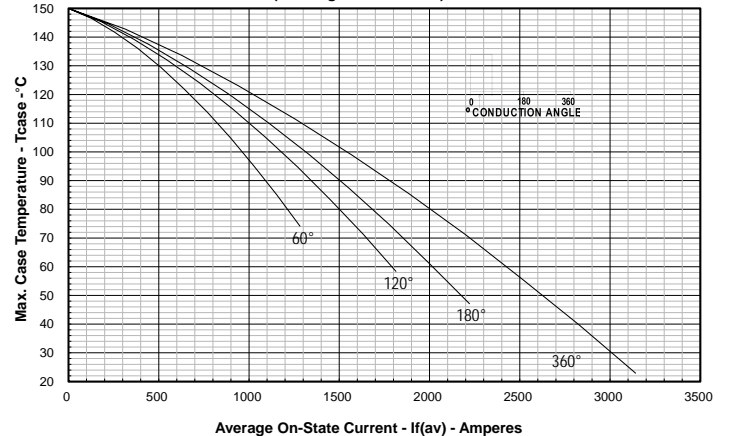
Maximum Allowable Case Temperature
(Sinusoidal Waveform)

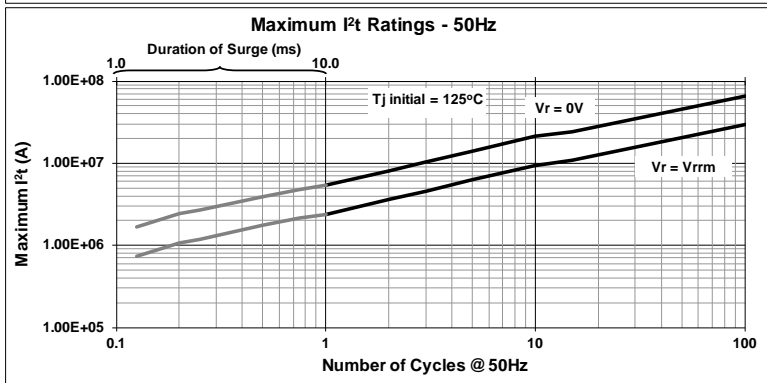
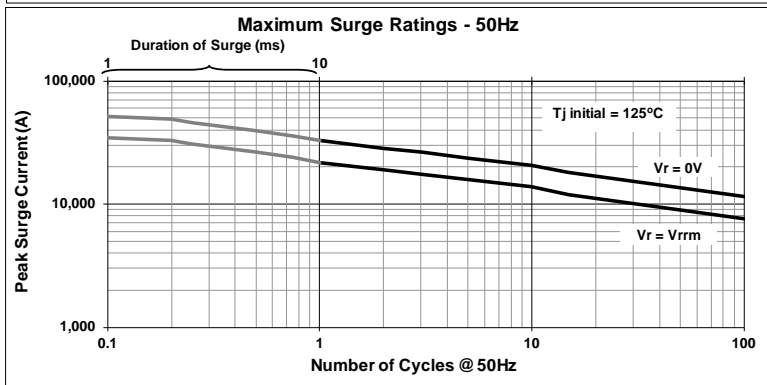
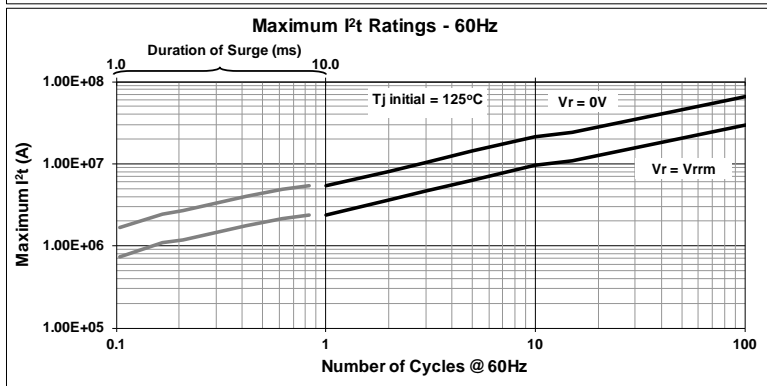
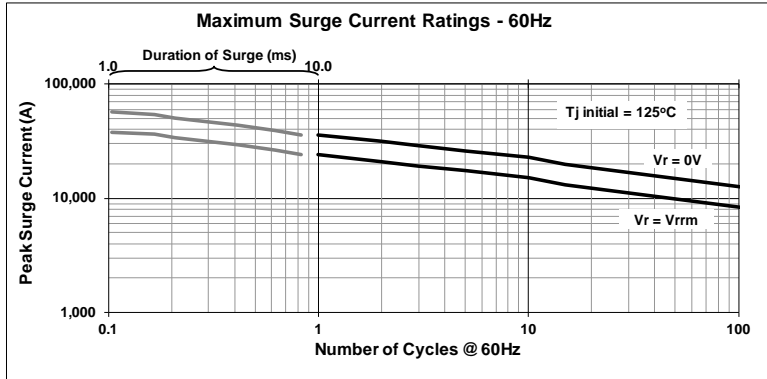


Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)





POW-R-BLOK™
Single Diode Isolated Module
1400 Amperes / Up to 5000 Volts

| DIM. | INCHES | MILLIMETERS |
|------|--------|-------------|
| A | 7.80 | 198.1 |
| B | 4.00 | 101.6 |
| C | 2.68 | 68.1 |
| D | 6.44 | 163.6 |
| E | 3.44 | 87.4 |
| F | .28 | 7.1 |
| G | 7.31 | 185.7 |
| H | 7.00 | 177.8 |
| M | .281 | 7.1 |
| N | .45 | 11.4 |
| P | .54 | 13.7 |
| Q | 5.93 | 150.6 |
| R | .19 | 4.8 |
| T | .48 | 12.2 |
| U | 2.28 | 58 |
| V | 2.54 | 64.5 |
| W | 4.93 | 125.2 |
| X | 3.81 | 96.8 |
| Z | 2.00 | 50.8 |
| AA | 1.00 | 25.4 |
| BB | .50 | 12.7 |
| CC | 1.00 | 25.4 |
| DD | .406 | 10.3 |
| FF | .66 | 16.8 |

