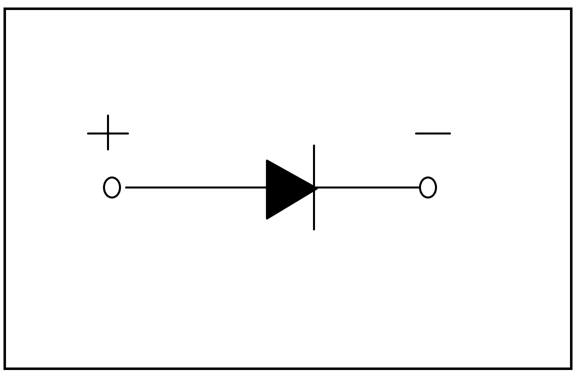
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

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



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

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	

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Reverse Blocking Voltage Derate Vrrm at Tj < 25C – Consult Factory		V_{RRM}	Up to 5000	V
Non-Repetitive Peak Blocking Voltage (t < 5 msec) Derate Vrsm at Tj < 25C - Consult Factory		V_{RSM}	V_{RRM} + 100V	V
RMS Current Per Diode (180 ^{o} 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 ^{o} 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 Tj = 25C, Vr = 0	60 Hz 50 Hz	I_{FSM} I_{FSM}	41,760 37,930	A A
Peak One Cycle Surge Current, Non-Repetitive Tj = 25C, Vr = Vrrm	60 Hz 50 Hz	I_{FSM} I_{FSM}	27,840 25,290	A A
Peak One Cycle Surge Current, Non-Repetitive Tj = 125C, Vr = 0	60 Hz 50 Hz	I_{FSM} I_{FSM}	36,000 32,700	A A
Peak One Cycle Surge Current, Non-Repetitive Tj = 125C, Vr = Vrrm	60 Hz 50 Hz	I_{FSM} I_{FSM}	24,000 21,800	A A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	19,270	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	15,140	A
I^2t for Fusing for One Cycle Tj = 125C, Vr = Vrrm	8.3 milliseconds 10 milliseconds	I^2t I^2t	2.39×10^6 2.38×10^6	A^2 sec A^2 sec
I^2t for Fusing for One Cycle Tj = 25C, Vr = 0 V	8.3 milliseconds 10 milliseconds	I^2t I^2t	7.24×10^6 7.19×10^6	A^2 sec A^2 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.

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Electrical Characteristics, T_J=25°C unless otherwise specified

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

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{\Theta J\text{-}C}$	Per Module			0.032	°C/W
Thermal Impedance Coefficients	$Z_{\Theta J\text{-}C}$	$Z_{\Theta J\text{-}C}$= K_1 (1-exp(-t/τ_1)) + K_2 (1-exp(-t/τ_2)) + K_3 (1-exp(-t/τ_3)) + K_4 (1-exp(-t/τ_4))	K_1 = 8.58 E-04 K_2 = 9.78 E-04 K_3 = 2.92 E-02 K_4 =9.72 E-04	τ_1 = 1.36 E-02 τ_2 = 1.80 E-01 τ_3 = 9.86 τ_4 = 59.4		
Thermal Resistance, Case to Sink Lubricated	$R_{\Theta C\text{-}S}$	Per Module			0.009	°C/W

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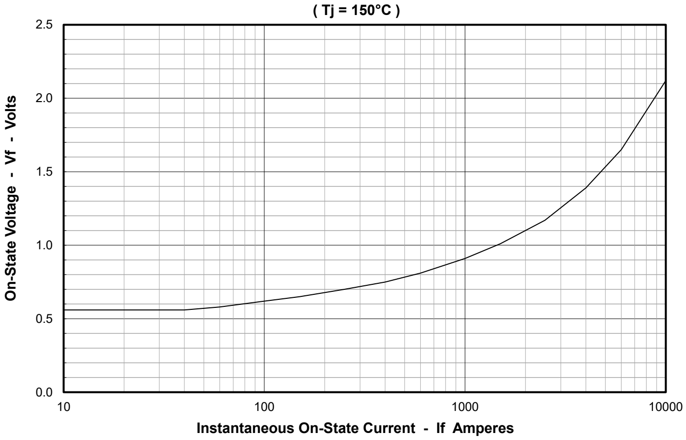
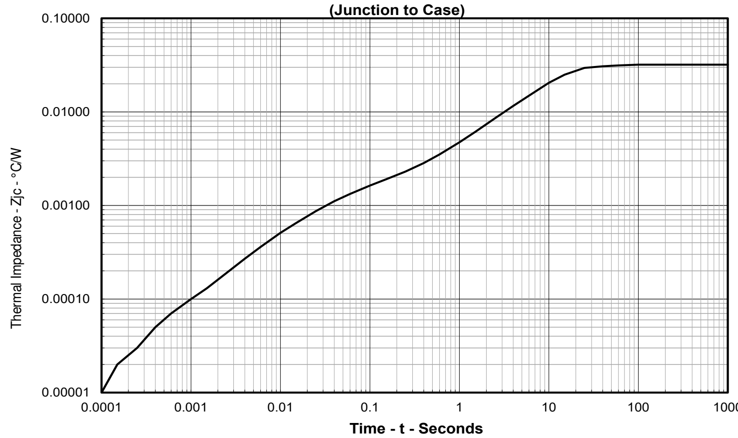
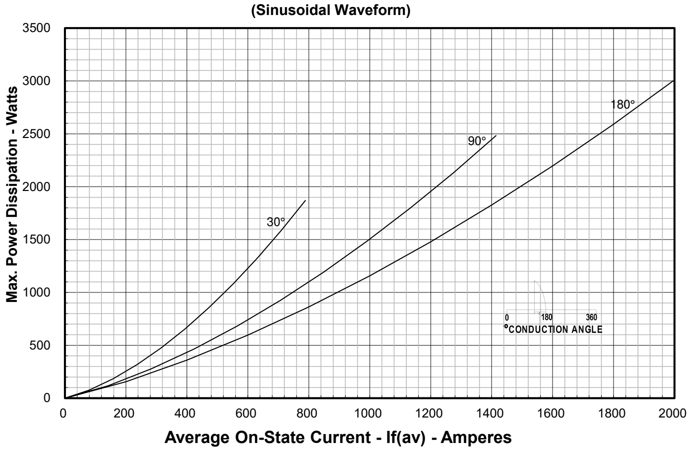
Maximum On-State Forward Voltage Drop
(Tj = 150°C)



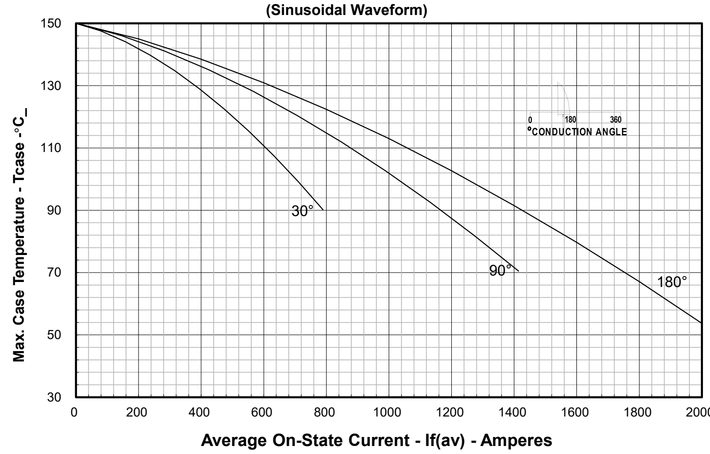
Maximum Transient Thermal Impedance
(Junction to Case)



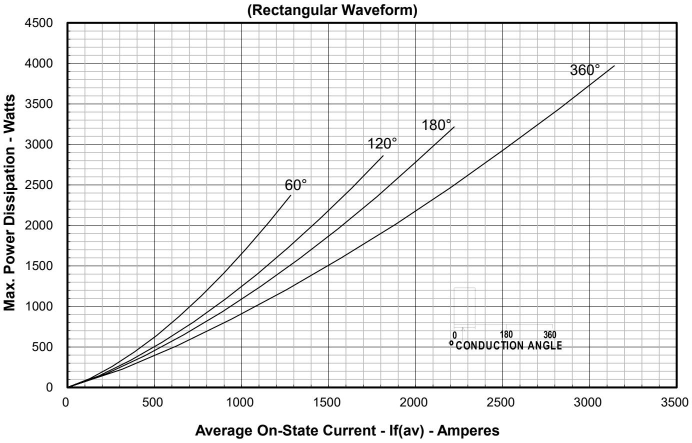
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



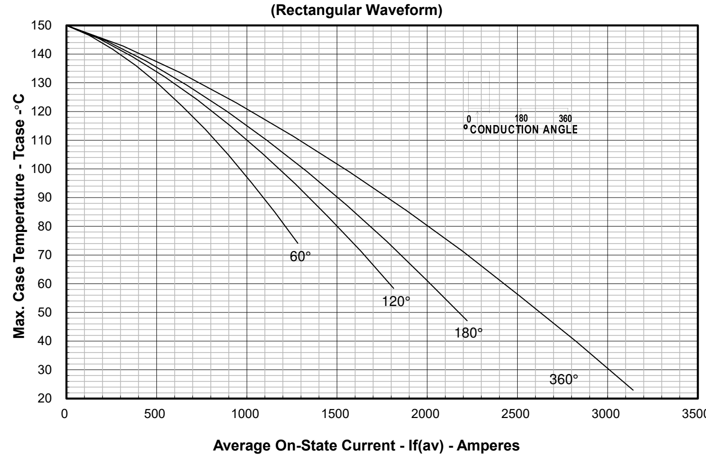
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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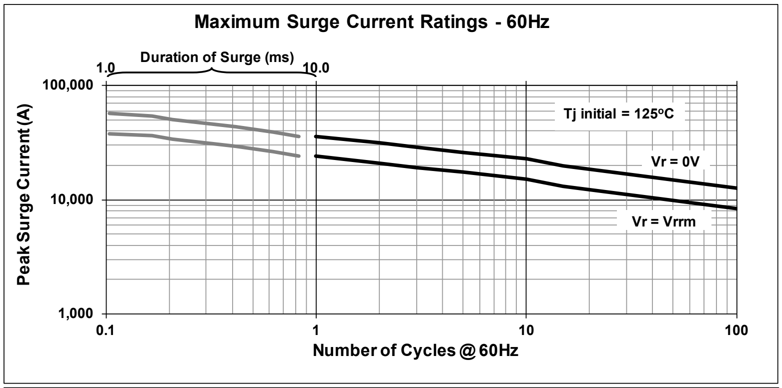

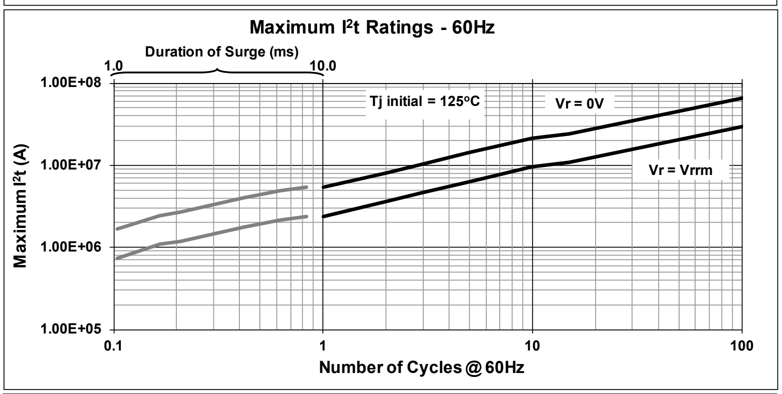

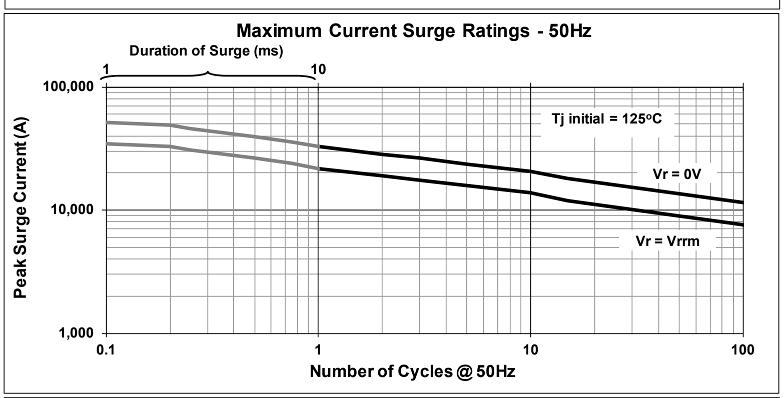

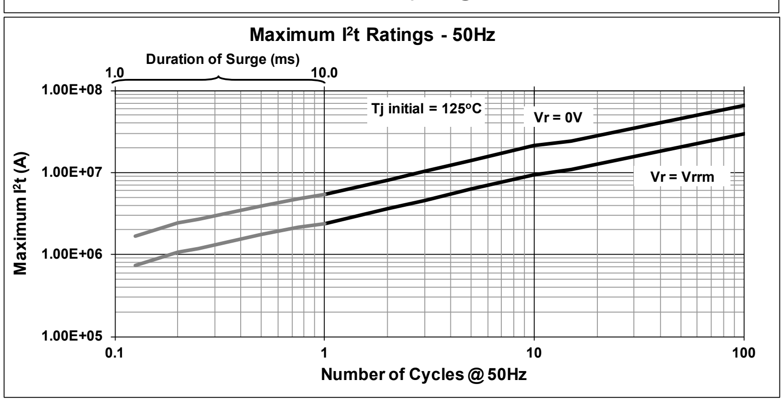

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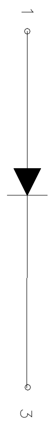

DIM.	INCHES	MILLIMETERS
A	7.80	198.1
B	4.00	101.6
C	2.68	68.1
D	6.44	163.6
E	3.44	87.4
F	.28	7.1
G	7.31	185.7
H	7.00	177.8
M	.281	7.1
N	.45	11.4
P	.54	13.7
Q	5.93	150.6
R	.19	4.8
T	.48	12.2
U	2.28	58
V	2.54	64.5
W	4.93	125.2
X	3.81	96.8
Z	2.00	50.8
AA	1.00	25.4
BB	.50	12.7
CC	1.00	25.4
DD	.406	10.3
FF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