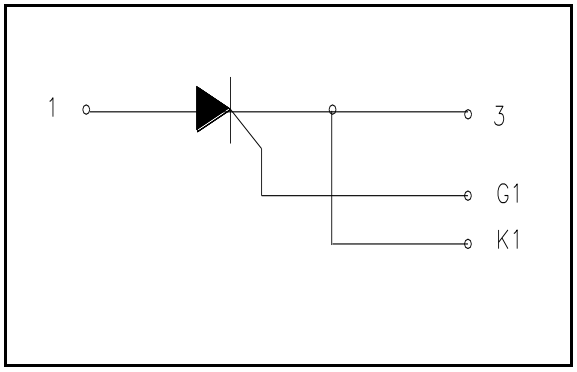
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

POW-R-BLOK™
Single SCR Isolated Module
1000 Amperes / Up to 4000 Volts



Description:
Powerex Single SCR Modules are designed for use in applications requiring phase control and isolated packaging. The modules are isolated for easy mounting with other components on a common heatsink.

Features:
- Electrically Isolated Heatsinking
- Compression Bonded Elements
- Paralleled SCRs in Module for Increased Capacity
- 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
- Motor Soft Starters
- Battery Supplies
- Power Supplies
- Large IGBT Circuit Front Ends

Ordering Information:
Select the complete eight-digit module part number from the table below.
Example: PS434010 is a 4000 Volt, 1000A Average Single SCR Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PS43	40	10

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	Up to 4000	V
Non-Repetitive Peak Blocking Voltage (t < 5 msec)		V_{RSM}	V_{RRM} + 100V	V
RMS Current AC Switch Configuration	180° Conduction, T_C=47°C	$I_{T(RMS)}$	3300	A
(180 ^{o} Conduction)	180° Conduction, T_C=54°C	$I_{T(RMS)}$	3080	A
(Two PS434010 in AC Switch Configuration)	180° Conduction, T_C=67°C	$I_{T(RMS)}$	2640	A
	180° Conduction, T_C=79°	$I_{T(RMS)}$	**2200**	A
RMS Current	180° Conduction, T_C=47°C	$I_{T(RMS)}$	2355	A
(180 ^{o} Conduction)	180° Conduction, T_C=54°C	$I_{T(RMS)}$	2200	A
	180° Conduction, T_C=67°C	$I_{T(RMS)}$	1885	A
	180° Conduction, T_C=79°C	$I_{T(RMS)}$	**1570**	A
Average Forward Current	180° Conduction, T_C=47°C	$I_{T(AV)}$	1500	A
(180 ^{o} Conduction)	180° Conduction, T_C=54°C	$I_{T(AV)}$	1400	A
	180° Conduction, T_C=67°C	$I_{T(AV)}$	1200	A
	180° Conduction, T_C=79°C	$I_{T(AV)}$	**1000**	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	50,500	A
Tj = 25C, Vr = 0	50 Hz	I_{TSM}	42,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	33,600	A
Tj = 25C, Vr = Vrrm	50 Hz	I_{TSM}	28,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	43,500	A
Tj = 125C, Vr = 0	50 Hz	I_{TSM}	36,300	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	29,000	A
Tj = 125C, Vr = Vrrm	50 Hz	I_{TSM}	24,200	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	23,000	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = 0	I_{TSM}	29,100	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	18,000	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = 0	I_{TSM}	23,000	A
I^2t for Fusing for One Cycle	8.3 milliseconds	I^2t	3.5×10^6	A^2 sec
Tj = 125C, Vr = Vrrm	10 milliseconds	I^2t	2.9×10^6	A^2 sec
I^2t for Fusing for One Cycle	8.3 milliseconds	I^2t	8.1×10^6	A^2 sec
Tj = 125C, Vr = 0	10 milliseconds	I^2t	6.6×10^6	A^2 sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	600	A/µs
Maximum Rate-of-Rise of On-State Current, (Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	200	A/µs
Operating Temperature		T_J	-40 to +125	°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	60 Hz, 60 sec	VAC 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 for 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 Forward Leakage Current	I_{DRM}	Up to 4000V, T_J=125°C		300	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 4000V, T_J=125°C		300	mA
Peak On-State Voltage	V_{TM}	I_{TM}=3000A, T_J=25°C		2.50	V
Threshold Voltage, Low-level Slope Resistance, Low-level	$V_{(TO)1}$ r_{T1}	T_J = 125°C, I = 15%$I_{T(AV)}$ to $\pi I_{T(AV)}$		1.400 0.193	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 125°C, I = $\pi I_{T(AV)}$ to I_{TSM}		1.391 0.200	V mΩ
V_{TM} Coefficients, Full Range		T_J = 125°C, I = 50A to 15kA V_{TM} = A+ B Ln I +C I + D Sqrt I	A = B = C = D =	1.610 -4.03 E-02 1.93 E-04 2.50 E-03	
Minimum dV/dt	dV/dt	Exponential to 0.80V_{DRM} T_j=125°C, Gate Open	800		V/µs
Gate Trigger Current	I_{GT} I_G Required	T_j=25°C, V_D=12V Min Ig Required to Ensure Turn-On of Paralleled SCRs in Module	60 800mA	400	mA
Gate Trigger Voltage	V_{GT}	T_j=25°C, V_D=12V		4.5	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j=125°C, V_D= ½ V_{DRM}		0.15	Volts
Holding Current	I_H			600	mA
Peak Forward Gate Current	I_{GTM}			8.0	Amp
Peak Reverse Gate Voltage	V_{GRM}			5	Volts
Maximum Average Gate Power Dissipation	$P_{GM\ (AVE)}$			60	Watts

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{\Theta J-C}$	Per Module, both conducting			0.024	°C/W
Thermal Impedance Coefficients	$Z_{\Theta J-C}$	$Z_{\Theta J-C}$= 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 = 4.05 E-04 K_2 = 5.19 E-03 K_3 = 1.63 E-02 K_4 = 2.12 E-03	τ_1 = 6.24 E-03 τ_2 = 2.46 E-01 τ_3 = 8.20 τ_4 = 35.33		
Thermal Resistance, Case to Sink Lubricated	$R_{\Theta C-S}$	Per Module			0.009	°C/W

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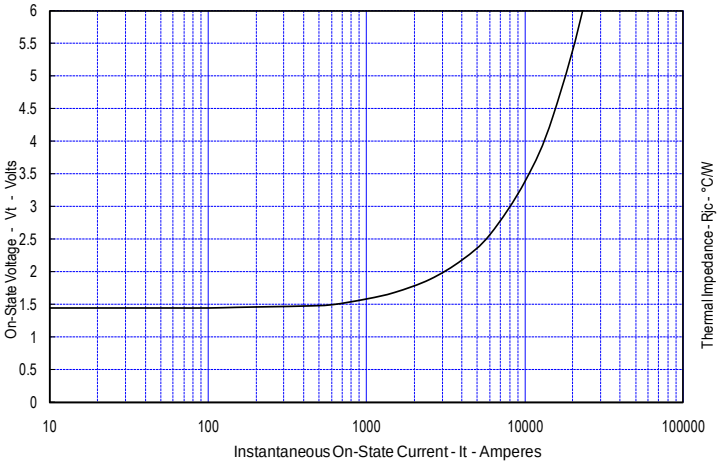
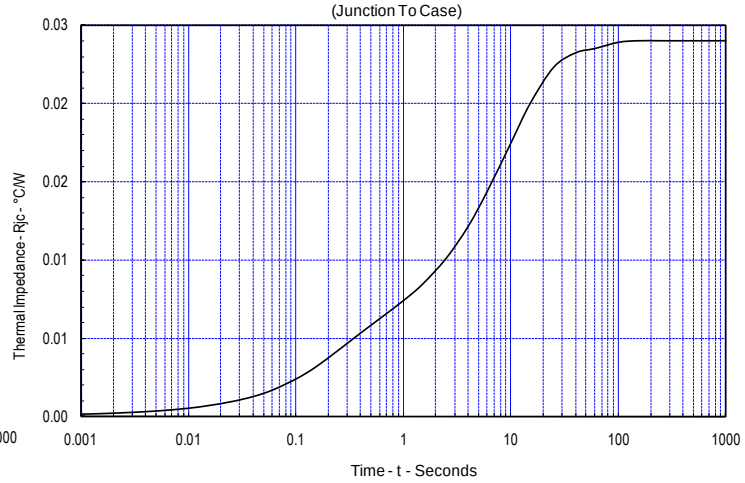
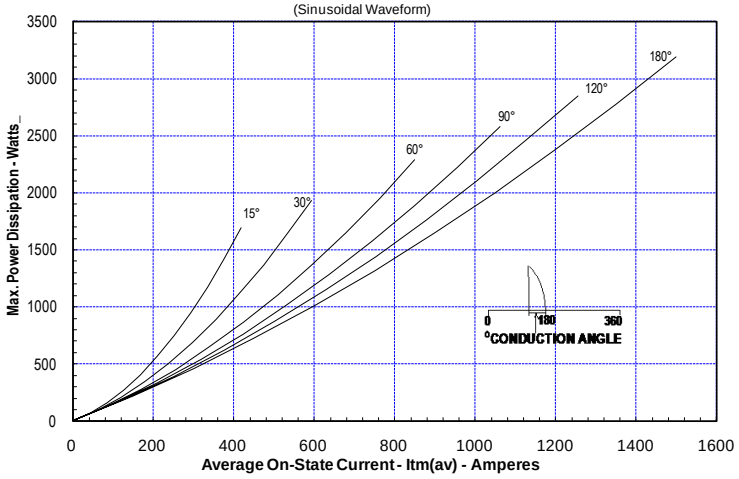
Maximum On-State Forward Voltage Drop
(Tj = 125C)



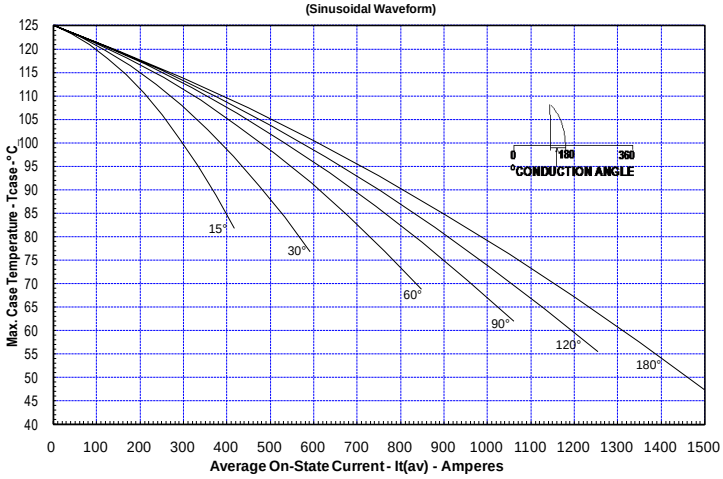
Maximum Transient Thermal Impedance
(Junction To Case)



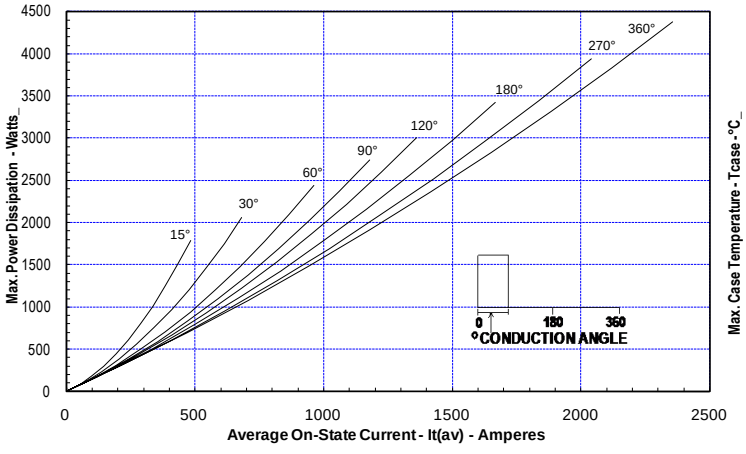
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



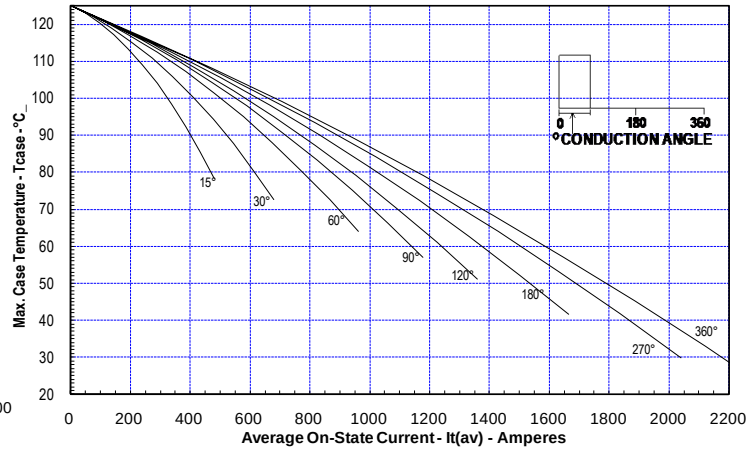
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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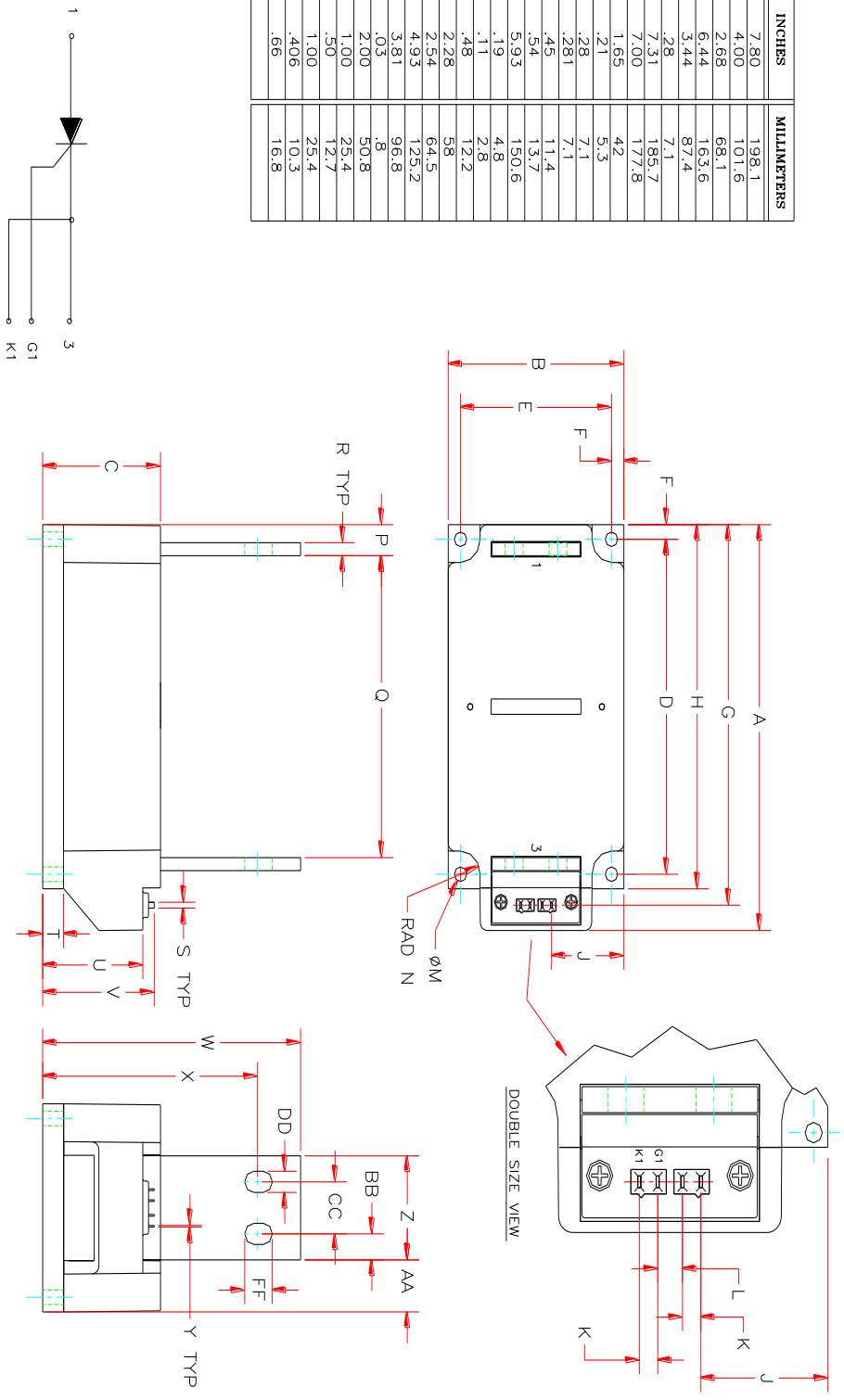
DIM.	INCHES	MILLIMETERS
A	7.80	198.1
B	4.00	101.6
C	2.68	68.1
D	6.44	163.6
E	3.44	87.4
F	.28	7.1
G	7.31	185.7
H	7.00	177.8
J	1.65	42
K	.21	5.3
L	.28	7.1
M	.281	7.1
N	.45	11.4
P	.54	13.7
Q	5.93	150.6
R	.19	4.8
S	.11	2.8
T	.48	12.2
U	2.28	58
V	2.54	64.5
W	4.93	125.2
X	3.81	96.8
Y	.03	.8
Z	2.00	50.8
AA	1.00	25.4
BB	.50	12.7
CC	1.00	25.4
DD	.406	10.3
FF	.66	16.8



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