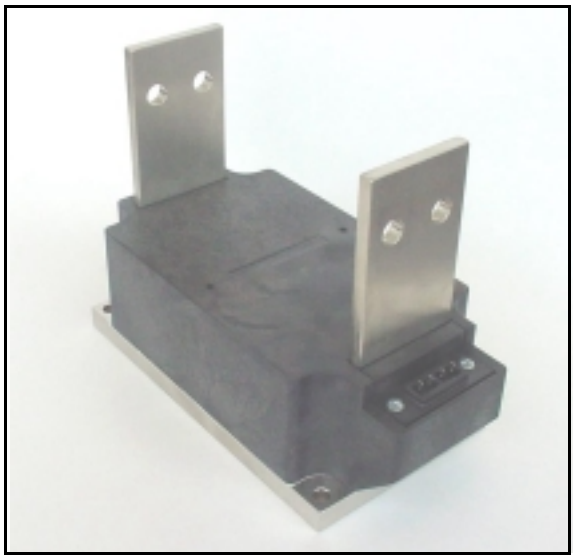
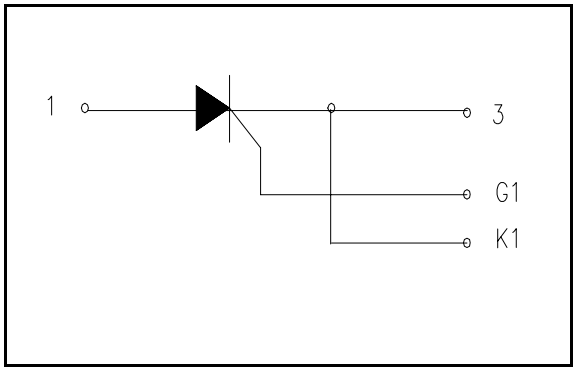
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (724) 925-7272

POW-R-BLOK™
Single SCR Isolated Module
1500 Amperes / Up to 1800 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
- 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: PS431815 is a 1800 Volt, 1500A Average Single SCR Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PS43	12 14 16 18	15

06/30/2003

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	Up to 1800	V
Non-Repetitive Peak Blocking Voltage (t < 5 msec)		V_{RSM}	V_{RRM} + 100V	V
RMS Current AC Switch Configuration	**180◦ Conduction, T_C=86◦C**	$I_{T(RMS)}$	**3300**	A
(180 ^{O} Conduction)	180◦ Conduction, T_C=89◦C	$I_{T(RMS)}$	3080	A
(Two PS43__15 in AC Switch Configuration)	180◦ Conduction, T_C=93◦C	$I_{T(RMS)}$	2860	A
	180◦ Conduction, T_C=96◦	$I_{T(RMS)}$	2640	A
RMS Current	**180◦ Conduction, T_C=86◦C**	$I_{T(RMS)}$	**2355**	A
(180 ^{O} Conduction)	180◦ Conduction, T_C=89◦C	$I_{T(RMS)}$	2200	A
	180◦ Conduction, T_C=93◦C	$I_{T(RMS)}$	2040	A
	180◦ Conduction, T_C=96◦C	$I_{T(RMS)}$	1885	A
Average Forward Current	**180◦ Conduction, T_C=86◦C**	$I_{T(AV)}$	**1500**	A
(180 ^{O} Conduction)	180◦ Conduction, T_C=89◦C	$I_{T(AV)}$	1400	A
	180◦ Conduction, T_C=93◦C	$I_{T(AV)}$	1300	A
	180◦ Conduction, T_C=96◦C	$I_{T(AV)}$	1200	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	115,000	A
Tj = 25C, Vr = 0	50 Hz	I_{TSM}	105,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	78,000	A
Tj = 25C, Vr = Vrrm	50 Hz	I_{TSM}	71,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	102,000	A
Tj = 125C, Vr = 0	50 Hz	I_{TSM}	93,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{TSM}	68,000	A
Tj = 125C, Vr = Vrrm	50 Hz	I_{TSM}	62,000	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	54,000	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	42,000	A
I^2t for Fusing for One Cycle	8.3 milliseconds	I^2t	19.3×10^6	A^2 sec
Tj = 125C, Vr = Vrrm	10 milliseconds	I^2t	19.2×10^6	A^2 sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	400	A/μs
Maximum Rate-of-Rise of On-State Current, (Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	150	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			455 11.75	g lb
V Isolation @ 25C	60 Hz, 60 sec	VAC_{rms}	3600	V

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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 1800V, T_J=125◦C		200	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 1800V, T_J=125◦C		200	mA
Peak On-State Voltage	V_{TM}	I_{TM}=3000A, T_J=25◦C		1.30	V
Threshold Voltage, Low-level Slope Resistance, Low-level	$V_{(TO)1}$ r_{T1}	T_J = 125◦C, I = 15%$I_{T(AV)}$ to π$I_{T(AV)}$		0.691 0.102	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 125◦C, I = π$I_{T(AV)}$ to I_{TSM}		0.871 0.065	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 =	0.7963 -3.77 E-02 3.65 E-05 7.19 E-03	
Minimum dV/dt	dV/dt	Exponential to 0.67V_{DRM} T_j=125◦C, Gate Open	600		V/μs
Gate Trigger Current	I_{GT}	T_j=25◦C, V_D=12V		400	mA
Gate Trigger Voltage	V_{GT}	T_j=25◦C, V_D=12V		3.0	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	$R_{ΘJ-C}$	Per Module, both conducting			0.024	◦C/W
Thermal Impedance Coefficients	$Z_{ΘJ-C}$	$Z_{ΘJ-C}$= K_1 (1-exp(-t/t_1))	K_1 = 4.05 E-04	t_1 = 6.24 E-03		
		+ K_2 (1-exp(-t/t_2))	K_2 = 5.19 E-03	t_2 = 2.46 E-01		
		+ K_3 (1-exp(-t/t_3))	K_3 = 1.63 E-02	t_3 = 8.20		
		+ K_4 (1-exp(-t/t_4))	K_4 = 2.12 E-03	t_4 = 35.33		
Thermal Resistance, Case to Sink Lubricated	$R_{ΘC-S}$	Per Module			0.009	◦C/W

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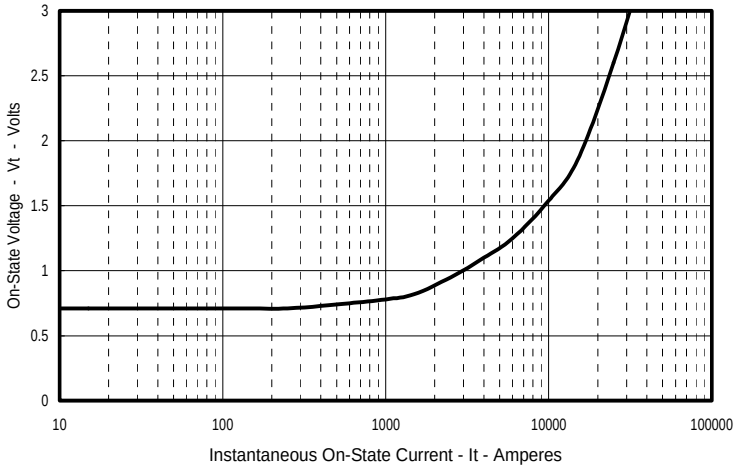
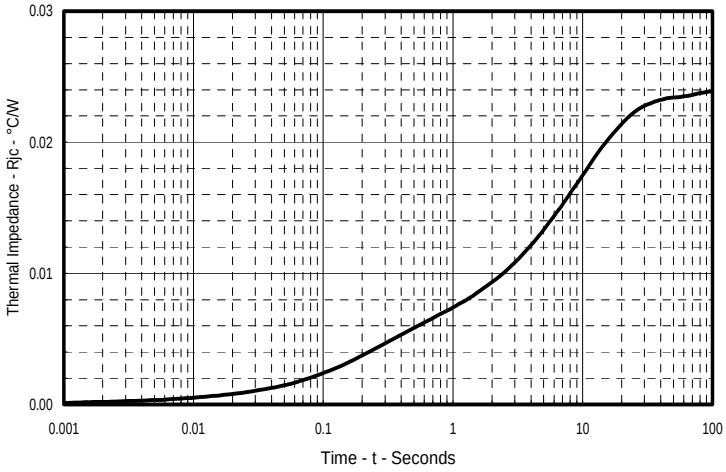
Typical On-State Forward Voltage Drop

(Tj = 125C)



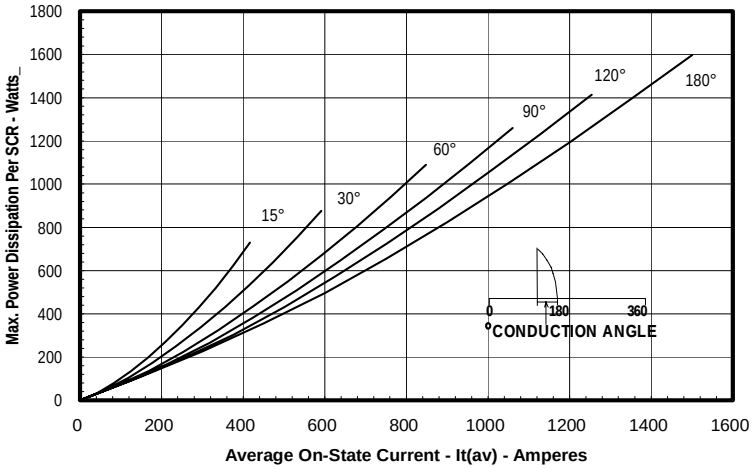
Maximum Transient Thermal Impedance

(Junction To Case)



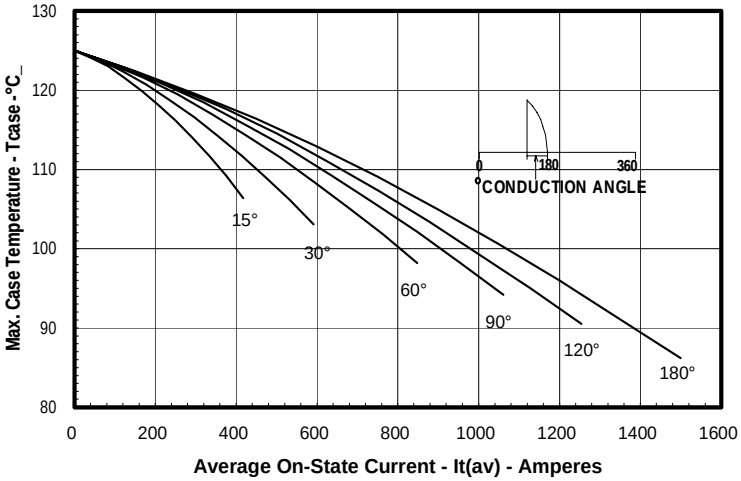
Maximum On-State Power Dissipation

(Sinusoidal Waveform)



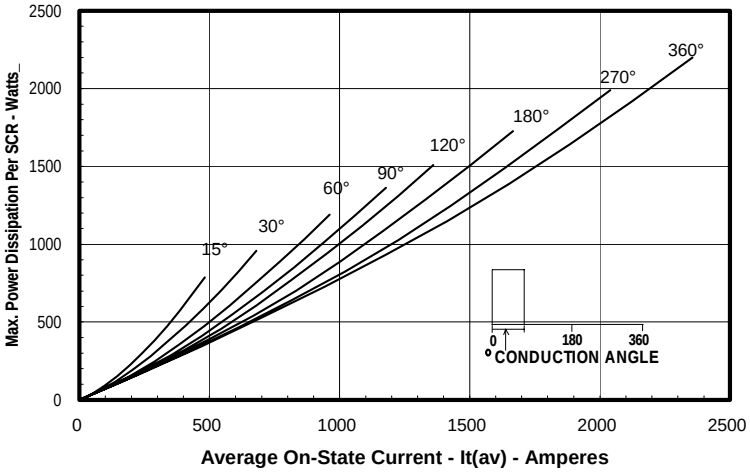
Maximum Allowable Case Temperature

(Sinusoidal Waveform)



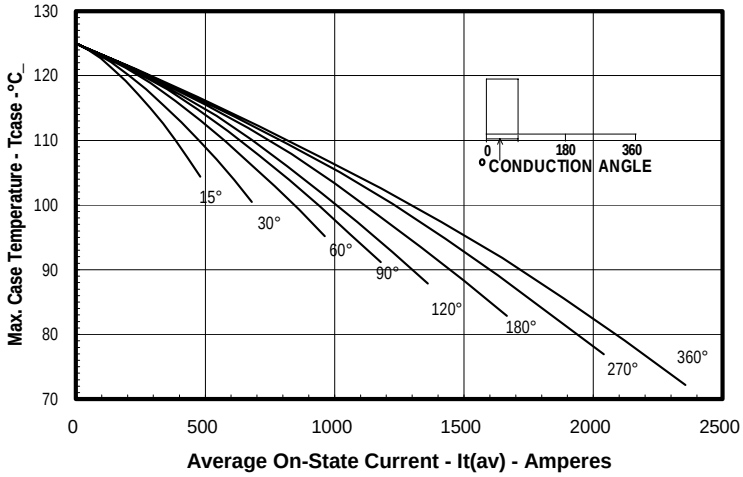
Maximum On-State Power Dissipation

(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