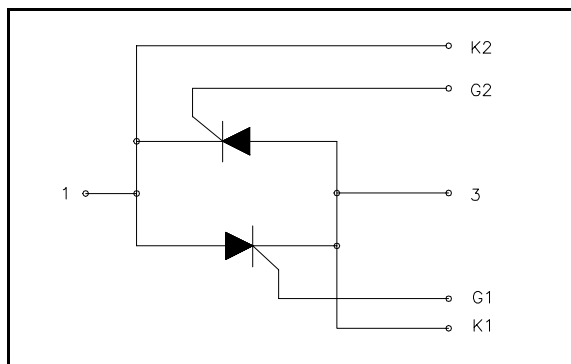


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (724) 925-7272

POW-R-BLOK™ **AC Switch SCR Isolated Module** **1550 Amps RMS, Up to 1800 Volts**



Ordering Information:

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

Example: PA431807 is a 1800 Volt, 700A Average/SCR (1550 Ampere RMS/Switch) SCR AC Switch Isolated POW-R-BLOK™ Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PA43	12	07
	14	Average
	16	Current
	18	Per SCR

Description:

Powerex AC Switch 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:

- Transfer Switches
- AC Welders
- Motor Soft Starters

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POW-R-BLOK™
AC Switch SCR Isolated Module
1550 Amps RMS, Up to 1800 Volts

Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	1800	V
Non-Repetitive Peak Blocking Voltage ($t < 5$ msec)		V_{RSM}	1900	V
RMS Current	180° Conduction, $T_C=74^\circ\text{C}$	$I_{T(RMS)}$	1775	A
(AC Switch, 180° Conduction)	180° Conduction, $T_C=78^\circ\text{C}$	$I_{T(RMS)}$	1665	A
	180° Conduction, $T_C=82^\circ\text{C}$	$I_{T(RMS)}$	1550	A
	180° Conduction, $T_C=86^\circ\text{C}$	$I_{T(RMS)}$	1440	A
Average Forward Current Per SCR (180° Conduction)	180° Conduction, $T_C=74^\circ\text{C}$	$I_{T(AV)}$	800	A
	180° Conduction, $T_C=78^\circ\text{C}$	$I_{T(AV)}$	750	A
	180° Conduction, $T_C=82^\circ\text{C}$	$I_{T(AV)}$	700	A
	180° Conduction, $T_C=86^\circ\text{C}$	$I_{T(AV)}$	650	A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 25^\circ\text{C}$, $V_r = 0$	60 Hz	I_{TSM}	69,000	A
	50 Hz	I_{TSM}	63,000	A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 25^\circ\text{C}$, $V_r = V_{rrm}$	60 Hz	I_{TSM}	46,000	A
	50 Hz	I_{TSM}	42,000	A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 125^\circ\text{C}$, $V_r = 0$	60 Hz	I_{TSM}	60,000	A
	50 Hz	I_{TSM}	54,750	A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 125^\circ\text{C}$, $V_r = V_{rrm}$	60 Hz	I_{TSM}	40,000	A
	50 Hz	I_{TSM}	36,500	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, $T_j = 125^\circ\text{C}$, $V_r = V_{rrm}$	I_{TSM}	32,100	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, $T_j = 125^\circ\text{C}$, $V_r = V_{rrm}$	I_{TSM}	25,200	A
I^2t for Fusing for One Cycle $T_j = 125^\circ\text{C}$, $V_r = V_{rrm}$	8.3 milliseconds	I^2t	6.60×10^6	$\text{A}^2 \text{ sec}$
	10 milliseconds	I^2t	6.66×10^6	$\text{A}^2 \text{ sec}$
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	400	$\text{A}/\mu\text{s}$
Maximum Rate-of-Rise of On-State Current, (Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	150	$\text{A}/\mu\text{s}$
Operating Temperature		T_j	-40 to +125	$^\circ\text{C}$
Storage Temperature		T_{stg}	-40 to +150	$^\circ\text{C}$
Max. Mounting Torque, M6 Mounting Screw			132	in. – Lb.
			15	Nm
Max. Mounting Torque, M10 Terminal Screw			106	in. – Lb.
			12	Nm
Module Weight, Typical			455	g
			11.75	lb
V Isolation @ 25C		V_{rms}	3000	V

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

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Forward Leakage Current	I_{DRM}	Up to 1800V, $T_J=125^\circ\text{C}$		100	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 1800V, $T_J=125^\circ\text{C}$		100	mA
Peak On-State Voltage	V_{FM}	$I_{TM}=3000\text{A}$, $T_J=125^\circ\text{C}$		1.30	V
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_J = 125^\circ\text{C}$, $I = 15\%I_{T(AV)}$ to $\pi I_{T(AV)}$		0.703	V
Slope Resistance, Low-level	r_{T1}			0.184	$m\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_J = 125^\circ\text{C}$, $I = \pi I_{T(AV)}$ to I_{TSM}		1.01	V
Slope Resistance, High-level	r_{T2}			0.117	$m\Omega$
V_{TM} Coefficients, Full Range		$T_J = 125^\circ\text{C}$, $I = 50\text{A}$ to 6kA $V_{TM} = A + B \ln I + C I + D \text{Sqrt } I$	A = B = C = D =	0.7999 -4.62 E-02 7.33 E-05 1.10 E-02	
Minimum dV/dt	dV/dt	Exponential to $0.67V_{DRM}$ $T_J=125^\circ\text{C}$, Gate Open	600 Typ.		$V/\mu\text{s}$
Gate Trigger Current	I_{GT}	$T_J=25^\circ\text{C}$, $V_D=12\text{V}$		200	mA
Gate Trigger Voltage	V_{GT}	$T_J=25^\circ\text{C}$, $V_D=12\text{V}$		3.0	Volts
Non-Triggering Gate Voltage	V_{GDM}	$T_J=125^\circ\text{C}$, $V_D= \frac{1}{2} V_{DRM}$		0.15	Volts
Holding Current	I_H			300	mA
Peak Forward Gate Current	I_{GTM}			4.0	Amp
Peak Reverse Gate Voltage	V_{GRM}			5	Volts
Maximum Average Gate Power Dissipation	$P_{GM(AVE)}$			16	Watts

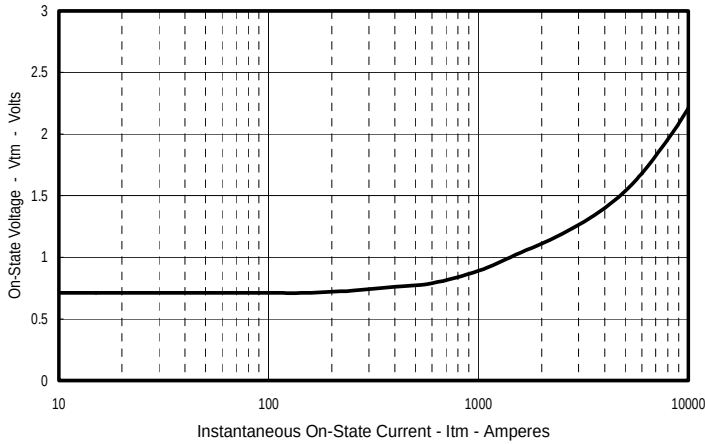
Thermal Characteristics

Characteristics	Symbol		Max.	Units
Thermal Resistance, Junction to Case	$R_{\Theta J-C}$	Per Module, both conducting Per Junction, both conducting	0.029 0.058	$^\circ\text{C/W}$ $^\circ\text{C/W}$
Thermal Impedance Coefficients	$Z_{\Theta J-C}$	$Z_{\Theta J-C} = K_1 (1 - \exp(-t/t_1))$ $+ K_2 (1 - \exp(-t/t_2))$ $+ K_3 (1 - \exp(-t/t_3))$ $+ K_4 (1 - \exp(-t/t_4))$	$K_1 = 5.04 \text{ E-}04$ $K_2 = 2.31 \text{ E-}03$ $K_3 = 2.83 \text{ E-}03$ $K_4 = 5.24 \text{ E-}02$	$t_1 = 2.47 \text{ E-}03$ $t_2 = 4.42 \text{ E-}02$ $t_3 = 1.370$ $t_4 = 9.668$
Thermal Resistance, Case to Sink Lubricated	$R_{\Theta C-S}$	Per Module	0.009	$^\circ\text{C/W}$

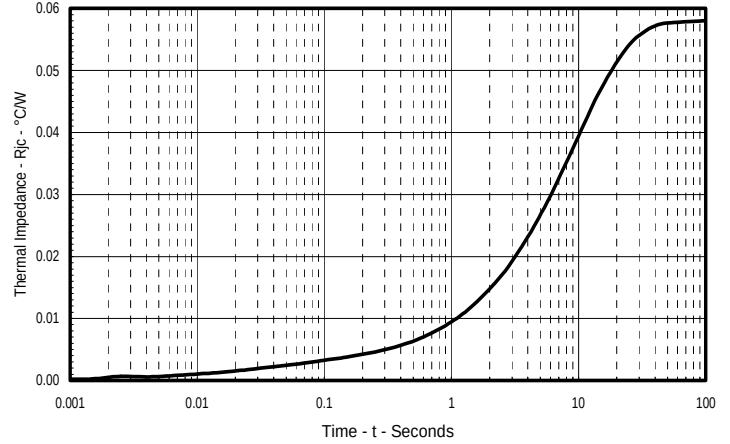
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AC Switch SCR Module 1530 Amps RMS, Up to 1800 Volts

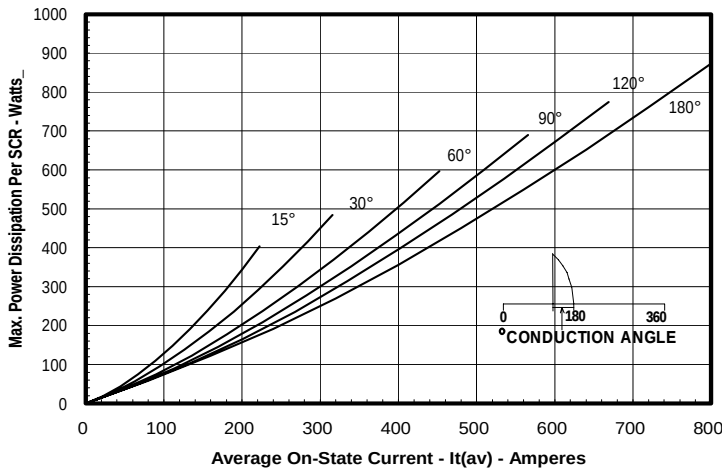
Typical On-State Forward Voltage Drop
($T_J = 125^\circ\text{C}$)



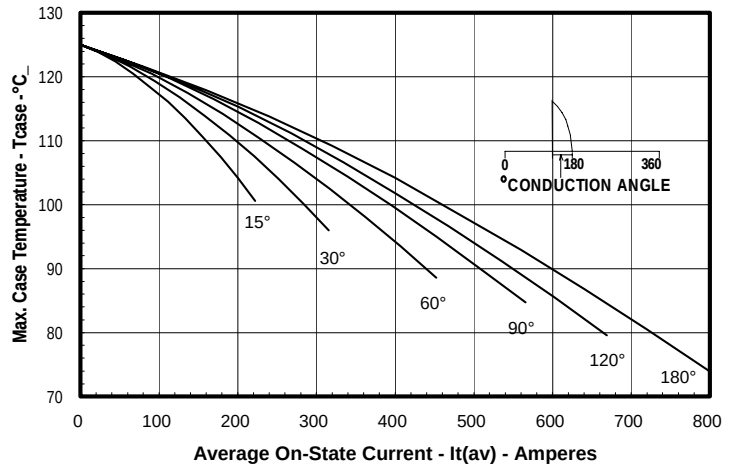
Maximum Transient Thermal Impedance
(Junction To Case)



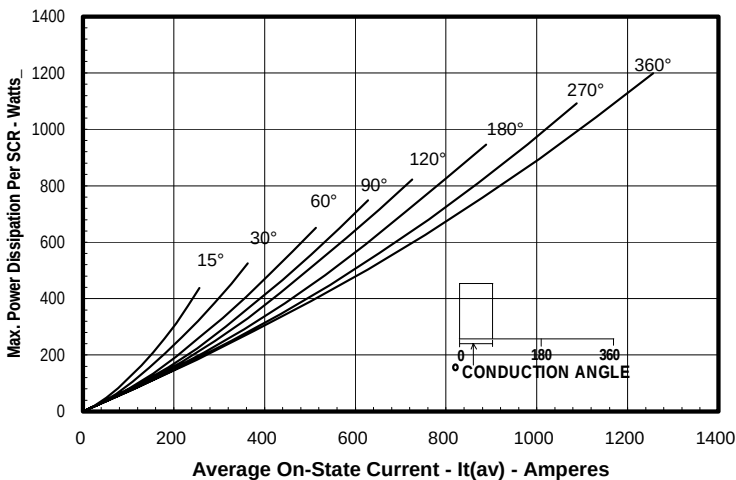
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



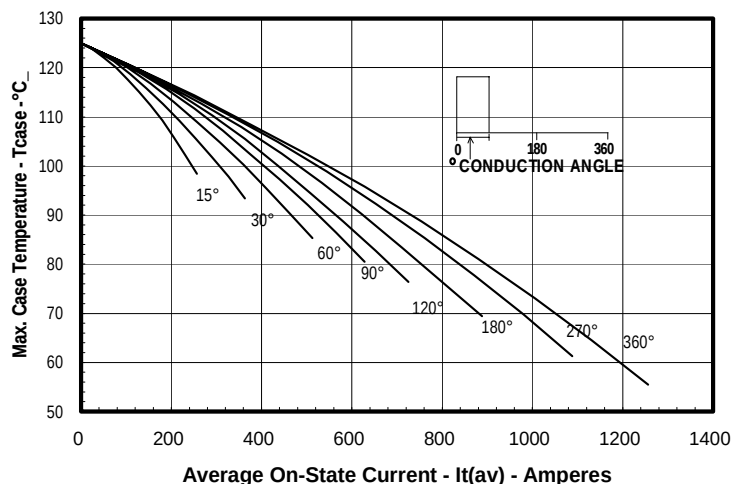
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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AC Switch SCR Module
1550 Amps RMS / 1800 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
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

