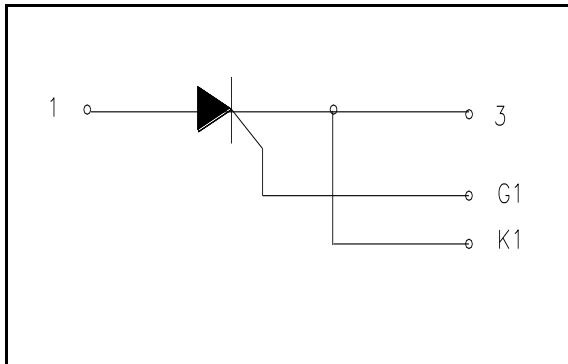


**POW-R-BLOK<sup>™</sup>**  
**Single SCR Isolated Module**  
**1500 Amperes / Up to 1800 Volts**



**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<sup>™</sup> Module

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

**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

**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)	<b>180° Conduction, <math>T_C=86^\circ C</math></b> 180° Conduction, $T_C=89^\circ C$	$I_{T(RMS)}$	<b>3300</b> 3080 A
(Two PS43__15 in AC Switch Configuration)	180° Conduction, $T_C=93^\circ C$ 180° Conduction, $T_C=96^\circ C$	$I_{T(RMS)}$	2860 2640 A
RMS Current (180° Conduction)	<b>180° Conduction, <math>T_C=86^\circ C</math></b> 180° Conduction, $T_C=89^\circ C$ 180° Conduction, $T_C=93^\circ C$ 180° Conduction, $T_C=96^\circ C$	$I_{T(RMS)}$	<b>2355</b> 2200 2040 1885 A
Average Forward Current (180° Conduction)	<b>180° Conduction, <math>T_C=86^\circ C</math></b> 180° Conduction, $T_C=89^\circ C$ 180° Conduction, $T_C=93^\circ C$ 180° Conduction, $T_C=96^\circ C$	$I_{T(AV)}$	<b>1500</b> 1400 1300 1200 A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 25C, V_r = 0$	60 Hz 50 Hz	$I_{TSM}$	115,000 105,000 A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 25C, V_r = V_{rrm}$	60 Hz 50 Hz	$I_{TSM}$	78,000 71,000 A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 125C, V_r = 0$	60 Hz 50 Hz	$I_{TSM}$	102,000 93,000 A
Peak One Cycle Surge Current, Non-Repetitive $T_j = 125C, V_r = V_{rrm}$	60 Hz 50 Hz	$I_{TSM}$	68,000 62,000 A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, $T_j = 125C, V_r = V_{rrm}$	$I_{TSM}$	54,000 A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, $T_j = 125C, V_r = V_{rrm}$	$I_{TSM}$	42,000 A
$I^2t$ for Fusing for One Cycle $T_j = 125C, V_r = V_{rrm}$	8.3 milliseconds 10 milliseconds	$I^2t$	$19.3 \times 10^6$ $19.2 \times 10^6$ A <sup>2</sup> sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	400 A/ $\mu$ s
Maximum Rate-of-Rise of On-State Current, (Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	150 A/ $\mu$ s
Operating Temperature		$T_J$	-40 to +125 °C
Storage Temperature		$T_{stg}$	-40 to +150 °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			5.33 kg 11.75 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.

**Electrical Characteristics, T<sub>J</sub>=25°C unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Forward Leakage Current	I <sub>DRM</sub>	Up to 1800V, T <sub>J</sub> =125°C		200	mA
Repetitive Peak Reverse Leakage Current	I <sub>RRM</sub>	Up to 1800V, T <sub>J</sub> =125°C		200	mA
Peak On-State Voltage	V <sub>TM</sub>	I <sub>TM</sub> =3000A, T <sub>J</sub> =25°C		1.30	V
Threshold Voltage, Low-level	V <sub>(TO)1</sub>	T <sub>J</sub> = 125°C, I = 15%I <sub>T(AV)</sub> to πI <sub>T(AV)</sub>		0.691	V
Slope Resistance, Low-level	r <sub>T1</sub>			0.102	mΩ
Threshold Voltage, High-level	V <sub>(TO)2</sub>	T <sub>J</sub> = 125°C, I = πI <sub>T(AV)</sub> to I <sub>TSM</sub>		0.871	V
Slope Resistance, High-level	r <sub>T2</sub>			0.065	mΩ
V <sub>TM</sub> Coefficients, Full Range		T <sub>J</sub> = 125°C, I = 50A to 15kA V <sub>TM</sub> = 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	
Critical Rate of Rise of Off-State Voltage	dV/dt	Exponential to 0.67V <sub>DRM</sub> T <sub>J</sub> =125°C, Gate Open		600	V/μs
Gate Trigger Current	I <sub>GT</sub> I <sub>G</sub> Required	T <sub>J</sub> =25°C, V <sub>D</sub> =12V Min I <sub>G</sub> Required to Ensure Turn-On of Paralleled SCRs in Module	800mA	400	mA
Gate Trigger Voltage	V <sub>GT</sub>	T <sub>J</sub> =25°C, V <sub>D</sub> =12V		4.5	Volts
Non-Triggering Gate Voltage	V <sub>GDM</sub>	T <sub>J</sub> =125°C, V <sub>D</sub> = ½ V <sub>DRM</sub>		0.15	Volts
Holding Current	I <sub>H</sub>			600	mA
Peak Forward Gate Current	I <sub>GTM</sub>			8.0	Amp
Peak Reverse Gate Voltage	V <sub>GRM</sub>			5	Volts
Maximum Average Gate Power Dissipation	P <sub>GM (AVE)</sub>			60	Watts

**Thermal Characteristics**

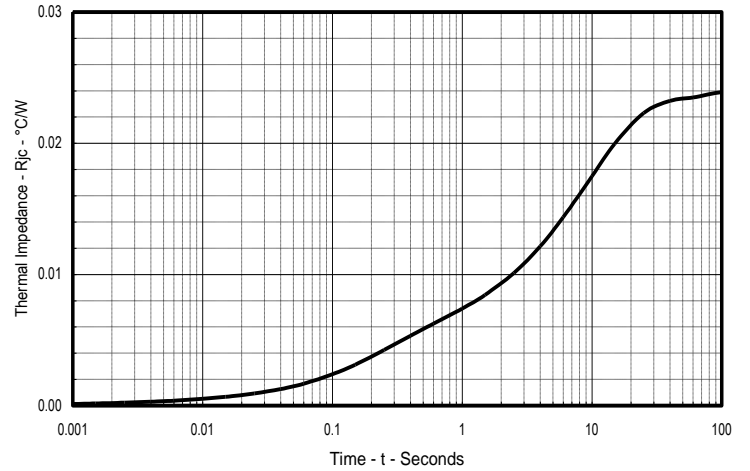
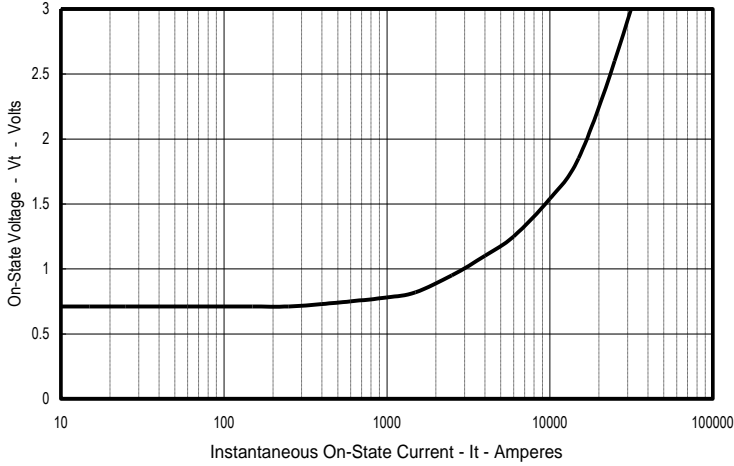
Characteristics	Symbol		Max.	Units
Thermal Resistance, Junction to Case	R <sub>ΘJ-C</sub>	Per Module, both conducting	0.024	°C/W
Thermal Impedance Coefficients	Z <sub>ΘJ-C</sub>	Z <sub>ΘJ-C</sub> = K <sub>1</sub> (1-exp(-t/τ <sub>1</sub> )) + K <sub>2</sub> (1-exp(-t/τ <sub>2</sub> )) + K <sub>3</sub> (1-exp(-t/τ <sub>3</sub> )) + K <sub>4</sub> (1-exp(-t/τ <sub>4</sub> ))	K <sub>1</sub> = 4.05 E-04 K <sub>2</sub> = 5.19 E-03 K <sub>3</sub> = 1.63 E-02 K <sub>4</sub> = 2.12 E-03	τ <sub>1</sub> = 6.24 E-03 τ <sub>2</sub> = 2.46 E-01 τ <sub>3</sub> = 8.20 τ <sub>4</sub> = 35.33
Thermal Resistance, Case to Sink Lubricated	R <sub>ΘC-S</sub>	Per Module	0.009	°C/W

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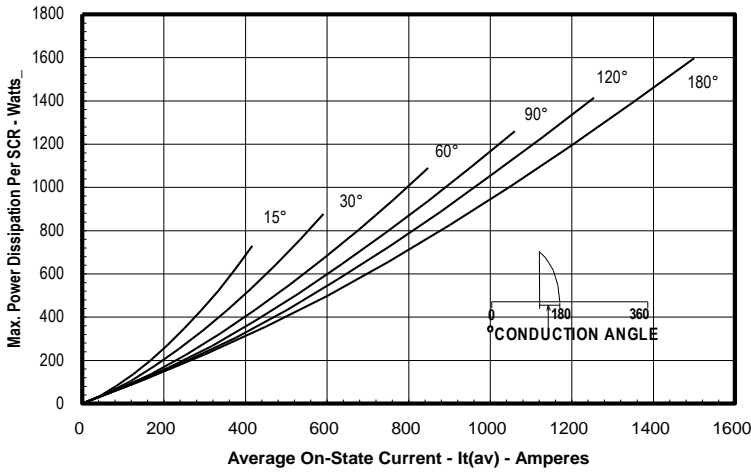
**POW-R-BLOK™**  
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Maximum Transient Thermal Impedance  
(Junction To Case)

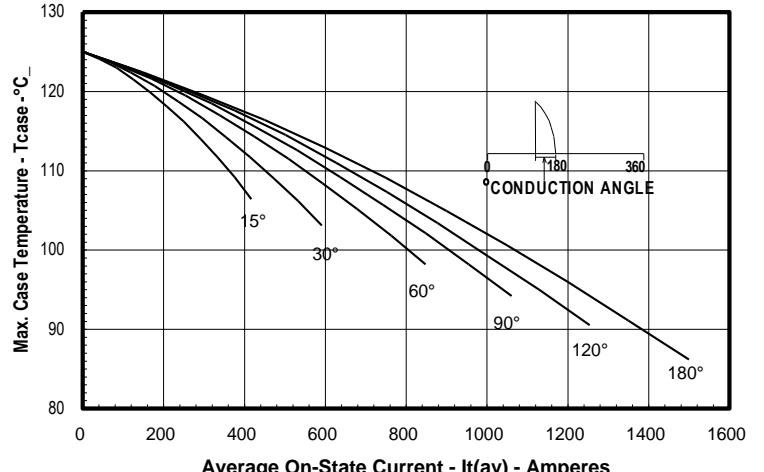
Typical On-State Forward Voltage Drop  
( $T_j = 125^\circ\text{C}$ )



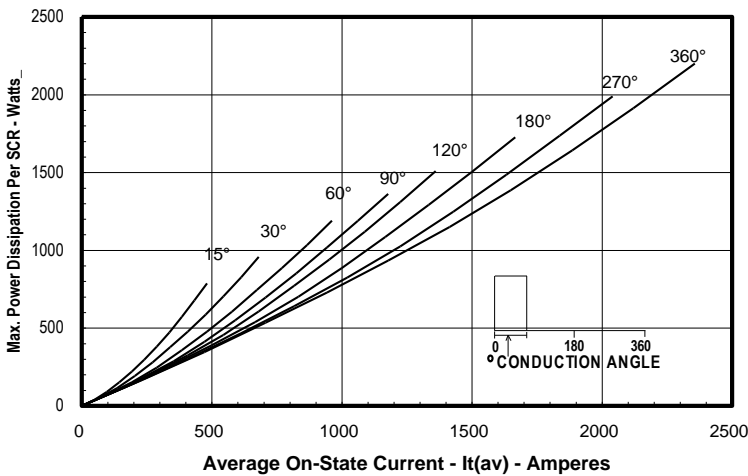
Maximum On-State Power Dissipation  
(Sinusoidal Waveform)



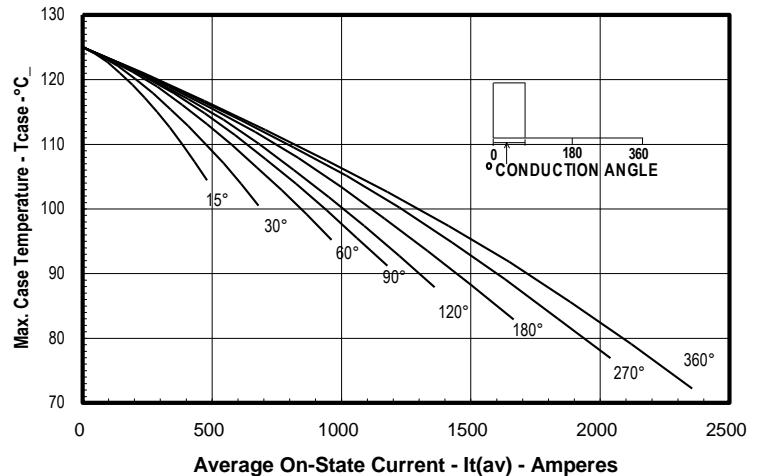
Maximum Allowable Case Temperature  
(Sinusoidal Waveform)



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

