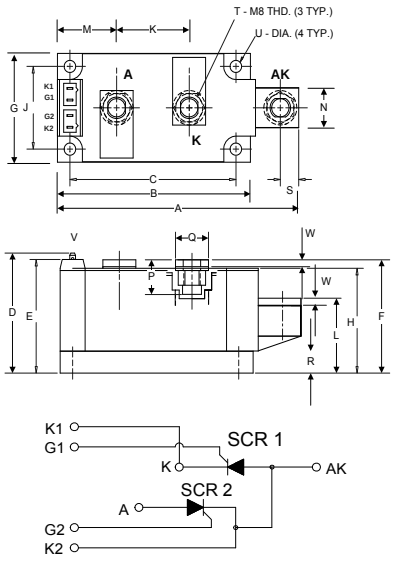
Powerex, Inc., 173 Pavilion Ln, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

POW-R-BLOK^{TM}
Dual SCR Isolated Module
330 Amperes / Up to 1600 Volts

OUTLINE DRAWING



CONNECTION DIAGRAM

ND43__33
Dual SCR Isolated
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Description:

Powerex Dual 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. *POW-R-BLOK^{TM}* has been tested and recognized by the Underwriters Laboratories.

Features:

- Electrically Isolated Heatsinking
- Aluminum Nitride Insulator
- Compression Bonded Elements
- Metal Baseplate
- Low Thermal Impedance for Improved Current Capability
- Quick Connect Gate Terminal with Provision for Keyed Mating Plug
- UL Recognized

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

ND43 Outline Dimensions

Dimension	Inches	Millimeters
A	4.57	116
B	3.66	93
C	3.15	80.0
D	2.17	55.1
E	2.06	52.3
F	2.07	52.0
G	1.97	50.0
H	1.90	48.3
J	1.50	38.1
K	1.38	35.0
L	1.35	34.3
M	1.122	28.5
N	.71	18.0
P	.57	14.5
Q	.625	15.9
R	.394	10.00
S	.350	8.9
T	M8 Metric	M8
U	.250 Dia.	6.35 Dia.
V	.110 x .032	2.8 x 0.8
W	.12	3.0

Note: Dimensions are for reference only.

Ordering Information:

Select the complete eight digit module part number from the table below.
Example: ND431633 is a 1600Volt, 330 Ampere Dual SCR Isolated *POW-R-BLOK^{TM}* Module

Type	Voltage Volts (x100)	Current Amperes (x 10)
ND43	06	33
	08	
	10	
	12	
	14	
	16	

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	up to 1600	V
Non-Repetitive Peak Reverse Blocking Voltage	(t < 5 msec)	V_{RSM}	1600	V
RMS Forward Current	180° Conduction, T_C=71°C	$I_{T(RMS)}$	520	A
	180° Conduction, T_C=78°C	$I_{T(RMS)}$	480	A
Average Forward Current	180° Conduction, T_C=71°C	$I_{T(AV)}$	330	A
	180° Conduction, T_C=78°C	$I_{T(AV}$	305	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz, V_r=V_{RRM}, Tj=Tjmax	I_{FSM}	8,800	A
	50 Hz, V_r=V_{RRM}, Tj=Tjmax	I_{FSM}	7,920	A
	60 Hz, V_r=V_{RRM}, Tj=25C	I_{FSM}	10,210	A
	50 Hz, V_r=V_{RRM}, Tj=25C	I_{FSM}	9,180	A
	60 Hz, V_r=0 Tj=Tjmax	I_{FSM}	13,200	A
	50 Hz, V_r=0, Tj=Tjmax	I_{FSM}	11,850	A
	60 Hz, V_r=0, Tj=25C	I_{FSM}	15,310	A
	50 Hz, V_r=0, Tj=25C	I_{FSM}	13,780	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, V_r=0 Tj=Tjmax	I_{FSM}	10,590	A
	50 Hz, V_r=0, Tj=1Tjmax	I_{FSM}	9,530	A
	60 Hz, V_r=0, Tj=25C	I_{FSM}	12,290	A
	50 Hz, V_r=0, Tj=25C	I_{FSM}	11,060	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, V_r=0 Tj=Tjmax	I_{FSM}	8,325	A
	50 Hz, V_r=0, Tj=Tjmax	I_{FSM}	7,490	A
	60 Hz, V_r=0, Tj=25C	I_{FSM}	9,660	A
	50 Hz, V_r=0, Tj=25C	I_{FSM}	8,690	A
I^2t for Fusing for One Cycle, 8.3 milliseconds (V_r=0)	8.3 milliseconds, Tj=Tjmax	I^2t	726,000	A^2 sec
	8.3 milliseconds, Tj=Tjmax	I^2t	977,000	A^2 sec
	10 milliseconds, Tj=150C	I^2t	706,000	A^2 sec
	10 milliseconds, Tj=25C	I^2t	950,000	A^2 sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	T_j=25°C, I_G=500mA, V_D=0.67 $V_{DRM\ (Rated)}$, I_{TM}=π $I_{T(AV)}$, T_r < 0.5μS, t_p > 6μs	di/dt	800	A/μs
Peak Gate Power Dissipation		P_{GM}	16	W
Average Gate Power Dissipation		$P_{G(AV)}$	3	W
Peak Forward Gate Current		I_{GFM}	4	A
Peak Forward Gate Voltage		V_{GFM}	10	V
Peak Reverse Gate Voltage		V_{GRM}	5	V
Operating Temperature		T_J	-40 to +130	°C
Storage Temperature		T_{stg}	-40 to +150	°C
Max. Mounting Torque, M6 Mounting Screw			45	in.-Lb.
			5	Nm
Max. Mounting Torque, M8 Terminal Screw			110	in.-Lb.
			12	Nm
Module Weight, Typical			840	g
			1.85	lb
V Isolation @ 25C		V_{rms}	2500	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 1600V, T_J=130°C		50	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 1600V, T_J=130°C		50	mA
Peak On-State Voltage	V_{FM}	I_{TM}=625A		1.30	V
Threshold Voltage, Low-level Slope Resistance, Low-level	$V_{(TO)1}$ r_{T1}	T_J = 130°C, I = 15%$I_{T(AV)}$ to $\pi I_{T(AV)}$		0.819 0.589	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 130°C, I = $\pi I_{T(AV)}$ to I_{TSM}		0.47 0.731	V mΩ
V_{TM} Coefficients, Full Range		T_J = 130°C, I = 15%$I_{T(AV)}$ to I_{TSM} V_{TM} = A+ B Ln I +C I + D Sqrt I	A = B = C = D =	0.5849 0.1060 9.25 E-4 -0.0286	
Minimum dV/dt	dV/dt	Exponential to 2/3 V_{DRM} T_j=130°C, Gate Open	500		V/µs
Turn-On Time (Typical)	t_{on}	I_{TM} = 100A, V_D = 100V	7	(Typical)	µs
Turn-Off Time (Typical)	t_{off}	T_J = 130°C, I_T= 250A Re-Applied dV/dt = 20V/µs Linear to 0.8 V_{DRM}	150	(Typical)	µs
Gate Trigger Current	I_{GT}	T_j=25°C, V_D=12V		150	mA
Gate Trigger Voltage	V_{GT}	T_j=25°C, V_D=12V		3.0	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j=130°C, V_D= ½ V_{DRM}		0.15	Volts

Thermal Characteristics

Characteristics	Symbol			Max.	Units
Thermal Resistance, Junction to Case	$R_{\Theta J-C}$	Per Module, both conducting Per Junction both conducting		0.07 0.14	°C/W °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 = 5.27E-3 K_2 = 1.17E-2 K_3 = 5.26E-2 K_4 = 6.97E-2	τ_1 = 1.69E-4 τ_2 = 2.07E-2 τ_3 = 2.37E-1 τ_4 = 2.46	
Thermal Resistance, Case to Sink Lubricated	$R_{\Theta C-S}$	Per Module		0.03	°C/W

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 us, reliability, capability,
or future availability of this product.

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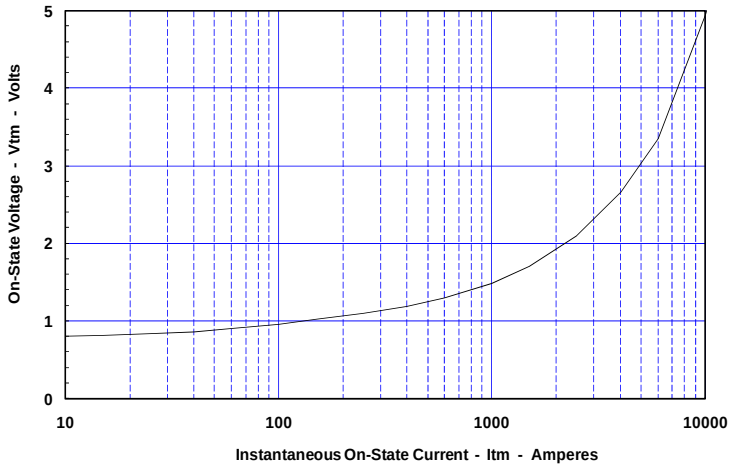
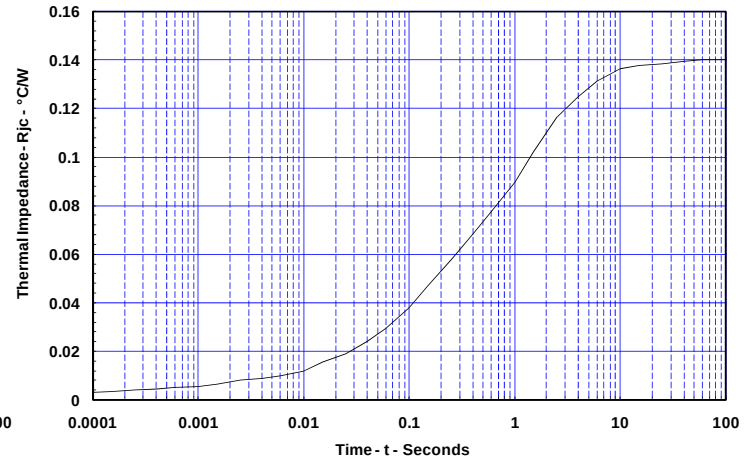
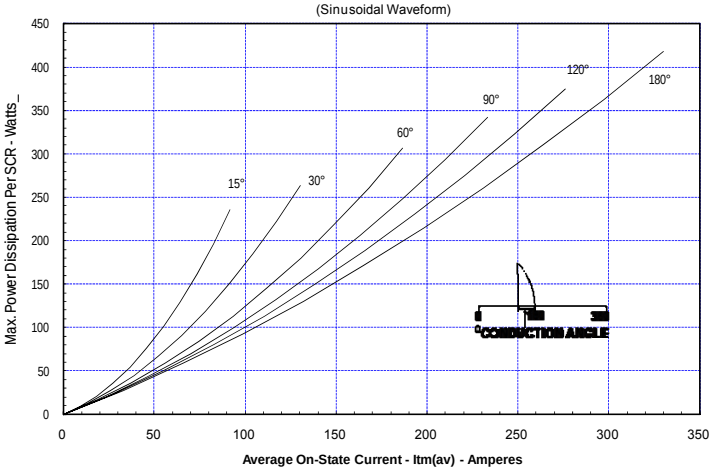
Maximum On-State Forward Voltage Drop
(Tj = 130 °C)



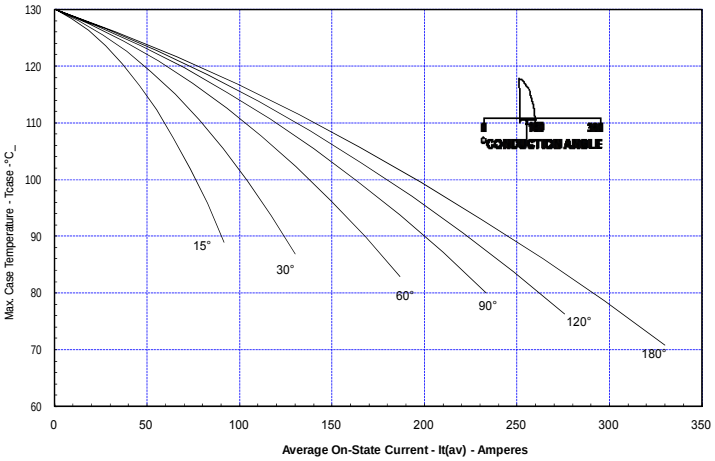
Maximum Transient Thermal Impedance
(Junction to Case)



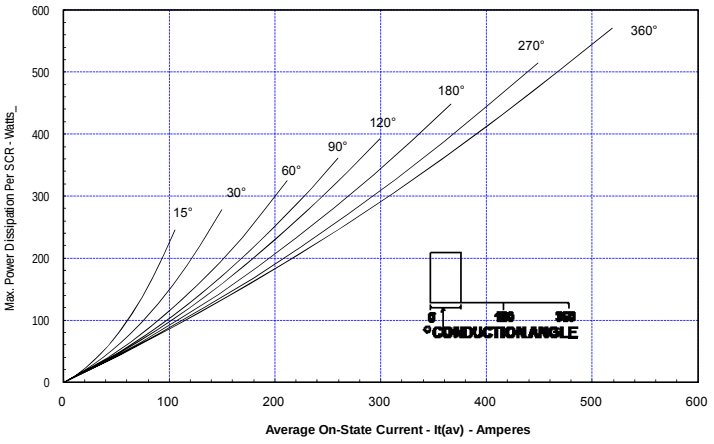
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



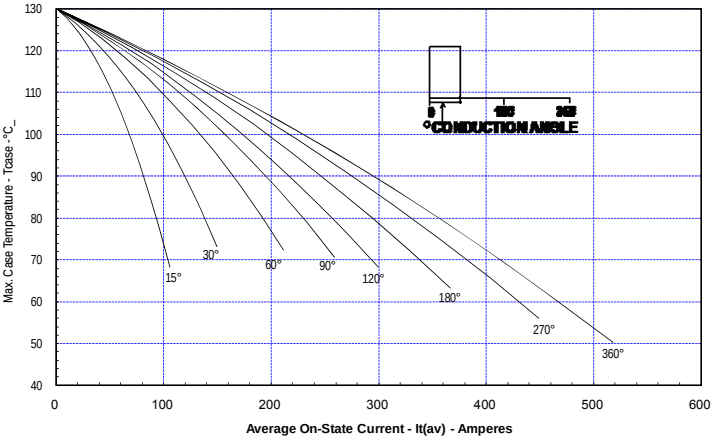
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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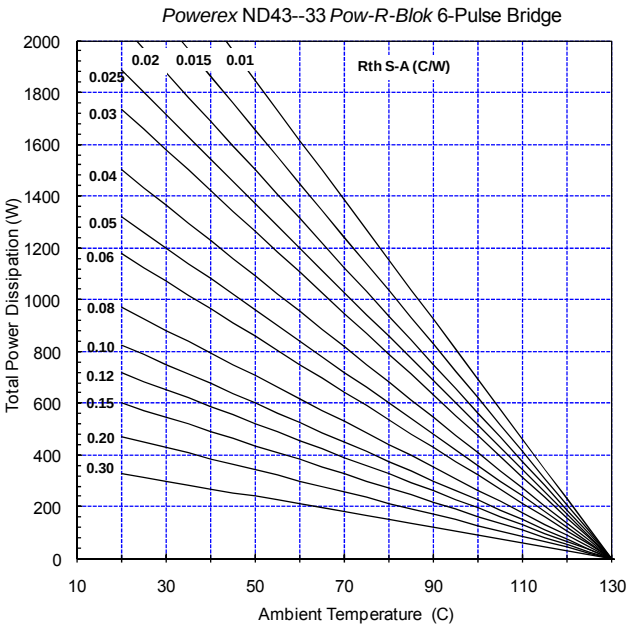

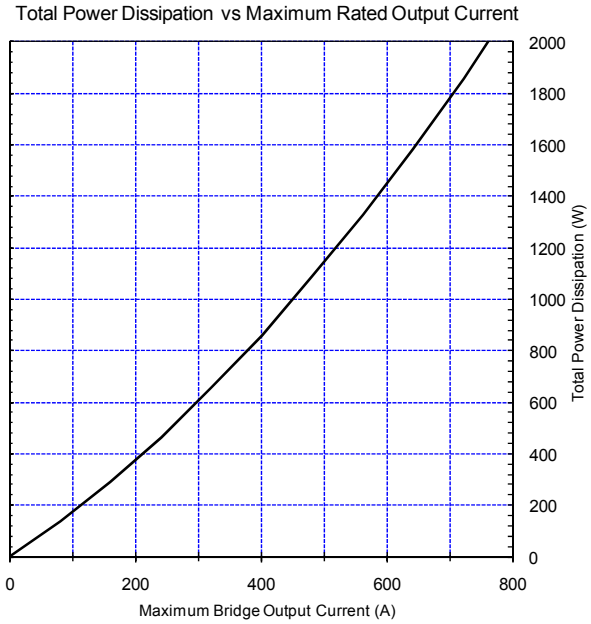

Six-Pulse Bridge Circuit Total Power Dissipation & Maximum Rated Output Current With Sink to Ambient Resistance of Heatsink as a Parameter.