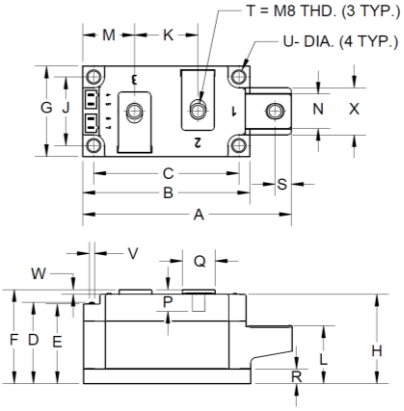
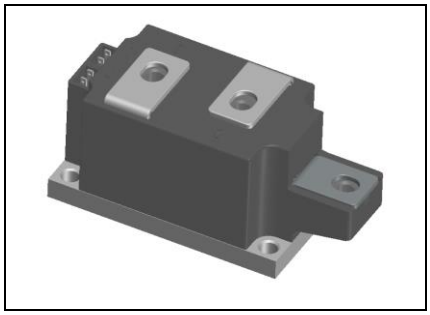
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

POW-R-BLOK™
Dual SCR/Diode Isolated Module
340 Amperes / Up to 1800 Volts



CONNECTION DIAGRAM



NDR2__34
Dual SCR/Diode Isolated
POW-R-BLOK™ Module
340 Amperes / 1600-1800 Volts

Description:

Powerex Dual SCR/Diode 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
- 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 (E78240)

NDR2 Outline Dimensions

Dimension	Inches	Millimeters
A	4.53	115
B	3.62	92
C	3.15	80
D	1.77	45
E	1.73	44
F	2.05	52
G	1.97	50
H	1.95	49.5
J	1.50	38
K	1.38	35
L	1.26	32
M	1.12	28.5
N	0.75	19
P	.47	12
Q	.71	18
R	.32	8
S	.35	9
T	M8 Metric	M8
U	.24 Dia.	6
V	.110 x .032	2.8 x 0.8
W	.12	2.5
X	1.02	26

Note: Dimensions are for reference only.

Ordering Information:

Select the complete eight digit module part number from the table below.
Example: ND421634 is a 1600Volt, 340 Ampere Dual SCR/Diode Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x 10)
NDR2	16 18	34

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

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	1600, 1800	V
Non-Repetitive Peak Reverse Blocking Voltage (t < 5 msec)		V_{RSM}	V_{RRM} +100	V
RMS Forward Current	180° Conduction, T_C=85°C	$I_{T(RMS)}$	534	A
Average Forward Current	180° Conduction, T_C=85°C	$I_{T(AV)}$ /$I_{F(AV)}$	340	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz, 0V reapplied, T_j= T_{jmax}	I_{TSM}/I_{FSM}	9000	A
	60 Hz, 0V reapplied, T_j= 25°C	I_{TSM}/I_{FSM}	10,400	A
	50 Hz, 0V reapplied, T_j= T_{jmax}	I_{TSM}/I_{FSM}	8500	A
	50 Hz, 0V reapplied, T_j= 25°C	I_{TSM}/I_{FSM}	9800	A
I^2t for Fusing for One Cycle, 8.3 milliseconds	60 Hz, 0V reapplied, T_j= T_{jmax}	I^2t	335,000	A^2 sec
	60 Hz, 0V reapplied, T_j= 25°C	I^2t	445,000	A^2 sec
	50 Hz, 0V reapplied, T_j= T_{jmax}	I^2t	360,000	A^2 sec
	50 Hz, 0V reapplied, T_j= 25°C	I^2t	480,000	A^2 sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	T_j= T_{jmax}, I_G= 2 A, V_D=0.67 $V_{DRM\ (Rated)}$, I_{TM}= 2 * $I_{T(AV)}$, t_p > 50 µs, d_{iG}/dt >= 1 A/µs	di/dt	500	A/µs
Average Gate Power Dissipation		$P_{G(AV)}$	3	W
Peak Forward Gate Current		I_{GFM}	6	A
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, M5 Mounting Screw			53 6	in.-Lb. Nm
Max. Mounting Torque, M8 Terminal Screw			79 9	in.-Lb. Nm
Module Weight, Typical			800 1.76	g lb
V Isolation @ 25C	t = 1 minute	V_{rms}	3000	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		40	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 1600V, T_J=130°C		40	mA
Peak On-State Voltage	V_{TM} /V_{FM}	I_{TM} /I_{FM} = 785 A		1.40	V
Threshold Voltage, Low-level Slope Resistance, Low-level	$V_{(TO)1}$ r_{T1}	T_J = 130°C, I = 15%$I_{T(AV)}$ to π$I_{T(AV)}$		0.75 0.500	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 130°C, I = π$I_{T(AV)}$ to I_{TSM}		0.47 0.731	V mΩ
V_{TM} /V_{FM} Coefficients, Full Range		T_J = 130°C, I = 15%$I_{T(AV)}$ to I_{TSM} V_{TM} /V_{FM} = 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	1000		V/µs
Turn-Off Time (Typical)	t_{off}	T_J = 130°C, I_T= 325 A, di/dt= 10 A/µs, V_R= 100 V Re-Applied dV/dt = 50V/µs Linear to 0.67 V_{DRM}	160	(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		2.0	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j=130°C, V_D= 0.67 V_{DRM}		0.25	Volts

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{ΘJ-C}$	Per Module, both conducting Per Junction both conducting			0.055 0.11	°C/W °C/W
Thermal Impedance Coefficients	$Z_{ΘJ-C}$	$Z_{ΘJ-C}$= 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 = 7.09E-4 K_2 = 3.29E-3 K_3 = 1.08E-2 K_4 = 9.54E-2	τ_1 = 2.29E-4 τ_2 = 3.63E-3 τ_3 = 0.1251 τ_4 = 1.97627		
Thermal Resistance, Case to Sink Lubricated	$R_{ΘC-S}$	Per Module			0.02	°C/W

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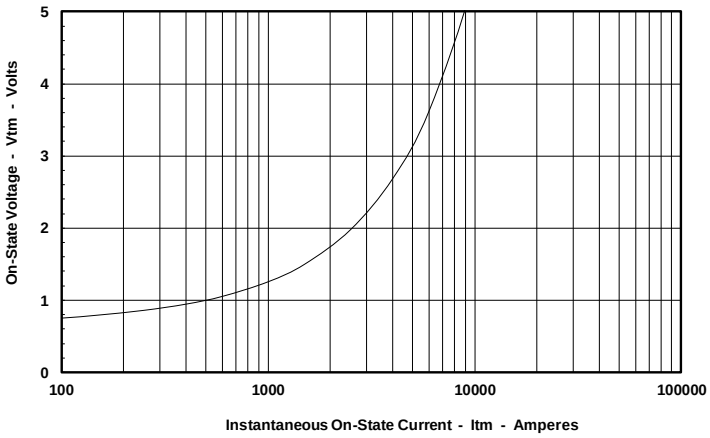
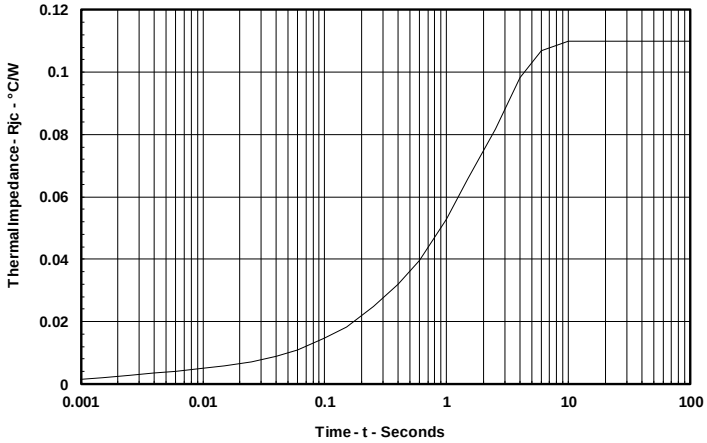
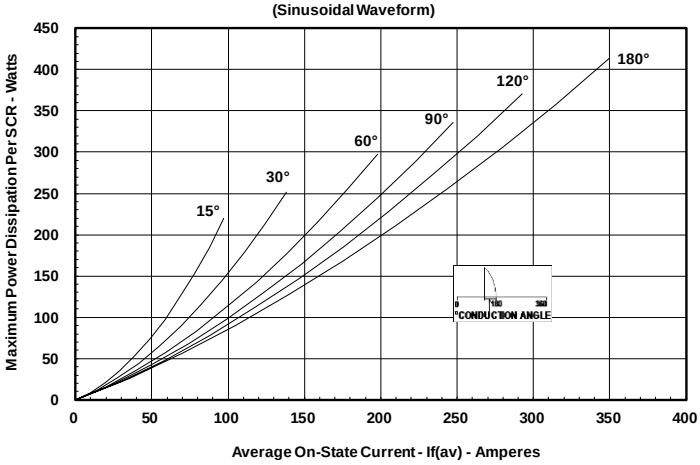
Maximum On-State Forward Voltage Drop
(Tj = 130 °C)



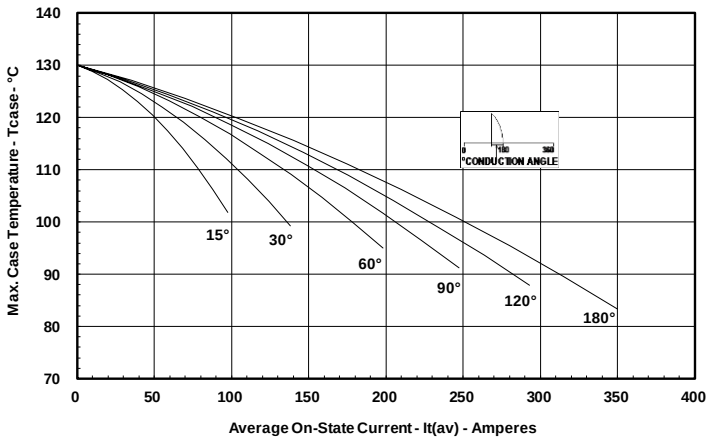
Maximum Transient Thermal Impedance
(Junction to Case)



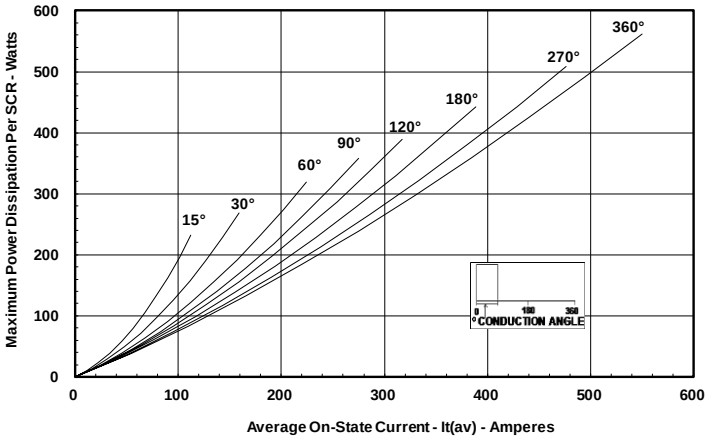
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



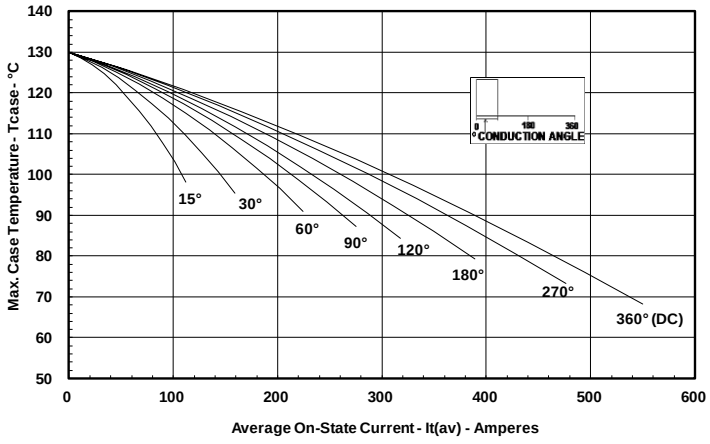
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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