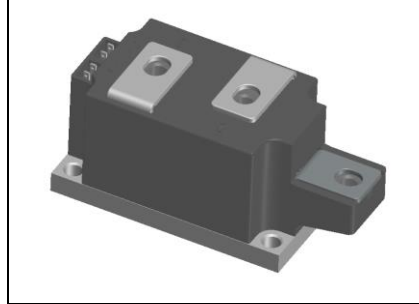
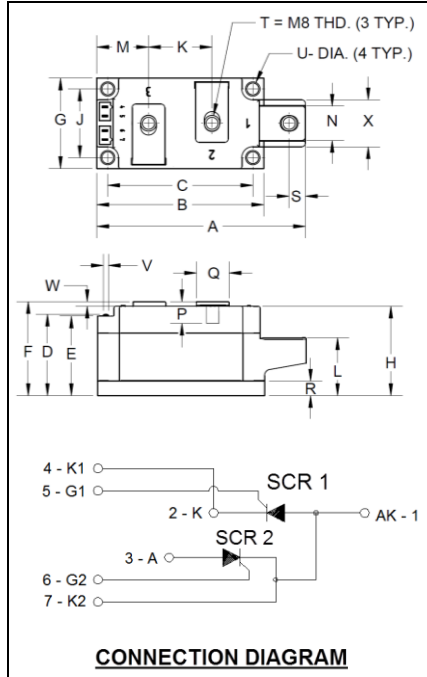


Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
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POW-R-BLOK™ Dual SCR Isolated Module 340 Amperes / Up to 1800 Volts



NDR3_34
Dual SCR Isolated
POW-R-BLOK™ Module
340 Amperes / 1600-1800 Volts

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.

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)

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

NDR3 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: NDR31634 is a 1600Volt, 340 Ampere Dual SCR Isolated POW-R-BLOK™ Module

Type	Voltage Volts (x100)	Current Amperes (x 10)
NDR3	16 18	34

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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, $T_C = 85^\circ\text{C}$	$I_{T(RMS)}$	534	A
Average Forward Current	180° Conduction, $T_C = 85^\circ\text{C}$	$I_{T(AV)}$ / $I_{F(AV)}$	340	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz, 0V reappplied, $T_J = T_{Jmax}$	I_{TSM}/I_{FSM}	9000	A
	60 Hz, 0V reappplied, $T_J = 25^\circ\text{C}$	I_{TSM}/I_{FSM}	10,400	A
	50 Hz, 0V reappplied, $T_J = T_{Jmax}$	I_{TSM}/I_{FSM}	8500	A
	50 Hz, 0V reappplied, $T_J = 25^\circ\text{C}$	I_{TSM}/I_{FSM}	9800	A
I^2t for Fusing for One Cycle, 8.3 milliseconds	60 Hz, 0V reappplied, $T_J = T_{Jmax}$	I^2t	335,000	$\text{A}^2 \text{ sec}$
	60 Hz, 0V reappplied, $T_J = 25^\circ\text{C}$	I^2t	445,000	$\text{A}^2 \text{ sec}$
	50 Hz, 0V reappplied, $T_J = T_{Jmax}$	I^2t	360,000	$\text{A}^2 \text{ sec}$
	50 Hz, 0V reappplied, $T_J = 25^\circ\text{C}$	I^2t	480,000	$\text{A}^2 \text{ sec}$
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	$T_J = T_{Jmax}$, $I_G = 2 \text{ A}$, $V_D = 0.67 V_{DRM} \text{ (Rated)}$, $I_{TM} = 2 * I_{T(AV)}$, $t_p > 50 \mu\text{s}$, $d_iG/dt \geq 1 \text{ A}/\mu\text{s}$	di/dt	500	$\text{A}/\mu\text{s}$
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	$^\circ\text{C}$
Storage Temperature		T_{stg}	-40 to +150	$^\circ\text{C}$
Max. Mounting Torque, M5 Mounting Screw			53	in.-Lb.
			6	Nm
Max. Mounting Torque, M8 Terminal Screw			79	in.-Lb.
			9	Nm
Module Weight, Typical			800	g
			1.76	lb
V Isolation @ 25C	$t = 1 \text{ minute}$	V_{rms}	3000	V

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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 1600V, $T_J=130^\circ\text{C}$		40	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 1600V, $T_J=130^\circ\text{C}$		40	mA
Peak On-State Voltage	V_{TM}/V_{FM}	$I_{TM}/I_{FM} = 785 \text{ A}$		1.40	V
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_J = 130^\circ\text{C}$, $I = 15\%I_{T(AV)}$ to $\pi I_{T(AV)}$		0.75	V
Slope Resistance, Low-level	r_{T1}			0.500	$\text{m}\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_J = 130^\circ\text{C}$, $I = \pi I_{T(AV)}$ to I_{TSM}		0.47	V
Slope Resistance, High-level	r_{T2}			0.731	$\text{m}\Omega$
V_{TM}/V_{FM} Coefficients, Full Range		$T_J = 130^\circ\text{C}$, $I = 15\%I_{T(AV)}$ to I_{TSM} $V_{TM}/V_{FM} = A + B \ln I + C I + D \text{ Sqrt } I$	A = B = C = D =	0.5849 0.1060 9.25 E-4 -0.0286	
Minimum dV/dt	dV/dt	Exponential to $2/3 V_{DRM}$ $T_J=130^\circ\text{C}$, Gate Open	1000		V/ μs
Turn-Off Time (Typical)	t_{off}	$T_J = 130^\circ\text{C}$, $I_T = 325 \text{ A}$, $di/dt = 10 \text{ A}/\mu\text{s}$, $V_R = 100 \text{ V}$ Re-Applied $dV/dt = 50 \text{ V}/\mu\text{s}$ Linear to $0.67 V_{DRM}$	160	(Typical)	μs
Gate Trigger Current	I_{GT}	$T_J=25^\circ\text{C}$, $V_D=12\text{V}$		150	mA
Gate Trigger Voltage	V_{GT}	$T_J=25^\circ\text{C}$, $V_D=12\text{V}$		2.0	Volts
Non-Triggering Gate Voltage	V_{GDM}	$T_J=130^\circ\text{C}$, $V_D = 0.67 V_{DRM}$		0.25	Volts

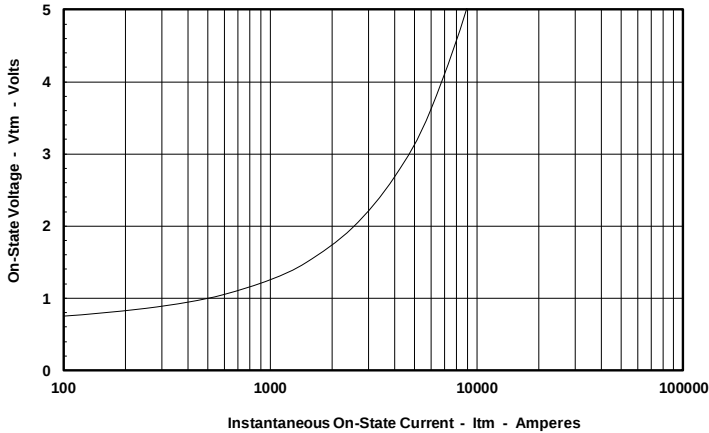
Thermal Characteristics

Characteristics	Symbol		Max.	Units
Thermal Resistance, Junction to Case	$R_{\theta J-C}$	Per Module, both conducting Per Junction both conducting	0.055 0.11	$^\circ\text{C}/\text{W}$ $^\circ\text{C}/\text{W}$
Thermal Impedance Coefficients	$Z_{\theta J-C}$	$Z_{\theta J-C} = K_1 (1 - \exp(-t/\tau_1))$ + $K_2 (1 - \exp(-t/\tau_2))$ + $K_3 (1 - \exp(-t/\tau_3))$ + $K_4 (1 - \exp(-t/\tau_4))$	$K_1 = 7.09\text{E-}4$ $K_2 = 3.29\text{E-}3$ $K_3 = 1.08\text{E-}2$ $K_4 = 9.54\text{E-}2$	$\tau_1 = 2.29\text{E-}4$ $\tau_2 = 3.63\text{E-}3$ $\tau_3 = 0.1251$ $\tau_4 = 1.97627$
Thermal Resistance, Case to Sink Lubricated	$R_{\theta C-S}$	Per Module	0.02	$^\circ\text{C}/\text{W}$

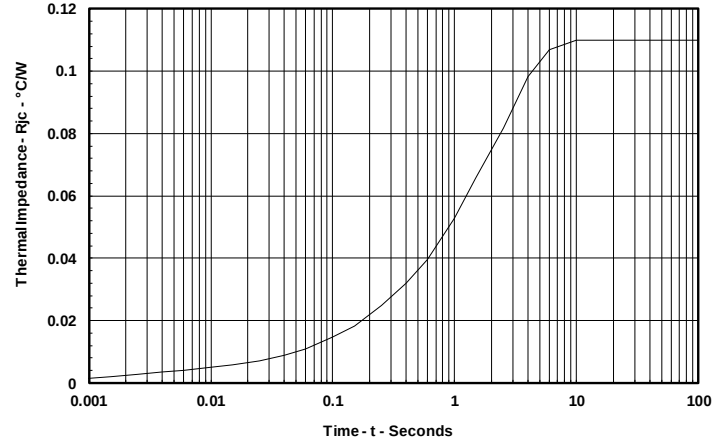
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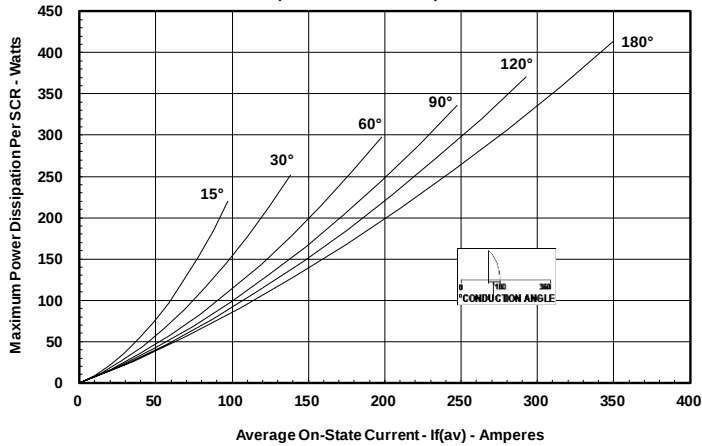
Maximum On-State Forward Voltage Drop
($T_j = 130^\circ\text{C}$)



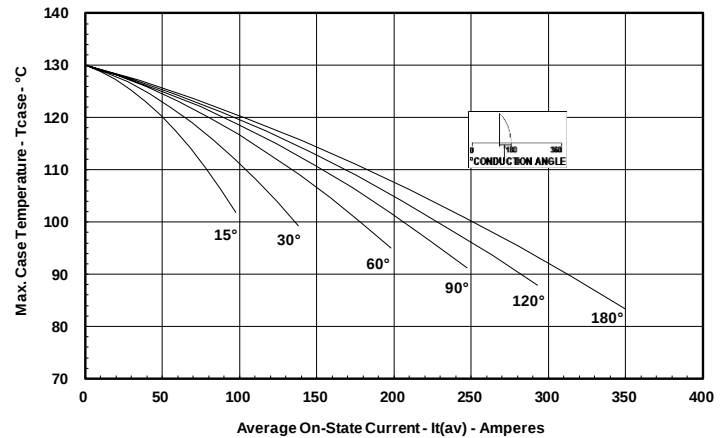
Maximum Transient Thermal Impedance
(Junction to Case)



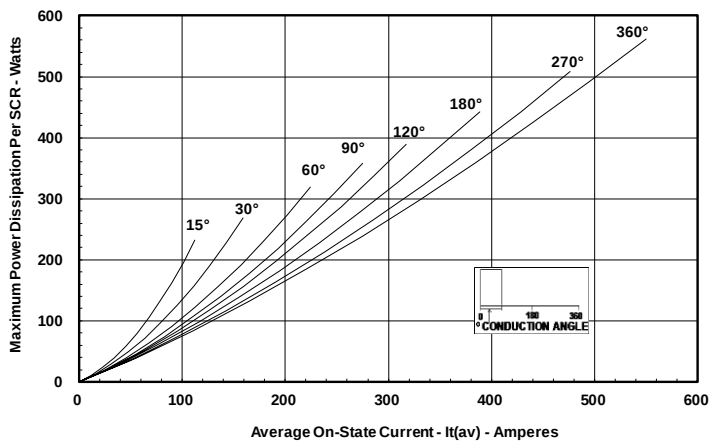
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)

