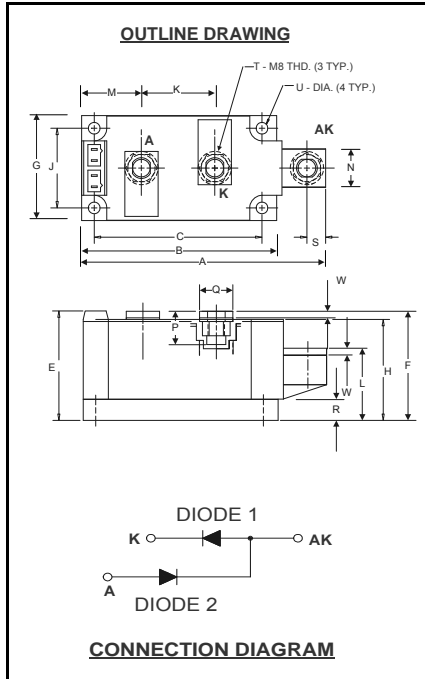


Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272  
www.pwr.com

**POW-R-BLOK™**  
**Dual Diode Isolated Module**  
**Up to 320 Amperes & 2000 Volts**



**ND41\_\_32**  
**Dual Diode Isolated**  
**POW-R-BLOK™ Module**  
200-320 Amperes / 600-2000 Volts

**Description:**

Powerex Dual Diode Modules are designed for use in applications requiring rectification and isolated packaging. The modules are isolated for easy mounting with other components on a common heatsink. *POW-R-BLOK™* has been tested and recognized by the Underwriters Laboratories.

**Features:**

- Electrically Isolated Heatsinking
- Aluminum Nitride Isolator
- Compression Bonded Elements
- Metal Baseplate
- Low Thermal Impedance for Improved Current Capability
- 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

**ND41 Outline Dimensions**

Dimension	Inches	Millimeters
A	4.57	116
B	3.66	93
C	3.15	80.0
E	2.06	52.3
F	2.05	52.0
G	1.97	50.0
H	1.90	48.3
J	1.50	38.1
K	1.38	35.0
L	1.26	32.0
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.
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: ND412032 is a 2000Volt, 320 Ampere Dual Diode Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x10)
ND41	06	32
	08	
	10	
	12	
	14	
	16	
	18	
	20	

**Absolute Maximum Ratings**

Characteristics	Conditions	Symbol		Units
Repetitive Peak Reverse Blocking Voltage		$V_{RRM}$	up to 2000	V
Non-Repetitive Peak Reverse Blocking Voltage ( $t < 5$ msec)		$V_{RSM}$	$V_{RRM} + 200$	V
RMS Forward Current	180° Conduction, $T_C=101^\circ\text{C}$	$I_{F(RMS)}$	502	A
	180° Conduction, $T_C=105^\circ\text{C}$	$I_{F(RMS)}$	470	A
	180° Conduction, $T_C=109^\circ\text{C}$	$I_{F(RMS)}$	440	A
	180° Conduction, $T_C=112^\circ\text{C}$	$I_{F(RMS)}$	408	A
Average Forward Current	180° Conduction, $T_C=101^\circ\text{C}$	$I_{F(AV)}$	320	A
	180° Conduction, $T_C=105^\circ\text{C}$	$I_{F(AV)}$	300	A
	180° Conduction, $T_C=109^\circ\text{C}$	$I_{F(AV)}$	280	A
	180° Conduction, $T_C=112^\circ\text{C}$	$I_{F(AV)}$	260	A
Peak One Cycle Surge Current, Non-Repetitive Initial $T_j = T_j$ max	60 Hz, 100% $V_{RRM}$ reapplied	$I_{FSM}$	8000	A
	60 Hz, No $V_{RRM}$ reapplied	$I_{FSM}$	10,000	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, 100% $V_{RRM}$ reapplied	$I_{FSM}$	5750	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, 100% $V_{RRM}$ reapplied	$I_{FSM}$	4975	A
$I^2t$ for Fusing for One Cycle, 8.3 milliseconds		$I^2t$	266,000	$\text{A}^2 \text{sec}$
Operating Temperature		$T_J$	-40 to +150	$^\circ\text{C}$
Storage Temperature		$T_{stg}$	-40 to +150	$^\circ\text{C}$
Max. Mounting Torque, M6 Mounting Screw			45	in.-Lb.
			5	Nm
Max. Mounting Torque, M8 Terminal Screw			95	in.-Lb.
			11	Nm
Module Weight, Typical			840	g
			1.85	lb.
V Isolation @ 25C		$V_{rms}$	2500	V

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

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Reverse Leakage Current	$I_{RRM}$	Up to 2000V, $T_J=150^\circ\text{C}$		50	mA
Peak On-State Voltage	$V_{FM}$	$I_{FM}=1500\text{A}$		1.35	V
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_J = 150^\circ\text{C}$ , $I = 15\%I_{F(AV)}$ to $\pi I_{F(AV)}$		0.764	V
Slope Resistance, Low-level	$r_{T1}$			0.360	$\text{m}\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_J = 150^\circ\text{C}$ , $I = \pi I_{F(AV)}$ to $I_{FSM}$		0.710	V
Slope Resistance, High-level	$r_{T2}$			0.420	$\text{m}\Omega$
$V_{TM}$ Coefficients, Full Range		$T_J = 150^\circ\text{C}$ , $I = 15\%I_{F(AV)}$ to $I_{FSM}$	A =	0.7144	
			B =	0.0232	
		$V_{FM} = A + B \ln I + C I + D \text{ Sqrt } I$	C =	4.72 E-4	
			D =	-6.71 E-3	
Diode Reverse Recovery Time (Typical)	$t_{rr}$	$I_{fm} = 1500\text{A}$ , $T_p = 190 \mu\text{s}$ $di/dt = -25\text{A}/\mu\text{s}$		10	$\mu\text{s}$

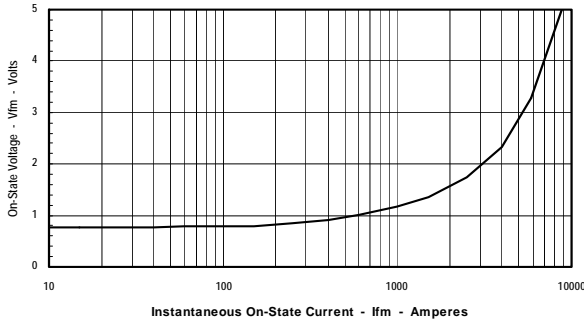
**Thermal Characteristics**

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	$^\circ\text{C}/\text{W}$ $^\circ\text{C}/\text{W}$
Thermal Impedance Coefficients	$Z_{\theta J-C}$	$Z_{\theta J-C} = K_1 (1 - \exp(-t/\tau_1))$ + $K_2 (1 - \exp(-t/\tau_2))$ + $K_3 (1 - \exp(-t/\tau_3))$ + $K_4 (1 - \exp(-t/\tau_4))$	$K_1 = 5.27\text{E-}3$ $K_2 = 1.17\text{E-}2$ $K_3 = 5.26\text{E-}2$ $K_4 = 6.97\text{E-}2$	$\tau_1 = 1.69\text{E-}4$ $\tau_2 = 2.07\text{E-}2$ $\tau_3 = 2.37\text{E-}1$ $\tau_4 = 2.46$
Thermal Resistance, Case to Sink Lubricated	$R_{\theta C-S}$	Per Module	0.03	$^\circ\text{C}/\text{W}$

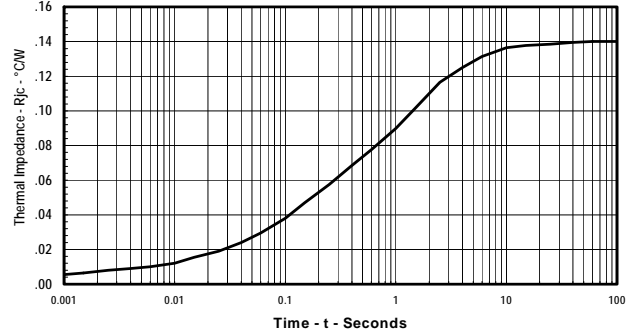
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## POW-R-BLOCK™ Dual Diode Isolated Module Up to 320 Amperes & 2000 Volts

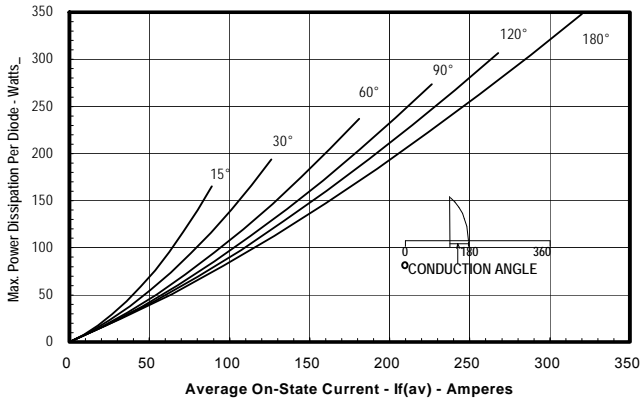
**Maximum On-State Forward Voltage Drop**  
(T<sub>J</sub> = 150 °C)



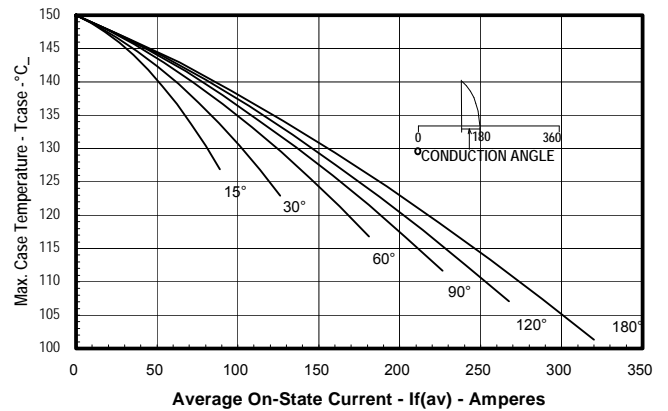
**Maximum Transient Thermal Impedance**  
(Junction to Case)



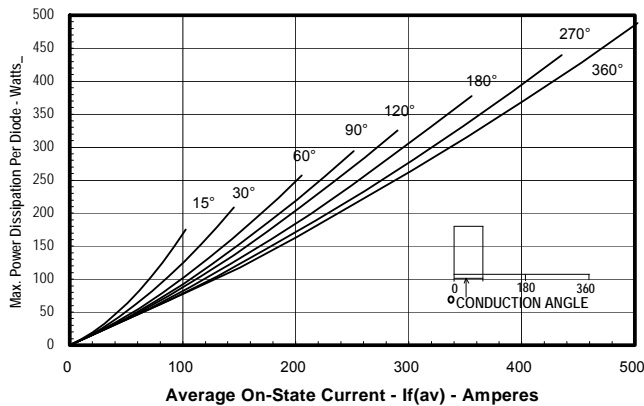
**Maximum On-State Power Dissipation**  
(Sinusoidal Waveform)



**Maximum Allowable Case Temperature**  
(Sinusoidal Waveform)



**Maximum On-State Power Dissipation**  
(Rectangular Waveform)



**Maximum Allowable Case Temperature**  
(Rectangular Waveform)

