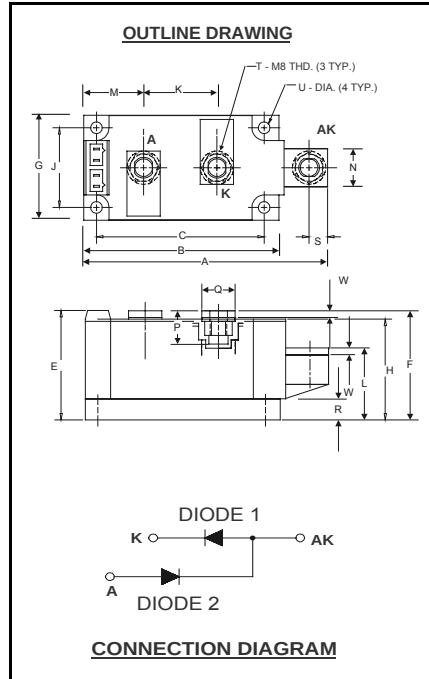


**POW-R-BLOK™****Dual Diode Isolated Module  
Up to 320 Amperes & 2000 Volts**

**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         | 1.35      | 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         | .22 Dia.  | 5.6 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<br>Volts<br>(x100) | Current<br>Amperes<br>(x10) |
|------|----------------------------|-----------------------------|
| ND41 | 06                         | 20                          |
|      | 08                         | 22                          |
|      | 10                         | 24                          |
|      | 12                         | 26                          |
|      | 14                         | 28                          |
|      | 16                         | 30                          |
|      | 18                         | 32                          |
|      | 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<br>( $t < 5$ 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                    | 60 Hz, 100% $V_{RRM}$ reapplied            | $I_{FSM}$    | 8000            | A                        |
| Initial $T_j = T_j \text{ max}$                                 | 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<sub>J</sub>=25°C unless otherwise specified**

| Characteristics                          | Symbol             | Test Conditions                                                               | Min. | Max.      | Units |
|------------------------------------------|--------------------|-------------------------------------------------------------------------------|------|-----------|-------|
| Repetitive Peak Reverse Leakage Current  | I <sub>RRM</sub>   | Up to 2000V, T <sub>J</sub> =150°C                                            |      | 50        | mA    |
| Peak On-State Voltage                    | V <sub>FM</sub>    | I <sub>FM</sub> =1500A                                                        |      | 1.35      | V     |
| Threshold Voltage, Low-level             | V <sub>(TO)1</sub> | T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to $\pi$ I <sub>F(AV)</sub> |      | 0.764     | V     |
| Slope Resistance, Low-level              | r <sub>T1</sub>    |                                                                               |      | 0.360     | mΩ    |
| Threshold Voltage, High-level            | V <sub>(TO)2</sub> | T <sub>J</sub> = 150°C, I = $\pi$ I <sub>F(AV)</sub> to I <sub>FSM</sub>      |      | 0.710     | V     |
| Slope Resistance, High-level             | r <sub>T2</sub>    |                                                                               |      | 0.420     | mΩ    |
| V <sub>TM</sub> Coefficients, Full Range |                    | T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to I <sub>FSM</sub>         | A =  | 0.7144    |       |
|                                          |                    |                                                                               | B =  | 0.0232    |       |
|                                          |                    | V <sub>FM</sub> = A+ B Ln I +C I + D Sqrt I                                   | C =  | 4.72 E-4  |       |
|                                          |                    |                                                                               | D =  | -6.71 E-3 |       |
| Diode Reverse Recovery Time (Typical)    | t <sub>rr</sub>    | I <sub>fm</sub> = 1500A, T <sub>p</sub> = 190 μs<br>di/dt = -25A/μs           |      | 10        | μs    |

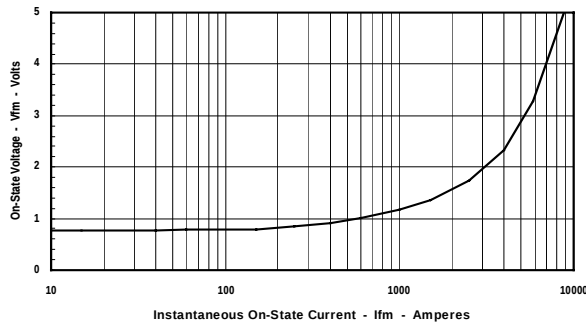
**Thermal Characteristics**

| Characteristics                             | Symbol            |                                                                                                                                                                                                                | Max.                                                                                                         | Units                                                                                                     |
|---------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Thermal Resistance, Junction to Case        | R <sub>ΘJ-C</sub> | Per Module, both conducting<br>Per Junction both conducting                                                                                                                                                    | 0.07<br>0.14                                                                                                 | °C/W<br>°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> ))<br>+ K <sub>2</sub> (1-exp(-t/τ <sub>2</sub> ))<br>+ K <sub>3</sub> (1-exp(-t/τ <sub>3</sub> ))<br>+ K <sub>4</sub> (1-exp(-t/τ <sub>4</sub> )) | K <sub>1</sub> = 5.27E-3<br>K <sub>2</sub> = 1.17E-2<br>K <sub>3</sub> = 5.26E-2<br>K <sub>4</sub> = 6.97E-2 | τ <sub>1</sub> = 1.69E-4<br>τ <sub>2</sub> = 2.07E-2<br>τ <sub>3</sub> = 2.37E-1<br>τ <sub>4</sub> = 2.46 |
| Thermal Resistance, Case to Sink Lubricated | R <sub>ΘC-S</sub> | Per Module                                                                                                                                                                                                     | 0.03                                                                                                         | °C/W                                                                                                      |

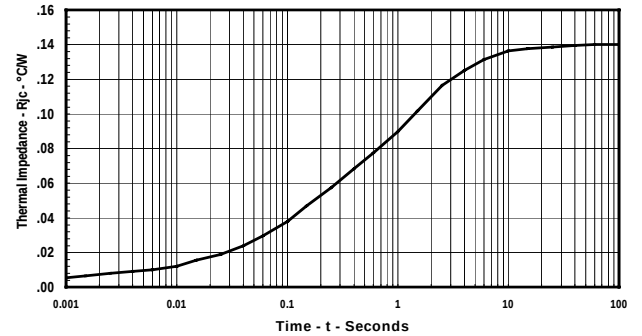
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (724) 925-7272

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

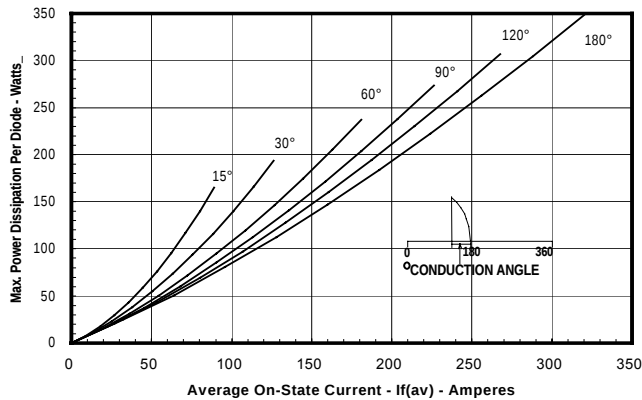
Maximum On-State Forward Voltage Drop  
( $T_J = 150^\circ\text{C}$ )



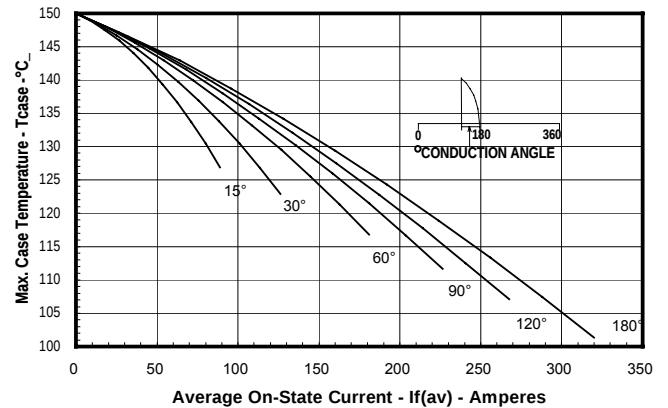
Maximum Transient Thermal Impedance  
(Junction to Case)



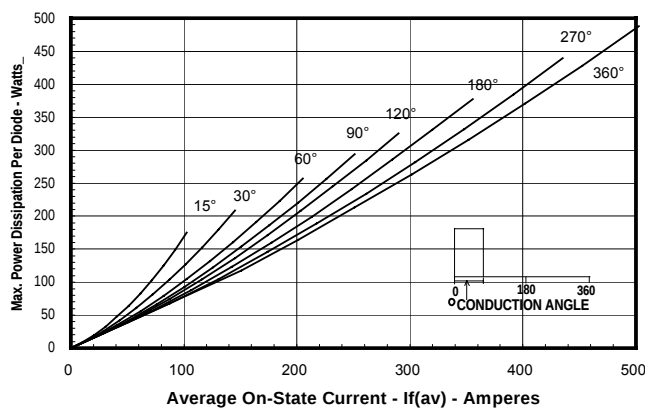
Maximum On-State Power Dissipation  
(Sinusoidal Waveform)



Maximum Allowable Case Temperature  
(Sinusoidal Waveform)



Maximum On-State Power Dissipation  
(Rectangular Waveform)



Maximum Allowable Case Temperature  
(Rectangular Waveform)

