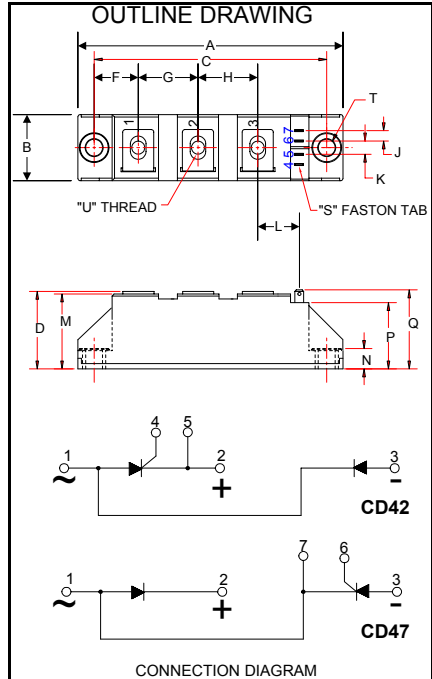


### POW-R-BLOK™

Dual SCR/Diode Isolated Module  
90 Amperes / Up to 1800 Volts



**CD42\_\_90B, CD47\_\_90B**  
**Dual SCR/Diode Isolated**  
**POW-R-BLOK™ Module**  
90 Amperes / Up to 1800 Volts

#### Description:

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

#### Features:

##### Features:

- Electrically Isolated Heatsinking
- DBC Alumina (Al<sub>2</sub>O<sub>3</sub>) Insulator
- Copper Baseplate
- Low Thermal Impedance for Improved Current Capability
- UL Recognition Pending

#### 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
- Lighting Control
- Heat & Temperature Control
- Welders

#### CD42, CD47 Outline Dimensions

| Dimension | Inches     | Millimeters |
|-----------|------------|-------------|
| A         | 3.66       | 93          |
| B         | 0.79       | 20          |
| C         | 3.15       | 80          |
| D         | 1.18       | 30          |
| F         | 0.61       | 15.5        |
| G         | 0.79       | 20          |
| H         | 0.79       | 20          |
| J         | 0.16       | 4           |
| K         | 0.22       | 5.7         |
| L         | 0.59       | 15          |
| M         | 1.10       | 28          |
| N         | 0.31       | 8           |
| P         | 0.94       | 24          |
| Q         | 1.16       | 29.4        |
| S         | 0.11 x .03 | 2.8 x 0.8   |
| T         | 0.25       | 6.4         |
| U         | M5         | M5          |

Note: Dimensions are for reference only.

#### Ordering Information:

Select the complete nine digit module part number from the table below.  
Example: CD421690B is a 1600Volt, 90 Ampere Dual SCR/Diode Isolated *POW-R-BLOK™* Module

| Type | Voltage<br>Volts<br>(x100) | Current<br>Amperes | Version |
|------|----------------------------|--------------------|---------|
| CD42 | 08                         | 90                 | B       |
| CD47 | 12                         |                    |         |
|      | 14                         |                    |         |
|      | 16                         |                    |         |
|      | 18                         |                    |         |



**CD42\_\_90B**  
**CD47\_\_90B**

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

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#### Absolute Maximum Ratings

| Characteristics                                                 | Conditions                                                | Symbol                |                 | Units                  |
|-----------------------------------------------------------------|-----------------------------------------------------------|-----------------------|-----------------|------------------------|
| Repetitive Peak Forward and Reverse Blocking Voltage            |                                                           | $V_{DRM}$ & $V_{RRM}$ | up to 1800      | V                      |
| Non-Repetitive Peak Reverse Blocking Voltage<br>( $t < 5$ msec) |                                                           | $V_{RSM}$             | $V_{RRM} + 100$ | V                      |
| RMS Forward Current                                             | 180° Conduction, $T_C=85^\circ\text{C}$                   | $I_{T(RMS)}$          | 150             | A                      |
| Average Forward Current                                         | 180° Conduction, $T_C=85^\circ\text{C}$                   | $I_{T(AV)}$           | 95              | A                      |
| Peak One Cycle Surge Current, Non-Repetitive                    | 60 Hz, 100% $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$  | $I_{TSM}$             | 1570            | A                      |
|                                                                 | 60 Hz, No $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$    | $I_{TSM}$             | 1870            | A                      |
|                                                                 | 60 Hz, No $V_{RRM}$ reapplied, $T_J=25^\circ\text{C}$     | $I_{TSM}$             | 2100            | A                      |
|                                                                 | 50 Hz, 100% $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$  | $I_{TSM}$             | 1500            | A                      |
|                                                                 | 50 Hz, No $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$    | $I_{TSM}$             | 1785            | A                      |
|                                                                 | 50 Hz, No $V_{RRM}$ reapplied, $T_J=25^\circ\text{C}$     | $I_{TSM}$             | 2000            | A                      |
| $I^2t$ for Fusing for One Cycle, 8.3 milliseconds               | 8.3 ms, 100% $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$ | $I^2t$                | 10,270          | $\text{A}^2\text{sec}$ |
|                                                                 | 8.3 ms, No $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$   | $I^2t$                | 14,520          | $\text{A}^2\text{sec}$ |
|                                                                 | 8.3 ms, No $V_{RRM}$ reapplied, $T_J=25^\circ\text{C}$    | $I^2t$                | 18,300          | $\text{A}^2\text{sec}$ |
|                                                                 | 10 ms, 100% $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$  | $I^2t$                | 11,250          | $\text{A}^2\text{sec}$ |
|                                                                 | 10 ms, No $V_{RRM}$ reapplied, $T_J=125^\circ\text{C}$    | $I^2t$                | 15,910          | $\text{A}^2\text{sec}$ |
|                                                                 | 10 ms, No $V_{RRM}$ reapplied, $T_J=25^\circ\text{C}$     | $I^2t$                | 20,000          | $\text{A}^2\text{sec}$ |
| Maximum Rate-of-Rise of On-State Current,<br>(Non-Repetitive)   | $T_J=25^\circ\text{C}$                                    | $di/dt$               | 150             | $\text{A}/\mu\text{s}$ |
| Operating Temperature                                           |                                                           | $T_J$                 | -40 to +125     | $^\circ\text{C}$       |
| Storage Temperature                                             |                                                           | $T_{stg}$             | -40 to +125     | $^\circ\text{C}$       |
| Max. Mounting Torque, M5 Mounting Screw on<br>Terminals         |                                                           |                       | 25              | in.-Lb.                |
|                                                                 |                                                           |                       | 3               | Nm                     |
| Max. Mounting Torque, Module to Heatsink                        |                                                           |                       | 44              | in.-Lb.                |
|                                                                 |                                                           |                       | 5               | Nm                     |
| Module Weight, Typical                                          |                                                           |                       | 95              | g                      |
|                                                                 |                                                           |                       | 3.35            | oz.                    |
| V Isolation @ 25C                                               | 50 – 60 Hz, 1 minute                                      | $V_{rms}$             | 3000            | V                      |
| Circuit to base, all terminals shorted together                 | 50 – 60 Hz, 1 second                                      | $V_{rms}$             | 3500            | V                      |

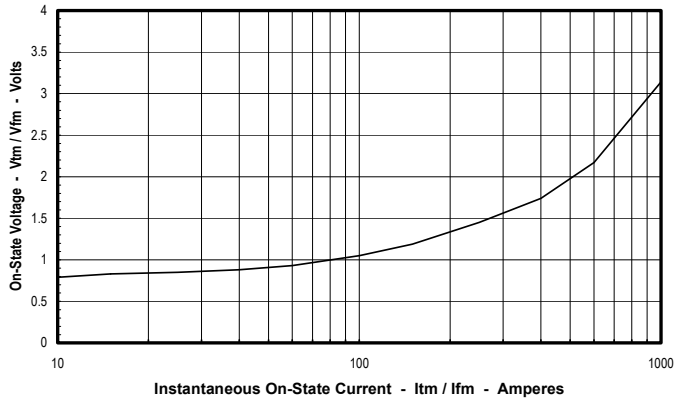
**Electrical Characteristics,  $T_J=25^\circ\text{C}$  unless otherwise specified**

| Characteristics                         | Symbol                          | Test Conditions                                                                                | Min.        | Max.      | Units                                |
|-----------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------|-------------|-----------|--------------------------------------|
| Repetitive Peak Forward Leakage Current | $I_{\text{DRM}}$                | Up to 1800V, $T_J=125^\circ\text{C}$                                                           |             | 20        | mA                                   |
| Repetitive Peak Reverse Leakage Current | $I_{\text{RRM}}$                | Up to 1800V, $T_J=125^\circ\text{C}$                                                           |             | 20        | mA                                   |
| Peak On-State Voltage                   | $V_{\text{TM}} / V_{\text{FM}}$ | $I_{\text{TM}} / I_{\text{FM}}=300\text{A}$                                                    |             | 1.65      | V                                    |
| Threshold Voltage, Low-level            | $V_{(\text{TO})1}$              | $T_J = 125^\circ\text{C}$ , $I = 16.7\% \times \pi I_{\text{T(AV)}}$ to $\pi I_{\text{T(AV)}}$ |             | 0.9       | V                                    |
| Slope Resistance, Low-level             | $r_{\text{T1}}$                 |                                                                                                |             | 2.0       | $\text{m}\Omega$                     |
| Minimum dV/dt                           | dV/dt                           | $T_J=125^\circ\text{C}$ , Up to 800V<br>$T_J=125^\circ\text{C}$ , 1200 - 1800V                 | 500<br>1000 |           | V/ $\mu\text{s}$<br>V/ $\mu\text{s}$ |
| Turn-Off Time (Typical)                 | $t_{\text{off}}$                | $T_J = 25^\circ\text{C}$                                                                       | 40 - 100    | (Typical) | $\mu\text{s}$                        |
| Gate Trigger Current                    | $I_{\text{GT}}$                 | $T_J= 25^\circ\text{C}$ , $V_D=6\text{V}$ , Resistive Load                                     |             | 150       | mA                                   |
| Gate Trigger Voltage                    | $V_{\text{GT}}$                 | $T_J= 25^\circ\text{C}$ , $V_D=6\text{V}$ , Resistive Load                                     |             | 3.0       | Volts                                |
| Non-Triggering Gate Voltage             | $V_{\text{GDM}}$                | $T_J=125^\circ\text{C}$ , $V_D=V_{\text{DRM}}$                                                 |             | 0.25      | Volts                                |
| Non-Triggering Gate Current             | $I_{\text{GDM}}$                | $T_J=125^\circ\text{C}$ , $V_D=V_{\text{DRM}}$                                                 |             | 6         | mA                                   |
| Holding Current                         | $I_{\text{H}}$                  | $T_J = 25^\circ\text{C}$                                                                       |             | 250       | mA                                   |
| Latching Current                        | $I_{\text{L}}$                  | $T_J = 25^\circ\text{C}$                                                                       |             | 600       | mA                                   |

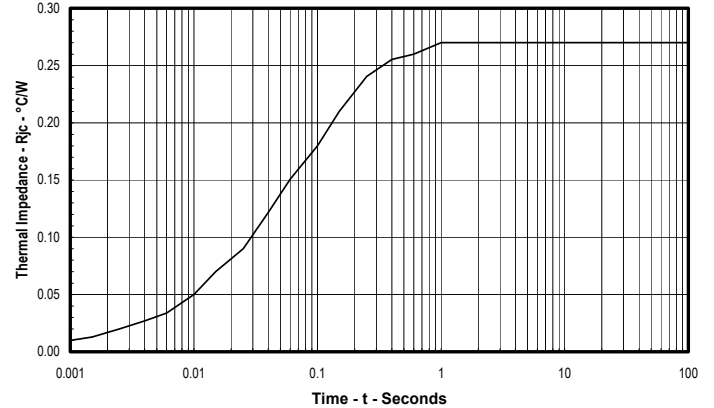
**Thermal Characteristics**

| Characteristics                             | Symbol                 |                               | Max. | Units              |
|---------------------------------------------|------------------------|-------------------------------|------|--------------------|
| Thermal Resistance, Junction to Case        | $R_{\Theta\text{J-C}}$ | Per Module, both conducting   | 0.14 | $^\circ\text{C/W}$ |
| DC Operation                                |                        | Per Junction, both conducting | 0.28 | $^\circ\text{C/W}$ |
| Thermal Resistance, Case to Sink Lubricated | $R_{\Theta\text{C-S}}$ | Per Module                    | 0.1  | $^\circ\text{C/W}$ |

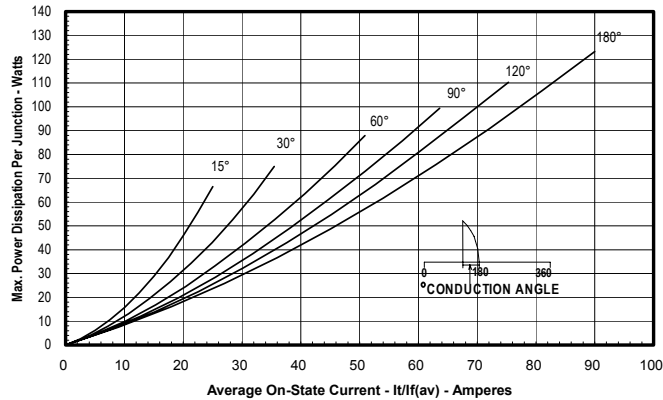
**Maximum On-State Forward Voltage Drop**  
( $T_J = 125^\circ\text{C}$ )



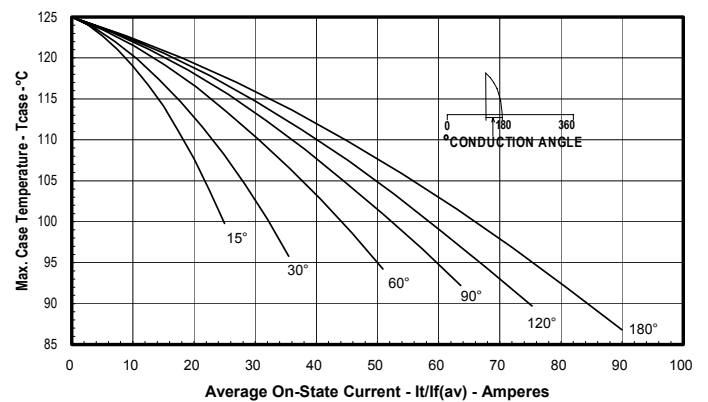
**Maximum Transient Thermal Impedance**  
(Junction to Case)



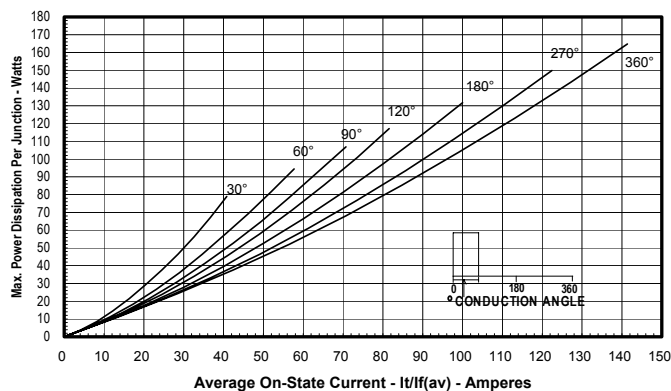
**Maximum On-State Power Dissipation**  
(Sinusoidal Waveform)



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



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



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

