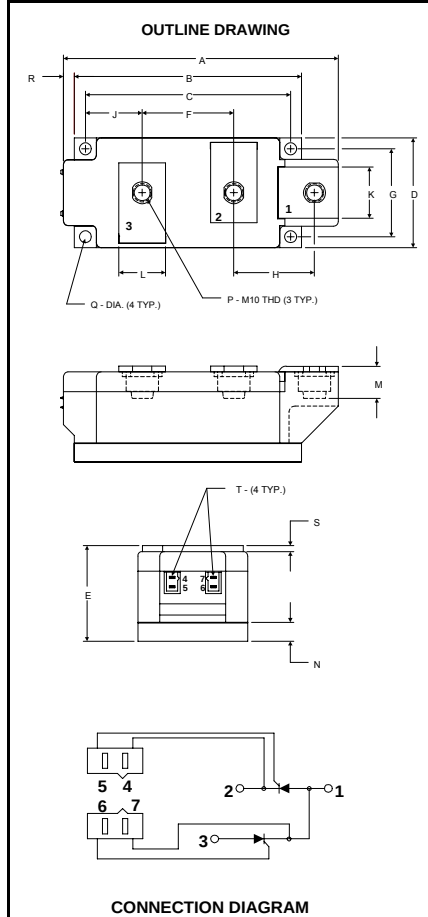


### POW-R-BLOK™ Dual SCR Isolated Module 500 Amperes / 1800 Volts



**LD431850  
Dual SCR  
POW-R-BLOK™ Module  
500 Amperes / 1800 Volts**

#### LD43 Outline Dimensions

| Dimension | Inches      | Millimeters |
|-----------|-------------|-------------|
| A         | 5.91        | 150.0       |
| B         | 4.88        | 124.0       |
| C         | 4.41        | 112.0       |
| D         | 2.36        | 60.0        |
| E         | 2.05        | 52.0        |
| F         | 1.97        | 50.0        |
| G         | 1.89        | 48.0        |
| H         | 1.73        | 44.0        |
| J         | 1.22        | 31.0        |
| K         | 1.10        | 28.0        |
| L         | 1.00        | 25.4        |
| M         | 0.69        | 17.5        |
| N         | 0.39        | 10.0        |
| P         | M10 Metric  | M10         |
| Q         | 0.26 Dia.   | 6.5 Dia.    |
| R         | 0.24        | 6.0         |
| S         | 0.12        | 3.0         |
| T         | .110 x .032 | 2.5 x 0.8   |

Note: Dimensions are for reference only.

#### Ordering Information:

Select the complete eight-digit module part number from the table below.

Example: LD431850 is a 1800V, 500 Ampere Dual SCR Isolated POW-R-BLOK™ Module.

| Type | Voltage<br>Volts<br>(x100) | Current<br>Amperes<br>(x10) |
|------|----------------------------|-----------------------------|
| LD43 | 18                         | 50                          |

#### 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. 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

**LD431850**

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

**POW-R-BLOK™**  
**Dual SCR Isolated Module**  
**500 Amperes / 1800 Volts****Absolute Maximum Ratings**

| Characteristics                                           | Conditions                                | Symbol                | Units              |                         |
|-----------------------------------------------------------|-------------------------------------------|-----------------------|--------------------|-------------------------|
| Repetitive Peak Forward and Reverse Blocking Voltage      |                                           | $V_{DRM}$ & $V_{RRM}$ | 1800               | V                       |
| Non-Repetitive Peak Blocking Voltage<br>( $t < 5$ msec)   |                                           | $V_{RSM}$             | 1900               | V                       |
| RMS Forward Current                                       |                                           | $I_{T(RMS)}$          | 900                | A                       |
| Average Forward Current                                   | 180° Conduction, $T_C=84^{\circ}\text{C}$ | $I_{T(AV)}$           | 500                | A                       |
|                                                           | 180° Conduction, $T_C=80^{\circ}\text{C}$ | $I_{T(AV)}$           | 540                | A                       |
| Peak One Cycle Surge Current, Non-Repetitive              | 60 Hz, 100% $V_{RRM}$ reapplied           | $I_{TSM}$             | 17,000             | A                       |
|                                                           | 50 Hz, 100% $V_{RRM}$ reapplied           | $I_{TSM}$             | 16,300             | A                       |
| Peak Three Cycle Surge Current, Non-Repetitive            | 60 Hz, 100% $V_{RRM}$ reapplied           | $I_{TSM}$             | 12,250             | A                       |
| Peak Ten Cycle Surge Current, Non-Repetitive              | 60 Hz, 100% $V_{RRM}$ reapplied           | $I_{TSM}$             | 10,500             | A                       |
| $I^2t$ for Fusing for One Cycle                           | 8.3 milliseconds                          | $I^2t$                | $1.20 \times 10^6$ | $\text{A}^2 \text{sec}$ |
|                                                           | 10 milliseconds                           | $I^2t$                | $1.33 \times 10^6$ | $\text{A}^2 \text{sec}$ |
| Maximum Rate-of-Rise of On-State Current,<br>(Repetitive) | Per JEDEC Standard 397 5.2.2.6            | $di/dt$               | 200                | A/ $\mu\text{s}$        |
| Operating Temperature                                     |                                           | $T_J$                 | -40 to +130        | $^{\circ}\text{C}$      |
| Storage Temperature                                       |                                           | $T_{stg}$             | -40 to +150        | $^{\circ}\text{C}$      |
| Max. Mounting Torque, M6 Mounting Screw                   |                                           |                       | 55                 | in. – Lb.               |
|                                                           |                                           |                       | 6                  | Nm                      |
| Max. Mounting Torque, M10 Terminal Screw                  |                                           |                       | 110                | in. – Lb.               |
|                                                           |                                           |                       | 12                 | Nm                      |
| Module Weight, Typical                                    |                                           |                       | 1500               | g                       |
|                                                           |                                           |                       | 3.30               | lb                      |
| V Isolation @ 25C                                         |                                           | $V_{rms}$             | 3000               | V                       |

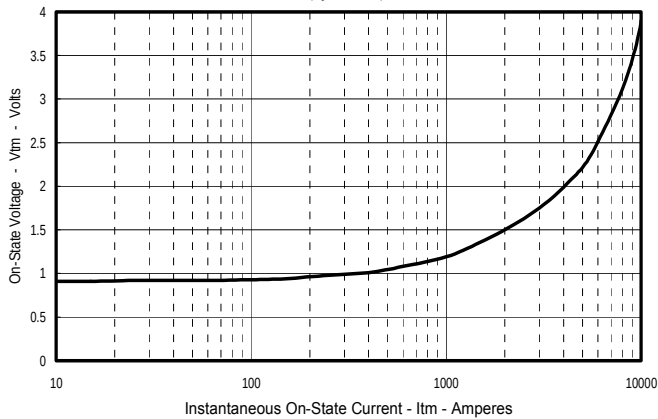
**Electrical Characteristics, T<sub>J</sub>=25°C unless otherwise specified**

| Characteristics                          | Symbol             | Test Conditions                                                               | Min.      | Max.      | Units |
|------------------------------------------|--------------------|-------------------------------------------------------------------------------|-----------|-----------|-------|
| Repetitive Peak Forward Leakage Current  | I <sub>DRM</sub>   | Up to 1800V, T <sub>J</sub> =130°C                                            |           | 80        | mA    |
| Repetitive Peak Reverse Leakage Current  | I <sub>RRM</sub>   | Up to 1800V, T <sub>J</sub> =130°C                                            |           | 80        | mA    |
| Peak On-State Voltage                    | V <sub>FM</sub>    | I <sub>TM</sub> =1500A, T <sub>J</sub> =25°C                                  |           | 1.45      | V     |
|                                          | V <sub>FM</sub>    | I <sub>TM</sub> =1500A, T <sub>J</sub> =130°C                                 |           | 1.40      | V     |
| Threshold Voltage, Low-level             | V <sub>(TO)1</sub> | T <sub>J</sub> = 130°C, I = 15%I <sub>T(AV)</sub> to $\pi$ I <sub>T(AV)</sub> |           | 0.916     | V     |
| Slope Resistance, Low-level              | r <sub>T1</sub>    |                                                                               |           | 0.28      | mΩ    |
| Threshold Voltage, High-level            | V <sub>(TO)2</sub> | T <sub>J</sub> = 130°C, I = $\pi$ I <sub>T(AV)</sub> to I <sub>TSM</sub>      |           | 1.01      | V     |
| Slope Resistance, High-level             | r <sub>T2</sub>    |                                                                               |           | 0.25      | mΩ    |
| V <sub>TM</sub> Coefficients, Full Range |                    | T <sub>J</sub> = 130°C, I = 10A to 6kA                                        | A =       | 0.9032    |       |
|                                          |                    |                                                                               | B =       | -5.98E-03 |       |
|                                          |                    | V <sub>TM</sub> = A + B Ln I + C I + D Sqrt I                                 | C =       | 2.23E-04  |       |
|                                          |                    |                                                                               | D =       | 4.05E-03  |       |
| Minimum dV/dt                            | dV/dt              | Exponential to V <sub>DRM</sub><br>T <sub>J</sub> =130°C, Gate Open           | 1000 Typ. |           | V/μs  |
| Gate Trigger Current                     | I <sub>GT</sub>    | T <sub>J</sub> =25°C, V <sub>D</sub> =12V                                     |           | 200       | mA    |
| Gate Trigger Voltage                     | V <sub>GT</sub>    | T <sub>J</sub> =25°C, V <sub>D</sub> =12V                                     |           | 3.0       | Volts |
| Non-Triggering Gate Voltage              | V <sub>GDM</sub>   | T <sub>J</sub> =130°C, V <sub>D</sub> = ½ V <sub>DRM</sub>                    |           | 0.25      | Volts |
| Peak Forward Gate Current                | I <sub>GTM</sub>   |                                                                               |           | 4.0       | Amp   |
| Peak Reverse Gate Voltage                | V <sub>GRM</sub>   |                                                                               |           | 5         | Volts |

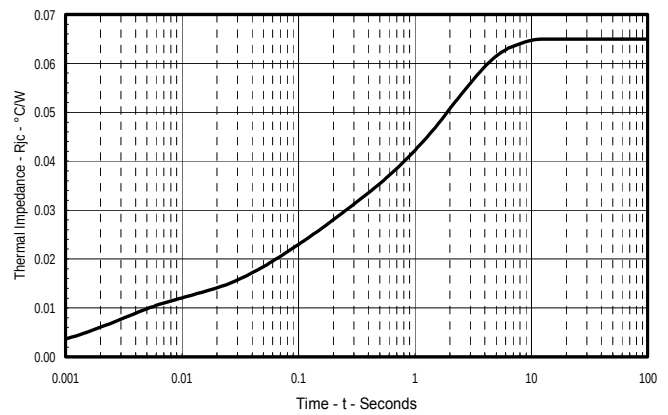
**Thermal Characteristics**

| Characteristics                             | Symbol            |                                                                | Max.                      | Units                     |
|---------------------------------------------|-------------------|----------------------------------------------------------------|---------------------------|---------------------------|
| Thermal Resistance, Junction to Case        | R <sub>ΘJ-C</sub> | Per Module, both conducting                                    | 0.0325                    | °C/W                      |
|                                             |                   | Per Junction, both conducting                                  | 0.0650                    | °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> )) | K <sub>1</sub> = 8.03E-04 | τ <sub>1</sub> = 3.39E-04 |
|                                             |                   | + K <sub>2</sub> (1-exp(-t/τ <sub>2</sub> ))                   | K <sub>2</sub> = 1.03E-02 | τ <sub>2</sub> = 3.15E-03 |
|                                             |                   | + K <sub>3</sub> (1-exp(-t/τ <sub>3</sub> ))                   | K <sub>3</sub> = 1.64E-02 | τ <sub>3</sub> = 0.106    |
|                                             |                   | + K <sub>4</sub> (1-exp(-t/τ <sub>4</sub> ))                   | K <sub>4</sub> = 3.75E-02 | τ <sub>4</sub> = 2.066    |
| Thermal Resistance, Case to Sink Lubricated | R <sub>ΘC-S</sub> | Per Module                                                     | 0.01                      | °C/W                      |

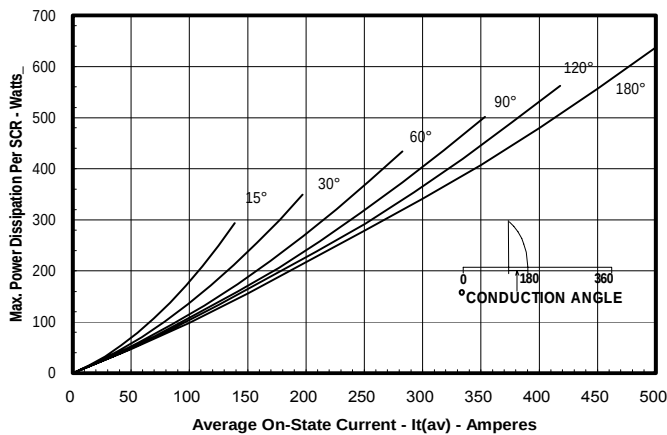
Typical On-State Forward Voltage Drop  
(T<sub>J</sub> = 125°C)



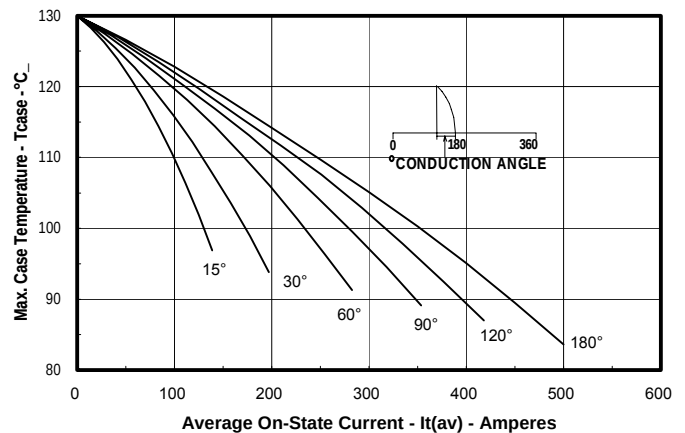
Maximum Transient Thermal Impedance  
(Junction To Case)



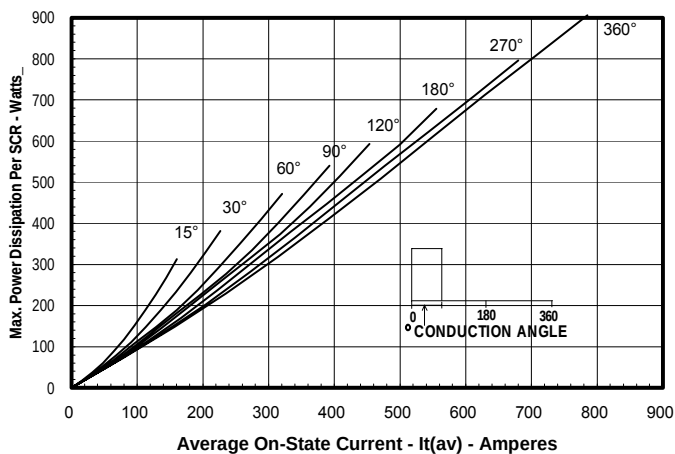
Maximum On-State Power Dissipation  
(Sinusoidal Waveform)



Maximum Allowable Case Temperature  
(Sinusoidal Waveform)



Maximum On-State Power Dissipation  
(Rectangular Waveform)



Maximum Allowable Case Temperature  
(Rectangular Waveform)

