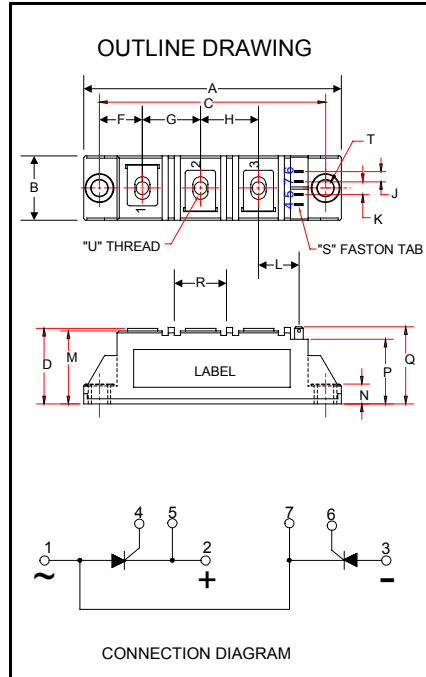


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (724) 925-7272

POW-R-BLOK™

Dual SCR Isolated Module

40 Amperes / Up to 1600 Volts



CD43__40A

**Dual SCR Isolated
POW-R-BLOK™ Module**

40 Amperes / Up to 1600 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. POW-R-BLOK™ has been tested and recognized by the Underwriters Laboratories.

Features:

- Electrically Isolated Heatsinking
- DBC Alumina (Al₂O₃) Insulator
- Copper Baseplate
- Low Thermal Impedance for Improved Current Capability
- 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
- Lighting Control
- Heat & Temperature Control
- Welders

CD43 Outline Dimensions

| Dimension | Inches | Millimeters |
|-----------|------------|-------------|
| A | 3.62 | 92 |
| B | 0.83 | 21 |
| C | 3.15 | 80 |
| D | 1.18 | 30 |
| F | 0.59 | 15 |
| G | 0.79 | 20 |
| H | 0.79 | 20 |
| J | 0.16 | 4 |
| K | 0.23 | 5.8 |
| L | 0.61 | 15.5 |
| M | 1.14 | 29 |
| N | 0.25 | 6.3 |
| P | 0.94 | 24 |
| Q | 1.18 | 30 |
| R | 0.71 | 18 |
| S | 0.11 x .03 | 2.8 x 0.8 |
| T | 0.25 | 6.3 |
| U | M5 | M5 |

Note: Dimensions are for reference only.

Ordering Information:

Select the complete nine digit module part number from the table below.
Example: CD431640A is a 1600Volt, 40 Ampere Dual SCR Isolated POW-R-BLOK™ Module

| Type | Voltage Volts (x100) | Current Amperes (x 1) |
|------|----------------------------|-----------------------------|
| CD43 | 08 12 16 | 40 |

Absolute Maximum Ratings

| Characteristics | Conditions | Symbol | Units |
|---|--|-----------------------|------------------------------|
| Repetitive Peak Forward and Reverse Blocking Voltage | | V_{DRM} & V_{RRM} | up to 1600 V |
| Non-Repetitive Peak Reverse Blocking Voltage ($t < 5$ msec) | | V_{RSM} | $V_{RRM} + 100$ V |
| RMS Forward Current | 180° Conduction, $T_C=91^\circ\text{C}$ | $I_{T(RMS)}$ | 63 A |
| | 180° Conduction, $T_C=91^\circ\text{C}$ (AC Switch) | $I_{T(RMS)}$ | 93 A |
| Average Forward Current | 180° Conduction, $T_C=91^\circ\text{C}$ | $I_{T(AV)}$ | 40 A |
| Peak One Cycle Surge Current, Non-Repetitive | 60 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 750 A |
| | 60 Hz, No V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 890 A |
| | 60 Hz, No V_{RRM} reapplied, $T_J=25^\circ\text{C}$ | I_{TSM} | 985 A |
| | 50 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 715 A |
| | 50 Hz, No V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 850 A |
| | 50 Hz, No V_{RRM} reapplied, $T_J=25^\circ\text{C}$ | I_{TSM} | 940 A |
| Peak Three Cycle Surge Current, Non-Repetitive | 60 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 570 A |
| | 50 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 545 A |
| Peak Ten Cycle Surge Current, Non-Repetitive | 60 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 460 A |
| | 50 Hz, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I_{TSM} | 445 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 | 2330 A^2sec |
| | 8.3 ms, No V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I^2t | 3300 A^2sec |
| | 8.3 ms, No V_{RRM} reapplied, $T_J=25^\circ\text{C}$ | I^2t | 4030 A^2sec |
| | 10 ms, 100% V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I^2t | 2560 A^2sec |
| | 10 ms, No V_{RRM} reapplied, $T_J=125^\circ\text{C}$ | I^2t | 3610 A^2sec |
| | 10 ms, No V_{RRM} reapplied, $T_J=25^\circ\text{C}$ | I^2t | 4420 A^2sec |
| Maximum Rate-of-Rise of On-State Current, (Non-Repetitive) | $T_J=25^\circ\text{C}$, $I_G=0.5$ A, $V_D=0.67 V_{DRM}$ (Rated), $I_{TM}=300\text{A}$, $T_r < 0.5\mu\text{s}$, $t_p > 6\mu\text{s}$ | di/dt | 150 A/ μs |
| Peak Gate Power Dissipation | $T_p < 5$ ms, $T_J = 125^\circ\text{C}$ | P_{GM} | 10 W |
| Average Gate Power Dissipation | $F = 50$ Hz, $T_J = 125^\circ\text{C}$ | $P_{G(AV)}$ | 2.5 W |
| Peak Forward Gate Current | $T_p < 5$ ms, $T_J = 125^\circ\text{C}$ | I_{GFM} | 2.5 A |
| Peak Reverse Gate Voltage | $T_p < 5$ ms, $T_J = 125^\circ\text{C}$ | V_{GRM} | 10 V |
| 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 Terminals | | | 25 in.-Lb. |
| | | | 3 Nm |
| Max. Mounting Torque, Module to Heatsink | | | 44 in.-Lb. |
| | | | 5 Nm |
| Module Weight, Typical | | | 110 g |
| | | | 3.88 oz. |
| V Isolation @ 25C | 50 – 60 Hz, 1 minute | V_{rms} | 2500 V |
| Circuit to base, all terminals shorted together | 50 – 60 Hz, 1 second | V_{rms} | 3500 V |

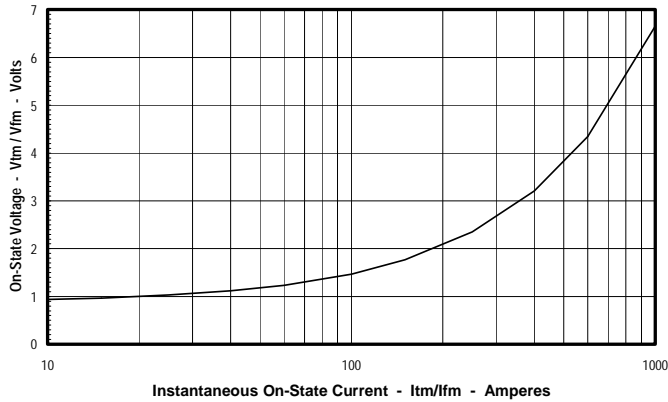
Electrical Characteristics, T_J=25°C unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Max. | Units |
|--|--------------------|--|--------------------------|--|-------------------------|
| Repetitive Peak Forward Leakage Current | I _{DRM} | Up to 1600V, T _J =125°C | | 15 | mA |
| Repetitive Peak Reverse Leakage Current | I _{RRM} | Up to 1600V, T _J =125°C | | 15 | mA |
| Peak On-State Voltage | V _{FM} | I _{TM} =140A | | 1.81 | V |
| Threshold Voltage, Low-level | V _{(TO)1} | T _J = 125°C, I = 16.7% x I _{T(AV)} to I _{T(AV)} | | 0.88 | V |
| Slope Resistance, Low-level | r _{T1} | | | 5.90 | mΩ |
| Threshold Voltage, High-level | V _{(TO)2} | T _J = 125°C, I = I _{T(AV)} to I _{TSM} | | 0.91 | V |
| Slope Resistance, High-level | r _{T2} | | | 5.74 | mΩ |
| V _{TM} Coefficients, Full Range | | T _J = 125°C, I = 15% x I _{T(AV)} to I _{TSM} V _{TM} = A + B Ln I + C I + D Sqrt I | A = B = C = D = | 0.872 -1.86 E-3 5.65 E-3 4.33 E-3 | |
| Minimum dV/dt | dV/dt | Linear to 2/3 V _{DRM} T _J =125°C, Gate Open Circuit | 500 | | V/μs |
| Turn-Off Time (Typical) | t _{off} | T _J = 25°C, I _T = 2A V _r = 50V, -dI/dt=10 A/μs Re-Applied dV/dt = 200 V/μs, Linear to 900 V | 40 - 100 | (Typical) | μs |
| Gate Trigger Current | I _{GT} | T _J = -40°C, V _D =6V, Resistive Load T _J = 25°C, V _D =6V, Resistive Load T _J =125°C, V _D =6V, Resistive Load | | 270 150 80 | mA mA mA |
| Gate Trigger Voltage | V _{GT} | T _J = -40°C, V _D =6V, Resistive Load T _J = 25°C, V _D =6V, Resistive Load T _J =125°C, V _D =6V, Resistive Load | | 4.0 2.5 1.7 | Volts Volts Volts |
| Non-Triggering Gate Voltage | V _{GDM} | T _J =125°C, V _D =V _{DRM} | | 0.25 | Volts |
| Non-Triggering Gate Current | I _{GDM} | T _J =125°C, V _D =V _{DRM} | | 6 | mA |
| Holding Current | I _H | V _D =6V, Resistive Load, Gate Open | | 200 | mA |
| Latching Current | I _L | V _D =6V, Resistive Load | | 400 | mA |

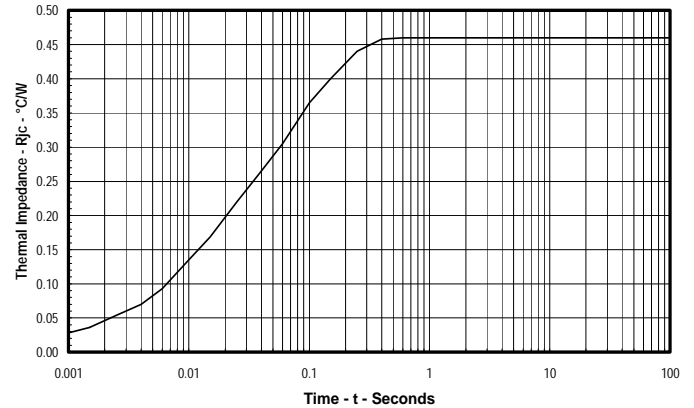
Thermal Characteristics

| Characteristics | Symbol | | Max. | Units |
|--|-------------------|--|---|--------------|
| Thermal Resistance, Junction to Case DC Operation | R _{ΘJ-C} | Per Module, both conducting Per Junction, both conducting | 0.230 0.460 | °C/W °C/W |
| Thermal Impedance Coefficients | Z _{ΘJ-C} | Z _{ΘJ-C} = K ₁ (1-exp(-t/τ ₁)) + K ₂ (1-exp(-t/τ ₂)) + K ₃ (1-exp(-t/τ ₃)) + K ₄ (1-exp(-t/τ ₄)) | K ₁ = 1.77 E-2 K ₂ = -1.00 E-2 K ₃ = 1.46 E-1 K ₄ = 3.07 E-1 τ ₁ = 4.73 E-4 τ ₂ = 1.67 E-3 τ ₃ = 9.77 E-3 τ ₄ = 8.76 E-2 | |
| Thermal Resistance, Case to Sink Lubricated | R _{ΘC-S} | Per Module | 0.1 | °C/W |

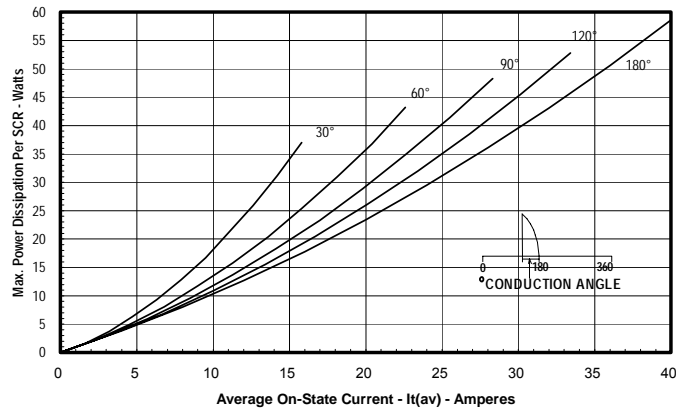
Maximum On-State Forward Voltage Drop
($T_j = 125^\circ\text{C}$)



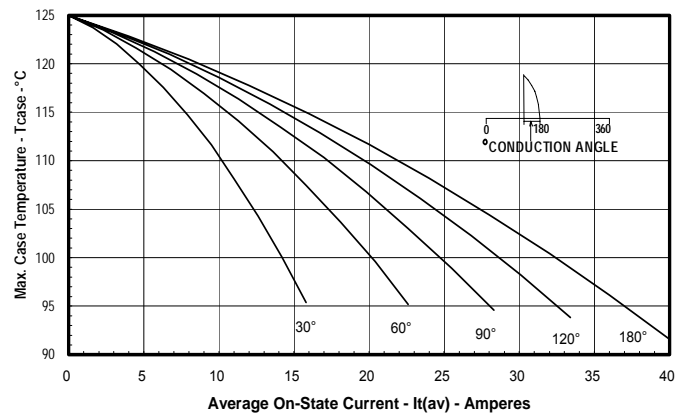
Maximum Transient Thermal Impedance
(Junction to Case)



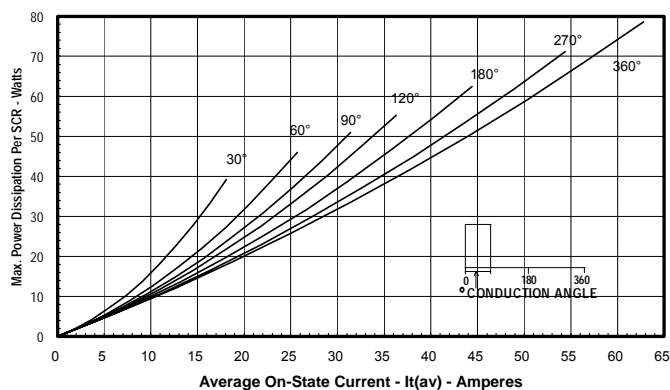
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)

