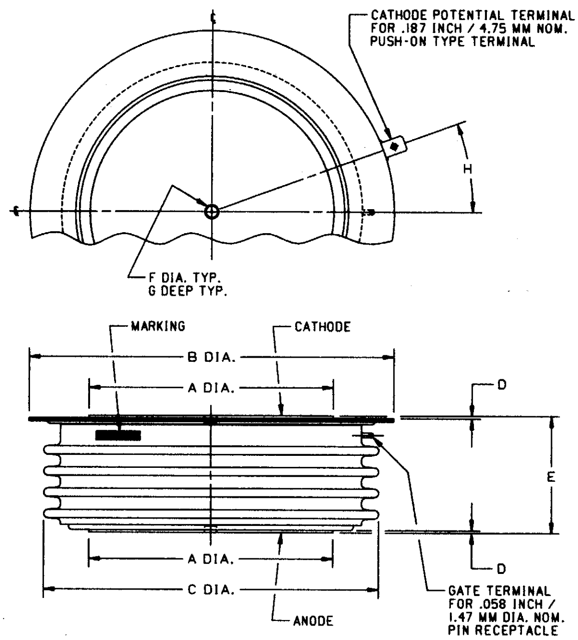
# POWEREX

# C782

Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

## Phase Control SCR

**2300 Amperes Average**
**2500 Volts**

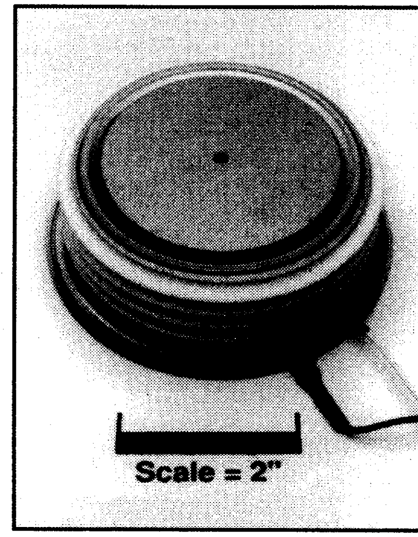



CASE NUMBER TBK
NOMINAL DIMENSIONS

STRIKE DISTANCE = 1.04 INCH / 26.4 MM MIN.
CREEPAGE DISTANCE = 1.64 INCH / 41.6 MM MIN.

| SYM. | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| INCHES | 2.88 | 4.36 | 3.95 | .030 | 1.400/1.440 | .140 | .080 | 20° |
| MM | 73.2 | 110.7 | 100.3 | 0.76 | 35.56/36.58 | 3.56 | 2.03 | 20° |

**C782** (Outline Drawing)

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### Description:

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak, hermetic Pow-R-Disc devices employing the field proven amplifying gate.

### Features:

- ☐ Low On-State Voltage
- ☐ High di/dt Capability
- ☐ High dv/dt Capability
- ☐ Hermetic Packaging
- ☐ Excellent Surge and $I^2t$ Ratings

### Applications:

- ☐ Power Supplies
- ☐ Motor Control

### Ordering Information:

Select the complete six digit part number you desire from the table, i.e. C782LE is a 2500 Volt, 2300 Ampere Phase Control SCR.

| Type | Voltage $V_{DRM}$ $V_{RRM}$ | Code | Current $I_{T(av)}$ |
|---|---|---|---|
| C782 | 2200 | LB | 2300 |
| | 2300 | LC | |
| | 2400 | LD | |
| | 2500 | LE | |

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## Absolute Maximum Ratings

| Characteristics | Symbol | C782 | Units |
|---|---|---|---|
| Non-repetitive Transient Peak Reverse Voltage | $V_{RSM}$ | $V_{RRM}$ + 100V | Volts |
| RMS On-state Current, $T_C$ = 70°C | $I_{T(rms)}$ | 3610 | Amperes |
| Average Current 180° Sine Wave, $T_C$ = 70°C | $I_{T(av)}$ | 2300 | Amperes |
| RMS On-state Current, $T_C$ = 55°C | $I_{T(rms)}$ | 4240 | Amperes |
| Average Current 180° Sine Wave, $T_C$ = 55°C | $I_{T(av)}$ | 2700 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz | $I_{tsm}$ | 35000 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz | $I_{tsm}$ | 32000 | Amperes |
| Critical Rate-of-rise of On-state Current (Non-repetitive) | di/dt | 600 | A/µsec |
| Critical Rate-of-rise of On-state Current (Repetitive) | di/dt | 100 | A/µsec |
| $I^2t$ (for Fusing) for One Cycle, 60Hz | $I^2t$ | 5 x $10^6$ | $A^2$sec |
| Peak Gate Power Dissipation | $P_{GM}$ | 250 | Watts |
| Average Gate Power Dissipation | $P_{G(av)}$ | 35 | Watts |
| Operating Temperature | $T_j$ | -40 to +125°C | °C |
| Storage Temperature | $T_{stg}$ | -40 to +150°C | °C |
| Approximate Weight | | 3.5 | lb. |
| | | 1.60 | kg |
| Mounting Force | | 9000 to 10000 | lb. |
| | | 40 to 44.5 | kN |

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## Electrical Characteristics, $T_j$ = 25°C Unless Otherwise Specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Repetitive Peak Reverse Leakage Current | $I_{RRM}$ | $T_j$ = 125°C, $V_R$ = $V_{RRM}$ | | | 150 | mA |
| Repetitive Peak Forward Leakage Current | $I_{DRM}$ | $T_j$ = 125°C, $V_D$ = $V_{DRM}$ | | | 150 | mA |
| Peak On-state Voltage | $V_{TM}$ | $T_j$ = 125°C, $I_T$ = 2000A Peak<br>Duty Cycle < 0.1% | | | 1.35 | Volts |
| Threshold Voltage, Low-level | $V_{(TO)1}$ | $T_j$ = 125°C, I = 15%, $I_{T(av)}$ to $\pi I_{T(av)}$ | | | 0.86799 | Volts |
| Slope Resistance, Low-level | $r_{T1}$ | | | | 0.1703 | mΩ |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_j$ = 125°C, I = $\pi I_{T(av)}$ to $I_{TSM}$ | | | 1.0951 | Volts |
| Slope Resistance, High-level | $r_{T2}$ | | | | 0.1226 | mΩ |
| $V_{TM}$ Coefficients, Low-level | | $T_j$ = 125°C, I = 15% $I_{T(av)}$ to $\pi I_{T(av)}$ | | | $A_1$ = 0.60452<br>$B_1$ = 0.003408<br>$C_1$ = 3.235E-05<br>$D_1$ = 0.01293 | |
| $V_{TM}$ Coefficients, High-level | | $T_j$ = 125°C, I = $\pi I_{T(av)}$ to $I_{TSM}$ | | | $A_2$ = 2.2748<br>$B_2$ = -0.17012<br>$C_2$ = 1.155E-04<br>$D_2$ = 0.004534 | |
| Typical Delay Time | $t_d$ | $T_j$ = 125°C, $V_D$ = 1800V | | 3 | | μsec |
| Typical Turn-off Time | $t_q$ | $T_j$ = 125°C, $I_T$ = 2000A,<br>tp > 2msec,$di_R$/dt = 5A/μsec<br>V Reapplied = 1500V,<br>dv/dt = 1000V/μsec, $V_R$ = 100V | | 250 | | μsec |
| Minimum Critical dv/dt - Exponential to $V_{DRM}$ | dv/dt | $T_j$ = 125°C, $V_D$ = 0.8 $V_{DRM}$ | 500 | | | V/μsec |
| Gate Trigger Current | $I_{GT}$ | $T_j$ = 25°C, $V_D$ = $12V_{DC}$ | | | 250 | mA |
| Gate Trigger Voltage | $V_{GT}$ | $T_j$ = 25°C, $V_D$ = $12V_{DC}$ | | | 4.5 | Volts |
| Non-Triggering Gate Voltage | $V_{GDM}$ | $T_j$ = 125°C, $V_D$ = 1300V | | | 0.5 | Volts |
| Peak Forward Gate Current | $I_{GTM}$ | | | | 20 | A |
| Peak Reverse Gate Voltage | $V_{GRM}$ | | | | 20 | Volts |

### Thermal Characteristics

| | | | |
|---|---|---|---|
| Maximum Thermal Resistance, Double Sided Cooling | | | |
| Junction-to-Case | $R_{\theta(j\text{-}c)}$ | 0.012 | °C/W |
| Case-to-Sink | $R_{\theta(c\text{-}s)}$ | 0.002 | °C/W |

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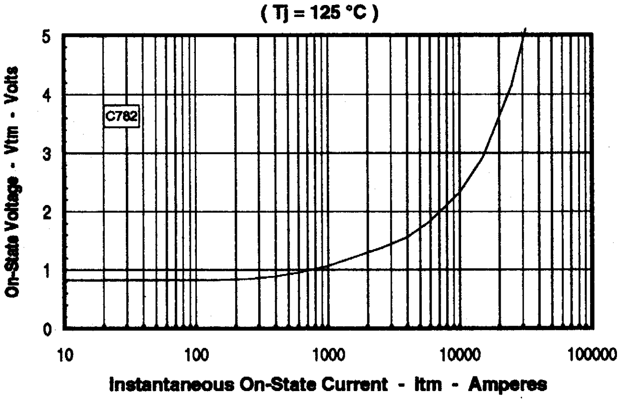
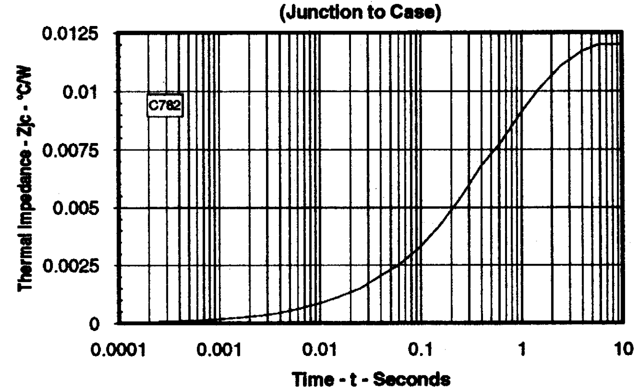
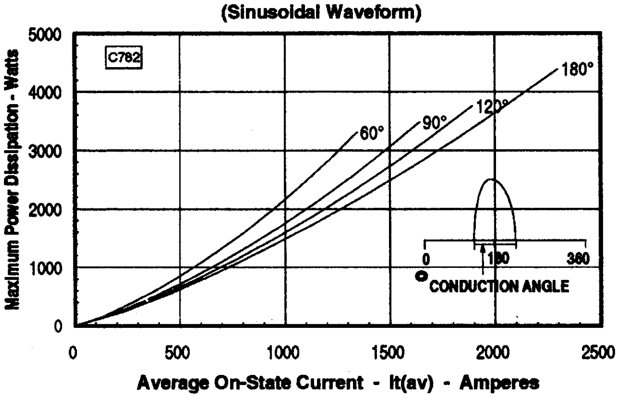
**Maximum On-State Forward Voltage Drop**
**( Tj = 125 °C )**



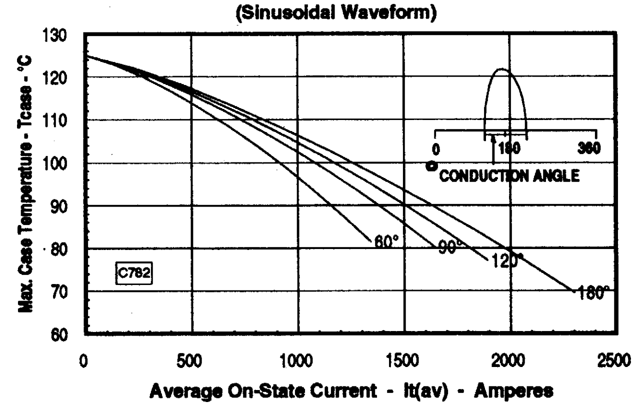

**Maximum Transient Thermal Impedance**
**(Junction to Case)**



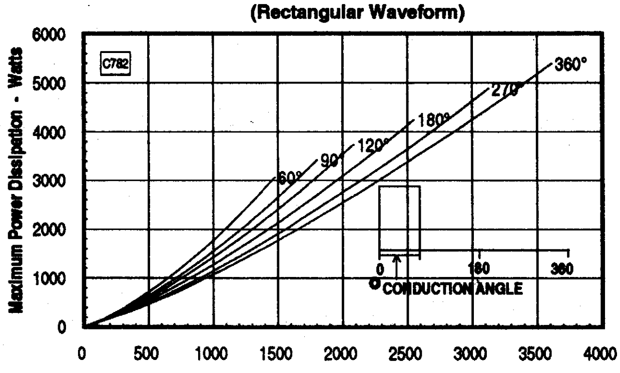

**Maximum On-State Power Dissipation**
**(Sinusoidal Waveform)**



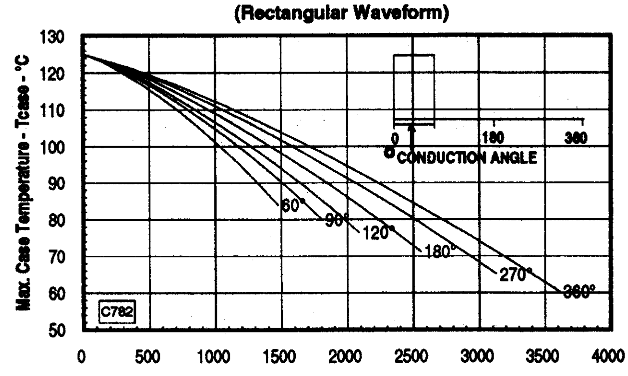

**Maximum Allowable Case Temperature**
**(Sinusoidal Waveform)**




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




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




Note: Spreading losses included. Curves are for an inductive load.