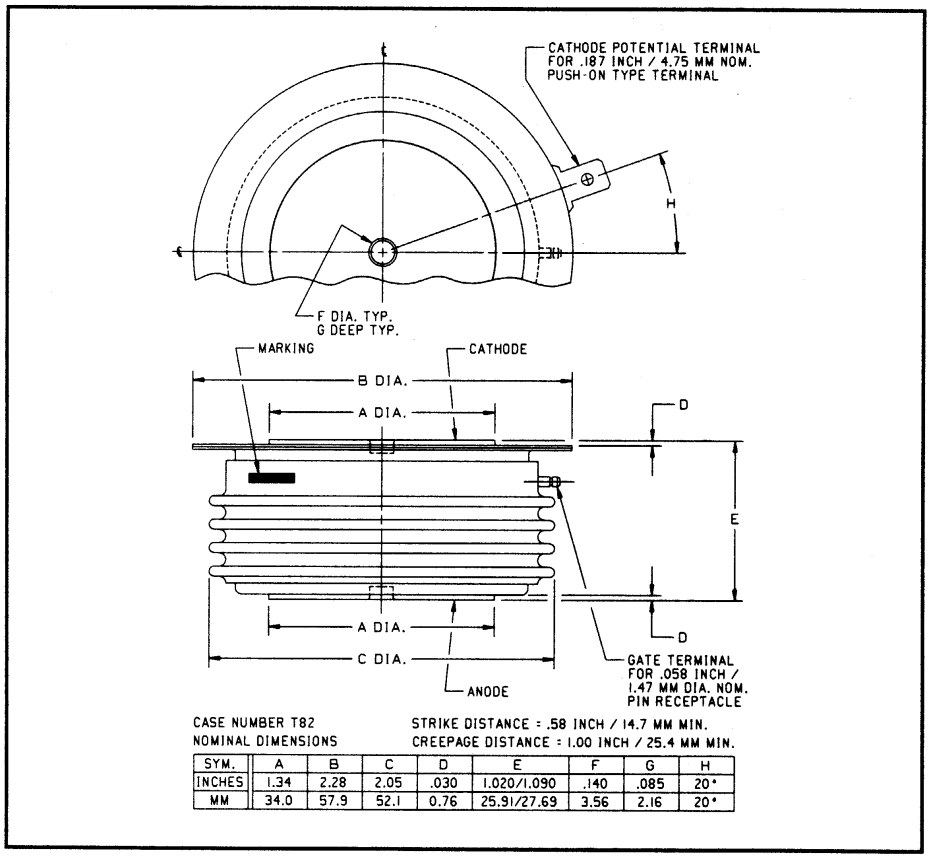
# T820
# 900A

*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*
***900 Amperes Average***
***1600 Volts***




CASE NUMBER T82
NOMINAL DIMENSIONS

STRIKE DISTANCE = .58 INCH / 14.7 MM MIN.
CREEPAGE DISTANCE = 1.00 INCH / 25.4 MM MIN.

| SYM. | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| INCHES | 1.34 | 2.28 | 2.05 | .030 | 1.020/1.090 | .140 | .085 | 20° |
| MM | 34.0 | 57.9 | 52.1 | 0.76 | 25.91/27.69 | 3.56 | 2.16 | 20° |

**T820 900A** (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 12 digit part number you desire from the table below.

| Type | Voltage $V_{DRM}/V_{RRM}$ (Volts) | Current $I_{T(av)}$ (A) | Turn-off $t_q$ (µsec) | Gate Current $I_{GT}$ (mA) | Lead Code |
|---|---|---|---|---|---|
| T820 | 02 through 16 | 90 | 0 | 4 | DH |
| | 200V through 1600V | 900A | 200µsec (Typical) | 150mA | 12" |

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## Absolute Maximum Ratings

| Characteristics | Symbol | T820 900A | Units |
|---|---|---|---|
| Non-repetitive Transient Peak Reverse Voltage | $V_{RSM}$ | $V_{RRM}$ + 100V | Volts |
| RMS On-state Current, $T_C$ = 70°C | $I_{T(rms)}$ | 1410 | Amperes |
| Average Current 180° Sine Wave, $T_C$ = 70°C | $I_{T(av)}$ | 900 | Amperes |
| RMS On-state Current, $T_C$ = 55°C | $I_{T(rms)}$ | 1725 | Amperes |
| Average Current 180° Sine Wave, $T_C$ = 55°C | $I_{T(av)}$ | 1100 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz | $I_{tsm}$ | 15000 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz | $I_{tsm}$ | 13700 | Amperes |
| Critical Rate-of-rise of On-state Current (Non-repetitive) | di/dt | 400 | A/µsec |
| Critical Rate-of-rise of On-state Current (Repetitive) | di/dt | 150 | A/µsec |
| $I^2t$ (for Fusing) for One Cycle, 60Hz | $I^2t$ | 935,000 | $A^2$sec |
| Peak Gate Power Dissipation | $P_{GM}$ | 16 | Watts |
| Average Gate Power Dissipation | $P_{G(av)}$ | 3 | Watts |
| Operating Temperature | $T_j$ | -40 to +125°C | °C |
| Storage Temperature | $T_{stg}$ | -40 to +150°C | °C |
| Approximate Weight | | 8 | oz. |
| | | 227 | g |
| Mounting Force | | 3000 to 3500 | lb. |
| | | 1360 to 1590 | kg. |

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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, $V_R = V_{RRM}$ | | | 35 | mA |
| Repetitive Peak Forward Leakage Current | $I_{DRM}$ | $T_j$ = 125°C, $V_D = V_{DRM}$ | | | 35 | mA |
| Peak On-state Voltage | $V_{TM}$ | $I_{TM}$ = 1500A 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 $\pi I_{T(av)}$ | | | 0.78526 | Volts |
| Slope Resistance, Low-level | $r_{T1}$ | | | | 0.3505 | mΩ |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_j$ = 125°C, I = $\pi I_{T(av)}$ to $I_{TSM}$ | | | 1.0789 | Volts |
| Slope Resistance, High-level | $r_{T2}$ | | | | 0.2311 | mΩ |
| $V_{TM}$ Coefficients, Low-level | | $T_j$ = 125°C, I = 15% $I_{T(av)}$ to $\pi I_{T(av)}$ | | | | |
| | | | | | $A_1$ = 0.68865 | |
| | | | | | $B_1$ = -0.04011 | |
| | | | | | $C_1$ = -1.578E-05 | |
| | | | | | $D_1$ = 0.025339 | |
| $V_{TM}$ Coefficients, High-level | | $T_j$ = 125°C, I = $\pi I_{T(av)}$ to $I_{TSM}$ | | | | |
| | | | | | $A_2$ = 2.6289 | |
| | | | | | $B_2$ = -0.37766 | |
| | | | | | $C_2$ = 8.873E-05 | |
| | | | | | $D_2$ = 0.034055 | |
| Typical Turn-on Time | $t_{on}$ | $I_T$ = 1000A, $V_D$ = 600V | | 5 | | µsec |
| Typical Turn-off Time | $t_q$ | $T_j$ = 125°C, $I_T$ = 250A,<br>$di_R/dt$ = 50A/µsec Reapplied<br>dv/dt = 20V/µsec Linear to<br>80% $V_{DRM}$ | | 200 | | µsec |
| Minimum Critical dv/dt - Exponential to $V_{DRM}$ | dv/dt | $T_j$ = 125°C | 300 | | | V/µsec |
| Gate Trigger Current | $I_{GT}$ | $T_j$ = 25°C, $V_D$ = 12V | | | 150 | mA |
| Gate Trigger Voltage | $V_{GT}$ | $T_j$ = 25°C, $V_D$ = 12V | | | 3.0 | Volts |
| Non-Triggering Gate Voltage | $V_{GDM}$ | $T_j$ = 125°C, $V_D = V_{DRM}$ | | | 0.15 | Volts |
| Peak Forward Gate Current | $I_{GTM}$ | | | | 4 | A |
| Peak Reverse Gate Voltage | $V_{GRM}$ | | | | 5 | Volts |

**Thermal Characteristics**

| | | | | | | |
|---|---|---|---|---|---|---|
| Maximum Thermal Resistance, Double Sided Cooling | | | | | | |
| Junction-to-Case | $R_{\theta(j-c)}$ | | | | 0.037 | °C/W |
| Case-to-Sink | $R_{\theta(c-s)}$ | | | | 0.020 | °C/W |

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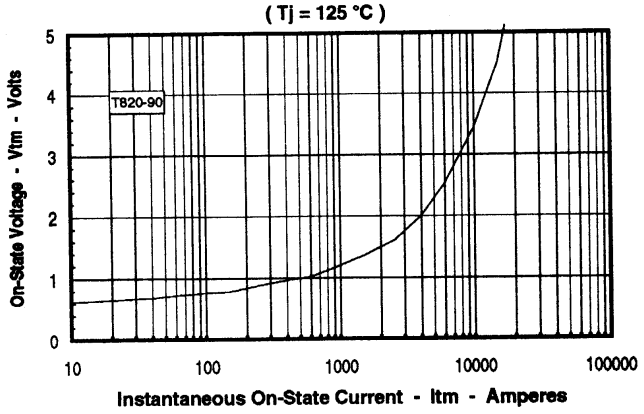
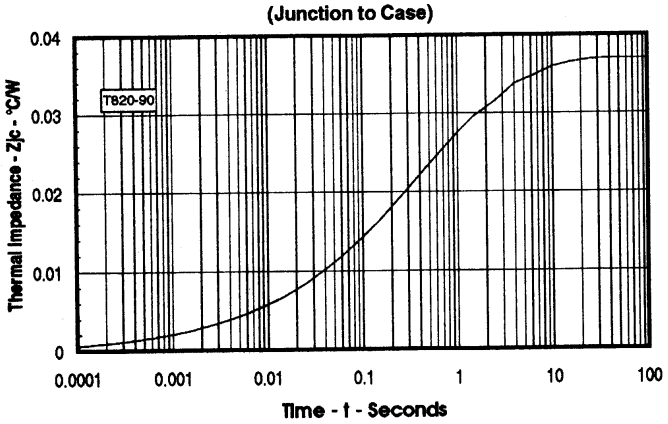
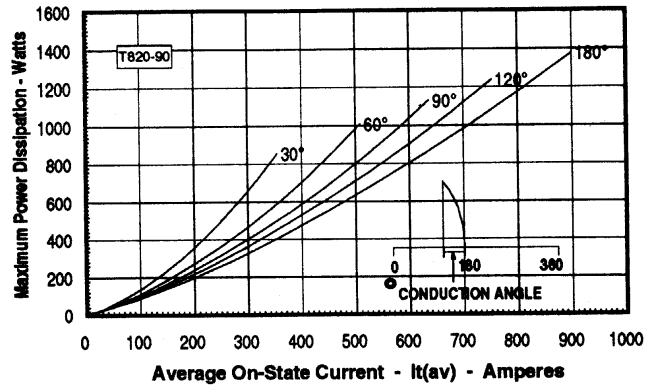
**Maximum On-State Forward Voltage Drop**
**( Tj = 125 °C )**



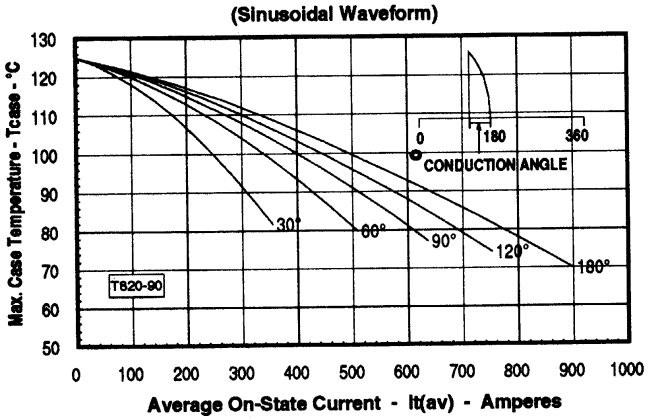

**Maximum Transient Thermal Impedance**
**(Junction to Case)**



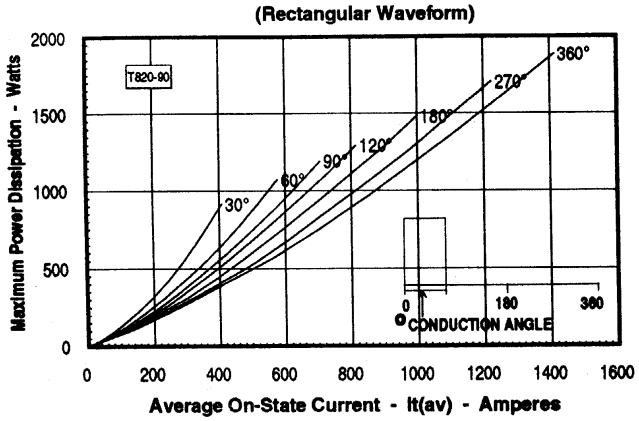

**Maximum On-State Power Dissipation**
**(Sinusoidal Waveform)**




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




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




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