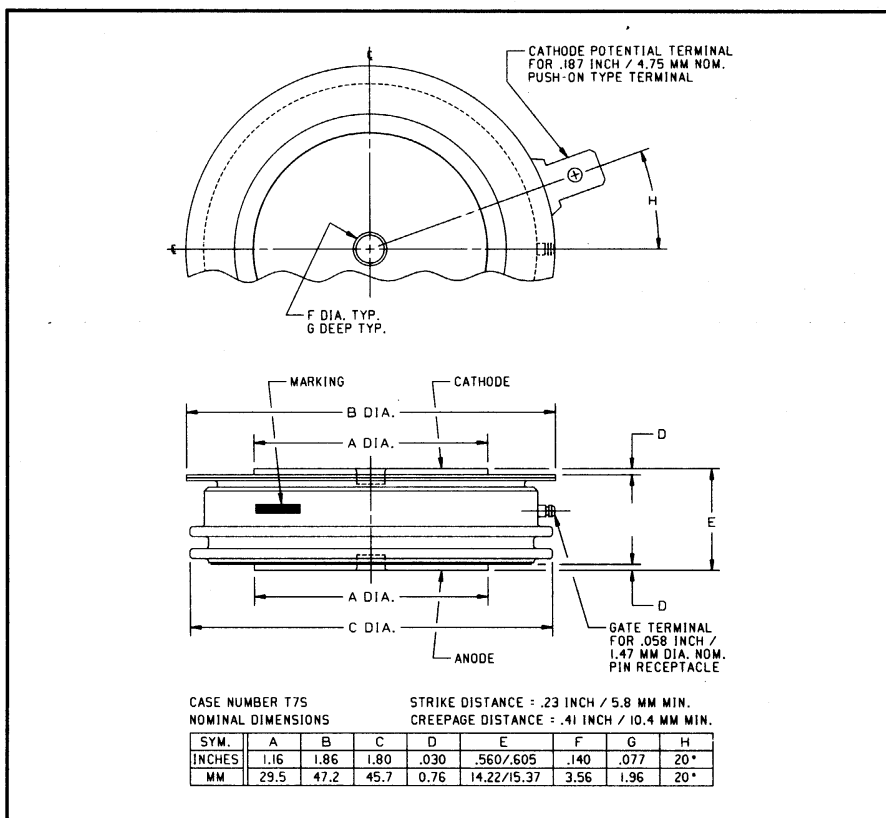
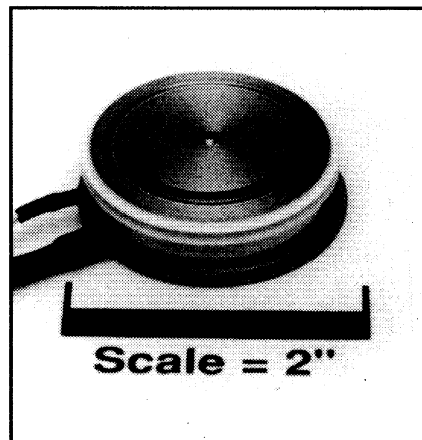


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272  
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

**Phase Control SCR**  
750 Amperes Average  
1800-2400 Volts



T7S0 750A (2400V) (Outline Drawing)



T7S0 750A (2400V) Phase Control SCR  
750 Amperes Average, 1800-2400 Volts

### 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                      | Current            | Turn-off                   | Gate Current     | Lead Code |
|------|------------------------------|--------------------|----------------------------|------------------|-----------|
|      | $V_{DRM}/V_{RRM}$<br>(Volts) | $I_{T(av)}$<br>(A) | $t_q$<br>( $\mu$ sec)      | $I_{GT}$<br>(mA) |           |
| T7S0 | 18<br>20<br>24               | 75                 | 0                          | 4                | DN        |
|      | 1800V<br>2000V<br>2400V      | 750A               | 150 $\mu$ sec<br>(Typical) | 150mA            | 8"        |



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**T7S0 750A (2400V)**  
**Phase Control SCR**  
750 Amperes Average, 1800-2400 Volts

### Absolute Maximum Ratings

| Characteristics                                             | Symbol       | T7S0 750A (2400V) | Units              |
|-------------------------------------------------------------|--------------|-------------------|--------------------|
| Non-repetitive Transient Peak Reverse Voltage               | $V_{RSM}$    | $V_{RRM} + 100V$  | Volts              |
| RMS On-state Current, $T_C = 73^\circ C$                    | $I_{T(rms)}$ | 1180              | Amperes            |
| Average Current 180° Sine Wave, $T_C = 73^\circ C$          | $I_{T(av)}$  | 750               | Amperes            |
| RMS On-state Current, $T_C = 55^\circ C$                    | $I_{T(rms)}$ | 1440              | Amperes            |
| Average Current 180° Sine Wave, $T_C = 55^\circ C$          | $I_{T(av)}$  | 920               | Amperes            |
| Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz | $I_{tsm}$    | 10500             | Amperes            |
| Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz | $I_{tsm}$    | 9600              | Amperes            |
| Critical Rate-of-rise of On-state Current (Non-repetitive)  | $di/dt$      | 600               | A/ $\mu$ sec       |
| Critical Rate-of-rise of On-state Current (Repetitive)      | $di/dt$      | 150               | A/ $\mu$ sec       |
| $I^2t$ (for Fusing) for One Cycle, 60Hz                     | $I^2t$       | 460,000           | A <sup>2</sup> 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                                          |              | 4                 | oz.                |
|                                                             |              | 113               | g                  |
| Mounting Force                                              |              | 2000 to 2400      | lb.                |
|                                                             |              | 900 to 1090       | kg.                |



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**T7S0 750A (2400V)**  
**Phase Control SCR**  
750 Amperes Average, 1800-2400 Volts

## Electrical Characteristics, $T_j = 25^\circ\text{C}$ Unless Otherwise Specified

| Characteristics                                     | Symbol      | Test Conditions                                                                                                                                                      | Min. | Typ. | Max.                                                                                | Units                    |
|-----------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|--------------------------|
| Repetitive Peak Reverse Leakage Current             | $I_{RRM}$   | $T_j = 125^\circ\text{C}$ , $V_R = V_{RRM}$                                                                                                                          |      |      | 30                                                                                  | mA                       |
| Repetitive Peak Forward Leakage Current             | $I_{DRM}$   | $T_j = 125^\circ\text{C}$ , $V_D = V_{DRM}$                                                                                                                          |      |      | 30                                                                                  | mA                       |
| Peak On-state Voltage                               | $V_{TM}$    | $I_{TM} = 625\text{A Peak}$<br>Duty Cycle $< 0.1\%$                                                                                                                  |      |      | 1.40                                                                                | Volts                    |
| Threshold Voltage, Low-level                        | $V_{(TO)1}$ | $T_j = 125^\circ\text{C}$ , $I = 15\%$ , $I_{T(av)}$ to $\pi I_{T(av)}$                                                                                              |      |      | 0.97192                                                                             | Volts                    |
| Slope Resistance, Low-level                         | $r_{T1}$    |                                                                                                                                                                      |      |      | 0.4818                                                                              | $\text{m}\Omega$         |
| Threshold Voltage, High-level                       | $V_{(TO)2}$ | $T_j = 125^\circ\text{C}$ , $I = \pi I_{T(av)}$ to $I_{TSM}$                                                                                                         |      |      | 1.4824                                                                              | Volts                    |
| Slope Resistance, High-level                        | $r_{T2}$    |                                                                                                                                                                      |      |      | 0.2845                                                                              | $\text{m}\Omega$         |
| $V_{TM}$ Coefficients, Low-level                    |             | $T_j = 125^\circ\text{C}$ , $I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$                                                                                                  |      |      | $A_1 = 0.38516$<br>$B_1 = 0.12628$<br>$C_1 = 4.189\text{E-}04$<br>$D_1 = -0.005704$ |                          |
| $V_{TM}$ Coefficients, High-level                   |             | $T_j = 125^\circ\text{C}$ , $I = \pi I_{T(av)}$ to $I_{TSM}$                                                                                                         |      |      | $A_2 = 2.1990$<br>$B_2 = -0.30712$<br>$C_2 = 4.831\text{E-}05$<br>$D_2 = 0.044366$  |                          |
| Typical Turn-on Time                                | $t_{on}$    | $I_T = 100\text{A}$ , $V_D = 100\text{V}$                                                                                                                            |      | 7    |                                                                                     | $\mu\text{sec}$          |
| Typical Turn-off Time                               | $t_q$       | $T_j = 125^\circ\text{C}$ , $I_T = 250\text{A}$ ,<br>$di_R/dt = 25\text{A}/\mu\text{sec}$ Reapplied<br>$dv/dt = 20\text{V}/\mu\text{sec}$ Linear to<br>80% $V_{DRM}$ |      | 150  |                                                                                     | $\mu\text{sec}$          |
| Minimum Critical $dv/dt$ - Exponential to $V_{DRM}$ | $dv/dt$     | $T_j = 125^\circ\text{C}$                                                                                                                                            | 300  |      |                                                                                     | $\text{V}/\mu\text{sec}$ |
| Gate Trigger Current                                | $I_{GT}$    | $T_j = 25^\circ\text{C}$ , $V_D = 12\text{V}$                                                                                                                        |      |      | 150                                                                                 | mA                       |
| Gate Trigger Voltage                                | $V_{GT}$    | $T_j = 25^\circ\text{C}$ , $V_D = 12\text{V}$                                                                                                                        |      |      | 3.0                                                                                 | Volts                    |
| Non-Triggering Gate Voltage                         | $V_{GDM}$   | $T_j = 125^\circ\text{C}$ , $V_D = V_{DRM}$                                                                                                                          |      |      | 0.15                                                                                | Volts                    |
| Peak Forward Gate Current                           | $I_{GTM}$   |                                                                                                                                                                      |      |      | 4                                                                                   | A                        |
| Peak Reverse Gate Voltage                           | $V_{GRM}$   |                                                                                                                                                                      |      |      | 5                                                                                   | Volts                    |

## Thermal Characteristics

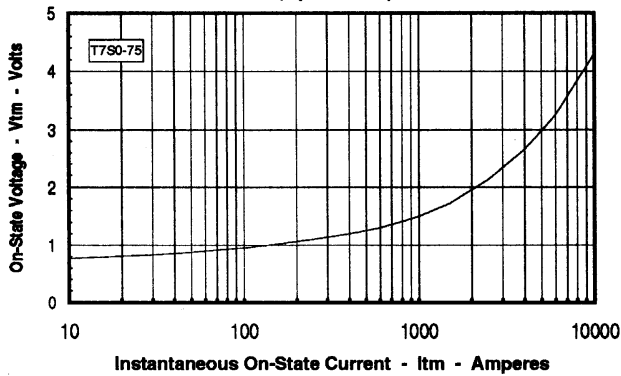
Maximum Thermal Resistance, Double Sided Cooling

|                  |                   |       |                           |
|------------------|-------------------|-------|---------------------------|
| Junction-to-Case | $R_{\theta(j-c)}$ | 0.035 | $^\circ\text{C}/\text{W}$ |
| Case-to-Sink     | $R_{\theta(c-s)}$ | 0.02  | $^\circ\text{C}/\text{W}$ |

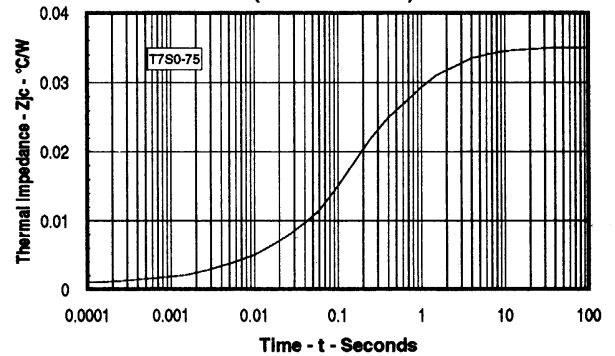
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**T7S0 750A (2400V)**  
**Phase Control SCR**  
750 Amperes Average, 1800-2400 Volts

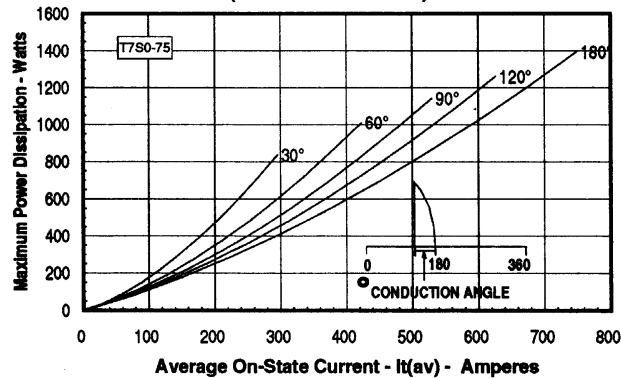
**Maximum On-State Forward Voltage Drop**  
( $T_J = 125^\circ\text{C}$ )



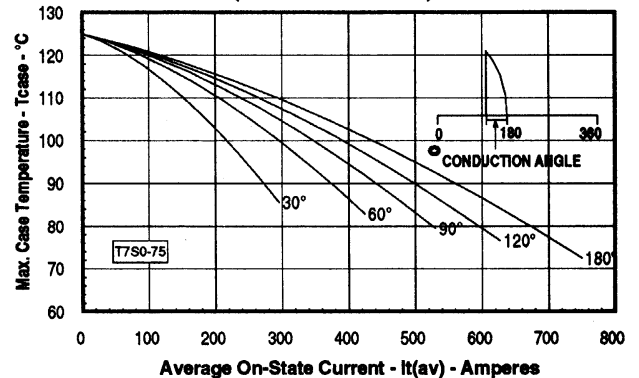
**Maximum Transient Thermal Impedance**  
(Junction to Case)



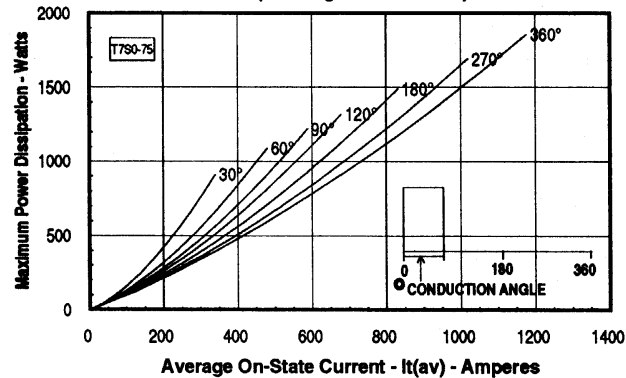
**Maximum On-State Power Dissipation**  
(Sinusoidal Waveform)



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



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



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

