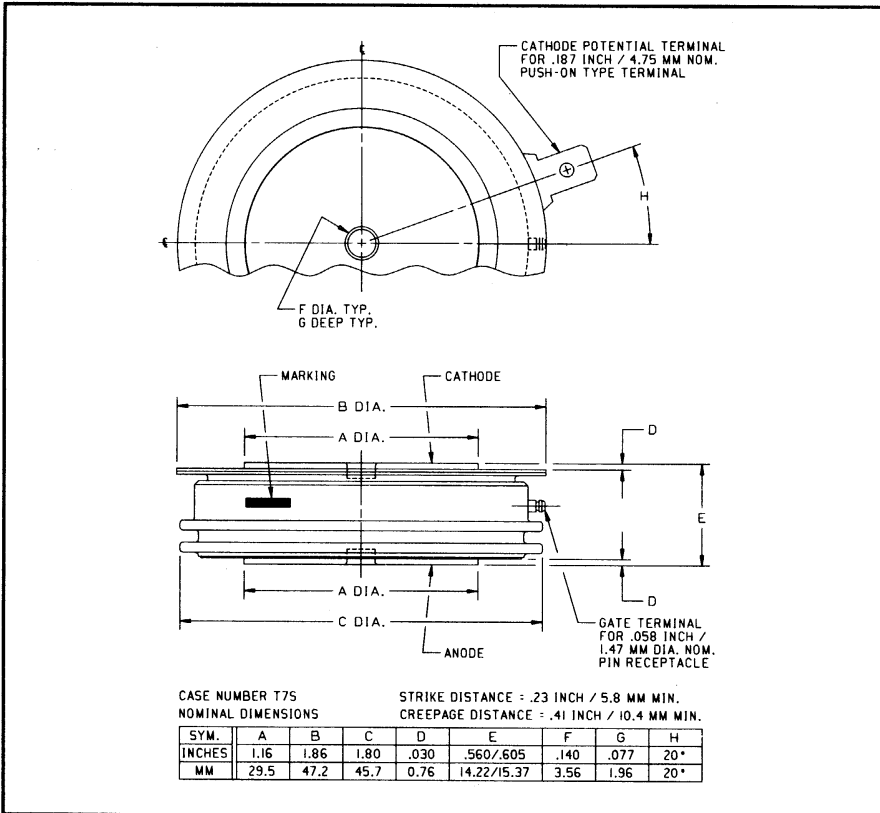


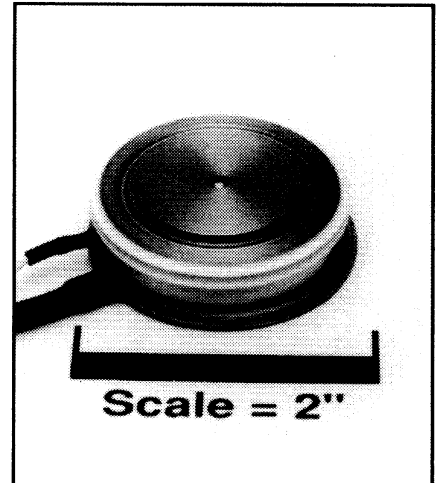
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR

650 Amperes Average
1800-2400 Volts



T7S0 650A (1800-2400V) (Outline Drawing)



T7S0 650A (2400V) Phase Control SCR
650 Amperes Average, 1800-2400 Volts

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} (Volts) | $I_T(av)$ (A) | t_q (μ sec) | I_{GT} (mA) | |
| T7S0 | 18 20 24 | 65 | 0 | 4 | DN |
| | 1800V 2000V 2400V | 650A | 150 μ sec (Typical) | 150mA | 8" |

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

T7S0 650A (2400V)
Phase Control SCR
 650 Amperes Average, 1800-2400 Volts

Absolute Maximum Ratings

| Characteristics | Symbol | T7S0 650A (2400V) | Units |
|---|--------------|-------------------|--------------------|
| Non-repetitive Transient Peak Reverse Voltage | V_{RSM} | $V_{RRM} + 100V$ | Volts |
| RMS On-state Current, $T_C = 70^\circ C$ | $I_{T(rms)}$ | 1020 | Amperes |
| Average Current 180° Sine Wave, $T_C = 70^\circ C$ | $I_{T(av)}$ | 650 | Amperes |
| RMS On-state Current, $T_C = 55^\circ C$ | $I_{T(rms)}$ | 1270 | Amperes |
| Average Current 180° Sine Wave, $T_C = 55^\circ C$ | $I_{T(av)}$ | 810 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz | I_{tsm} | 9000 | Amperes |
| Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz | I_{tsm} | 8200 | Amperes |
| Critical Rate-of-rise of On-state Current (Non-repetitive) | di/dt | 600 | A/ μ sec |
| Critical Rate-of-rise of On-state Current (Repetitive) | di/dt | 150 | A/ μ sec |
| I^2t (for Fusing) for One Cycle, 60Hz | I^2t | 338,000 | 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 | | 4 | oz. |
| | | 113 | g |
| Mounting Force | | 2000 to 2400 | lb. |
| | | 900 to 1090 | kg. |

T7S0 650A (2400V)

Phase Control SCR

650 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} | $I_{TM} = 625\text{A Peak}$ Duty Cycle < 0.1% | | | 1.50 | Volts |
| Threshold Voltage, Low-level | $V_{(TO)1}$ | $T_j = 125^\circ\text{C}, I = 15\%, I_{T(av)}$ to $\pi I_{T(av)}$ | | | 0.99967 | Volts |
| Slope Resistance, Low-level | r_{T1} | | | | 0.70105 | m Ω |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | 1.5734 | Volts |
| Slope Resistance, High-level | r_{T2} | | | | 0.3897 | m Ω |
| V_{TM} Coefficients, Low-level | | $T_j = 125^\circ\text{C}, I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$ | | | | |
| | | | | | $A_1 = 0.76237$ | |
| | | | | | $B_1 = 0.02889$ | |
| | | | | | $C_1 = 4.486\text{E-}04$ | |
| | | | | | $D_1 = 0.00954$ | |
| V_{TM} Coefficients, High-level | | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | | |
| | | | | | $A_2 = -2.3231$ | |
| | | | | | $B_2 = 0.64507$ | |
| | | | | | $C_2 = 3.519\text{E-}04$ | |
| | | | | | $D_2 = -0.0179$ | |
| Typical Turn-on Time | t_{on} | $I_T = 100\text{A}, V_D = 100\text{V}$ | | 7 | | μsec |
| Typical Turn-off Time | t_q | $T_j = 125^\circ\text{C}, I_T = 250\text{A},$ $di_R/dt = 25\text{A}/\mu\text{sec}$ Reapplied $dv/dt = 20\text{V}/\mu\text{sec}$ Linear to 80% V_{DRM} | | 150 | | μsec |
| Minimum Critical dv/dt - Exponential to V_{DRM} | dv/dt | $T_j = 125^\circ\text{C}$ | 300 | | | V/ μsec |
| 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

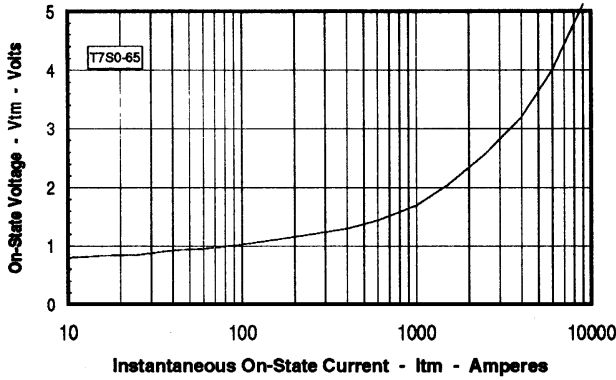
Maximum Thermal Resistance, Double Sided Cooling

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

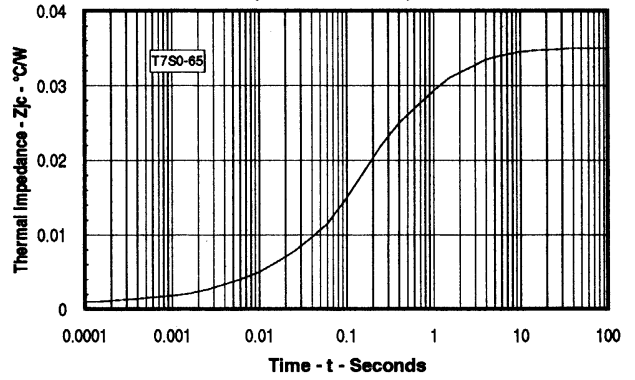
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T7S0 650A (2400V)
Phase Control SCR
 650 Amperes Average, 1800-2400 Volts

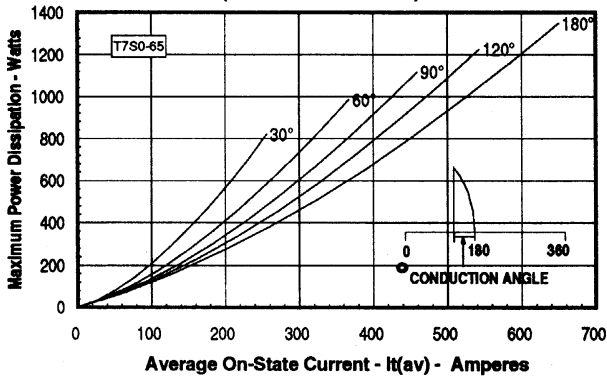
Maximum On-State Forward Voltage Drop
 ($T_j = 125^\circ\text{C}$)



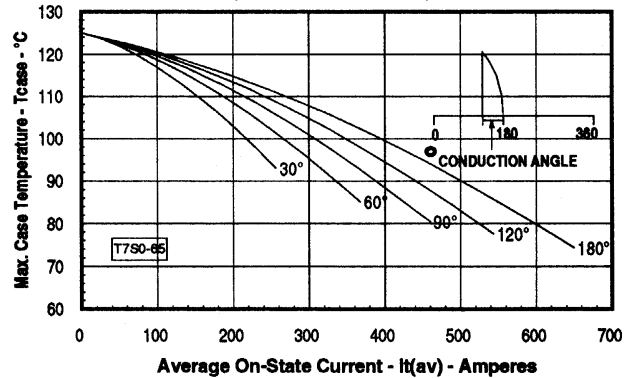
Maximum Transient Thermal Impedance
 (Junction to Case)



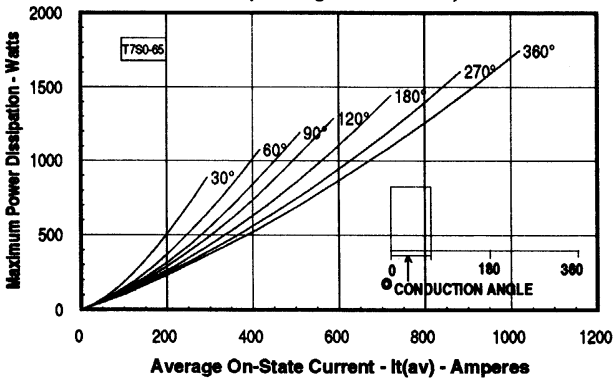
Maximum On-State Power Dissipation
 (Sinusoidal Waveform)



Maximum Allowable Case Temperature
 (Sinusoidal Waveform)



Maximum On-State Power Dissipation
 (Rectangular Waveform)



Maximum Allowable Case Temperature
 (Rectangular Waveform)

