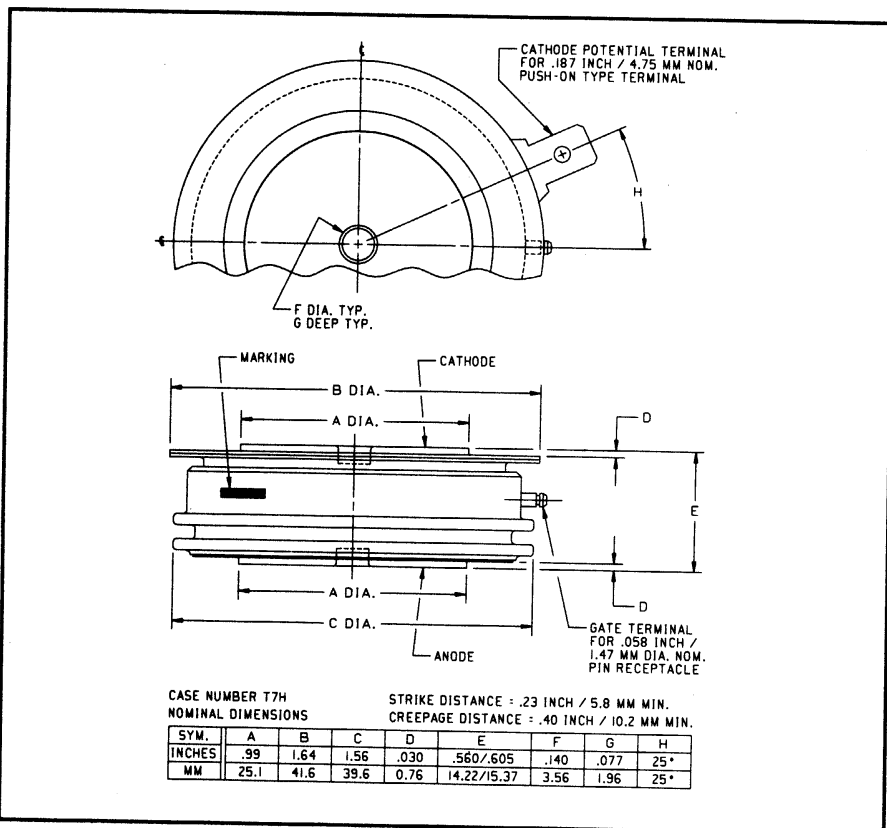
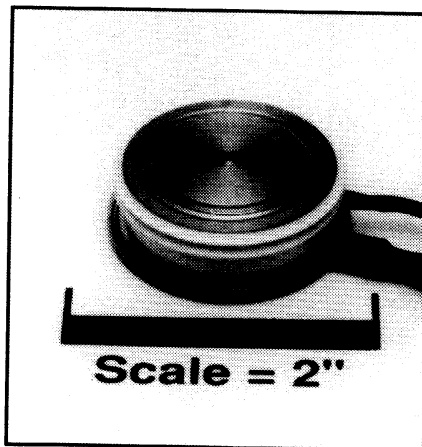


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR
650 Amperes Average
1600 Volts



T7S0 650A (1600V) (Outline Drawing)



T7S0 650A (1600V) Phase Control SCR
650 Amperes Average, 1600 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 | 02 through 16 | 65 | 0 | 4 | DN |
| | 200V through 1600V | 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



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T7S0 650A (1600V)
Phase Control SCR
 650 Amperes Average, 1600 Volts

Absolute Maximum Ratings

| Characteristics | Symbol | T7S0 650A (1600V) | Units |
|---|-------------|-------------------|--------------------|
| Non-repetitive Transient Peak Reverse Voltage | V_{RSM} | $V_{RRM} + 100V$ | Volts |
| RMS On-state Current, $T_C = 65^\circ C$ | $I_T(rms)$ | 1020 | Amperes |
| Average Current 180° Sine Wave, $T_C = 65^\circ C$ | $I_T(av)$ | 650 | Amperes |
| RMS On-state Current, $T_C = 55^\circ C$ | $I_T(rms)$ | 1125 | Amperes |
| Average Current 180° Sine Wave, $T_C = 55^\circ C$ | $I_T(av)$ | 715 | 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 24000 | lb. |
| | | 900 to 1090 | kg. |



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T7S0 650A (1600V)
 Phase Control SCR
 650 Amperes Average, 1600 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% | | | 1.5 | Volts |
| Threshold Voltage, Low-level | $V_{(TO)1}$ | $T_j = 125^\circ\text{C}, I = 15\%, I_{T(av)}$ to $\pi I_{T(av)}$ | | | 1.0336 | Volts |
| Slope Resistance, Low-level | r_{T1} | | | | 0.62862 | m Ω |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | 1.68191 | Volts |
| Slope Resistance, High-level | r_{T2} | | | | 0.36847 | m Ω |
| V_{TM} Coefficients, Low-level | | $T_j = 125^\circ\text{C}, I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$ | | | | |
| | | | | | $A_1 = 1.41917$ | |
| | | | | | $B_1 = -0.1663$ | |
| | | | | | $C_1 = 1.243\text{E-}04$ | |
| | | | | | $D_1 = 0.04196$ | |
| V_{TM} Coefficients, High-level | | $T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to I_{TSM} | | | | |
| | | | | | $A_2 = 13.50422$ | |
| | | | | | $B_2 = -1.82507$ | |
| | | | | | $C_2 = 1.8133\text{E-}04$ | |
| | | | | | $D_2 = 0.06793$ | |
| Typical Turn-on Time | t_{on} | $I_T = 100\text{A}, V_D = 100\text{V}$ | | 7 | | μsec |
| Typical Turn-off Time | t_q | $T_j = 125^\circ\text{C}, I_T = 250\text{A},$ $di_T/dt = 25\text{A}/\mu\text{sec}$ 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

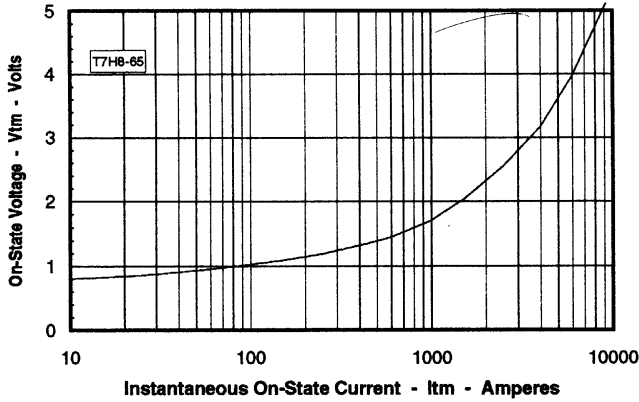
Maximum Thermal Resistance, Double Sided Cooling

| | | | | |
|------------------|-------------------|--|------|--------------------|
| Junction-to-Case | $R_{\theta(j-c)}$ | | 0.04 | $^\circ\text{C/W}$ |
| Case-to-Sink | $R_{\theta(c-s)}$ | | 0.02 | $^\circ\text{C/W}$ |

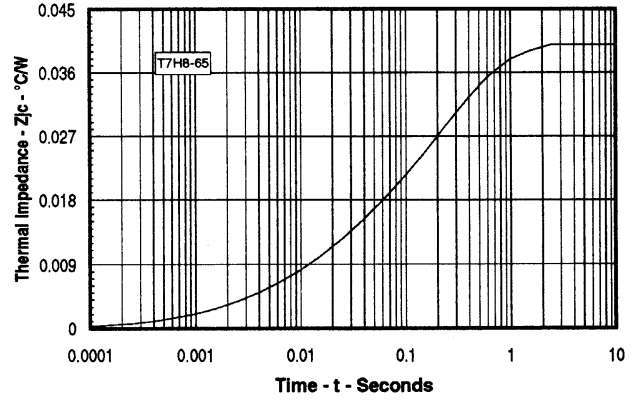
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T7S0 650A (1600V)
Phase Control SCR
 650 Amperes Average, 1600 Volts

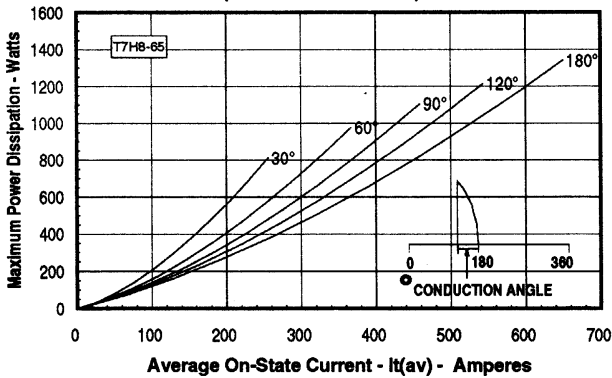
Maximum On-State Forward Voltage Drop
 ($T_J = 125^\circ\text{C}$)



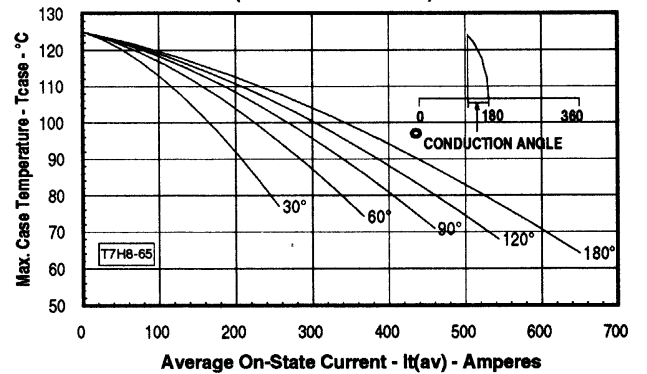
Maximum Transient Thermal Impedance
 (Junction to Case)



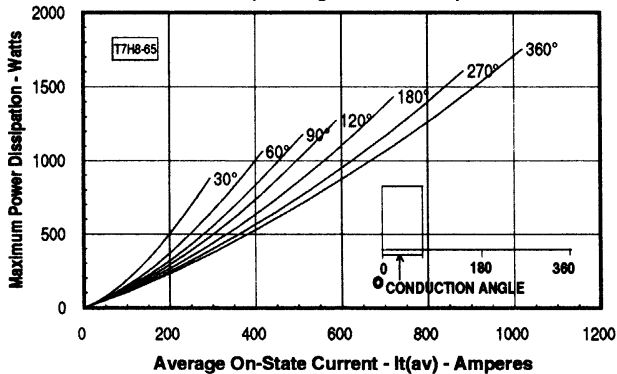
Maximum On-State Power Dissipation
 (Sinusoidal Waveform)



Maximum Allowable Case Temperature
 (Sinusoidal Waveform)



Maximum On-State Power Dissipation
 (Rectangular Waveform)



Maximum Allowable Case Temperature
 (Rectangular Waveform)

