

T7H8 650A (Outline Drawing)



**T7H8 650A Phase Control SCR
650 Amperes Average, 1800 Volts**

Ordering Information:

Select the complete 12 digit module part number from the table below.
Example: T7H8166504DN is a 1600V 650A Phase Control SCR.

| Type | Voltage V_{RRM} (Volts) | Current $I_{T(av)}$ (A) | Turn-off Time t_q (μ sec) | Gate Current I_{GT} (mA) | Lead Code |
|------|---|-------------------------------|--|----------------------------------|--------------|
| T7H8 | 02 through 18 200V through 1800V | 65 650A | 0 150 μ sec typical | 4 150 mA | DN 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



**T7H8
650A**

Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
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**Phase Control SCR
650 Amperes Average
1800 Volts**

Absolute Maximum Ratings

| Characteristics | Symbol | Units |
|--|----------------------------|----------------------------|
| Non-Repetitive Transient Peak Reverse Blocking 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) 60 Hz | I_{TSM} | 9000 Amperes |
| Peak One Cycle Surge On-State Current (Non-Repetitive) 50 Hz | 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, 60 Hz | 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 |
| Storage Temperature | T_{stg} | -40 to +150 °C |
| Approximate Weight | | 4 oz. |
| | | 113 g |
| Mounting Force | | 2000 to 2400 lb. |
| | | 900 to 1090 kg. |

Information presented is based upon manufacturers testing and projected capabilities.
This information is subject to change without notice.
The manufacturer makes no claim as to the suitability of use, reliability, capability,
or future availability of this product.

Electrical Characteristics, $T_J=25^\circ\text{C}$ unless otherwise specified

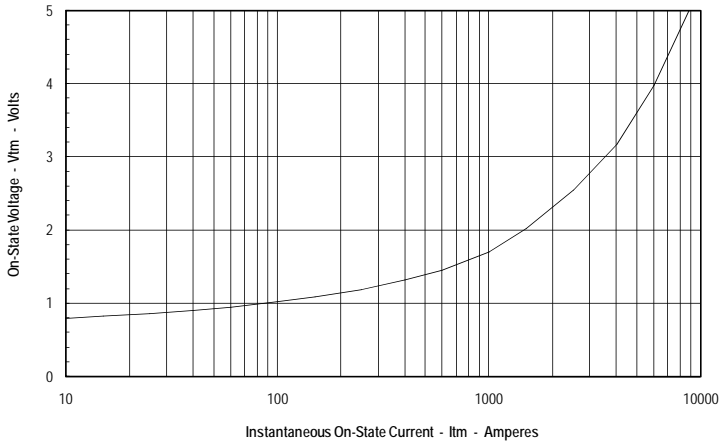
| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|-------------|---|------|------|------------|------------------------|
| Repetitive Peak Reverse Leakage Current | I_{RRM} | $T_J=125^\circ\text{C}$, $V_R = V_{RRM}$ | | | 30 | mA |
| Repetitive Peak Forward Leakage Current | I_{DRM} | $T_J=125^\circ\text{C}$, $V_D = V_{DRM}$ | | | 30 | mA |
| Peak On-State Voltage | V_{TM} | $I_{FM}=625\text{A peak}$, Duty Cycle < 0.1 % | | | 1.50 | V |
| 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 | V |
| Slope Resistance, Low-level | r_{T1} | | | | 0.62862 | $\text{m}\Omega$ |
| Threshold Voltage, High-level | $V_{(TO)2}$ | $T_J = 125^\circ\text{C}$, $I = \pi I_{T(AV)}$ to I_{TSM} | | | 1.68191 | V |
| Slope Resistance, High-level | r_{T2} | | | | 0.36847 | $\text{m}\Omega$ |
| V_{TM} Coefficients, Low-level | | $T_J = 125^\circ\text{C}$, $I = 15\%I_{T(AV)}$ to $\pi I_{T(AV)}$ | | A = | 1.41917 | |
| | | | | B = | -0.1663 | |
| | | $V_{TM} = A + B \ln(I) + C(I) + D \text{ Sqrt}(I)$ | | C = | 1.243 E-04 | |
| | | | | D = | 0.04196 | |
| Typical Turn-On Time | t_{on} | $I_T = 100\text{A}$, $V_D = 100\text{V}$ | | 7 | | μs |
| Typical Turn-Off Time | t_q | $T_J = 125^\circ\text{C}$, $I_T = 250\text{A}$, $di_R/dt = 25\text{A}/\mu\text{s}$ Reapplied $dv/dt = 20\text{V}/\mu\text{s}$ Linear to 80% V_{DRM} | | 150 | | μs |
| Minimum Critical dv/dt – Exponential to V_{DRM} | dv/dt | $T_J = 125^\circ\text{C}$ | 300 | | | $\text{V}/\mu\text{s}$ |
| 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 | V |
| Non-Triggering Gate Voltage | V_{GDM} | $T_J = 125^\circ\text{C}$, $V_D = V_{DRM}$ | | | 0.15 | V |
| Peak Forward Gate Current | I_{GTM} | | | | 4 | A |
| Peak Reverse Gate Voltage | V_{GRM} | | | | 5 | V |

Thermal Characteristics

| Maximum Thermal Resistance, Double Sided Cooling | | Max. | Units |
|--|-------------------|------|---------------------------|
| Junction-to-Case | $R_{\Theta(J-C)}$ | 0.04 | $^\circ\text{C}/\text{W}$ |
| Case-to-Sink | $R_{\Theta(C-S)}$ | 0.02 | $^\circ\text{C}/\text{W}$ |

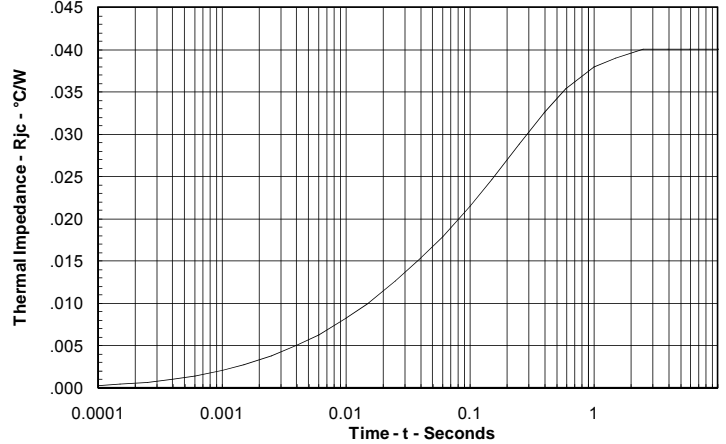
Maximum On-State Forward Voltage Drop

(T_j = 125 C)



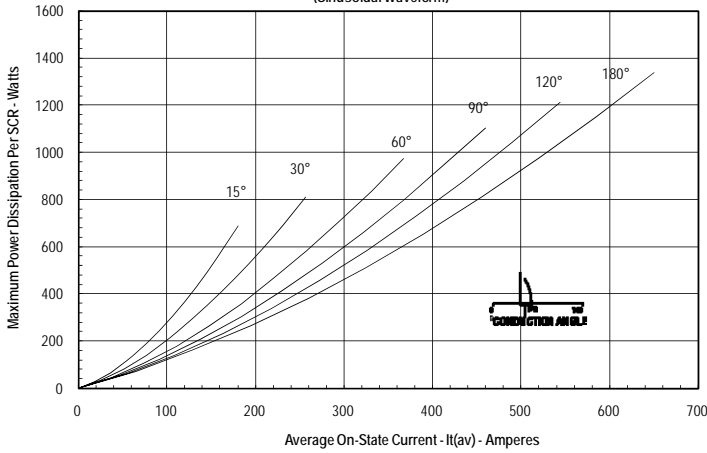
Maximum Transient Thermal Impedance

(Junction to Case)



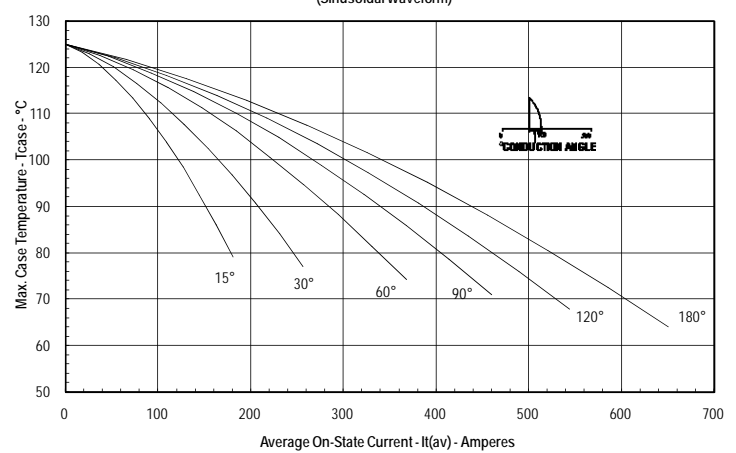
Maximum On-State Power Dissipation

(Sinusoidal Waveform)



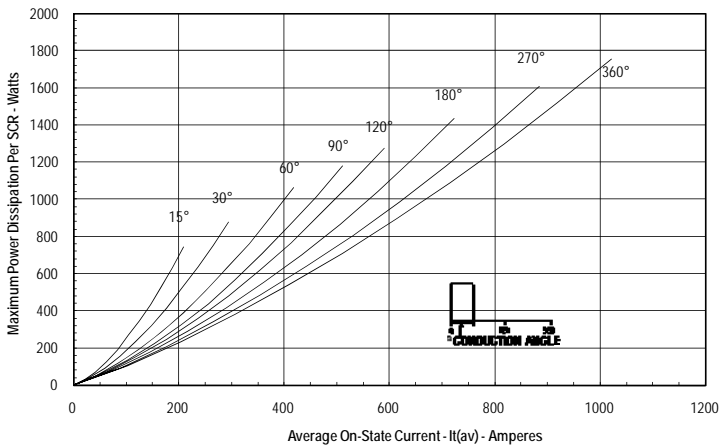
Maximum Allowable Case Temperature

(Sinusoidal Waveform)



Maximum On-State Power Dissipation

(Rectangular Waveform)



Maximum Allowable Case Temperature

(Rectangular Waveform)

