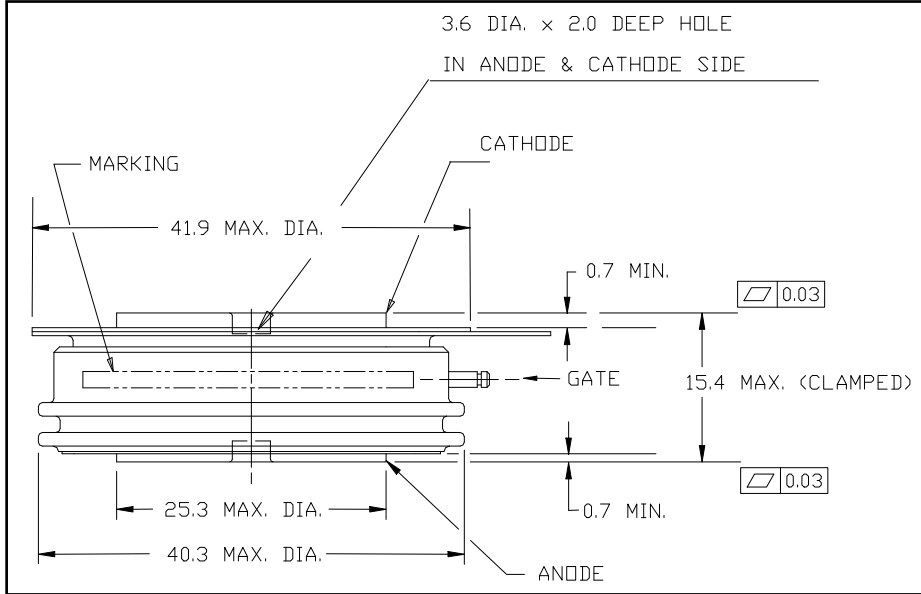


**Phase Control SCR  
650 Amperes Average  
1800 Volts**



**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 $t_q$ ( $\mu$ sec)	Gate Current $I_{GT}$ (mA)	Lead Code
T7H8	02 through 18  200V through 1800V	65  650A	0  150 $\mu$ 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  
www.pwrx.com

**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/ $\mu$ sec
Critical Rate-of-rise of On-State Current (Repetitive)	di/dt	150 A/ $\mu$ sec
$I^2t$ (for Fusing) for One Cycle, 60 Hz	$I^2t$	338,000 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
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**

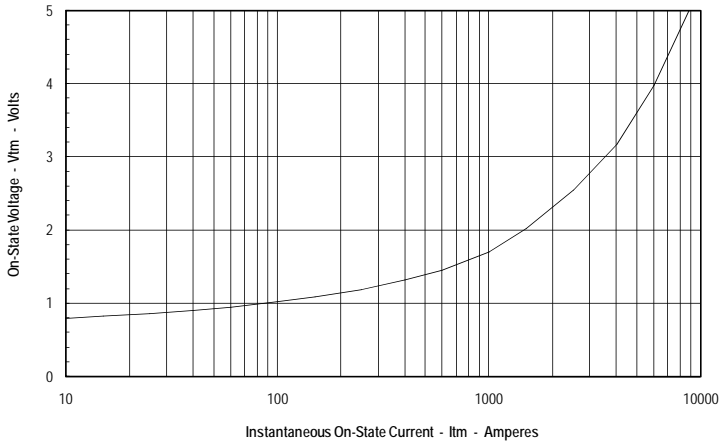
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Leakage Current	$I_{RRM}$	$T_J=125^\circ\text{C}$ , $V_R = V_{RRM}$			30	mA
Repetitive Peak Forward Leakage Current	$I_{DRM}$	$T_J=125^\circ\text{C}$ , $V_D = V_{DRM}$			30	mA
Peak On-State Voltage	$V_{TM}$	$I_{FM}=625\text{A peak}$ , 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		$\mu\text{s}$
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		$\mu\text{s}$
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	$^\circ\text{C}/\text{W}$

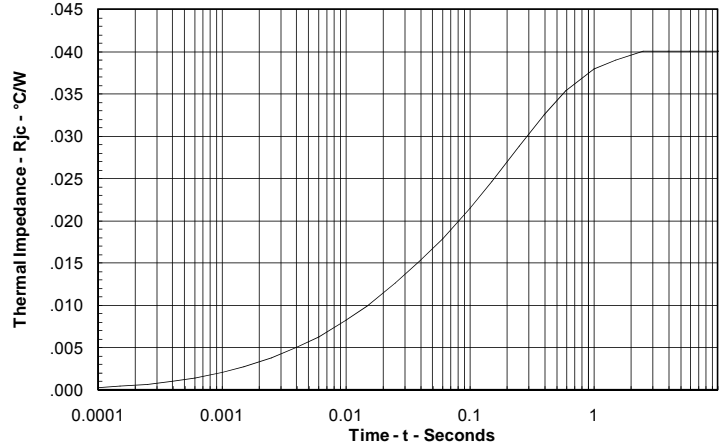
**Maximum On-State Forward Voltage Drop**

(T<sub>j</sub> = 125 C)



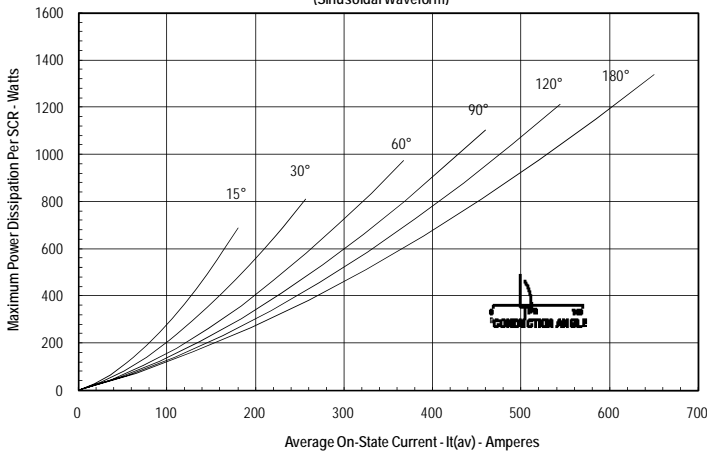
**Maximum Transient Thermal Impedance**

(Junction to Case)



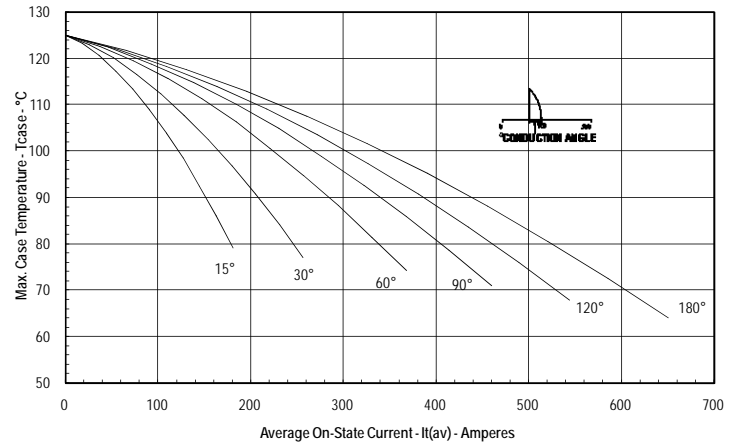
**Maximum On-State Power Dissipation**

(Sinusoidal Waveform)



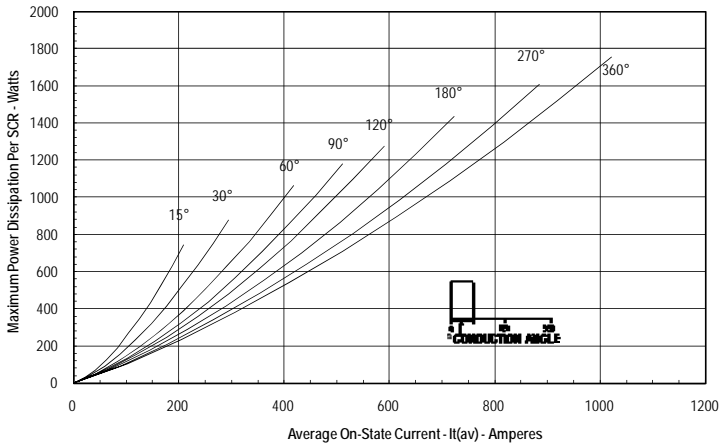
**Maximum Allowable Case Temperature**

(Sinusoidal Waveform)



**Maximum On-State Power Dissipation**

(Rectangular Waveform)



**Maximum Allowable Case Temperature**

(Rectangular Waveform)

