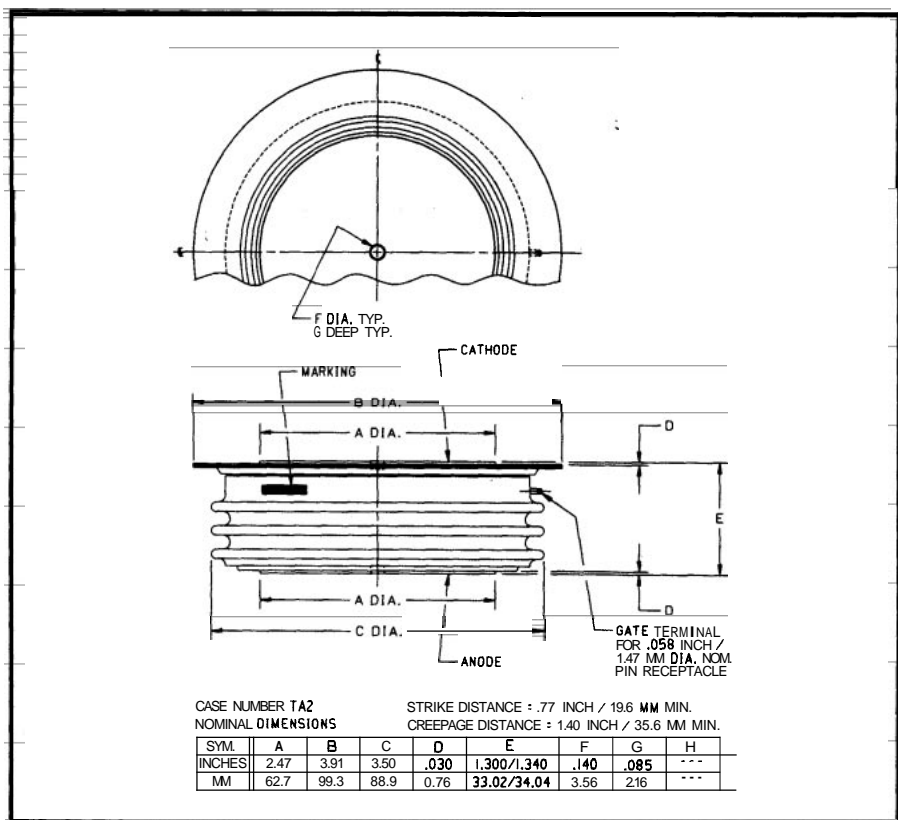


### Phase Control SCR 1600 Amperes Average 2200 Volts



TA20 1600A (Outline Drawing)



TA20 1600A Phase Control SCR  
1600 Amperes Average, 2200 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
	$V_{ORM}/V_{RRM}$ (Volts)	$I_{T(av)}$ (A)	$t_q$ ( $\mu$ sec)	$I_{GT}$ (mA)	
TA20	02 through 22  200V through 2200V	16  1600A	0  250 $\mu$ sec (Typical)	3  200mA	DH  12"



POWEREX, Inc. 173 Pavilion Ln Youngwood, PA USA 724-925-7272 www.pwr.com

**TA20 1600A**  
**Phase Control SCR**  
1600 Amperes Average, 2200 Volts

### Absolute Maximum Ratings

Characteristics	Symbol	TA20 1600A	Units
Non-repetitive Transient Peak Reverse Voltage	$V_{RSM}$	$V_{RRM} + 100V$	Volts
RMS On-state Current, $T_C = 80^\circ C$	$I_{T(rms)}$	2500	Amperes
Average Current 180° Sine Wave, $T_C = 80^\circ C$	$I_{T(av)}$	1600	Amperes
RMS On-state Current, $T_C = 55^\circ C$	$I_{T(rms)}$	3390	Amperes
Average Current 180° Sine Wave, $T_C = 55^\circ C$	$I_{T(av)}$	2160	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 60Hz	$I_{tsm}$	29500	Amperes
Peak One Cycle Surge On-state Current (Non-repetitive) 50Hz	$I_{tsm}$	26900	Amperes
Critical Rate-of-rise of On-state Current (Non-repetitive)	$di/dt$	400	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	$I^2t$	$3.63 \times 10^6$	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		2.1	lb.
		950	g
Mounting Force		9000 to 11000	lb.
		4100 to 5000	kg.



POWEREX, Inc. 173 Pavilion Ln Youngwood, PA USA 724-925-7272 www.pwr.com

**TA20 1600A**  
**Phase Control SCR**  
 1600 Amperes Average, 2200 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	$I_{RRM}$	$T_j = 125^\circ\text{C}, V_R = V_{RRM}$			100	mA
Repetitive Peak Forward Leakage Current	$I_{DRM}$	$T_j = 125^\circ\text{C}, V_D = V_{DRM}$			100	mA
Peak On-state Voltage	$V_{TM}$	$I_{TM} = 3000\text{A Peak}$ Duty Cycle < 0.1%			1.75	Volts
Threshold Voltage, Low-level	$V_{(TO)1}$	$T_j = 125^\circ\text{C}, I = 15\%, I_{T(av)}$ to $\pi I_{T(av)}$			0.89109	Volts
Slope Resistance, Low-level	$r_{T1}$				0.2148	$\text{m}\Omega$
Threshold Voltage, High-level	$V_{(TO)2}$	$T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to $I_{TSM}$			1.7405	Volts
Slope Resistance, High-level	$r_{T2}$				0.1024	$\text{m}\Omega$
$V_{TM}$ Coefficients, Low-level		$T_j = 125^\circ\text{C}, I = 15\% I_{T(av)}$ to $\pi I_{T(av)}$				$A_1 = 1.1219$ $B_1 = -0.10195$ $C_1 = 4.764\text{E-}05$ $D_1 = 0.02077$
$V_{TM}$ Coefficients, High-level		$T_j = 125^\circ\text{C}, I = \pi I_{T(av)}$ to $I_{TSM}$				$A_2 = -3.7832$ $B_2 = 0.56271$ $C_2 = 3.607\text{E-}05$ $D_2 = 0.010389$
Typical Turn-on Time	$t_{on}$	$I_{TM} = 1000\text{A}, V_D = 1500\text{V}$		4		$\mu\text{sec}$
Typical Turn-off Time	$t_q$	$T_j = 125^\circ\text{C}, I_T = 250\text{A},$ $di_R/dt = 50\text{A}/\mu\text{sec}$ Reapplied $dv/dt = 20\text{V}/\mu\text{sec}$ Linear to 80% $V_{DRM}$		250		$\mu\text{sec}$
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	$I_{GT}$	$T_j = 25^\circ\text{C}, V_D = 12\text{V}$			200	mA
Gate Trigger Voltage	$V_{GT}$	$T_j = 25^\circ\text{C}, V_D = 12\text{V}$			4.5	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

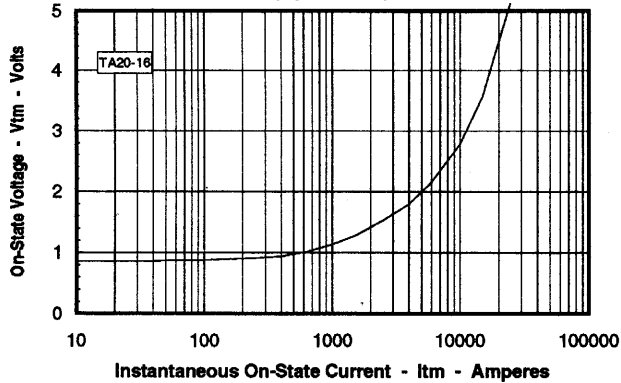
**Thermal Characteristics**

Maximum Thermal Resistance, Double Sided Cooling

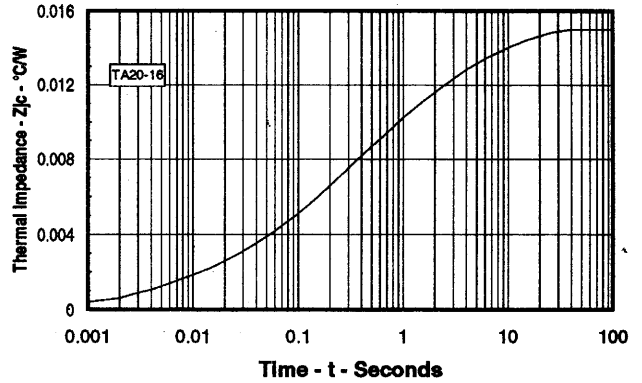
Junction-to-Case	$R_{\theta(j-c)}$		0.015	$^\circ\text{C}/\text{W}$
Case-to-Sink	$R_{\theta(c-s)}$		0.007	$^\circ\text{C}/\text{W}$

**TA20 1600A**  
**Phase Control SCR**  
 1600 Amperes Average, 2200 Volts

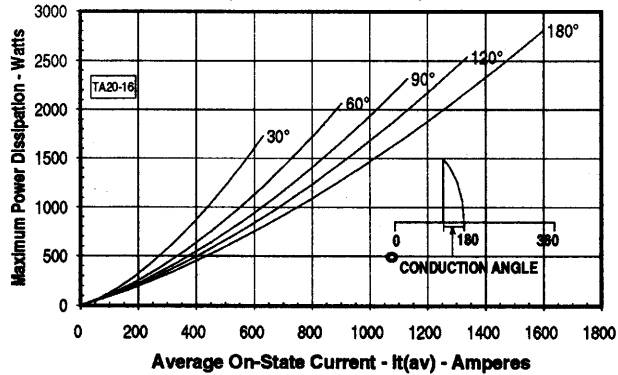
**Maximum On-State Forward Voltage Drop**  
 ( $T_J = 125^\circ\text{C}$ )



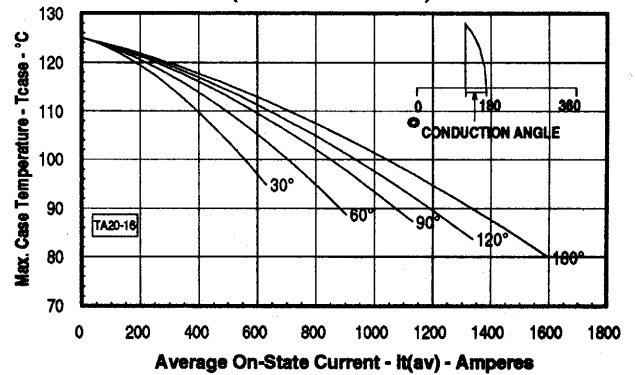
**Maximum Transient Thermal Impedance**  
 (Junction to Case)



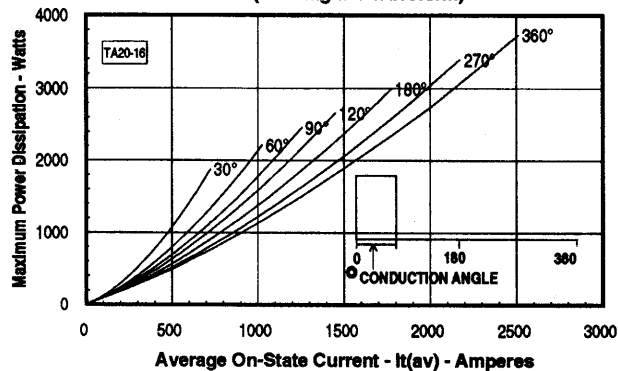
**Maximum On-State Power Dissipation**  
 (Sinusoidal Waveform)



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



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



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

