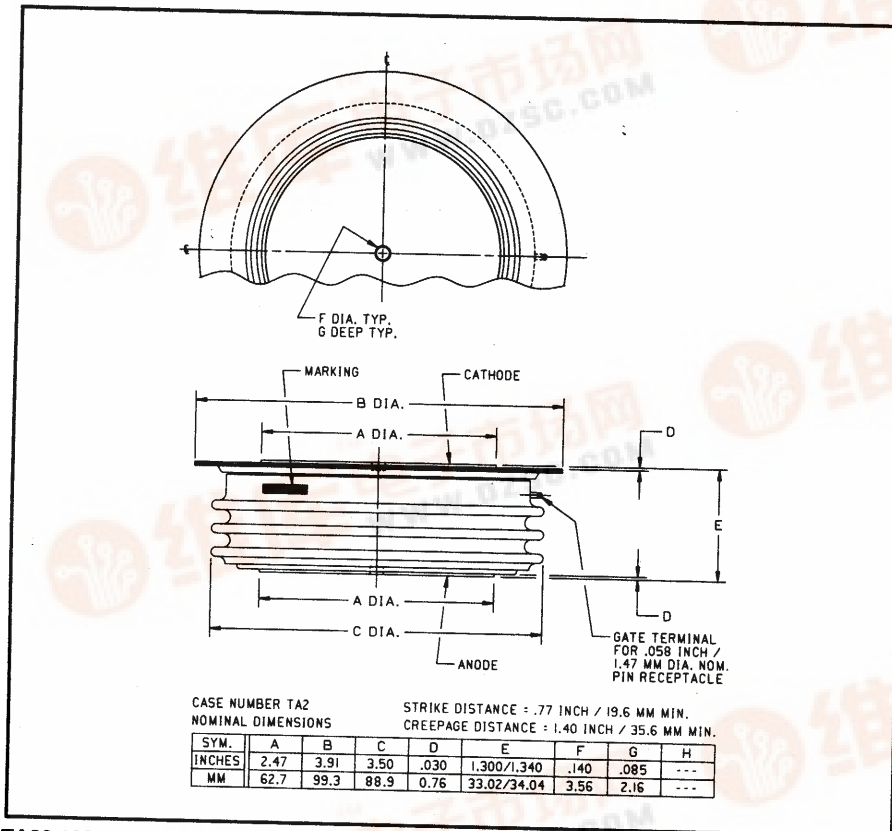
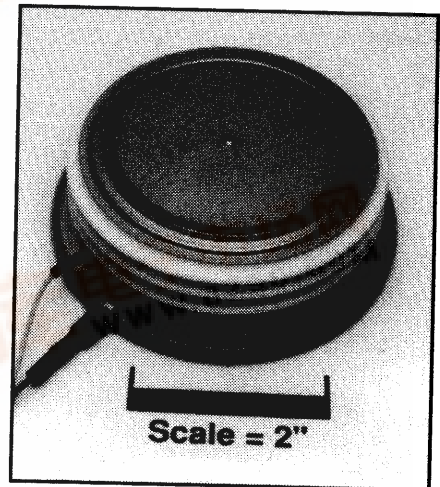


Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272
Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Phase Control SCR
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

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)	
TA20	02 through 22 200V through 2200V	16 1600A	0 250 μ sec (Typical)	3 200mA	DH 12"





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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/ 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	3.63×10^6	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		2.1	lb.
		950	g
Mounting Force		9000 to 11000	lb.
		4100 to 5000	kg.



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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	$m\Omega$
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	$m\Omega$
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		μsec
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		μsec
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}	$T_j = 25^\circ\text{C}$, $V_D = 12\text{V}$			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	$R_{\theta(j-c)}$	0.015	$^\circ\text{C}/\text{W}$
Case-to-Sink	$R_{\theta(c-s)}$	0.007	$^\circ\text{C}/\text{W}$

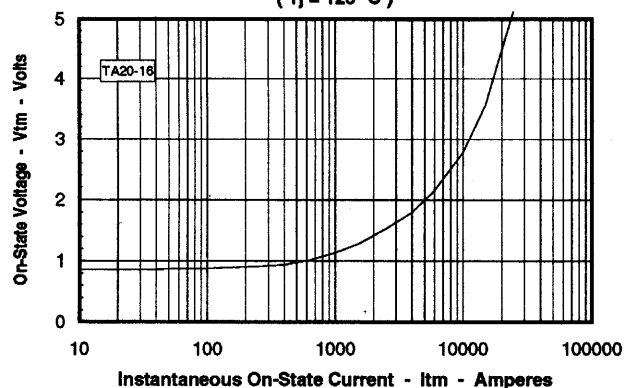


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TA20 1600A
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1600 Amperes Average, 2200 Volts

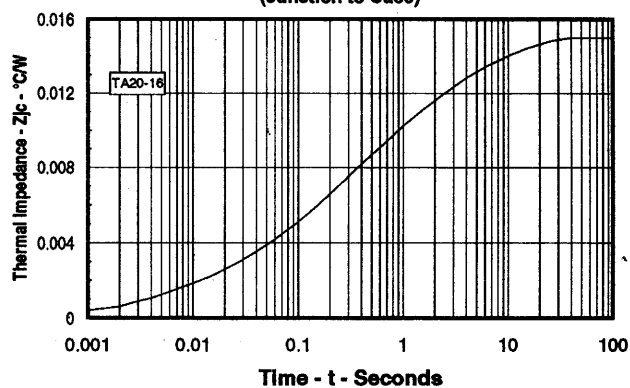
Maximum On-State Forward Voltage Drop

($T_J = 125^\circ\text{C}$)



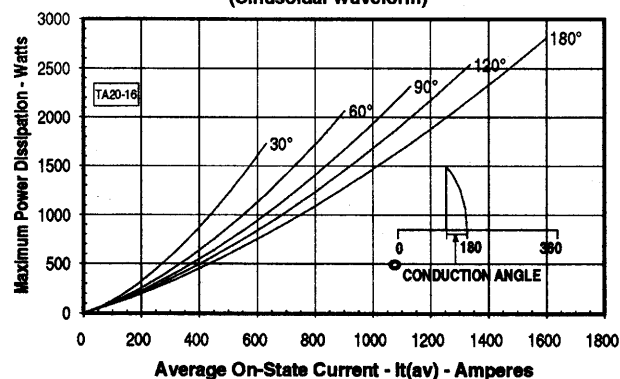
Maximum Transient Thermal Impedance

(Junction to Case)



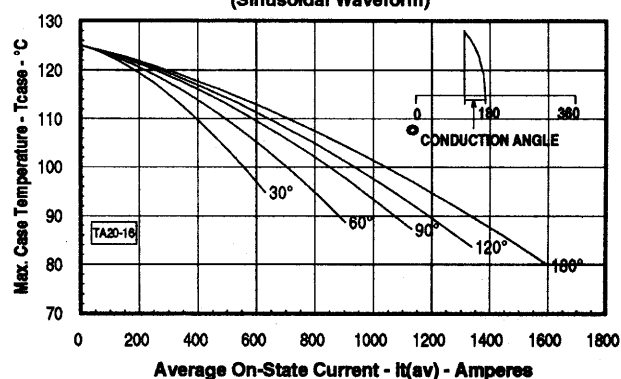
Maximum On-State Power Dissipation

(Sinusoidal Waveform)



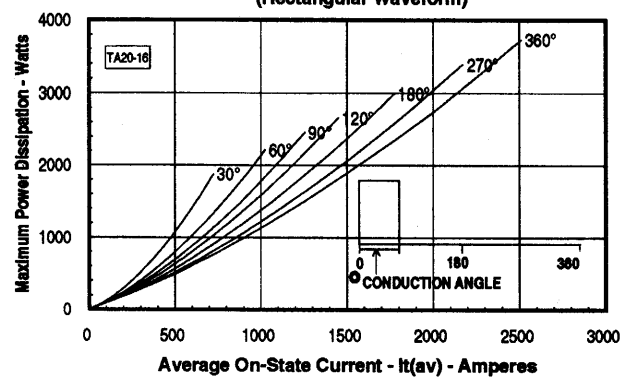
Maximum Allowable Case Temperature

(Sinusoidal Waveform)



Maximum On-State Power Dissipation

(Rectangular Waveform)



Maximum Allowable Case Temperature

(Rectangular Waveform)

