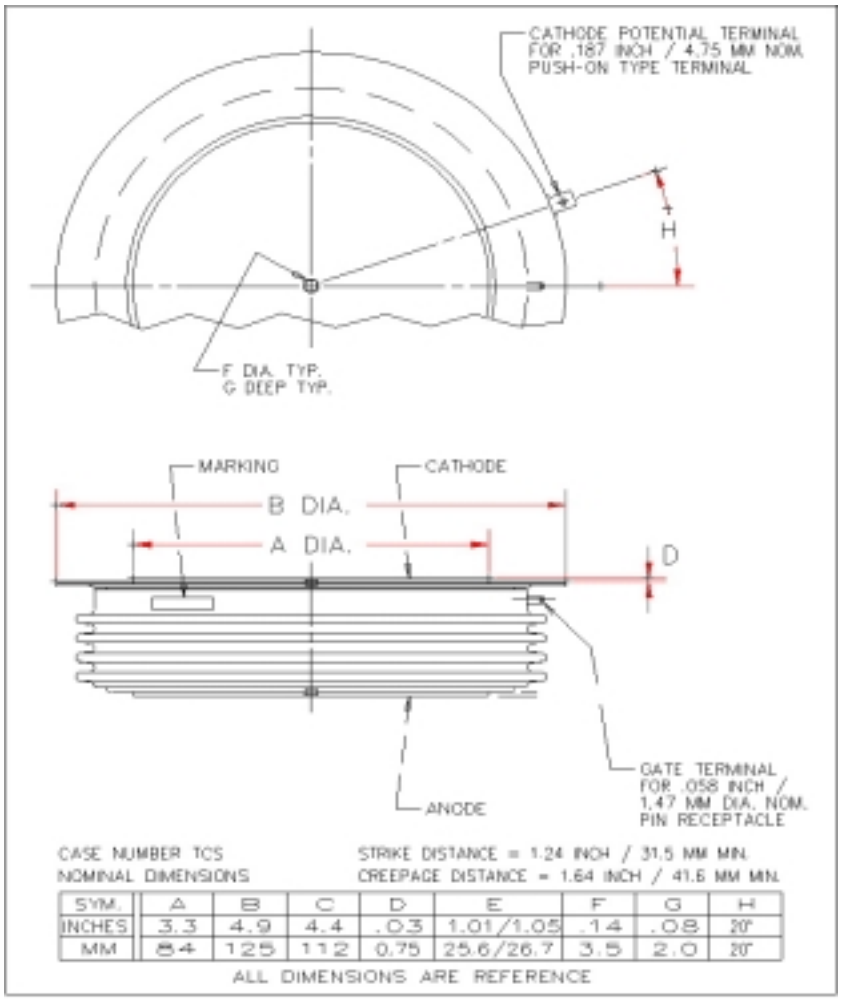
PRELIMINARY

TCAQ__34

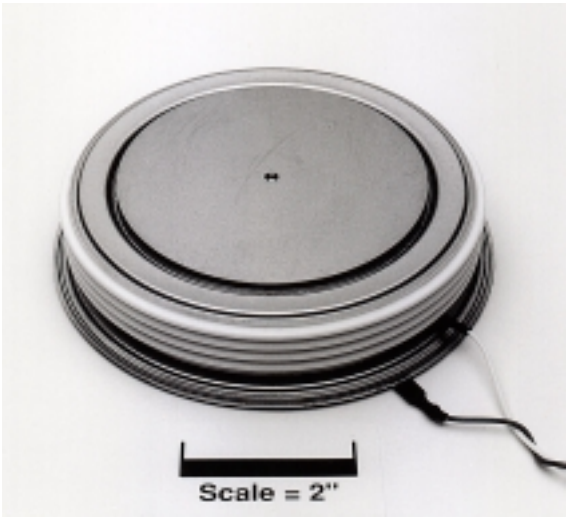
Phase Control Thyristor

3400 Amperes 2800 Volts

Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724)925-7272



SYM.	A	B	C	D	E	F	G	H
INCHES	3.3	4.9	4.4	.03	1.01/1.05	.14	.08	20°
MM	84	125	112	0.75	25.6/26.7	3.5	2.0	20°



The TCAQ is a high voltage, high current disc pack SCR employing a high di/dt gate structure. This gate design allows the SCR to be reliably operated at high di/dt and dv/dt conditions in various phase control applications.

FEATURES:

- Low On-State Voltage
- High di/dt Capability
- High dv/dt Capability
- Hermetic Ceramic Package
- Excellent Surge and I^2t Ratings

APPLICATIONS:

- DC Power Supplies
- Motor Controls
- SS Contactors

ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.
EXAMPLE: TCAQ28340HDH is a 2800V-3400A SCR with 250ma IGT and 12 inch gate and cathode potential leads.

PART	Voltage Rating	Voltage Code	Current Rating	Current Code	Turn-Off	Gate	Leads
	V_{DRM}-V_{RRM}		I_{tavg}		Tq	I_{GT}	
TCAQ	2200	**22**	3400	**34**	**0**	**H**	**DH**
	2500	**25**					
	2800	**28**			500us	250ma	12"
					(typ.)	(max)	

Revised: 9/26/2002

Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	V_{DRM}-V_{RRM}	2800	Volts
Average On-State Current, T_C=70°C	$I_{T(Avg.)}$	3400	A
RMS On-State Current, T_C=70°C	$I_{T(RMS)}$	5341	A
Average On-State Current, T_C=54°C	$I_{T(Avg.)}$	4100	A
RMS On-State Current, T_C=54°C	$I_{T(RMS)}$	6440	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	60,000	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	56,568	A
Fuse Coordination I^2t, 60Hz	I^2t	1.50E+07	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	1.60E+07	A^2s
Critical Rate-of-Rise of On-State Current Repetitive	di/dt	300	A/us
Critical Rate-of-Rise of On-State Current Non-Repetitive	di/dt	600	A/us
Peak Gate Power, 100us	P_{GM}	16	Watts
Average Gate Power	$P_{G(avg)}$	5	Watts
Operating Temperature	Tj	-40 to+125	°C
Storage Temperature	$T_{Stg.}$	-50 to+150	°C
Approximate Weight		4.6	lb
		2.09	Kg
Mounting Force		9,000 - 12,000	lbs
		40 - 53	Knewtons

Electrical Characteristics, Tj=25°C unless otherwise specified

Characteristic	Symbol	Test Conditions	Rating min	Rating typ	Rating max	Units
Repetitive Peak Forward Leakage Current	I_{DRM}	Tj=125°C, V_{DRM}=Rated			250	ma
Repetitive Peak Reverse Leakage Current	I_{RRM}	Tj=125°C, V_{RRM}=Rated			250	ma
Peak On-State Voltage	V_{TM}	Tj=125°C, I_{TM}=3000A			1.34	V
V_{TM} Model, Low Level	V_0	Tj=125°C			0.915	V
VTM = V_O + r•I_{TM}	r	15% I_{TM} - π•I_{TM}			1.40E-04	Ω
V_{TM} Model, High Level	V_0	Tj=125°C			1.038	V
VTM = V_O + r•I_{TM}	r	π•I_{TM} - I_{TSM}			1.05E-04	Ω
V_{TM} Model, 4-Term	A	Tj=125°C			0.150	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			0.140	
C•(I_{TM}) + D•(I_{TM})^{½}	C				0.000115	
	D				-0.005	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		2.5		us
Turn-Off Time	tq	Tj=125°C dv/dt = 20V/us to 80% V_{DRM}			400	us
$dv/dt_{(Crit)}$	dv/dt	Tj=125°C Exp. Waveform V_D =80% Rated	1000			V/us
Gate Trigger Current	I_{GT}	Tj=25°C V_D = 12V	30	100	250	ma
Gate Trigger Voltage	V_{GT}		0.8	2.0	4.5	V
Peak Reverse Gate Voltage	V_{GRM}				5	V

Thermal Characteristics

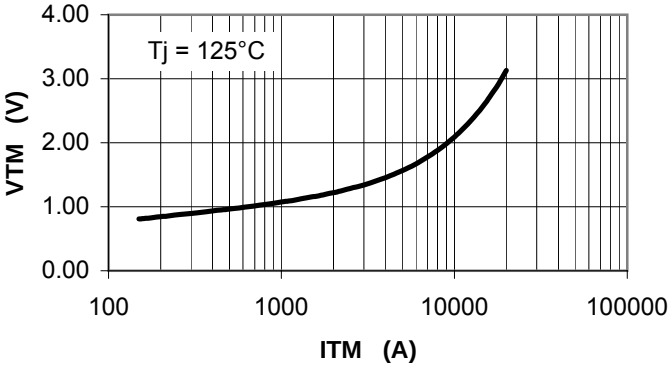
Characteristic	Symbol	Test Conditions	Rating min	Rating typ	Rating max	Units
Thermal Resistance						
Junction to Case	$R\Theta_{jc}$	Double side cooled		0.007	0.008	°C/Watt
Case to Sink	$R\Theta_{cs}$	Double side cooled		0.0015	0.002	°C/Watt
Thermal Impedance Model	$Z\Theta_{jc}$	Double side cooled				

$$Z\Theta_{jc}(t) = \Sigma(A(N)\bullet(1-\exp(-t/Tau(N))))$$

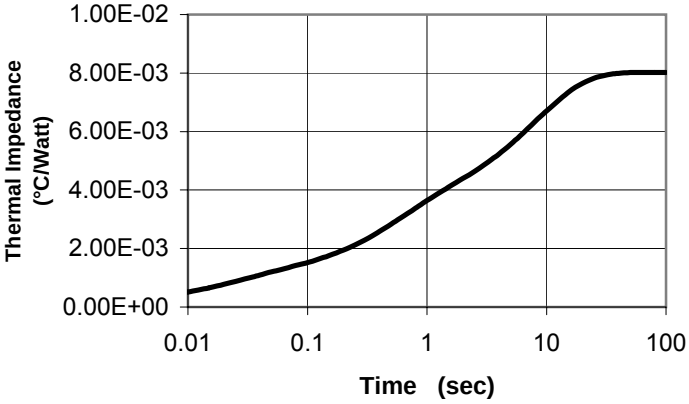
where:

N =	1	2	3	4
A(N) =	1.43E-04	9.08E-04	2.37E-03	4.60E-03
Tau(N) =	2.62E-03	2.31E-02	5.00E-01	8.00E+00

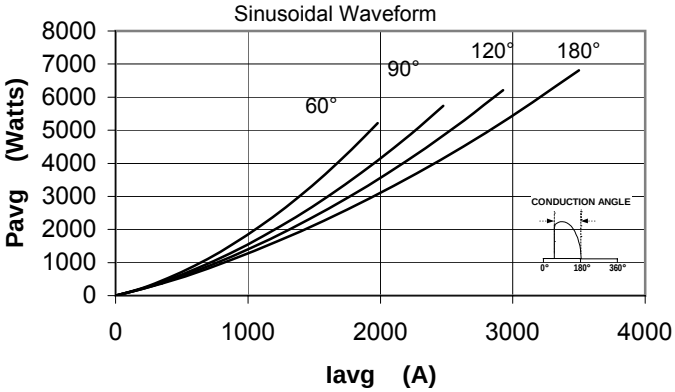
Maximum On-State Voltage Drop



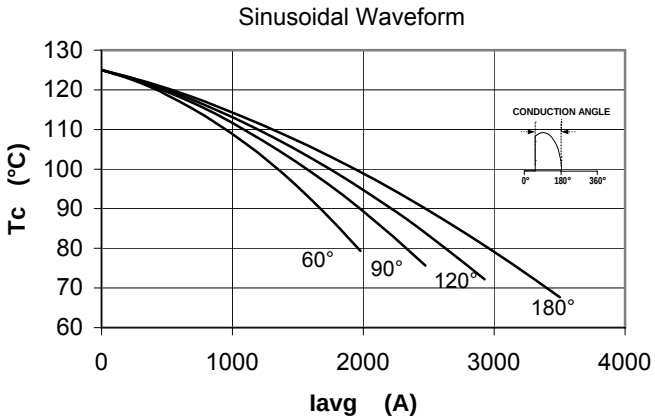
MAXIMUM TRANSIENT THERMAL IMPEDANCE



Maximum On-State Power Dissipation



Maximum Allowable Case Temperature



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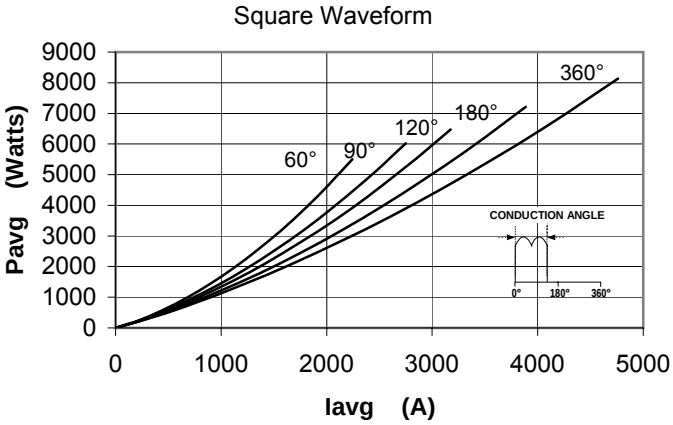

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