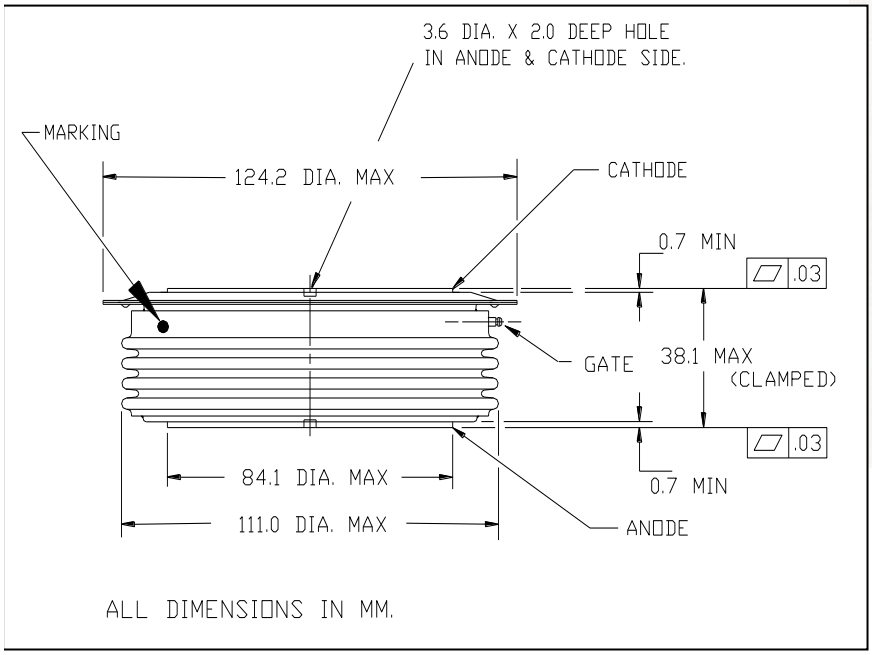
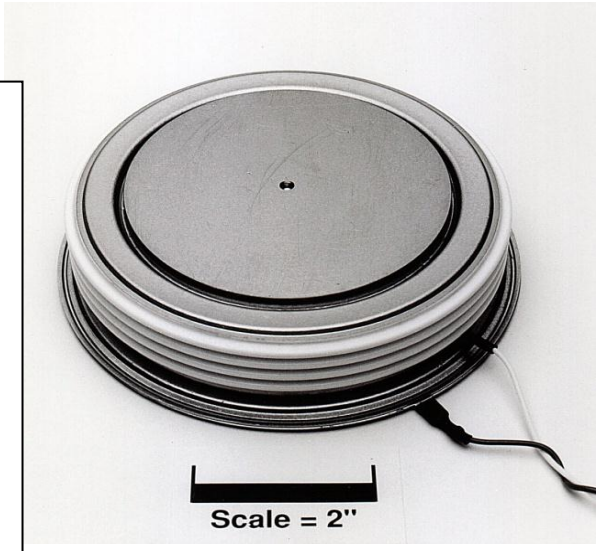
TC20__2402

Phase Control Thyristor

2450Amperes 4400Volts

Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 www.pwrx.com





The TC20 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

ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.
EXAMPLE: TC20442402DH is a 4400V-2450A SCR with300ma 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}	
TC20	4400	**44**	2450	**24**	**0**	**2**	
	4200	**42**					
	4000	**40**			500us	300ma	12"
	3600	**36**			(typ.)	(max)	

Revised: 8/14/2012

Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	V_{DRM}-V_{RRM}	4400	Volts
Average On-State Current, T_C=73°C	$I_{T(Avg.)}$	2450	A
RMS On-State Current, T_C=73°C	$I_{T(RMS)}$	3848	A
Average On-State Current, T_C=55°C	$I_{T(Avg.)}$	2920	A
RMS On-State Current, T_C=55°C	$I_{T(RMS)}$	4587	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	30,000	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	28,284	A
Fuse Coordination I^2t, 60Hz	I^2t	3.75E+06	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	4.00E+06	A^2s
Critical Rate-of-Rise of On-State Current Repetitive	di/dt	100	A/us
Critical Rate-of-Rise of On-State Current Non-Repetitive	di/dt	300	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		5.5	lb
		2.49	Kg
Mounting Force		12,000-15,000	lbs
		53 - 67	KNewtons

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 suitability for use, reliability, capability or future availability of this product.

Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 www.pwrx.com

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			300	ma
Repetitive Peak Reverse Leakage Current	I_{RRM}	Tj=125°C, V_{RRM}=Rated			300	ma
Peak On-State Voltage	V_{TM}	Tj=125°C, I_{TM}=3000A			1.80	V
V_{TM} Model, Low Level	V_0	Tj=125°C			0.990	V
VTM = V_O + r•I_{TM}	r	15% I_{TM} - π•I_{TM}			2.71E-04	Ω
V_{TM} Model, High Level	V_0	Tj=125°C			0.698	V
VTM = V_O + r•I_{TM}	r	π•I_{TM} - I_{TSM}			3.04E-04	Ω
V_{TM} Model, 4-Term	A	Tj=125°C			0.191	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			0.181	
C•(I_{TM}) + D•(I_{TM})^{½}	C				3.56E-04	
	D				-1.66E-02	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		1.5		us
Turn-Off Time	tq	Tj=125°C dv/dt = 20V/us to 67% V_{DRM}			500	us
$dv/dt_{(Crit)}$	dv/dt	Tj=125°C Exp. Waveform V_D =67% Rated	1000			V/us
Gate Trigger Current	I_{GT}	Tj=25°C V_D = 12V	30	150	300	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			0.009	°C/Watt
Case to Sink	$R\Theta_{cs}$	Double side cooled			0.0025	°C/Watt
Thermal Impedance Model	$Z\Theta_{jc}$	Double side cooled				

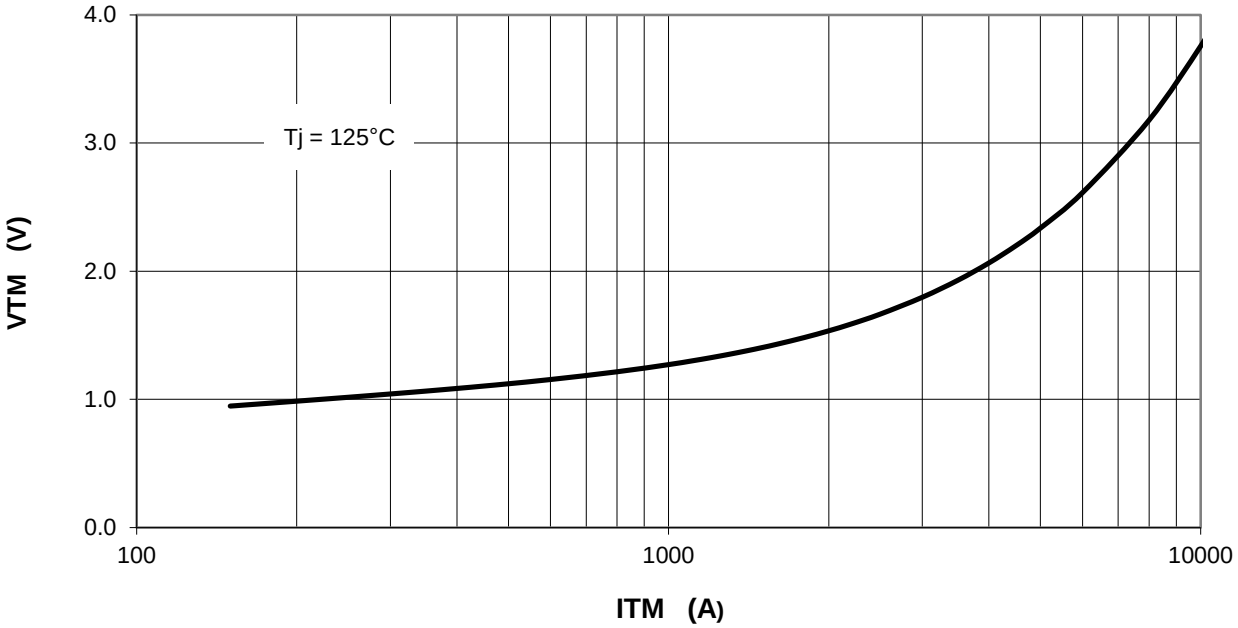
$$Z\Theta_{jc}(t) = \Sigma(A(N)\bullet(1-\exp(-t/Tau(N))))$$

where:

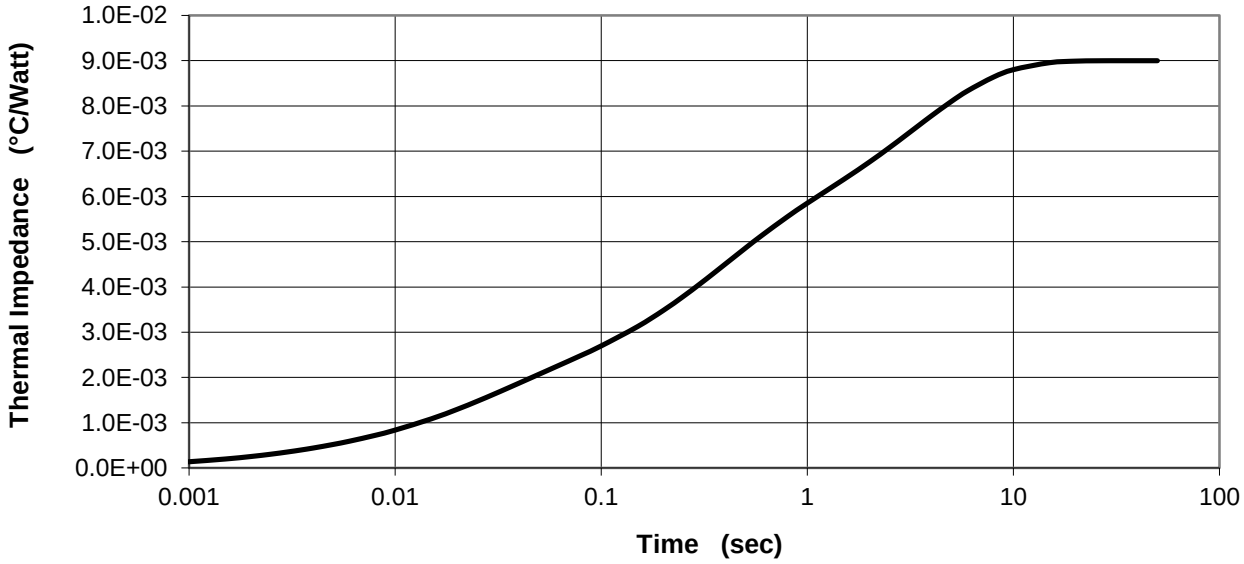
N =	1	2	3	4
A(N) =	2.00E-04	1.50E-03	3.20E-03	4.10E-03
Tau(N) =	2.62E-03	2.31E-02	3.05E-01	3.30E+00

Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 www.pwrx.com

Maximum On-State Voltage Drop

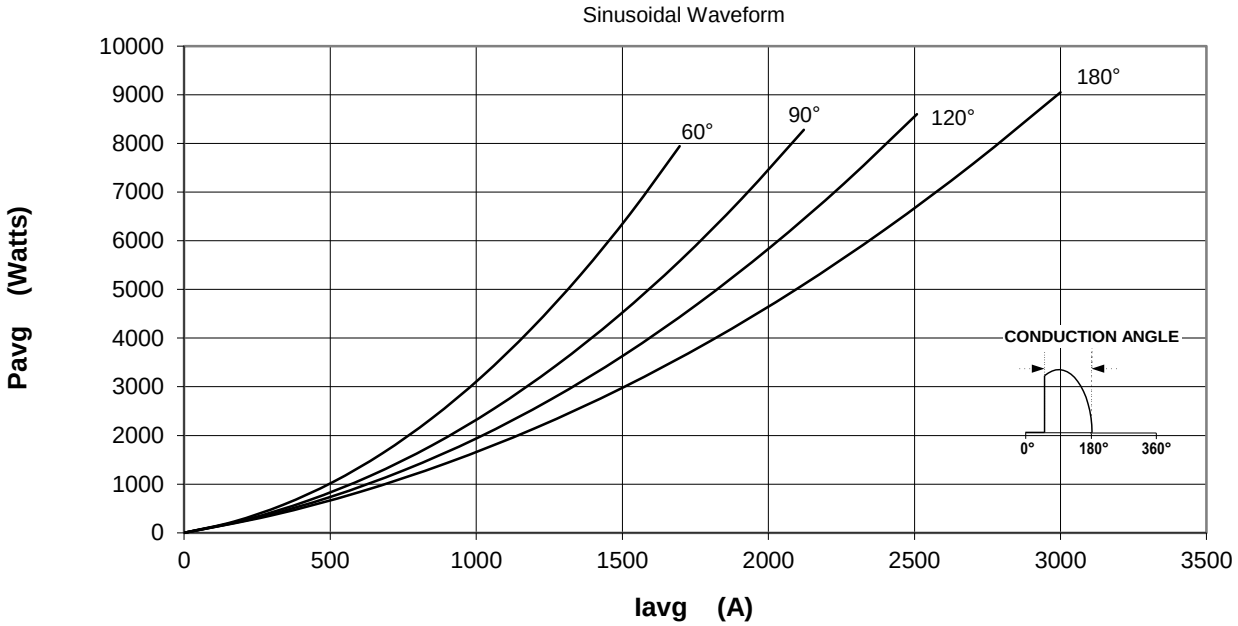


MAXIMUM TRANSIENT THERMAL IMPEDANCE

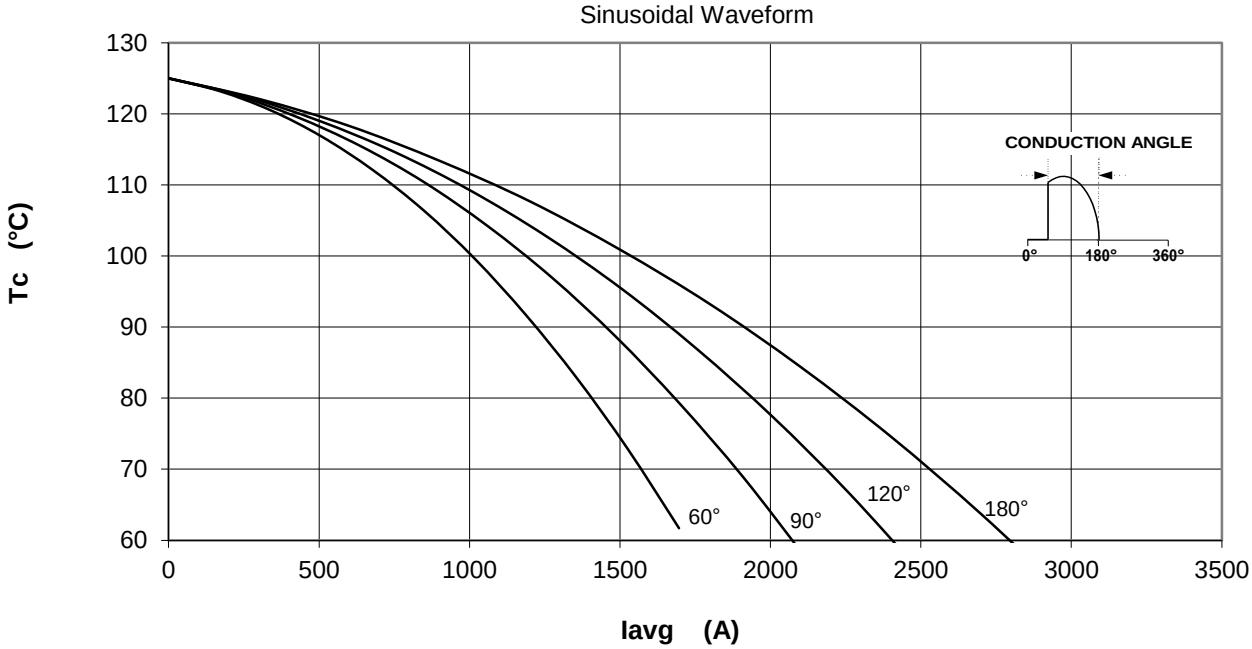


Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 www.pwrx.com

Maximum On-State Power Dissipation



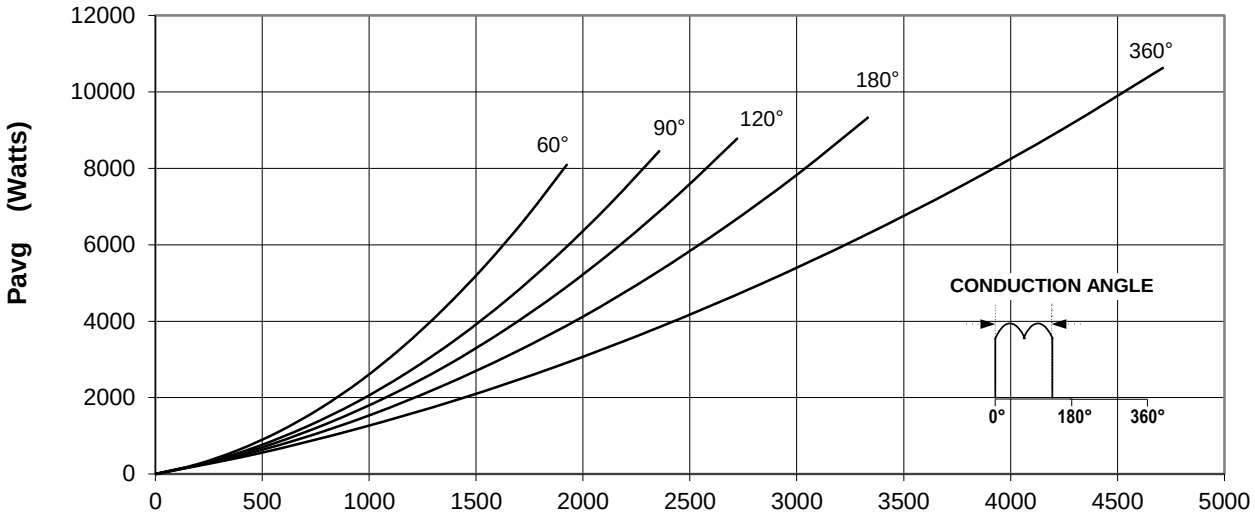
Maximum Allowable Case Temperature



Maximum On-State Power Dissipation

Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 www.pwrx.com

Square Waveform



Maximum Allowable Case Temperature

Square Waveform

