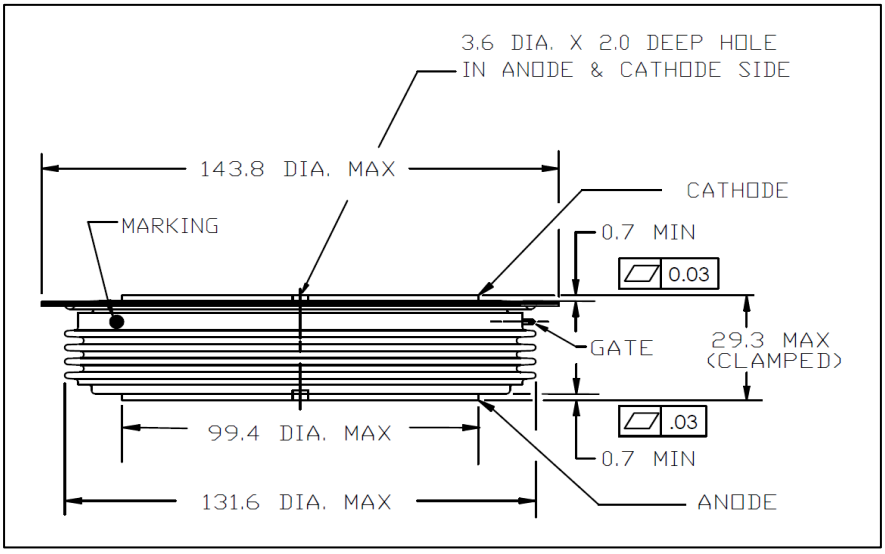
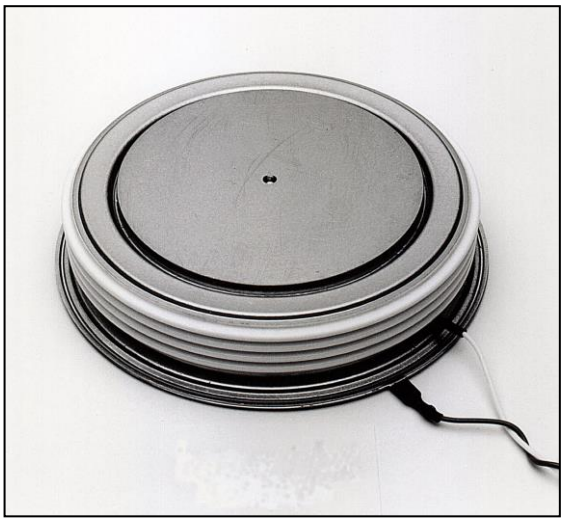
TDS5__5003

Phase Control Thyristor

Powerex, Inc., 173 Pavilion Ln, Youngwood, PA 15697-1800 (724)925-7272 WWW.PWRX.COM

5000Amperes 2000Volts





The TDS5 is a low voltage, high current, thin pack disc SCR employing a amplifing gate structure. This thin package provides greater cooling thus maximizing high current performance. The amplifing 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
- Plating Rectifiers

ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.
EXAMPLE: TDS520503DH is a 2000V-5000A SCR with 200ma 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}	
TDS5	2000	**20**	5000	**50**	**0**	**3**	**DH**
	1800	**18**					
	1600	**16**			500us	200ma	12"
	1400	**14**			(typ.)	(max)	
	1200	**12**					

Revised: 7/28/2020

Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	V_{DRM}-V_{RRM}	2000	Volts
Average On-State Current, T_C=68°C	$I_{T(Avg.)}$	5000	A
RMS On-State Current, T_C=68°C	$I_{T(RMS)}$	7854	A
Average On-State Current, T_C=55°C	$I_{T(Avg.)}$	5700	A
RMS On-State Current, T_C=55°C	$I_{T(RMS)}$	8954	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	90,000	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	84,852	A
Fuse Coordination I^2t, 60Hz	I^2t	3.38E+07	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	3.60E+07	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		6.5	lb
		2.95	Kg
Mounting Force		16,000-20,000	lbs
		71.2 - 89.0	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			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}=4000A			1.15	V
V_{TM} Model, Low Level	V_0	Tj=125°C			0.848	V
VTM = V_O + r•I_{TM}	r	15% I_{TM} - π•I_{TM}			6.58E-02	mΩ
V_{TM} Model, High Level	V_0	Tj=125°C			1.117	V
VTM = V_O + r•I_{TM}	r	π•I_{TM} - I_{TSM}			4.74E-02	mΩ
V_{TM} Model, 4-Term	A	Tj=125°C			0.770	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			-0.013	
C•(I_{TM}) + D•(I_{TM})^{½}	C				3.30E-05	
	D				5.40E-03	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		4		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	500			V/us
Gate Trigger Current	I_{GT}	Tj=25°C V_D = 12V	30	150	200	ma
Gate Trigger Voltage	V_{GT}		0.8	2.0	4.0	V
Peak Reverse Gate Voltage	V_{GRM}				5	V

Thermal Characteristics

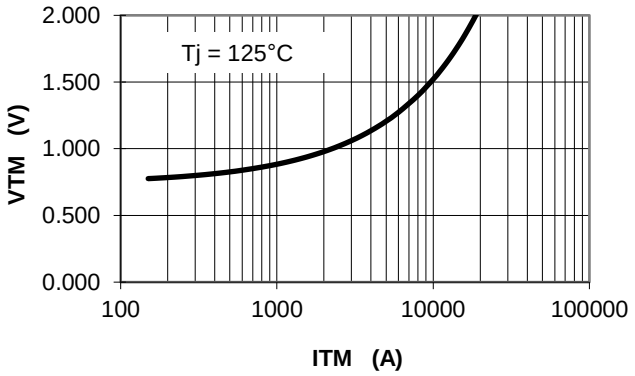
Characteristic	Symbol	Test Conditions	Rating max	Units
Thermal Resistance				
Junction to Case	$R\Theta_{jc}$	Double side cooled	0.0065	°C/Watt
Case to Sink	$R\Theta_{cs}$	Double side cooled	0.0015	°C/Watt
Thermal Impedance Model	$Z\Theta_{jc}$	Double side cooled		

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

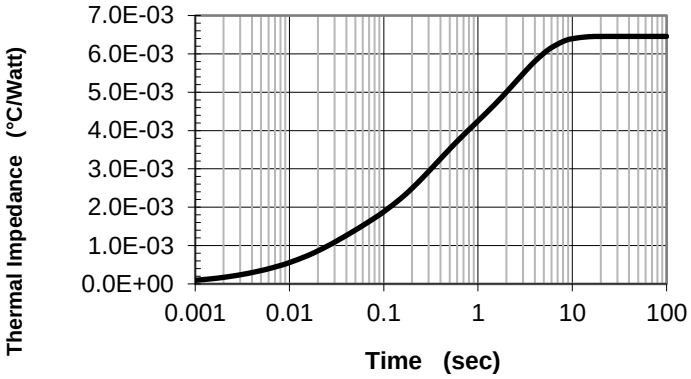
where:

N =	1	2	3	4
A(N) =	1.43E-04	9.08E-04	2.18E-03	3.23E-03
Tau(N) =	2.62E-03	2.31E-02	2.50E-01	2.50E+00

Maximum On-State Voltage Drop

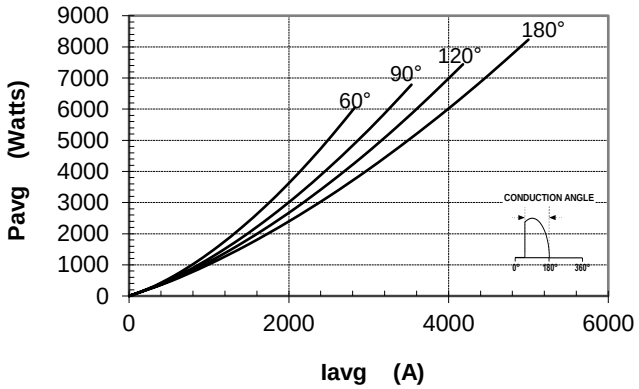


MAXIMUM TRANSIENT THERMAL IMPEDANCE



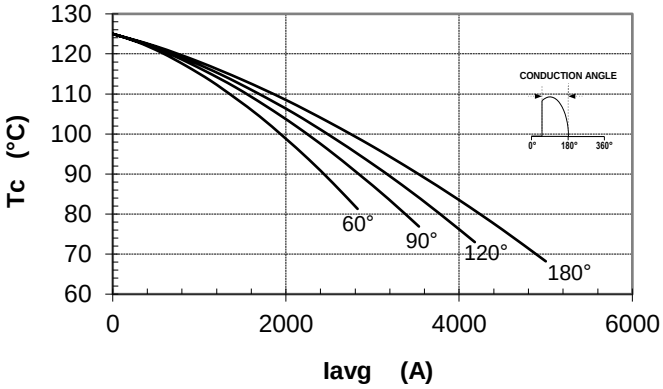
Maximum On-State Power Dissipation

Sinusoidal Waveform



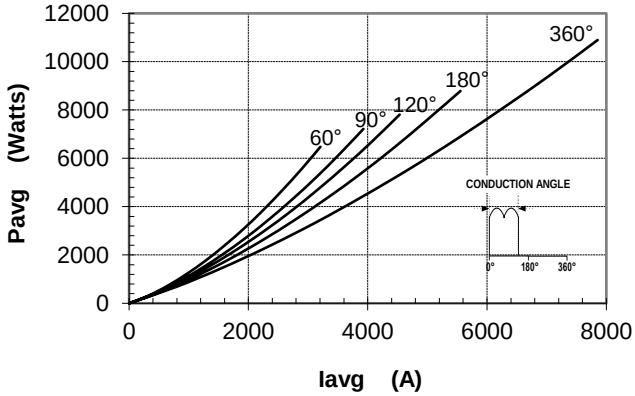
Maximum Allowable Case Temperature

Sinusoidal Waveform



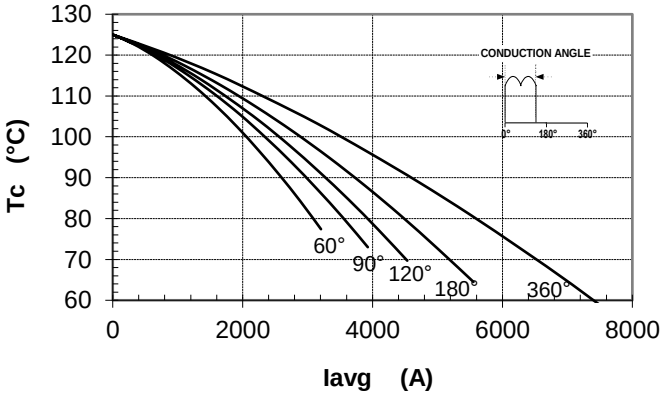
Maximum On-State Power Dissipation

Square Waveform



Maximum Allowable Case Temperature

Square Waveform



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