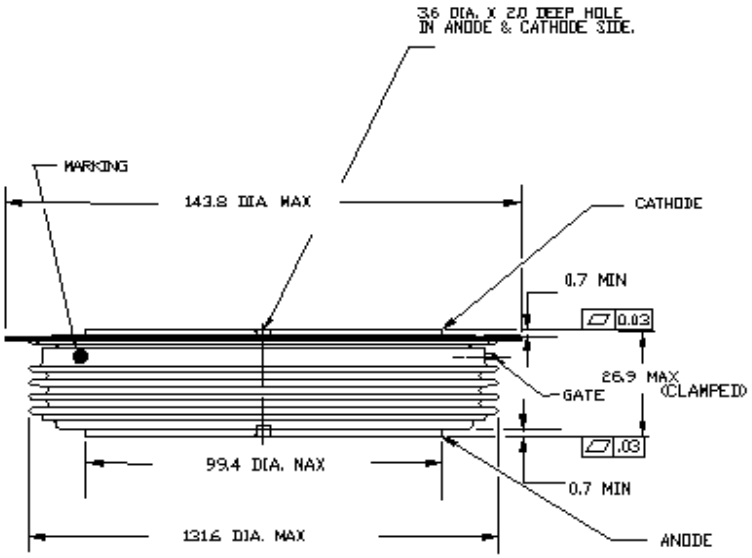
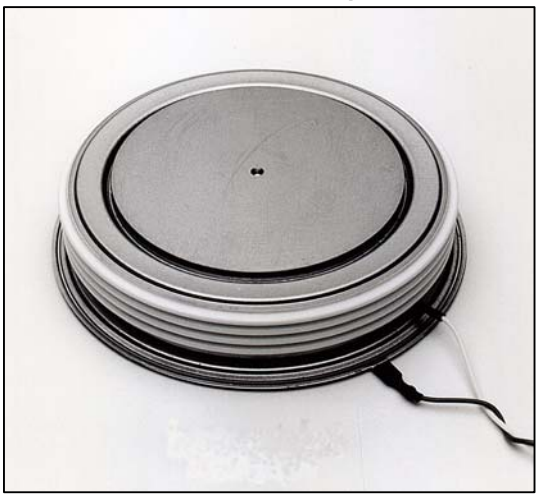
TDS4__4002

Phase Control Thyristor

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

4000Amperes 3000Volts





The TDS4 is a medium 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: TDS4304002DH is a 3000V 4000A SCR with 300ma 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}	
TDS4	3000	**30**	4000	**40**	**0**	**2**	
	2800	**28**					
	2600	**26**			600us	300ma	12"
	2400	**24**			(typ.)	(max)	

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Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	V_{DRM}-V_{RRM}	3000	Volts
Average On-State Current, T_C=70°C	$I_{T(Avg.)}$	4000	A
RMS On-State Current, T_C=70°C	$I_{T(RMS)}$	6283	A
Average On-State Current, T_C=55°C	$I_{T(Avg.)}$	4700	A
RMS On-State Current, T_C=55°C	$I_{T(RMS)}$	7383	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	80,000	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	75,424	A
Fuse Coordination I^2t, 60Hz	I^2t	2.67E+07	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	2.84E+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			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}=4000A			1.38	V
V_{TM} Model, Low Level	V_0	Tj=125°C			0.942	V
$VTM = V_O + r \bullet I_{TM}$	r	15% I_{TM} - π•I_{TM}			9.79E-02	mΩ
V_{TM} Model, High Level	V_0	Tj=125°C			1.175	V
$VTM = V_O + r \bullet I_{TM}$	r	π•I_{TM} - I_{TSM}			7.45E-02	mΩ
V_{TM} Model, 4-Term	A	Tj=125°C			-0.257	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			0.185	
C•(I_{TM}) + D•(I_{TM})^{½}	C				7.73E-05	
	D				-3.20E-03	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		3		us
Turn-Off Time	tq	Tj=125°C dv/dt = 20V/us to 67% V_{DRM}			600	us
$dv/dt_{(Crit)}$	dv/dt	Tj=125°C Exp. Waveform V_D =67% Rated	800			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	5.0	V
Peak Reverse Gate Voltage	V_{GRM}				5	V
Reverse Recovery Currrent	IR(Rec)	Tj=125°C V_R = 100V			300	A
Reverse Recovery Charge	QRA				10,500	µCoul

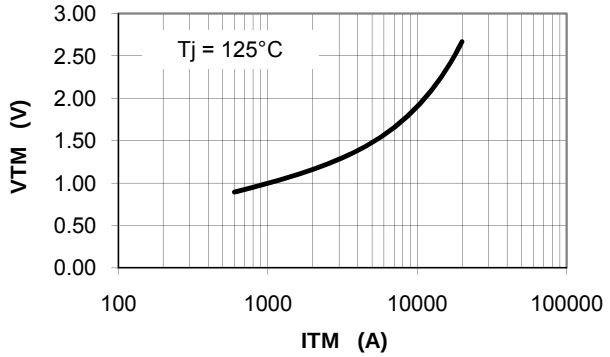
Thermal Characteristics

Characteristic	Symbol	Test Conditions	Rating min	Rating typ	Rating max	Units
Thermal Resistance						
Junction to Case	$R\Theta_{jc}$	Double side cooled		0.0065	0.0070	°C/Watt
Case to Sink	$R\Theta_{cs}$	Double side cooled		0.001	0.0015	°C/Watt
Thermal Impedance Model	$Z\Theta_{jc}$	Double side cooled				

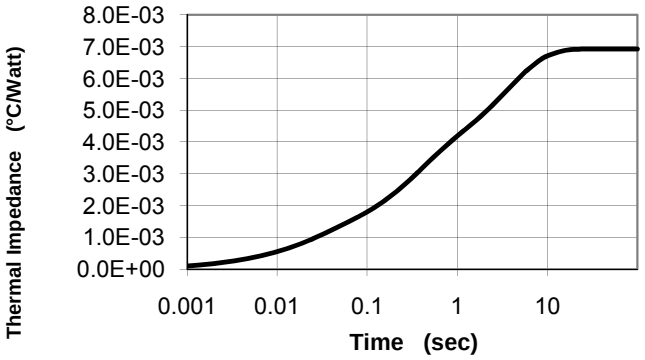
$Z\Theta_{jc}(t) = \Sigma(A(N) \bullet (1-\exp(-t/Tau(N))))$ where:

N =	1	2	3	4
A(N) =	1.43E-04	9.08E-04	2.37E-03	3.50E-03
Tau(N) =	2.62E-03	2.31E-02	3.05E-01	3.60E+00

Maximum On-State Voltage Drop

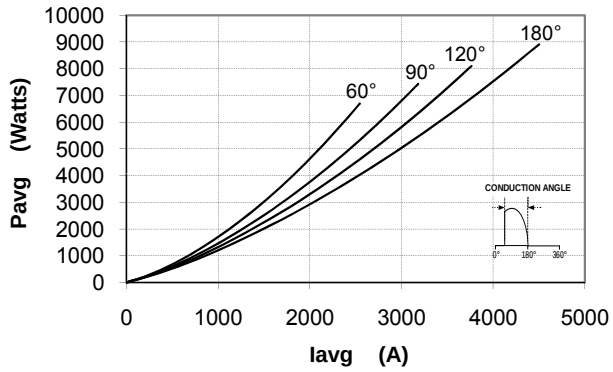


MAXIMUM TRANSIENT THERMAL IMPEDANCE



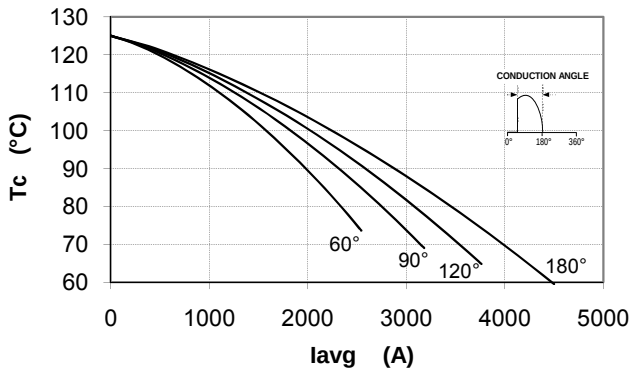
Maximum On-State Power Dissipation

Sinusoidal Waveform



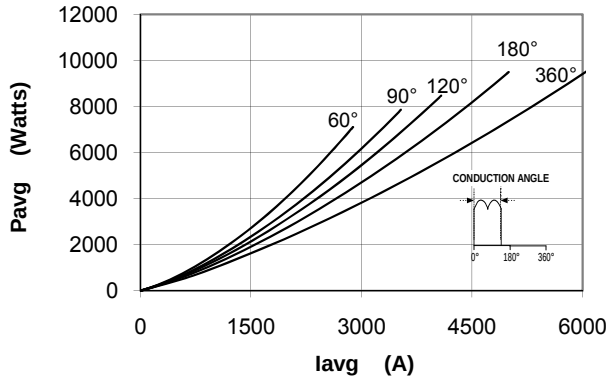
Maximum Allowable Case Temperature

Sinusoidal Waveform



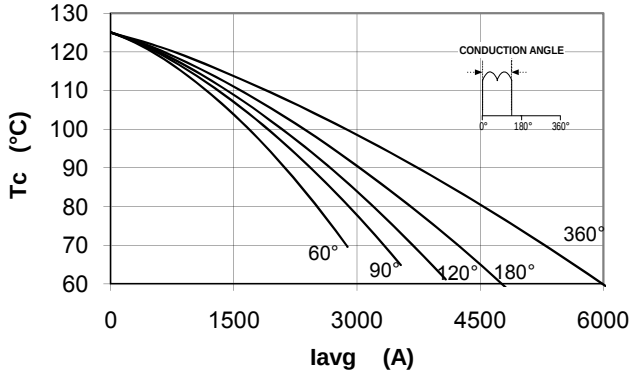
Maximum On-State Power Dissipation

Square Waveform



Maximum Allowable Case Temperature

Square Waveform



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