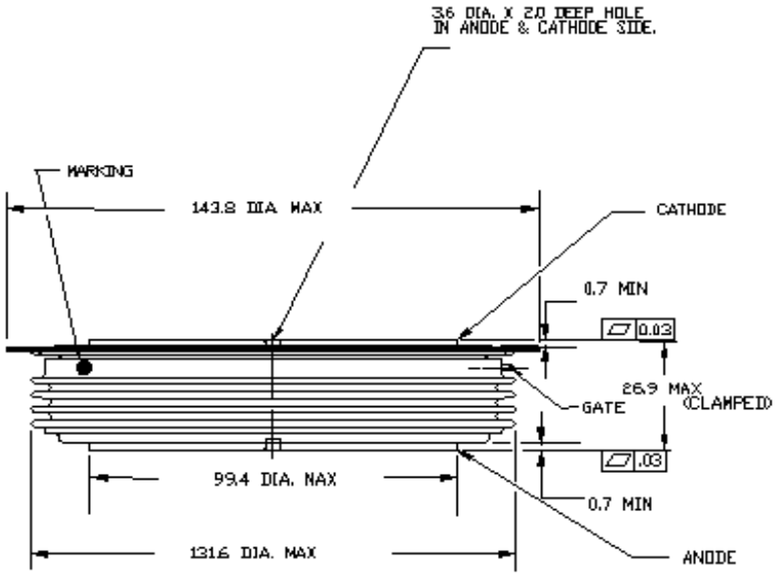
TDS4__4002

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

Information presented is based upon limited testing or 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.

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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•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•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

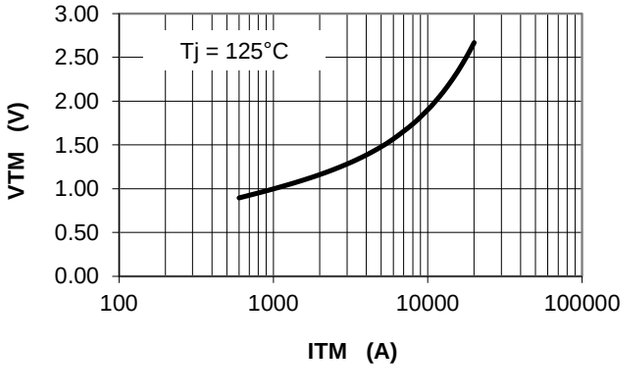
Thermal Characteristics

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				

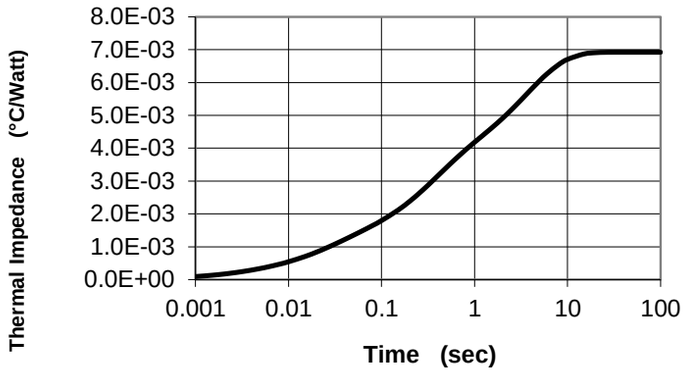
$Z\Theta_{jc}(t) = \Sigma(A(N)\bullet(1-\exp(-t/Tau(N))))$ where:

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

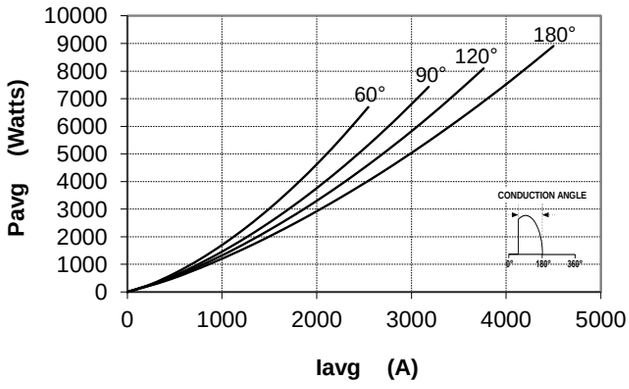


MAXIMUM TRANSIENT THERMAL IMPEDANCE



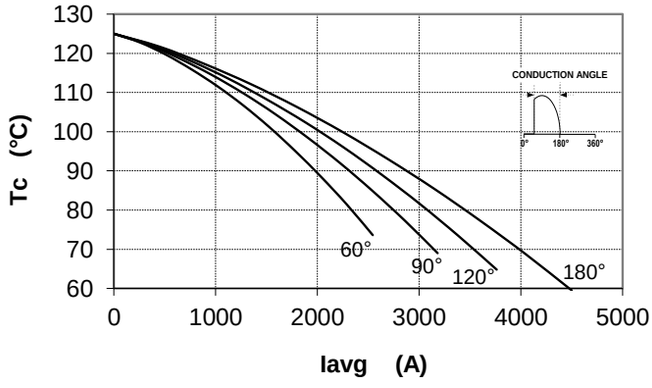
Maximum On-State Power Dissipation

Sinusoidal Waveform



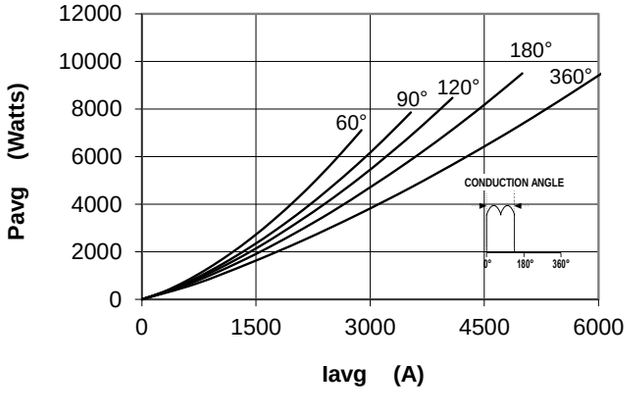
Maximum Allowable Case Temperature

Sinusoidal Waveform



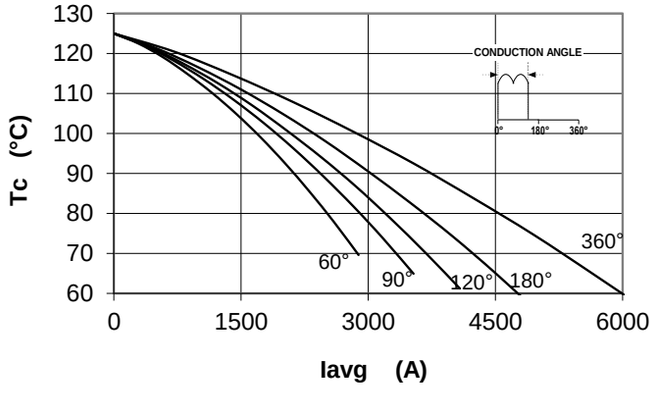
Maximum On-State Power Dissipation

Square Waveform



Maximum Allowable Case Temperature

Square Waveform



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