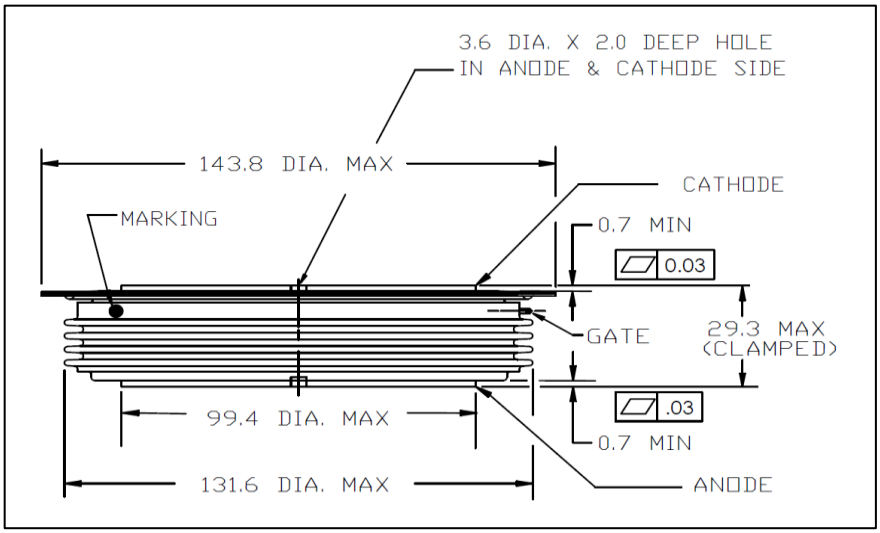
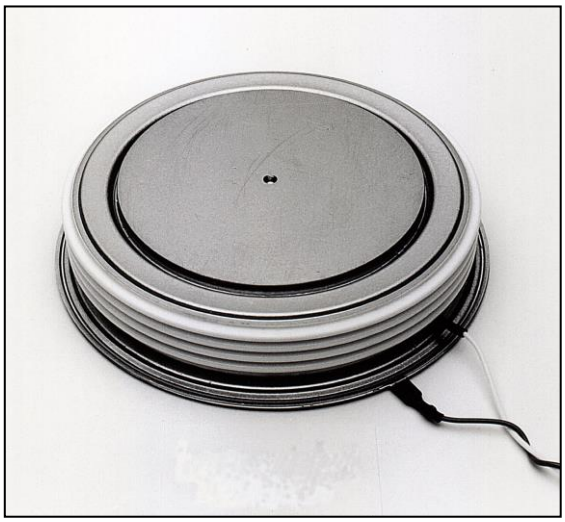
TDS4__3302

Phase Control Thyristor

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

3325 Amperes 4500 Volts





The TDS4 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: TDS4443302DH is a4400V-3325A 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	4500	**45**	3325	**33**	**0**	**2**	**DH**
	4400	**44**					
	4200	**42**			600us	300ma	12"
	4000	**40**			(typ.)	(max)	

Revised: 7/28/2020

Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	V_{DRM}-V_{RRM}	4000 - 4500	Volts
Average On-State Current, T_C= 70 °C	$I_{T(Avg.)}$	3325	A
RMS On-State Current, T_C= 70 °C	$I_{T(RMS)}$	5223	A
Average On-State Current, T_C= 55 °C	$I_{T(Avg.)}$	3633	A
RMS On-State Current, T_C= 55 °C	$I_{T(RMS)}$	5707	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	56,000	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	52,797	A
Fuse Coordination I^2t, 60Hz	I^2t	1.31E+07	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	1.39E+07	A^2s
Critical Rate-of-Rise of On-State Current Repetitive from .67•VDRM	di/dt	100	A/us
Critical Rate-of-Rise of On-State Current Non-Repetitive from .67•VDRM	di/dt	150	A/us
Application Specific Repetitive di/dt Rate Linear Rate to 700A followed by 10A/us to Itavg.	di/dt	400	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		5.0	lb
		2.27	Kg
Mounting Force		18,000 - 25,000	lbs
		80 - 110	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}= 4000 A			1.77	V
V_{TM} Model, Low Level	V_0	Tj=125°C			0.991	V
VTM = V_O + r•I_{TM}	r	15% I_{TM} - π•I_{TM}			0.196	mΩ
V_{TM} Model, High Level	V_0	Tj=125°C			0.772	V
VTM = V_O + r•I_{TM}	r	π•I_{TM} - I_{TSM}			0.218	mΩ
V_{TM} Model, 4-Term	A	Tj=125°C			0.132	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			0.181	
C•(I_{TM}) + D•(I_{TM})^{½}	C				2.57E-04	
	D				-1.41E-02	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		3		us
Turn-Off Time (typ)	tq	Tj=125°C dv/dt = 20V/us to 80% V_{DRM}		600		us
$dv/dt_{(Crit)}$	dv/dt	Tj=125°C Exp. Waveform V_D =67% Rated	2000			V/us
Gate Trigger Current	I_{GT}	Tj=25°C V_D = 12V	40	100	300	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 min	Rating typ	Rating max	Units
Thermal Resistance						
Junction to Case	$R\Theta_{jc}$	Double side cooled		0.0055	0.006	°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	9.38E-04	2.42E-03	2.50E-03
Tau(N) =	2.62E-03	2.31E-02	3.05E-01	3.30E+00

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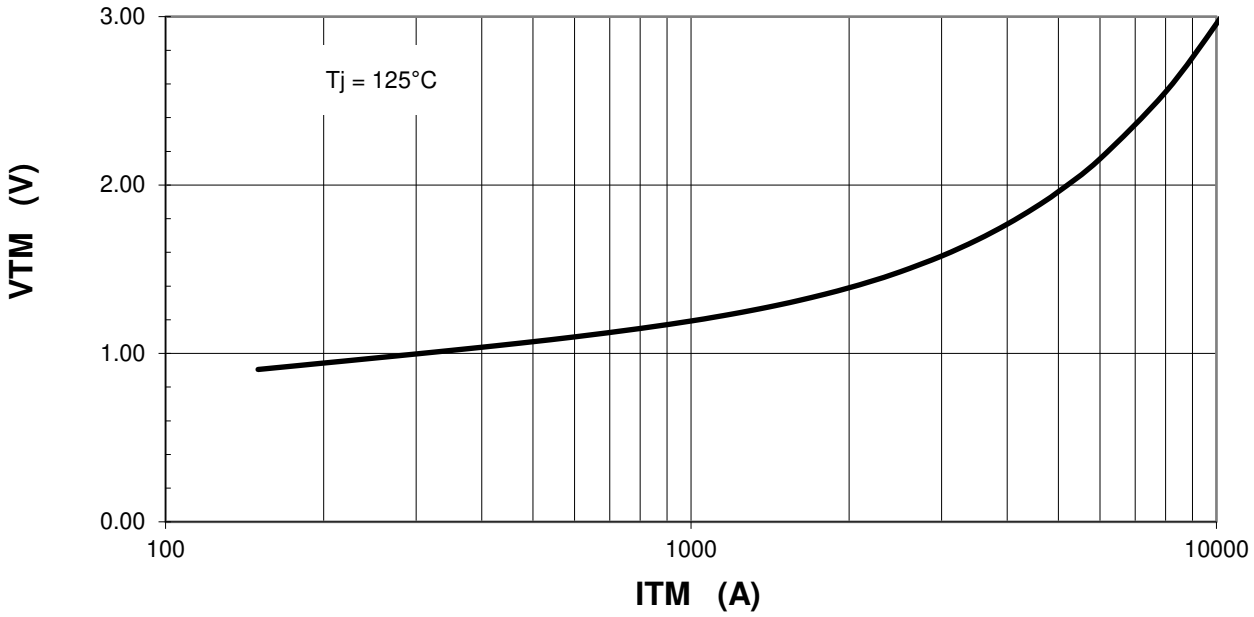
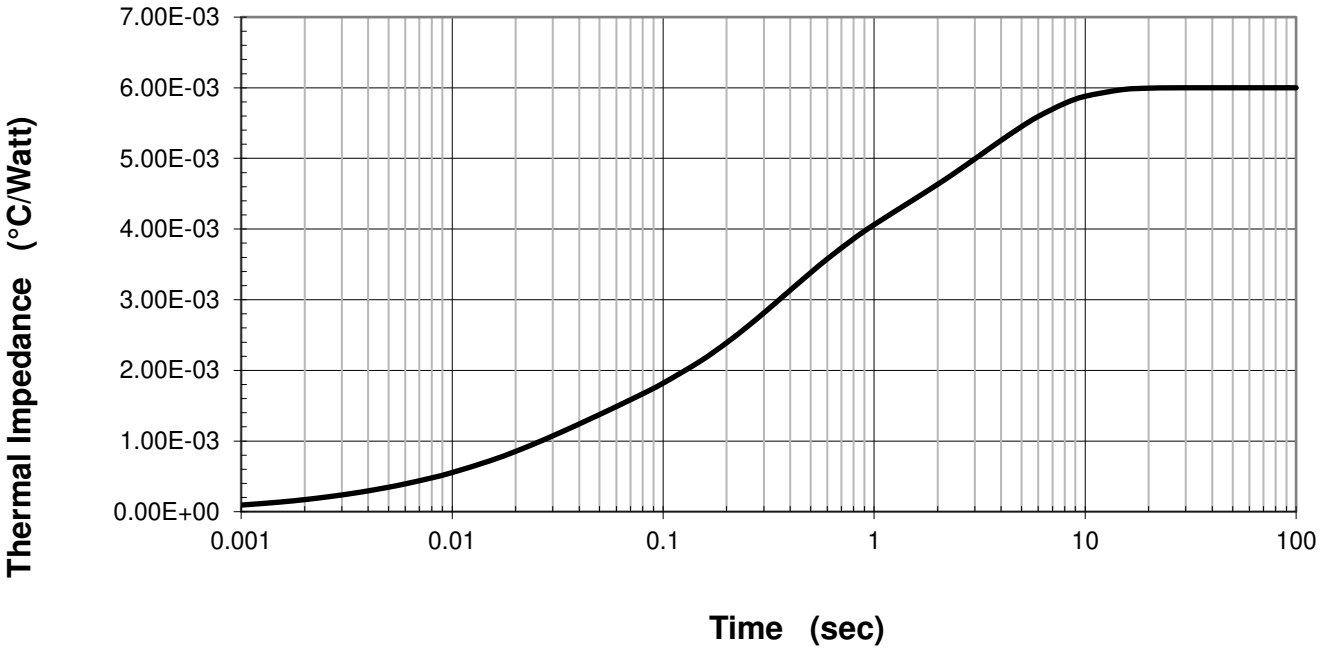
Maximum On-State Voltage Drop



Maximum Transient Thermal Impedance



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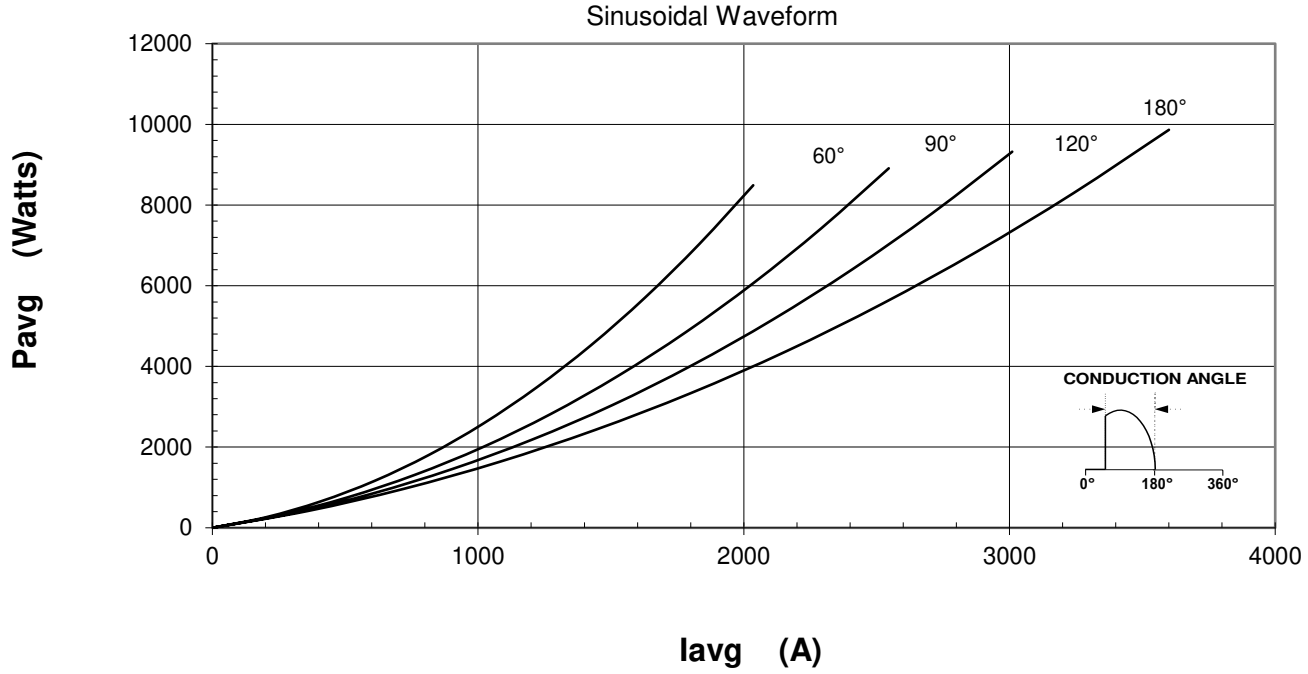
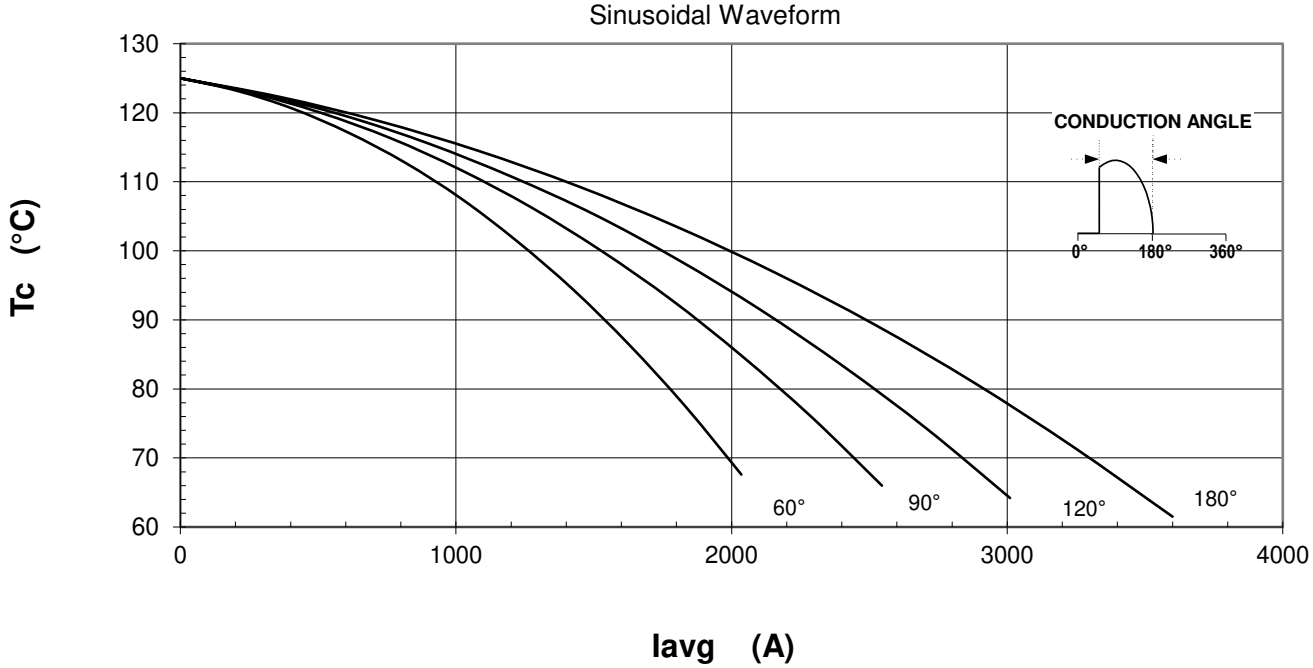
Maximum On-State Power Dissipation



Maximum Allowable Case Temperature



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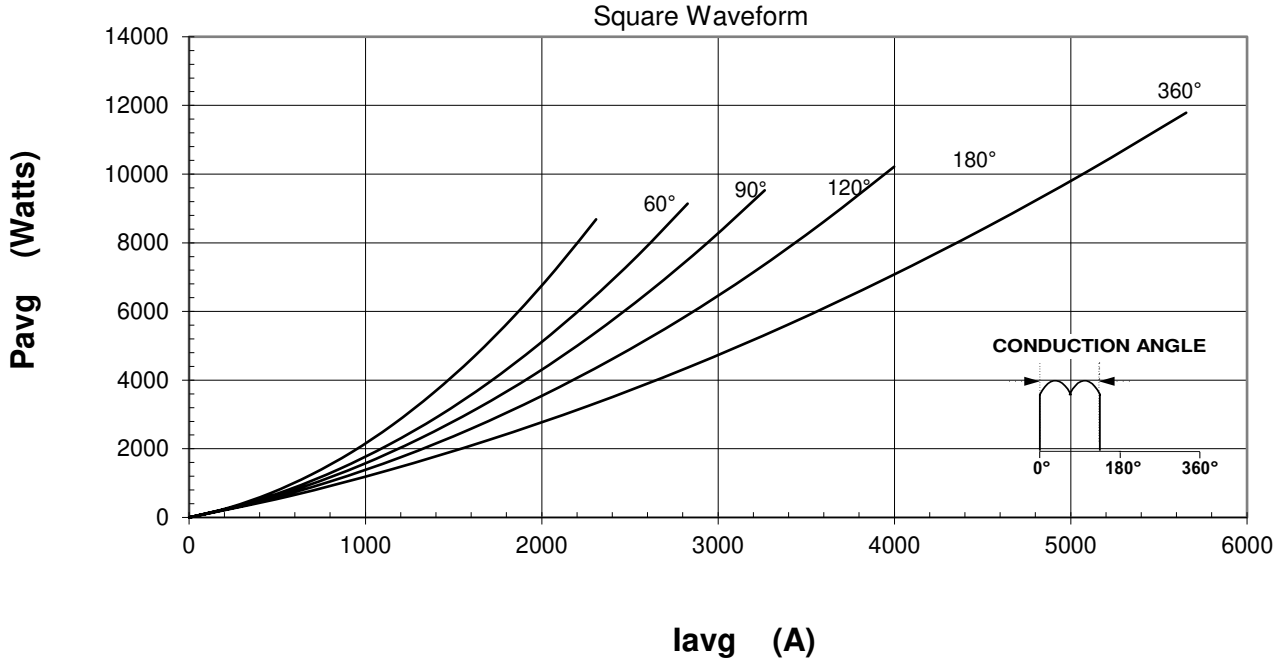
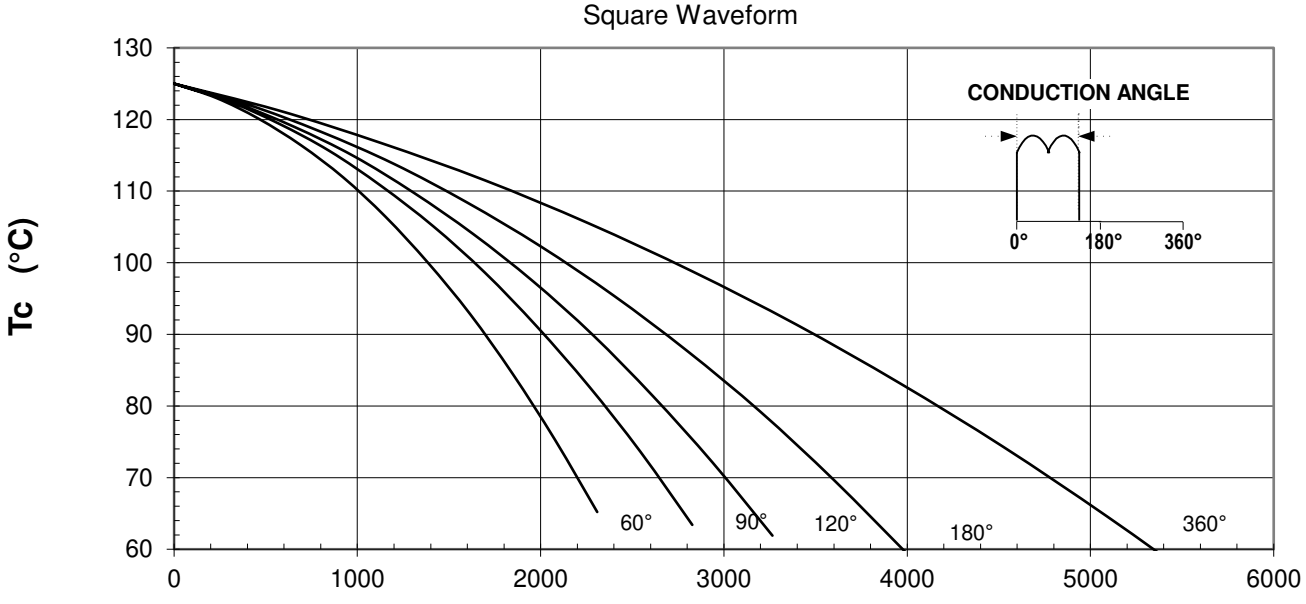
Maximum On-State Power Dissipation



Iavg (A)

Maximum Allowable Case Temperature



Iavg (A)