

The TBS4 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. The shorter ceramic package offers reduced thermal resistance offering highest current rating available.

FEATURES:

- Low On-State Voltage
- High di/dt Capability
- High dv/dt Capability
- Hermetic Ceramic Package
- Excellent Surge and I²t Ratings

APPLICATIONS:

- DC Power Supplies
- Motor Controls
- AC Soft-Starters

ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.
EXAMPLE: TBS436250HDH is a 3600V - 2500A SCR with 250ma IGT and 12 inch gate and cathode potential leads.

PART	Voltage Rating $V_{DRM}-V_{RRM}$	Voltage Code	Current Rating I_{tavg}	Current Code	Turn-Off t_q	Gate I_{GT}	Leads
TBS4	3600	36	2500	25	0	H	
	3400	34					
	3200	32			600us	250ma	12"
	3000	30			(typ.)	(max)	

Revised: 1/13/2009

Absolute Maximum Ratings

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	$V_{DRM}-V_{RRM}$	3600	Volts
Average On-State Current, $T_C=70^{\circ}C$	$I_{T(Avg.)}$	2500	A
RMS On-State Current, $T_C=70^{\circ}C$	$I_{T(RMS)}$	3927	A
Average On-State Current, $T_C=55^{\circ}C$	$I_{T(Avg.)}$	2675	A
RMS On-State Current, $T_C=55^{\circ}C$	$I_{T(RMS)}$	4202	A
Peak One Cycle Surge Current, 60Hz, $V_R=0V$	I_{TSM}	34,000	A
Peak One Cycle Surge Current, 50Hz, $V_R=0V$	I_{TSM}	32,055	A
Fuse Coordination I^2t , 60Hz	I^2t	4.82E+06	A ² s
Fuse Coordination I^2t , 50Hz	I^2t	5.14E+06	A ² s
Critical Rate-of-Rise of On-State Current	di/dt	100	A/us
Repetitive .67•VDRM			
Critical Rate-of-Rise of On-State Current	di/dt	200	A/us
Non-Repetitive .67•VDRM			
Peak Gate Power, 100us	P_{GM}	16	Watts
Average Gate Power	$P_{G(avg)}$	5	Watts
Operating Temperature	T_j	-40 to+125	°C
Storage Temperature	$T_{Stg.}$	-50 to+150	°C
Approximate Weight		2.5	lb
		1.13	Kg
Mounting Force		9000-10000	lbs
		40 - 44.5	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.

Electrical Characteristics, Tj=25°C unless otherwise specified

Characteristic	Symbol	Test Conditions	Rating			Units
			min	typ	max	
Repetitive Peak Forward Leakage Current	I_{DRM}	Tj=125°C, V_{DRM} =Rated			200	ma
Repetitive Peak Reverse Leakage Current	I_{RRM}	Tj=125°C, V_{RRM} =Rated			200	ma
Peak On-State Voltage	V_{TM}	Tj=125°C, I_{TM} =2000A			1.50	V
V_{TM} Model, Low Level	V_0	Tj=125°C			1.026	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	15% $I_{TM} - \pi \cdot I_{TM}$			0.233	mΩ
V_{TM} Model, High Level	V_0	Tj=125°C			1.175	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	$\pi \cdot I_{TM} - I_{TSM}$			0.208	mΩ
V_{TM} Model, 4-Term	A	Tj=125°C			0.120	
$V_{TM} = A + B \cdot \ln(I_{TM}) +$	B	15% $I_{TM} - I_{TSM}$			0.146	
$C \cdot (I_{TM}) + D \cdot (I_{TM})^{1/2}$	C				0.000212	
	D				-0.00344	
Turn-On Delay Time	t_d	$V_D = 0.5 \cdot V_{DRM}$ Gate Drive: 40V - 20Ω			3.5	us
Turn-Off Time	t_q	Tj=125°C dv/dt = 20V/us to 80% V_{DRM}			600	us
Reverse Recovery Current	$I_{R(Rec)}$	Tj=125°C 1500A -10A/us				A
Reverse Recovery Charge	Q_{RR}					uCoul
dv/dt _(Crit)	dv/dt	Tj=125°C Exp. Waveform $V_D = 80\%$ Rated	1000			V/us
Gate Trigger Current	I_{GT}	Tj=25°C $V_D = 12V$	30	150	250	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			Units
			min	typ	max	
Thermal Resistance						
Junction to Case	$R\theta_{jc}$	Double side cooled		0.0075	0.0085	°C/Watt
Case to Sink	$R\theta_{cs}$	Double side cooled		0.0015	0.002	°C/Watt

Thermal Impedance Model $Z\theta_{jc}$ Double side cooled

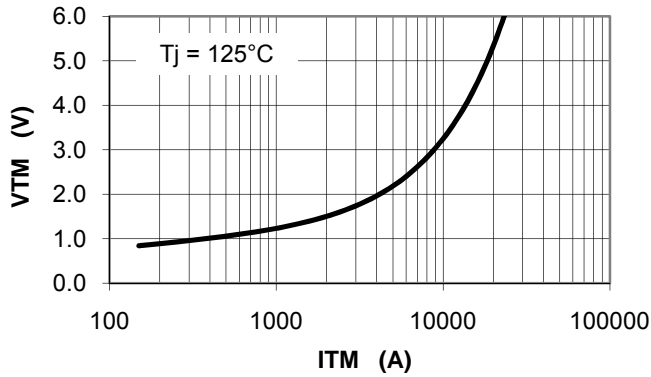
$$Z\theta_{jc}(t) = \sum(A(N) \cdot (1 - \exp(-t/\text{Tau}(N))))$$

where: N = 1 2 3 4

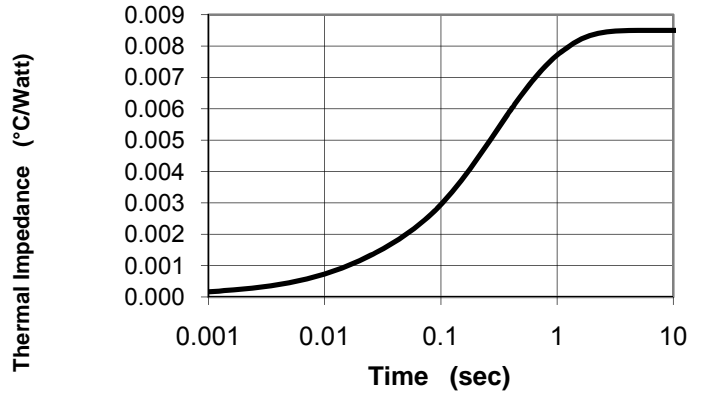
$A(N) = 1.13E-04 \quad 7.51E-04 \quad 3.53E-03 \quad 4.11E-03$

$\text{Tau}(N) = 6.54E-04 \quad 1.48E-02 \quad 1.89E-01 \quad 6.00E-01$

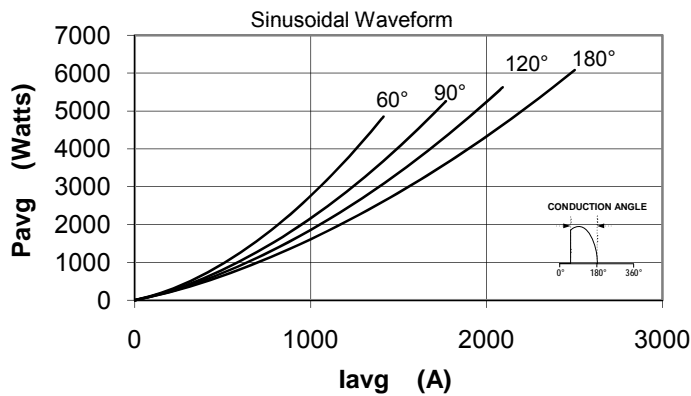
Maximum On-State Voltage Drop



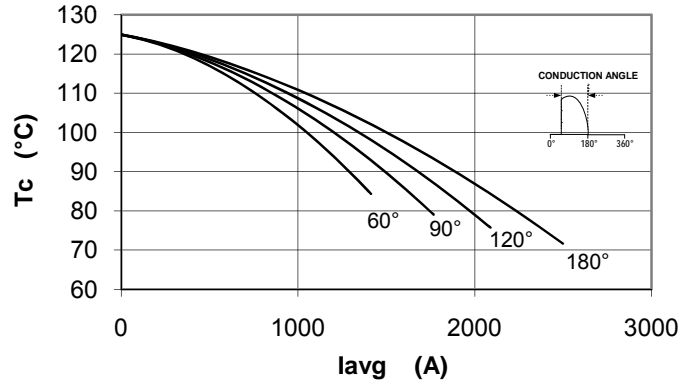
MAXIMUM TRANSIENT THERMAL IMPEDANCE



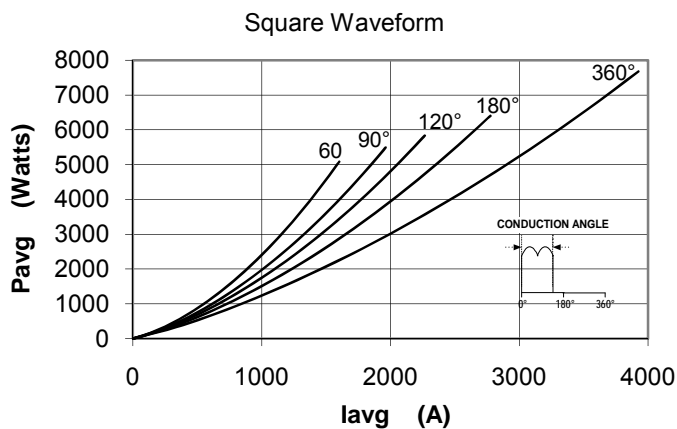
Maximum On-State Power Dissipation



Maximum Allowable Case Temperature
Sinusoidal Waveform



Maximum On-State Power Dissipation



Maximum Allowable Case Temperature
Square Waveform

