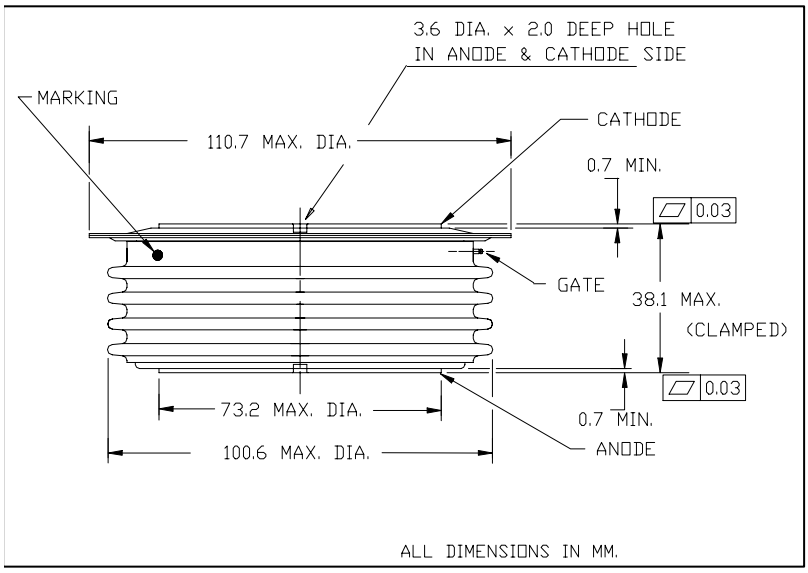
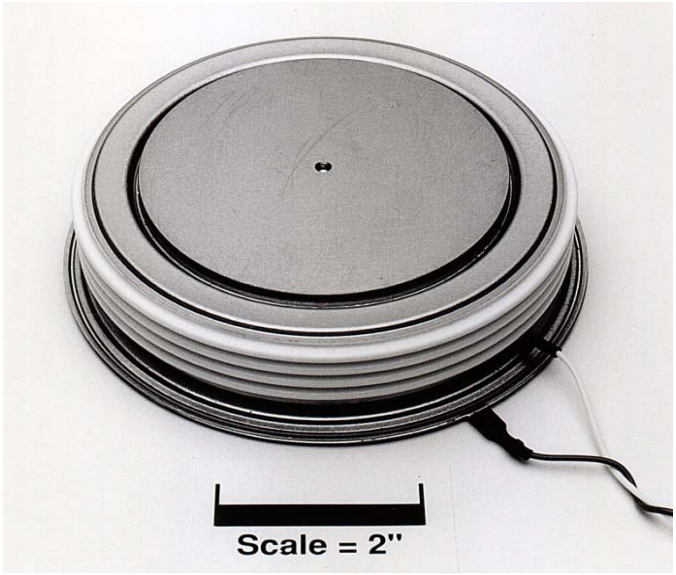
TBKD__190H

Phase Control Thyristor

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

1890 Amperes 4500 Volts





The TBKD 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
- AC Soft-Starters

ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.
EXAMPLE: TBKD45190HDH is a 4500V - 1890A SCR with 250ma 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}	
TBKD	4500	**45**	1890	**19**	**0**	**H**	
	4200	**42**					
	4000	**40**			600us	250ma	12"
					(typ.)	(max)	

Revised: 10/17/2007

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	$I_{T(Avg.)}$	1890	A
RMS On-State Current, T_C=70°C	$I_{T(RMS)}$	2969	A
Average On-State Current, T_C=60°C	$I_{T(Avg.)}$	2110	A
RMS On-State Current, T_C=60°C	$I_{T(RMS)}$	3314	A
Peak One Cycle Surge Current, 60Hz, V_R=0V	I_{TSM}	33,600	A
Peak One Cycle Surge Current, 50Hz, V_R=0V	I_{TSM}	31,678	A
Fuse Coordination I^2t, 60Hz	I^2t	4.70E+06	A^2s
Fuse Coordination I^2t, 50Hz	I^2t	5.02E+06	A^2s
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	Tj	-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

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}=2000A			1.70	V
V_{TM} Model, Low Level	V_0	Tj=125°C			1.130	V
VTM = V_O + r•I_{TM}	r	15% I_{TM} - π•I_{TM}			2.75E-04	Ω
V_{TM} Model, High Level	V_0	Tj=125°C			1.274	V
VTM = V_O + r•I_{TM}	r	π•I_{TM} - I_{TSM}			2.46E-04	Ω
V_{TM} Model, 4-Term	A	Tj=125°C			0.468	
V_{TM}= A + B•Ln(I_{TM}) +	B	15%I_{TM} - I_{TSM}			0.112	
C•(I_{TM}) + D•(I_{TM})^{½}	C				0.000249	
	D				-0.00253	
Turn-On Delay Time	t_d	V_D = 0.5•V_{DRM} Gate Drive: 40V - 20Ω		3.5		us
Turn-Off Time	tq	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

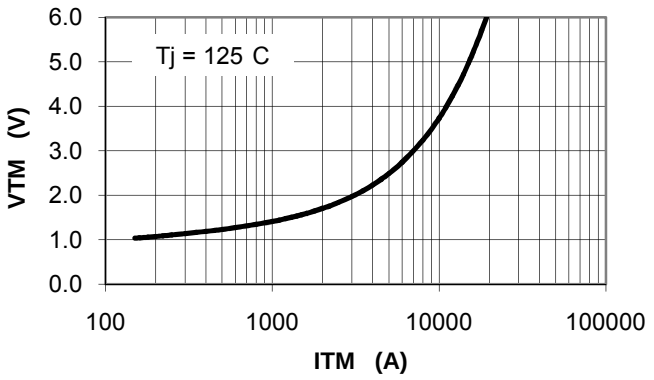
Characteristic	Symbol	Test Conditions	Rating min	Rating typ	Rating max	Units
Thermal Resistance						
Junction to Case	$R\Theta_{jc}$	Double side cooled		0.01	0.012	°C/Watt
Case to Sink	$R\Theta_{cs}$	Double side cooled		0.0015	0.002	°C/Watt
Thermal Impedance Model	$Z\Theta_{jc}$	Double side cooled				

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

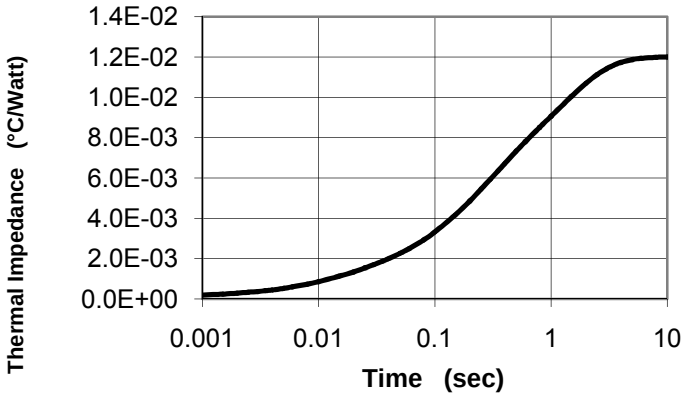
where:

N =	1	2	3	4
A(N) =	1.10E-04	8.86E-04	4.54E-03	6.47E-03
Tau(N) =	5.05E-04	1.33E-02	1.95E-01	1.25E+00

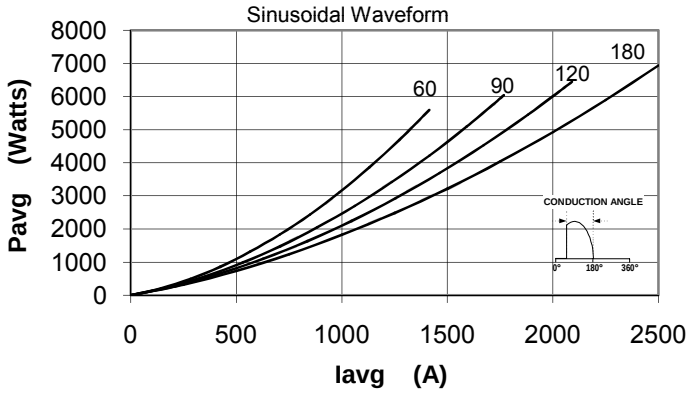
Maximum On-State Voltage Drop



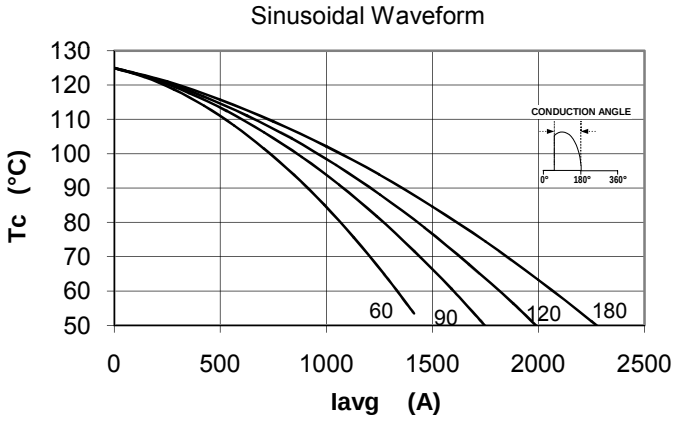
MAXIMUM TRANSIENT THERMAL IMPEDANCE



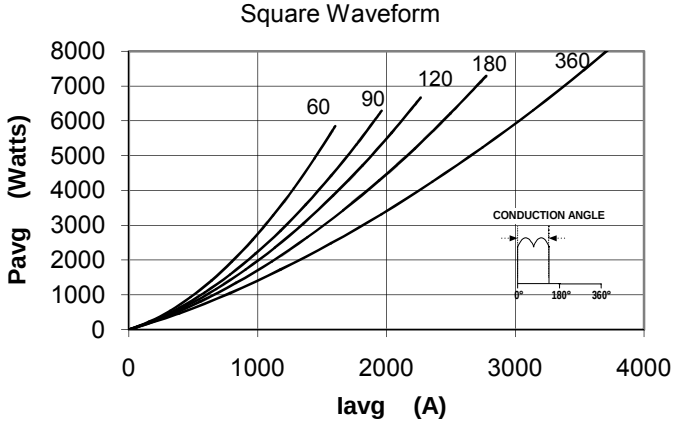
Maximum On-State Power Dissipation



Maximum Allowable Case Temperature



Maximum On-State Power Dissipation



Maximum Allowable Case Temperature