

The TDK4 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<sup>2</sup>t Ratings

### APPLICATIONS:

- DC Power Supplies
- Motor Controls

### ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.  
EXAMPLE: TDK4443302DH is a 4400V-3300A SCR with 300ma IGT and 12 inch gate and cathode potential leads.

PART	Voltage Rating	Voltage Code	Current Rating	Current Code	Turn-Off I <sub>q</sub>	Gate I <sub>GT</sub>	Leads
	V <sub>DRM</sub> -V <sub>RPM</sub>		I <sub>tavg</sub>				
TDK4	4500	45	3300	33	0	2	12"
	4400	44					
	4200	42					
	4000	40					
	3600	36					

**Absolute Maximum Ratings<sup>†</sup>**

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	$V_{DRM}-V_{RRM}$	4400	Volts
Average On-State Current, $T_C=72^\circ\text{C}$	$I_{T(Avg.)}$	3300	A
RMS On-State Current, $T_C=70^\circ\text{C}$	$I_{T(RMS)}$	5184	A
Average On-State Current, $T_C=55^\circ\text{C}$	$I_{T(Avg.)}$	3900	A
RMS On-State Current, $T_C=55^\circ\text{C}$	$I_{T(RMS)}$	6126	A
Peak One Cycle Surge Current, 60Hz, $V_R=0V$	$I_{TSM}$	50,000	A
Peak One Cycle Surge Current, 50Hz, $V_R=0V$	$I_{TSM}$	47,140	A
Fuse Coordination $I^2t$ , 60Hz	$I^2t$	1.04E+07	A <sup>2</sup> s
Fuse Coordination $I^2t$ , 50Hz	$I^2t$	1.11E+07	A <sup>2</sup> s
Critical Rate-of-Rise of On-State Current	di/dt	150	A/us
Repetitive from .67•VDRM			
Critical Rate-of-Rise of On-State Current	di/dt	300	A/us
Non-Repetitive from .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	$T_{Stg.}$	-40 to+150	°C
Approximate Weight		7	lb
		3.18	Kg
Mounting Force		18,000 - 25,000	lbs
		80 - 110	KNewtons

<sup>†</sup> Ratings apply for operation at rated load force.

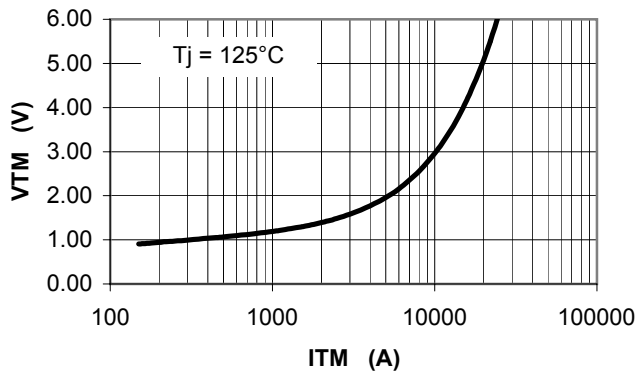
**Electrical Characteristics, Tj=25°C unless otherwise specified**

Characteristic	Symbol	Test Conditions	Rating			Units
			min	typ	max	
Repetitive Peak Forward Leakage Current	$I_{DRM}$	Tj=125°C, $V_{DRM}$ =Rated			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, $I_{TM}$ =3000A			1.60	V
$V_{TM}$ Model, Low Level	$V_0$	Tj=125°C			0.991269	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	15% $I_{TM} - \pi \cdot I_{TM}$			1.96E-04	$\Omega$
$V_{TM}$ Model, High Level	$V_0$	Tj=125°C			0.772002	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	$\pi \cdot I_{TM} - I_{TSM}$			2.18E-04	$\Omega$
$V_{TM}$ Model, 4-Term	A	Tj=125°C			0.132	
$V_{TM} = A + B \cdot \ln(I_{TM}) +$	B	15% $I_{TM} - I_{TSM}$			0.181	
$C \cdot (I_{TM}) + D \cdot (I_{TM})^{1/2}$	C				2.57E-04	
	D				-1.41E-02	
Turn-On Delay Time	$t_d$	$V_D = 0.5 \cdot V_{DRM}$ Gate Drive: 40V - 20 $\Omega$			3	us
Turn-Off Time (typ)	tq	Tj=125°C dv/dt = 20V/us to 80% $V_{DRM}$			400	us
dv/dt <sub>(crit)</sub>	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

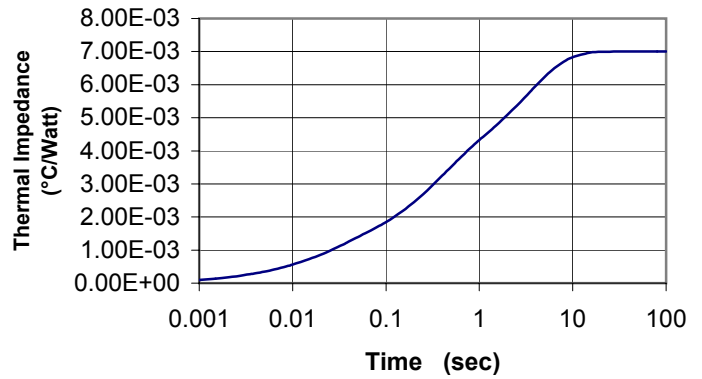
**Thermal Characteristics**

Characteristic	Symbol	Test Conditions	Rating			Units	
			min	typ	max		
Thermal Resistance							
Junction to Case	$R\theta_{jc}$	Double side cooled		0.0055	0.007	°C/Watt	
Case to Sink	$R\theta_{cs}$	Double side cooled		0.0015	0.002	°C/Watt	
Thermal Impedance Model							
$Z\theta_{jc}(t) = \Sigma(A(N) \cdot (1 - \exp(-t/\text{Tau}(N))))$		Double side cooled					
	where:		N =	1	2	3	4
			A(N) =	1.43E-04	9.38E-04	2.42E-03	3.50E-03
			Tau(N) =	2.62E-03	2.31E-02	3.05E-01	3.30E+00

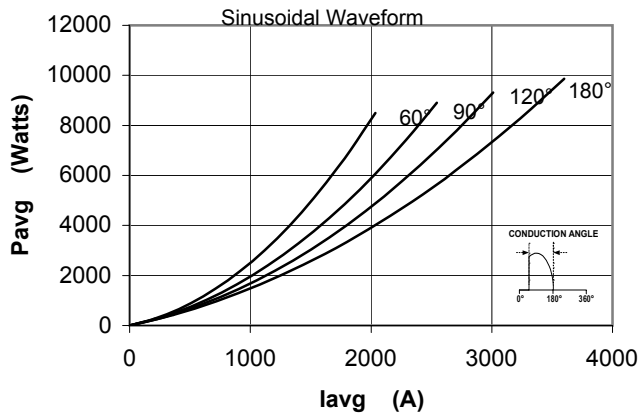
#### Maximum On-State Voltage Drop



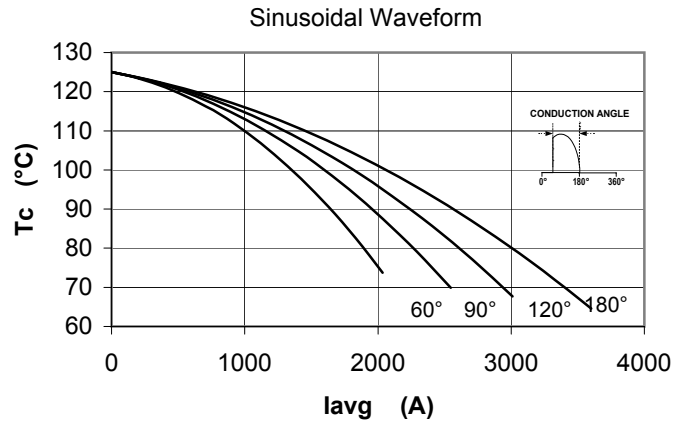
#### MAXIMUM TRANSIENT THERMAL IMPEDANCE



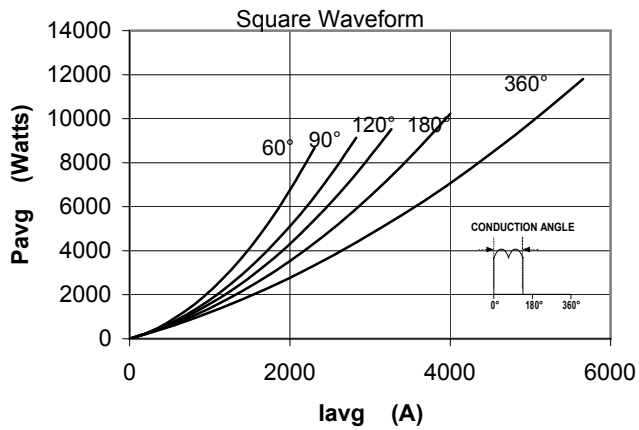
#### Maximum On-State Power Dissipation



#### Maximum Allowable Case Temperature



#### Maximum On-State Power Dissipation



#### Maximum Allowable Case Temperature

