

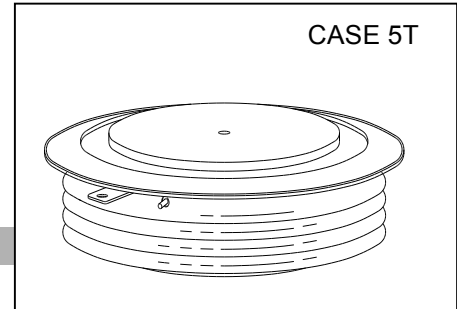
# KP4000A/800V

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## HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

### Features:

- . All Diffused Structure
- . Spoke Amplifying Gate Configuration
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device



## ELECTRICAL CHARACTERISTICS AND RATINGS

### Blocking - Off State

Device Type	V <sub>RRM</sub> (1)	V <sub>DRM</sub> (1)	V <sub>RSM</sub> (1)
KP4000	800	800	900

- V<sub>RRM</sub> = Repetitive peak reverse voltage  
 V<sub>DRM</sub> = Repetitive peak off state voltage  
 V<sub>RSM</sub> = Non repetitive peak reverse voltage (2)

Repetitive peak reverse leakage and off state leakage	I <sub>RRM</sub> /I <sub>DRM</sub>	80 mA 150mA (3)
Critical rate of voltage rise	dV/dt (4)	1000V/μsec

### Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	I <sub>T(AV)</sub>		4000		A	Sinewave, 180° conduction, T <sub>c</sub> =85°C
RMS value of on-state current	I <sub>TRMS</sub>		6200		A	Nominal value
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		60000		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
I square t	I <sup>2</sup> t		16.x10 <sup>6</sup>		A <sup>2</sup> s	10.0 msec
Latching current	I <sub>L</sub>		3		A	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		350		mA	V <sub>D</sub> = 24 V; I = 2.5 A
Peak on-state voltage	V <sub>TM</sub>		1.30		V	I <sub>TM</sub> =3000 A; Duty cycle ≤ 0.01%
Critical rate of rise of on-state current (5, 6)	di/dt		800		A/μs	Switching from V <sub>DRM</sub> ≤ 3000 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		200		A/μs	Switching from V <sub>DRM</sub> ≤ 3000 V

### Notes:

All ratings are specified for T<sub>j</sub>=25 °C unless otherwise stated.

- (1) All voltage ratings are specified for an applied 50Hz/60zHz sinusoidal waveform over the temperature range -40 to +125 °C.
- (2) 10 msec. max. pulse width
- (3) Maximum value for T<sub>j</sub> = 125 °C.
- (4) Minimum value for linear and exponential waveshape to 70% rated V<sub>DRM</sub>. Gate open. T<sub>j</sub> = 125 °C.
- (5) Non-repetitive value.
- (6) The value of di/dt is established in accordance with EIA/NIMA Standard RS-397, Section5-2-2-6. The value defined would be in addition to that obtained from a snubber circuit, comprising a 0.2 μF capacitor and 20 ohmsresistance in parallel with the thristor under test.

**Gating**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	$P_{GM}$		200		W	$t_p = 40 \mu s$
Average gate power dissipation	$P_{G(AV)}$		5		W	
Peak gate current	$I_{GM}$		20		A	
Gate current required to trigger all units	$I_{GT}$		300		mA	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25^\circ C$
Gate voltage required to trigger all units	$V_{GT}$		3		V	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 25^\circ C$
Peak negative voltage	$V_{GRM}$		20		V	

**Dynamic**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	$t_d$		3.0		$\mu s$	$I_{TM} = 50 A; V_D = 2000 V$ Gate pulse: $V_G = 20 V; R_G = 20 \text{ ohms};$ $t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -50 V$ )	$t_q$		600	250	$\mu s$	$I_{TM} > 2000 A; di/dt = 10 A/\mu s;$ $V_R \geq -50 V; \text{Re-applied } dV/dt = 500$ $V/\mu s \text{ linear to } 2000 V; V_G = 0;$ $T_j = 125^\circ C; \text{Duty cycle } \geq 0.01\%$
Reverse recovery current	$I_{rr}$		300		A	$I_{TM} > 2000 A; di/dt = 10 A/\mu s;$ $V_R \geq -50 V$

**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	$T_j$	-40	+125		$^\circ C$	
Storage temperature	$T_{stg}$	-40	+150		$^\circ C$	
Thermal resistance - junction to case	$R_{\theta(j-c)}$		0.006		$^\circ C/W$	Double sided cooled
Thermal resistance - case to sink	$R_{\theta(c-s)}$		0.002		$^\circ C/W$	Double sided cooled * *
Mounting force	F		90		kN	

greased

\* Mounting surfaces smooth, flat and

Note : for case outline and dimensions, see case outline drawing in page 3 of this Technical Data

