

# KP1000A/4000V

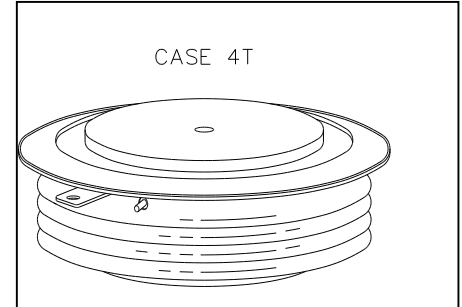
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## HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

### Features:

- . All Diffused Structure
- . Center Amplifying Gate Configuration
- . Blocking capability up to 4000 volts
- . 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)
KP1000	4000	4000	4100

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	I <sub>RRM</sub> / I <sub>DRM</sub>	15 mA 200mA (3)
Critical rate of voltage rise	dV/dt (4)	300 V/μsec

### Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	I <sub>T(AV)</sub>		1150		A	Sinewave, 180° conduction, T <sub>c</sub> =74°C
RMS value of on-state current	I <sub>TRMS</sub>		1800		A	Nominal value
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		15000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
			14000		A	
I square t	I <sup>2</sup> t		937000		A <sup>2</sup> s	8.3 msec and 10.0 msec
Latching current	I <sub>L</sub>		800		mA	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		400		mA	V <sub>D</sub> = 24 V; I = 2.5 A
Peak on-state voltage	V <sub>TM</sub>		2.50		V	I <sub>TM</sub> = 2000 A; T <sub>vj</sub> =125°C
Critical rate of rise of on-state current (5, 6)	di/dt		300		A/μs	Switching from V <sub>DRM</sub> ≤ 1500 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		100		A/μs	Switching from V <sub>DRM</sub> ≤ 1500 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/60Hz 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 80% 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, Section 5-2-2-6. The value defined would be in addition to that obtained from a snubber circuit, comprising a 0.2 μF capacitor and 20 ohms resistance in parallel with the thyristor under test.

**ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)**
**KP1000A/4000V**
**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	$I_{GM}$		10		A	
Gate current required to trigger all units	$I_{GT}$		300 150 125		mA mA mA	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +125^\circ C$
Gate voltage required to trigger all units	$V_{GT}$	0.30	5 3		V V V	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 0-125^\circ C$ $V_D = \text{Rated } V_{DRM}; R_L = 1000 \text{ ohms}; T_j = +125^\circ C$
Peak negative voltage	$V_{GRM}$		5		V	

**Dynamic**

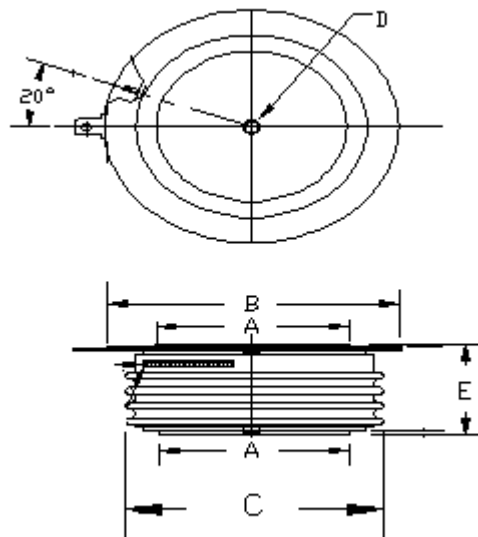
Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	$t_d$		1.5	0.7	$\mu s$	$I_{TM} = 50 A; V_D = \text{Rated } V_{DRM}$ Gate pulse: $V_G = 20 V; R_G = 20 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -50 V$ )	$t_q$		250	125	$\mu s$	$I_{TM} = 1000 A; di/dt = 25 A/\mu s;$ $V_R \geq -50 V; \text{Re-applied } dV/dt = 20 V/\mu s \text{ linear to } 50\% V_{DRM}; V_G = 0;$ $T_j = 125^\circ C; \text{Duty cycle} \geq 0.01\%$
Reverse recovery charge	$Q_{rr}$		*		$\mu C$	$I_{TM} = 1000 A; di/dt = 25 A/\mu s;$ $V_R \geq -50 V$

\* For guaranteed max. value, contact factory.

**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	$R_{\theta(j-c)}$		0.025 0.050		$^\circ C/W$	Double sided cooled Single sided cooled
Thermal resistance - case to sink	$R_{\theta(c-s)}$		0.010 0.020		$^\circ C/W$	Double sided cooled * Single sided cooled *
Mounting force	P	5500 24.5	6000 26.7		lb. kN	

\* Mounting surfaces smooth, flat and greased



- A: 47 mm
- B: 74 mm
- C: 66 mm
- D:  $\varnothing 5 \times 3$  mm
- E: 26 mm