P O S I T I O N I N G KP4000A/1800V - Power Thyristor

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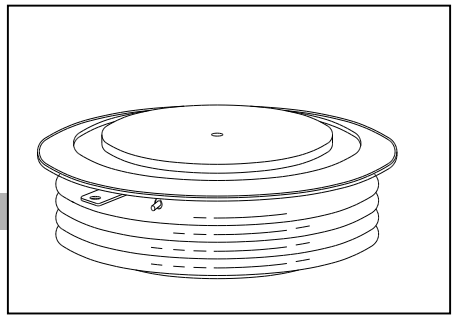
HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

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_{RRM} (1)	V_{DRM} (1)	V_{RSM} (1)
KP4000A	1800	1800	1900

V_{RRM} = Repetitive peak reverse voltage
V_{DRM} = Repetitive peak off state voltage
V_{RSM} = Non repetitive peak reverse voltage (2)

Repetitive peak reverse leakage and off state leakage	I_{RRM} / I_{DRM}	10 mA 200 mA (3)
Critical rate of voltage rise	dV/dt (4)	1000 V/μsec

Notes:
All ratings are specified for Tj=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 Tj = 125 °C.
(4) Minimum value for linear and exponential waveshape to 70% rated V_{DRM}. Gate open. Tj = 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 thristor under test.

Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	$I_{T(AV)}$		4000		A	Sinewave,180° conduction,T_c=70°C
RMS value of on-state current	I_{TRMS}		5640		A	Nominal value
Peak one cpstcle surge (non repetitive) current	I_{TSM}		59200 62000		A A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T_j = 125 °C 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T_j = 125 °C
I square t	I^2t		$2.8x10^6$		A^2s	8.3 msec and 10.0 msec
Latching current	I_L	100	500		mA	V_D = 24 V; R_L= 12 ohms
Holding current	I_H	30	150		mA	V_D = 24 V; I = 2.5 A
Peak on-state voltage	V_{TM}		1.50		V	I_{TM} = 5000;Duty cpstcle ≤ 0.01%
Critical rate of rise of on-state current (5, 6)	di/dt		300		A/μs	Switching from V_{DRM} ≤ 3000 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		100		A/μs	Switching from V_{DRM} ≤ 3000 V

Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		200		W	t_p = 40 us
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}		300 200 125		mA mA mA	V_D = 6 V;R_L = 3 ohms;T_j = -40 °C V_D = 6 V;R_L = 3 ohms;T_j = +25 °C V_D = 6 V;R_L = 3 ohms;T_j = +125°C
Gate voltage required to trigger all units	V_{GT}	 0.30	5 4 		V V V	V_D = 6 V;R_L = 3 ohms;T_j = -40 °C V_D = 6 V;R_L = 3 ohms;T_j = 0-125°C V_D = Rated V_{DRM}; R_L = 1000 ohms; T_j = + 125 °C
Peak negative voltage	V_{GRM}		20		V	

Dynamic

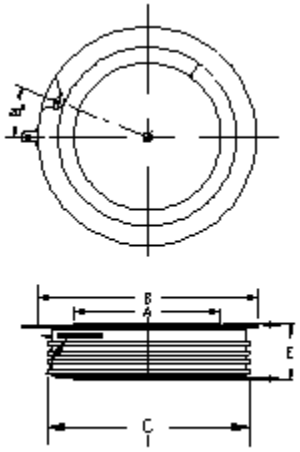
Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		3.0	2.5	µs	I_{TM} = 50 A; V_D = 2000 V Gate pulse: V_G = 20 V; R_G = 20 ohms; t_r = 0.1 µs; t_p = 20 µs
Turn-off time (with V_R = -50 V)	t_q		400	250	µs	I_{TM} > 2000 A; di/dt = 10 A/µs; V_R ≥ -50 V; Re-applied dV/dt = 500 V/µs linear to 2000 V; V_G = 0; T_j = 125 °C; Duty cpstcle ≥ 0.01%
Reverse recovery current	I_{rr}		110		A	I_{TM} > 2000 A; di/dt = 10 A/µs; V_R ≥ -50 V

THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T_j	-40	+125		°C	
Storage temperature	T_{stg}	-40	+150		°C	
Thermal resistance - junction to case	$R_{\theta(j-c)}$		0.012		°C/W	Double sided cooled Single sided cooled
Thermal resistamce - case to sink	$R_{\theta(c-s)}$		0.002		°C/W	Double sided cooled * Single sided cooled *
Mounting force	P	18000	24000		lb.	

Mounting surfaces smooth, flat and greased

CASE OUTLINE AND DIMENSIONS. **KP4000A/1800V - Power Thyristor**



A: 100 mm
B: 150 mm
C: 127 mm
E: 35 mm