



# KP5450-POWER THYRISTOR

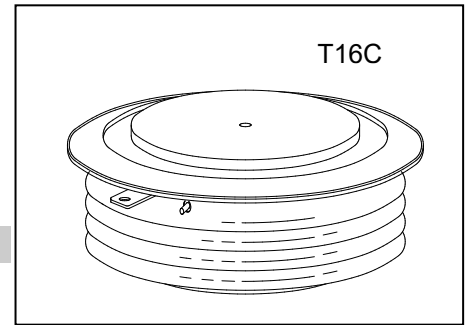
2000-2400  $V_{DRM}$

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## HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

### Features:

- . All Diffused Structure
- . Amplifying Gate Configuration
- . Blocking capability up to 2400 volts
- . 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)
KP5450/20	2000	2000	2200
KP5450/22	2200	2200	2400
KP5450/24	2400	2400	2500

$V_{RRM}$  = 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/ $\mu$ s

#### Notes:

- (1) All voltage ratings are specified for an applied 50Hz sinusoidal waveform over the temperature range  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .
- (2) 10 msec. max. pulse width
- (3) Maximum value for  $T_j = 125^{\circ}\text{C}$ .
- (4) Minimum value for linear and exponential waveshape to 67% rated  $V_{DRM}$ . Gate open.  $T_j = 125^{\circ}\text{C}$ .
- (5) The value of  $di/dt$  is established in accordance with EIA/NIMA Standard JB/T 8950.2-2013

### Conducting - On State

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	$I_{T(AV)}$		5450		A	Sinewave, 180° conduction, $T_c = 70^{\circ}\text{C}$
RMS value of on-state current	$I_{TRMS}$		8557		A	Nominal value
Peak one cycle surge (non repetitive) current	$I_{TSM}$		80000		A	10.0 msec (50Hz), sinusoidal waveshape, 180° conduction, $T_j = 125^{\circ}\text{C}$
I square t	$I^2t$		$3.2 \times 10^7$		$A^2s$	10 msec
Latching current	$I_L$		1000		mA	$V_D = 12\text{V}$ ; $R_L = 12\text{ohms}$
Holding current	$I_H$		200		mA	$V_D = 12\text{V}$ ; $I = 2.5\text{A}$
Peak on-state voltage	$V_{TM}$		1.3		V	$I_{TM} = 5000\text{A}$ ; $T_j = 25^{\circ}\text{C}$
Threshold voltage, low-level	$V_{TO}$		0.86		V	$T_j = 125^{\circ}\text{C}$
Slope resistance, low-level	$r_T$		0.061		$m\Omega$	1000A to 5000A
Critical rate of rise of on-state current(5)	$di/dt$		200		A/ $\mu$ s	$T_j = 125^{\circ}\text{C}$ ; $V_D = 0.67 V_{DRM}$ ; $f = 50\text{Hz}$ ; $I_{TM} = 6000\text{A}$

**Gating**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	$P_{GM}$		20		W	
Average gate power dissipation	$P_{G(AV)}$		4		W	
Gate-trigger current	$I_{GT}$		250		mA	$V_D = 12\text{ V}; R_L = 3\text{ ohms}; T_j = +25\text{ }^\circ\text{C}$
Gate- trigger voltage	$V_{GT}$	0.7	3.0		V	$V_D = 12\text{ V}; R_L = 3\text{ ohms}; T_j = +25\text{ }^\circ\text{C}$
Peak negative voltage	$V_{GRM}$		5		V	

**Dynamic**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	$t_d$		3.0	2.5	$\mu\text{s}$	$I_{TM}=100\text{A}; V_D=67\%V_{DRM}$ Gate pulse: $V_G=30\text{V}; R_G=10\text{ohms};$ $t_r=0.1\mu\text{s}; t_p=20\mu\text{s}$
Turn-off time (with $V_R = -5\text{ V}$ )	$t_q$			450	$\mu\text{s}$	$I_{TM} = 2000\text{A}; di/dt = -10\text{A}/\mu\text{s};$ $V_R = 100\text{V}; dv/dt = 30\text{V}/\mu\text{s};$ $V_D = 67\%V_{DRM}; T_j = 125\text{ }^\circ\text{C}$
Reverse recovery charge	$Q_{rr}$				$\mu\text{C}$	$I_{TM}=2000\text{A}; di/dt=-10\text{A}/\mu\text{s};$ $V_R=100\text{V}; T_j=125\text{ }^\circ\text{C}$

**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	$T_j$	-40	+125		$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-40	+140		$^\circ\text{C}$	
Thermal resistance - junction to case	$R_{\Theta(j-c)}$		0.006		$^\circ\text{C}/\text{W}$	Double sided cooled
Thermal resistance - case to heatsink	$R_{\Theta(c-s)}$		0.0015		$^\circ\text{C}/\text{W}$	Double sided cooled
Mounting force	F	76	84	80	kN	
Weight	m			1.9	kg	

\* Mounting surfaces smooth, flat and greased

