



T52P2000F Series

500 – 1400 V_{RMS}, 2000 A_{RMS}
Fast Recovery Thyristor

Features:

- All Diffused Structure
- Interdigitated Amplifying Gate Configuration
- Blocking capability up to 1400 volts
- 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⁾
T52P2000F500	500	500	600
T52P2000F600	600	600	720
T52P2000F800	800	800	960
T52P2000F1000	1000	1000	1150
T52P2000F1200	1200	1200	1300
T52P2000F1400	1400	1400	1500

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	I _{RRM} / I _{DRM}	15 mA 65 mA ⁽³⁾
Critical rate of voltage rise	dV/dt ⁽⁴⁾	500 V/μsec

Conducting - On State

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
RMS value of on-state current	I _{TRMS}		2000		A	Nominal value
Peak one cycle surge (non-repetitive) current	I _{TSM}		16000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T _j = 125 °C
			14600		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T _j = 125 °C
I square t	I ² t		1.06x10 ⁶		A ² s	8.3 msec and 10.0 msec
Latching current	I _L		1000		mA	V _D = 24 V; R _L = 12 ohms
Holding current	I _H		500		mA	V _D = 24 V; I = 2.5 A

Notes:

All ratings are specified for T_j=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_j = 125°C.

(4) Minimum value for linear and exponential waveshape to 80% rated V_{DRM}. Gate open. T_j = 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.



Peak on-state voltage	V_{TM}		2.6		V	$I_{TM} = 4000 \text{ A}$; Duty cycle $\leq 0.01\%$
Critical rate of rise of on-state current ^(5, 6)	di/dt		800		A/ μs	Switching from $V_{DRM} \leq 1000 \text{ V}$, non-repetitive
Critical rate of rise of on-state current ⁽⁶⁾	di/dt		400		A/ μs	Switching from $V_{DRM} \leq 1000 \text{ V}$

Gating

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

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		1.5	0.7	μs	$I_{TM} = 50 \text{ A}$; $V_D = \text{Rated } V_{DRM}$ Gate pulse: $V_G = 20 \text{ V}$; $R_G = 20 \text{ ohms}$; $t_r = 0.1 \mu\text{s}$; $t_p = 20 \mu\text{s}$
Turn-off time (with $V_R = -50 \text{ V}$)	t_q		35		μs	$I_{TM} = 1000 \text{ A}$; di/dt = $100 \text{ A}/\mu\text{s}$; $V_R \geq -50 \text{ V}$; Re-applied dV/dt = $200 \text{ V}/\mu\text{s}$ linear to $80\% V_{DRM}$; $V_G = 0$; $T_J = 125^\circ\text{C}$; Duty cycle $\geq 0.01\%$
Reverse recovery charge	Q_{rr}		*	400	μC	$I_{TM} = 1000 \text{ A}$; di/dt = $100 \text{ A}/\mu\text{s}$; $V_R \geq -50 \text{ V}$

* 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		°C	
Storage temperature	T _{STG}	-40	+150		°C	
Thermal resistance – junction to case	R _{Θ(j-c)}		0.023 0.045		°C/W	Double sided cooled Single sided cooled
Thermal resistance – case to sink	R _{Θ(c-s)}		0.010 0.020		°C/W	Double sided cooled * Single sided cooled *
Mounting force	P	5500 24.5	6000 26.7		lb. kN	
Weight	W			16 460	oz. g	

* Mounting surfaces smooth, flat, and greased

CASE OUTLINE AND DIMENSIONS

