



T77P3000F

2000 – 2800 Volts, 3000 Amps
Fast Recovery High Power Thyristor

Features:

- All Diffused Structure
- Linear Amplifying Gate Configuration
- Blocking capability up to 2800 volts
- Guaranteed Maximum Turn-Off Time
- High dV/dt Capability
- Pressure Assembled Device



ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

Device Type	$V_{RRM}^{(1)}$	$V_{DRM}^{(1)}$	$V_{RSM}^{(1)}$
T77P3000F2000	2000	2000	2100
T77P3000F2200	2200	2200	2300
T77P3000F2400	2400	2400	2500
T77P3000F2600	2600	2600	2700
T77P3000F2800	2800	2800	2900

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}	20 mA 100 mA ⁽³⁾
Critical rate of voltage rise	$dV/dt^{(4)}$	500 V/ μ sec

Conducting - On State

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	$I_{T(AV)}$		3000		A	Sinewave, 180° conduction, $T_C=65^\circ C$
RMS value of on-state current	I_{TRMS}		5100		A	Nominal value
Peak one cycle surge (non-repetitive) current	I_{TSM}		48000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, $T_J = 125^\circ C$ 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, $T_J = 125^\circ C$
			43500		A	
I square t	I^2t		8.2×10^6		A^2s	8.3 msec and 10.0 msec
Latching current	I_L		1000		mA	$V_D = 24 V$; $R_L = 12 \text{ ohms}$
Holding current	I_H		500		mA	$V_D = 24 V$; $I = 2.5 A$

Notes:

All ratings are specified for $T_J=25^\circ C$ unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range -40 to $+125^\circ C$.

(2) 10 msec. max. pulse width

(3) Maximum value for $T_J = 125^\circ C$.

(4) Minimum value for linear and exponential waveshape to 80% rated V_{DRM} . Gate open. $T_J = 125^\circ C$.

(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}		2.45		V	$I_{TM} = 7850$ A; Duty cycle $\leq 0.01\%$
Critical rate of rise of on-state current ^(5, 6)	di/dt		800		A/ μ s	Switching from $V_{DRM} \leq 1000$ V, non-repetitive
Critical rate of rise of on-state current ⁽⁶⁾	di/dt		400		A/ μ s	Switching from $V_{DRM} \leq 1000$ V

Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		200		W	$t_p = 40$ μ s
Average gate power dissipation	$P_{G(AV)}$		5		W	
Peak gate current	I_{GM}		15		A	
Gate current required to trigger all units	I_{GT}		300 200 125		mA mA mA	$V_D = 6$ V; $R_L = 3$ ohms; $T_J = -40^\circ$ C $V_D = 6$ V; $R_L = 3$ ohms; $T_J = +25^\circ$ C $V_D = 6$ V; $R_L = 3$ ohms; $T_J = +125^\circ$ 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; $T_J = -40^\circ$ C $V_D = 6$ V; $R_L = 3$ ohms; $T_J = 0-125^\circ$ C $V_D = \text{Rated } V_{DRM}$; $R_L = 1000$ ohms; $T_J = +125^\circ$ C
Peak negative voltage	V_{GRM}		20		V	

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		1.2	0.9	μ s	$I_{TM} = 50$ A; $V_D = 1500$ V Gate pulse: $V_G = 20$ V; $R_G = 20$ ohms; $t_r = 0.1$ μ s; $t_p = 20$ μ s
Turn-off time (with $V_R = -50$ V)	t_q			75	μ s	$I_{TM} = 4000$ A; $di/dt = 10$ A/ μ s; $V_R \geq -50$ V; Re-applied $dV/dt = 20$ V/ μ s linear to 80% V_{DRM} ; $V_G = 0$; $T_J = 125^\circ$ C; $t_p = 1000$ μ s
Reverse recovery current	I_{rr}			N/A	A	$I_{TM} > 2000$ A; $di/dt = 10$ A/ μ 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		°C	
Storage temperature	T _{STG}	-40	+150		°C	
Thermal resistance – junction to case	R _{Θ(j-c)}		0.009 0.018		°C/W	Double sided cooled Single sided cooled
Thermal resistance – case to sink	R _{Θ(c-s)}		0.002 0.004		°C/W	Double sided cooled * Single sided cooled *
Mounting force	P	14100 63.0	16000 71.0		lb. kN	INCORRECT
Weight	W				Lb. Kg.	

* Mounting surfaces smooth, flat and greased

CASE OUTLINE AND DIMENSIONS

