



# TPF SERIES 30MM

500 - 1400 V<sub>RRM</sub>, 600 A<sub>RRMS</sub>

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 <sub>RRM</sub> <sup>(1)</sup>	V <sub>DRM</sub> <sup>(1)</sup>	V <sub>RSM</sub> <sup>(1)</sup>
T30P600F500	500	500	600
T30P600F600	600	600	720
T30P600F800	800	800	960
T30P600F1000	1000	1000	1150
T30P600F1200	1200	1200	1300
T30P600F1400	1400	1400	1500

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<sup>(2)</sup>

Repetitive peak reverse leakage and off state leakage	I <sub>RRM</sub> / I <sub>DRM</sub>	20 mA 40 mA <sup>(3)</sup>
Critical rate of voltage rise <sup>(4)</sup>	dV/dt	400 V/μsec

### Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
RMS value of on-state current	I <sub>TRMS</sub>		600		A	Nominal value
Peak one cycle surge (non-repetitive) current	I <sub>TSM</sub>		6000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>J</sub> = 125°C
			5500		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>J</sub> = 125°C
I square t	I <sup>2</sup> t		15000 0		A <sup>2</sup> s	8.3 msec and 10.0 msec
Latching current	I <sub>L</sub>		1000		mA	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		500		mA	V <sub>D</sub> = 24 V; I = 2.5 A

### 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 wave shape 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.



Peak on-state voltage	$V_{TM}$		2.50		V	$I_{TM} = 1200 \text{ A}$ ; Duty cycle $\leq 0.01\%$
Critical rate of rise of on-state current <sup>(5, 6)</sup>	$di/dt$		800		A/ $\mu\text{s}$	Switching from $V_{DRM} \leq 1000 \text{ V}$ , non-repetitive
Critical rate of rise of on-state current <sup>(6)</sup>	$di/dt$		400		A/ $\mu\text{s}$	Switching from $V_{DRM} \leq 1000 \text{ V}$

**Gating**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	$P_{GM}$		200		W	$t_p = 40 \mu\text{s}$
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	$V_D = 6 \text{ V}; R_L = 3 \text{ ohms}; T_J = -40^\circ\text{C}$ $V_D = 6 \text{ V}; R_L = 3 \text{ ohms}; T_J = +25^\circ\text{C}$ $V_D = 6 \text{ V}; R_L = 3 \text{ ohms}; T_J = +125^\circ\text{C}$
Gate voltage required to trigger all units	$V_{GT}$	0.15	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	$\mu\text{s}$	$I_{TM} = 50 \text{ A}$ ; $V_D = \text{Rated } V_{DRM}$ 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 $V_R = -50 \text{ V}$ )	$t_q$		20		$\mu\text{s}$	$I_{TM} = 500 \text{ A}$ ; $di/dt = 25 \text{ A}/\mu\text{s}$ ; $V_R \geq -50 \text{ V}$ ; 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	$Q_{rr}$		*		$\mu\text{C}$	$I_{TM} = 500 \text{ A}$ ; $di/dt = 25 \text{ A}/\mu\text{s}$ ; $V_R \geq -50 \text{ V}$

\* For guaranteed max. value contact factory.



**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T <sub>J</sub>	-40	+125		°C	
Storage temperature	T <sub>STG</sub>	-40	+150		°C	
Thermal resistance – junction to case	R <sub>Θ(j-c)</sub>	0.045 (1)	0.055 (2)		°C/W	Double sided cooled (1) @ 2000 lb.; (2) @ 800 lb.
Thermal resistance – junction to case	R <sub>Θ(j-c)</sub>	0.090 (1)	0.110 (2)		°C/W	Single sided cooled (1) @ 2000 lb.; (2) @ 800 lb.
Thermal resistance – case to sink	R <sub>Θ(c-s)</sub>		.030 .060		°C/W	Double sided cooled * Single sided cooled *
Mounting force	P	800 3.6	2500 11.1		lb. kN	
Weight	W			2.5 70	oz. g	

\* Mounting surfaces smooth, flat and greased

**CASE OUTLINE AND DIMENSIONS**

