



TPF SERIES 38MM

1500 – 2000 V_{RRM} , 900 A_{RMS}

Fast Recovery Thyristor

Features:

- All Diffused Structure
- Interdigitated Amplifying Gate Configuration
- Blocking capability up to 2000 volts
- Guaranteed Maximum Turn-Off Time
- High dV/dt Capability
- Pressure Assembled Device



ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

Device Type	$V_{RRM}^{(1)}$	$V_{DRM}^{(1)}$	$V_{RSM}^{(1)}$
T38P900F1500	1500	1500	1600
T38P900F1600	1600	1600	1700
T38P900F1700	1700	1700	1800
T38P900F1800	1800	1800	1900
T38P900F1900	1900	1900	2000
T38P900F2000	2000	2000	2100

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}	15 mA 50 mA ⁽³⁾
Critical rate of voltage rise ⁽⁴⁾	dV/dt	500 V/ μ sec

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.

Conducting - On State

Parameter	Symbol	Min.	Max.	Units	Conditions
RMS value of on-state current	I_{TRMS}		900	A	Nominal value
Peak one cycle surge (non-repetitive) current	I_{TSM}		7800	A	8.3 msec (60Hz), sinusoidal waveshape, 180° conduction, $T_J = 125^\circ C$
			7200	A	10.0 msec (50Hz), sinusoidal waveshape, 180° conduction, $T_J = 125^\circ C$
I square t	I^2t		250000	A^2s	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	$V_D = 24 V$; $I = 2.5 A$
Peak on-state voltage	V_{TM}		2.5	V	$I_{TM} = 2000 A$; $T_J = 125^\circ C$
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		200	A/μs	Switching from V _{DRM} ≤ 1000 V
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Gating

Parameter	Symbol	Min.	Max.	Units	Conditions
Peak gate power dissipation	P _{GM}		200	W	t _p = 40 μs
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}		400	mA	V _D = 6 V; R _L = 3 ohms; T _J = -40°C
			200	mA	V _D = 6 V; R _L = 3 ohms; T _J = +25°C
			150	mA	V _D = 6 V; R _L = 3 ohms; T _J = +125°C
Gate voltage required to trigger all units	V _{GT}	0.25	5	V	V _D = 6 V; R _L = 3 ohms; T _J = -40°C
			3	V	V _D = 6 V; R _L = 3 ohms; T _J = 0-125°C
				V	V _D = Rated V _{DRM} ; R _L = 1000 ohms; T _J = + 125°C
Peak negative voltage	V _{GRM}		5	V	

Dynamic

Parameter	Symbol	Max.	Typ.	Units	Conditions
Delay time	t _d	3.0	1.5	μs	I _{TM} = 500 A; V _D = 1000 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	30		μs	I _{TM} = 500 A; di/dt = 30 A/μs; V _R ≥ -50 V; Re-applied dV/dt = 100 V/μs linear to 80% V _{DRM} ; V _G = 0; T _J = 125°C; Duty cycle ≥ 0.01%
Reverse recovery charge	I _{rr}	185		A	I _{TM} = 500 A; di/dt = 30 A/μs; V _R ≥ -50 V; T _J = 125°C



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)}		0.040 0.080		°C/W	Double sided cooled Single sided cooled
Thermal resistance – Case to Sink	R _{Θ(c-s)}		0.015 0.030		°C/W	Double sided cooled * Single sided cooled *
Mounting force	P	3000 13.3	3500 15.5		lb. kN	
Weight	W			9 225	oz. g	

* Mounting surfaces smooth, flat and greased

CASE OUTLINE AND DIMENSIONS

