TPF SERIES 38MM

500 – 1400 V_{RRM}, 1000 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)
T38P1000F500	500	500	600
T38P1000F600	600	600	720
T38P1000F800	800	800	960
T38P1000F1000	1000	1000	1150
T38P1000F1200	1200	1200	1300
T38P1000F1400	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 leakage	I_{RRM} / I_{DRM}	15 mA 35 mA(3)
Critical rate of voltage rise (4)	dV/dt	500 V/µsec

Notes:
All ratings are specified for T_J=25°C unless otherwise stated.
(1) All voltage ratings are specified for an applied 50Hz/60zHz 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.

Conducting - On State

Parameter	Symbol	Min.	Max.	Units	Conditions
RMS value of on-state current	I_{TRMS}		1000	A	Nominal value
Peak one cycle surge (non-repetitive) current	I_{TSM}		10000 9100	A A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T_J = 125°C 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T_J = 125°C
I square t	I^2t		415000	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; Duty cycle ≤ 0.01%

Critical rate of rise of on-state current [5, 6]	di/dt		800	A/µs	Switching from $V_{DRM} \leq 1000$ V, non-repetitive
Critical rate of rise of on-state current [6]	di/dt		400	A/µs	Switching from $V_{DRM} \leq 1000$ V

Gating

Parameter	Symbol	Min.	Max.	Units	Conditions
Peak gate power dissipation	P_{GM}		200	W	t_p = 40 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}		400 200 150	mA mA mA	V_D = 6 V; R_L = 3 ohms; T_J = -40°C V_D = 6 V; R_L = 3 ohms; T_J = +25°C V_D = 6 V; R_L = 3 ohms; T_J = +125°C
Gate voltage required to trigger all units	V_{GT}	0.25	5 3	V V V	V_D = 6 V; R_L = 3 ohms; T_J = -40°C V_D = 6 V; R_L = 3 ohms; T_J = 0-125°C 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	1.5	0.5	µs	I_{TM} = 500 A; V_D = Rated V_{DRM} 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	25 To 40		µs	I_{TM} = 500 A; di/dt = 30 A/µs; $V_R \geq$ -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	Q_{rr}	*		µC	I_{TM} = 500 A; di/dt = 25 A/µs; $V_R \geq$ -50 V

* For guaranteed max. value, consult 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	$R_{\Theta (j-c)}$		0.040 0.080		°C/W	Double sided cooled Single sided cooled
Thermal resistance – Case to Sink	$R_{\Theta (c-s)}$		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