

FR1000AX50 Fast Switching Reverse-conducting Thyristor
2500 V_{DRM}; 1550 A rms
RCT FOR INVERTER AND CHOPPER APPLICATIONS
Features:

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Blocking capability up to 2500 volts
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device

ELECTRICAL CHARACTERISTICS AND RATINGS
Blocking - Off State

Device Type	V _{DRM} (1)	V _{DSM} (1)
FR1000AX50	2500	2500

V_{DRM} = Repetitive peak off state voltage

Repetitive peak off state leakage	I _{DRM}	20 mA 80mA (3)
Critical rate of voltage rise	dV/dt (4)	700 V/μsec

Conducting - on state

Parameter	Symbol	Max.	Typ.	Units	Conditions
RMS value of on-state current	I _{TRMS}	1550		A	Nominal value
Average on-state current	I _{T(AV)}	1000		A	Continuous single-phase, half sine wave, 180° conduction
Peak one cycle surge (non repetitive) current	I _{TSM}	14000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T _j = 125 °C
I square t	I ² t	8.2.x 10 ⁵		A ² s	8.3 msec and 10.0 msec
RMS reverse current	I _{R(RMS)}	630		A	
Average reverse current	I _{R(AV)}	400		A	Continuous single-phase, half sine wave, 180° conduction
Peak on-state voltage	V _{TM}	2.2		V	I _{TM} =1000A T _j = 125 °C
Peak reverse voltage	V _{RM}	4.0		V	I _{RM} =1200A, T _j = 125 °C
Critical rate of rise of on-state current	di/dt	300		A/μs	V _D =1/2V _{DRM} , I _{TM} =800A f=60Hz I _{GM} =1.5A, di _G /dt=1.0A/us, T _j =125°C
Critical rate of decrease of reverse commutating current	(di/dt) _C	200		A/μs	I _{TM} =4000A, t _w =60us, I _{RM} =4000A, dv/dt=700V/us, V _{DM} =1/2V _{DRN} , T _j =125°C, S aturable reactor 7500v.us

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.

ELECTRICAL CHARACTERISTICS AND RATINGS (cont.)
Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		30		W	$t_p = 40 \mu s$
Average gate power dissipation	$P_{G(AV)}$		8		W	
Peak gate current	I_{GM}		10		A	
Gate current required to trigger all units	I_{GT}		350		mA	$V_D = 6 V; R_L = 2 \text{ ohms}; T_j = +25 \text{ }^\circ\text{C}$
Gate voltage required to trigger all units	V_{GT}		4		V	$V_D = 6 V; R_L = 2 \text{ ohms}; T_j = 25^\circ\text{C}$
Peak non- trigger voltage	V_{GD}		0.2		V	$T_j = 125 \text{ }^\circ\text{C}; V_D = 1/2 V_{DRM}$

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Turn-off time	t_q		50		μs	$I_{TM} = 4000 \text{ A}; di_1/dt = -200 \text{ A}/\mu s;$ $di_2/dt = 50 \text{ A}/\mu s, I_{RM} = 500 \text{ A}; dV/dt = 700 \text{ V}/\mu s$ $V_{DR} = 1250 \text{ V}$ $T_j = 125 \text{ }^\circ\text{C}; t_w = 60 \mu s$

* 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		$^\circ\text{C}$	
Storage temperature	T_{stg}	-40	+150		$^\circ\text{C}$	
Thyristor part thermal resistance - junction to fin	$R_{\theta I(j-f)}$		0.022		$^\circ\text{C}/\text{W}$	Double sided cooled
Diode part thermal resistance - junction to fin	$R_{\theta III(j-f)}$		0.070		$^\circ\text{C}/\text{W}$	Double sided cooled
Mounting force	P		45		kN	
Weight	W		670		g	

* Mounting surfaces smooth, flat and greased

CASE OUTLINE AND DIMENSIONS.

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