

**FR1000BX ( BW ) Fast Switching Reverse-conducting Thyristor**

**2500 V<sub>DRM</sub>; 1550 A rms**

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**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 <sub>DRM</sub> (1)	V <sub>DSM</sub> (1)
FR1000BX50	2500	2500
FR1000BW50	2500	2500

V<sub>DRM</sub> = Repetitive peak off state voltage

Repetitive peak off state leakage	I <sub>DRM</sub>	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 <sub>TRMS</sub>		1550		A	Nominal value
Average on-state current	I <sub>T(AV)</sub>	FR1000BX FR1000BW	1000		A	Continuous single-phase, half sine wave, 180° conduction
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		14000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
I square t	I <sup>2</sup> t		8.2.x 10 <sup>5</sup>		A <sup>2</sup> s	8.3 msec and 10.0 msec
RMS reverse current	I <sub>R(RMS)</sub>		630		A	
Average reverse current	I <sub>R(AV)</sub>		400		A	Continuous single-phase, half sine wave, 180° conduction
Peak on-state voltage	V <sub>TM</sub>	FR1000BX FR1000BW	2.2 3.0		V	I <sub>TM</sub> =1000A T <sub>j</sub> = 125 °C I <sub>TM</sub> =2400A; T <sub>j</sub> = 125 °C
Peak reverse voltage	V <sub>RM</sub>		4		V	I <sub>RM</sub> =1200A, T <sub>j</sub> = 125 °C
Critical rate of rise of on-state current	di/dt		300		A/μs	V <sub>D</sub> =1/2V <sub>DRM</sub> , I <sub>TM</sub> =800A f=60Hz I <sub>GM</sub> =1.5A, di <sub>G</sub> /dt=1.0A/us, T <sub>j</sub> =125°C
Critical rate of decrease of reverse commutating current	(di/dt) <sub>C</sub>	FR1000BX FR1000BW	200		A/μs	I <sub>TM</sub> =4000A, tw=60us, I <sub>RM</sub> =4000A, dv/dt=700V/us, V <sub>DM</sub> =1/2V <sub>DRN</sub> , T <sub>j</sub> =125°C, S aturable reactor 7500v.us

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/60zHz 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 waveshape to 80% rated V<sub>DRM</sub>. Gate open. T<sub>j</sub> = 125 °C.
- (5) Non-repetitive value.

**Gating**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	$P_{GM}$		16		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	$V_D = 6 V; R_L = 2 \text{ ohms}; T_j = +25^\circ C$
Gate voltage required to trigger all units	$V_{GT}$		4		V	$V_D = 6 V; R_L = 2 \text{ ohms}; T_j = 25^\circ C$
Peak non- trigger voltage	$V_{GD}$		0.2		V	$T_j = 125^\circ C; V_D = 1/2 V_{DRM}$

**Dynamic**

Parameter	Symbol		Max.	Typ.	Units	Conditions
Turn-off time	$t_q$	FR1000BX	35		$\mu s$	$I_{TM} = 4000 A; di_1/dt = -200 A/\mu s; di_2/dt = 50 A/\mu s, I_{RM} = 500 A; dV/dt = 700 V/\mu s V_{DR} = 1250 V; T_j = 125^\circ C; tw = 60 \mu s$
		FR1000BW	50			

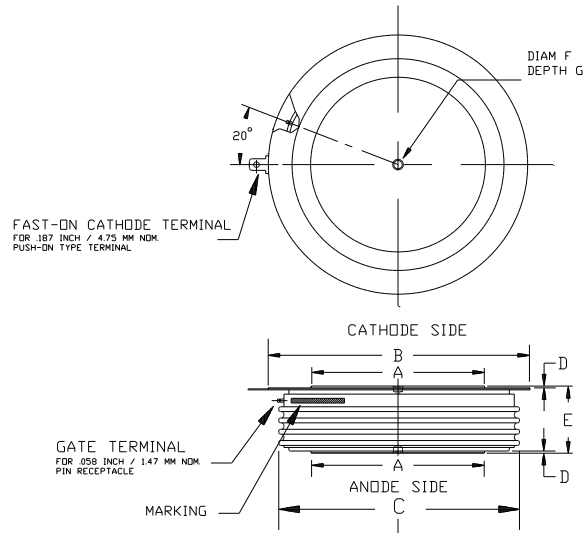
\* For guaranteed max. value, contact factory.

**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	$T_j$	-40	+125		$^\circ C$	
Storage temperature	$T_{stg}$	-40	+150		$^\circ C$	
Thyristor part thermal resistance - junction to fin	$R_{\theta J (j-f)}$		0.022		$^\circ C/W$	Double sided cooled
Diode part thermal resistance – junction to fin	$R_{\theta J (j-f)}$		0.070		$^\circ C/W$	Double sided cooled
Mounting force	P				lb. kN	
Weight	W				g	

\* Mounting surfaces smooth, flat and greased

Note : for case outline and dimensions, see case outline drawing in page 4 of this Technical Data



**CASE 6T  
NOMINAL OUTLINE DIMENSIONS**

DIMENSIONS	INCH	MM
DIAM. A	2.47	62.7
DIAM. B	3.91	99.3
DIAM. C	3.50	88.9
D	.030	.76
E	1.300 / 1.340	32.02 / 34.04
F	.140	3.56
G	.080	2.03