MITSUBISHI GATE COMMUTATED TURN-OFF THYRISTORS

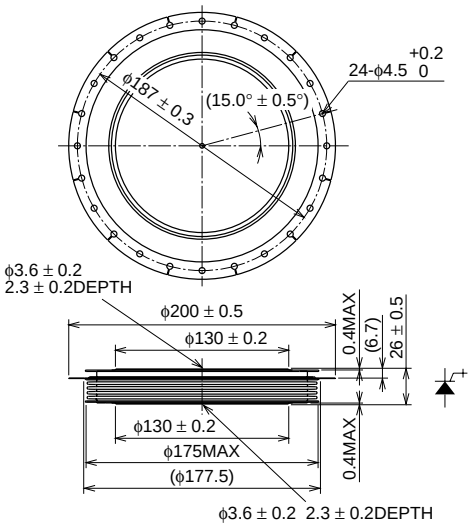
FGC6000AX-120DS

HIGH POWER INVERTER USE
PRESS PACK TYPE

FGC6000AX-120DS

- I_{TQRM} Repetitive controllable on-state current 6000A
- $I_{T(AV)}$ Average on-state current 2000A
- V_{DRM} Repetitive peak off-state voltage 6000V
- Anode short type

OUTLINE DRAWING **Dimensions in mm**



APPLICATION

Inverters, DC choppers, Induction heaters, DC to DC converters.

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	Unit
V_{RRM}	Repetitive peak reverse voltage	22	V
V_{RSM}	Non-repetitive peak reverse voltage	22	V
$V_{R(DC)}$	DC reverse voltage	22	V
V_{DRM}	Repetitive peak off-state voltage*	6000	V
V_{DSM}	Non-repetitive peak off-state voltage*	6000	V
$V_{D(DC)}$	DC off-state voltage*	4800	V
V_{LTDS}	Long term DC stability voltage*	3200	V

* : V_{GK} = –2V

Symbol	Parameter	Conditions	Ratings	Unit
I_{TQRM}	Repetitive controllable on-state current	V_{DM} = 5500V, V_D = 3000V, L_C = 0.3μH, V_{RG} = 20V di_{GQ}/dt = 10000A/μs, Tj = 25/125°C (see Fig. 1, 2)	6000	A
$I_{T(RMS)}$	RMS on-state current	Applied for all conduction angles f = 60Hz, sinewave θ = 180°, T_f = 72°C	3100	A
$I_{T(AV)}$	Average on-state current		2000	A
I_{TSM}	Surge on-state current	One half cycle at 60Hz, T_j = 125°C	40	kA
I^2t	Current-squared, time integration		6.7×10^6	A^2s
di/dt	Critical rate of rise of on-state current	I_T = 6000A, V_D = 3000V, I_{GM}= 300A, T_j= 125°C di_G/dt = 200A/μs (see Fig. 1, 2)	1000	A/μs
V_{FGM}	Peak forward gate voltage		10	V
V_{RGM}	Peak reverse gate voltage		22	V
I_{FGM}	Peak forward gate current		1500	A
I_{RGM}	Peak reverse gate current		6000	A
P_{FGM}	Peak forward gate power dissipation		15	kW
P_{RGM}	Peak reverse gate power dissipation		180	kW
$P_{FG(AV)}$	Average forward gate power dissipation		300	W
$P_{RG(AV)}$	Average reverse gate power dissipation		900	W
T_j	Junction temperature		–40 ~ +125	°C
T_{stg}	Storage temperature		–40 ~ +150	°C
—	Mounting force required	(Recommended value 108kN)	98 ~ 118	kN
—	Weight	Typical value	3700	g

Mar. 2001

MITSUBISHI ELECTRIC

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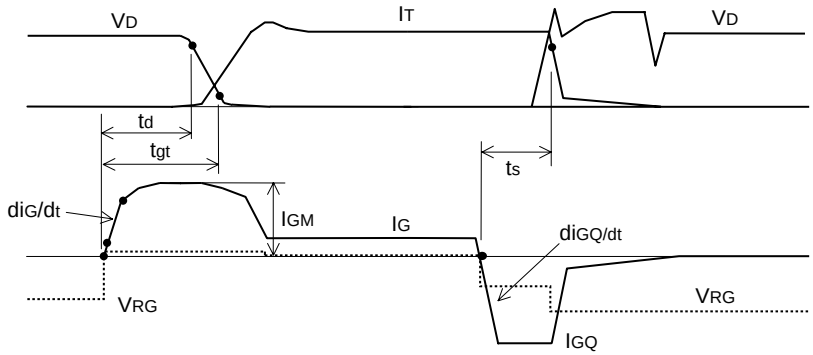
ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{TM}	On-state voltage	I_T = 6000A, T_j = 125°C	—	—	4.0	V
I_{RRM}	Repetitive peak reverse current	V_{RM} = 22V, T_j = 125°C	—	—	100	mA
I_{DRM}	Repetitive peak off-state current	V_D = 6000V, V_{GK} = –2V, T_j = 125°C	—	—	320	mA
I_{GRM}	Reverse gate current	V_{RM} = 22V, T_j = 125°C	—	—	100	mA
dv/dt	Critical rate of rise of off-state voltage	V_D = 3000V, V_{GK} = –2V, T_j = 125°C (see Fig. 3)	3000	—	—	V/µs
t_{gt}	Turn-on time	V_D = 3000V, I_T = 6000A, I_{GM} = 300A, T_j = 125°C di/dt = 1000A/µs, di_G/dt = 200A/µs (see Fig. 2)	—	—	5.0	µs
t_s	Storage time	I_T = 6000A, V_D =3000V, di_{GQ}/dt = 10000A/µs, T_j = 125°C, L_C = 0.3µH, V_{RG} = 20V (see Fig. 2)	—	—	3.0	µs
I_{GT}	Gate trigger current	DC METHOD : V_D = 24V, R_L = 0.1Ω, T_j = 25°C	—	—	8.0	A
V_{GT}	Gate trigger voltage		—	—	1.5	V
$R_{th(j-f)}$	Thermal resistance	Junction to fin	—	—	0.0044	°C/W

Fig. 1 Turn-on and Turn-off waveform



t_d ; 0V_G ~ 0.9V_D
t_{gt} ; 0V_G ~ 0.1V_D
di_G/dt ; 0.1I_{GM} ~ 0.9I_{GM}
t_s ; 0V_G ~ 0.9I_T
di_{GQ}/dt ; 0.1I_{GQ} ~ 0.9I_{GQ}

Fig. 2 Turn-on and Turn-off test circuit
(With clamp circuit)

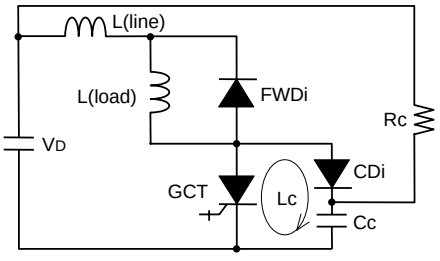
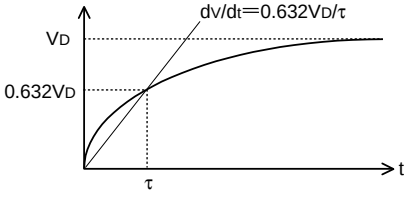


Fig. 3 dv/dt test waveform



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