

FGC6000AX-120DS

HIGH POWER INVERTER USE
PRESS PACK TYPE

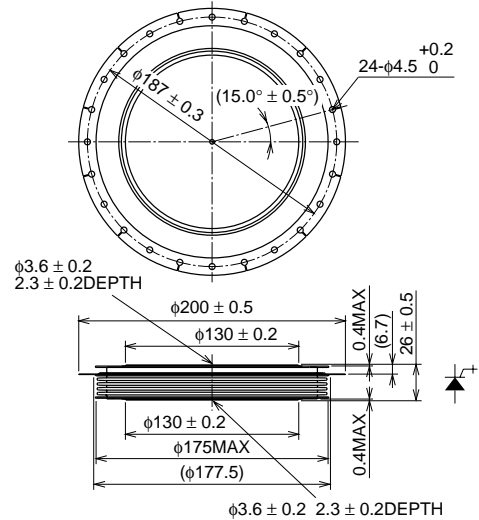
FGC6000AX-120DS



- Asymmetrical GCT
- ITQRM Repetitive controllable on-state current 6000A
- IT(AV) Average on-state current 2000A
- VDRM Repetitive peak off-state voltage 6000V
- VRRM Repetitive peak reverse voltage 22V

OUTLINE DRAWING

Dimensions in mm



APPLICATION

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

MAXIMUM RATINGS

Symbol	Parameter	Conditions	Voltage class	Unit
VRRM	Repetitive peak reverse voltage	—	22	V
VRSM	Non-repetitive peak reverse voltage	—	22	V
VDRM	Repetitive peak off-state voltage	VGK = -2V	6000	V
VDSM	Non-repetitive peak off-state voltage	VGK = -2V	6000	V
VLDS	Long term DC stability voltage	VGK = -2V, λ = 100 Fit	3200	V

Symbol	Parameter	Conditions	Ratings	Unit
ITQRM	Repetitive controllable on-state current	VDM = 5500V, VD = 3000V, CC = 6μF, LC = 0.4μH, VRG = 20V diG/dt = 10000A/μs, Tj = 25/125°C (see Fig. 1, 2)	6000	A
IT(RMS)	RMS on-state current	Applied for all conduction angles	3100	A
IT(AV)	Average on-state current	f = 60Hz, sinewave θ = 180°, Tr = 72°C	2000	A
ITSM	Surge on-state current	One half cycle at 60Hz, Tj = 125°C	50	kA
∫I ² t	Current-squared, time integration		10.4 × 10 ⁶	A ² s
di/dt	Critical rate of rise of on-state current	IT = 6000A, VD = 3000V, IGM = 300A, Tj = 25/125°C diG/dt = 200A/μs (see Fig. 1, 2)	1000	A/μs
VFGM	Peak forward gate voltage		10	V
VRGM	Peak reverse gate voltage		22	V
IFGM	Peak forward gate current		1500	A
IRGM	Peak reverse gate current		6000	A
PFGM	Peak forward gate power dissipation		15	kW
PRGM	Peak reverse gate power dissipation		180	kW
PFG(AV)	Average forward gate power dissipation		300	W
PRG(AV)	Average reverse gate power dissipation		900	W
Tj	Junction temperature		-40 ~ +125	°C
Tstg	Storage temperature		-40 ~ +150	°C
—	Mounting force required	(Recommended value 108kN)	98 ~ 118	kN
—	Weight	Typical value	3700	g

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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	V
I _{RRM}	Repetitive peak reverse current	V _{RM} = 22V, T _j = 125°C	—	—	100	mA
I _{DRM}	Repetitive peak off-state current	V _{DM} = 6000V, V _{GK} = -2V, T _j = 125°C	—	—	150	mA
I _{GRM}	Reverse gate current	V _{RG} = 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 (Expo.wave)	3000	—	—	V/μs
t _{gt}	Turn-on time	V _D = 3000V, I _T = 6000A, I _{GM} = 300A, T _j = 125°C	—	—	3	μs
t _d	Turn-on delay time	di/dt = 1000A/μs, di _G /dt = 200A/μs (see Fig. 1,2)	—	—	1	μs
E _{ON}	Turn-on switching energy	I _T = 2800A, V _D = 3000V, di/dt = 1000A/μs, I _{GM} = 300A, di _G /dt = 200A/μs, T _j = 125°C (see Fig. 1,2)	—	—	1.5	J/P
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. 1,2)	—	—	3.0	μs
E _{OFF}	Turn-off switching energy	I _T = 2800A, V _{DM} = 4300V, V _D = 3000V, T _j = 125°C, C _c = 6μF, L _C = 0.4μH, V _{RG} = 20V, di _{GQ} /dt = 10000A/μs (see Fig. 1,2)	—	—	20	J/P
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	K/W

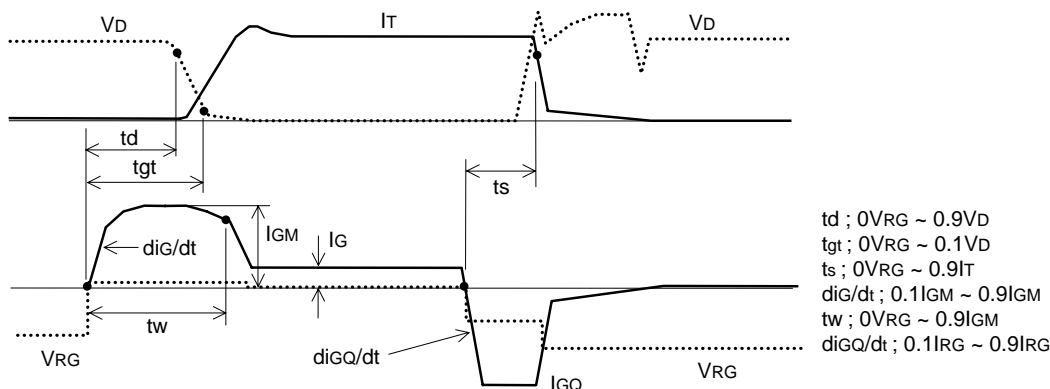


Fig. 1 Turn-on and Turn-off waveform

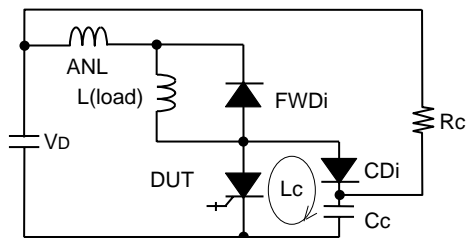


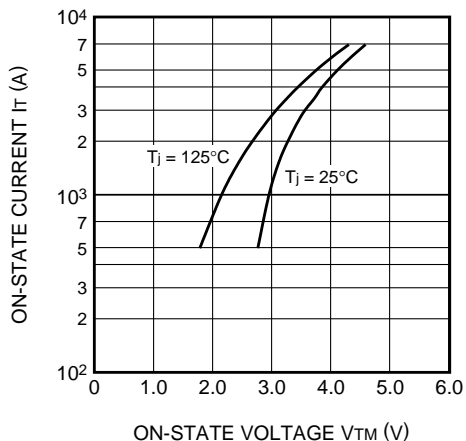
Fig. 2 Turn-on and Turn-off test circuit
(With clamp circuit)

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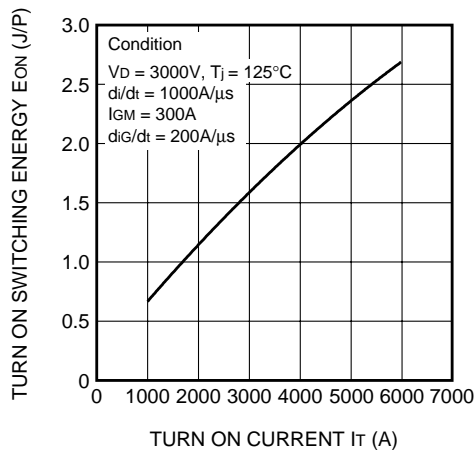
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PERFORMANCE CURVES

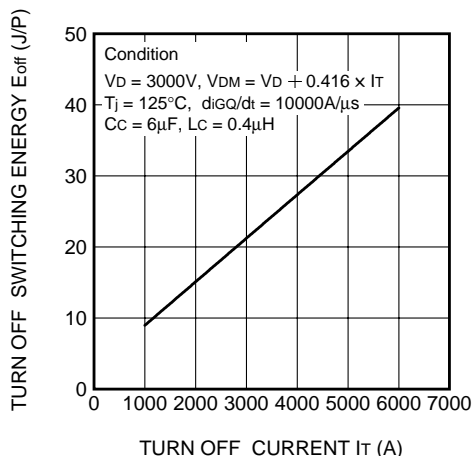
MAXIMUM ON-STATE CHARACTERISTIC



E_{on} VS I_T



E_{off} VS I_T



MAXIMUM THERMAL IMPEDANCE CHARACTERISTIC (JUNCTION TO FIN)

