

MITSUBISHI GATE TURN-OFF THYRISTORS

FG4000EX-50DA

HIGH POWER INVERTER USE
PRESS PACK TYPE

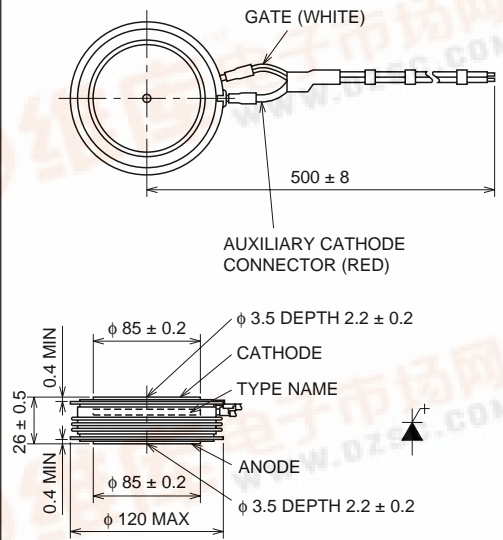
FG4000EX-50DA



- ITQRM Repetitive controllable on-state current 4000A
- IT(AV) Average on-state current 1600A
- VDRM Repetitive peak off state voltage 2500V
- Anode short type

OUTLINE DRAWING

Dimensions in mm



APPLICATION

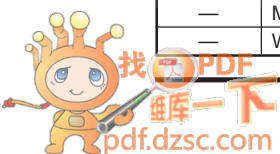
Inverters, D.C. choppers, Induction heaters, D.C. to D.C. converters.

MAXIMUM RATINGS

Symbol	Parameter	Voltage class		Unit
		50DA		
VRRM	Repetitive peak reverse voltage	17		V
VRSM	Non-repetitive peak reverse voltage	17		V
VR(DC)	DC reverse voltage	17		V
VDRM	Repetitive peak off-state voltage*	2500		V
VDSM	Non-repetitive peak off-state voltage*	2500		V
VD(DC)	DC off-state voltage*	1500		V

* : V_{GK} = -2V

Symbol	Parameter	Conditions	Ratings	Unit
ITQRM	Repetitive controllable on-state current	V _{DM} = 1875V, T _j = 125°C, C _s = 6.0μF, L _s = 0.2μH	4000	A
IT(RMS)	RMS on-state current		2500	A
IT(AV)	Average on-state current	f = 60Hz, sine wave θ = 180°, T _f = 72°C	1600	A
ITSM	Surge (non-repetitive) on-state current	One half cycle at 60Hz	24	kA
i ² t	Current-squared, time integration	One cycle at 60Hz	2.4 × 10 ⁶	A ² s
diT/dt	Critical rate of rise of on-state current	V _D = 1250V, I _{GM} = 50A, T _j = 125°C	500	A/μs
VFGM	Peak forward gate voltage		10	V
VRGM	Peak reverse gate voltage		17	V
IFGM	Peak forward gate current		130	A
IRGM	Peak gate reverse current		1100	A
PFGM	Peak forward gate power dissipation		520	W
PRGM	Peak reverse gate power dissipation		33	kW
PFG(AV)	Average forward gate power dissipation		130	W
PRG(AV)	Average reverse gate power dissipation		300	W
T _j	Junction temperature		-40 ~ +125	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Mounting force required	Recommended value 45	39 ~ 55	kN
—	Weight	Standard value	1600	g



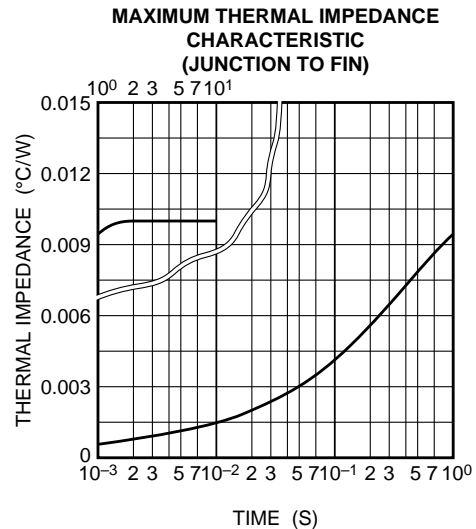
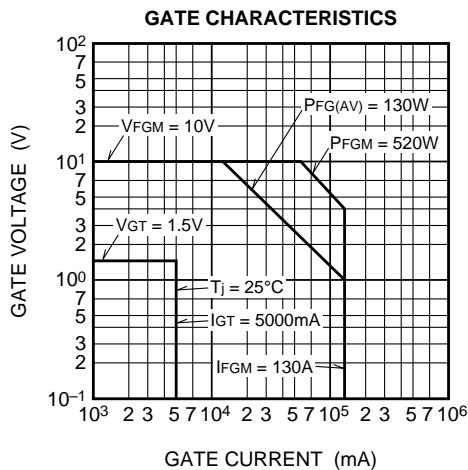
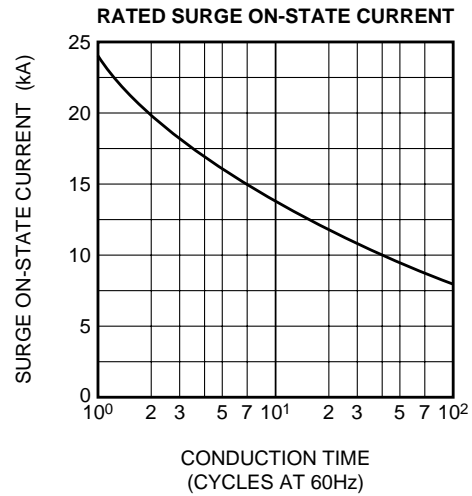
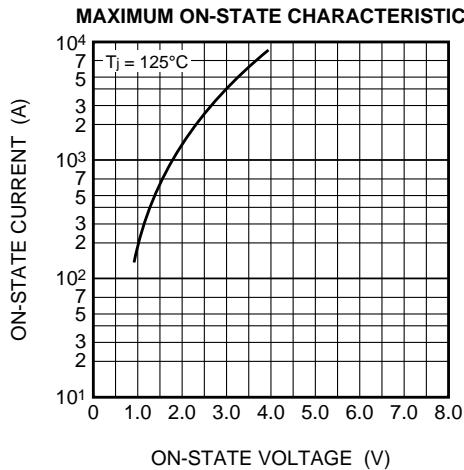
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ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _{TM}	On-state voltage	T _j = 125°C, I _{TM} = 4000A, Instantaneous measurement	—	—	3.0	V
I _{RRM}	Repetitive peak reverse current	T _j = 125°C, V _{RRM} Applied	—	—	100	mA
I _{DRM}	Repetitive peak off-state current	T _j = 125°C, V _{DRM} Applied, V _{GK} = -2V	—	—	50	mA
I _{RG}	Reverse gate current	T _j = 125°C, V _{RG} = 17V	—	—	100	mA
dv/dt	Critical rate of rise of off-state voltage	T _j = 125°C, V _D = 1250V, V _{GK} = -2V	1000	—	—	V/μs
t _{gt}	Turn-on time	T _j = 125°C, I _{TM} = 4000A, I _{GM} = 50A, V _D = 1250V	—	—	10	μs
t _{gq}	Turn-off time	T _j = 125°C, I _{TM} = 4000A, V _{DM} = 1875V, diGQ/dt = -50A/μs V _{RG} = 17V, C _S = 6.0μF, L _S = 0.2μH	—	—	30	μs
I _{GQM}	Peak gate turn-off current		—	1000	—	A
V _{GT}	Gate trigger voltage	DC METHOD : V _D = 24V, R _L = 0.1Ω, T _j = 25°C	—	—	1.5	V
I _{GT}	Gate trigger current		—	—	5000	mA
R _{th(j-f)}	Thermal resistance	Junction to fin	—	—	0.010	°C/W

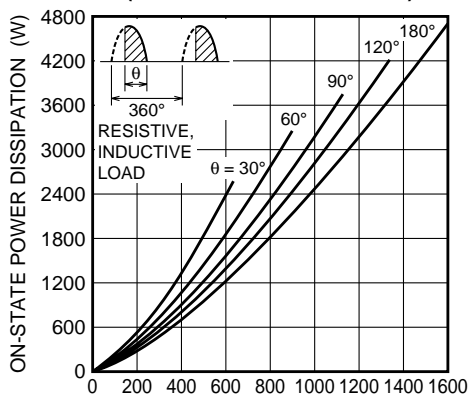
PERFORMANCE CURVES



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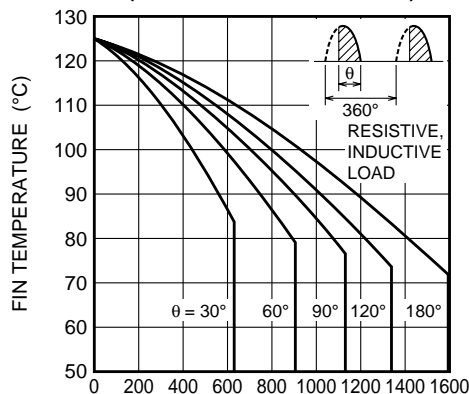
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MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (SINGLE-PHASE HALF WAVE)



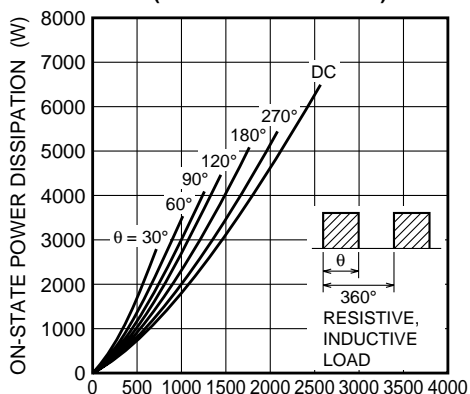
AVERAGE ON-STATE CURRENT (A)

ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)



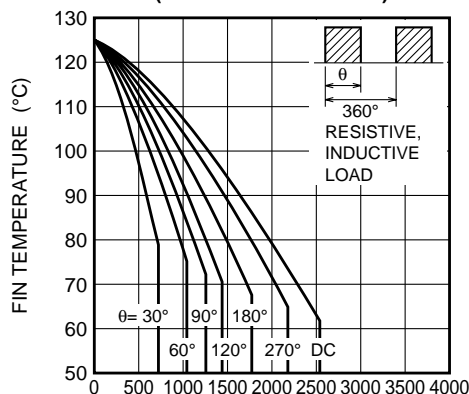
AVERAGE ON-STATE CURRENT (A)

MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (RECTANGULAR WAVE)



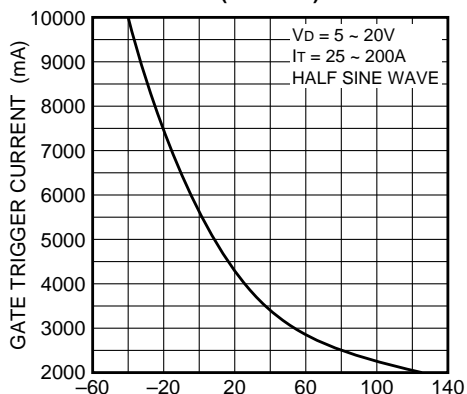
AVERAGE ON-STATE CURRENT (A)

ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)



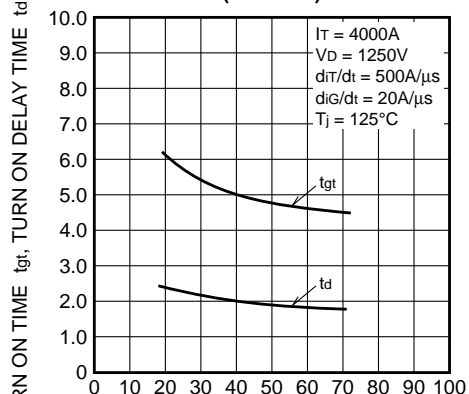
AVERAGE ON-STATE CURRENT (A)

GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)



JUNCTION TEMPERATURE (°C)

TURN ON TIME, TURN ON DELAY TIME VS. TURN ON GATE CURRENT (TYPICAL)



TURN ON GATE CURRENT (A)

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