

FG4000HX-90DS

HIGH POWER INVERTER USE
PRESS PACK TYPE

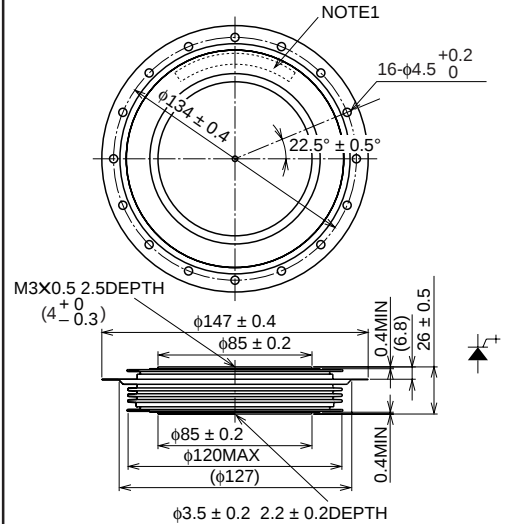
FG4000HX-90DS



- ITQRM Repetitive controllable on-state current3000A
- IT(AV) Average on-state current1200A
- VDRM Repetitive peak off state voltage4500V
- 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
		90DS	
VRRM	Repetitive peak reverse voltage	19	V
VRSM	Non-repetitive peak reverse voltage	19	V
VR(DC)	DC reverse voltage	19	V
VDRM	Repetitive peak off-state voltage*	4500	V
VDSM	Non-repetitive peak off-state voltage*	4500	V
VD(DC)	DC off-state voltage*	2500	V

* : VGK = -2V

Symbol	Parameter	Conditions	Ratings	Unit
ITQRM	Repetitive controllable on-state current	V _{DM} = 3375V, C _s = 3.0μF, L _s = 0.4μH, T _J = 25/125°C	3000	A
IT(RMS)	RMS on-state current	Applied for all conduction angles	1880	A
IT(AV)	Average on-state current	f = 60Hz, sinewave θ = 180°, T _f = 78°C	1200	A
ITSM	Surge on-state current	One half cycle at 60Hz, T _J = 125°C	20	kA
I ² t	Current-squared, time integration		1.7 × 10 ⁶	A ² s
diT/dt	Critical rate of rise of on-state current	V _D = 2250V, I _{TM} = 3000A, I _{GM} = 100A, T _J = 125°C diG/dt = 50A/μs, C _s = 3μF, R _s = 5Ω	500	A/μs
VFGM	Peak forward gate voltage		10	V
VRGM	Peak reverse gate voltage		19	V
IFGM	Peak forward gate current		1000	A
IRGM	Peak reverse gate current		4000	A
PFGM	Peak forward gate power dissipation	tw = 20μs, f = 60Hz	10	kW
PRGM	Peak reverse gate power dissipation	tw = 30μs, f = 60Hz	120	kW
PFG(AV)	Average forward gate power dissipation		200	W
PRG(AV)	Average reverse gate power dissipation		6300	W
T _J	Junction temperature		-40 ~ +125	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Mounting force required	(Recommended value 47kN)	39 ~ 55	kN
—	Weight	Typical value	1600	g

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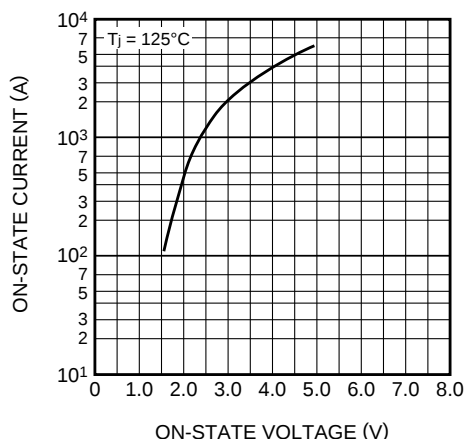
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ELECTRICAL CHARACTERISTICS

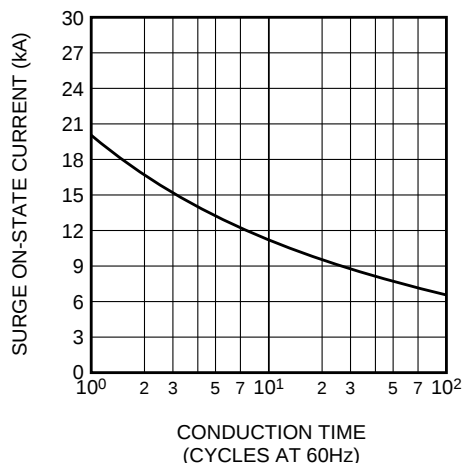
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{TM}	On-state voltage	$I_T = 3000A$, $T_j = 125^\circ C$	—	—	3.5	V
I_{RRM}	Repetitive peak reverse current	$V_{RM} = 19V$, $T_j = 125^\circ C$	—	—	100	mA
I_{DRM}	Repetitive peak off-state current	$V_{DM} = 4500V$, $V_{GK} = -2V$, $T_j = 125^\circ C$	—	—	150	mA
I_{GRM}	Reverse gate current	$V_{RG} = 19V$, $T_j = 125^\circ C$	—	—	100	mA
dv/dt	Critical rate of rise of off-state voltage	$V_D = 2250V$, $T_j = 125^\circ C$, $V_{GK} = -2V$ (Expo. ware)	1000	—	—	V/ μs
t_d	Delay time	$I_T = 3000A$, $V_D = 2250V$, $I_{GM} = 100A$, $T_j = 125^\circ C$ $di/dt = 500A/\mu s$, $dg/dt = 50A/\mu s$ $C_s = 3\mu s$, $R_s = 5\Omega$	—	—	3	μs
t_s	Storage time	$I_T = 3000A$, $V_{DM} = 3375V$, $V_D = 2250V$ $di/dt = 6000A/\mu s$, $C_s = 3.0\mu F$, $L_s = 0.4\mu H$	—	—	3	μs
I_{GQ}	Peak gate turn-off current	$T_j = 125^\circ C$	—	—	—	A
I_{GT}	Gate trigger current	DC METHOD : $V_D = 24V$, $R_L = 0.1\Omega$, $T_j = 25^\circ C$	—	—	4.0	A
V_{GT}	Gate trigger voltage		—	—	1.5	V
$R_{th(j-f)}$	Thermal resistance	Junction to fin	—	—	0.01	$^\circ C/W$

PERFORMANCE CURVES

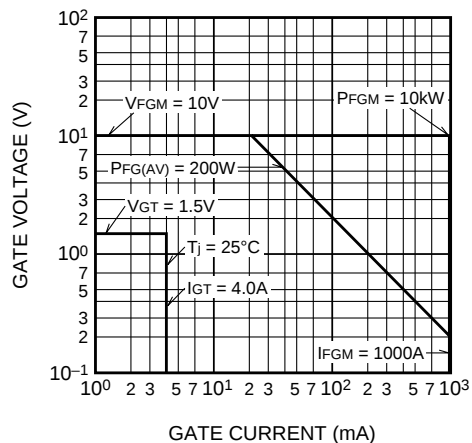
MAXIMUM ON-STATE CHARACTERISTIC



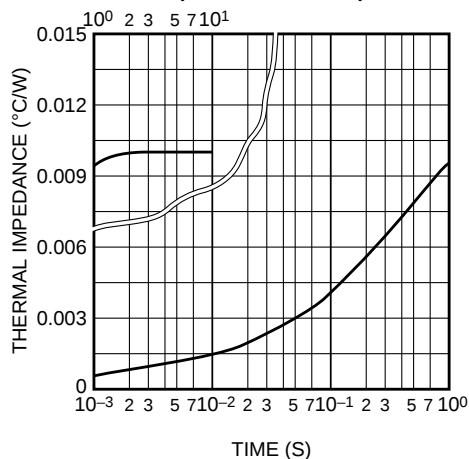
RATED SURGE ON-STATE CURRENT



GATE CHARACTERISTICS

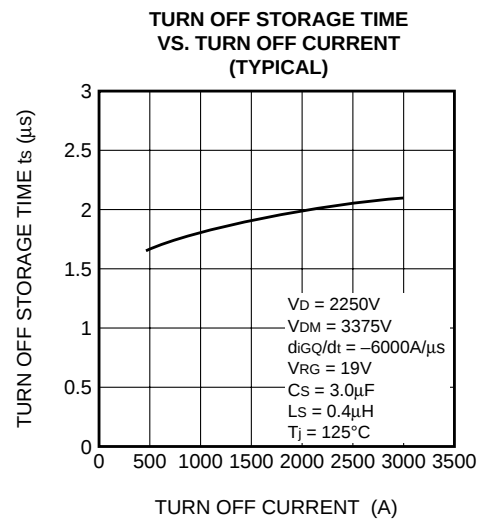
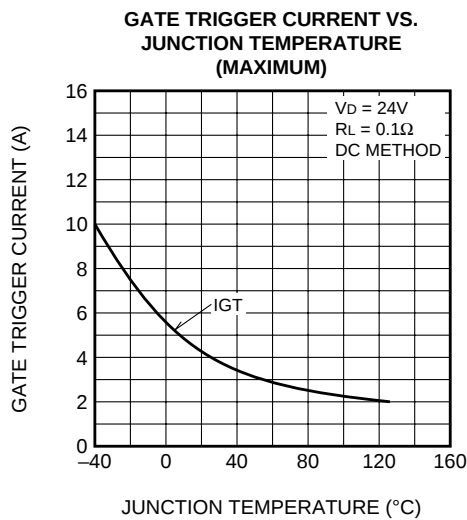
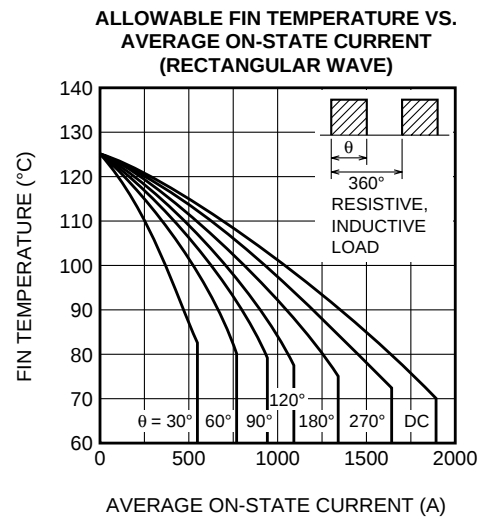
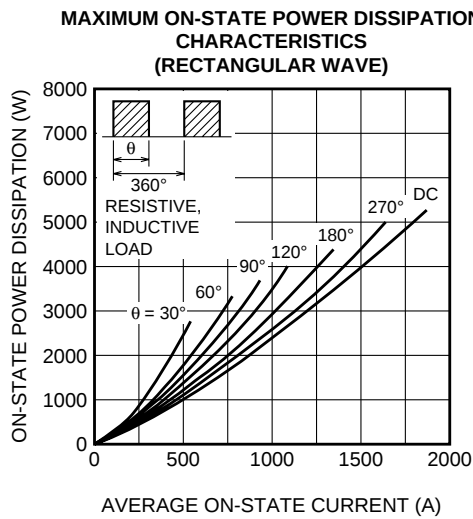
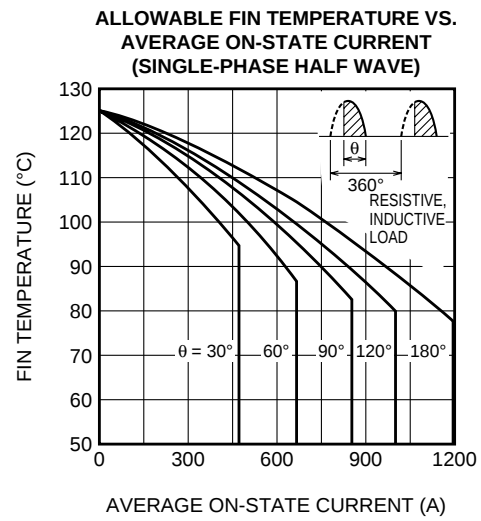
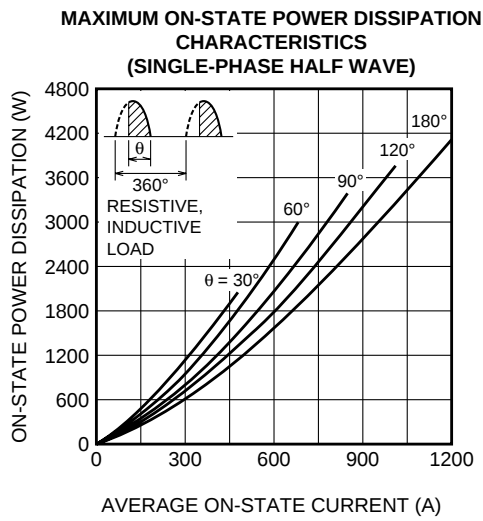


MAXIMUM THERMAL IMPEDANCE CHARACTERISTIC (JUNCTION TO FIN)



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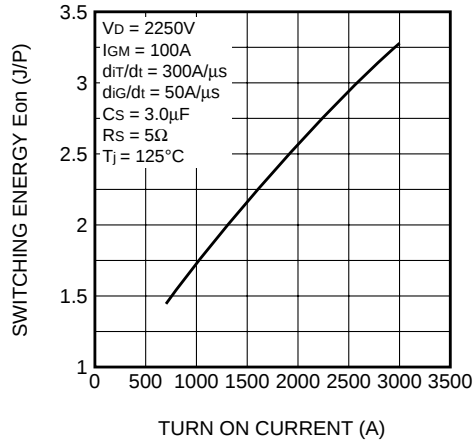
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TURN ON SWITCHING ENERGY
(MAXIMUM)



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