

FGR3000CV-90DA

HIGH POWER INVERTER USE
PRESS PACK TYPE

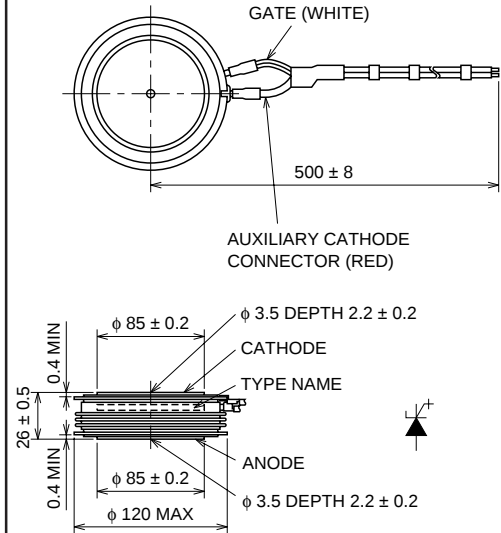
FGR3000CV-90DA



- ITQRM Repetitive controllable on-state current 3000A
- IT(AV) Average on-state current 900A
- VDRM Repetitive peak off state voltage 4500V
- Reverse conducting 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
		90DA	
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, T _J = 125°C, C _s = 3.5μF, L _s = 0.2μH	3000	A
IT(RMS)	RMS on-state current		1410	A
IT(AV)	Average on-state current	f = 60Hz, sine wave θ = 180°, T _r = 70°C	900	A
ITSM	Surge (non-repetitive) on-state current	One half cycle at 60Hz	18	kA
IT ² _t	I ² t for fusing	One cycle at 60Hz	1.3 × 10 ⁶	A ² s
IR(RMS)	RMS Reverse current		1100	A
IR(AV)	Average reverse current	f = 60Hz, sine wave θ = 180°, T _r = 70°C	700	A
IRSM	Surge (non-repetitive) reverse current	One half cycle at 60Hz	22	kA
IR ² _t	Current-squared, time integration	One cycle at 60Hz	2.0 × 10 ⁶	A ² s
diT/dt	Critical rate of rise of on-state current	V _D = 2250V, I _{GM} = 40A, T _J = 125°C	500	A/μs
VFGM	Peak forward gate voltage		10	V
VRGM	Peak reverse gate voltage		18	V
IFGM	Peak forward gate current		100	A
IRGM	Peak gate reverse current		900	A
PFGM	Peak forward gate power dissipation		400	W
PRGM	Peak reverse gate power dissipation		27	kW
PFG(AV)	Average forward gate power dissipation		100	W
PRG(AV)	Average reverse gate power dissipation		230	W
T _J	Junction temperature		-40 ~ +125	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Mounting force required	Recommended value 37	31 ~ 43	kN
—	Weight	Standard value	1450	g

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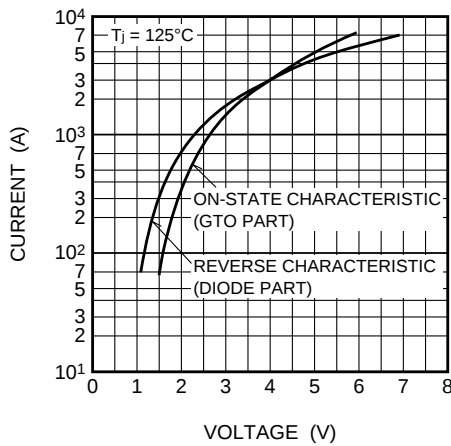
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ELECTRICAL CHARACTERISTICS

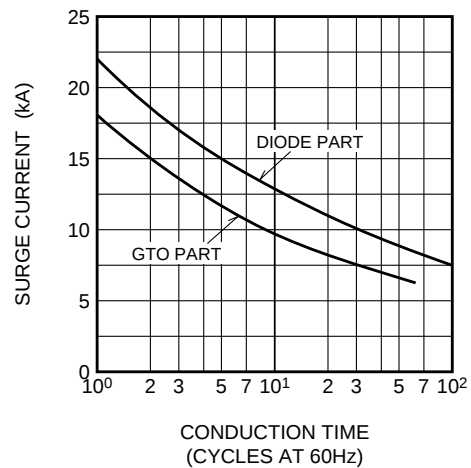
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _{TM}	On-state voltage	T _j = 125°C, I _{TM} = 3000A, Instantaneous measurment	—	—	4.0	V
V _{RM}	Peak reverse voltage drop	T _j = 125°C, I _{RM} = 3000A, Instantaneous measurment	—	—	4.0	V
I _{DRM}	Repetitive peak off-state current	T _j = 125°C, V _{DRM} Applied, V _{GK} = -2V	—	—	200	mA
I _{RG}	Reverse gate current	T _j = 125°C, V _{RG} = 17V	—	—	250	mA
dv/dt	Critical rate of rise of off-state voltage	T _j = 125°C, V _D = 2250V, V _{GK} = -2V	1000	—	—	V/μs
t _{gt}	Turn-on time	T _j = 125°C, I _{TM} = 3000A, I _{GM} = 40A, V _D = 2250V	—	—	10	μs
t _{gq}	Turn-off time	T _j = 125°C, I _{TM} = 3000A, V _{DM} = 3375V, diGQ/dt = -40A/μs V _{RG} = 17V, C _s = 3.5μF, L _s = 0.2μH	—	—	30	μs
I _{GQM}	Peak gate turn-off current		—	750	—	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		—	—	3000	mA
R _{th(j-f)}	Thermal resistance	GTO Side (Junction to fin)	—	—	0.016	°C/W
		Diode Side (Junction to fin)	—	—	0.025	

PERFORMANCE CURVES

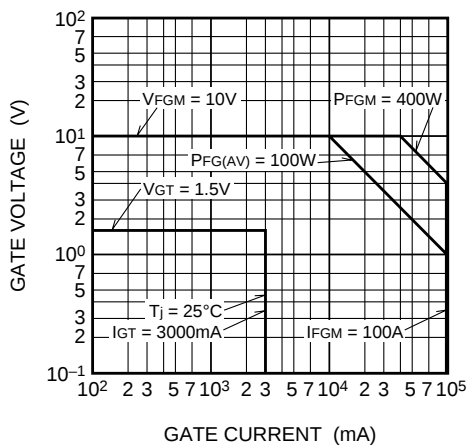
MAXIMUM ON-STATE AND MAXIMUM REVERSE CHARACTERISTICS



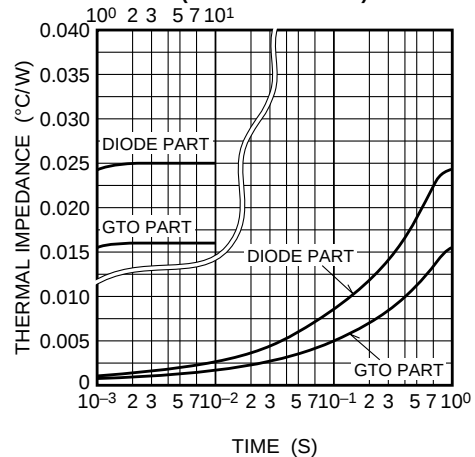
RATED ON-STATE AND REVERSE SURGE CURRENT



GATE CHARACTERISTICS



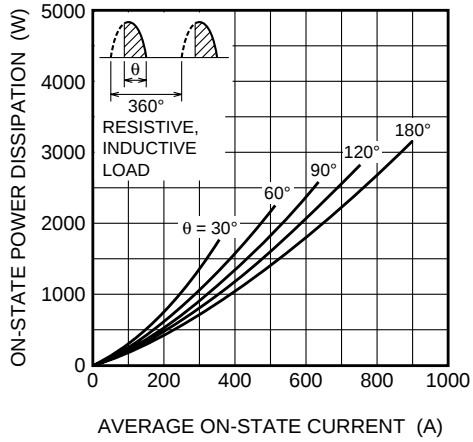
MAXIMUM THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO FIN)



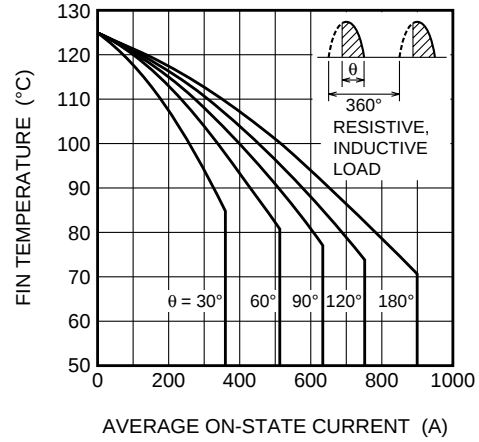
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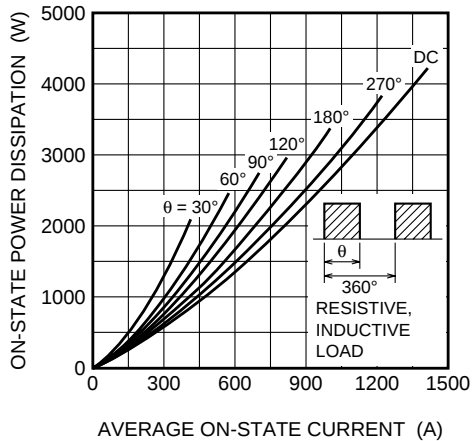
MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (GTO PART, SINGLE-PHASE HALF WAVE)



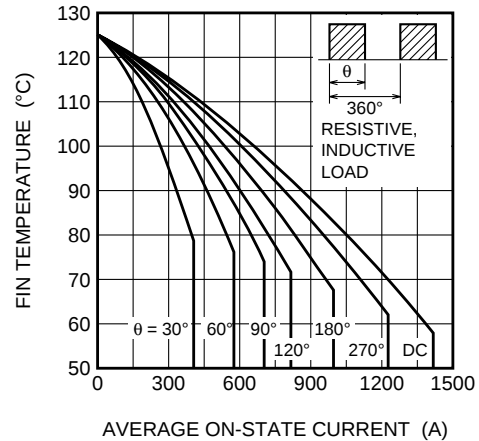
ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (GTO PART, SINGLE-PHASE HALF WAVE)



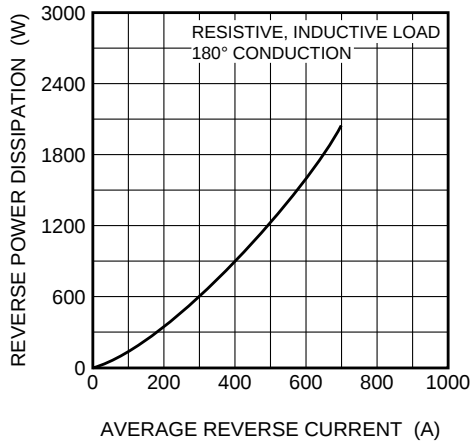
MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (GTO PART, RECTANGULAR WAVE)



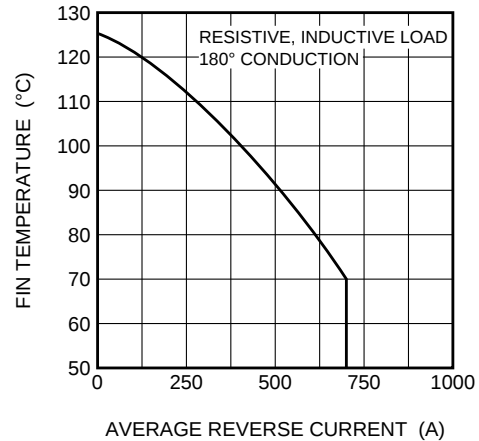
ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (GTO PART, RECTANGULAR WAVE)



MAXIMUM REVERSE POWER DISSIPATION CHARACTERISTIC (DIODE PART, SINGLE PHASE WAVE)



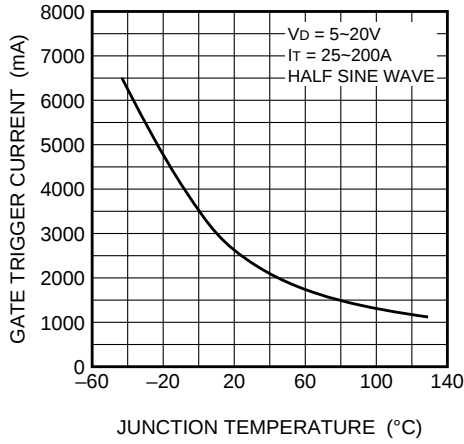
ALLOWABLE FIN TEMPERATURE VS. AVERAGE REVERSE CURRENT (DIODE PART, SINGLE PHASE HALF WAVE)



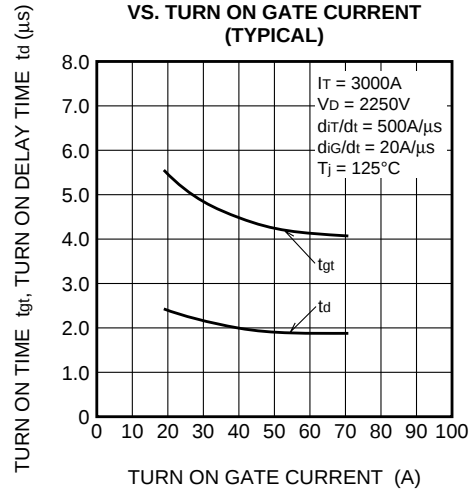
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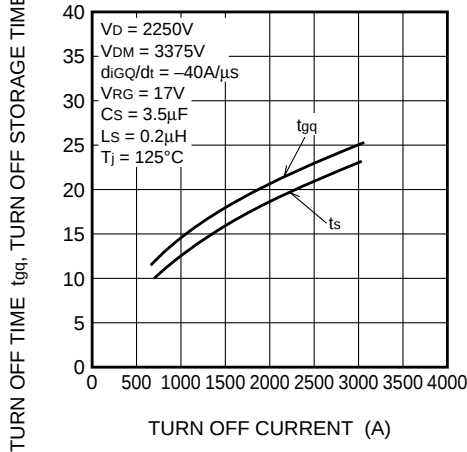
**GATE TRIGGER CURRENT VS.
JUNCTION TEMPERATURE
(TYPICAL)**



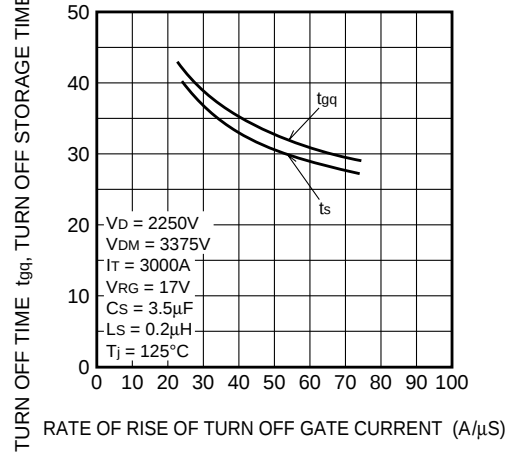
**TURN ON TIME, TURN ON DELAY TIME
VS. TURN ON GATE CURRENT
(TYPICAL)**



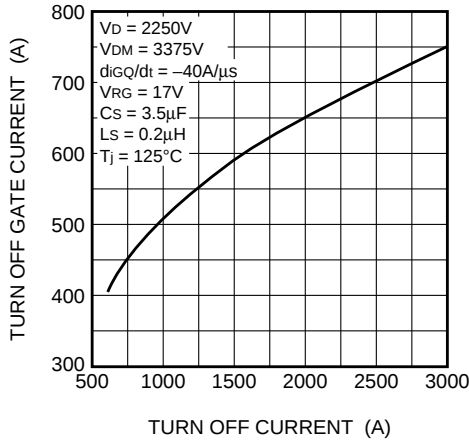
**TURN OFF TIME, TURN OFF STORAGE TIME
VS. TURN OFF GATE CURRENT
(TYPICAL)**



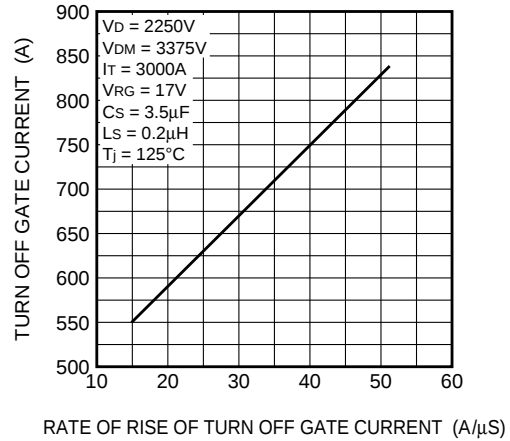
**TURN OFF TIME, TURN OFF STORAGE TIME
VS. RATE OF RISE OF TURN OFF GATE CURRENT
(TYPICAL)**



**TURN OFF GATE CURRENT
VS. TURN OFF CURRENT
(TYPICAL)**

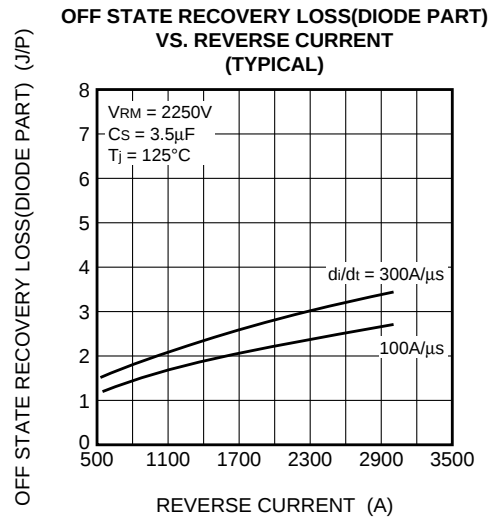
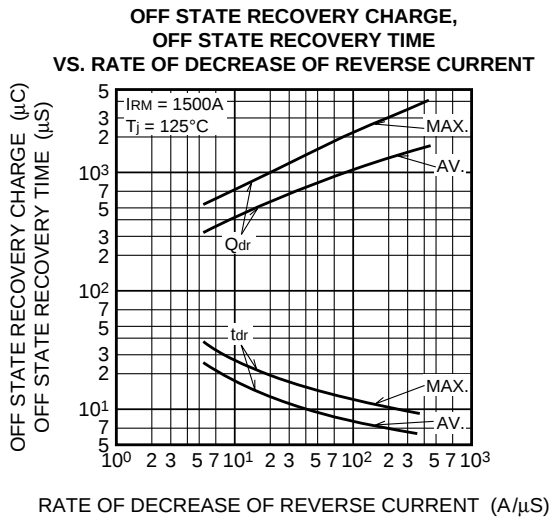
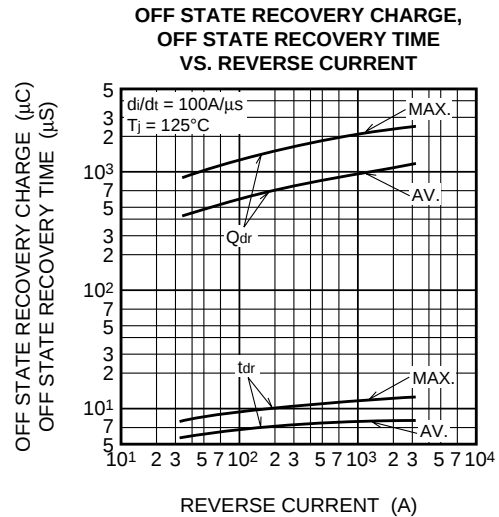
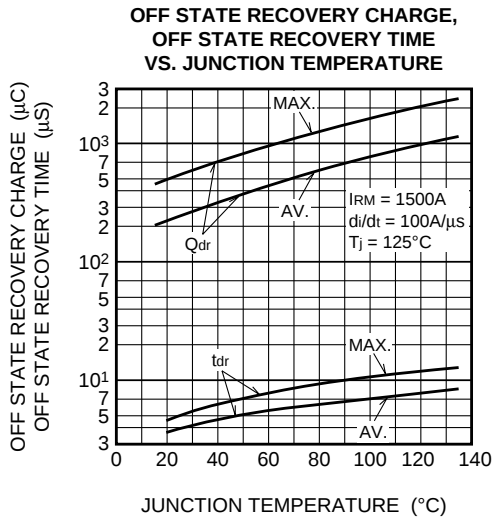
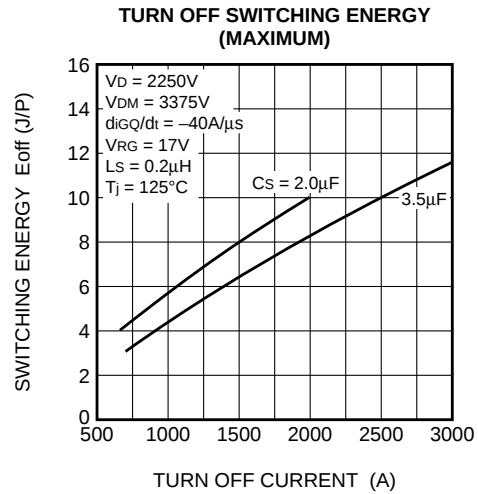
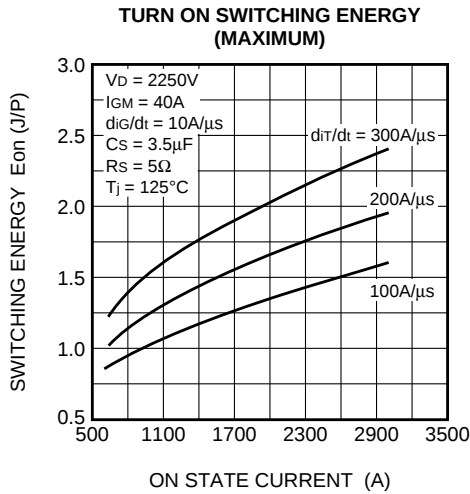


**TURN OFF GATE CURRENT VS.
RATE OF RISE OF GATE CURRENT
(TYPICAL)**



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