MITSUBISHI GATE TURN-OFF THYRISTORS

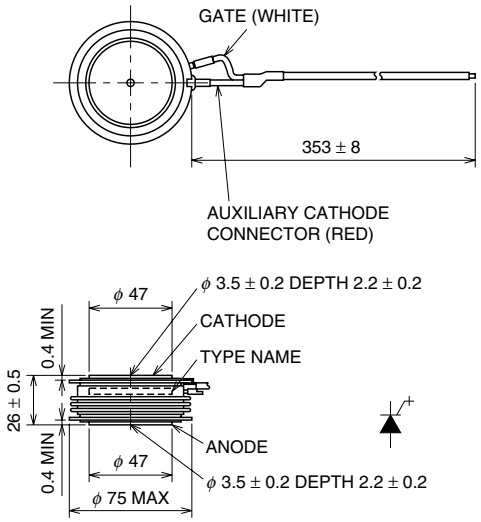
FG1000BV-90DA

HIGH POWER INVERTER USE
PRESS PACK TYPE

FG1000BV-90DA

- I_{TQRM} Repetitive controllable on-state current 1000A
- $I_{T(AV)}$ Average on-state current 400A
- V_{DRM} Repetitive peak off-state voltage 4500V
- 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
		90DA	
V_{RRM}	Repetitive peak reverse voltage	17	V
V_{RSM}	Non-repetitive peak reverse voltage	17	V
$V_{R(DC)}$	DC reverse voltage	17	V
V_{DRM}	Repetitive peak off-state voltage*	4500	V
V_{DSM}	Non-repetitive peak off-state voltage*	4500	V
$V_{D(DC)}$	DC off-state voltage*	3600	V

* : V_{GK} = –2V

Symbol	Parameter	Conditions	Ratings	Unit
I_{TQRM}	Repetitive controllable on-state current	V_D = 2250V, V_{DM} = 3375V, T_j = 125°C, C_S = 0.7μF, L_S = 0.3μH	1000	A
$I_{T(RMS)}$	RMS on-state current		630	A
$I_{T(AV)}$	Average on-state current	f = 60Hz, sine wave θ = 180°, T_f = 70°C	400	A
I_{TSM}	Surge (non-repetitive) on-state current	One half cycle at 60Hz	8.4	kA
I^2t	Current-squared, time integration	One cycle at 60Hz	2.9×10^5	A^2s
di_T/dt	Critical rate of rise of on-state current	V_D = 2250V, I_{GM} = 20A, T_j = 125°C	1000	A/μs
V_{FGM}	Peak forward gate voltage		10	V
V_{RGM}	Peak reverse gate voltage		17	V
I_{FGM}	Peak forward gate current		60	A
I_{RGM}	Peak reverse gate current		500	A
P_{FGM}	Peak forward gate power dissipation		240	W
P_{RGM}	Peak reverse gate power dissipation		15	kW
$P_{FG(AV)}$	Average forward gate power dissipation		45	W
$P_{RG(AV)}$	Average reverse gate power dissipation		100	W
T_j	Junction temperature		–40 ~ +125	°C
T_{stg}	Storage temperature		–40 ~ +150	°C
—	Mounting force required	Recommended value 13	12 ~ 15	kN
—	Weight	Standard value	530	g

MITSUBISHI ELECTRIC

FG1000BV-90DA

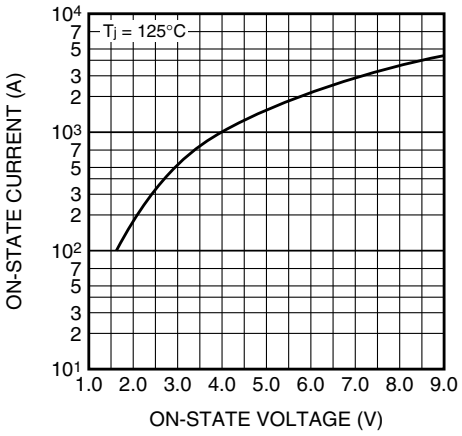
HIGH POWER INVERTER USE
PRESS PACK TYPE

ELECTRICAL CHARACTERISTICS

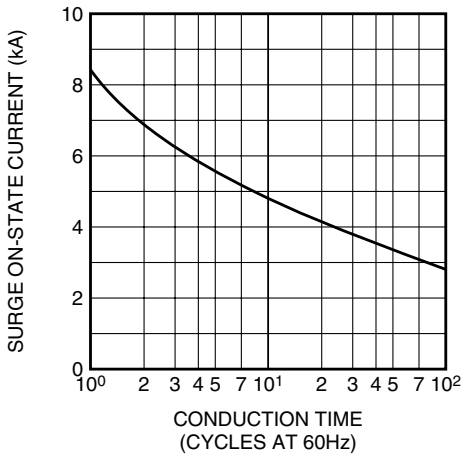
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{TM}	On-state voltage	T_j = 125°C, I_{TM} = 1000A, Instantaneous measurment	—	—	4.0	V
I_{RRM}	Repetitive peak reverse current	T_j = 125°C, V_{RRM} Applied	—	—	100	mA
I_{DRM}	Repetitive peak off-state current	T_j = 125°C, V_{DRM} Applied, V_{GK} = –2V	—	—	100	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 = 2250V, V_{GK} = –2V	1000	—	—	V/µs
t_{gt}	Turn-on time	T_j = 125°C, I_{TM} = 1000A, I_{GM} = 20A, V_D = 2250V	—	—	10	µs
t_{gq}	Turn-off time	T_j = 125°C, I_{TM} = 1000A, V_D = 2250V, di_{GQ}/dt = –30A/µs V_{RG} = 17V, C_S = 0.7µF, L_S = 0.3µH	—	—	20	µs
I_{GQM}	Peak gate turn-off current		—	380	—	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		—	—	2.5	A
$R_{th(j-f)}$	Thermal resistance	Junction to fin	—	—	0.03	K/W

PERFORMANCE CURVES

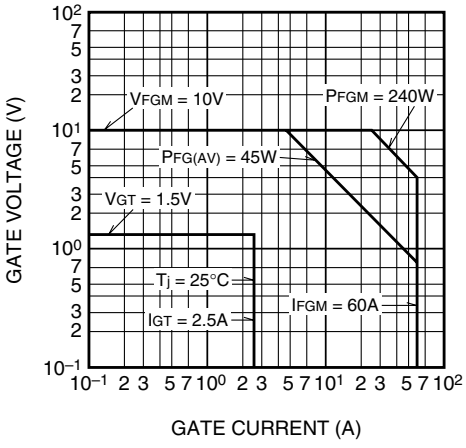
MAXIMUM ON-STATE CHARACTERISTIC



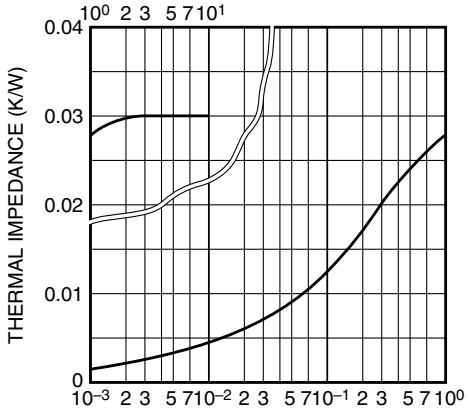
RATED SURGE ON-STATE CURRENT



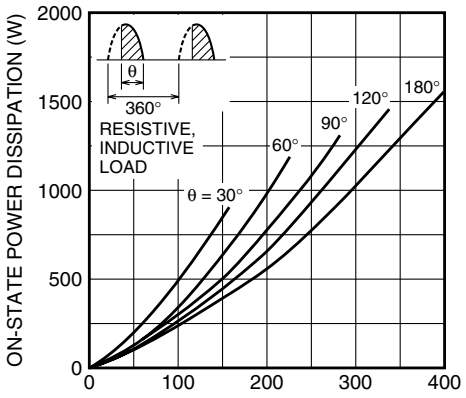
GATE CHARACTERISTICS



MAXIMUM THERMAL IMPEDANCE CHARACTERISTIC (JUNCTION TO FIN)

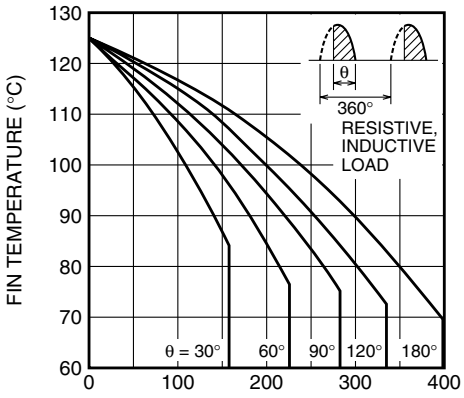


MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (SINGLE-PHASE HALF WAVE)



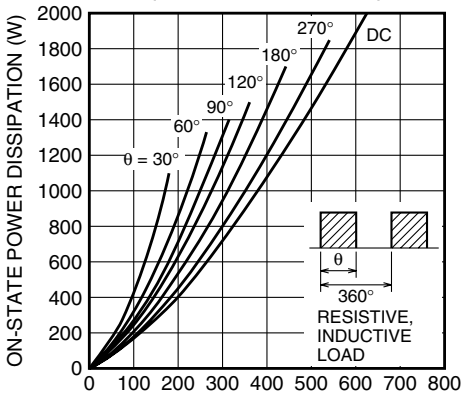
AVERAGE ON-STATE CURRENT (A)

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



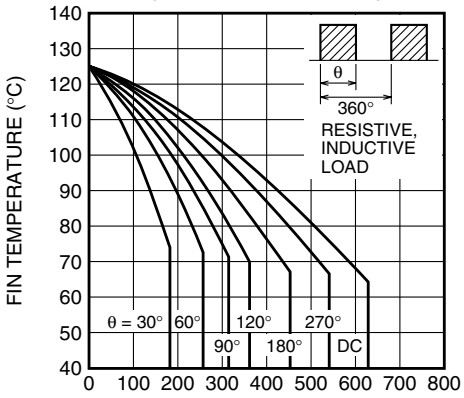
AVERAGE ON-STATE CURRENT (A)

MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (RECTANGULAR WAVE)



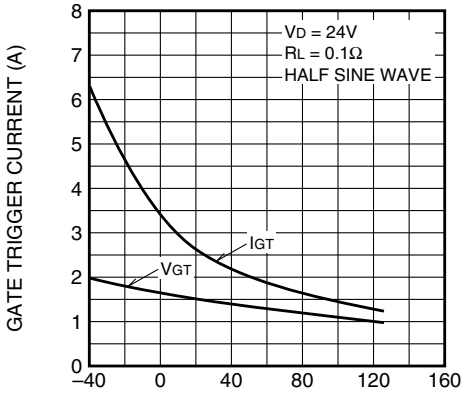
AVERAGE ON-STATE CURRENT (A)

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



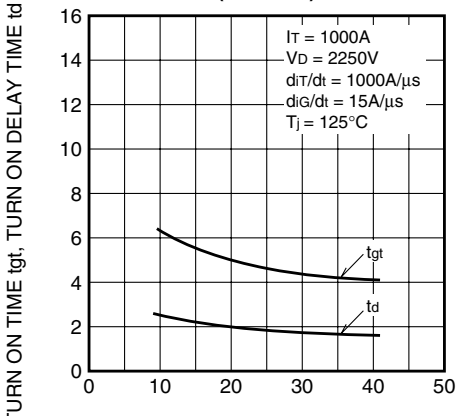
AVERAGE ON-STATE CURRENT (A)

GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)



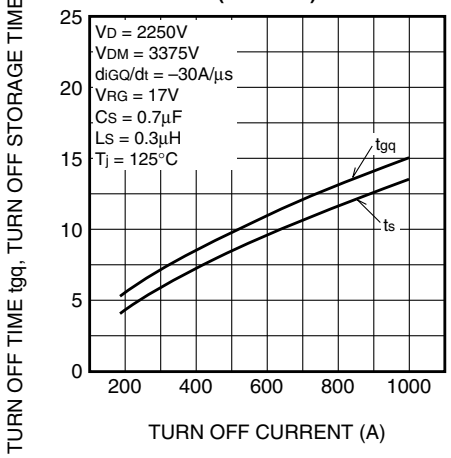
JUNCTION TEMPERATURE (°C)

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

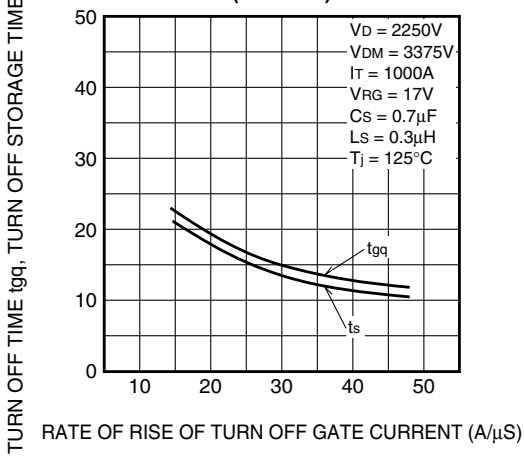


TURN ON GATE CURRENT (A)

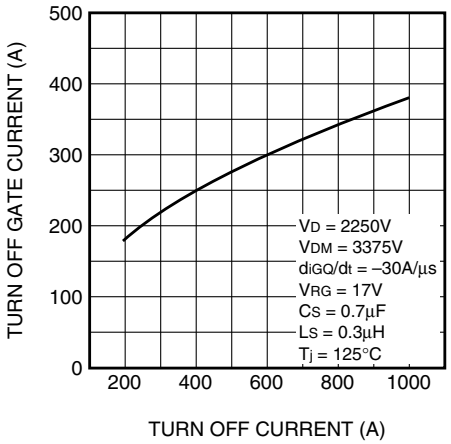
TURN OFF TIME, TURN OFF STORAGE TIME VS. TURN OFF CURRENT (TYPICAL)



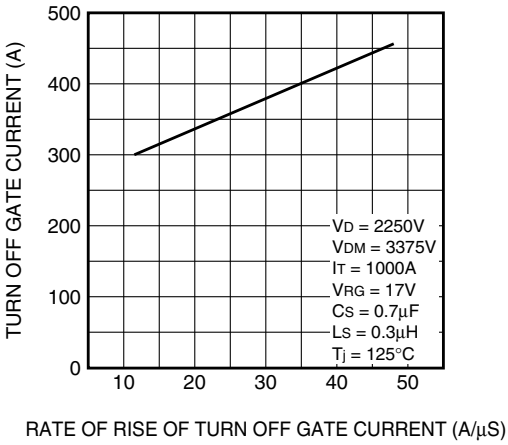
TURN OFF TIME, TURN OFF STORAGE TIME VS. RATE OF RISE OF TURN OFF GATE CURRENT (TYPICAL)



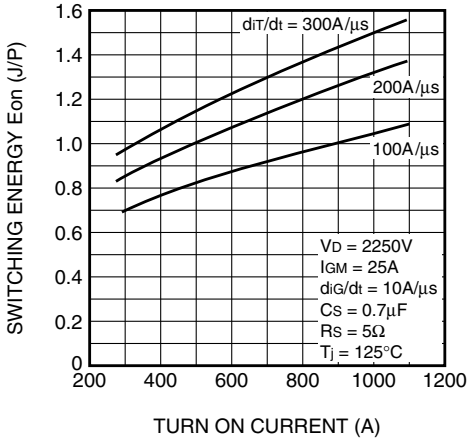
TURN OFF GATE CURRENT VS. TURN OFF CURRENT (TYPICAL)



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



TURN ON SWITCHING ENERGY (MAXIMUM)



TURN OFF SWITCHING ENERGY (MAXIMUM)