AS ENERGI

Gate Turn-Off Thyristors
AFG 1000-90-BV-DA

Key Parameters

I_{TQRM}	=	1000	A
$I_{T(AV)}$	=	400	A
V_{DRM}	=	4500	V

Application

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

MAXIMUM RATINGS

Symbols and parameters		Voltage class	Unit
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

Symbols and parameters			Value	Unit
I_{TQRM}	Repetitive controllable on-state current	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 = 3000V, I_{GM} = 90A, T_j = 125°C	1000	A/µs
V_{FGM}	Peak forward gate voltage		10	V
V_{RGM}	Peak reverse gate voltage		17	V

Symbols and parameters			Value	Unit
I_{FGM}	Peak forward gate current		60	A
I_{RGM}	Max. RMS on-state current		500	A
P_{FGM}	Peak forward gate power dissipation		240	W
P_{RGM}	Peak reverse gate power dissipation		15	kW
$P_{FG(AV)}$	Max. peak non-repetitive surge current		45	W
$P_{RG(AV)}$	Limiting load integral		100	W

ELECTRICAL CHARACTERISTICS

Symbols and parameters			Value			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_{DM} = 3375V, L_S = 0.3µH di_{GQ}/dt = –30A/µs, V_{RG} = 17V, C_S = 0.7µF			20	µs
I_{GQM}	Peak gate turn-off current			330		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				2500	mA

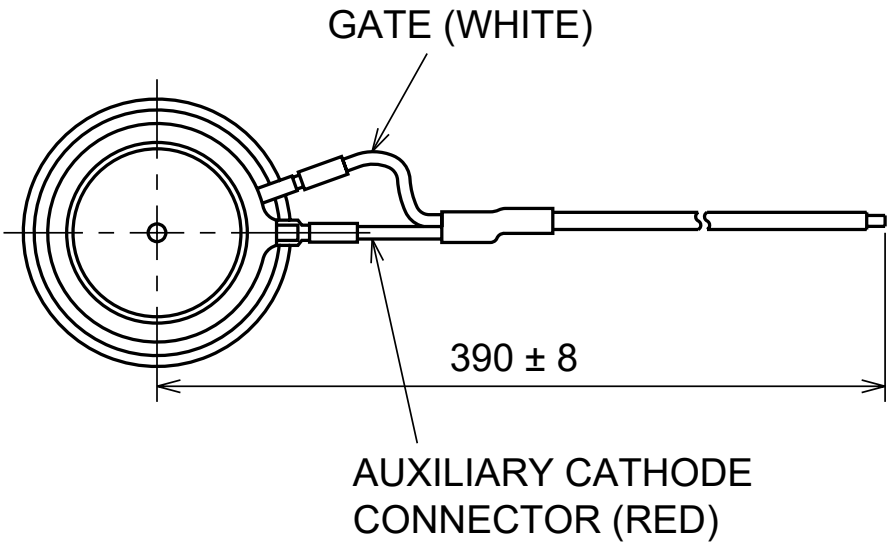
THERMAL

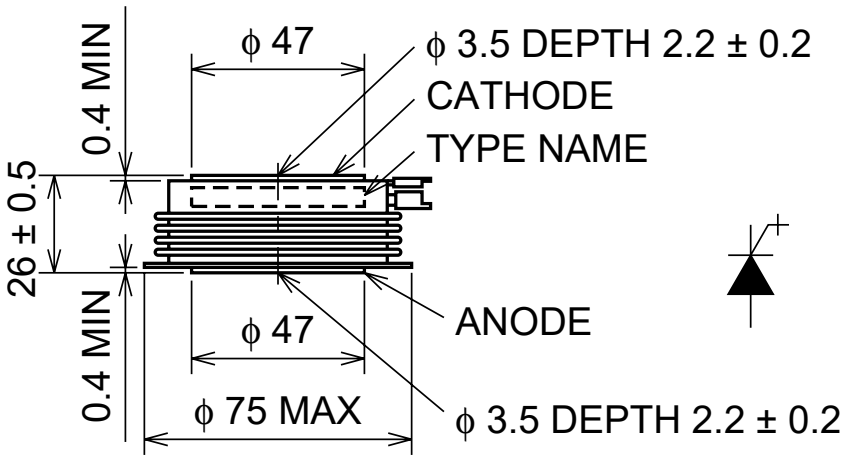
Symbols and parameters			Value	Unit
T_j	Junction operating temperature		-40 ... 125	°C
T_{stg}	Storage temperature range		-40 ... 150	°C
$R_{th(j-f)}$	Thermal resistance, max	Junction to fin	0.03	°C/W

MECHANICAL

Symbols and parameters			Value	Unit
M	Mounting force required	Recommended value 13	12 ... 15	kN
w	Weight		530	g

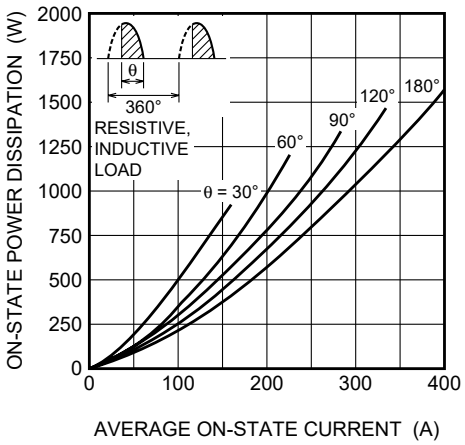
DIMENSIONES



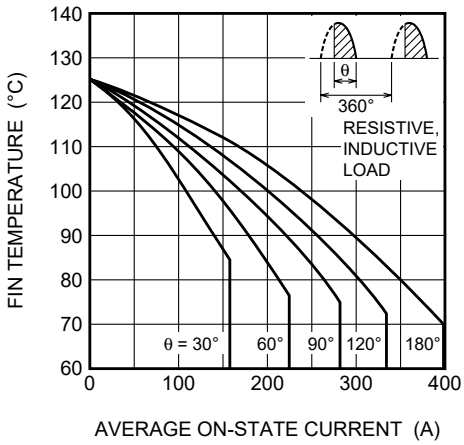


All dimensions in millimeters

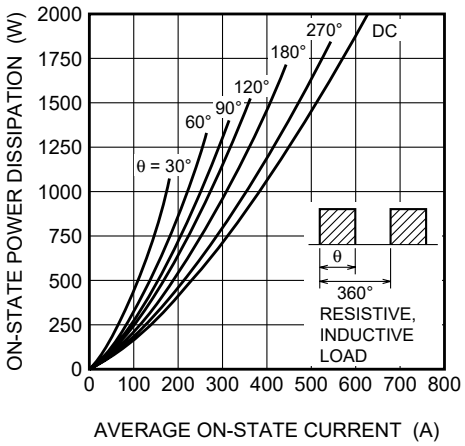
MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (SINGLE-PHASE HALF WAVE)



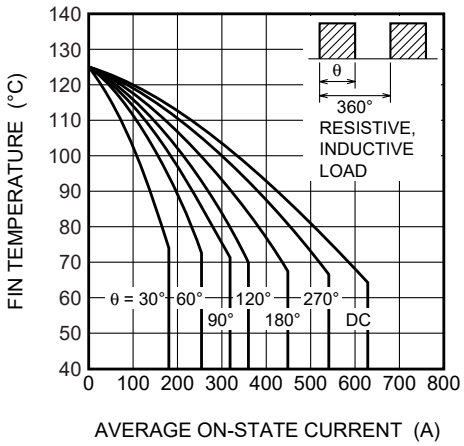
ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVE)



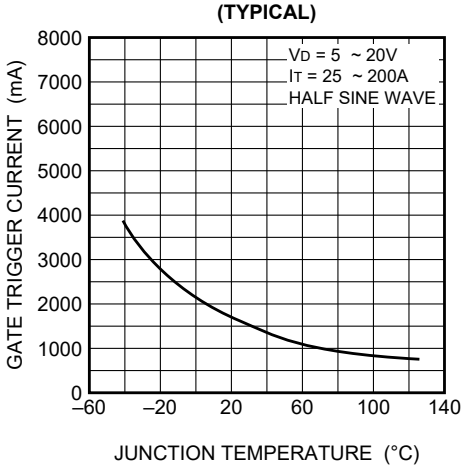
MAXIMUM ON-STATE POWER DISSIPATION CHARACTERISTICS (RECTANGULAR WAVE)



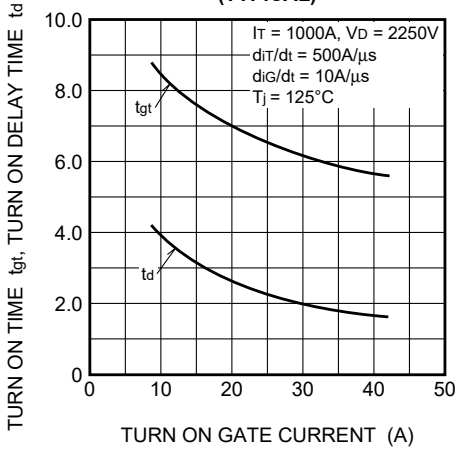
ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)



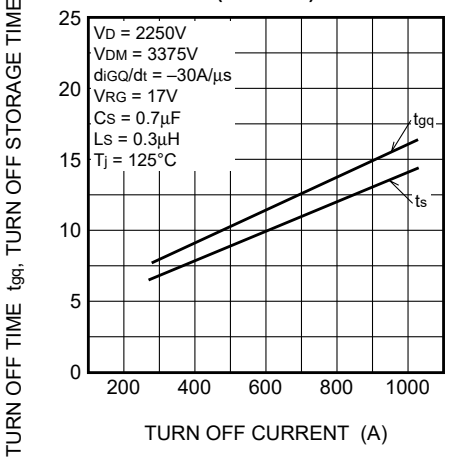
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)



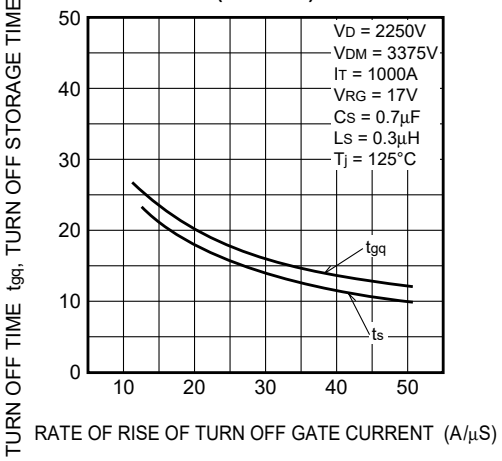
TURN ON TIME, TURN ON DELAY TIME VS. TURN ON GATE CURRENT (TYPICAL)



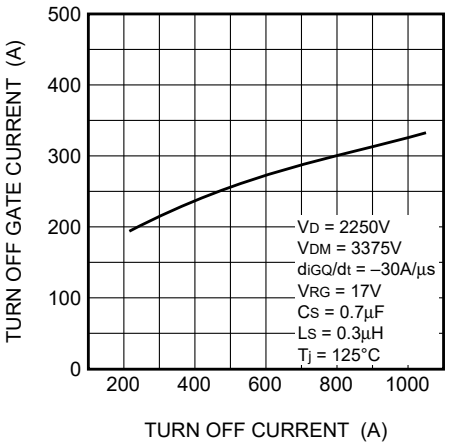
TURN OFF TIME, TURN OFF STORAGE TIME VS. TURN OFF CURRENT (TYPICAL)



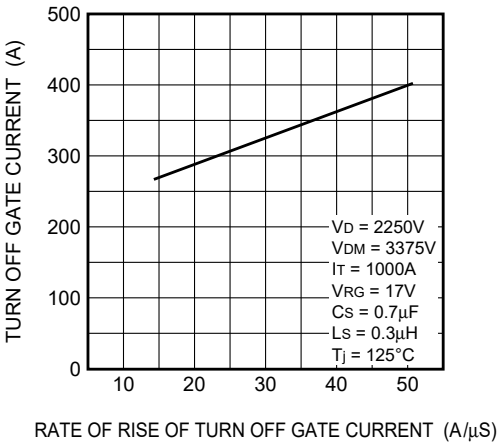
TURN OFF TIME, TURN OFF STORAGE TIME VS. RATE OF RISE OF TURN OFF GATE CURRENT (TYPICAL)



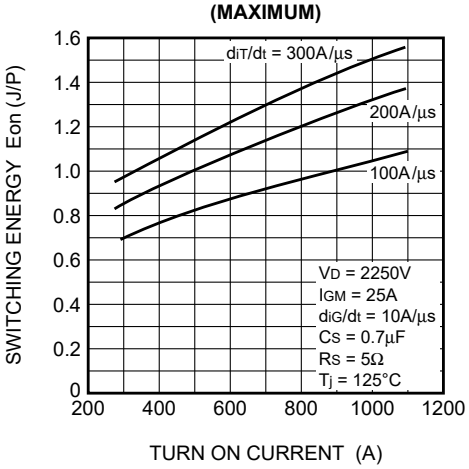
TURN OFF GATE CURRENT VS. TURN OFF CURRENT (TYPICAL)



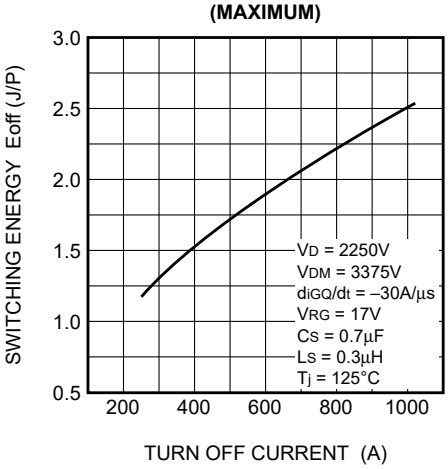
TURN OFF GATE CURRENT VS. RATE OF RISE OF GATE CURRENT (TYPICAL)



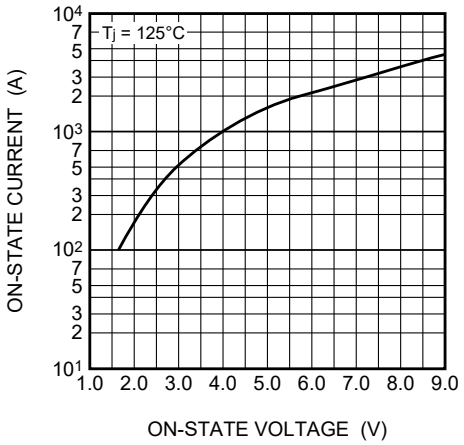
TURN ON SWITCHING ENERGY (MAXIMUM)



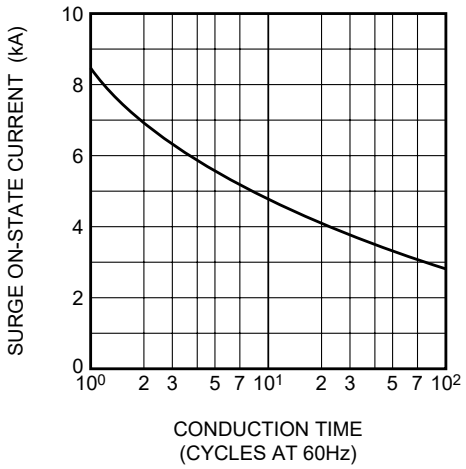
TURN OFF SWITCHING ENERGY (MAXIMUM)



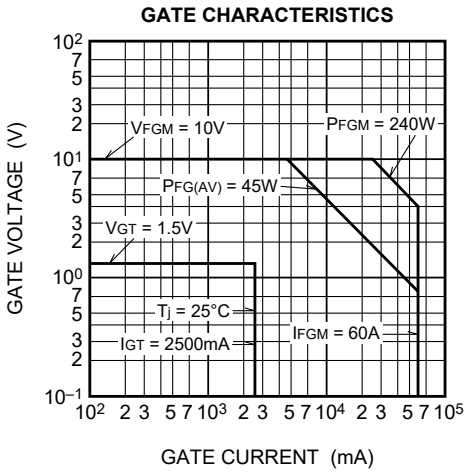
MAXIMUM ON-STATE CHARACTERISTIC



RATED SURGE ON-STATE CURRENT



GATE CHARACTERISTICS



MAXIMUM THERMAL IMPEDANCE CHARACTERISTIC (JUNCTION TO FIN)