



A5F:600.XXHY

VOLTAGE RATINGS

Part Number	$V_{RRM}, V_R - (V)$ Max. rep. peak reverse voltage		$V_{RSM}, V_R - (V)$ Max. non-rep. peak reverse voltage
	$T_J = 0$ to 125°C	$T_J = -40$ to 0°C	$T_J = 25$ to 125°C
	A5F:600.02HY	200	200
A5F:600.04HY	400	400	500
A5F:600.06HY	600	600	700
A5F:600.08HY	800	800	900
A5F:600.10HY	1000	1000	1100
A5F:600.12HY	1200	1200	1300
A5F:600.14HY	1400	1330	1500
A5F:600.16HY	1600	1520	1700
A5F:600.18HY	1800	1710	1900
A5F:600.20HY	2000	1900	2100

MAXIMUM ALLOWABLE RATINGS

PARAMETER	VALUE	UNITS	NOTES
T_J Junction Temperature	-40 to 125	$^\circ\text{C}$	-
T_{stg} Storage Temperature	-40 to 150	$^\circ\text{C}$	-
$I_{F(AV)}$ Max. Av. current @ Max. T_C	600	A	180° half sine wave
	70	$^\circ\text{C}$	
$I_{F(RMS)}$ Nom. RMS current	1015	A	-
I_{FSM} Max. Peak non-rep. surge current	12000	A	50 Hz half cycle sine wave Initial $T_J = 200^\circ\text{C}$, rated V_{RRM} applied after surge.
	12500		60 Hz half cycle sine wave
	14000		50 Hz half cycle sine wave Initial $T_J = 200^\circ\text{C}$, no voltage applied after surge.
	15000		60 Hz half cycle sine wave
I^2t Max. I^2t capability	710	kA^2s	$t = 10\text{ms}$ Initial $T_J = 200^\circ\text{C}$, rated V_{RRM} applied after surge.
	650		$t = 8.3\text{ms}$
	1000		$t = 10\text{ms}$ Initial $T_J = 200^\circ\text{C}$, no voltage applied after surge.
	920		$t = 8.3\text{ms}$
$I^2t^{1/2}$ Max. $I^2t^{1/2}$ capability	10000	$\text{kA}^2\text{s}^{1/2}$	Initial $T_J = 200^\circ\text{C}$, no voltage applied after surge. I^2t for time $t_x = I^2t^{1/2} * t_x^{1/2}$. ($0.1 < t_x < 10\text{ms}$).
di/dt Max. Non-repetitive rate-of-rise current	800	$\text{A}/\mu\text{s}$	$T_J = 125^\circ\text{C}$, $V_D = V_{DRM}$, $I_{TM} = 1600\text{A}$. Gate pulse: 20V, 20 Ω , approximately 40% of non-repetitive value.
P_{GM} Max. Peak gate power	16	W	$t_p < 5\text{ms}$
$P_{G(AV)}$ Max. Av. gate power	3	W	-
$+I_{GM}$ Max. Peak gate current	4	A	$t_p < 5\text{ms}$
$-V_{GM}$ Max. Peak negative gate voltage	15	V	-
F Mounting Force	15150(3400) $\pm 10\%$	N(Lbf)	-



A5F:600.XXHY

CHARACTERISTICS

PARAMETER	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
V_{TM} peak on-state voltage	---	2.15	2.45	V	Initial $T_J = 25^\circ\text{C}$, 50-60Hz half sine, $I_{peak} = 2025\text{A}$.
$V_{F(TO)1}$ Low-level threshold	---	---	1.31	V	$T_J = 125^\circ\text{C}$ Av. power = $V_{T(TO)} * I_{T(AV)} + r_T * [I_{T(RMS)}]^2$
$V_{F(TO)2}$ High-level threshold	---	---	1.55		
r_{T1} Low-level resistance	---	---	0.48	m Ω	Use low values for $I_{TM} < \pi$ rated $I_{T(AV)}$
r_{T2} High-level resistance	---	---	0.38		
I_L Latching current	---	350	---	mA	$T_C = 125^\circ\text{C}$, 12V anode. Gate pulse: 10V, 20 Ω , 100 μs .
I_H Holding current	---	120	500	mA	$T_C = 25^\circ\text{C}$, 12V anode. Initial $I_T = 15\text{A}$.
t_d Delay time	---	0.5	1.5	μs	$T_C = 25^\circ\text{C}$, $V_D = \text{rated } V_{DRM}$, 50A resistive load. Gate pulse: 10V, 20 Ω , 10 μs , 1 μs rise time.
t_q Turn-off time	---	---	60	μs	$T_J = 125^\circ\text{C}$, $I_{TM} = 500\text{A}$, $di/dt = 25\text{A}/\mu\text{s}$, $V_R = 50\text{V}$. $Dv/dt = 200\text{V}/\mu\text{s}$ lin. To 80% rated V_{DRM} . Gate: 0V, 100 Ω .
$t_{q(\text{diode})}$ Turn-off time with feedback diode	---	---	50	μs	$T_J = 125^\circ\text{C}$, $I_{TM} = 500\text{A}$, $di/dt = 25\text{A}/\mu\text{s}$, $V_R = 1\text{V}$. $dv/dt = 600\text{V}/\mu\text{s}$ lin. To 40% rated V_{DRM} . Gate: 0V, 100 Ω .
$I_{RM(REC)}$ Recovery current	---	93	---	A	$T_J = 125^\circ\text{C}$, $I_{TM} = 750\text{A}$, $diR/dt = 50\text{A}/\mu\text{s}$.
Q_{RR} Recovered charge	---	166	---	μC	
dv/dt Critical rate-of-rise of off-state voltage	500	700	---	V/ μs	$T_J = 125^\circ\text{C}$. Exp. to 100% or lin. Higher dv/dt values available.
	1000	---	---		$T_J = 125^\circ\text{C}$. Exp. To 67% V_{DRM} , gate open.
I_{RM} , I_{DM} Peak reverse and off-state current	---	30	60	mA	$T_J = 125^\circ\text{C}$, Rated V_{RRM} and V_{DRM} , gate open.
I_{GT} DC gate current to trigger	---	---	300	mA	$T_C = -40^\circ\text{C}$
	50	80	150		$T_C = 25^\circ\text{C}$ +12V anode-to-cathode. For recommended gate drive see "Gate Characteristics" figure.
V_{GT} DC gate voltage to trigger	---	---	3.3	V	$T_C = -40^\circ\text{C}$
	---	1.3	2.5		$T_C = 25^\circ\text{C}$
V_{GD} DC gate voltage not to trigger	---	---	0.3	V	$T_C = 25^\circ\text{C}$, Max. Value which will not trigger with rated V_{DRM} anode-to-cathode.
R_{thJC} Thermal resistance, junction-to-case	---	---	0.035	$^\circ\text{C}/\text{W}$	DC operation, double side coolde.
	---	---	0.041	$^\circ\text{C}/\text{W}$	180 $^\circ$ sine wave, double side coolde.
	---	---	0.042	$^\circ\text{C}/\text{W}$	120 $^\circ$ rectangular wave, double side cooled.
R_{thCS} Thermal resistance, case-to-sink	---	---	0.0300	$^\circ\text{C}/\text{W}$	Mtg. Surface smooth, flat and greased. Single side cooled. For double side, divide by 2.
wt Weight	---	255(9.0)	---	g(oz.)	---
Case Style	---	TO-200AC	---	JEDEC	---



A5F:600.XXHY

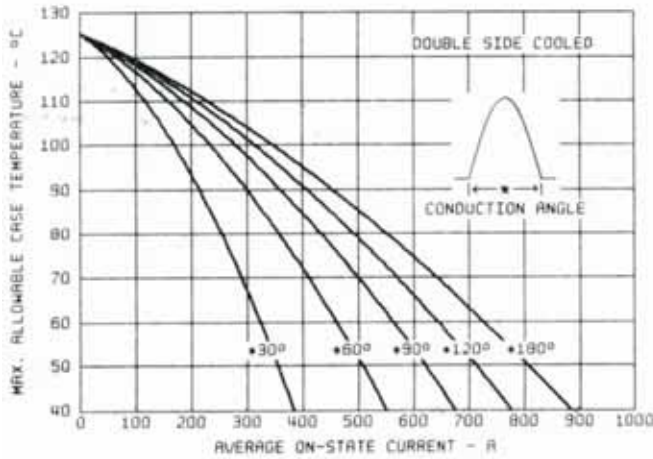


Fig. 1 — Case Temperature Ratings — Sinusoidal Waveforms, 50 to 400 Hz

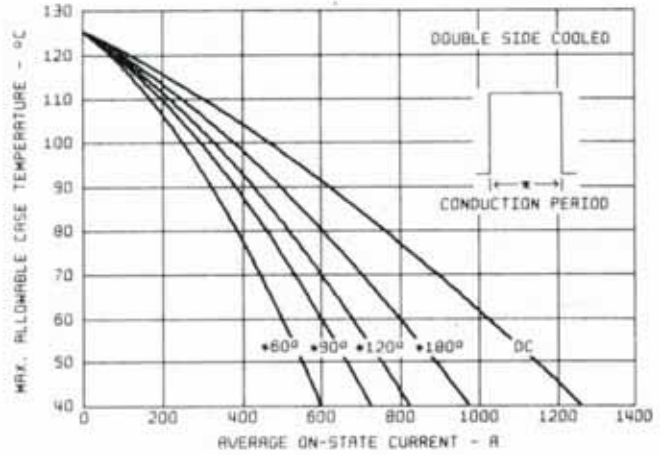


Fig. 2 — Case Temperature Ratings — Rectangular Waveforms, 50 to 400 Hz

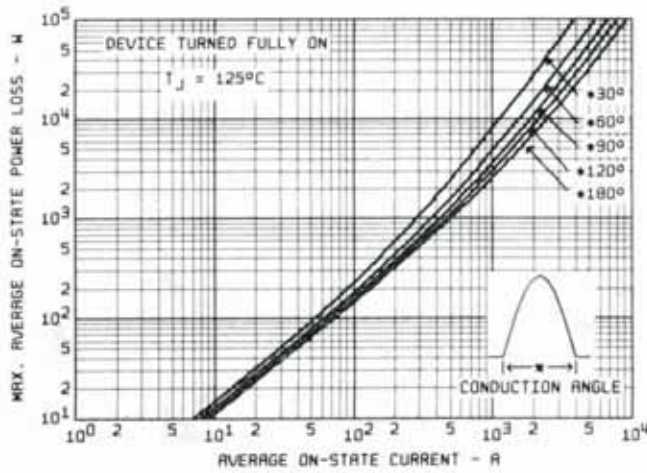


Fig. 3 — Power Loss Characteristics — Sinusoidal Waveforms

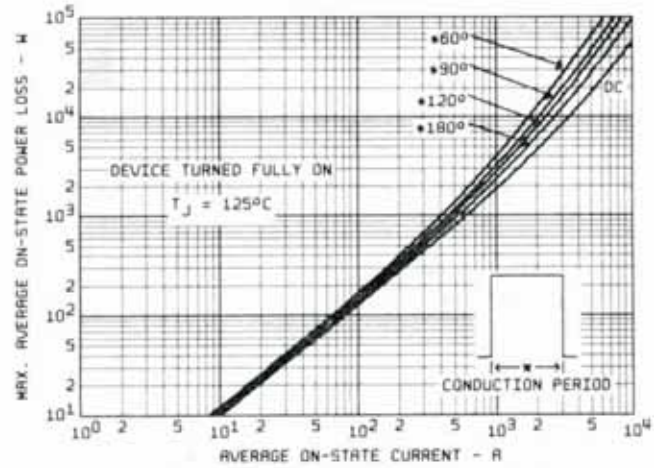


Fig. 4 — Power Loss Characteristics — Rectangular Waveforms

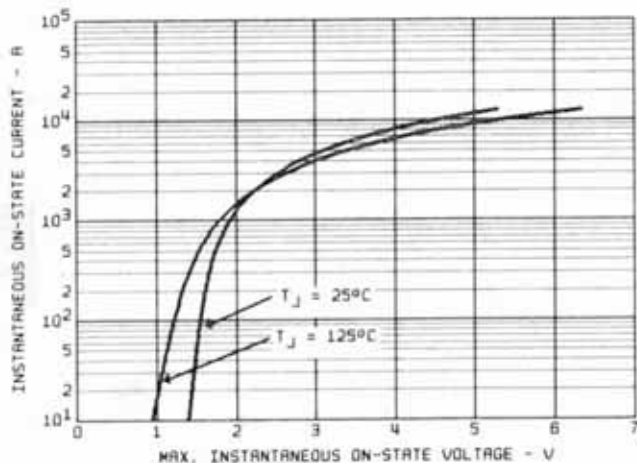


Fig. 5 — On-State Characteristics

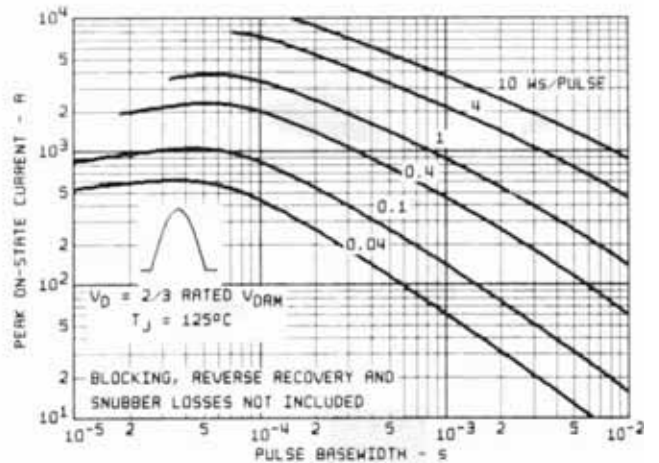


Fig. 6 — Max. Energy Loss per Pulse — Sinusoidal Waveforms



A5F:600.XXHY

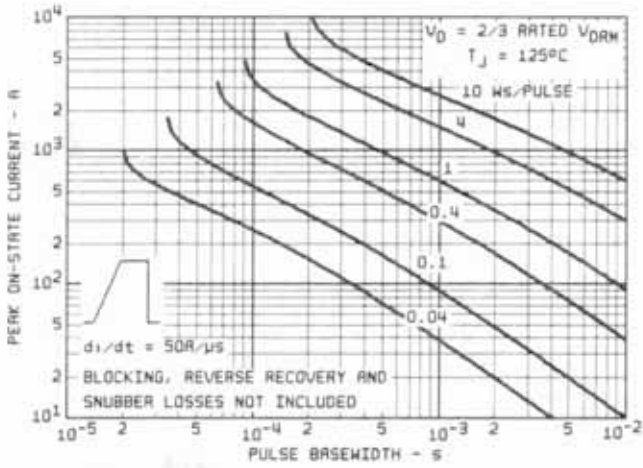


Fig. 7 — Max. Energy Loss per Pulse — Trapezoidal Waveforms, $di/dt = 50 \text{ A}/\mu\text{s}$

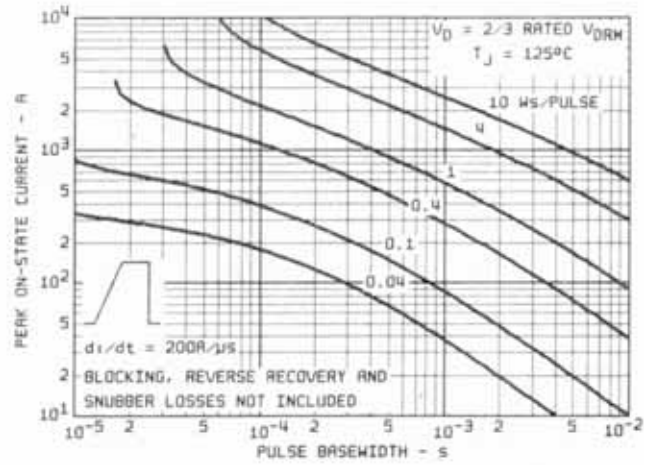


Fig. 8 — Max. Energy Loss per Pulse — Trapezoidal Waveforms, $di/dt = 200 \text{ A}/\mu\text{s}$

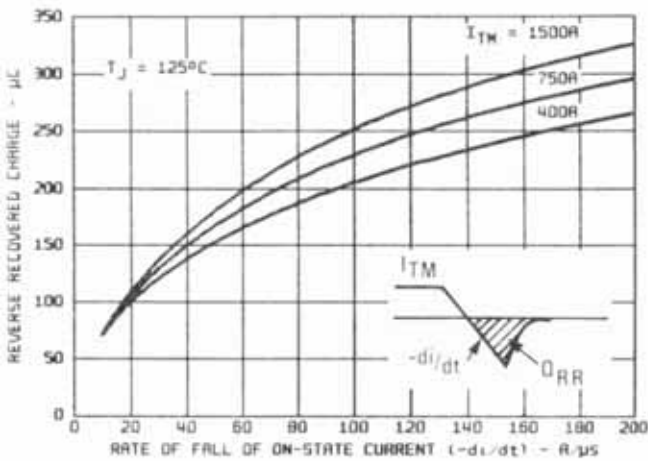


Fig. 9 — Typical Recovered Charge

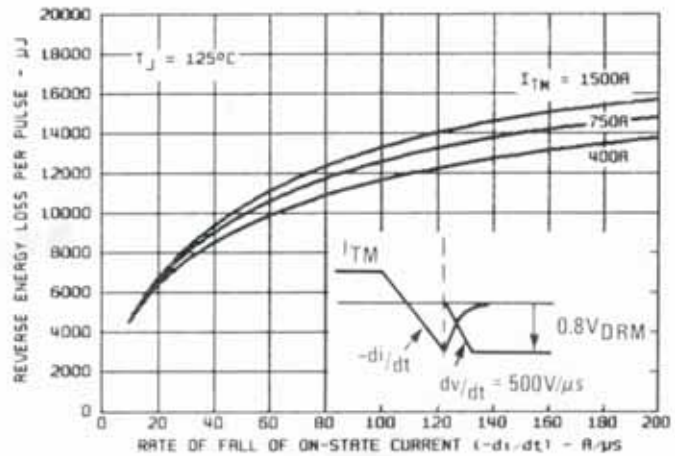


Fig. 10 — Typical Reverse Energy Losses

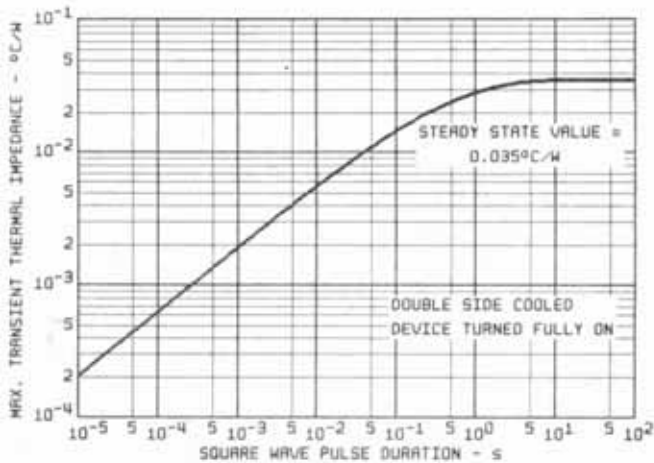


Fig. 11 — Transient Thermal Impedance, Junction-to-Case

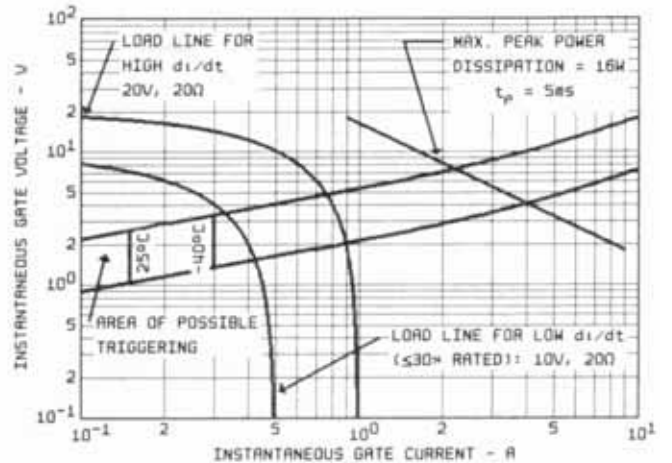


Fig. 12 — Gate Characteristics



A5F:600.XXHY

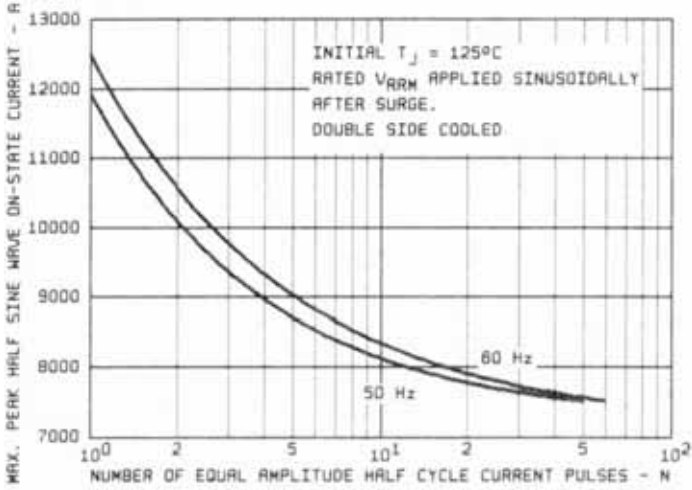


Fig. 13 — Non-Repetitive Surge Current Ratings

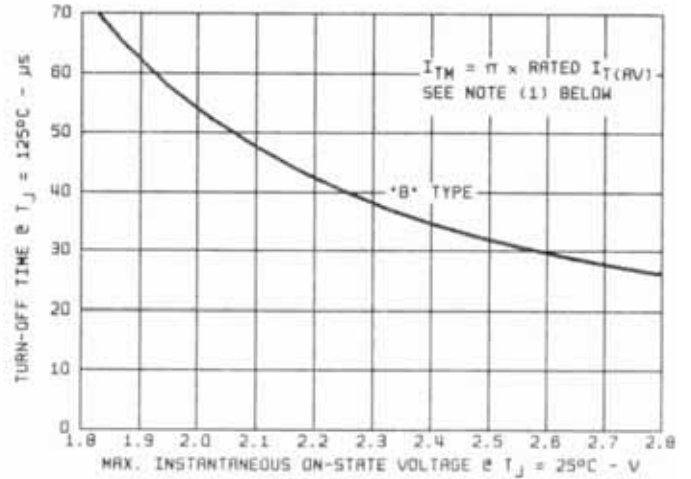


Fig. 14 — Trend for Turn-Off Time vs. On-State Voltage

(1) These curves are intended as a guideline. To specify non-standard t_q/V_{TM} contact factory.

TO-200AC

