S18CF SERIES
1200-1000 VOLTS RANGE
STANDARD TURN-OFF TIME 16 μs
110 AMP RMS, CENTER AMPLIFYING GATE
INVERTER TYPE STUD MOUNTED SCRs

VOLTAGE RATINGS

VOLTAGE CODE (1)	V_{RRM}, V_{DRM} – (V) Max. rep. peak reverse and off-state voltage	V_{RSM} – (V) Max. non-rep. peak reverse voltage $t_p \leq 5ms$	NOTES
	T_J = -40° to 125°C	T_J = 25° to 125°C	
12	1200	1300	Gate open
10	1000	1100	

MAXIMUM ALLOWABLE RATINGS

PARAMETER		VALUE	UNITS	NOTES
T_J	Junction temperature	-40 to 125	°C	
T_{stg}	Storage temperature	-40 to 150	°C	
$I_{T(AV)}$	Max. av. current	70	A	180° half sine wave
	● Max. T_C	85	°C	
$I_{T(RMS)}$	Max. RMS current	110	A	
I_{TSM}	Max. peak non-repetitive surge current	1910	A	50Hz half cycle sine wave — Initial T_J = 125°C, rated V_{RRM} applied after surge.
		2000		60Hz half cycle sine wave
		2270		50Hz half cycle sine wave — Initial T_J = 125°C, no voltage applied after surge.
		2380		60Hz half cycle sine wave
I^2t	Max. I^2t capability	18	kA^2s	t = 10ms — Initial T_J = 125°C, rated V_{RRM} applied after surge.
		17		t = 8.3ms
		26		t = 10ms — Initial T_J = 125°C, no voltage applied after surge.
		24		t = 8.3ms
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ capability	258	$kA^2\sqrt{s}$	Initial T_J = 125°C, no voltage applied after surge. I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$. $0.1 \leq t_x \leq 10ms$.
di/dt	Max. non-repetitive rate-of-rise of current	800	A/μs	T_J = 125°C, $V_D = V_{DRM}$, I_{TM} = 1600A. Gate pulse: 20V, 20Ω, 10μs, 0.5μs rise time. Max. repetitive di/dt is approximately 40% of non-repetitive value.
P_{GM}	Max. peak gate power	10	W	$t_p \leq 5ms$
$P_{G(AV)}$	Max. av. gate power	2	W	
$+I_{GM}$	Max. peak gate current	3	A	$t_p \leq 5ms$
$-V_{GM}$	Max. peak negative gate voltage	15	V	
T	Mounting torque	15.5(137) ± 10%	N•m	Non-lubricated threads
		14(120) ± 10%	(lbf-in)	Lubricated threads

(1) To complete the part number, refer to the Ordering Information table.

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CHARACTERISTICS

PARAMETER		MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
V_{TM}	Peak on-state voltage	—	1.95	2.06	V	Initial T_J = 25°C, 50-60Hz half sine, I_{peak} = 220A.
$V_{T(TO)1}$	Low-level threshold	—	—	1.28	V	T_J = 125°C Av. power = $V_{T(TO)} * I_{T(AV)} + r_T * [I_{T(RMS)}]^2$ Use low level values for $I_{TM} \leq \pi$ rated $I_{T(AV)}$
$V_{T(TO)2}$	High-level threshold	—	—	1.61		
r_{T1}	Low-level resistance	—	—	3.54	mΩ	
r_{T2}	High-level resistance	—	—	2.27		
I_L	Latching current	—	270	—	mA	T_C = 25°C, 12V anode. Gate pulse: 10V, 20Ω, 100µs.
I_H	Holding current	—	90	500	mA	T_C = 25°C, 12V anode. Initial I_T = 3A.
t_d	Delay time	—	0.5	1.5	µs	T_C = 25°C, V_D = rated V_{DRM}, 50A resistive load. Gate pulse: 10V, 20Ω, 10µs, 1µs rise time.
t_q	Turn-off time				µs	T_J = 125°C. I_{TM} = 200A, di_R/dt = 10A/µs, V_R = 50V, dv/dt = 200V/µs lin. to 80% rated V_{DRM}. Gate: 0V, 100Ω.
	"A" suffix	—	—	16		
	"B" suffix	—	—	20		
$t_{q(diode)}$	Turn-off time with feedback diode				µs	T_J = 125°C. I_{TM} = 200A, di_R/dt = 10A/µs, V_R = 1V, dv/dt = 600V/µs lin. to 40% rated V_{DRM}. Gate: 0V, 100Ω.
	"A" suffix	—	—	20		
	"B" suffix	—	—	25		
$I_{RM(REC)}$	Recovery current	—	57	—	A	T_J = 125°C, I_{TM} = 400A, di_R/dt = 50A/µs.
Q_{RR}	Recovered charge	—	58	—	µC	
dv/dt	Critical rate-of-rise of off-state voltage	500	700	—	V/µs	T_J = 125°C. Exp. to 100% or lin. to 80% V_{DRM}, gate open. Higher dv/dt values available.
		1000	—	—		T_J = 125°C. Exp. to 67% V_{DRM}, gate open.
I_{RM}, I_{DM}	Peak reverse and off-state current	—	10	20	mA	T_J = 125°C. Rated V_{RRM} and V_{DRM}, gate open.
I_{GT}	DC gate current to trigger	—	—	300	mA	T_C = -40°C +12V anode-to-cathode. For recommended gate drive see "Gate Characteristics" figure.
		25	50	150		T_C = 25°C
V_{GT}	DC gate voltage to trigger	—	—	3.3	V	T_C = -40°C
		—	1.2	2.5		T_C = 25°C
V_{GD}	DC gate voltage not to trigger	—	—	0.3	V	T_C = 125°C. Max. value which will not trigger with rated V_{DRM} anode-to-cathode.
R_{thJC}	Thermal resistance, junction-to-case	—	—	0.250	°C/W	DC operation
		—	—	0.291	°C/W	180° sine wave
		—	—	0.302	°C/W	120° rectangular wave
R_{thCS}	Thermal resistance, case-to-sink	—	—	0.100	°C/W	Mtg. surface smooth, flat and greased.
wt	Weight	—	100(3.5)	—	g(oz.)	
	Case Style	TO-209AC (TO-94)			JEDEC	

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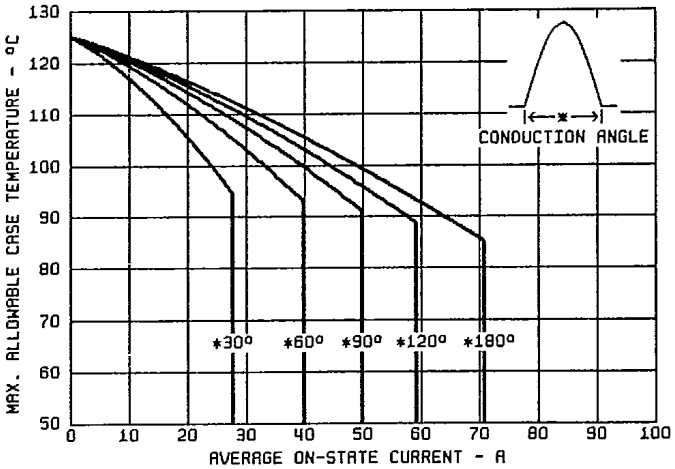

Fig. 1 — Case Temperature Ratings — Sinusoidal Waveforms, 50 to 400 Hz

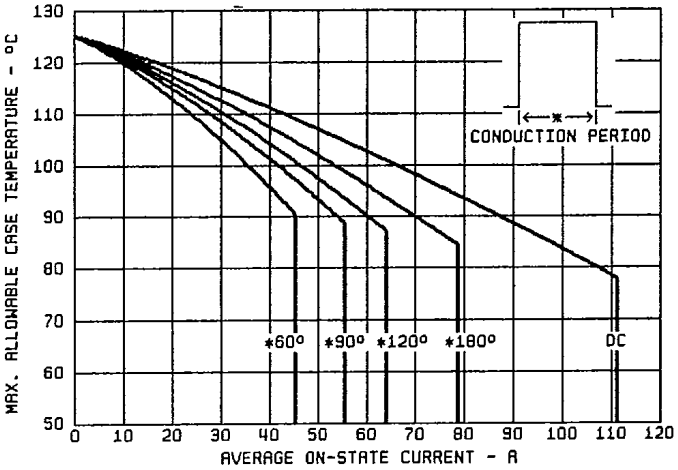

Fig. 2 — Case Temperature Ratings — Rectangular Waveforms, 50 to 400 Hz

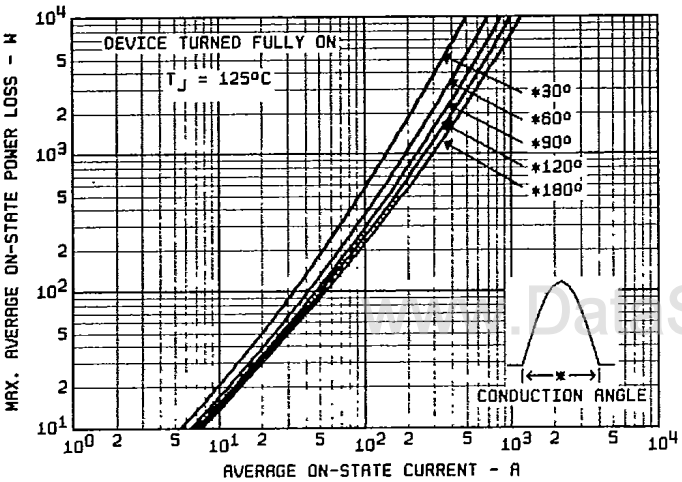

Fig. 3 — Power Loss Characteristics — Sinusoidal Waveforms

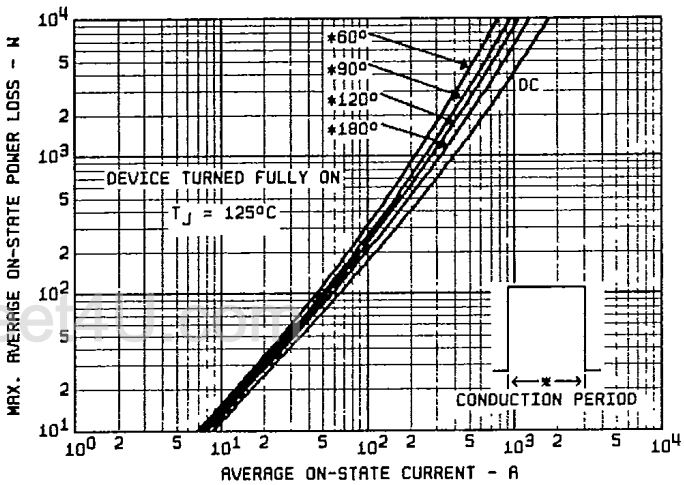

Fig. 4 — Power Loss Characteristics — Rectangular Waveforms

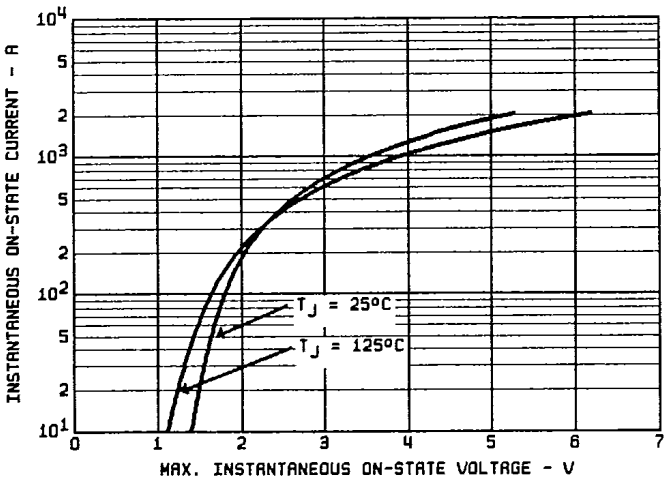

Fig. 5 — On-State Characteristics

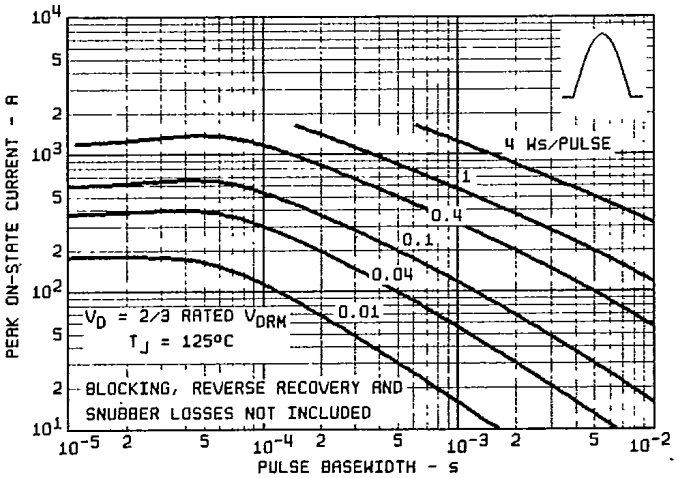

Fig. 6 — Max. Energy Loss per Pulse — Sinusoidal Waveforms

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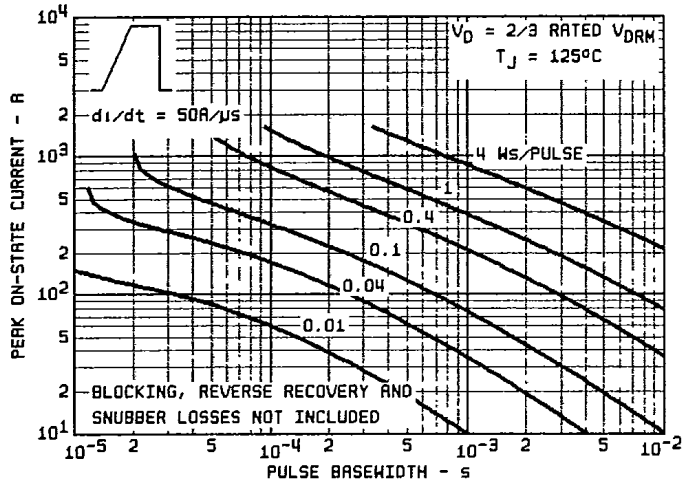

Fig. 7 — Max. Energy Loss per Pulse — Trapezoidal Waveforms, di/dt = 50 A/µs

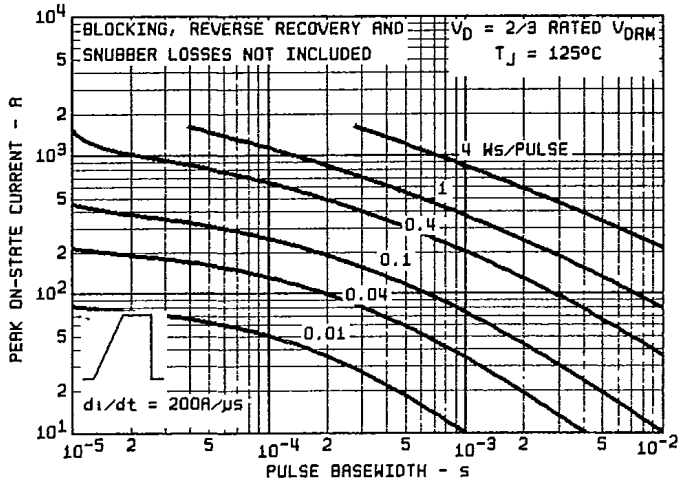

Fig. 8 — Max. Energy Loss per Pulse — Trapezoidal Waveforms, di/dt = 200 A/µs

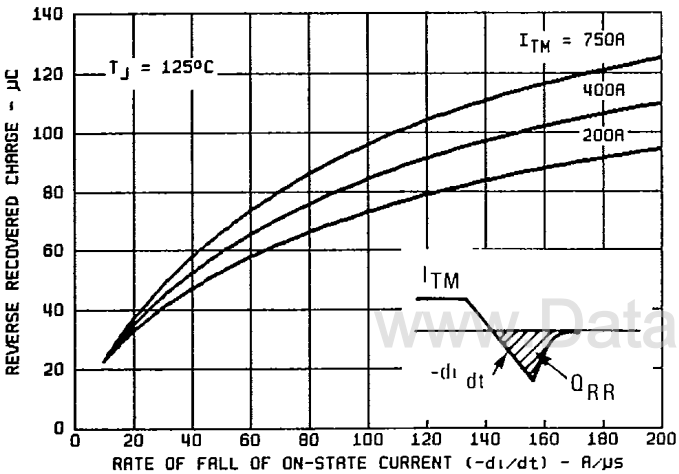

Fig. 9 — Typical Recovered Charge

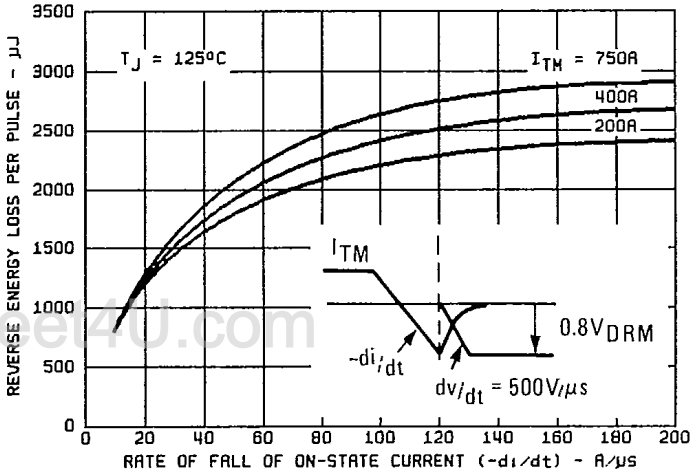

Fig. 10 — Typical Reverse Energy Losses

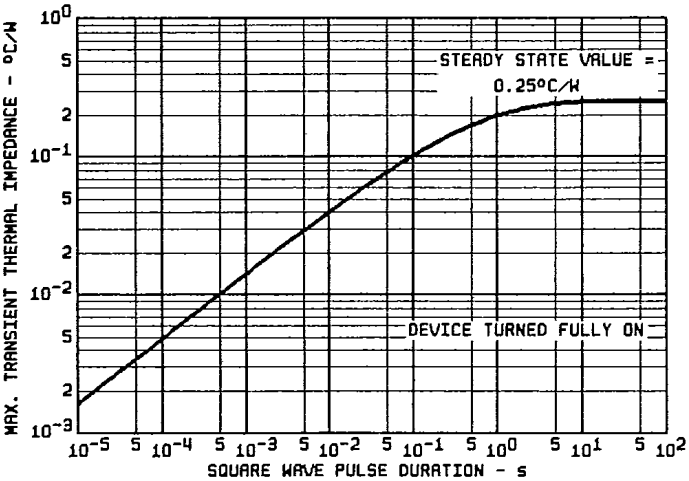

Fig. 11 — Transient Thermal Impedance, Junction-to-Case

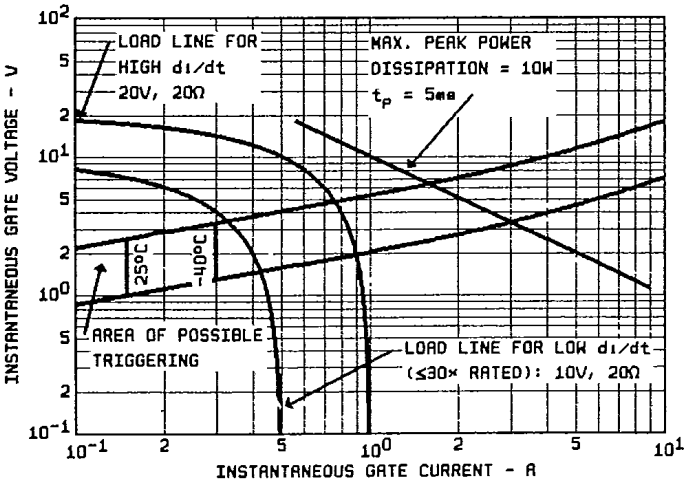

Fig. 12 — Gate Characteristics

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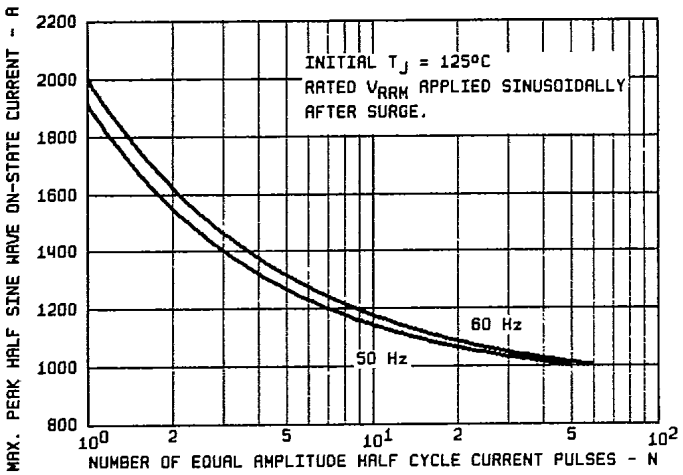

Fig. 13 — Non-Repetitive Surge Current Ratings

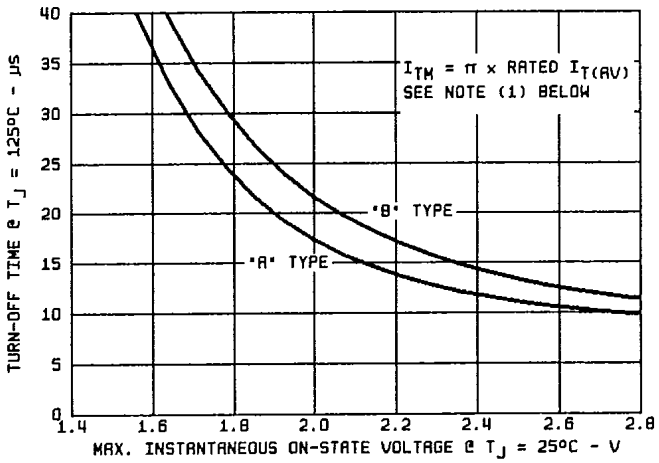

Fig. 14 — Trend for Turn-Off Time vs. On-State Voltage

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

ORDERING INFORMATION

TYPE	PACKAGE (1)		FAST	TEMPERATURE		VOLTAGE		TURN-OFF		LEADS & TERMINALS	
	CODE	DESCRIPTION		CODE	MAX. T_J	CODE	V_{DRM}	CODE	MAX. t_q	CODE	DESCRIPTION
S18	C	1/2" stud, ceramic housing.	F	—	125°C	12	1200V	A	16µs	0	Flexible leads, eyelet terminals. Standard in USA. (Fig. 1)
						10	1000V	B	20µs		
										1	Flexible leads, fast-on terminals. Standard in Europe. (Fig. 2)

(1) Other packages are also available:
- Supplied with flag terminals.
For further details contact factory.

For a device with standard USA case, max T_J = 125°C, V_{DRM} = 1200V, max. t_q = 16µs, order as: S18CF12A0.

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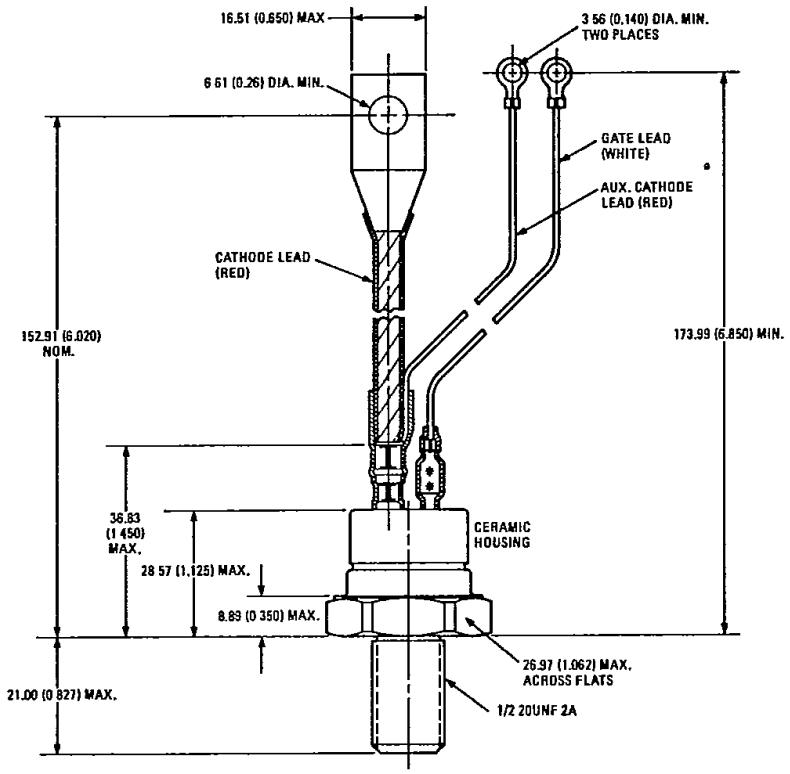

Fig. 1 — Conforms to JEDEC Outline TO-209AC (TO-94)

Dimensions in Millimeters and (Inches)

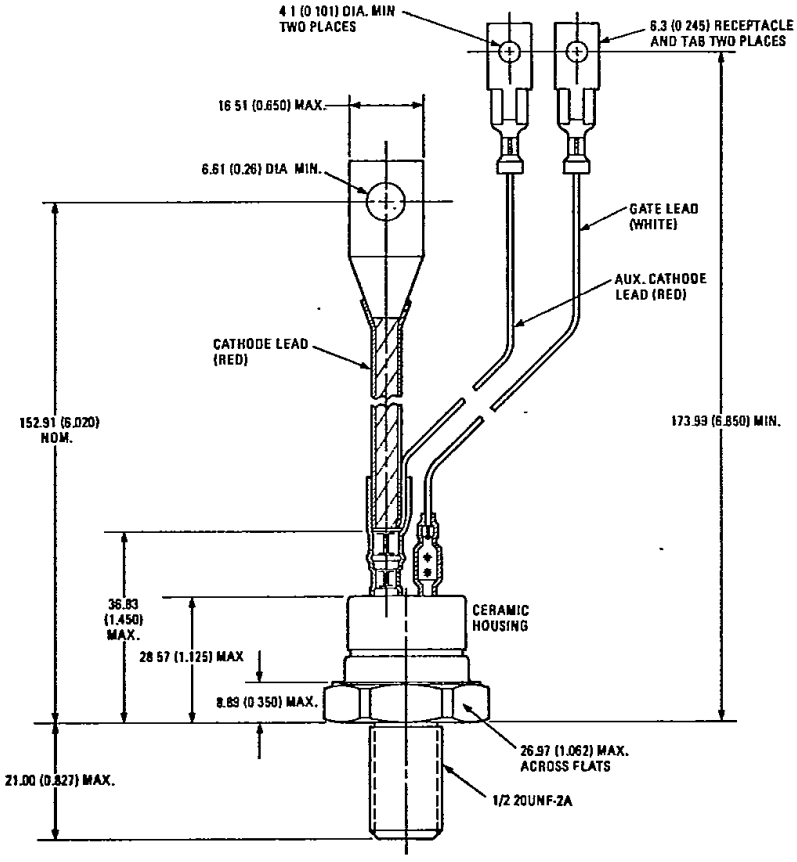

Fig. 2 — Similar to JEDEC Outline TO-209AC (TO-94) (A-25)

Dimensions in Millimeters and (Inches)