S18C & S18CH SERIES
400-200 VOLTS RANGE
175 AMP RMS, CENTER AMPLIFYING GATE
PHASE CONTROL 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°C to max. rated	T_J = 25°C to max. rated	
4A	400	500	Gate open
2A	200	300	

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

MAXIMUM ALLOWABLE RATINGS

PARAMETER		SERIES	VALUE	UNITS	NOTES
T_J	Junction temperature	S18C	-40 to 125	°C	
		S18CH	-40 to 150		
T_{stg}	Storage temperature	ALL	-40 to 150	°C	
$I_{T(AV)}$	Max. av. current	ALL	110	A	180° half sine wave
	@ Max. T_C	S18C	90	°C	
		S18CH	115		
$I_{T(RMS)}$	Max. RMS current	ALL	175	A	
I_{TSM}	Max. peak non-rep. surge current	ALL	2960	A	50Hz half cycle sine wave; Initial T_J = 125°C, rated V_{RRM} applied after surge.
			3100		60Hz half cycle sine wave
			3520		50Hz half cycle sine wave; Initial T_J = 125°C, no voltage applied after surge.
			3690		60Hz half cycle sine wave
I^2t	Max. I^2t capability	ALL	44	kA^2s	t = 10ms Initial T_J = 125°C, rated V_{RRM} applied after surge.
			40		t = 8.3ms
			62		t = 10ms Initial T_J = 125°C, no voltage applied after surge.
			57		t = 8.3ms
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ capability	ALL	620	$kA^2\sqrt{s}$	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-rep. rate-of-rise of current	ALL	800	A/µs	T_J = 125°C, $V_D = V_{DRM}$, I_{TM} = 1600A. Gate pulse: 20V, 20Ω, 10µs, 0.5µs rise. Max. repetitive di/dt is approximately 40% of non-repetitive value.
P_{GM}	Max. peak gate power	ALL	10	W	$t_p \leq 5ms$
$P_{G(AV)}$	Max. av. gate power	ALL	2	W	
$+I_{GM}$	Max. peak gate current	ALL	3	A	$t_p \leq 5ms$
$-V_{GM}$	Max. peak neg. gate voltage	ALL	5	V	
T	Mounting torque	ALL	15.5 (137) ± 10%	N·m	Non-lubricated threads.
			14 (120) ± 10%	(lbf-in)	Lubricated threads.

S18C & S18CH SERIES
400-200 VOLTS RANGE

CHARACTERISTICS

PARAMETER		SERIES	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
V_{TM}	Peak on-state voltage	ALL	—	1.10	1.22	V	Initial T_J = 25°C, 60Hz half sine, I_{peak} = 345A.
$V_{T(TO)1}$	Low-level threshold	ALL	—	—	0.743	V	T_J = max. rated Av. power = $V_{T(TO)} * I_{T(AV)} + r_T * (I_{T(RMS)})^2$ Use low level values for $I_{TM} \leq \pi I_{T(AV)}$
$V_{T(TO)2}$	High-level threshold		—	—	0.884		
r_{T1}	Low-level resistance	ALL	—	—	1.200	mΩ	
r_{T2}	High-level resistance		—	—	0.785		
I_L	Latching current	ALL	—	180	—	mA	T_C = 25°C, 12V anode. Gate pulse: 10V, 20Ω, 100μs.
I_H	Holding current	ALL	—	60	500	mA	T_C = 25°C, 12V anode. Initial I_T = 3A.
t_d	Delay time	ALL	—	0.5	1.5	μs	T_C = 25°C, V_D = V_{DRM}, 50A resistive load. Gate pulse: 10V, 20Ω, 10μs, 1μs rise.
t_q	Turn-off time	S18C	—	40	—	μs	T_J = max. rated. I_{TM} = 200A, di_R/dt = 10A/μs, V_R = 50V, dv/dt = 20V/μs lin. to rated V_{DRM}. Gate: 0V, 100Ω.
		S18CH	—	55	—		
t_a	Reverse current rise	ALL	—	7.9	—	μs	T_J = 125°C, I_{TM} = 200A, di_R/dt = 1A/μs
t_b	Reverse current fall	ALL	—	2.6	—	μs	
$I_{RM(REC)}$	Reverse current	ALL	—	7.9	—	A	
Q_{RR}	Recovered charge	ALL	—	42	—	μC	
dv/dt	Critical rate-of-rise of voltage	ALL	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	S18C	—	7	20	mA	T_J = 125°C. Rated V_{RRM} and V_{DRM}, gate open.
		S18CH	—	15	50		T_J = 150°C
I_{GT}	DC gate current to trigger	ALL	—	—	300	mA	T_C = -40°C +12V anode. For recommended gate drive see "Gate Characteristics" figure.
			25	50	150		T_C = 25°C
V_{GT}	DC gate voltage to trigger	ALL	—	—	3.3	V	T_C = -40°C
			—	1.2	2.5		T_C = 25°C
V_{GD}	DC gate voltage not to trigger	ALL	—	—	0.3	V	T_C = 125°C. Max. value which will not trigger with rated V_{DRM} anode.
R_{thJC}	Thermal resistance, junction-to-case	ALL	—	—	0.250	°C/W	DC operation
			—	—	0.292	°C/W	180° sine wave
			—	—	0.302	°C/W	120° rectangular wave
R_{thCS}	Thermal resistance, case-to-sink	ALL	—	—	0.100	°C/W	Mounting surface smooth, flat and greased.
wt	Weight	ALL	—	100(3.5)	—	g(oz.)	
	Case Style	ALL		TO-209AC (TO-94)		JEDEC	

T-25-19

S18C & S18CH SERIES
400-200 VOLTS RANGE

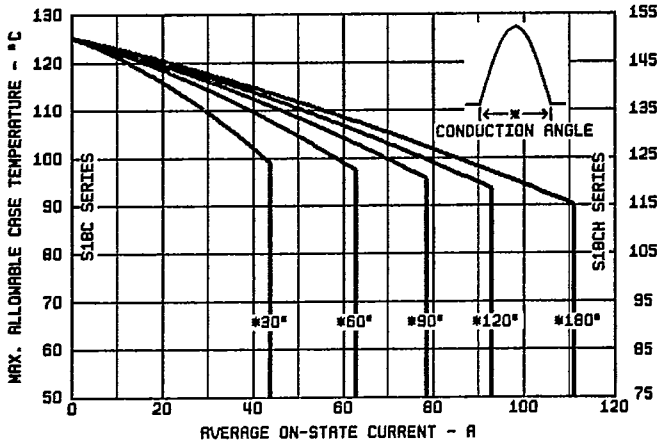

Fig. 1 — Case Temperature Ratings — Sinusoidal Waveforms, 50 to 400 Hz

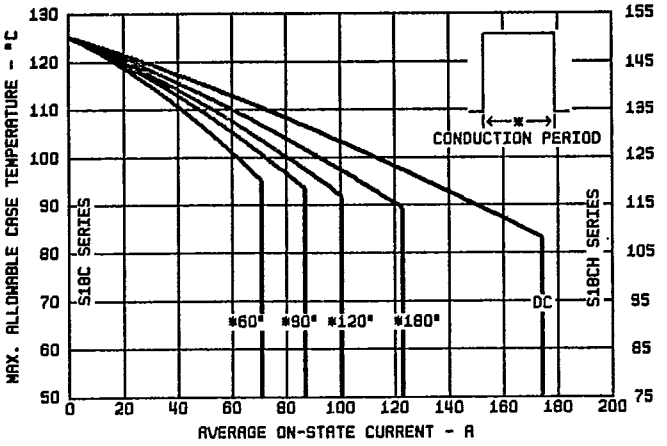

Fig. 2 — Case Temperature Ratings — Rectangular Waveforms, 50 to 400 Hz

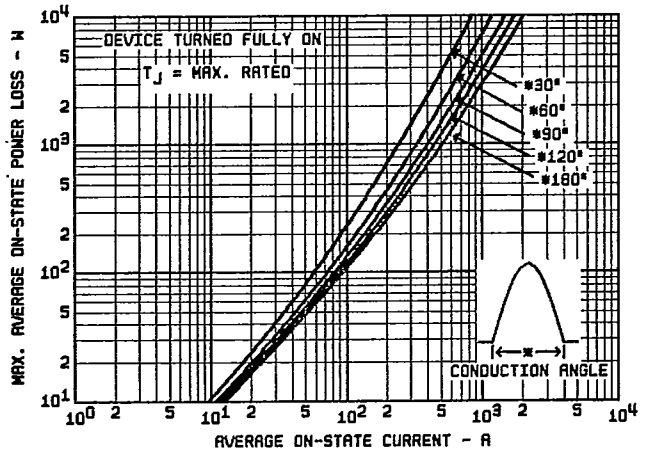

Fig. 3 — Power Loss Characteristics — Sinusoidal Waveforms

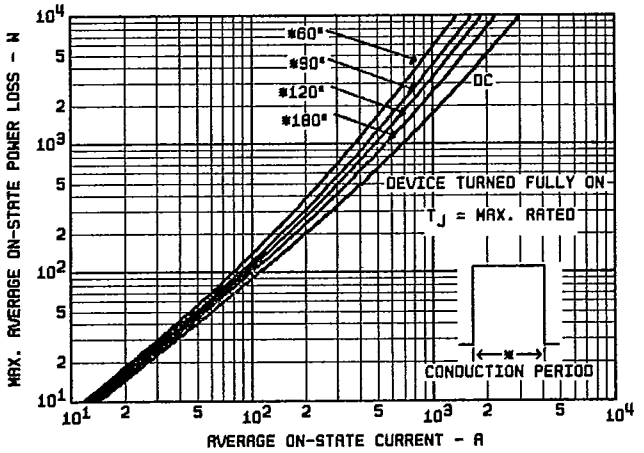

Fig. 4 — Power Loss Characteristics — Rectangular Waveforms

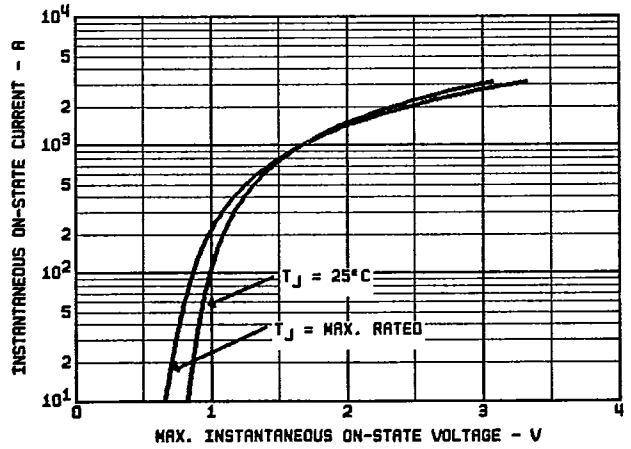

Fig. 5 — On-State Characteristics

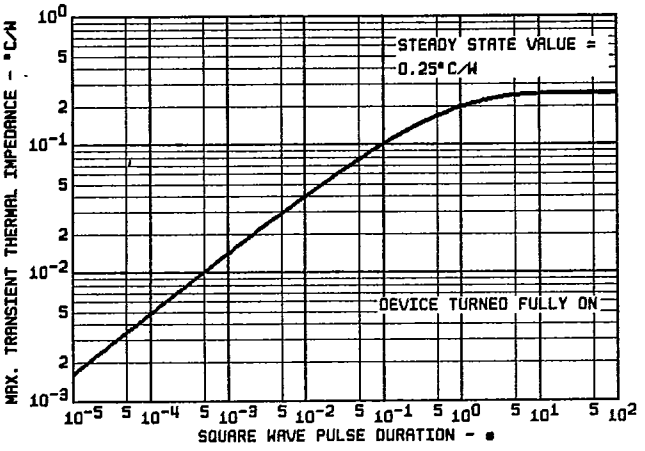

Fig. 6 — Transient Thermal Impedance, Junction-to-Case

S18C & S18CH SERIES
400-200 VOLTS RANGE

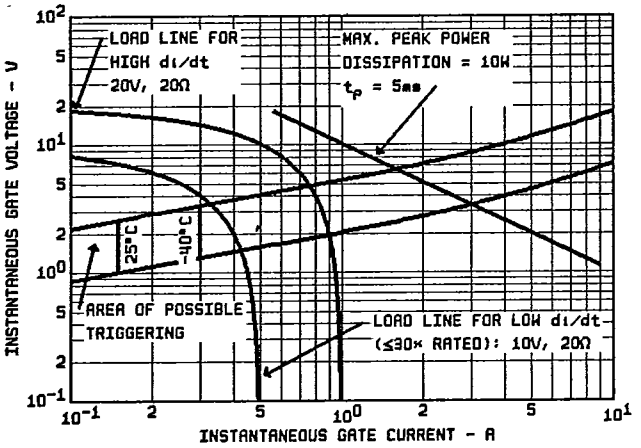

Fig. 7 — Gate Characteristics

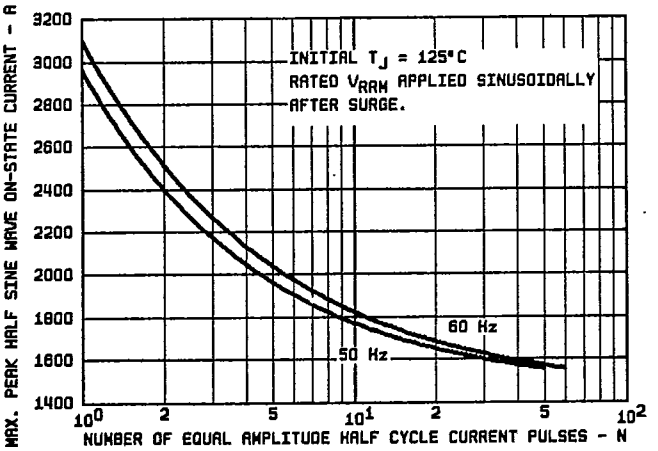

Fig. 8 — Non-Repetitive Surge Current Ratings

ORDERING INFORMATION

TYPE	PACKAGE		TEMPERATURE		VOLTAGE		LEADS & TERMINALS		BASE MODIFICATION (2)	
	CODE	DESCRIPTION	CODE	MAX. T_J	CODE	V_{DRM}	CODE	DESCRIPTION	CODE	DESCRIPTION
S18	CG	1/2" stud, glass seal. Standard in USA	—	125°C	4A	400V	0	Flexible leads, eyelet terminals. Standard in USA. (Fig. 1)	M	Metric threads.
			H	150°C	2A	200V				
	C	1/2" stud, ceramic housing. Standard in Europe.					1	Flexible leads, fast-on terminals. Standard in Europe. (Fig. 2)		
							2	Flag terminals (1). (Fig. 3 and 4)		

(1) Mounting torque on screw in flag terminal: 1.4 N·m (12 lbf-in) (2) Use only if required

For example, for a device with standard USA case, max. T_J = 150°C, V_{DRM} = 200V, order as:

TYPE	PACKAGE	TEMPERATURE	VOLTAGE	LEADS & TERMINALS
S18	CG	H	2A	0

S18C & S18CH SERIES
400-200 VOLTS RANGE

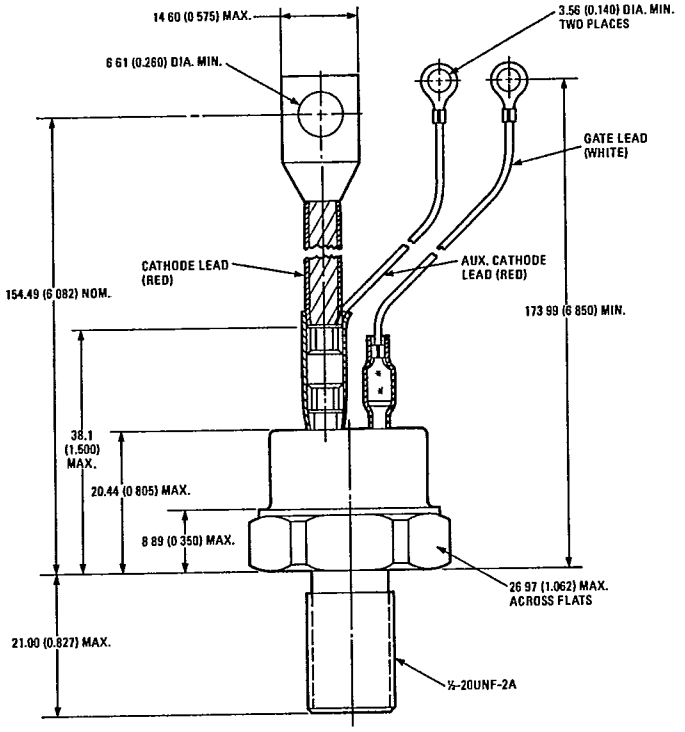

Fig. 1 — Conforms to JEDEC Outline TO-209AC (TO-94)
Dimensions in Millimeters and (Inches)

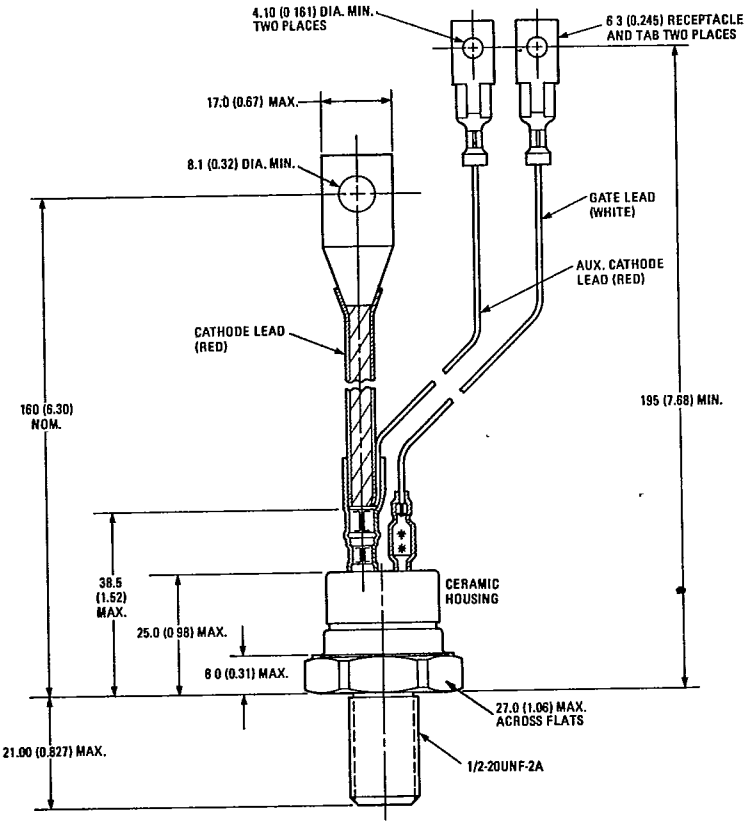

Fig. 2 — Similar to TO-209AC (TO-94)
Dimensions in Millimeters and (Inches)

S18C & S18CH SERIES
400-200 VOLTS RANGE

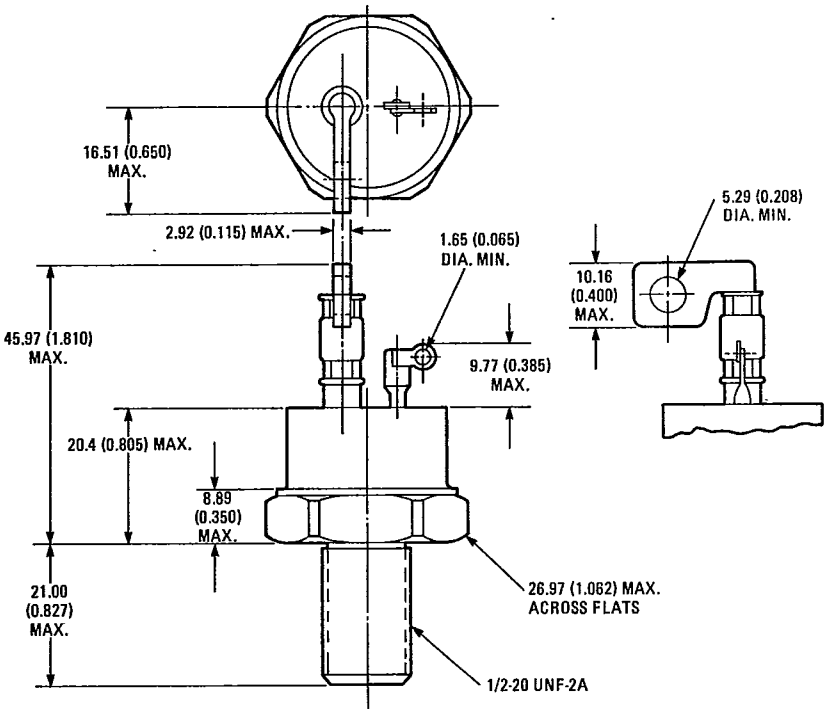

Fig. 3 — Conforms to JEDEC Outline TO-208AD (TO-83)
(Standard in U.S.A.)
Dimensions in Millimeters and (Inches)

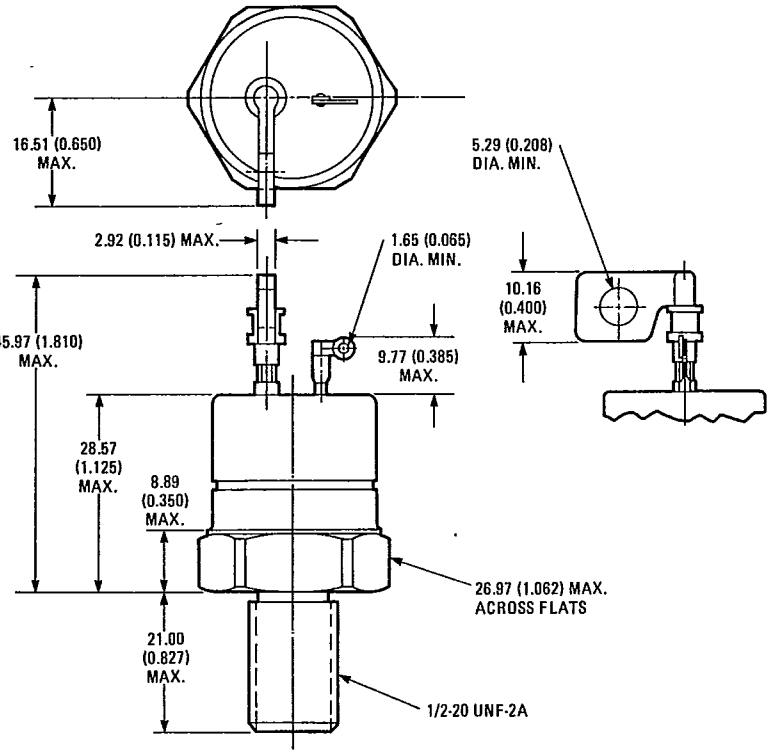

Fig. 4 — Conforms to JEDEC Outline TO-208AD (TO-83)
(Standard in Europe)
Dimensions in Millimeters and (Inches)