DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MAC93(A) SERIES

BIDIRECTIONAL THYRISTORS

FEATURES

- Available as “HR” (high reliability) screened per MIL-PRF-19500, JANTX level. Add “HR” suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding “-PBF” suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage (T_J = -40 to 125°C, ½ sine wave 50 to 60Hz, gate open) MAC93(A)-1 MAC93(A)-2 MAC93(A)-3 MAC93(A)-4	V_{DRM}	 30 60 100 200	Volts
RMS on-state current (full cycle sine wave 50 to 60Hz, T_C = 60°C)	$I_{T(RMS)}$	0.65	Amps
Peak non-repetitive surge current (1 cycle, 60Hz, T_C = 60°C, preceded and followed by rated current)	I_{TSM}	6.0	Amps
Circuit fusing considerations (T_J = -40 to + 125°C, t = 8.3ms)	I^2t	0.15	A^2s
Average gate power	$P_{G(AV)}$	0.01	Watts
Peak gate current	I_{GM}	1.0	Amps
Operating junction temperature range	T_J	-40 to +125	°C
Storage temperature range	T_{stg}	-40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\Theta JC}$	75	°C/W
Thermal resistance, junction to ambient	$R_{\Theta JA}$	200	°C/W

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ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise noted

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current (either direction) (V_D = Rated V_{DRM}, T_J = 125°C, gate open)	I_{DRM}	-	-	100	µA
Peak on-state voltage (either direction) (I_{TM} = 0.92A peak, pulse width = 1 to 2ms, duty cycle ≤ 2%)	V_{TM}	-	-	1.85	Volts
Gate trigger current (continuous dc) (V_D = 7V, R_L = 100Ω, minimum gate pulse width = 2µs) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC93A-1 through MAC93A-4	I_{GT}	 - -	 - -	 5.0 12	mA
Gate trigger voltage (continuous dc) (V_D = 7V, R_L = 100Ω, minimum gate pulse width = 2µs) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC93A-1 through MAC93A-4 MT2(+),G(+); MT2(-),G(-), T_C = -40°C, all devices MT2(+),G(-); MT2(-),G(+), T_C = -40°C, MAC93A-1 through MAC93A-4 (V_D = Rated V_{DRM}, R_L = 10kΩ, T_J = 125°C) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC93A-1 through MAC93A-4	V_{GT}	 - - - - 0.1 0.1	 - - - - - -	 2.0 2.0 2.5 3.0 - -	Volts
Holding current (either direction) (V_D = 7V, I_{TM} = 20mA, gate open, T_C = 25°C) (V_D = 7V, I_{TM} = 20mA, gate open, T_C = -40°C)	I_H	- -	- -	10 20	mA

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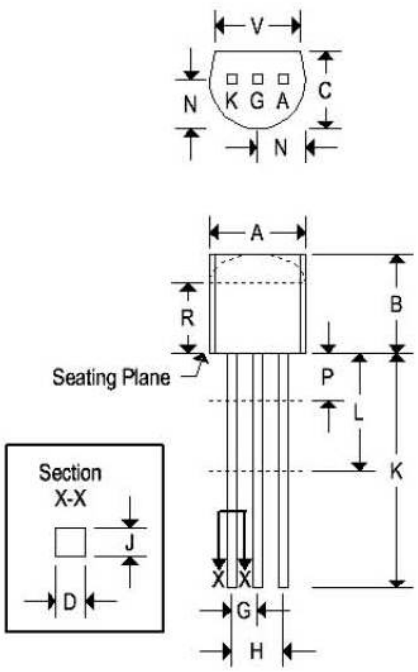
MECHANICAL CHARACTERISTICS

Case	TO-92
Marking	Alpha-numeric
Pin out	See below



	TO-92			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.175	0.205	4.450	5.200
B	0.170	0.210	4.320	5.330
C	0.125	0.165	3.180	4.190
D	0.016	0.022	0.410	0.550
F	0.016	0.019	0.410	0.480
G	0.045	0.055	1.150	1.390
H	0.095	0.105	2.420	2.660
J	0.015	0.020	0.390	0.500
K	0.500	-	12.700	-
L	0.250	-	6.350	-
N	0.080	0.105	2.040	2.660
P	-	0.100	-	2.540
R	0.115	-	2.930	-
V	0.135	-	3.430	-

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FIGURE 3 – AVERAGE CURRENT DERATING (REFERENCE: CASE TEMPERATURE)

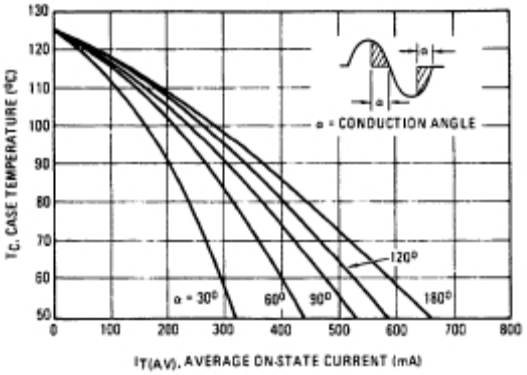

FIGURE 4 – RMS CURRENT DERATING (REFERENCE: CASE TEMPERATURE)

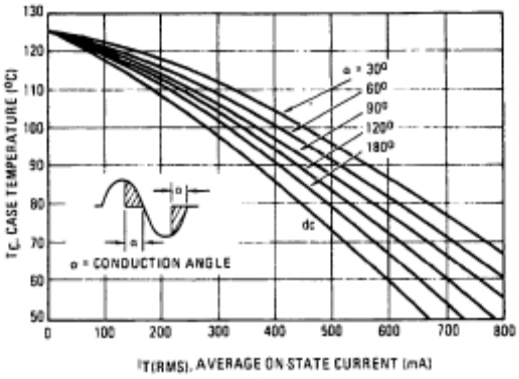

FIGURE 5 – AVERAGE CURRENT DERATING (REFERENCE: AMBIENT TEMPERATURE)

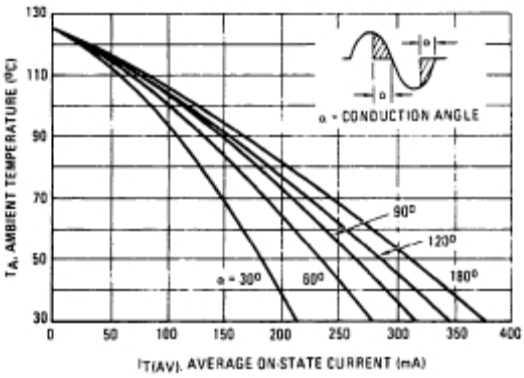

FIGURE 6 – RMS CURRENT DERATING (REFERENCE: AMBIENT TEMPERATURE)

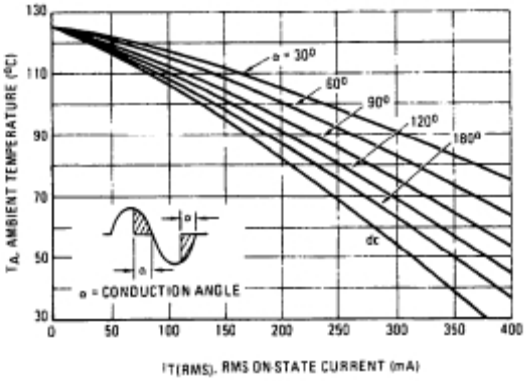

FIGURE 7 – ON-STATE POWER DISSIPATION

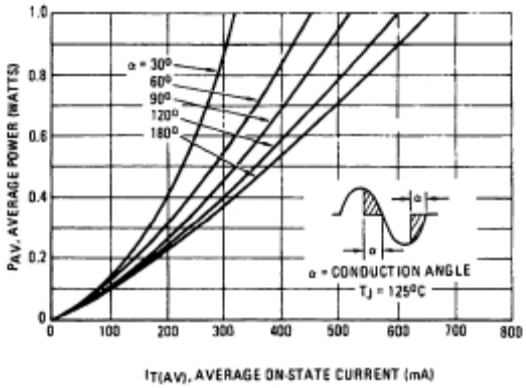

FIGURE 8 – ON-STATE POWER DISSIPATION

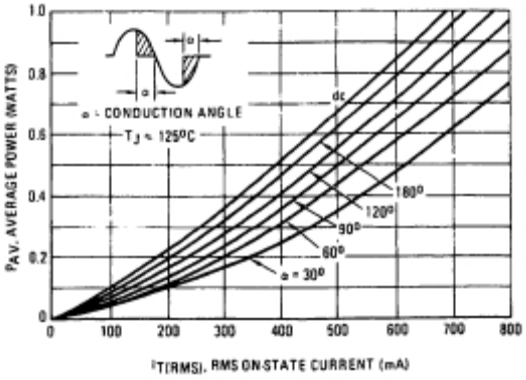

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FIGURE 9 – MAXIMUM ON-STATE CHARACTERISTICS

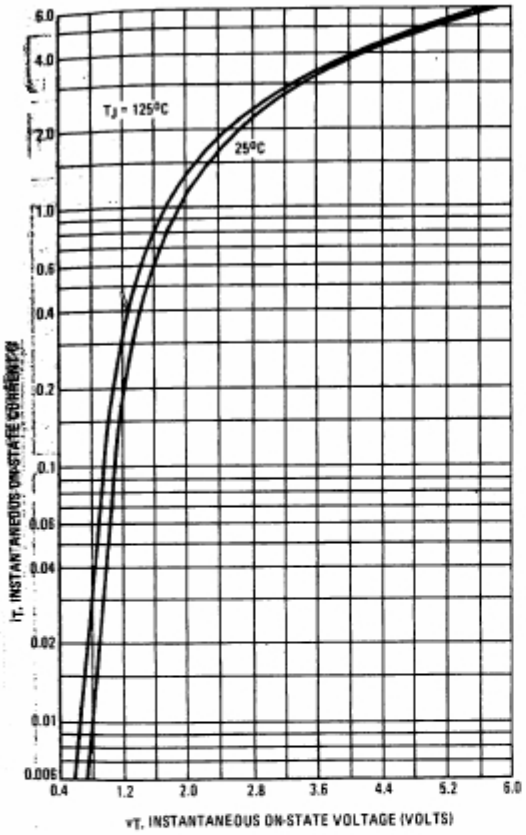

FIGURE 10 – TYPICAL HOLDING CURRENT

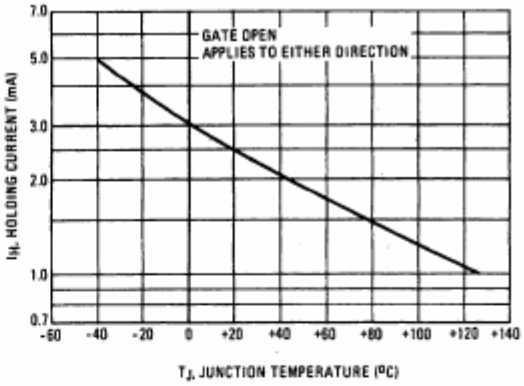

FIGURE 11 – MAXIMUM NON-REPETITIVE SURGE CURRENT

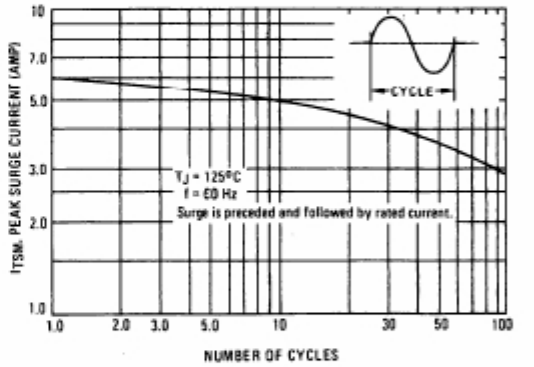

FIGURE 12 – THERMAL RESPONSE