

# DIGITRON SEMICONDUCTORS

## MAC94(A) SERIES

## SILICON BIDIRECTIONAL THYRISTORS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).

Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
<b>Peak repetitive off-state voltage</b> ( $T_J = -40$ to $125^\circ\text{C}$ , $\frac{1}{2}$ sine wave 50 to 60Hz, gate open) MAC94(A)-1 MAC94(A)-2 MAC94(A)-3 MAC94(A)-4	$V_{\text{DRM}}$	30 60 100 200	Volts
<b>RMS on-state current</b> (full cycle sine wave 50 to 60Hz, $T_C = 60^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	0.8	Amps
<b>Peak non-repetitive surge current</b> (1 cycle, 60Hz, $T_J = 60^\circ\text{C}$ , preceded and followed by rated current)	$I_{\text{TSM}}$	6.0	Amps
<b>Circuit fusing considerations</b> ( $T_J = -40$ to $+125^\circ\text{C}$ , $t = 8.3\text{ms}$ )	$I^2t$	0.15	$\text{A}^2\text{s}$
<b>Average gate power</b>	$P_{\text{G(AV)}}$	0.01	Watts
<b>Peak gate current</b>	$I_{\text{GM}}$	1.0	Amps
<b>Operating junction temperature range</b>	$T_J$	-40 to +125	$^\circ\text{C}$
<b>Storage temperature range</b>	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
<b>Thermal resistance, junction to case</b>	$R_{\text{eJC}}$	75	$^\circ\text{C/W}$
<b>Thermal resistance, junction to ambient</b>	$R_{\text{eJA}}$	200	$^\circ\text{C/W}$

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ.	Max	Unit
<b>Peak blocking current</b> (either direction) ( $V_D = \text{Rated } V_{\text{DRM}}$ , $T_J = 125^\circ\text{C}$ , gate open)	$I_{\text{DRM}}$	-	-	2.0	mA
<b>Peak on-state voltage</b> (either direction) ( $I_{\text{TM}} = 1.12\text{A}$ peak, pulse width = 1 to 2ms, duty cycle $\leq 2\%$ )	$V_{\text{TM}}$	-	-	1.5	Volts
<b>Gate trigger current</b> (continuous dc) ( $V_D = 7\text{V}$ , $R_L = 100\Omega$ , minimum gate pulse width = $2\mu\text{s}$ ) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC94A-1 through MAC94A-4	$I_{\text{GT}}$	-	-	5.0 10	mA
<b>Gate trigger voltage</b> (continuous dc) ( $V_D = 7\text{V}$ , $R_L = 100\Omega$ , minimum gate pulse width = $2\mu\text{s}$ ) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC94A-1 through MAC94A-4 MT2(+),G(+); MT2(-),G(-), $T_C = -40^\circ\text{C}$ , all devices MT2(+),G(-); MT2(-),G(+), $T_C = -40^\circ\text{C}$ , MAC94A-1 through MAC94A-4 ( $V_D = \text{Rated } V_{\text{DRM}}$ , $R_L = 10\text{k}\Omega$ , $T_J = 125^\circ\text{C}$ ) MT2(+),G(+); MT2(-),G(-), all devices MT2(+),G(-); MT2(-),G(+), MAC94A-1 through MAC94A-4	$V_{\text{GT}}$	-	-	2.0 2.0 3.0 3.0	Volts
<b>Holding current</b> (either direction) ( $V_D = 7\text{V}$ , $I_{\text{TM}} = 20\text{mA}$ , gate open, $T_C = 25^\circ\text{C}$ ) ( $V_D = 7\text{V}$ , $I_{\text{TM}} = 20\text{mA}$ , gate open, $T_C = -40^\circ\text{C}$ )	$I_{\text{H}}$	-	-	10 20	mA

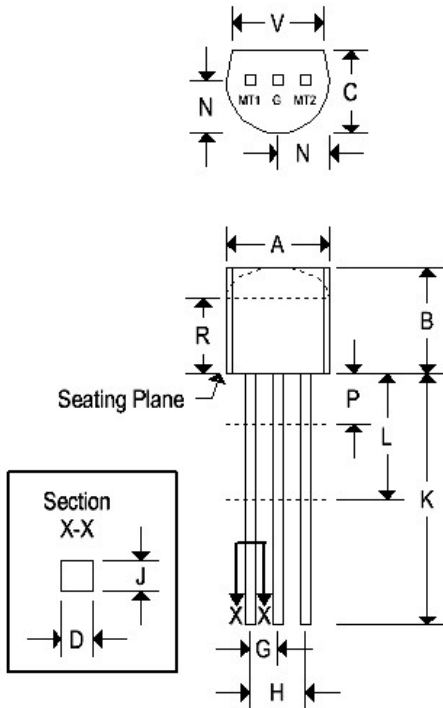
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SILICON BIDIRECTIONAL THYRISTORS

## MECHANICAL CHARACTERISTIC

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	-

FIGURE 1 – TYPICAL GATE TRIGGER VOLTAGE

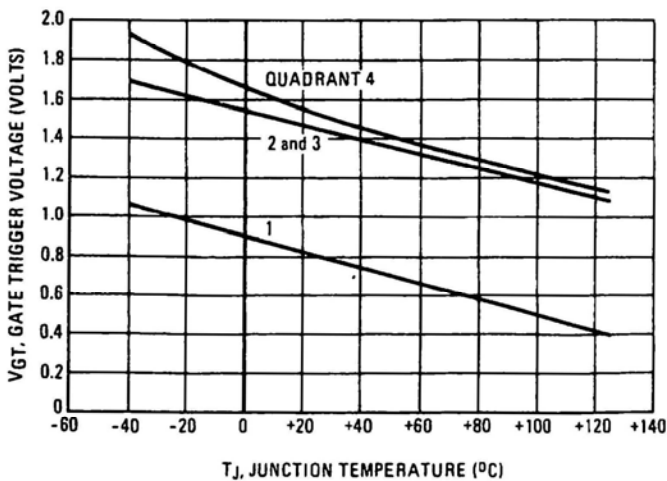
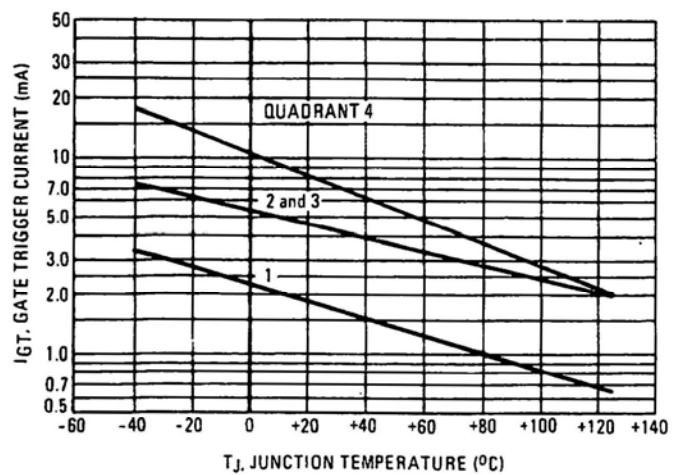


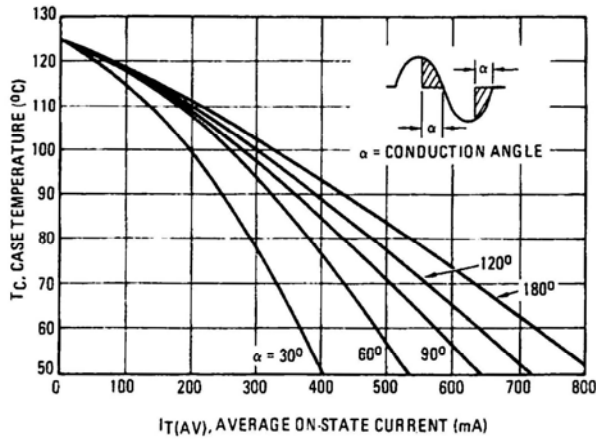
FIGURE 2 – TYPICAL GATE TRIGGER CURRENT



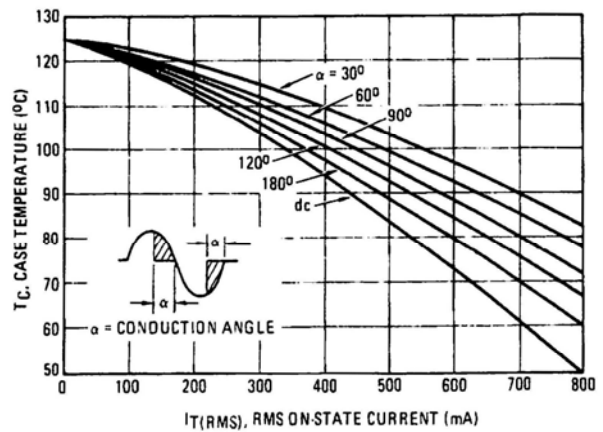
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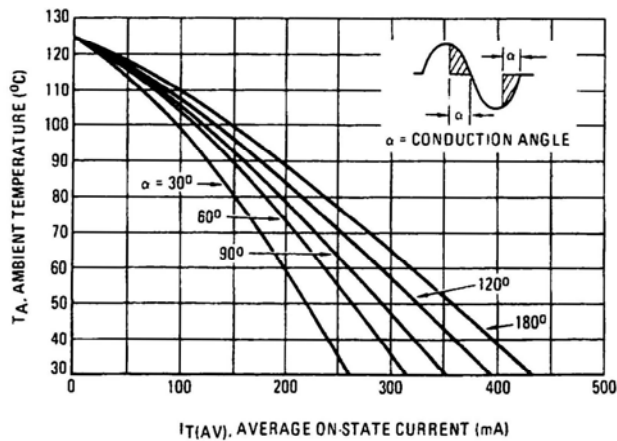
**FIGURE 3 – AVERAGE CURRENT DERATING  
(REFERENCE: CASE TEMPERATURE)**



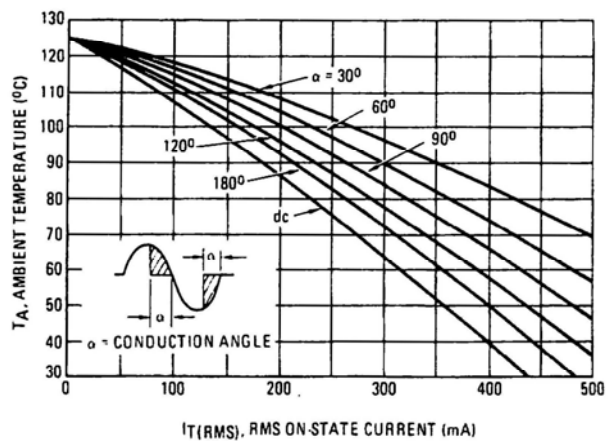
**FIGURE 4 – RMS CURRENT DERATING  
(REFERENCE: CASE TEMPERATURE)**



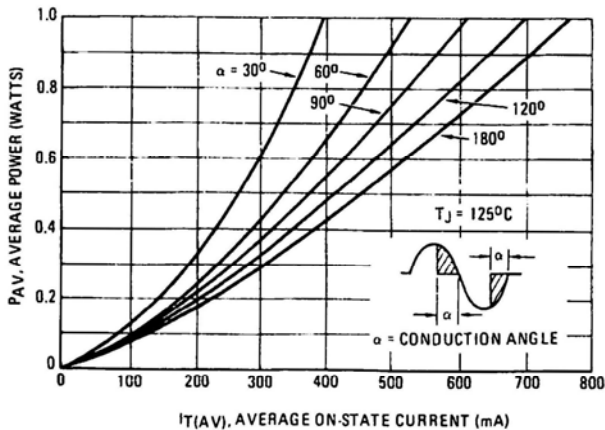
**FIGURE 5 – AVERAGE CURRENT DERATING  
(REFERENCE: AMBIENT TEMPERATURE)**



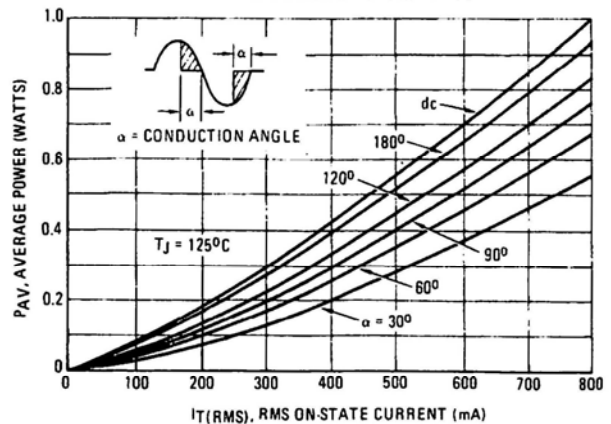
**FIGURE 6 – RMS CURRENT DERATING  
(REFERENCE: AMBIENT TEMPERATURE)**



**FIGURE 7 – ON-STATE POWER DISSIPATION**



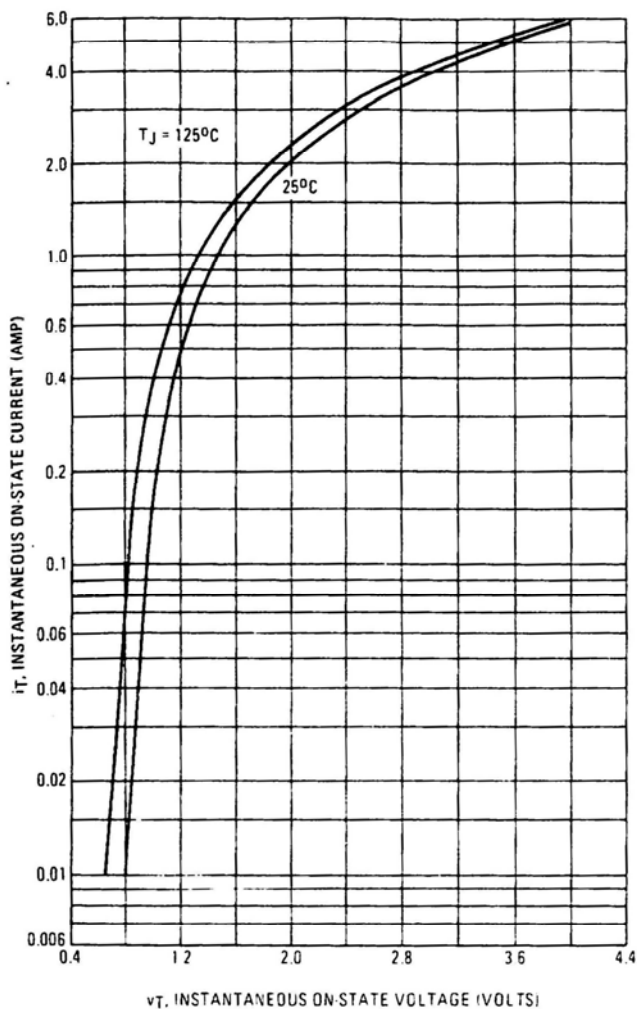
**FIGURE 8 – ON-STATE POWER DISSIPATION**



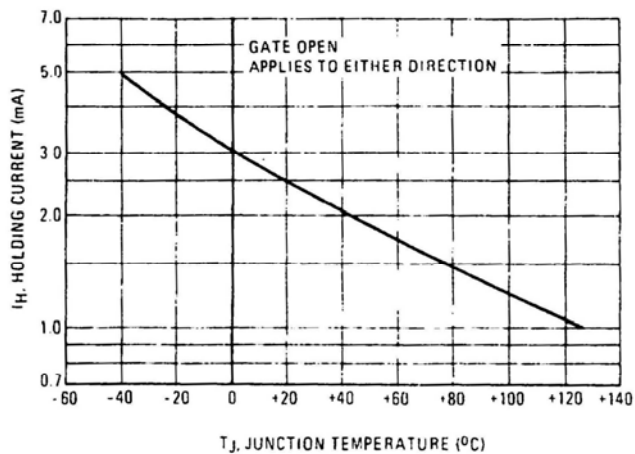
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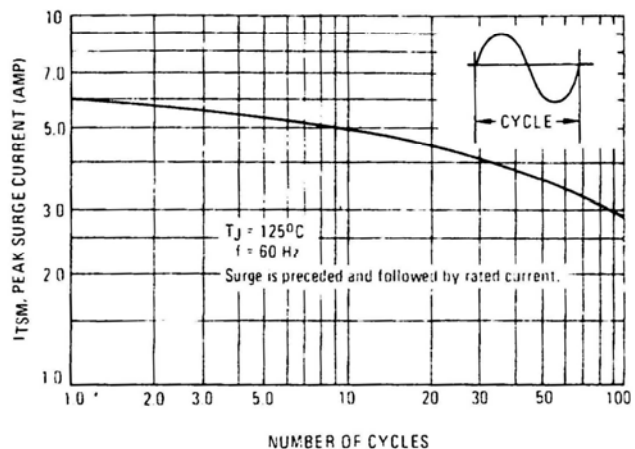
**FIGURE 9 – MAXIMUM ON STATE CHARACTERISTICS**



**FIGURE 10 – TYPICAL HOLDING CURRENT**



**FIGURE 11 – MAXIMUM NON-REPETITIVE SURGE CURRENT**



**FIGURE 12 – THERMAL RESPONSE**

