

DIGITRON SEMICONDUCTORS

MAC212(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 ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage ⁽¹⁾ $(T_J = -40 \text{ to } +125^\circ\text{C}, \frac{1}{2} \text{ sine wave } 50 \text{ to } 60 \text{ Hz, gate open})$ MAC212-4, MAC212A-4 MAC212-6, MAC212A-6 MAC212-8, MAC212A-8 MAC212-10, MAC212A-10	V_{DRM}	200 400 600 800	Volts
RMS on-state current (full sine wave, 50 to 60Hz, $T_C = 85^\circ\text{C}$)	$I_{\text{T(RMS)}}$	12	Amps
Peak non-repetitive surge current $(1 \text{ cycle, } 60 \text{ Hz, } T_C = 85^\circ\text{C, preceded and followed by rated current})$	I_{TSM}	100	Amps
Circuit fusing considerations ($t = 8.3\text{ms}$)	I^2t	40	A^2s
Peak gate power $(T_C = 85^\circ\text{C, pulse width} = 10\mu\text{s})$	P_{GM}	20	Watts
Average gate power $(T_C = 85^\circ\text{C, } t = 8.3\text{ms})$	$P_{\text{G(AV)}}$	0.35	Watts
Peak gate current $(T_C = 85^\circ\text{C, pulse width} = 10\mu\text{s})$	I_{GM}	2.0	Amps
Operating junction temperature range	T_J	-40 to +125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-40 to +150	$^\circ\text{C}$

Note 1: V_{DRM} for all types can be applied on a continuous basis. Blocking voltage shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\theta\text{JC}}$	2.1	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current (either direction) $(V_D = \text{Rated } V_{\text{DRM}} @ T_J = 25^\circ\text{C})$ $(V_D = \text{Rated } V_{\text{DRM}} @ T_J = 125^\circ\text{C})$	I_{DRM}	- -	- -	10 2	μA mA
Peak on-state voltage (either direction) $(I_{\text{TM}} = 17\text{A peak, pulse width} = 1 \text{ to } 2 \text{ ms, duty cycle} \leq 2\%)$	V_{TM}	-	1.3	1.75	Volts
Gate trigger current (continuous dc) (main terminal voltage = 12V, $R_L = 100\Omega$) MT2(+),G(+) MT2(+),G(-) MT2(-),G(-) MT2(-),G(+) "A" suffix only	I_{GT}	- - - -	12 12 20 35	50 50 50 75	mA
Gate trigger voltage (continuous dc) (main terminal voltage = 12V, $R_L = 100\Omega$) MT2(+),G(+) MT2(+),G(-) MT2(-),G(-) MT2(-),G(+) "A" suffix only (main terminal voltage = Rated V_{DRM} , $R_L = 10\text{k}\Omega$, $T_J = 125^\circ\text{C}$) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) "A" suffix only	V_{GT}	- - - - 0.2 0.2	0.9 0.9 1.1 1.4 - -	2 2 2 2.5 - -	Volts

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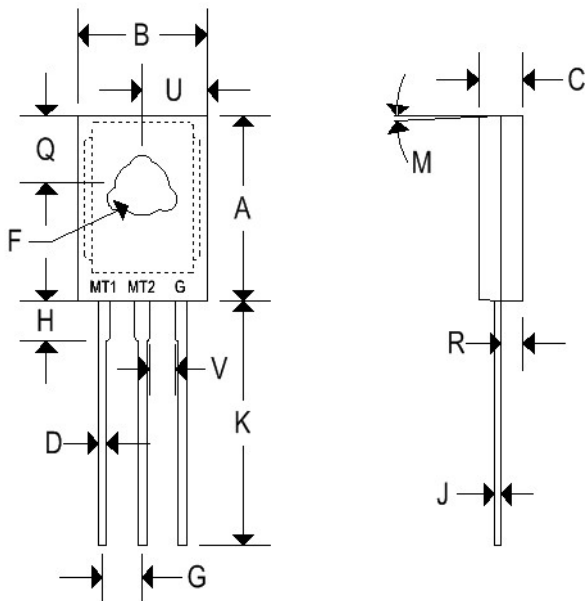
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Characteristic	Symbol	Min	Typ.	Max	Unit
Holding current (either direction) (main terminal voltage = 12V, gate open, initiating current = 500mA)	I_H	-	6	50	mA
Turn on time (V_D = Rated V_{DRM} , $I_{TM} = 17A$, $I_{GT} = 120mA$, rise time = 0.1 μs , pulse width = 2 μs)	t_{gt}	-	1.5	-	μs
Critical rate of rise of commutation voltage (V_D = Rated V_{DRM} , $I_{TM} = 17A$, commutating di/dt = 6.1A/ms, gate unenergized, $T_C = 85^\circ C$)	dv/dt(c)	-	5	-	V/ μs
Critical rate of rise of off-state voltage (V_D = Rated V_{DRM} , exponential voltage rise, gate open, $T_C = 85^\circ C$)	dv/dt	-	100	-	V/ μs

MECHANICAL CHARACTERISTIC

Case	TO-220AB
Marking	Body painted, alpha-numeric
Pin out	See below



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030

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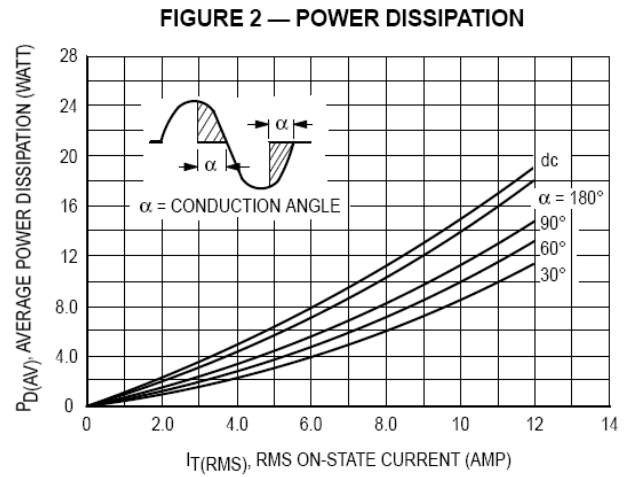
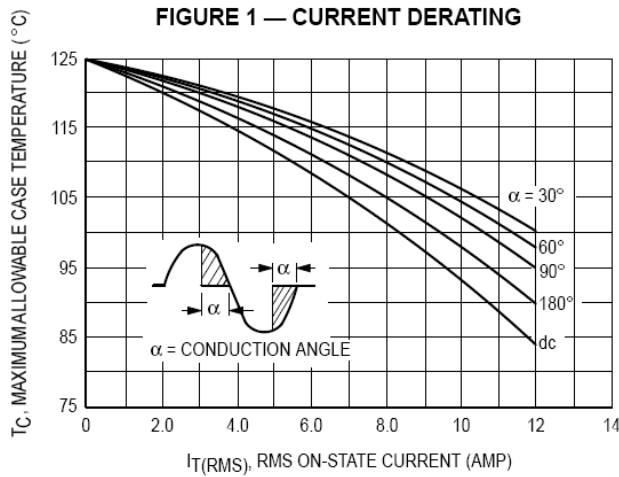


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

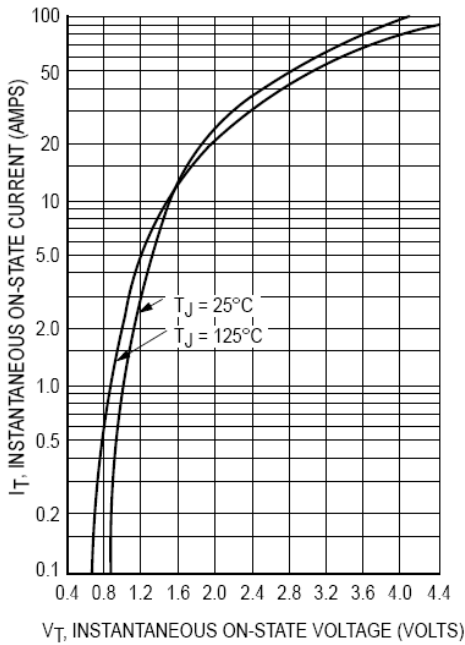


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

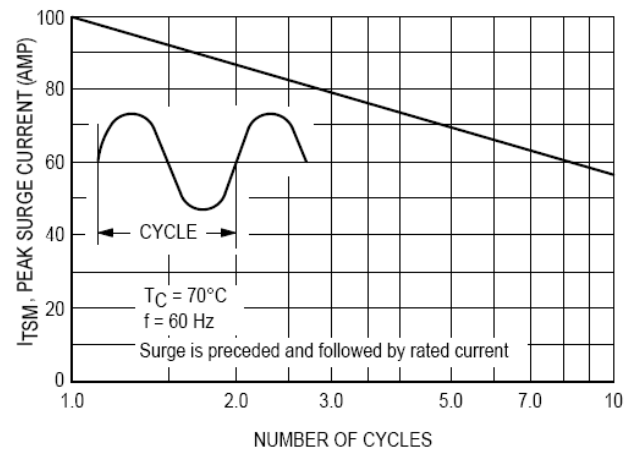
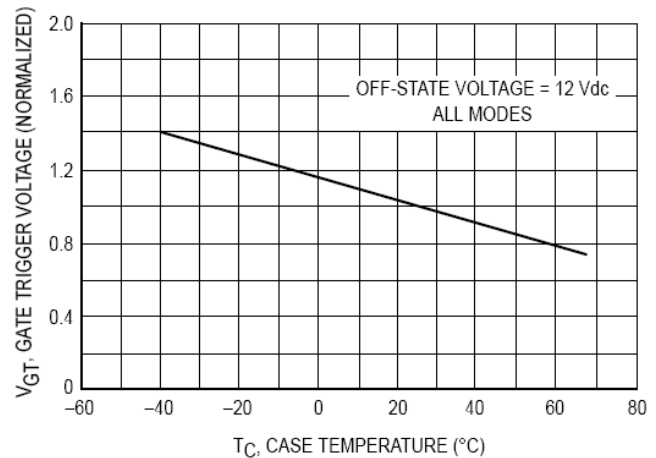


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE



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FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

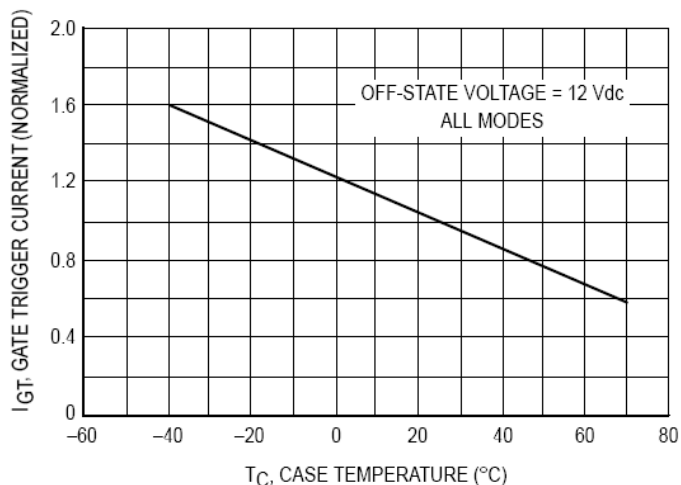


FIGURE 7 — TYPICAL HOLDING CURRENT

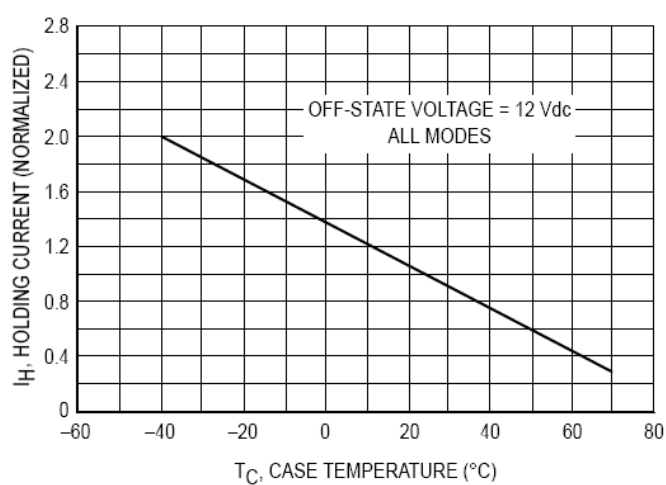


FIGURE 8 — THERMAL RESPONSE

