

# DIGITRON SEMICONDUCTORS

## MAC216(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, gate open</b> MAC216(A)-4 MAC216(A)-6 MAC216(A)-7 MAC216(A)-8	$V_{DRM}$	200 400 500 600	Volts
<b>Peak gate voltage</b>	$V_{GM}$	10	Volts
<b>RMS on-state current</b> ( $T_C = 80^\circ\text{C}$ )	$I_{T(RMS)}$	6	Amps
<b>Peak non-repetitive surge current</b> (1 cycle, 60 Hz)	$I_{TSM}$	60	Amps
<b>Circuit fusing considerations</b> ( $t = 1.0\text{ms}$ )	$I^2t$	18	$\text{A}^2\text{s}$
<b>Critical rate of rise of on-state current</b>	$di/dt$	10	$\text{A}/\mu\text{s}$
<b>Peak gate power</b> (pulse width = $10\mu\text{s}$ )	$P_{GM}$	10	Watts
<b>Average gate power</b> ( $T_C = 80^\circ\text{C}$ , $t = 8.3\text{ms}$ )	$P_{G(AV)}$	0.5	Watts
<b>Peak gate current</b> (pulse width = $10\mu\text{s}$ )	$I_{GM}$	3.5	Amps
<b>Operating junction temperature range</b>	$T_J$	-40 to +100	$^\circ\text{C}$
<b>Storage temperature range</b>	$T_{stg}$	-40 to +125	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
<b>Thermal resistance, junction to case</b>	$R_{\theta JC}$	2.2	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ.	Max	Unit
<b>Peak off state current</b> <sup>(1)</sup> (Rated $V_{DRM}$ = peak off state voltage, gate open @ $T_C = 25^\circ\text{C}$ ) (Rated $V_{DRM}$ = peak off state voltage, gate open @ $T_C = 100^\circ\text{C}$ )	$I_{DRM}$	-	0.01 0.2	0.1 0.5	mA
<b>Peak on-state voltage</b> <sup>(1)</sup> (Pulse width = $1.0\text{ms}$ , duty cycle < 2%, $I_{TM} = 8.5\text{A}$ peak)	$V_{TM}$	-	1.4	1.83	Volts
<b>Critical rate of rise of off-state voltage</b> <sup>(1)</sup> (Rated $V_{DRM}$ , gate open, exponential waveform, $T_C = 100^\circ\text{C}$ )	$dv/dt$	50	100	-	$\text{V}/\mu\text{s}$
<b>Critical rate of rise of commutating off-state voltage</b> <sup>(1)</sup> ( $I_{T(RMS)}$ = Rated RMS on-state current, $V_{DRM}$ = rated peak off-state voltage, gate open, commutating $di/dt = 3.2\text{A}/\text{ms}$ )	$dv/dt(c)$	4	-	-	$\text{V}/\mu\text{s}$
<b>Gate trigger current</b> <sup>(2)</sup> ( $V_D = 12\text{V}$ , trigger mode) MT2(-),G(+), $R_L = 50\Omega$ , "A" only MT2(+),G(+), $R_L = 100\Omega$ MT2(-),G(-), $R_L = 100\Omega$ MT2(+),G(-), $R_L = 50\Omega$ MT2(+),G(+), $R_L = 50\Omega$ , $T_C = -40^\circ\text{C}$ MT2(-),G(-), $R_L = 50\Omega$ , $T_C = -40^\circ\text{C}$ MT2(+),G(-), $R_L = 25\Omega$ , $T_C = -40^\circ\text{C}$ (MAC216) MT2(-),G(+), $R_L = 50\Omega$ , $T_C = -40^\circ\text{C}$ (MAC216A)	$I_{GT}$	-	40 10 20 25	75 50 50 50	mA
		-	-	80 80 75 120	

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Characteristic	Symbol	Min	Typ.	Max	Unit
<b>Gate trigger voltage</b> <sup>(2)</sup> ( $V_D = 12V$ , trigger mode) MT2(-),G(+), $R_L = 50\Omega$ , "A" only MT2(+),G(+), $R_L = 100\Omega$ MT2(-),G(-), $R_L = 100\Omega$ MT2(+),G(-), $R_L = 50\Omega$ MT2(+),G(+), $R_L = 50\Omega$ , $T_C = -40^\circ C$ MT2(-),G(-), $R_L = 50\Omega$ , $T_C = -40^\circ C$ MT2(+),G(-), $R_L = 25\Omega$ , $T_C = -40^\circ C$ (MAC216) MT2(-),G(-), $R_L = 50\Omega$ , $T_C = -40^\circ C$ (MAC216A) MT2(+),G(+), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ MT2(-),G(-), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ MT2(+),G(-), $R_L = 1000\Omega$ , $T_C = 100^\circ C$ MT2(-),G(+), $R_L = 1000\Omega$ , $T_C = 100^\circ C$	$V_{GT}$	-	0.8	2.5	Volts
<b>Holding current</b> <sup>(1)</sup> ( $V_D = 24V$ , initiating current = 0.5A, pulse width = 1ms, duty cycle $\leq 2\%$ , gate trigger source = 7V, 20 $\Omega$ ) $T_C = 25^\circ C$ $T_C = -40^\circ C$	$I_H$	-	15	50 100	mA
<b>Latching current</b> <sup>(2)</sup> ( $V_D = 24V$ , gate trigger source = 15V, 100 $\Omega$ , trigger mode) MT2(-),G(+) "A" only MT2(+),G(+) MT2(-),G(-) MT2(+),G(-) MT2(+),G(+), $T_C = -40^\circ C$ MT2(-),G(-), $T_C = -40^\circ C$ MT2(+),G(-), $T_C = -40^\circ C$ (MAC216) MT2(-),G(+), $T_C = -40^\circ C$ (MAC216A)	$I_L$	-	-	200 100 100 200 200 200 200 400	mA

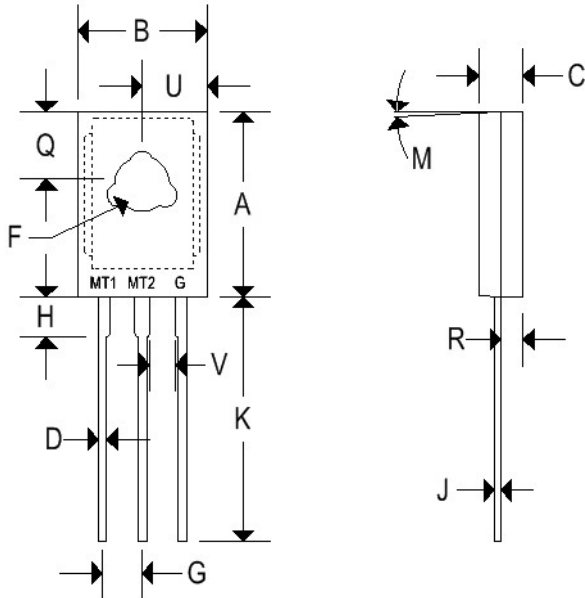
Note 1: Value apply for either polarity of Main Terminal 2 characteristics reference to Main Terminal 1.  
 Note 2: Main Terminal 1 is the reference terminal.

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### 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

FIGURE 1 - RMS CURRENT DERATING

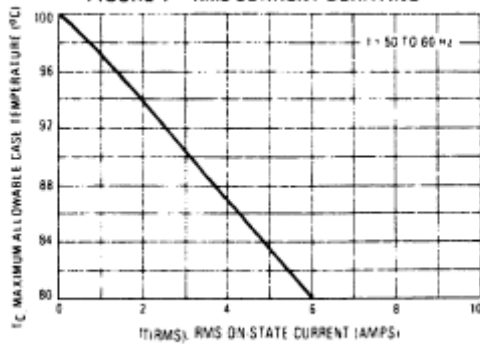


FIGURE 2 - POWER DISSIPATION

