DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MAC216(A) SERIES

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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\Theta JC}$	2.2	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak off state current [1] (Rated V_{DRM} = peak off state voltage, gate open @ T_C = 25°C) (Rated V_{DRM} = peak off state voltage, gate open @ T_C = 100°C)	I_{DRM}	 - -	 0.01 0.2	 0.1 0.5	mA
Peak on-state voltage [1] (Pulse width = 1.0ms, duty cycle < 2%, I_{TM} = 8.5A peak)	V_{TM}	-	1.4	1.83	Volts
Critical rate of rise of off-state voltage [1] (Rated V_{DRM}, gate open, exponential waveform, T_C = 100°C)	dv/dt	50	100	-	V/µs
Critical rate of rise of commutating off-state voltage [1] ($I_{T(RMS)}$ = Rated RMS on-state current, V_{DRM} = rated peak off-state voltage, gate open, commutating di/dt = 3.2A/ms)	dv/dt(c)	4	-	-	V/µs

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Gate trigger current [2]					
(V_D = 12V, trigger mode)					
MT2(-),G(+), R_L = 50Ω, "A" only	I_{GT}	-	40	75	mA
MT2(+),G(+), R_L = 100Ω		-	10	50	
MT2(-),G(-), R_L = 100Ω		-	20	50	
MT2(+),G(-), R_L = 50Ω		-	25	50	
MT2(+),G(+), R_L = 50Ω, T_C = -40°C		-	-	80	
MT2(-),G(-), R_L = 50Ω, T_C = -40°C		-	-	80	
MT2(+),G(-), R_L = 25Ω, T_C = -40°C (MAC216)		-	-	75	
MT2(-),G(+), R_L = 50Ω, T_C = -40°C (MAC216A)		-	-	120	
Gate trigger voltage [2]	V_{GT}				Volts
(V_D = 12V, trigger mode)					
MT2(-),G(+), R_L = 50Ω, "A" only		-	0.8	2.5	
MT2(+),G(+), R_L = 100Ω		-	0.8	2.5	
MT2(-),G(-), R_L = 100Ω		-	0.9	2.5	
MT2(+),G(-), R_L = 50Ω		-	-	2.5	
MT2(+),G(+), R_L = 50Ω, T_C = -40°C		-	-	3.5	
MT2(-),G(-), R_L = 50Ω, T_C = -40°C		-	-	3.5	
MT2(+),G(-), R_L = 25Ω, T_C = -40°C (MAC216)		-	-	2.5	
MT2(-),G(-), R_L = 50Ω, T_C = -40°C (MAC216A)		-	-	3.5	
MT2(+),G(+), R_L = 1000Ω, T_C = 100°C		0.2	-	-	
MT2(-),G(-), R_L = 1000Ω, T_C = 100°C		0.2	-	-	
MT2(+),G(-), R_L = 1000Ω, T_C = 100°C		0.2	-	-	
MT2(-),G(+), R_L = 1000Ω, T_C = 100°C		-	-	-	
Holding current [1]	I_H				mA
(V_D = 24V, initiating current = 0.5A, pulse width = 1ms, duty cycle ≤ 2%, gate trigger source = 7V, 20Ω)					
T_C = 25°C		-	15	50	
T_C = -40°C		-	-	100	
Latching current [2]	I_L				mA
(V_D = 24V, gate trigger source = 15V, 100Ω, trigger mode)					
MT2(-),G(+) "A" only		-	-	200	
MT2(+),G(+)		-	-	100	
MT2(-),G(-)		-	-	100	
MT2(+),G(-)		-	-	200	
MT2(+),G(+), T_C = -40°C		-	-	200	
MT2(-),G(-), T_C = -40°C		-	-	200	
MT2(+),G(-), T_C = -40°C (MAC216)		-	-	200	
MT2(-),G(+), T_C = -40°C (MAC216A)		-	-	400	

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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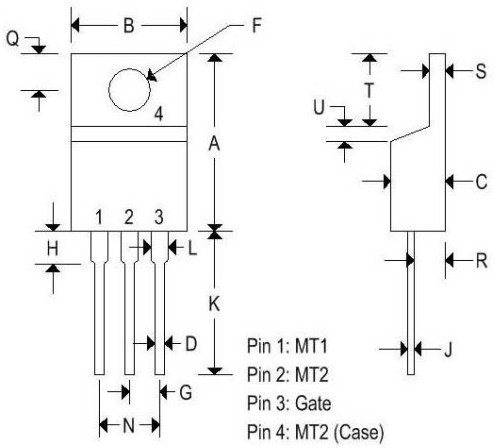
MECHANICAL CHARACTERISTICS

Case	TO-220AB
Marking	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

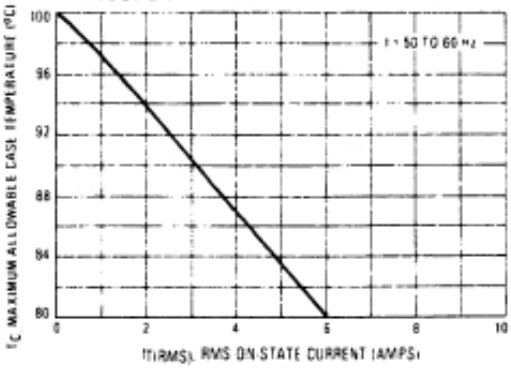


FIGURE 2 – POWER DISSIPATION