DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MAC210(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[1] (T_J = -40 to +125°C, ½ sine wave, 50 to 60Hz, gate open)			
MAC210-4, MAC210A-4	V_{DRM}	200	Volts
MAC210-5, MAC120A-5		300	
MAC210-6, MAC210A-6		400	
MAC210-7, MAC210A-7		500	
MAC210-8, MAC210A-8		600	
MAC210-9, MAC210A-9		700	
MAC210-10, MAC210A-10		800	
RMS on-state current (full sine wave, 50 to 60Hz, T_C = 70°C)	$I_{T(RMS)}$	10	Amps
Peak non-repetitive surge current (1 cycle, 60 Hz, T_C = 70°C, preceded and followed by rated current)	I_{TSM}	100	Amps
Circuit fusing considerations (t = 8.3ms)	I^2t	40	A^2s
Peak gate power (T_C = 70°C, pulse width = 10µs)	P_{GM}	20	Watts
Average gate power (T_C = 70°C, t = 8.3ms)	$P_{G(AV)}$	0.35	Watts
Peak gate current (T_C = 70°C, pulse width = 10µs)	I_{GM}	2.0	Amps
Operating junction and storage temperature range	T_J, T_{stg}	-40 to +125	°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	$R_{\Theta JC}$	2.2	°C/W

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

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current					
(Rated V_{DRM} @ T_J = 25°C)	I_{DRM}	-	-	10	µA
(Rated V_{DRM} @ T_J = 125°C)		-	-	2	mA
Peak on-state voltage (either direction) (I_{TM} = 14A peak, pulse width = 1 to 2 ms, duty cycle ≤ 2%)	V_{TM}	-	1.2	1.65	Volts
Gate trigger current (continuous dc)					
(main terminal voltage = 12V, R_L = 100Ω)					
MT2(+),G(+)	I_{GT}	-	12	50	mA
MT2(+),G(-)		-	12	50	
MT2(-),G(-)		-	20	50	
MT2(-),G(+) "A" suffix only		-	35	75	

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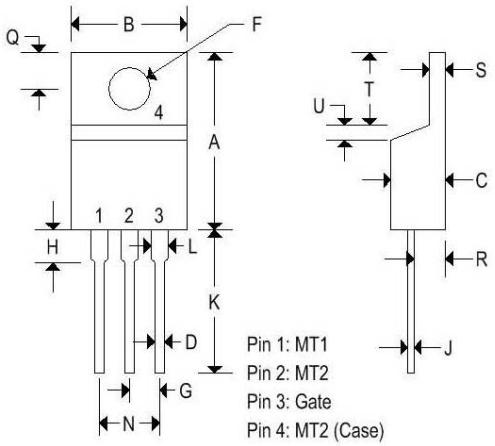
Gate trigger voltage (continuous dc) (main terminal voltage = 12V, R_L = 100Ω) MT2(+),G(+) MT2(+),G(-) MT2(-),G(-) MT2(-),G(+) "A" suffix only (main terminal voltage= Rated V_{DRM}, R_L = 10kΩ, T_J = 125°C) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) "A" suffix only	V_{GT}	 - - - - 0.2 0.2	 0.9 0.9 1.1 1.4 - -	 2 2 2 2.5 - -	Volts
Holding current (either direction) (main terminal voltage= 12V, gate open, initiating current = 500mA, T_C = 25°C)	I_H	-	6	50	mA
Turn on time (Rated V_{DRM}, I_{TM} = 14A, I_{GT} = 120mA, rise time = 0.1µs, pulse width = 2µs)	t_{gt}	-	1.5	-	µs
Critical rate of rise of commutation voltage (V_D = Rated V_{DRM}, I_{TM} = 14A, commutating di/dt = 5.0A/ms, gate unenergized, T_C = 70°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 = 70°C)	dv/dt	-	100	-	V/µs

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

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FIGURE 1 — CURRENT DERATING

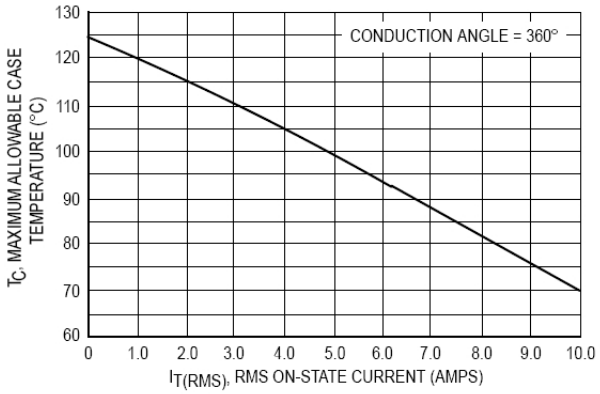

FIGURE 2 — POWER DISSIPATION

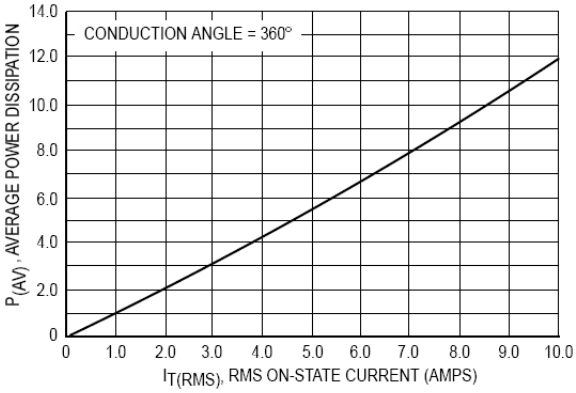

FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

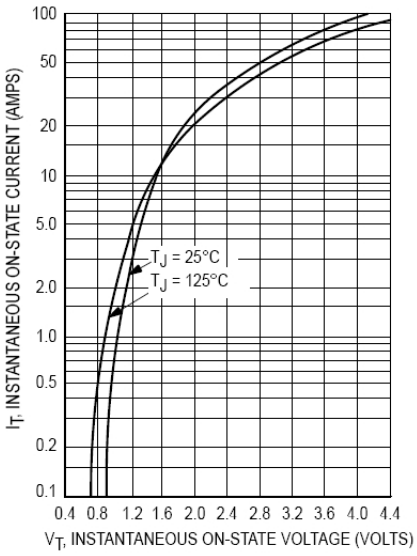

FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

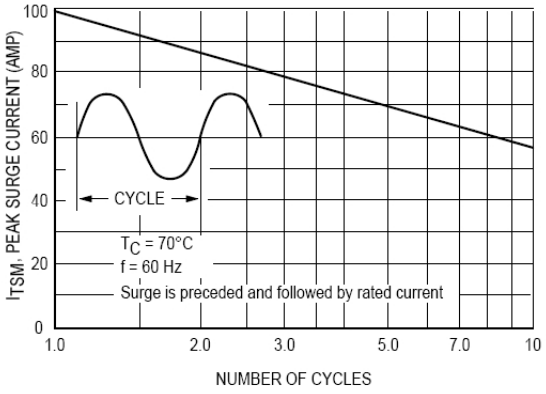

FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

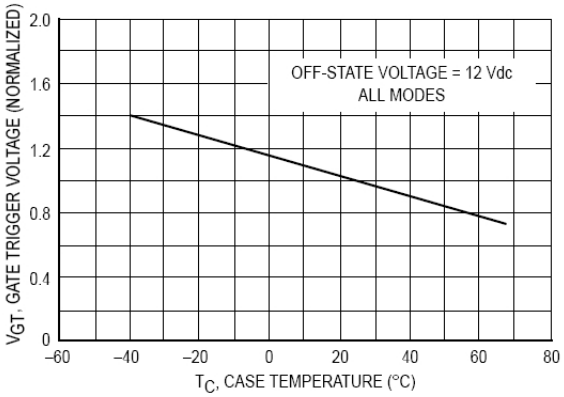

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FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

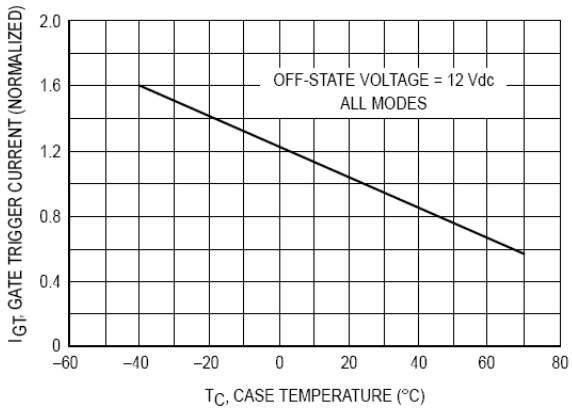

FIGURE 7 — TYPICAL HOLDING CURRENT

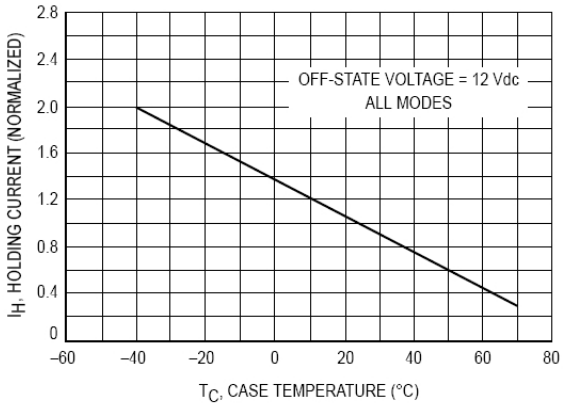

FIGURE 8 – THERMAL RESPONSE