

Triacs

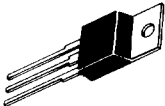
Silicon Bidirectional Thyristors

... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in Three Modes (MAC210 Series) or Four Modes (MAC210A Series)

**MAC210
Series
MAC210A
Series**

**TRIACs
10 AMPERES RMS
200 thru 800 VOLTS**



**CASE 221A-04
(TO-220AB)
STYLE 4**

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage, Note 1 (T _J = -40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC210-4, MAC210A4 MAC210-6, MAC210A6 MAC210-8, MAC210A8 MAC210-10, MAC210A10	V _{DRM}	200 400 600 800	Volts
On-State Current RMS (T _C = +70°C) Full Cycle Sine Wave 50 to 60 Hz	I _{T(RMS)}	10	Amps
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T _C = +70°C) Preceded and followed by Rated Current	I _{TSM}	100	Amps
Circuit Fusing Considerations (t = 8.3 ms)	i ² t	40	A ² s
Peak Gate Power (T _C = +70°C, Pulse Width = 10 μs)	P _{GM}	20	Watts
Average Gate Power (T _C = +70°C, t = 8.3 ms)	P _{G(AV)}	0.35	Watt
Peak Gate Current (T _C = +70°C, Pulse Width = 10 μs)	I _{GM}	2	Amps
Operating Junction Temperature Range	T _J	-40 to +125	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

Note 1. V_{DRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
 Devices listed in bold, italic are Motorola preferred devices.

MAC210 Series • MAC210A Series

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	$^{\circ}\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current ($V_D = \text{Rated } V_{DRM}$, Gate Open) $T_J = 25^{\circ}\text{C}$ $T_J = +125^{\circ}\text{C}$	I_{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) ($I_{TM} = 14 \text{ A Peak}$; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$)	V_{TM}	—	1.2	1.65	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$) 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 = 12 Vdc, $R_L = 100 \text{ Ohms}$) MT2(+), G(+) MT2(+), G(—) MT2(—), G(—) MT2(—), G(+) "A" SUFFIX ONLY (Main Terminal Voltage = Rated V_{DRM} , $R_L = 10 \text{ k ohms}$, $T_J = +125^{\circ}\text{C}$) 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
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 500 mA, $T_C = +25^{\circ}\text{C}$)	I_H	—	6	50	mA
Turn-On Time (Rated V_{DRM} , $I_{TM} = 14 \text{ A}$) ($I_{GT} = 120 \text{ mA}$, Rise Time = 0.1 μs , Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 14 \text{ A}$, Commutating $di/dt = 5.0 \text{ A/ms}$, Gate Unenergized, $T_C = 70^{\circ}\text{C}$)	$dv/dt(c)$	—	5	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Voltage Rise, Gate Open, $T_C = +70^{\circ}\text{C}$)	dv/dt	—	100	—	$\text{V}/\mu\text{s}$

MAC210 Series • MAC210A Series

FIGURE 1 — CURRENT DERATING

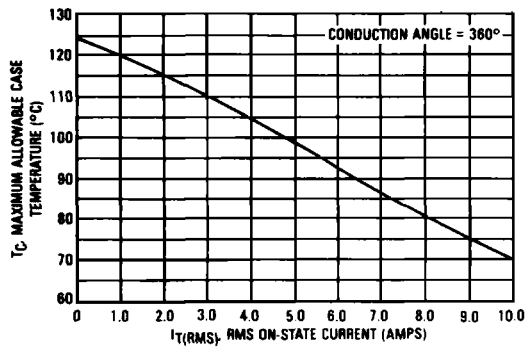


FIGURE 2 — POWER DISSIPATION

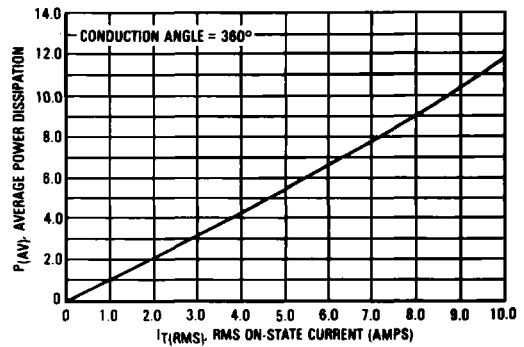


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

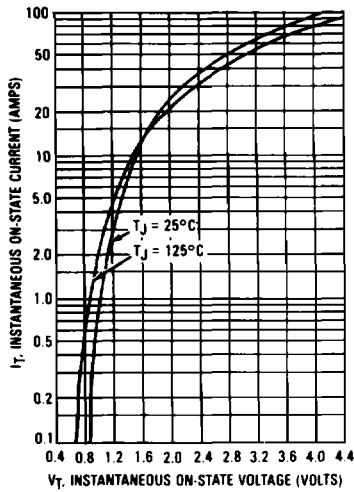


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

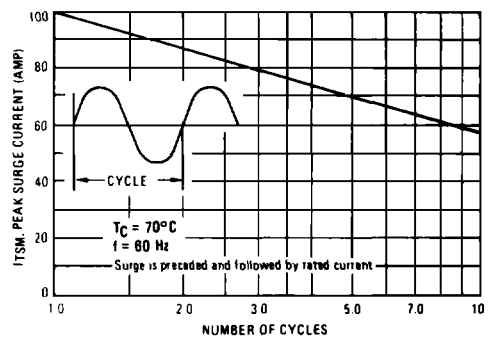
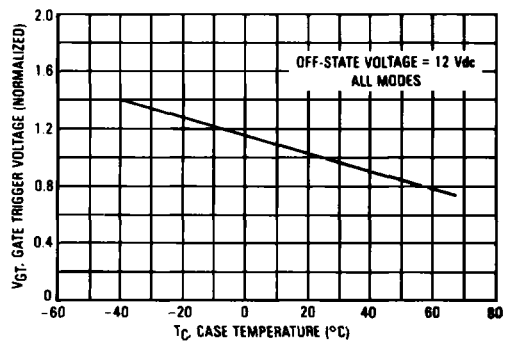


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE



MAC210 Series • MAC210A Series

FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

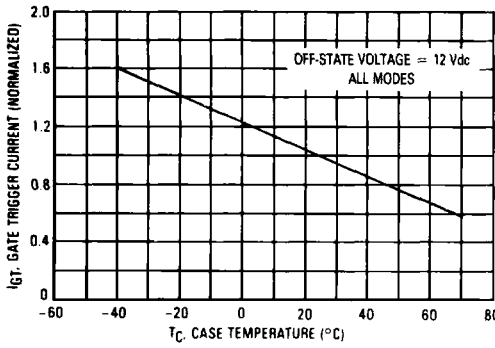


FIGURE 7 — TYPICAL HOLDING CURRENT

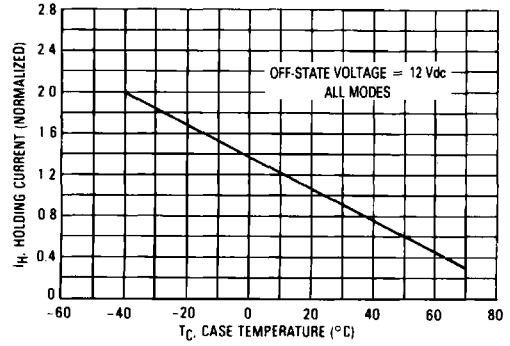


FIGURE 8 — THERMAL RESPONSE

