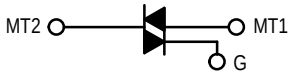
MAC210 Series MAC210A Series

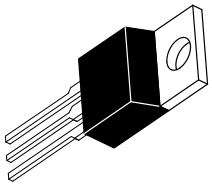
Triacs
Silicon Bidirectional Thyristors

. . . 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)

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(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^2t	40	A^2s
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

(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.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	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	I_{DRM}				
(V_D = Rated V_{DRM}, Gate Open) T_J = 25°C		—	—	10	μA
T_J = +125°C		—	—	2	mA
Peak On-State Voltage (Either Direction)	V_{TM}	—	1.2	1.65	Volts
(I_{TM} = 14 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)					
Gate Trigger Current (Continuous dc)	I_{GT}				mA
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)					
MT2(+), G(+)		—	12	50	
MT2(+), G(–)		—	12	50	
MT2(–), G(–)		—	20	50	
MT2(–), G(+) “A” SUFFIX ONLY		—	35	75	
Gate Trigger Voltage (Continuous dc)	V_{GT}				volts
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)					
MT2(+), G(+)		—	0.9	2	
MT2(+), G(–)		—	0.9	2	
MT2(–), G(–)		—	1.1	2	
MT2(–), G(+) “A” SUFFIX ONLY		—	1.4	2.5	
(Main Terminal Voltage = Rated V_{DRM}, R_L = 10 k ohms, T_J = +125°C)					
MT2(+), G(+); MT2(–), G(–); MT2(+), G(–)		0.2	—	—	
MT2(–), G(+) “A” SUFFIX ONLY		0.2	—	—	
Holding Current (Either Direction)	I_H	—	6	50	mA
(Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 500 mA, T_C = +25°C)					
Turn-On Time	t_{gt}	—	1.5	—	μs
(Rated V_{DRM}, I_{TM} = 14 A)					
(I_{GT} = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)					
Critical Rate of Rise of Commutation Voltage	dv/dt(c)	—	5	—	V/μs
(V_D = Rated V_{DRM}, I_{TM} = 14 A, Commutating di/dt = 5.0 A/ms, Gate Unenergized, T_C = 70°C)					
Critical Rate of Rise of Off-State Voltage	dv/dt	—	100	—	V/μs
(V_D = Rated V_{DRM}, Exponential Voltage Rise, Gate Open, T_C = +70°C)					

FIGURE 1 — CURRENT DERATING

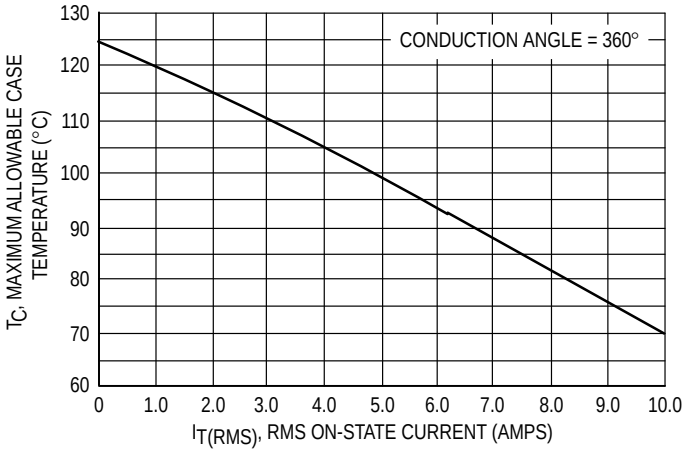


FIGURE 2 — POWER DISSIPATION

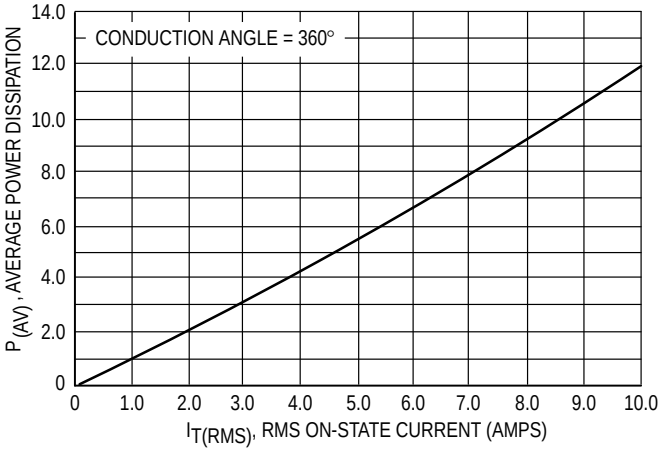


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

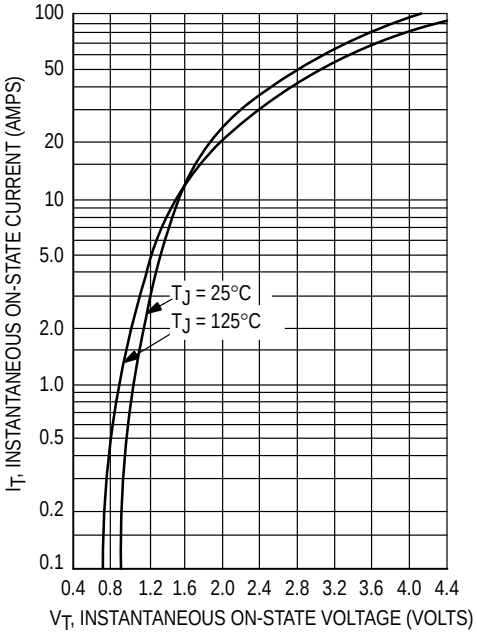


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

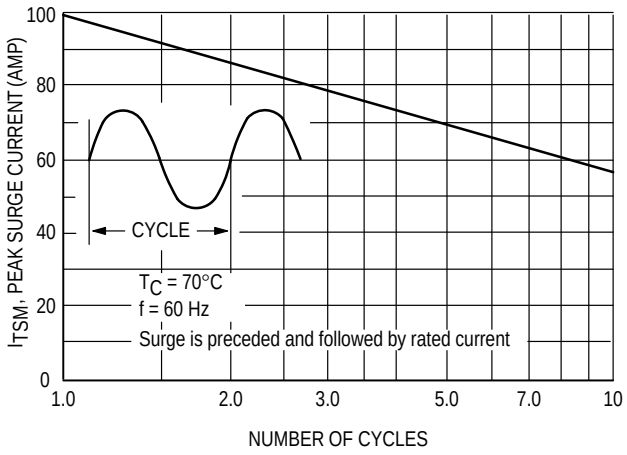


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

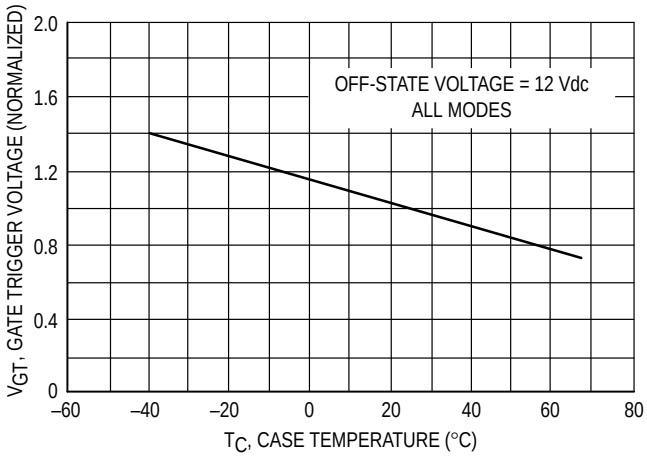


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

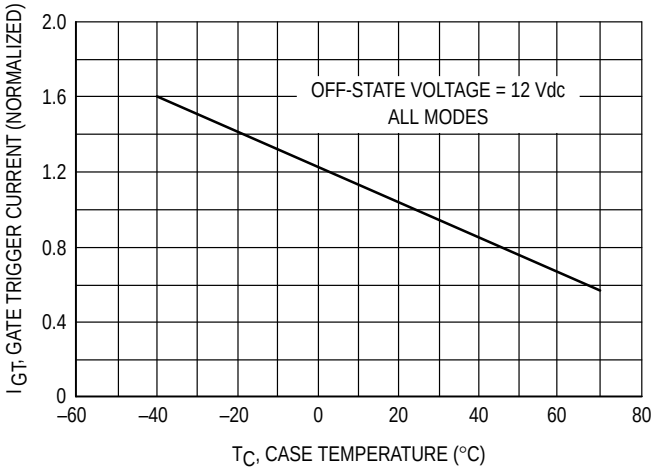


FIGURE 7 — TYPICAL HOLDING CURRENT

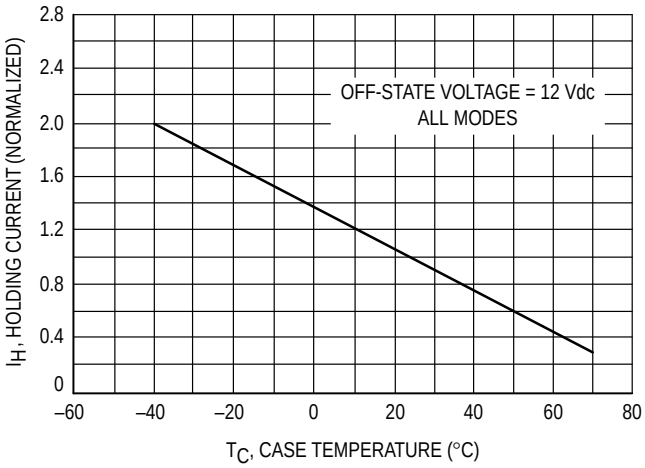


FIGURE 8 – THERMAL RESPONSE