# **Triacs**

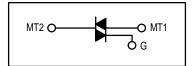
# **Silicon Bidirectional Thyristors**

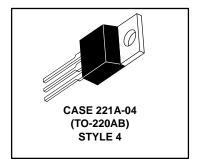
... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity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





#### **MAXIMUM RATINGS** ( $T_J = 25^{\circ}C$ unless otherwise noted.)

Rating		Symbol	Value	Unit	
Repetitive Peak Off-State Voltage <sup>(1)</sup> (T <sub>J</sub> = -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	VDRM	200 400 600 800	Volts	
On-State Current RMS (T <sub>C</sub> = +70°C) Full Cycle Sine Wave 50 to 60 Hz		I <sub>T(RMS)</sub>	10	Amps	
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T <sub>C</sub> = +70°C) Preceded and followed by Rated Current		ITSM	100	Amps	
Circuit Fusing Considerations (t = 8.3 ms)		l <sup>2</sup> t	40	A <sup>2</sup> s	
Peak Gate Power (T <sub>C</sub> = +70°C, Pulse Width = 10 μs)		P <sub>GM</sub>	20	Watts	
Average Gate Power (T <sub>C</sub> = +70°C, t = 8.3 ms)		P <sub>G(AV)</sub>	0.35	Watt	
Peak Gate Current (T <sub>C</sub> = +70°C, Pulse Width = 10 μs)		IGM	2	Amps	
Operating Junction Temperature Range		TJ	-40 to +125	°C	
Storage Temperature Range		T <sub>stg</sub>	-40 to +125	°C	

<sup>(1)</sup> V<sub>DRM</sub> 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.

## **MAC210 Series MAC210A Series**

## THERMAL CHARACTERISTICS

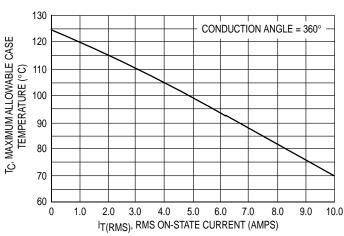
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{ heta JC}$	2.2	°C/W

# **ELECTRICAL CHARACTERISTICS** (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Тур	Max	Unit
Peak Blocking Current (V <sub>D</sub> = Rated V <sub>DRM</sub> , Gate Open) T <sub>J</sub> = 25°C T <sub>J</sub> = +125°C	IDRM	_	_	10 2	μA mA
Peak On-State Voltage (Either Direction) (I <sub>TM</sub> = 14 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	Vтм	_	1.2	1.65	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R <sub>L</sub> = 100 Ohms) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(-) MT2(-), G(+) "A" SUFFIX ONLY	l <sub>GT</sub>	_ _ _ _	12 12 20 35	50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L$ = 100 Ohms) MT2(+), $G(+)$ MT2(+), $G(-)$ MT2(-), $G(-)$ MT2(-), $G(-)$ MT2(-), $G(+)$ "A" SUFFIX ONLY (Main Terminal Voltage = Rated $V_{DRM}$ , $R_L$ = 10 k ohms, $T_J$ = +125°C) MT2(+), $G(+)$ ; MT2(-), $G(-)$ ; MT2(+), $G(-)$ MT2(-), $G(+)$ "A" SUFFIX ONLY	Vgт		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 <sub>C</sub> = +25°C)	Ιн	_	6	50	mA
Turn-On Time (Rated $V_{DRM}$ , $I_{TM}$ = 14 A) ( $I_{GT}$ = 120 mA, Rise Time = 0.1 $\mu$ s, Pulse Width = 2 $\mu$ s)	<sup>t</sup> gt		1.5		μs
Critical Rate of Rise of Commutation Voltage ( $V_D$ = Rated $V_{DRM}$ , $I_{TM}$ = 14 A, Commutating di/dt = 5.0 A/ms, Gate Unenergized, $T_C$ = 70°C)	dv/dt(c)		5	_	V/μs
Critical Rate of Rise of Off-State Voltage (V <sub>D</sub> = Rated V <sub>DRM</sub> , Exponential Voltage Rise, Gate Open, T <sub>C</sub> = +70°C)	dv/dt	_	100	_	V/μs

#### **MAC210 Series MAC210A Series**

FIGURE 1 — CURRENT DERATING



### FIGURE 2 — POWER DISSIPATION

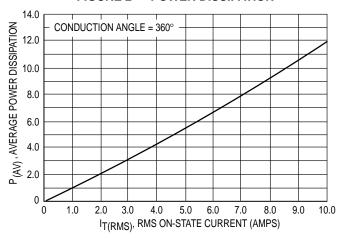


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

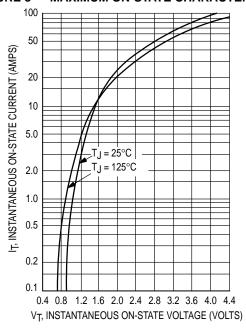


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

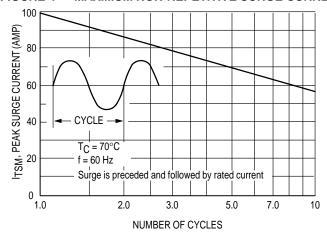
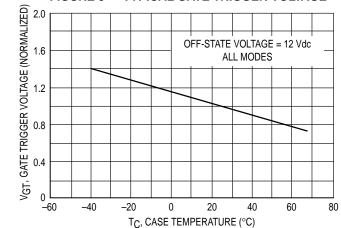


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE



### **MAC210 Series MAC210A Series**

FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

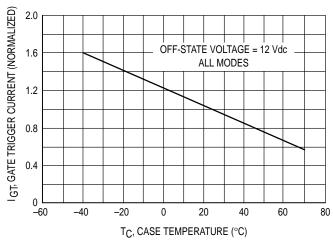


FIGURE 7 — TYPICAL HOLDING CURRENT

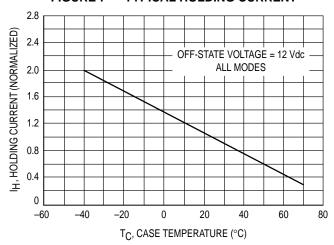


FIGURE 8 - THERMAL RESPONSE

