

## Advance Information

# TRIACS

## Silicon Bidirectional Thyristors

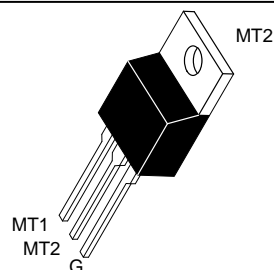
Designed for high performance full-wave ac control applications where high noise immunity and commutating di/dt are required.

- Blocking Voltage to 800 Volts
- On-State Current Rating of 12 Amperes RMS at 70°C
- Uniform Gate Trigger currents in Three Modes
- High Immunity to dv/dt — 250 V/ $\mu$ s minimum at 125°C
- High Commutating di/dt — 6.5 A/ms minimum at 125°C
- Industry Standard TO-220 AB Package
- High Surge Current Capability — 120 Amperes

## MAC12 SERIES\*

\*Motorola preferred devices

TRIACS  
12 AMPERES RMS  
400 thru 800  
VOLTS



CASE 221A-06  
(TO-220AB)  
Style 4

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

Parameter	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (1) ( $T_J = -40$ to $125^\circ\text{C}$ , Sine Wave, 50 to 60 Hz, Gate Open)	$V_{\text{DRM}}$	400 600 800	Volts
On-State RMS Current (Full Cycle Sine Wave, 60 Hz, $T_C = 70^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	12	A
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{\text{TSM}}$	100	A
Circuit Fusing Consideration ( $t = 8.3$ ms)	$i^2t$	41	A <sup>2</sup> sec
Peak Gate Power (Pulse Width $\leq 1.0$ $\mu$ s, $T_C = 80^\circ\text{C}$ )	$P_{\text{GM}}$	16	Watts
Average Gate Power ( $t = 8.3$ ms, $T_C = 80^\circ\text{C}$ )	$P_{\text{G(AV)}}$	0.35	Watts
Operating Junction Temperature Range	$T_J$	$-40$ to $+125$	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	$-40$ to $+150$	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta\text{JC}}$ $R_{\theta\text{JA}}$	2.2 62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{\text{DRM}}$ , Gate Open)	$I_{\text{DRM}}$	—	—	0.01 2.0	mA
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(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 1

## MAC12 SERIES

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
Peak On-State Voltage* ( $I_{TM} = \pm 17\text{ A}$ )	$V_{TM}$	—	—	1.85	Volts
Continuous Gate Trigger Current ( $V_D = 12\text{ V}$ , $R_L = 100\ \Omega$ ) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)	$I_{GT}$	5.0 5.0 5.0	13 16 18	35 35 35	mA
Hold Current ( $V_D = 12\text{ V}$ , Gate Open, Initiating Current = $\pm 150\text{ mA}$ )	$I_H$	—	20	40	mA
Latch Current ( $V_D = 24\text{ V}$ , $I_G = 35\text{ mA}$ ) MT2(+), G(+); MT2(–), G(–) MT2(+), G(–)	$I_L$	— —	20 30	50 80	mA
Gate Trigger Voltage ( $V_D = 12\text{ V}$ , $R_L = 100\ \Omega$ ) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)	$V_{GT}$	0.5 0.5 0.5	0.69 0.77 0.72	1.5 1.5 1.5	Volts
<b>DYNAMIC CHARACTERISTICS</b>					
Rate of Change of Commutating Current* ( $V_D = 400\text{ V}$ , $I_{TM} = 4.4\text{ A}$ , Commutating $dv/dt = 18\text{ V}/\mu\text{s}$ , Gate Open, $T_J = 125^\circ\text{C}$ , $f = 250\text{ Hz}$ , No Snubber)	$(dv/dt)_c$	6.5	—	—	A/ms
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	$dv/dt$	250	—	—	V/ $\mu\text{s}$

\*Indicates Pulse Test: Pulse Width  $\leq 2.0\text{ ms}$ , Duty Cycle  $\leq 2\%$ .