

## Advance Information

# TRIACS

## Silicon Bidirectional Thyristors

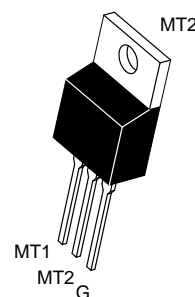
Designed primarily for full-wave ac control applications, such as motor controls, heating controls or dimmers; or where ever full-wave, silicon gate-controlled devices are needed.

- Uniform Gate Trigger Currents in Three Modes
- High Commutating di/dt and High Immunity to dv/dt @ 125°C
- Minimizes Snubber Networks for Protection
- Blocking Voltage to 800 Volts
- On-State Current Rating of 12 Amperes RMS at 80°C
- High Surge Current Capability – 100 Amperes
- Industry Standard TO-220AB Package for Ease of Design
- Glass Passivated Junctions for Reliability and Uniformity

## MAC12HC Series \*

\*Motorola preferred devices

TRIACS  
12 AMPERES RMS  
400 thru 800  
VOLTS



CASE 221A-09  
(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)	$V_{\text{DRM}}$		Volts
Peak Repetitive Reverse Voltage ( $T_J = -40$ to $125^\circ\text{C}$ , Sine Wave, 50 to 60 Hz, Gate Open)	$V_{\text{RRM}}$	400 600 800	
On-State RMS Current (All conduction angles; $T_C = 80^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	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 ( $t = 8.33$ ms)	$I^2t$	41	A <sup>2</sup> sec
Peak Gate Power (Pulse Width $\leq 1.0$ $\mu\text{s}$ , $T_C = 80^\circ\text{C}$ )	$P_{\text{GM}}$	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 5 Seconds	$T_L$	260	$^\circ\text{C}$

(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  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.

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



## MAC12HC Series

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

Symbol	Characteristic	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

$I_{\text{DRM}}$	Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{\text{DRM}}$ , Gate Open)	$T_J = 25^\circ\text{C}$	—	—	0.01	mA
		$T_J = 125^\circ\text{C}$	—	—	2.0	

#### ON CHARACTERISTICS

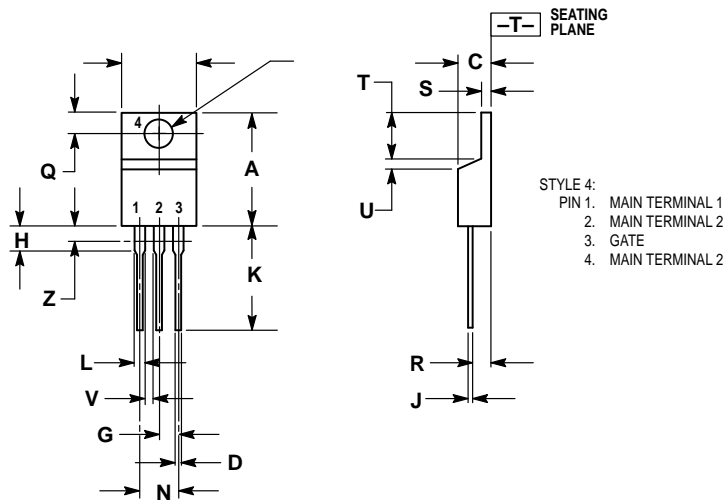
$V_{\text{TM}}$	Peak On-State Voltage <sup>1</sup> ( $I_{\text{TM}} = \pm 17 \text{ A}$ )	—	—	1.85	V
$I_{\text{GT}}$	Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ )	10	—	50	mA
	MT2(+), G(+)	10	—	50	
	MT2(+), G(–)	10	—	50	
$I_{\text{H}}$	Holding Current ( $V_D = 12 \text{ V}$ , Gate Open, Initiating Current = $\pm 150 \text{ mA}$ )	—	—	60	mA
$I_{\text{L}}$	Latch Current ( $V_D = 12 \text{ V}$ , $I_{\text{G}} = 10 \text{ mA}$ )	—	—	60	mA
	MT2(+), G(+)	—	—	80	
	MT2(+), G(–)	—	—	60	
$V_{\text{GT}}$	Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ )	0.5	—	1.5	V
	MT2(+), G(+)	0.5	—	1.5	
	MT2(+), G(–)	0.5	—	1.5	

#### DYNAMIC CHARACTERISTICS

$(di/dt)_C$	Rate of Change of Commutating Current <sup>1</sup> ( $V_D = 400 \text{ V}$ , $I_{\text{TM}} = 4.4 \text{ A}$ , Commutating $dv/dt = 18 \text{ V}/\mu\text{s}$ , Gate Open, $T_J = 125^\circ\text{C}$ , $f = 250 \text{ Hz}$ , $C_L = 10 \mu\text{F}$ , $L_L = 40 \text{ mH}$ , with Snubber)	15	—	—	A/ms
$dv/dt$	Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{\text{DRM}}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	600	—	—	V/ $\mu\text{s}$
$di/dt$	Repetitive Critical Rate of Rise of On-State Current	—	—	10	A/ $\mu\text{s}$

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


## PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

CASE 221A-09  
TO-220AB

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