

## Advance Information

# TRIACS

## Silicon Bidirectional Thyristors

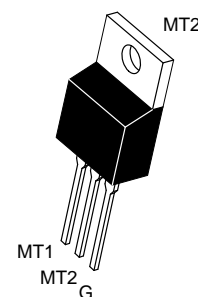
Designed for high performance full-wave ac control applications where high noise immunity and high commutating di/dt are required.

- Blocking Voltage to 800 Volts
- On-State Current Rating of 4.0 Amperes RMS at 100°C
- Uniform Gate Trigger Currents in Three Modes
- High Immunity to dv/dt — 500 V/μs minimum at 125°C
- Minimizes Snubber Networks for Protection
- High Surge Current Capability — 40 Amperes
- Industry Standard TO-220AB Package
- High Commutating di/dt — 6.0 A/ms minimum at 125°C

**MAC4M**  
**MAC4N**

Motorola preferred devices

**TRIACS**  
**4 AMPERES RMS**  
**600 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)	$V_{\text{RRM}}$	600 800	
On-State RMS Current (Full Cycle Sine Wave, 60 Hz, $T_C = 100^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	4.0	A
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{\text{TSM}}$	40	A
Circuit Fusing Consideration ( $t = 8.33$ ms)	$I^2t$	6.6	A <sup>2</sup> sec
Peak Gate Power (Pulse Width $\leq 1.0$ μs, $T_C = 100^\circ\text{C}$ )	$P_{\text{GM}}$	0.5	Watts
Average Gate Power ( $t = 8.3$ ms, $T_C = 100^\circ\text{C}$ )	$P_{\text{G(AV)}}$	0.1	Watts
Operating Junction Temperature Range	$T_J$	-40 to +125	°C
Storage Temperature Range	$T_{\text{stg}}$	-40 to +150	°C

### THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case	$R_{\theta\text{JC}}$	2.2	°C/W
— Junction to Ambient	$R_{\theta\text{JA}}$	62.5	
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 5 Seconds	$T_L$	260	°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.



## MAC4M MAC4N

### 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

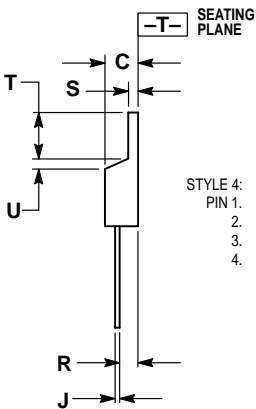
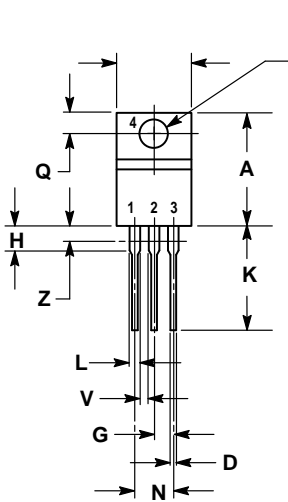
$V_{\text{TM}}$	Peak On-State Voltage <sup>1</sup> ( $I_{\text{TM}} = \pm 6.0 \text{ A}$ )	—	—	1.6	V
$I_{\text{GT}}$	Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ )	—	—	—	mA
	MT2(+), G(+)	8.0	—	35	
	MT2(+), G(–)	8.0	—	35	
$I_{\text{H}}$	Holding Current ( $V_D = 12 \text{ V}$ , Gate Open, Initiating Current = $\pm 200 \text{ mA}$ )	8.0	—	35	mA
		8.0	—	35	
$I_{\text{L}}$	Latching Current ( $V_D = 12 \text{ V}$ , $I_G = 10 \text{ mA}$ )	—	—	—	mA
	MT2(+), G(+)	—	—	60	
	MT2(+), G(–)	—	—	80	
$V_{\text{GT}}$	Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ )	—	—	—	V
	MT2(+), G(+)	0.5	—	1.3	
	MT2(+), G(–)	0.5	—	1.3	
$V_{\text{GT}}$	MT2(+), G(–)	0.5	—	1.3	V
	MT2(–), G(–)	0.5	—	1.3	

#### DYNAMIC CHARACTERISTICS

$(di/dt)_C$	Rate of Change of Commutating Current <sup>1</sup> ( $V_D = 400 \text{ V}$ , $I_{\text{TM}} = 4.0 \text{ A}$ , Commutating $dv/dt = 18 \text{ V}/\mu\text{s}$ , Gate Open, $T_J = 125^\circ\text{C}$ , $f = 500 \text{ Hz}$ , $C_L = 5.0 \mu\text{F}$ , $L_L = 20 \text{ mH}$ , No Snubber)	6.0	—	—	A/ms
$dv/dt$	Critical Rate of Rise of Off-State Voltage ( $V_D = 0.67 \times \text{Rated } V_{\text{DRM}}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	500	—	—	V/ $\mu\text{s}$
$di/dt$	Repetitive Critical Rate of Rise of On-State Voltage	—	—	10	A/ $\mu\text{s}$

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

PACKAGE DIMENSIONS




STYLE 4:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. MAIN TERMINAL 2

- 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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