

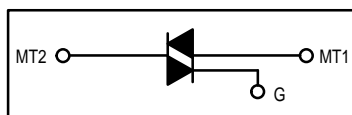
Advance Information

TRIACS

Silicon Bidirectional Thyristors

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

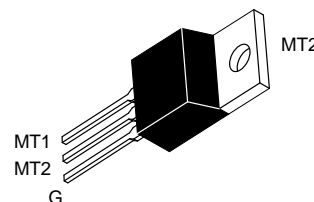
- Blocking Voltage to 800 Volts
- On-State Current Rating of 12 Amperes RMS at 70°C
- Uniform Gate Trigger currents in Three Modes
- High Immunity to dv/dt — 250 V/μs minimum at 125°C
- High Commutating di/dt — 6.5 A/ms minimum at 125°C
- Industry Standard TO-220 AB Package
- High Surge Current Capability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



MAC12 SERIES*

*Motorola preferred devices

TRIACS
12 AMPERES RMS
400 thru 800
VOLTS



CASE 221A-09
(TO-220AB)
Style 4

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|---------------------|-------------------|--------------------|
| Peak Repetitive Off-State Voltage ⁽¹⁾ (T _J = -40 to 125°C, Sine Wave, 50 to 60 Hz, Gate Open) | V _{DRM} | 400 600 800 | Volts |
| On-State RMS Current (Full Cycle Sine Wave, 60 Hz, T _C = 70°C) | I _{T(RMS)} | 12 | A |
| Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T _J = 125°C) | I _{TSM} | 100 | A |
| Circuit Fusing Consideration (t = 8.3 ms) | I ² t | 41 | A ² sec |
| Peak Gate Power (Pulse Width ≤ 1.0 μs, T _C = 80°C) | P _{GM} | 16 | Watts |
| Average Gate Power (t = 8.3 ms, T _C = 80°C) | P _{G(AV)} | 0.35 | Watts |
| Operating Junction Temperature Range | T _J | -40 to +125 | °C |
| Storage Temperature Range | T _{stg} | -40 to +150 | °C |

THERMAL CHARACTERISTICS

| | | | |
|---|--------------------------------------|-------------|------|
| Thermal Resistance — Junction to Case — Junction to Ambient | R _{θJC} R _{θJA} | 2.2 62.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds | T _L | 260 | °C |

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | |
|---|---|------------------|--------|--------|-------------|----|
| Peak Repetitive Blocking Current (V _D = Rated V _{DRM} , Gate Open) | T _J = 25°C T _J = 125°C | I _{DRM} | — — | — — | 0.01 2.0 | mA |
|---|---|------------------|--------|--------|-------------|----|

(1) V_{DRM} and V_{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 2



MAC12 SERIES

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

ON CHARACTERISTICS

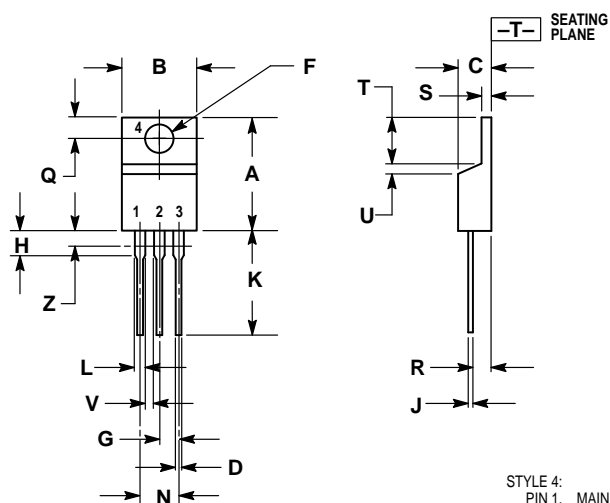
| | | | | | |
|--|----------|-----|------|------|-------|
| Peak On-State Voltage* ($I_{TM} = \pm 17\text{ A}$) | V_{TM} | — | — | 1.85 | Volts |
| Continuous Gate Trigger Current ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$) | I_{GT} | 5.0 | 13 | 35 | mA |
| MT2(+), G(+) | | 5.0 | 16 | 35 | |
| MT2(+), G(-) | | 5.0 | 18 | 35 | |
| MT2(-), G(-) | | | | | |
| Hold Current ($V_D = 12\text{ V}$, Gate Open, Initiating Current = $\pm 150\text{ mA}$) | I_H | — | 20 | 40 | mA |
| Latch Current ($V_D = 24\text{ V}$, $I_G = 35\text{ mA}$) | I_L | — | 20 | 50 | mA |
| MT2(+), G(+); MT2(-), G(-) | | — | 30 | 80 | |
| MT2(+), G(-) | | | | | |
| Gate Trigger Voltage ($V_D = 12\text{ V}$, $R_L = 100\ \Omega$) | V_{GT} | 0.5 | 0.69 | 1.5 | Volts |
| MT2(+), G(+) | | 0.5 | 0.77 | 1.5 | |
| MT2(+), G(-) | | 0.5 | 0.72 | 1.5 | |
| MT2(-), G(-) | | | | | |

DYNAMIC CHARACTERISTICS

| | | | | | |
|--|-------------|-----|---|---|------------------|
| 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/ μs |

*Indicates 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)
 ISSUE Z**

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