

Advance Information

TRIACS

Silicon Bidirectional Thyristors

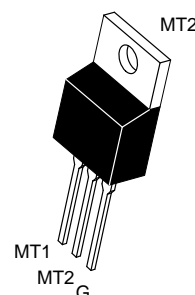
Designed primarily for full wave ac control applications, such as motor controls, heating controls or dimmers; or where ever full-wave, silicon gate-controlled devices are needed.

- 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 16 Amperes RMS
- High Surge Current Capability — 150 Amperes
- Industry Standard TO-220AB Package for Ease of Design
- Glass Passivated Junctions for Reliability and Uniformity

MAC16C Series

Motorola preferred devices

TRIACS
16 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_{DRM} | | Volts |
| Peak Repetitive Reverse Voltage ($T_J = -40$ to 125°C) | V_{RRM} | 400 600 800 | |
| On-State RMS Current (All Conduction Angles; $T_C = 80^\circ\text{C}$) | $I_{\text{T(RMS)}}$ | 16 | A |
| Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, $T_J = 125^\circ\text{C}$) | I_{TSM} | 150 | A |
| Circuit Fusing Consideration ($t = 8.33$ ms) | I^2t | 93 | A^2sec |
| Peak Gate Power (Pulse Width ≤ 1.0 μs , $T_C = 80^\circ\text{C}$) | P_{GM} | 20 | Watts |
| Average Gate Power ($t = 8.3$ ms, $T_C = 80^\circ\text{C}$) | $P_{\text{G(AV)}}$ | 0.5 | Watts |
| Operating Junction Temperature Range | T_J | -40 to $+125$ | $^\circ\text{C}$ |
| Storage Temperature Range | T_{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_{DRM} and V_{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.



MAC16C Series

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

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

OFF CHARACTERISTICS

| | | | | | | |
|------------------|---|---------------------------|---|---|------|----|
| I_{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

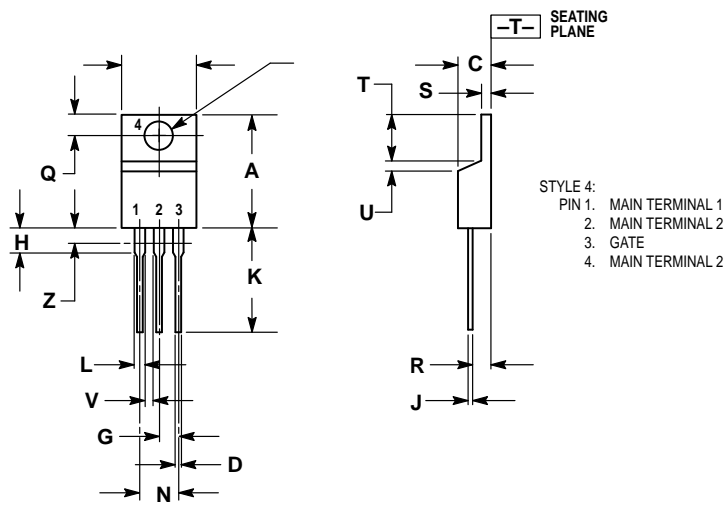
| | | | | | |
|-----------------|--|-----|---|-----|----|
| V_{TM} | Peak On-State Voltage ¹ ($I_{\text{TM}} = \pm 21 \text{ A Peak}$) | — | — | 1.6 | V |
| I_{GT} | Continuous Gate Trigger Current ($V_D = 12 \text{ V}$, $R_L = 100 \Omega$) | 8.0 | — | 35 | mA |
| | MT2(+), G(+) | 8.0 | — | 35 | |
| | MT2(+), G(–) | 8.0 | — | 35 | |
| I_{H} | Holding Current ($V_D = 12 \text{ V}$, Gate Open, Initiating Current = $\pm 150 \text{ mA}$) | — | — | 40 | mA |
| I_{L} | Latching Current ($V_D = 12 \text{ V}$, $I_{\text{G}} = 50 \text{ mA}$) | — | — | 60 | mA |
| | MT2(+), G(+) | — | — | 60 | |
| | MT2(+), G(–) | — | — | 60 | |
| V_{GT} | Continuous Gate Trigger Voltage ($V_D = 12 \text{ V}$, $R_L = 100 \Omega$) | 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 ¹ ($V_D = 400 \text{ V}$, $I_{\text{TM}} = 6.0 \text{ A}$, Commutating $dv/dt = 20 \text{ V}/\mu\text{s}$, 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/ μs |
| di/dt | Repetitive Critical Rate of Rise of On-State Voltage | — | — | 20 | A/ μs |

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

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; SPD, Strategic Planning Office, 141,
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 81-3-5487-8488

Customer Focus Center: 1-800-521-6274

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609
Motorola Fax Back System – US & Canada ONLY 1-800-774-1848
– <http://sps.motorola.com/mfax/>

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

HOME PAGE: <http://motorola.com/sps/>



MOTOROLA

