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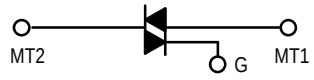
# MAC228A Series

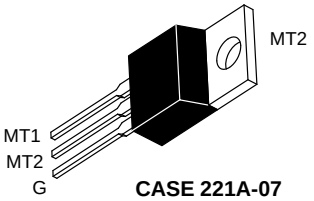
# Triacs
## Silicon Bidirectional Triode Thyristors

. . . designed primarily for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.

- Sensitive Gate Triggering in 3 Modes for AC Triggering on Sinking Current Sources
- Four Mode Triggering for Drive Circuits that Source Current
- All Diffused and Glass–Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal resistance and High Heat Dissipation
- Center Gate Geometry for Uniform Current Spreading

**TRIACs**
**8 AMPERES RMS**
**200 thru 800 VOLTS**




**CASE 221A-07**
**(TO-220AB)**
**STYLE 4**

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

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Off-State Voltage(1) ($T_J$ = –40 to 110°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) | $V_{DRM}$ | | Volts |
| MAC228A4 | | 200 | |
| MAC228A6 | | 400 | |
| MAC228A8 | | 600 | |
| MAC228A10 | | 800 | |
| On-State RMS Current ($T_C$ = 80°C) Full Cycle Sine Wave 50 to 60 Hz | $I_{T(RMS)}$ | 8 | Amps |
| Peak Non-repetitive Surge Current (One Full Cycle 60 Hz, $T_J$ = 110°C) | $I_{TSM}$ | 80 | Amps |
| Circuit Fusing (t = 8.3 ms) | $I^2t$ | 26 | $A^2s$ |
| Peak Gate Current (t ≤ 2 μs) | $I_{GM}$ | ±2 | Amps |
| Peak Gate Voltage (t ≤ 2 μs) | $V_{GM}$ | ±10 | Volts |
| Peak Gate Power (t ≤ 2 μs) | $P_{GM}$ | 20 | Watts |

1. $V_{DRM}$ 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. (continued)

**MAXIMUM RATINGS — continued**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Average Gate Power ($T_C$ = 80°C, t ≤ 8.3 ms) | $P_{G(AV)}$ | 0.5 | Watts |
| Operating Junction Temperature Range | $T_J$ | –40 to 110 | °C |
| Storage Temperature Range | $T_{stg}$ | –40 to 150 | °C |
| Mounting Torque | | 8 | in. lb. |

**THERMAL CHARACTERISTICS**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JC}$<br>$R_{\theta JA}$ | Thermal Resistance — Junction to Case<br>— Junction to Ambient | 2.0<br>62.5 | °C/W |
| $T_L$ | Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds | 260 | °C |

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C and either polarity of MT2 to MT1 voltage unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Peak Blocking Current<br>($V_D$ = Rated $V_{DRM}$) $T_J$ = 25°C<br>$T_J$ = 110°C | $I_{DRM}$ | <br>—<br>— | <br>—<br>— | <br>10<br>2 | <br>μA<br>mA |
| Peak On-State Voltage<br>($I_{TM}$ = 11 A Peak, Pulse Width ≤ 2 ms, Duty Cycle ≤ 2%) | $V_{TM}$ | — | — | 1.8 | Volts |
| Gate Trigger Current (Continuous dc)<br>($V_D$ = 12 V, $R_L$ = 100 Ω)<br>MT2(+), G(+); MT2(+), G(–); MT2(–), G(–)<br>MT2(–), G(+) | $I_{GT}$ | <br><br>—<br>— | <br><br>—<br>— | <br><br>5<br>10 | mA |
| Gate Trigger Voltage (Continuous dc)<br>($V_D$ = 12 V, $R_L$ = 100 Ω)<br>MT2(+), G(+); MT2(+), G(–); MT2(–), G(–)<br>MT2(–), G(+)<br>($V_D$ = Rated $V_{DRM}$, $T_C$ = 110°C, $R_L$ = 10 k)<br>MT2(+), G(+); MT2(+), G(–); MT2(–), G(–)<br>MT2(–), G(+) | $V_{GT}$ | <br><br>—<br>—<br><br>0.2<br>0.2 | <br><br>—<br>—<br><br>—<br>— | <br><br>2<br>2.5<br><br>—<br>— | Volts |
| Holding Current<br>($V_D$ = 12 Vdc, $I_{TM}$ = 200 mA, Gate Open) | $I_H$ | — | — | 15 | mA |
| Gate–Controlled Turn–On Time<br>($V_D$ = Rated $V_{DRM}$, $I_{TM}$ = 16 A Peak, $I_G$ = 30 mA) | $t_{gt}$ | — | 1.5 | — | μs |
| Critical Rate of Rise of Off-State Voltage<br>($V_D$ = Rated $V_{DRM}$, Exponential Waveform, $T_C$ = 110°C) | dv/dt | — | 25 | — | V/μs |
| Critical Rate of Rise of Commutation Voltage<br>($V_D$ = Rated $V_{DRM}$, $I_{TM}$ = 11.3 A,<br>Commutating di/dt = 4.1 A/ms, Gate Unenergized, $T_C$ = 80°C) | dv/dt(c) | — | 5 | — | V/μs |

**FIGURE 1 – RMS CURRENT DERATING**

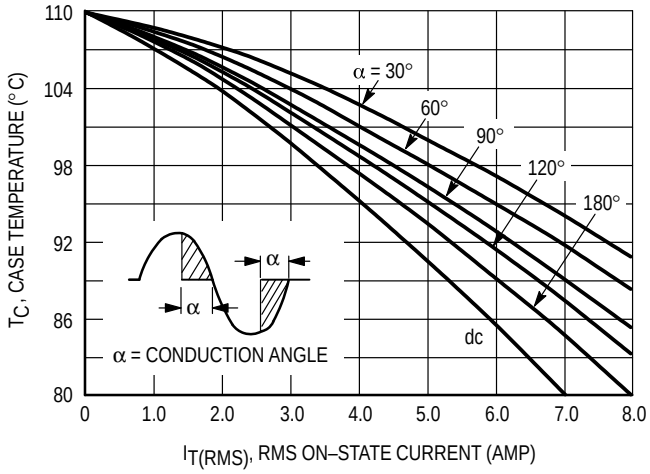
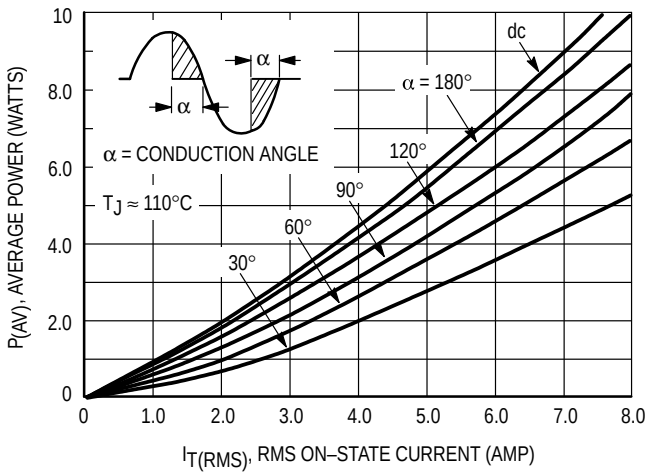
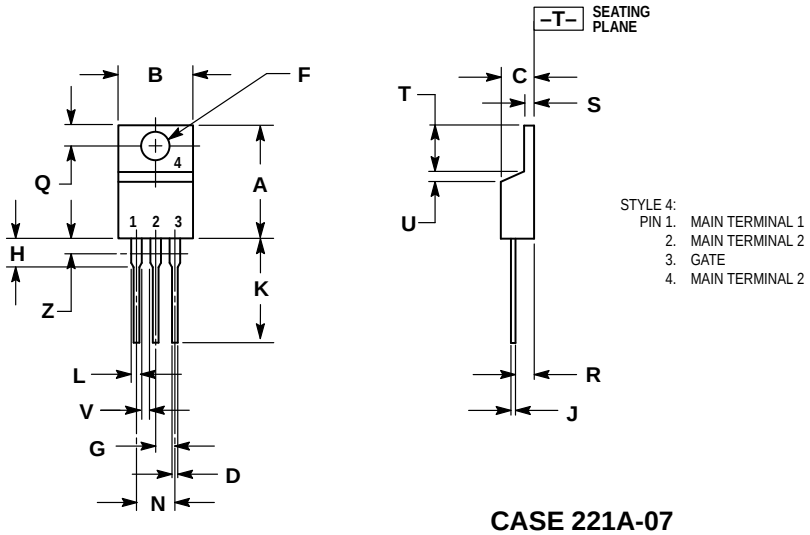



**FIGURE 2 – ON–STATE POWER DISSIPATION**



## 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.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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 | 0.014 | 0.022 | 0.36 | 0.55 |
| 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-07**
**(TO–220AB)**
**ISSUE Z**

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