# Silicon Controlled Rectifier
## Reverse Blocking Triode Thyristors

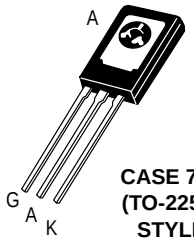
. . . Glassivated PNPN devices designed for high volume consumer applications such as temperature, light, and speed control; process and remote control, and warning systems where reliability of operation is important.

- Glassivated Surface for Reliability and Uniformity
- Power Rated at Economical Prices
- Practical Level Triggering and Holding Characteristics
- Flat, Rugged, Thermopad Construction for Low Thermal Resistance, High Heat Dissipation and Durability

**C106 Series ***

***Motorola preferred devices**

**SCRs**
**4 AMPERES RMS**
**50 thru 600 VOLTS**


**CASE 77-08**
**(TO-225AA)**
**STYLE 2**

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

| Rating | | Symbol | Value | Unit |
|---|---|---|---|---|
| Peak Repetitive Forward and Reverse Blocking Voltage(1)<br>($R_{GK}$ = 1 kΩ)<br>($T_C$ = –40° to 110°C) | C106F<br>C106A<br>C106B<br>C106D<br>C106M | $V_{DRM}$ or $V_{RRM}$ | <br>50<br>100<br>200<br>400<br>600 | Volts |
| RMS Forward Current<br>(All Conduction Angles) | | $I_{T(RMS)}$ | 4 | Amps |
| Average Forward Current<br>($T_A$ = 30°C) | | $I_{T(AV)}$ | 2.55 | Amps |
| Peak Non-repetitive Surge Current<br>(1/2 Cycle, 60 Hz, $T_J$ = –40 to +110°C) | | $I_{TSM}$ | 20 | Amps |
| Circuit Fusing (t = 8.3 ms) | | $I^2t$ | 1.65 | $A^2s$ |
| Peak Gate Power | | $P_{GM}$ | 0.5 | Watt |
| Average Gate Power | | $P_{G(AV)}$ | 0.1 | Watt |
| Peak Forward Gate Current | | $I_{GFM}$ | 0.2 | Amp |

1. $V_{DRM}$ and $V_{RRM}$ for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, 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. (cont.)

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

**MAXIMUM RATINGS — continued**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Reverse Gate Voltage | $V_{GRM}$ | 6 | Volts |
| Operating Junction Temperature Range | $T_J$ | –40 to +110 | °C |
| Storage Temperature Range | $T_{stg}$ | –40 to +150 | °C |
| Mounting Torque(1) | — | 6 | in. lb. |

1. Torque rating applies with use of compression washer (B52200F006). Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common.
For soldering purposes (either terminal connection or device mounting), soldering temperatures shall not exceed +200°C. For optimum results, an activated flux (oxide removing) is recommended.

**THERMAL CHARACTERISTICS** ($T_C$ = 25°C, $R_{GK}$ = 1 kΩ unless otherwise noted.)

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 3 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 75 | °C/W |

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted.)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Peak Forward or Reverse Blocking Current ($V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$, $R_{GK}$ = 1000 Ohms) | $T_J$ = 25°C | $I_{DRM}$, $I_{RRM}$ | — | — | 10 | μA |
| | $T_J$ = 110°C | | — | — | 100 | μA |
| Forward "On" Voltage ($I_{FM}$ = 1 A Peak) | | $V_{TM}$ | — | — | 2.2 | Volts |
| Gate Trigger Current (Continuous dc) | | $I_{GT}$ | | | | μA |
| ($V_{AK}$ = 6 Vdc, $R_L$ = 100 Ohms) | | | — | 30 | 200 | |
| ($V_{AK}$ = 6 Vdc, $R_L$ = 100 Ohms, $T_C$ = –40°C) | | | — | 75 | 500 | |
| Gate Trigger Voltage (Continuous dc) | | $V_{GT}$ | | | | Volts |
| ($V_{AK}$ = 6 Vdc, $R_L$ = 100 Ohms, $R_{GK}$ = 1000 Ohms) | $T_J$ = 25°C | | 0.4 | — | 0.8 | |
| ($V_{AK}$ = Rated $V_{DRM}$, $R_L$ = 3000 Ohms, | | | 0.5 | — | 1 | |
| $R_{GK}$ = 1000 Ohms, $T_J$ = 110°C) | $T_J$ = –40°C | | 0.2 | — | — | |
| Holding Current | $T_J$ = 25°C | $I_{HX}$ | 0.3 | — | 3 | mA |
| ($V_D$ = 12 Vdc, $R_{GK}$ = 1000 Ohms) | $T_J$ = –40°C | | 0.4 | — | 6 | |
| | $T_J$ = +110°C | | 0.14 | — | 2 | |
| Forward Voltage Application Rate ($T_J$ = 110°C, $R_{GK}$ = 1000 Ohms, $V_D$ = Rated $V_{DRM}$) | | dv/dt | — | 8 | — | V/μs |
| Turn-On Time | | $t_{gt}$ | — | 1.2 | — | μs |
| Turn-Off Time | | $t_q$ | — | 40 | — | μs |

**FIGURE 1 – AVERAGE CURRENT DERATING**

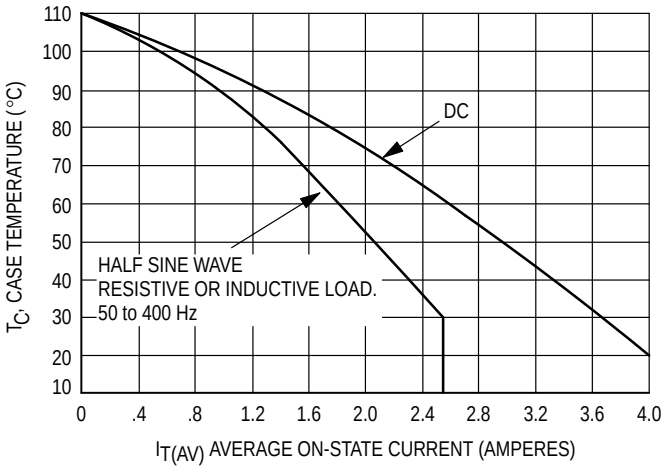
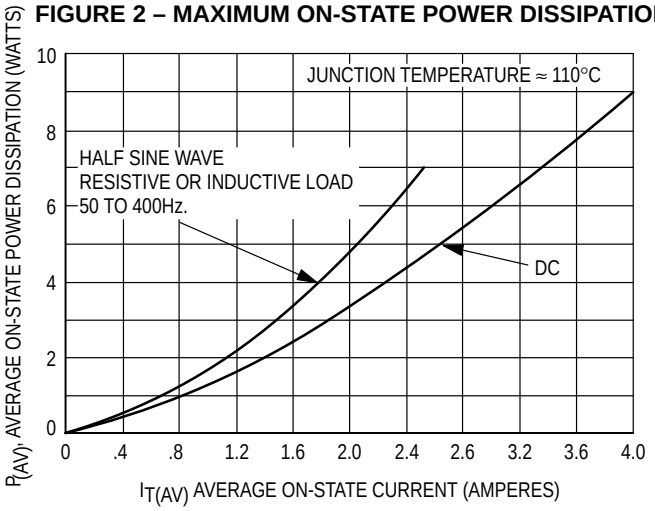
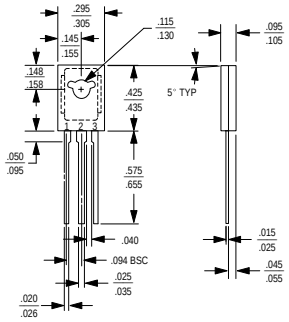



**FIGURE 2 – MAXIMUM ON-STATE POWER DISSIPATION**

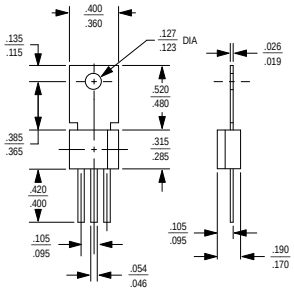


## Package Interchangeability

The dimensional diagrams below compare the critical dimensions of the Motorola C-106 package with competitive devices. It has been demonstrated that the smaller dimensions of the Motorola package make it compatible in most lead-mount and chassis-mount applications. The user is advised to compare all critical dimensions for mounting compatibility.

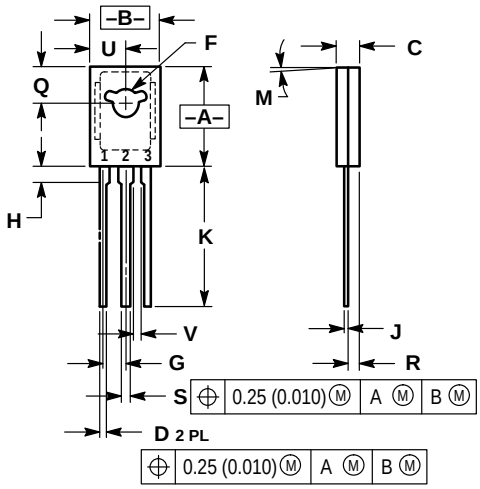



**Motorola C-106 Package**




**Competitive C-106 Package**

## PACKAGE DIMENSIONS




STYLE 2:
PIN 1. CATHODE
2. ANODE
3. GATE

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.425 | 0.435 | 10.80 | 11.04 |
| B | 0.295 | 0.305 | 7.50 | 7.74 |
| C | 0.095 | 0.105 | 2.42 | 2.66 |
| D | 0.020 | 0.026 | 0.51 | 0.66 |
| F | 0.115 | 0.130 | 2.93 | 3.30 |
| G | 0.094 BSC | | 2.39 BSC | |
| H | 0.050 | 0.095 | 1.27 | 2.41 |
| J | 0.015 | 0.025 | 0.39 | 0.63 |
| K | 0.575 | 0.655 | 14.61 | 16.63 |
| M | 5° TYP | | 5° TYP | |
| Q | 0.148 | 0.158 | 3.76 | 4.01 |
| R | 0.045 | 0.055 | 1.15 | 1.39 |
| S | 0.025 | 0.035 | 0.64 | 0.88 |
| U | 0.145 | 0.155 | 3.69 | 3.93 |
| V | 0.040 | — | 1.02 | — |

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**(TO–225AA)**