# Silicon Controlled Rectifiers
## Reverse Blocking Triode Thyristors

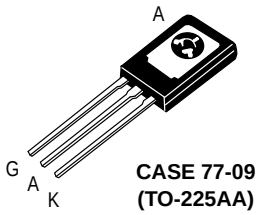
PNPN devices designed for high volume consumer applications such as temperature, light and speed control; process and remote control, and warning systems where reliability of operation is important.

- Glass-Passivated 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

**MCR106 Series***

***Motorola preferred devices except MCR106–3**

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


**CASE 77-09**
**(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) ($T_J$ = 110°C, $R_{GK}$ = 1 kΩ)<br>MCR106-6<br>MCR106-8 | $V_{DRM}$ and $V_{RRM}$ | <br>400<br>600 | Volts |
| RMS Forward Current (All Conduction Angles) | $I_{T(RMS)}$ | 4 | Amps |
| Average Forward Current $T_C$ = 93°C or $T_A$ = 30°C | $I_{T(AV)}$ | 2.55 | Amps |
| Peak Non-repetitive Surge Current (1/2 Cycle, 60 Hz, $T_J$ = –40 to +110°C) | $I_{TSM}$ | 25 | Amps |
| Circuit Fusing Considerations (t = 8.3 ms) | $I^2t$ | 2.6 | $A^2s$ |
| Peak Gate Power | $P_{GM}$ | 0.5 | Watt |
| Average Gate Power | $P_{G(AV)}$ | 0.1 | Watt |
| Peak Forward Gate Current | $I_{GM}$ | 0.2 | Amp |
| Peak Reverse Gate Voltage | $V_{RGM}$ | 6 | Volts |
| Operating Junction Temperature Range | $T_J$ | –40 to +110 | °C |

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.

**REV 1**

**MAXIMUM RATINGS — continued**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Storage Temperature Range | $T_{stg}$ | –40 to +150 | °C |
| Mounting Torque(1) | — | 6 | in. lb. |

**THERMAL CHARACTERISTICS**

| 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 and $R_{GK}$ = 1000 Ohms unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Peak Forward or Reverse Blocking Current<br>($V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$) $T_J$ = 25°C<br>$T_J$ = 110°C | $I_{DRM}$, $I_{RRM}$ | <br>—<br>— | <br>—<br>— | <br>10<br>200 | <br>µA<br>µA |
| Forward “On” Voltage<br>($I_{TM}$ = 4 A Peak) | $V_{TM}$ | — | — | 2 | Volts |
| Gate Trigger Current (Continuous dc)(2)<br>($V_{AK}$ = 7 Vdc, $R_L$ = 100 Ohms)<br>($V_{AK}$ = 7 Vdc, $R_L$ = 100 Ohms, $T_C$ = –40°C) | $I_{GT}$ | <br>—<br>— | <br>—<br>— | <br>200<br>500 | µA |
| Gate Trigger Voltage (Continuous dc)<br>($V_{AK}$ = 7 Vdc, $R_L$ = 100 Ohms, $T_C$ = 25°C) | $V_{GT}$ | — | — | 1 | Volts |
| Gate Non-Trigger Voltage<br>($V_{AK}$ = Rated $V_{DRM}$, $R_L$ = 100 Ohms, $T_J$ = 110°C) | $V_{GD}$ | 0.2 | — | — | Volts |
| Holding Current<br>($V_{AK}$ = 7 Vdc, $T_C$ = 25°C) | $I_H$ | — | — | 5 | mA |
| Forward Voltage Application Rate<br>($T_J$ = 110°C) | dv/dt | — | 10 | — | V/µs |

1. Torque rating applies with use of compression washer (B52200-F006 or equivalent). 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. (See AN209B).
   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.
2. $R_{GK}$ current is not included in measurement.

## CURRENT DERATING

**FIGURE 1 – MAXIMUM CASE TEMPERATURE**

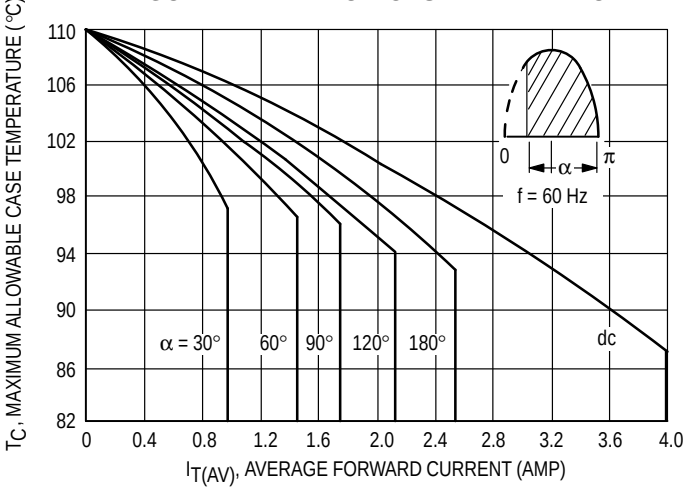
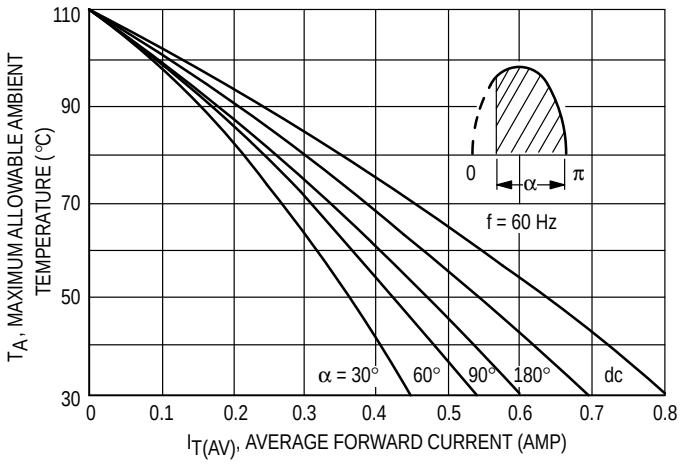
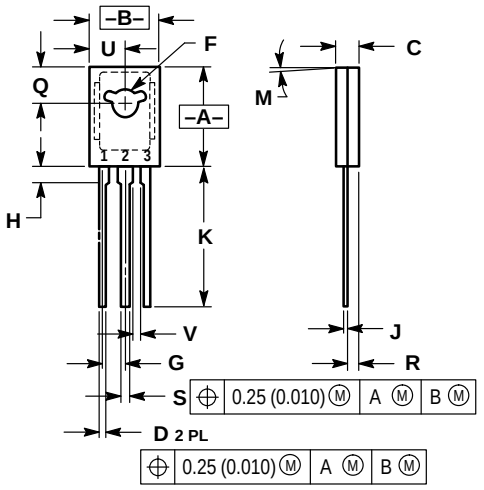



**FIGURE 2 – MAXIMUM AMBIENT TEMPERATURE**



## PACKAGE DIMENSIONS




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 | 0.065 | 1.15 | 1.65 |
| S | 0.025 | 0.035 | 0.64 | 0.88 |
| U | 0.145 | 0.155 | 3.69 | 3.93 |
| V | 0.040 | — | 1.02 | — |

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

**CASE 77-09**
**(TO-225AA)**
**ISSUE W**



**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**: Motorola Japan 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.; Silicon Harbour Centre,
2, Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.
852–26629298

**HOME PAGE**: http://motorola.com/sps/