

MCR106-6, MCR106-8

Preferred Device

Sensitive Gate Silicon Controlled Rectifiers Reverse Blocking 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
- Device Marking: Device Type, e.g., MCR106-6, Date Code

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

| Rating | Symbol | Value | Unit |
|--|--------------------------|-----------------|----------------------|
| Peak Repetitive Off-State Voltage ⁽¹⁾ ($T_J = -40$ to 110°C , Sine Wave 50 to 60 Hz, Gate Open) MCR106-6 MCR106-8 | V_{DRM} , V_{RRM} | 400 600 | Volts |
| On-State RMS Current ($T_C = 93^\circ\text{C}$) (180° Conduction Angles) | $I_T(\text{RMS})$ | 4.0 | Amps |
| Average On-State Current (180° Conduction Angles; $T_C = 93^\circ\text{C}$) | $I_T(\text{AV})$ | 2.55 | Amps |
| Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, $T_J = 110^\circ\text{C}$) | I_{TSM} | 25 | Amps |
| Circuit Fusing Considerations ($t = 8.3$ ms) | I^2t | 2.6 | A^2s |
| Forward Peak Gate Power ($T_C = 93^\circ\text{C}$, Pulse Width ≤ 1.0 μs) | P_{GM} | 0.5 | Watt |
| Forward Average Gate Power ($T_C = 93^\circ\text{C}$, $t = 8.3$ ms) | $P_{G(\text{AV})}$ | 0.1 | Watt |
| Forward Peak Gate Current ($T_C = 93^\circ\text{C}$, Pulse Width ≤ 1.0 μs) | I_{GM} | 0.2 | Amp |
| Peak Reverse Gate Voltage ($T_C = 93^\circ\text{C}$, Pulse Width ≤ 1.0 μs) | V_{RGM} | 6.0 | Volts |
| Operating Junction Temperature Range | T_J | -40 to $+110$ | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -40 to $+150$ | $^\circ\text{C}$ |
| Mounting Torque ⁽²⁾ | — | 6.0 | in. lb. |

(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.

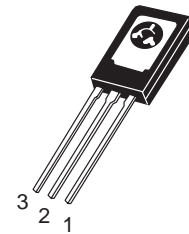
(2) Torque rating applies with use of compression washer (B52200-F006 or equivalent). Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common. (See AN209B). For soldering purposes (either terminal connection or device mounting), soldering temperatures shall not exceed $+200^\circ\text{C}$. For optimum results, an activated flux (oxide removing) is recommended.



ON Semiconductor

<http://onsemi.com>

SCRs
4 AMPERES RMS
400 thru 600 VOLTS



TO-225AA
(formerly TO-126)
CASE 077
STYLE 2

| PIN ASSIGNMENT | |
|----------------|---------|
| 1 | Cathode |
| 2 | Anode |
| 3 | Gate |

ORDERING INFORMATION

| Device | Package | Shipping |
|----------|---------|----------|
| MCR106-6 | TO225AA | 500/Box |
| MCR106-8 | TO225AA | 500/Box |

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

MCR106–6, MCR106–8

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-----|------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 3.0 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 75 | °C/W |
| Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds | T_L | 260 | °C |

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

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

OFF CHARACTERISTICS

| | | | | | |
|---|--------------------|---|---|-----|---------------|
| Peak Repetitive Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}; R_{GK} = 1000 \text{ Ohms}$) | I_{DRM}, I_{RRM} | — | — | 10 | μA |
| $T_J = 25^\circ\text{C}$ $T_J = 110^\circ\text{C}$ | | — | — | 200 | μA |

ON CHARACTERISTICS

| | | | | | |
|--|----------|-----|---|------------|---------------|
| Peak Forward On–State Voltage ⁽¹⁾ ($I_{TM} = 4 \text{ A Peak}$) | V_{TM} | — | — | 2.0 | Volts |
| Gate Trigger Current (Continuous dc) ⁽²⁾ ($V_{AK} = 7 \text{ Vdc}, R_L = 100 \text{ Ohms}$) ($T_C = -40^\circ\text{C}$) | I_{GT} | — | — | 200 500 | μA |
| Gate Trigger Voltage (Continuous dc) ⁽²⁾ ($V_{AK} = 7 \text{ Vdc}, R_L = 100 \text{ Ohms}$) | V_{GT} | — | — | 1.0 | Volts |
| Gate Non-Trigger Voltage ⁽²⁾ ($V_{AK} = 12 \text{ Vdc}, R_L = 100 \text{ Ohms}, T_J = 110^\circ\text{C}$) | V_{GD} | 0.2 | — | — | Volts |
| Holding Current ($V_{AK} = 7 \text{ Vdc}$, Initiating Current = 200 mA, Gate Open) | I_H | — | — | 5.0 | mA |

DYNAMIC CHARACTERISTICS

| | | | | | |
|---|---------|---|----|---|------------------|
| Critical Rate–of–Rise of Off–State Voltage ($T_J = 110^\circ\text{C}$) | dv/dt | — | 10 | — | V/ μs |
|---|---------|---|----|---|------------------|

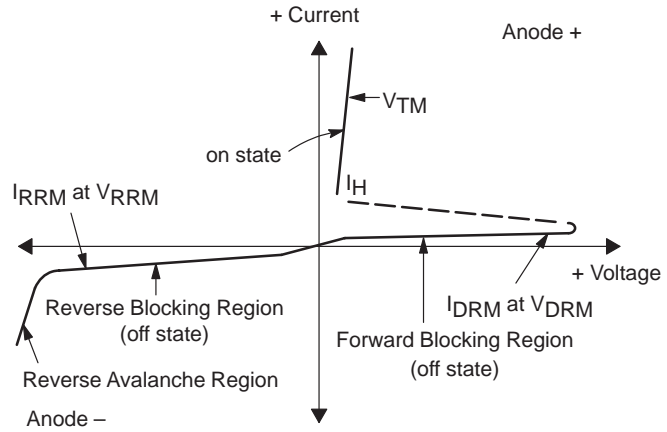
(1) Pulse Test: Pulse Width $\leq 1.0 \text{ ms}$, Duty Cycle $\leq 1\%$.

(2) R_{GK} current is not included in measurement.

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Voltage Current Characteristic of SCR

| Symbol | Parameter |
|-----------|---|
| V_{DRM} | Peak Repetitive Off State Forward Voltage |
| I_{DRM} | Peak Forward Blocking Current |
| V_{RRM} | Peak Repetitive Off State Reverse Voltage |
| I_{RRM} | Peak Reverse Blocking Current |
| V_{TM} | Peak On State Voltage |
| I_H | Holding Current |



CURRENT DERATING

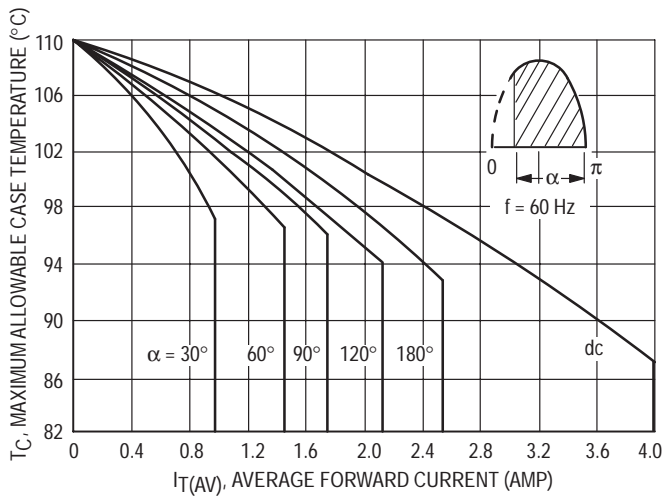


Figure 1. Maximum Case Temperature

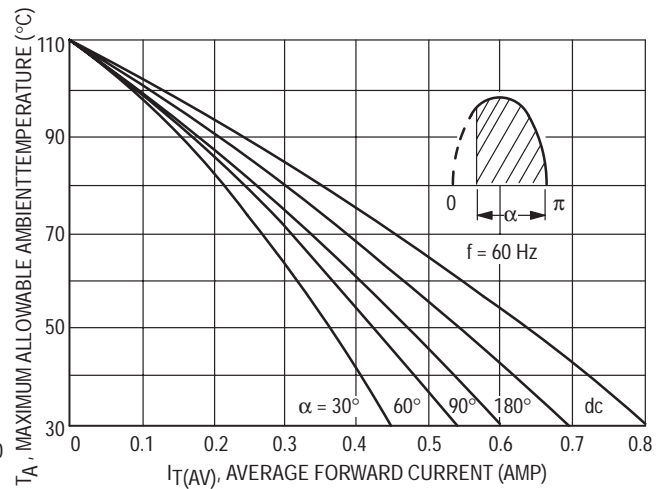
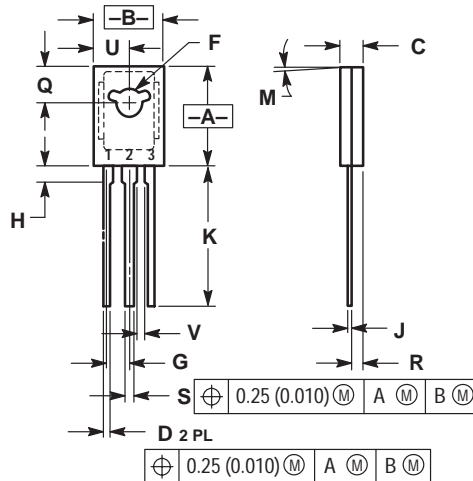


Figure 2. Maximum Ambient Temperature

MCR106-6, MCR106-8

PACKAGE DIMENSIONS


TO-225AA (formerly TO-126) CASE 077-09 ISSUE W



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

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | 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

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