

# Silicon Controlled Rectifiers

## Reverse Blocking Triode Thyristors

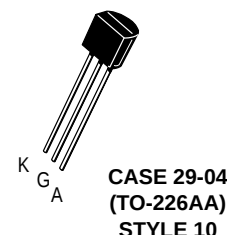
PNPN devices designed for high volume, line-powered consumer applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits. Supplied in an inexpensive plastic TO-226AA package which is readily adaptable for use in automatic insertion equipment.

- Sensitive Gate Trigger Current — 200  $\mu$ A Maximum
- Low Reverse and Forward Blocking Current — 100  $\mu$ A Maximum,  $T_C = 125^\circ\text{C}$
- Low Holding Current — 5 mA Maximum
- Glass-Passivated Surface for Reliability and Uniformity

## MCR100 Series\*

\*Motorola preferred devices

SCRs  
0.8 AMPERE RMS  
100 thru 600 VOLTS



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

| Rating                                                                                                                                                                                     | Symbol                        | Value                    | Unit                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------|----------------------|
| Peak Repetitive Forward and Reverse Blocking Voltage <sup>(1)</sup><br>( $T_J = 25$ to $125^\circ\text{C}$ , $R_{GK} = 1\text{ k}\Omega$ )<br>MCR100-3<br>MCR100-4<br>MCR100-6<br>MCR100-8 | $V_{DRM}$<br>and<br>$V_{RRM}$ | 100<br>200<br>400<br>600 | Volts                |
| Forward Current RMS (See Figures 1 & 2)<br>(All Conduction Angles)                                                                                                                         | $I_T(\text{RMS})$             | 0.8                      | Amps                 |
| Peak Forward Surge Current, $T_A = 25^\circ\text{C}$<br>(1/2 Cycle, Sine Wave, 60 Hz)                                                                                                      | $I_{TSM}$                     | 10                       | Amps                 |
| Circuit Fusing Considerations<br>( $t = 8.3\text{ ms}$ )                                                                                                                                   | $I^2t$                        | 0.415                    | $\text{A}^2\text{s}$ |
| Peak Gate Power — Forward, $T_A = 25^\circ\text{C}$                                                                                                                                        | $P_{GM}$                      | 0.1                      | Watts                |
| Average Gate Power — Forward, $T_A = 25^\circ\text{C}$                                                                                                                                     | $P_{GF(AV)}$                  | 0.01                     | Watt                 |
| Peak Gate Current — Forward, $T_A = 25^\circ\text{C}$<br>(300 $\mu\text{s}$ , 120 PPS)                                                                                                     | $I_{GFM}$                     | 1                        | Amp                  |
| Peak Gate Voltage — Reverse                                                                                                                                                                | $V_{GRM}$                     | 5                        | Volts                |
| Operating Junction Temperature Range @ Rated $V_{RRM}$ and $V_{DRM}$                                                                                                                       | $T_J$                         | -40 to +125              | $^\circ\text{C}$     |
| Storage Temperature Range                                                                                                                                                                  | $T_{stg}$                     | -40 to +150              | $^\circ\text{C}$     |
| Lead Solder Temperature<br>( $< 1/16''$ from case, 10 s max)                                                                                                                               | —                             | +230                     | $^\circ\text{C}$     |

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.

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

## MCR100 Series

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max | Unit                 |
|-----------------------------------------|-----------------|-----|----------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 75  | $^{\circ}\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | $^{\circ}\text{C/W}$ |

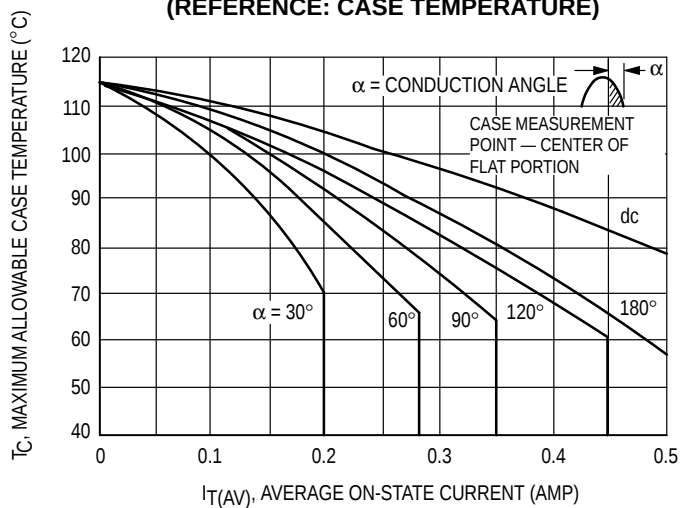
### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ , $R_{GK} = 1\text{ k}\Omega$ unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                        | Symbol             | Min           | Max             | Unit                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-----------------|--------------------------------|
| Peak Forward or Reverse Blocking Current<br>( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ )<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = 125^{\circ}\text{C}$                                                                                     | $I_{DRM}, I_{RRM}$ | —<br>—        | 10<br>100       | $\mu\text{A}$<br>$\mu\text{A}$ |
| Forward "On" Voltage <sup>(1)</sup><br>( $I_{TM} = 1\text{ A Peak @ } T_A = 25^{\circ}\text{C}$ )                                                                                                                                                     | $V_{TM}$           | —             | 1.7             | Volts                          |
| Gate Trigger Current (Continuous dc) <sup>(2)</sup><br>(Anode Voltage = 7 Vdc, $R_L = 100\text{ Ohms}$ )<br>$T_C = 25^{\circ}\text{C}$                                                                                                                | $I_{GT}$           | —             | 200             | $\mu\text{A}$                  |
| Gate Trigger Voltage (Continuous dc)<br>(Anode Voltage = 7 Vdc, $R_L = 100\text{ Ohms}$ )<br>(Anode Voltage = Rated $V_{DRM}$ , $R_L = 100\text{ Ohms}$ )<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$<br>$T_C = 125^{\circ}\text{C}$ | $V_{GT}$           | —<br>—<br>0.1 | 0.8<br>1.2<br>— | Volts                          |
| Holding Current<br>(Anode Voltage = 7 Vdc, initiating current = 20 mA)<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = -40^{\circ}\text{C}$                                                                                                                   | $I_H$              | —<br>—        | 5<br>10         | mA                             |

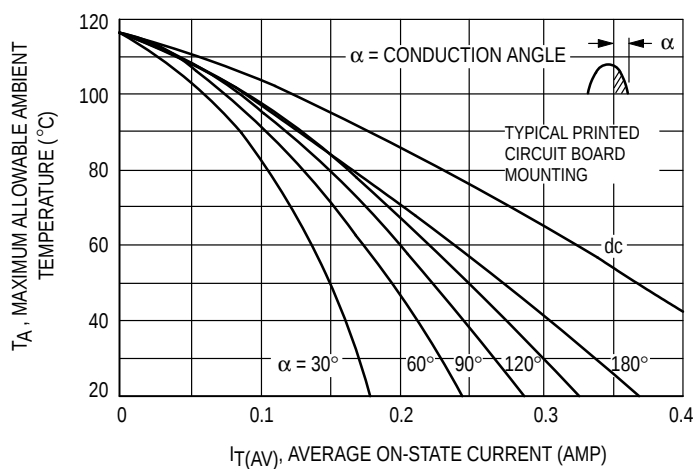
1. Forward current applied for 1 ms maximum duration, duty cycle  $\leq 1\%$ .

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

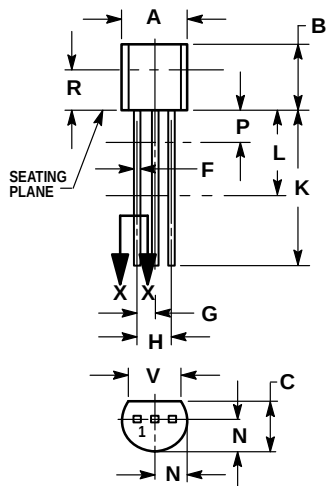
**FIGURE 1 – MCR100-7, MCR100-8 CURRENT DERATING  
(REFERENCE: CASE TEMPERATURE)**



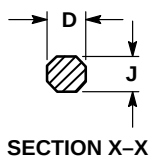
**FIGURE 2 – MCR100-7, MCR100-8 CURRENT DERATING  
(REFERENCE: AMBIENT TEMPERATURE)**



## PACKAGE DIMENSIONS



STYLE 10:  
 PIN 1. CATHODE  
 2. GATE  
 3. ANODE



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.45        | 5.20 |
| B   | 0.170  | 0.210 | 4.32        | 5.33 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.016  | 0.022 | 0.41        | 0.55 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.015  | 0.020 | 0.39        | 0.50 |
| K   | 0.500  | —     | 12.70       | —    |
| L   | 0.250  | —     | 6.35        | —    |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | —      | 0.100 | —           | 2.54 |
| R   | 0.115  | —     | 2.93        | —    |
| V   | 0.135  | —     | 3.43        | —    |

CASE 29-04  
 (TO-226AA)

## MCR100 Series

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 can and do vary in different applications. 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.

### Literature Distribution Centers:

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.

JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.



MCR100/D

