

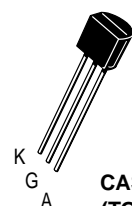
# Silicon Controlled Rectifiers

... designed and tested for repetitive peak operation required for CD ignition, fuel ignitors, flash circuits, motor controls and low-power switching applications.

- 150 Amperes for 2  $\mu$ s Safe Area
- High dv/dt
- Very Low Forward "On" Voltage at High Current
- Low-Cost TO-226AA (TO-92)

**MCR22-6**  
**MCR22-8**

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



**CASE 29-11**  
**(TO-226AA)**  
**STYLE 10**

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

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Blocking Voltage ( $R_{GK} = IK$ , $T_J = 25$ to $125^\circ\text{C}$ )	$V_{DRM}$ , $V_{RRM}$	400 600	Volts
On-State Current RMS (All Conduction Angles)	$I_T(\text{RMS})$	1.5	Amps
Peak Non-repetitive Surge Current, $T_A = 25^\circ\text{C}$ (1/2 Cycle, Sine Wave, 60 Hz)	$I_{TSM}$	15	Amps
Circuit Fusing Considerations ( $t = 8.3$ ms)	$I^2t$	0.9	$\text{A}^2\text{s}$
Peak Gate Power, $T_A = 25^\circ\text{C}$	$P_{GM}$	0.5	Watt
Average Gate Power, $T_A = 25^\circ\text{C}$	$P_{G(AV)}$	0.1	Watt
Peak Forward Gate Current, $T_A = 25^\circ\text{C}$ (300 $\mu$ s, 120 PPS)	$I_{FGM}$	0.2	Amp
Peak Reverse Gate Voltage	$V_{RGM}$	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 (Lead Length $\geq 1/16''$ 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.

## MCR22-6 MCR22-8

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	160	$^{\circ}\text{C/W}$

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ unless otherwise noted. $R_{GK} = 1000 \text{ Ohms.}$ )

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Forward or Reverse Blocking Current ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ ) $T_C = 25^{\circ}\text{C}$ $T_C = 125^{\circ}\text{C}$	$I_{DRM}, I_{RRM}$	— —	— —	10 200	$\mu\text{A}$ $\mu\text{A}$
Forward "On" Voltage ( $I_{TM} = 1 \text{ A Peak}$ )	$V_{TM}$	—	1.2	1.7	Volts
Gate Trigger Current (Continuous dc) <sup>(1)</sup> (Anode Voltage = 6 Vdc, $R_L = 100 \text{ Ohms}$ ) $T_C = 25^{\circ}\text{C}$ $T_C = -40^{\circ}\text{C}$	$I_{GT}$	— —	30 —	200 500	$\mu\text{A}$
Gate Trigger Voltage (Continuous dc) (Anode Voltage = 7 Vdc, $R_L = 100 \text{ Ohms}$ ) (Anode Voltage = Rated $V_{DRM}$ , $R_L = 100 \text{ Ohms}$ ) $T_C = 25^{\circ}\text{C}$ $T_C = -40^{\circ}\text{C}$ $T_C = 125^{\circ}\text{C}$	$V_{GT}$ $V_{GD}$	— 0.1	— —	0.8 1.2 —	Volts
Holding Current (Anode Voltage = 12 Vdc) $T_C = 25^{\circ}\text{C}$ $T_C = -40^{\circ}\text{C}$	$I_H$	— —	2 —	5 10	mA
Forward Voltage Application Rate ( $T_C = 125^{\circ}\text{C}$ )	$dv/dt$	—	25	—	$\text{V}/\mu\text{s}$

1.  $R_{GK}$  Current Not Included in Measurement.

### CURRENT DERATING

FIGURE 1 — MAXIMUM CASE TEMPERATURE

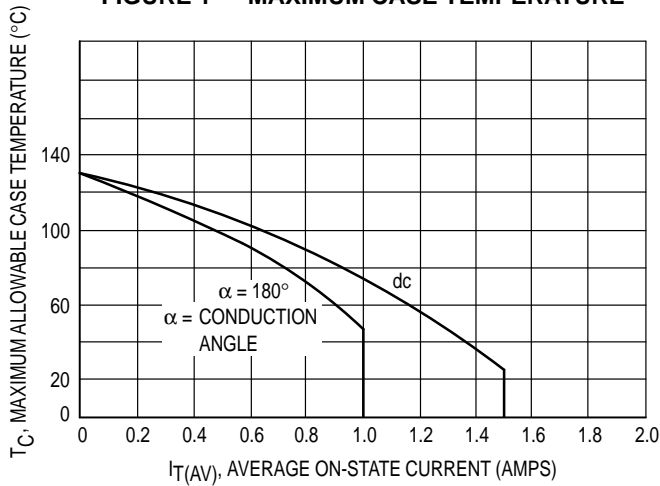


FIGURE 2 — MAXIMUM AMBIENT TEMPERATURE

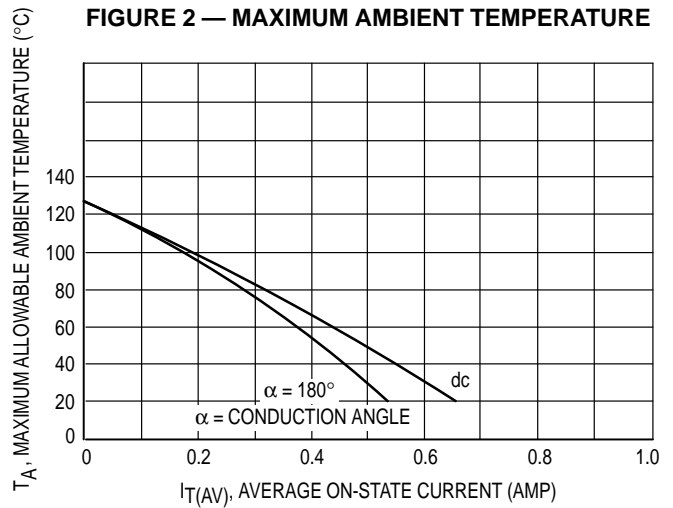


FIGURE 3 — TYPICAL FORWARD VOLTAGE

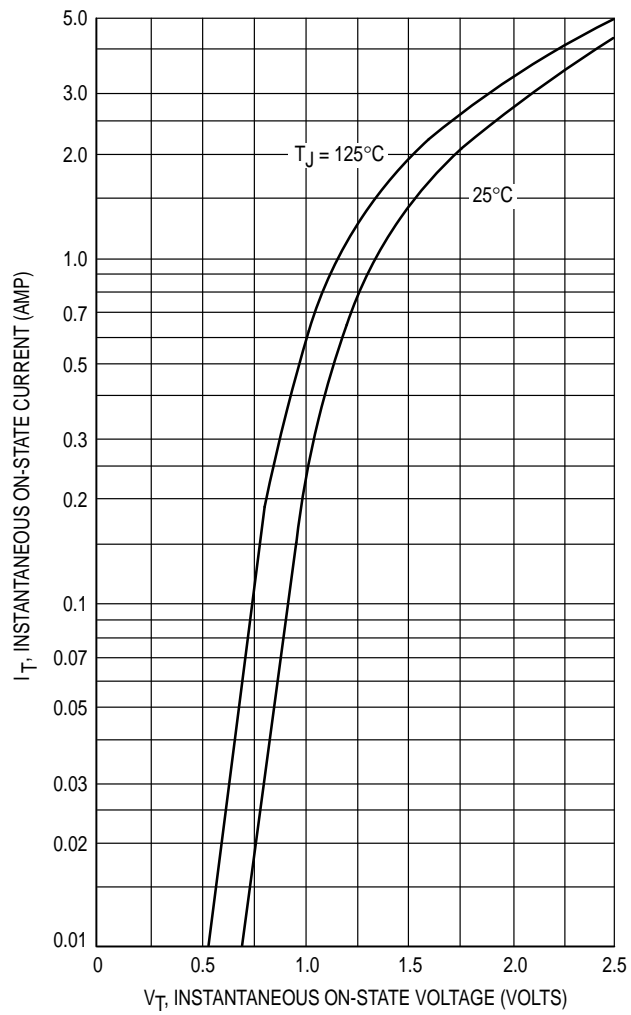
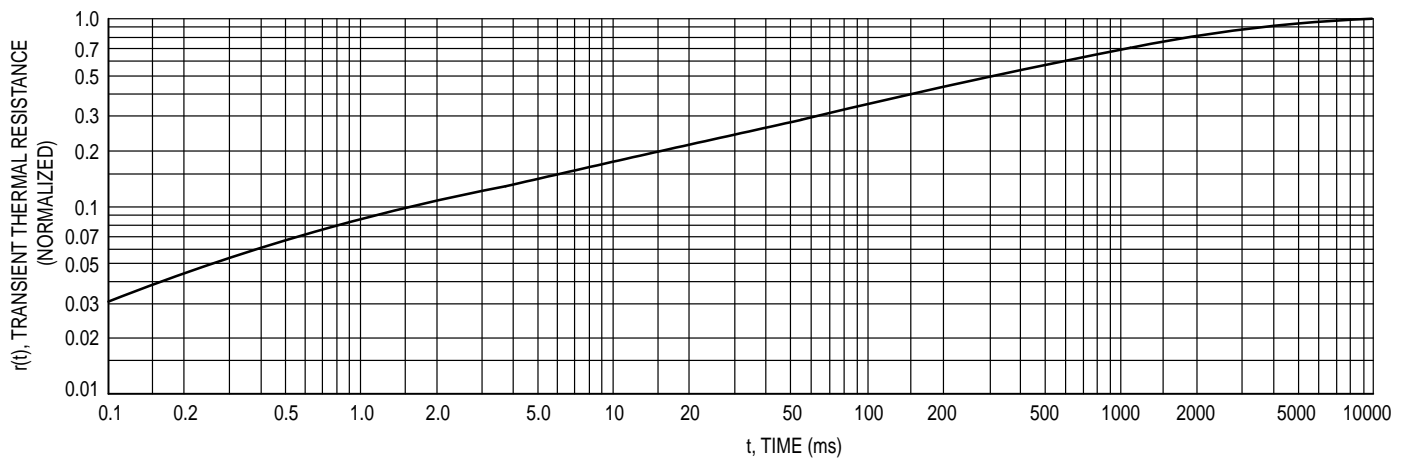


FIGURE 4 — THERMAL RESPONSE



## TYPICAL CHARACTERISTICS

FIGURE 5 — GATE TRIGGER VOLTAGE

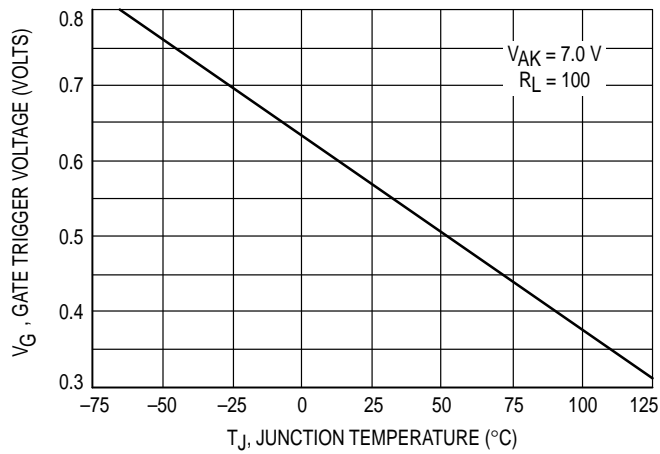


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

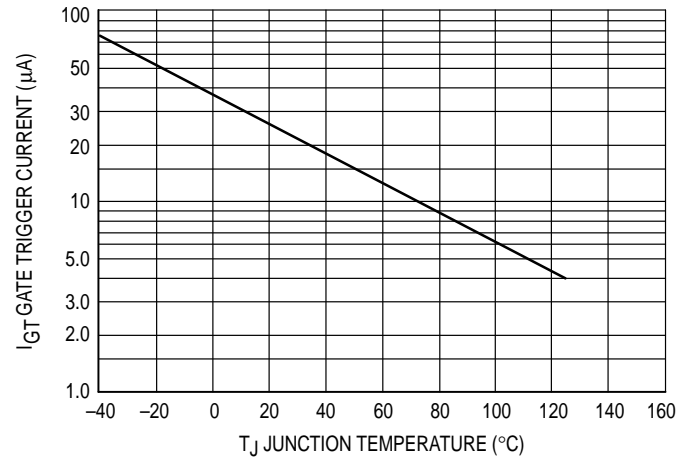


FIGURE 7 — HOLDING CURRENT

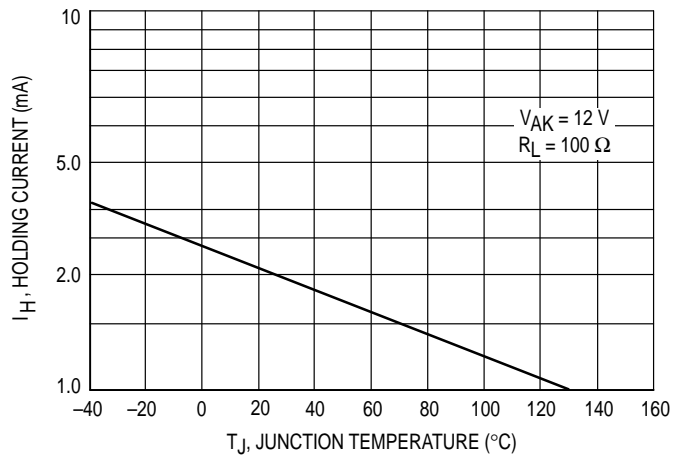
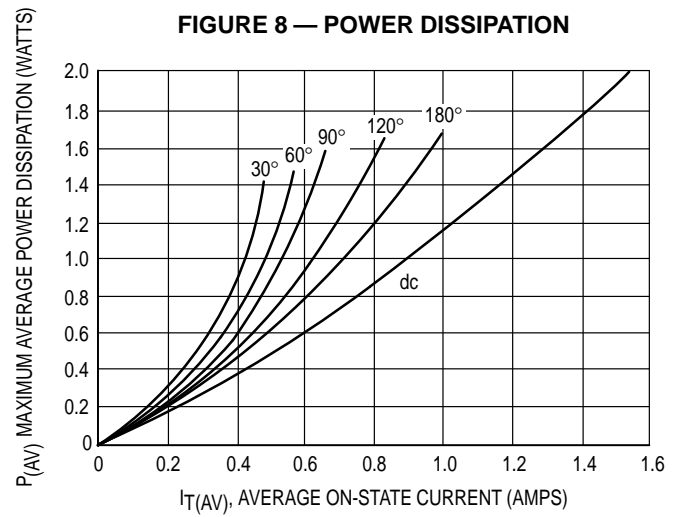
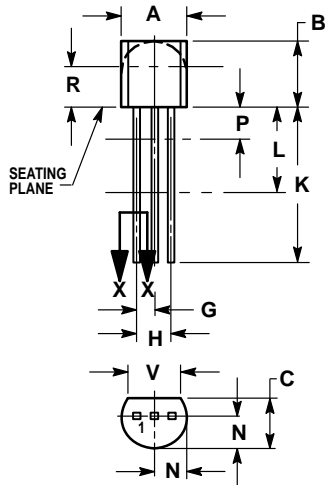


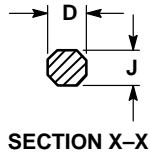
FIGURE 8 — POWER DISSIPATION



## 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. 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	0.021	0.407	0.533
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 29-11  
(TO-226AA)  
ISSUE AJ

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 which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. 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  registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

**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:** Nippon Motorola 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.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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

**MOTOROLA**