

# 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 <sup>(1)</sup> ( $T_J = -40$ to $110^\circ\text{C}$ , Sine Wave 50 to 60 Hz, Gate Open) MCR106-6 MCR106-8	$V_{DRM}$ , $V_{RRM}$	400 600	Volts
On-State RMS Current ( $T_C = 93^\circ\text{C}$ ) ( $180^\circ$ Conduction Angles)	$I_T(\text{RMS})$	4.0	Amps
Average On-State Current ( $180^\circ$ 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	$\text{A}^2\text{s}$
Forward Peak Gate Power ( $T_C = 93^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$P_{GM}$	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 $\leq 1.0$ $\mu\text{s}$ )	$I_{GM}$	0.2	Amp
Peak Reverse Gate Voltage ( $T_C = 93^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$V_{RGM}$	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 <sup>(2)</sup>	—	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.

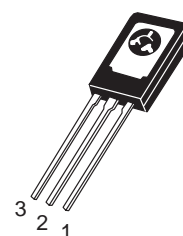
(2) Torque rating applies with use of compression washer (B52200-F006 or equivalent). Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Anode lead and heatsink contact pad are common. (See AN209B). For soldering purposes (either terminal connection or 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

### THEMAL CHARACTERISTICS

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### 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	$\mu A$
$T_J = 25^{\circ}C$		—	—	200	$\mu A$
$T_J = 110^{\circ}C$		—	—		

### ON CHARACTERISTICS

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

### DYNAMIC CHARACTERISTICS

Critical Rate–of–Rise of Off–State Voltage ( $T_J = 110^{\circ}C$ )	$dv/dt$	—	10	—	$V/\mu s$
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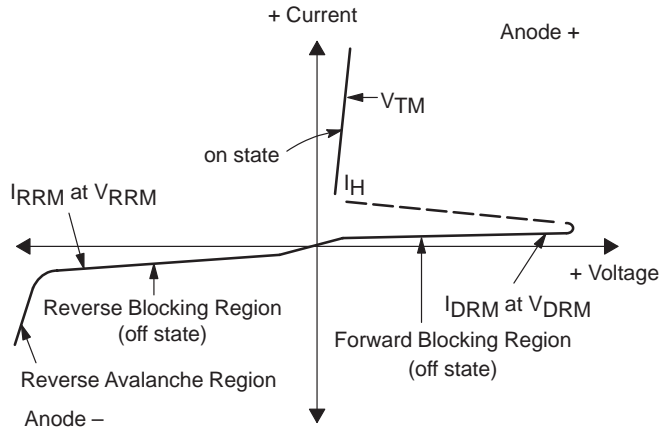
(1) Pulse Test: Pulse Width  $\leq 1.0 \text{ ms}$ , Duty Cycle  $\leq 1\%$ .

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

# MCR106-6, MCR106-8

## 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

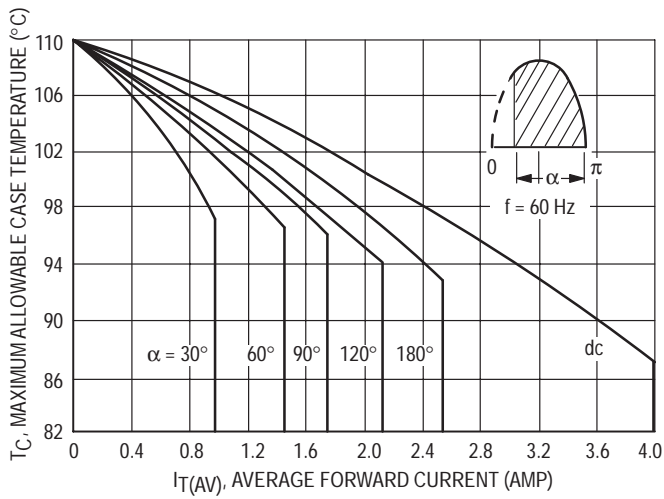


Figure 1. Maximum Case Temperature

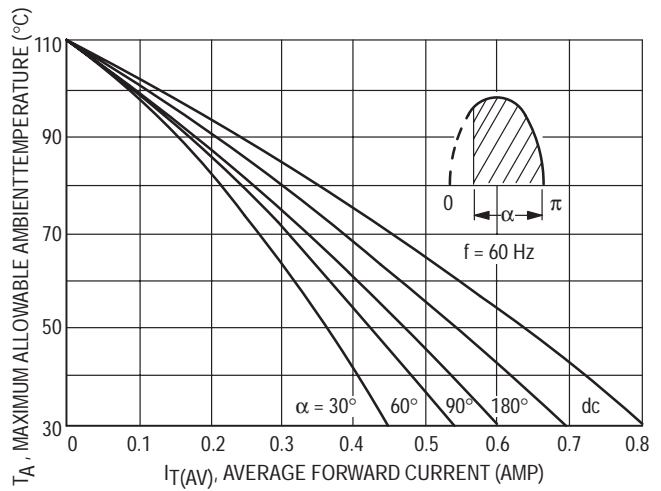
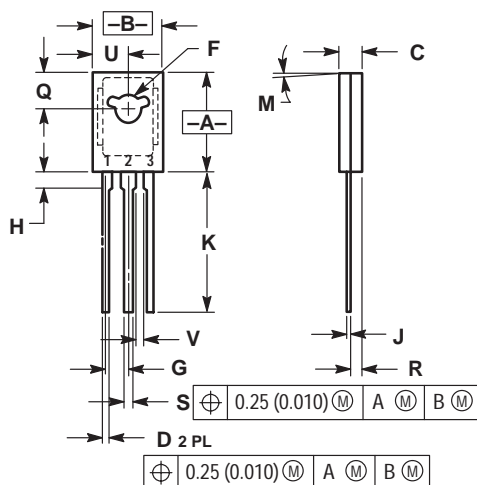


Figure 2. Maximum Ambient Temperature

# 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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