

# 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.

### Features

- 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
- Pb-Free Packages are Available\*

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) ( $T_J = -40$ to $110^\circ\text{C}$ , Sine Wave 50 to 60 Hz, $R_{GK} = 1\text{ k}\Omega$ ) MCR106-6 MCR106-8	$V_{DRM}$ , $V_{RRM}$	400 600	V
On-State RMS Current, ( $T_C = 93^\circ\text{C}$ ) ( $180^\circ$ Conduction Angles)	$I_{T(RMS)}$	4.0	A
Average On-State Current, ( $180^\circ$ Conduction Angles; $T_C = 93^\circ\text{C}$ )	$I_{T(AV)}$	2.55	A
Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, $T_J = 110^\circ\text{C}$ )	$I_{TSM}$	25	A
Circuit Fusing Considerations, ( $t = 8.3\text{ ms}$ )	$I^2t$	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	W
Forward Average Gate Power, ( $T_C = 93^\circ\text{C}$ , $t = 8.3\text{ ms}$ )	$P_{G(AV)}$	0.1	W
Forward Peak Gate Current, ( $T_C = 93^\circ\text{C}$ , Pulse Width $\leq 1.0\ \mu\text{s}$ )	$I_{GM}$	0.2	A
Peak Reverse Gate Voltage, ( $T_C = 93^\circ\text{C}$ , Pulse Width $\leq 1.0\ \mu\text{s}$ )	$V_{RGM}$	6.0	V
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 (Note 2)	-	6.0	in. lb.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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.

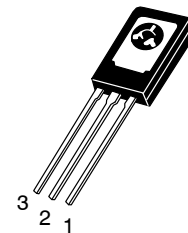
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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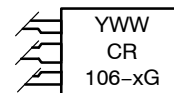
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SCRs  
4 AMPERES RMS  
400 thru 600 VOLTS



TO-225AA  
CASE 77  
STYLE 2

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
CR106-x = Device Code  
x = 6 or 8  
G = Pb-Free Package

### PIN ASSIGNMENT

1	Cathode
2	Anode
3	Gate

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}; R_{GK} = 1 \text{ k}\Omega$ )	$I_{DRM}, I_{RRM}$	-	-	10	$\mu\text{A}$
$T_J = 25^{\circ}\text{C}$		-	-	200	$\mu\text{A}$
$T_J = 110^{\circ}\text{C}$		-	-		

## ON CHARACTERISTICS

Peak Forward On-State Voltage (Note 3) ( $I_{TM} = 4 \text{ A Peak}$ )	$V_{TM}$	-	-	2.0	V
Gate Trigger Current (Continuous dc) (Note 4) ( $V_{AK} = 7 \text{ Vdc}, R_L = 100 \Omega$ ) ( $T_C = -40^{\circ}\text{C}$ )	$I_{GT}$	-	-	200	$\mu\text{A}$
		-	-	500	
Gate Trigger Voltage (Continuous dc) (Note 4) ( $V_{AK} = 7 \text{ Vdc}, R_L = 100 \Omega$ )	$V_{GT}$	-	-	1.0	V
Gate Non-Trigger Voltage (Note 4) ( $V_{AK} = 12 \text{ Vdc}, R_L = 100 \Omega, T_J = 110^{\circ}\text{C}$ )	$V_{GD}$	0.2	-	-	V
Holding Current ( $V_{AK} = 7 \text{ Vdc}, \text{Initiating Current} = 200 \text{ mA}, R_{GK} = 1 \text{ k}\Omega$ )	$I_H$	-	-	5.0	mA

## DYNAMIC CHARACTERISTICS

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

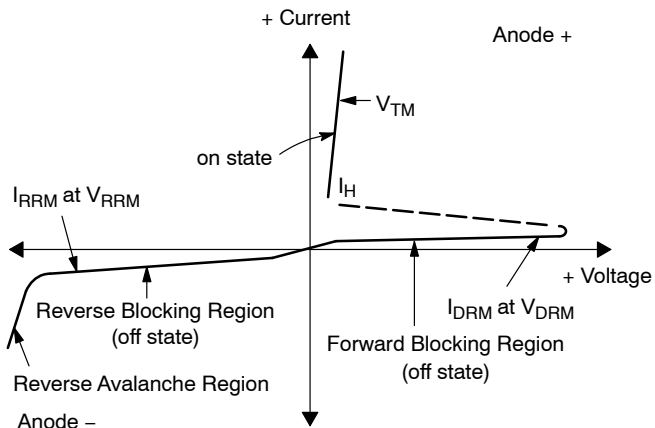
4.  $R_{GK}$  current is not included in measurement.

## ORDERING INFORMATION

Device	Package	Shipping
MCR106-6	TO-225AA	500 Units / Box
MCR106-6G	TO-225AA (Pb-Free)	500 Units / Box
MCR106-8	TO-225AA	500 Units / Box
MCR106-8G	TO-225AA (Pb-Free)	500 Units / Box

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

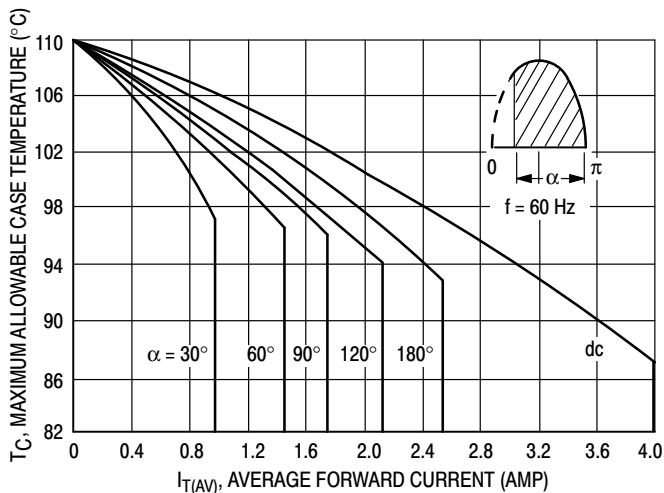


Figure 1. Maximum Case Temperature

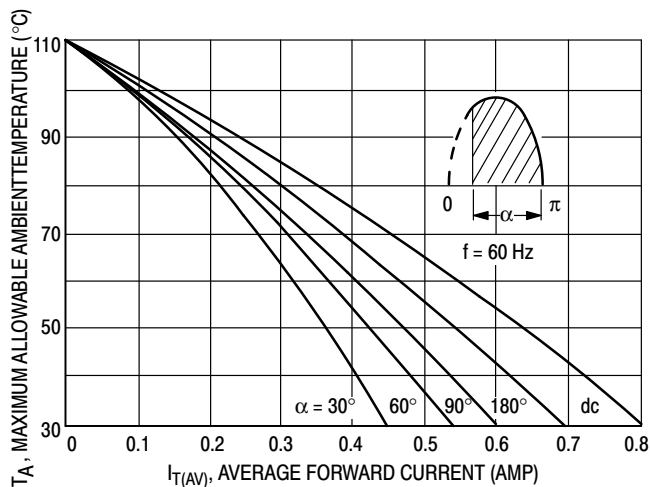
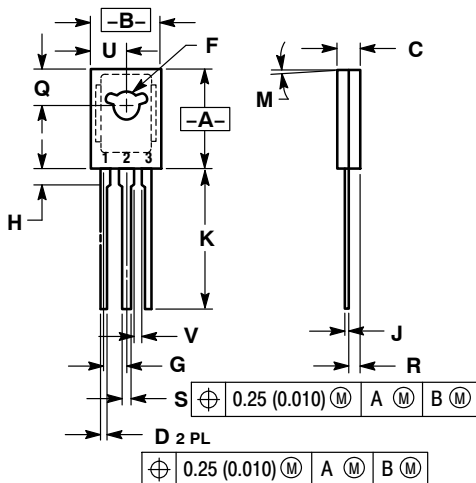


Figure 2. Maximum Ambient Temperature

# MCR106-6, MCR106-8

## PACKAGE DIMENSIONS

TO-225  
CASE 77-09  
ISSUE Z



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

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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