

# MCR72-3, MCR72-6, MCR72-8

Preferred Device

## Sensitive Gate Silicon Controlled Rectifiers

### Reverse Blocking Thyristors

Designed for industrial and consumer applications such as temperature, light and speed control; process and remote controls; warning systems; capacitive discharge circuits and MPU interface.

- Center Gate Geometry for Uniform Current Density
- All Diffused and Glass-Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Low Trigger Currents, 200  $\mu$ A Maximum for Direct Driving from Integrated Circuits
- Device Marking: Logo, Device Type, e.g., MCR72-3, 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) MCR72-3 MCR72-6 MCR72-8	$V_{DRM}$ , $V_{RRM}$	100 400 600	Volts
On-State RMS Current ( $180^\circ$ Conduction Angles; $T_C = 83^\circ\text{C}$ )	$I_T(\text{RMS})$	8.0	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, 60 Hz, $T_J = 110^\circ\text{C}$ )	$I_{TSM}$	100	Amps
Circuit Fusing Considerations ( $t = 8.3$ ms)	$I^2t$	40	$\text{A}^2\text{s}$
Forward Peak Gate Voltage ( $t \leq 10 \mu\text{s}$ , $T_C = 83^\circ\text{C}$ )	$V_{GM}$	$\pm 5.0$	Volts
Forward Peak Gate Current ( $t \leq 10 \mu\text{s}$ , $T_C = 83^\circ\text{C}$ )	$I_{GM}$	1.0	Amp
Forward Peak Gate Power ( $t \leq 10 \mu\text{s}$ , $T_C = 83^\circ\text{C}$ )	$P_{GM}$	5.0	Watts
Average Gate Power ( $t = 8.3$ ms, $T_C = 83^\circ\text{C}$ )	$P_{G(AV)}$	0.75	Watt
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	—	8.0	in. lb.

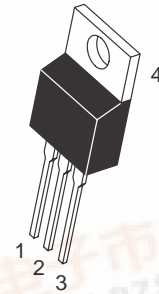
(1)  $V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



ON Semiconductor

<http://onsemi.com>

SCRs  
8 AMPERES RMS  
100 thru 600 VOLTS



TO-220AB  
CASE 221A  
STYLE 3

#### PIN ASSIGNMENT

Pin	Assignment
1	Cathode
2	Anode
3	Gate
4	Anode

#### ORDERING INFORMATION

Device	Package	Shipping
MCR72-3	TO220AB	500/Box
MCR72-6	TO220AB	500/Box
MCR72-8	TO220AB	500/Box

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



## MCR72-3, MCR72-6, MCR72-8

### THEMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
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 <sup>(1)</sup> ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}; R_{GK} = 1 \text{ k}\Omega$ )	$I_{DRM}, I_{RRM}$	$T_J = 25^{\circ}C$	—	—	10	$\mu A$
		$T_J = 110^{\circ}C$	—	—	500	$\mu A$

### ON CHARACTERISTICS

Peak Forward On-State Voltage ( $I_{TM} = 16 \text{ A Peak, Pulse Width} \leq 1 \text{ ms, Duty Cycle} \leq 2\%$ )	$V_{TM}$	—	1.7	2.0	Volts
Gate Trigger Current (Continuous dc) <sup>(2)</sup> ( $V_D = 12 \text{ V, } R_L = 100 \Omega$ )	$I_{GT}$	—	30	200	$\mu A$
Gate Trigger Voltage (Continuous dc) <sup>(2)</sup> ( $V_D = 12 \text{ V, } R_L = 100 \Omega$ )	$V_{GT}$	—	0.5	1.5	Volts
Gate Non-Trigger Voltage ( $V_D = 12 \text{ Vdc, } R_L = 100 \Omega, T_J = 110^{\circ}C$ )	$V_{GD}$	0.1	—	—	Volts
Holding Current ( $V_D = 12 \text{ V, Initiating Current} = 200 \text{ mA, Gate Open}$ )	$I_H$	—	—	6.0	mA
Gate Controlled Turn-On Time ( $V_D = \text{Rated } V_{DRM}, I_{TM} = 16 \text{ A, } I_G = 2 \text{ mA}$ )	$t_{gt}$	—	1.0	—	$\mu s$

### DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}, R_{GK} = 1 \text{ k}\Omega, T_J = 110^{\circ}C, \text{ Exponential Waveform}$ )	$dv/dt$	—	10	—	$V/\mu s$
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(1) Ratings apply for negative gate voltage or  $R_{GK} = 1 \text{ k}\Omega$ . Devices shall not have a positive gate voltage concurrently with a negative voltage on the anode. Devices should not be tested with a constant current source for forward and reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.

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

# MCR72-3, MCR72-6, MCR72-8

## 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

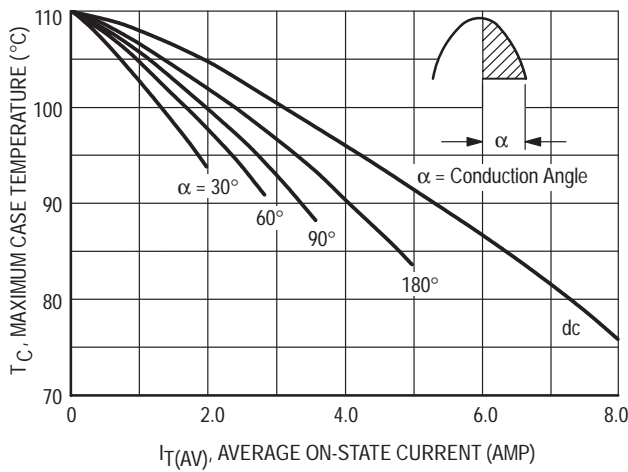
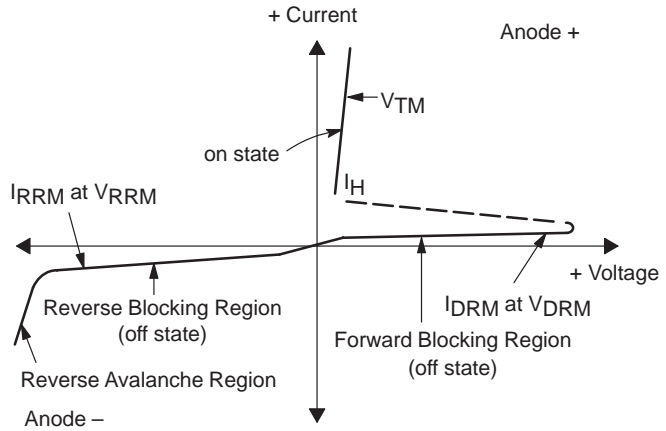


Figure 1. Average Current Derating

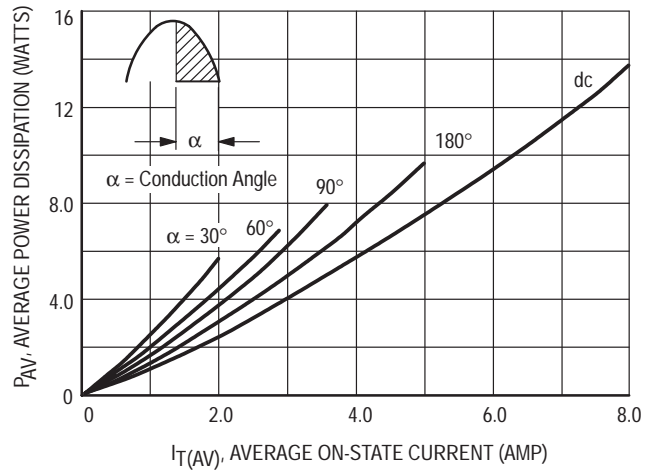


Figure 2. On-State Power Dissipation

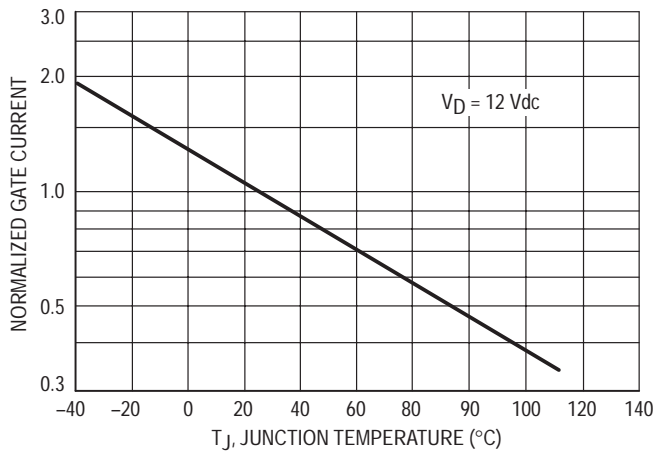


Figure 3. Normalized Gate Current

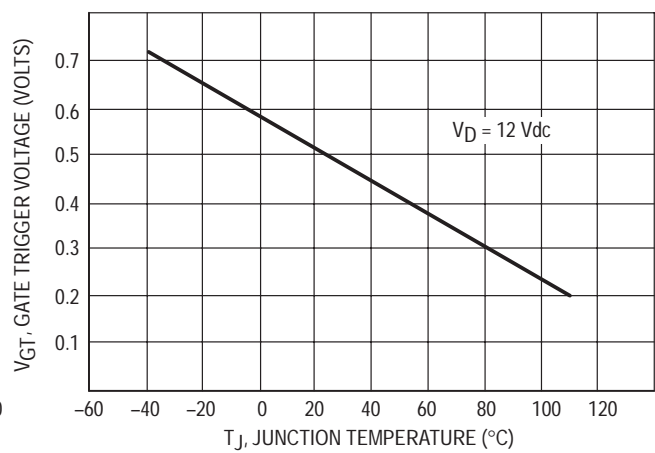
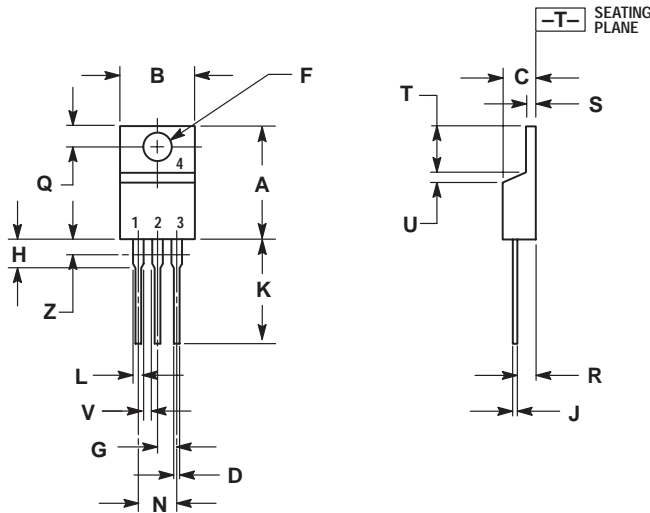


Figure 4. Gate Voltage

# MCR72-3, MCR72-6, MCR72-8

## PACKAGE DIMENSIONS

TO-220AB  
CASE 221A-07  
ISSUE Z




### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

### STYLE 3:

- PIN 1. CATHODE
- ANODE
- GATE
- ANODE

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