

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 μ 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 ⁽¹⁾ ($T_J = -40$ to 110°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° Conduction Angles; $T_C = 83^\circ\text{C}$)	$I_{\text{T(RMS)}}$	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	A^2s
Forward Peak Gate Voltage ($t \leq 10$ μs , $T_C = 83^\circ\text{C}$)	V_{GM}	± 5.0	Volts
Forward Peak Gate Current ($t \leq 10$ μs , $T_C = 83^\circ\text{C}$)	I_{GM}	1.0	Amp
Forward Peak Gate Power ($t \leq 10$ μs , $T_C = 83^\circ\text{C}$)	P_{GM}	5.0	Watts
Average Gate Power ($t = 8.3$ ms, $T_C = 83^\circ\text{C}$)	$P_{\text{G(AV)}}$	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.

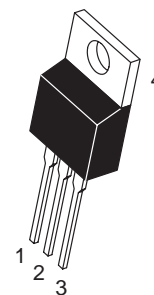
(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that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

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}\text{C/W}$
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 ⁽¹⁾ ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}; R_{GK} = 1 \text{ k}\Omega$) $T_J = 25^{\circ}\text{C}$ $T_J = 110^{\circ}\text{C}$	I_{DRM}, I_{RRM}	— —	— —	10 500	μA μA
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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) ⁽²⁾ ($V_D = 12 \text{ V, } R_L = 100 \Omega$)	I_{GT}	—	30	200	μA
Gate Trigger Voltage (Continuous dc) ⁽²⁾ ($V_D = 12 \text{ V, } R_L = 100 \Omega$)	V_{GT}	—	0.5	1.5	Volts
Gate Non-Trigger Voltage ($V_D = 12 \text{ Vdc, } R_L = 100 \Omega, T_J = 110^{\circ}\text{C}$)	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	—	μs

DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}, R_{GK} = 1 \text{ k}\Omega, T_J = 110^{\circ}\text{C, Exponential Waveform}$)	dv/dt	—	10	—	$\text{V}/\mu\text{s}$
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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.

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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

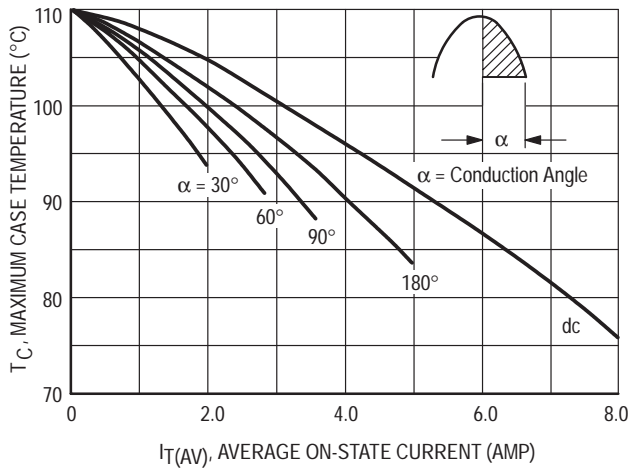
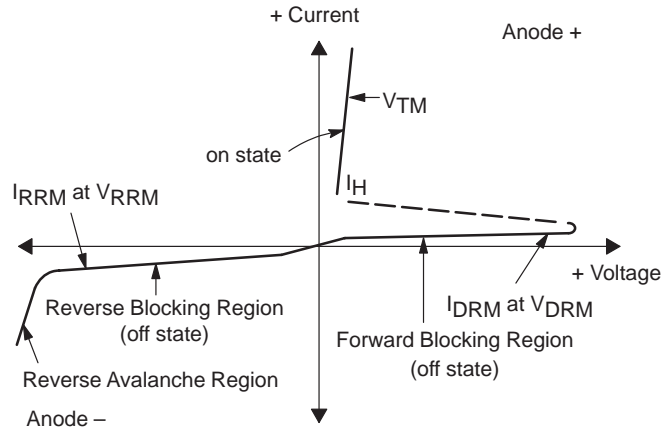


Figure 1. Average Current Derating

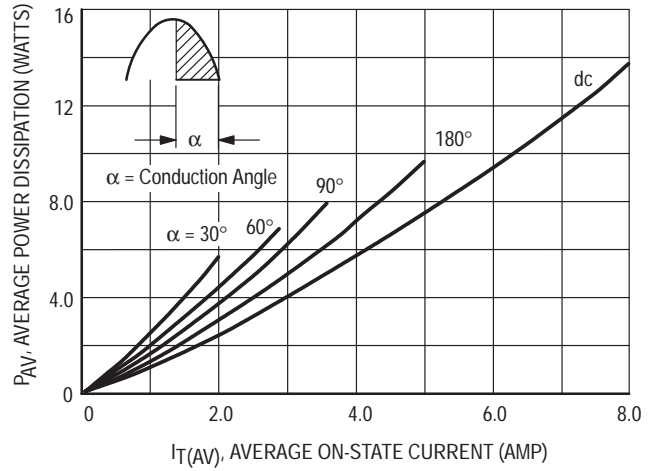


Figure 2. On-State Power Dissipation

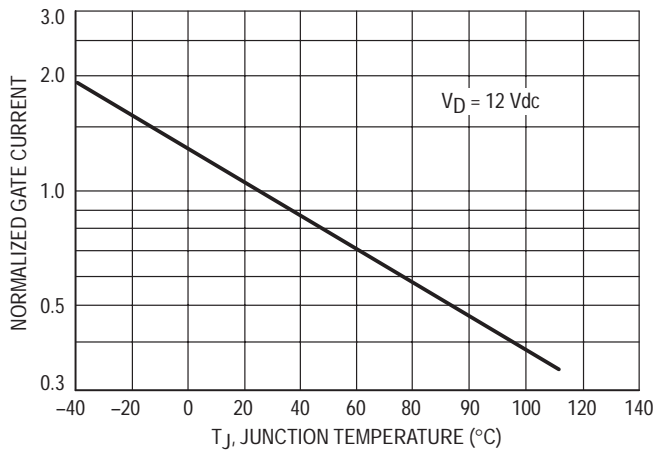


Figure 3. Normalized Gate Current

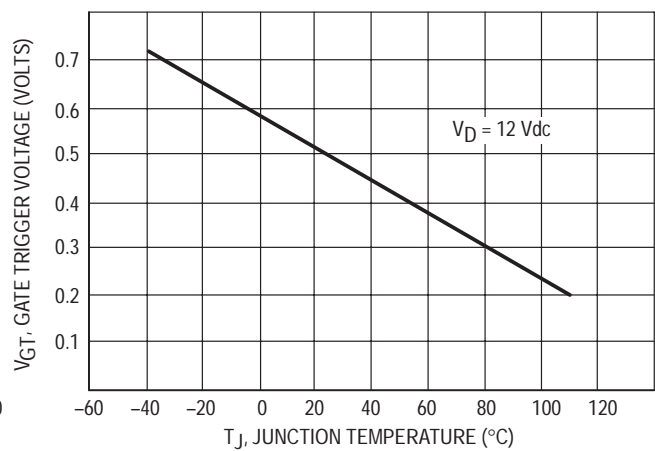
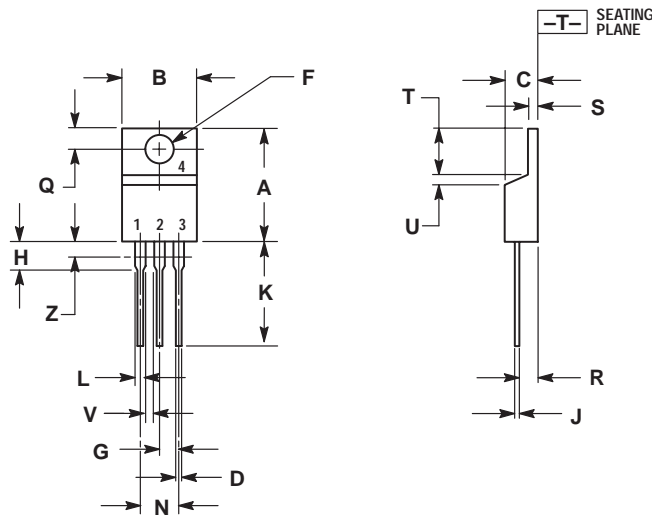


Figure 4. Gate Voltage

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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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