MCR72-3, MCR72-6, MCR72-8

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.

Features

- 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 μA Maximum for Direct Driving from Integrated Circuits
- These are Pb−Free Devices*

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage (Note 1) (T_J = −40 to 110°C, Sine Wave, 50 Hz to 60 Hz) MCR72−3 / MCR72−6 / MCR72−8	V_{DRM}, V_{RRM}	100 / 400 / 600	V
On-State RMS Current (180° Conduction Angles; T_C = 83°C)	$I_{T(RMS)}$	8.0	A
Peak Non-Repetitive Surge Current (1/2 Cycle, 60 Hz, T_J = 110°C)	I_{TSM}	100	A
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	40	A^2s
Forward Peak Gate Voltage (t ≤ 10 μs, T_C = 83°C)	V_{GM}	±5.0	V
Forward Peak Gate Current (t ≤ 10 μs, T_C = 83°C)	I_{GM}	1.0	A
Forward Peak Gate Power (t ≤ 10 μs, T_C = 83°C)	P_{GM}	5.0	W
Average Gate Power (t = 8.3 ms, T_C = 83°C)	$P_{G(AV)}$	0.75	W
Operating Junction Temperature Range	T_J	−40 to +110	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C
Mounting Torque	−	8.0	in. lb.

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

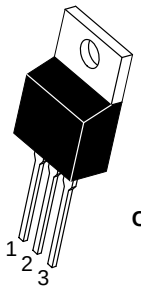
1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that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

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

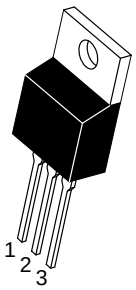
ON Semiconductor®

www.onsemi.com

SCRs
8 AMPERES RMS
100 thru 600 VOLTS



TO−220AB
CASE 221A−07
STYLE 3



TO−220AB
CASE 221A−09
STYLE 3

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

MARKING AND ORDERING INFORMATION

See detailed marking, ordering, and shipping information in the package dimensions section on page 4 of this data sheet.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	2.2	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	60	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Secs	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

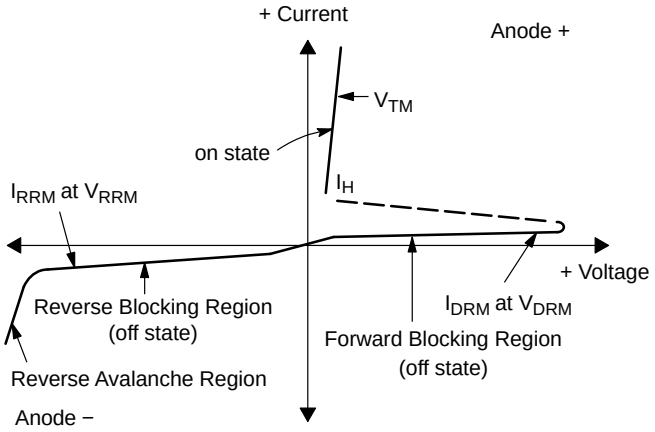
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (Note 2) (V_{AK} = Rated V_{DRM} or V_{RRM}; R_{GK} = 1 kΩ) T_J = 25°C T_J = 110°C	I_{DRM}, I_{RRM}	− −	− −	10 500	μA μA
High Logic Level Supply Current from V_{CC}	I_{CCH}	4	4	μA	μA
ON CHARACTERISTICS					
Peak Forward On-State Voltage (I_{TM} = 16 A Peak, Pulse Width ⩽ 1 ms, Duty Cycle ⩽ 2%)	V_{TM}	−	1.7	2.0	V
Gate Trigger Current (Continuous dc) (Note 3) (V_D = 12 V, R_L = 100 Ω)	I_{GT}	−	30	200	μA
Gate Trigger Voltage (Continuous dc) (Note 3) (V_D = 12 V, R_L = 100 Ω)	V_{GT}	−	0.5	1.5	V
Gate Non−Trigger Voltage (V_D = 12 Vdc, R_L = 100 Ω, T_J = 110°C)	V_{GD}	0.1	−	−	V
Holding Current (V_D = 12 V, Initiating Current = 200 mA, R_{GK} = 1 kΩ)	I_H	−	−	6.0	mA
Gate Controlled Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 16 A, I_G = 2 mA)	t_{gt}	−	1.0	−	μs
DYNAMIC CHARACTERISTICS					
Critical Rate-of-Rise of Off-State Voltage (V_D = Rated V_{DRM}, R_{GK} = 1 kΩ, T_J = 110°C, Exponential Waveform)	dv/dt	−	10	−	V/μs

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Ratings apply for negative gate voltage or R_{GK} = 1 kΩ. 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.
3. R_{GK} current not included in measurement.

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



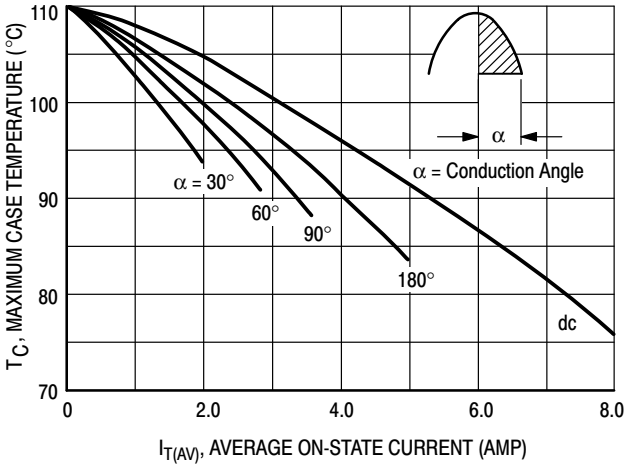


Figure 1. Average Current Derating

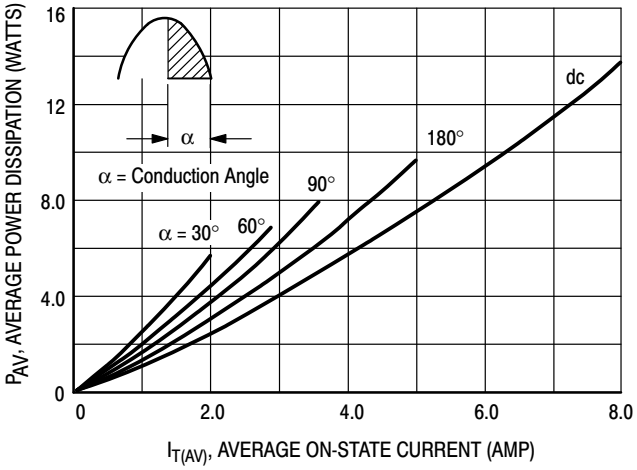


Figure 2. On−State Power Dissipation

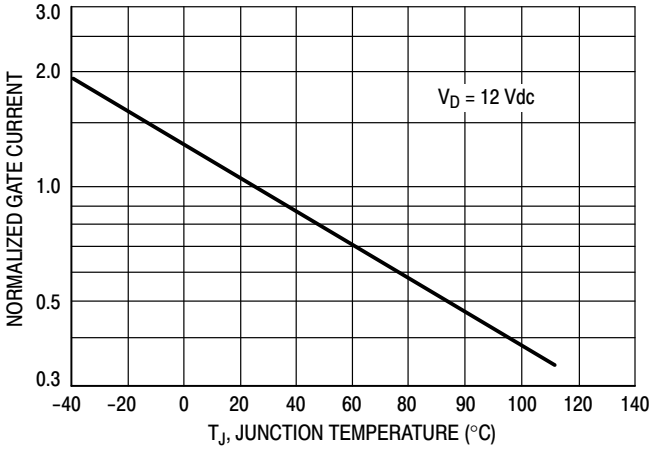


Figure 3. Normalized Gate Current

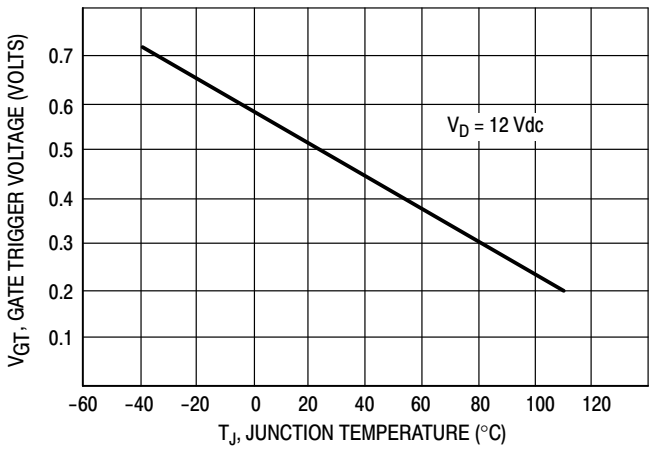
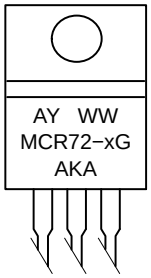


Figure 4. Gate Voltage

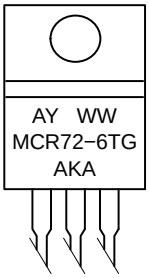
MARKING DIAGRAMS

TO−220AB
CASE 221A−07



A = Assembly Location
Y = Year
WW = Work Week
MCR72−x = Device Code
x = 3, 6, 8, or 8T
G = Pb−Free Package
AKA = Diode Polarity

TO−220AB
CASE 221A−09



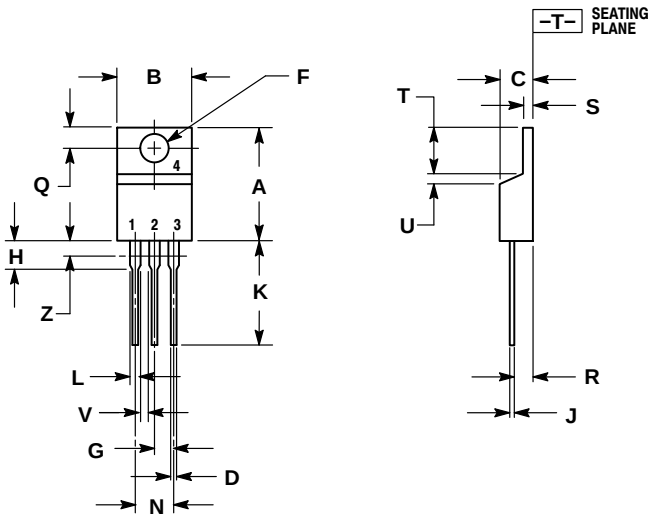
A = Assembly Location
Y = Year
WW = Work Week
MCR72−6T = Device Code
G = Pb−Free Package
AKA = Diode Polarity

ORDERING INFORMATION

Device	Package	Shipping
MCR72−3G	TO−220AB (Pb−Free)	500 Units / Box
MCR72−6G	TO−220AB (Pb−Free)	500 Units / Box
MCR72−6TG	TO−220AB (Pb−Free)	50 Units / Rail
MCR72−8G	TO−220AB (Pb−Free)	500 Units / Box
MCR72−8TG	TO−220AB (Pb−Free)	50 Units / Rail

PACKAGE DIMENSIONS

TO−220
CASE 221A−07
ISSUE O



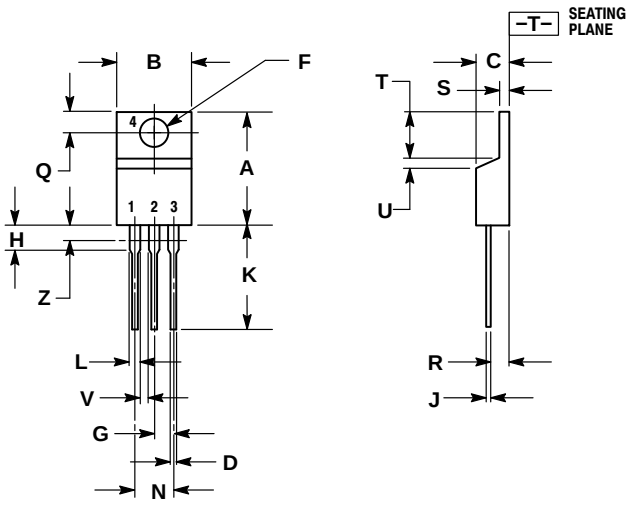
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	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
2. ANODE
3. GATE
4. ANODE

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AH



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.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
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
2. ANODE
3. GATE
4. ANODE

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

MCR72/D