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.

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
- Pb−Free Packages are Available*

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.

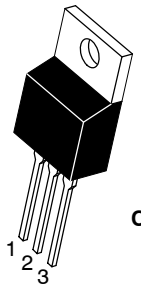
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

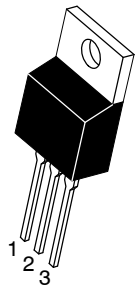
ON Semiconductor®

http://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 5 of this data sheet.

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

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.

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

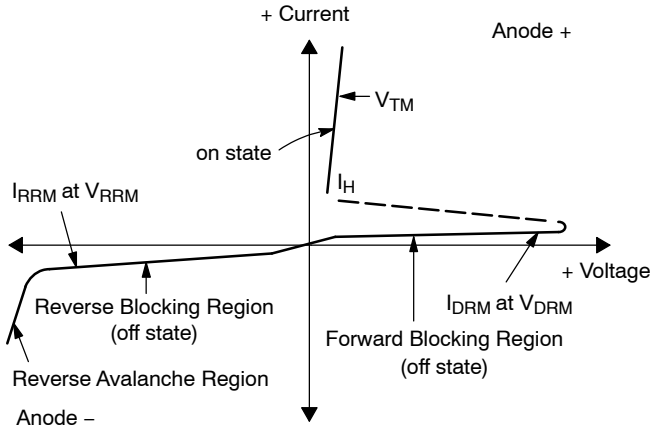
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

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

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



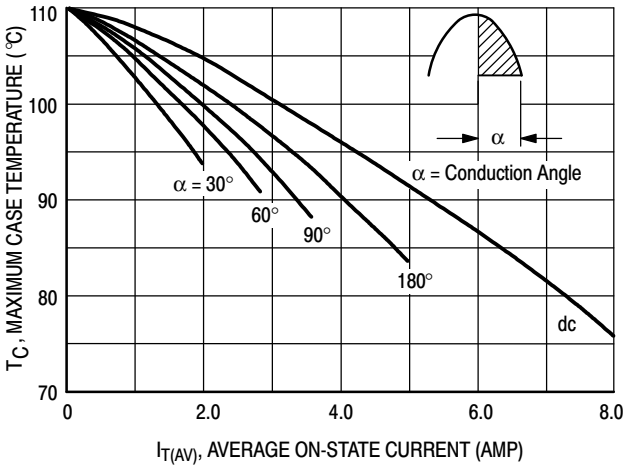


Figure 1. Average Current Derating

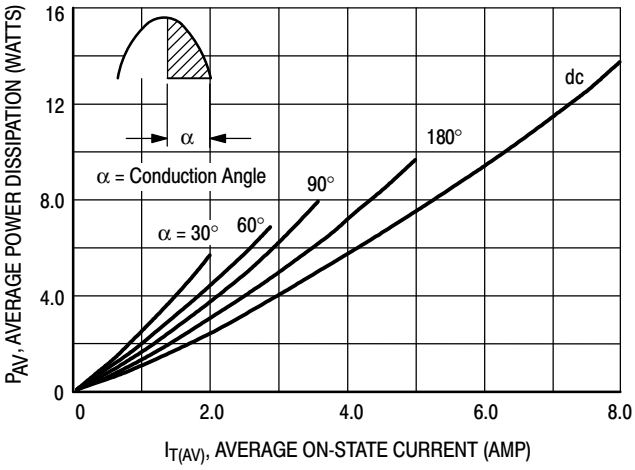


Figure 2. On−State Power Dissipation

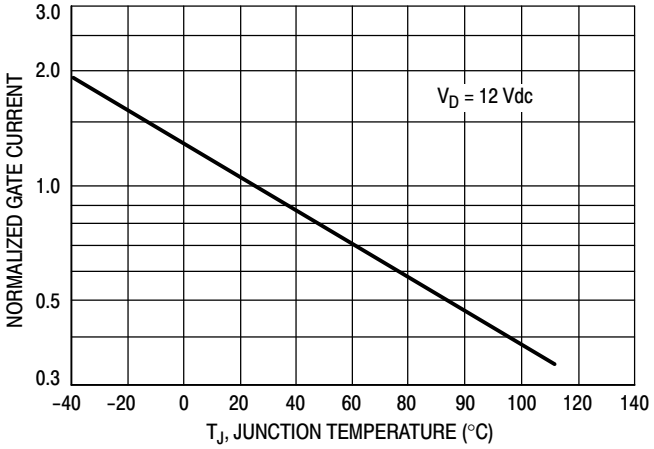


Figure 3. Normalized Gate Current

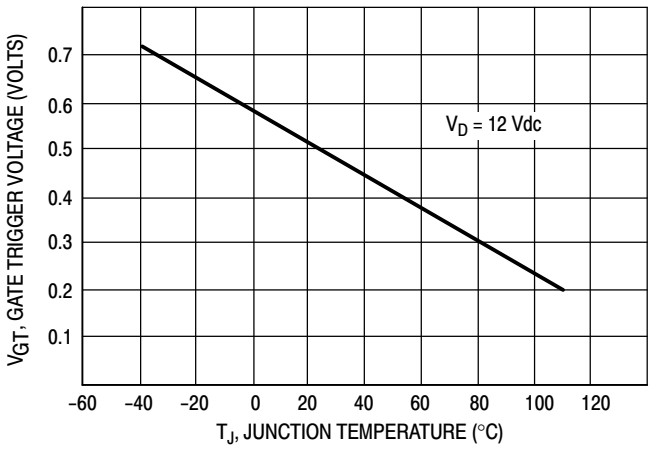
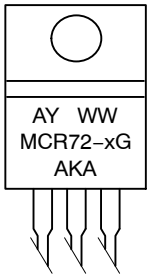


Figure 4. Gate Voltage

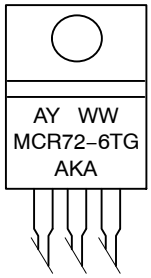
MARKING DIAGRAMS

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



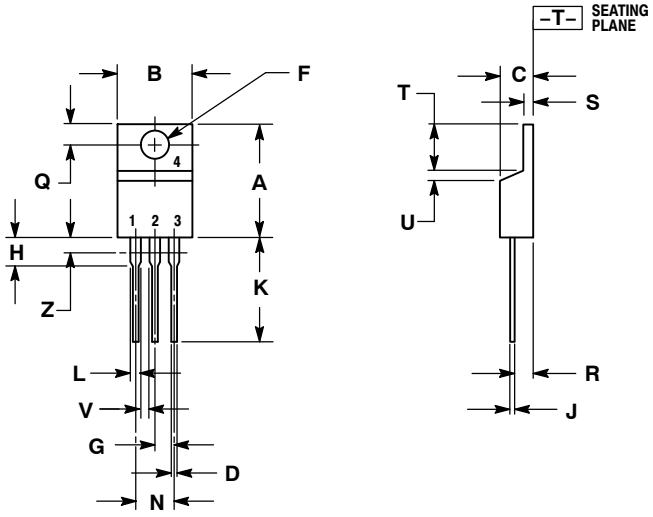
A = Assembly Location
Y = Year
WW = Work Week
MCR72−6T = Device Code
G = Pb−Free Package
AKA = Diode Polarity

ORDERING INFORMATION

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

PACKAGE DIMENSIONS

TO−220
CASE 221A−07
ISSUE O

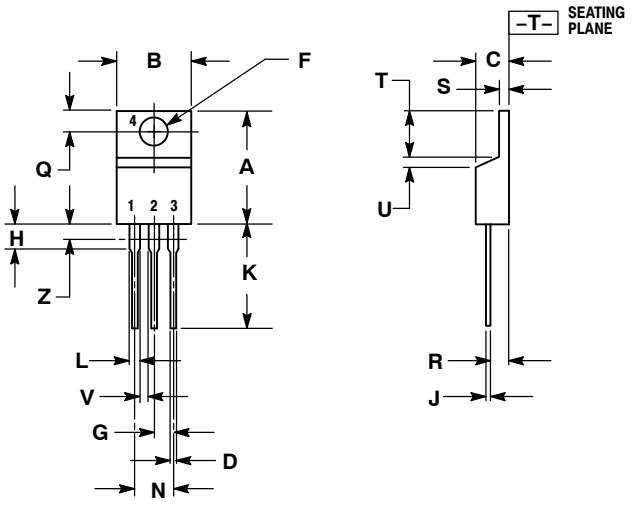


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	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

TO−220
CASE 221A−09
ISSUE AF



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Z	---	0.080	---	2.04

STYLE 3:
PIN 1. CATHODE
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3. GATE
4. ANODE

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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