

# MCR218-2G, MCR218-4G, MCR218-6G

## Silicon Controlled Rectifiers

### Reverse Blocking Thyristors

Designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supplies; or wherever half-wave silicon gate-controlled, solid-state devices are needed.

#### Features

- Glass-Passivated Junctions
- Blocking Voltage to 400 Volts
- TO-220 Construction – Low Thermal Resistance, High Heat Dissipation and Durability

**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 $125^\circ\text{C}$ , Gate Open)	$V_{\text{DRM}}$ , $V_{\text{RRM}}$	50 200 400	V
MCR218-2G			
MCR218-4G			
MCR218-6G			
On-State RMS Current ( $180^\circ$ Conduction Angles; $T_C = 70^\circ\text{C}$ )	$I_{\text{TRMS}}$	8.0	A
Peak Non-repetitive Surge Current ( $1/2$ Cycle, Sine Wave 60 Hz, $T_J = 125^\circ\text{C}$ )	$I_{\text{TSM}}$	100	A
Circuit Fusing Considerations ( $t = 8.3$ ms)	$I^2t$	26	$\text{A}^2\text{s}$
Forward Peak Gate Power (Pulse Width $\leq 1.0$ $\mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$P_{\text{GM}}$	5.0	W
Forward Average Gate Power ( $t = 8.3$ ms, $T_C = 70^\circ\text{C}$ )	$P_{\text{G(AV)}}$	0.5	W
Forward Peak Gate Current (Pulse Width $\leq 1.0$ $\mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$I_{\text{GM}}$	2.0	A
Operating Junction Temperature Range	$T_J$	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$

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.  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  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.



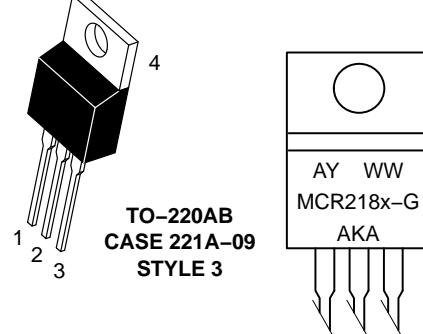
**ON Semiconductor®**

[www.onsemi.com](http://www.onsemi.com)

**SCRs**  
**8 AMPERES RMS**  
**50 thru 400 VOLTS**



#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
MCR218x = Device Code  
x = 2, 4 or 6  
G = Pb-Free Package  
AKA = Diode Polarity

#### ORDERING INFORMATION

Device	Package	Shipping
MCR218-2G	TO220AB (Pb-Free)	500 Units/Bulk
MCR218-4G	TO220AB (Pb-Free)	500 Units/Bulk
MCR218-6G	TO220AB (Pb-Free)	500 Units/Bulk

# MCR218-2G, MCR218-4G, MCR218-6G

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.0	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Peak Repetitive Forward or Reverse Blocking Current ( $V_{AK}$ = Rated $V_{DRM}$ or $V_{RRM}$ , Gate Open)	$I_{DRM}, I_{RRM}$	–	–	10	$\mu\text{A}$
$T_J = 25^\circ\text{C}$		–	–	2.0	mA
$T_J = 125^\circ\text{C}$					

## ON CHARACTERISTICS

Peak Forward On-State Voltage (Note 2) ( $I_{TM} = 16$ A Peak)	$V_{TM}$	–	1.5	1.8	V
Gate Trigger Current (Continuous dc) ( $V_D = 12$ V, $R_L = 100$ Ohms)	$I_{GT}$	–	10	25	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12$ V, $R_L = 100$ Ohms)	$V_{GT}$	–	–	1.5	V
Gate Non-Trigger Voltage (Rated 12 V, $R_L = 100$ Ohms, $T_J = 125^\circ\text{C}$ )	$V_{GD}$	0.2	–	–	V
Holding Current ( $V_D = 12$ Vdc, Initiating Current = 200 mA, Gate Open)	$I_H$	–	16	30	mA

## DYNAMIC CHARACTERISTICS

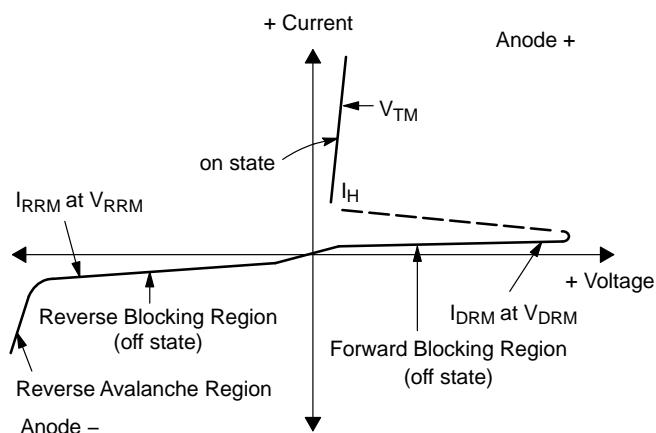
Critical Rate-of-Rise of Off-State Voltage ( $V_D$ = Rated $V_{DRM}$ , Exponential Waveform, Gate Open, $T_J = 125^\circ\text{C}$ )	$dv/dt$	–	100	–	V/ $\mu\text{s}$
--	---------	---	-----	---	------------------

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.

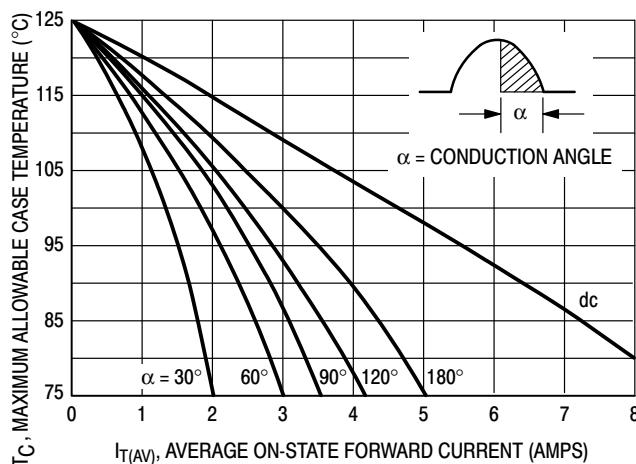
2. Pulse Test: Pulse Width = 1.0 ms, Duty Cycle  $\leq 2\%$ .

## Voltage Current Characteristic of SCR

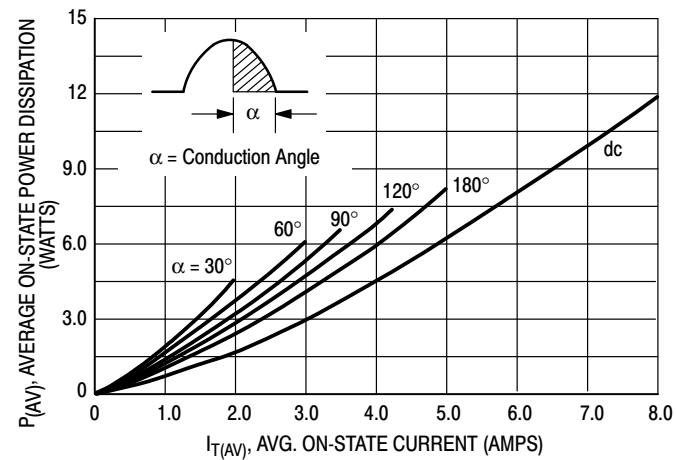
Symbol	Parameter
$V_{DRM}$	Peak Repetitive Off State Forward Voltage
$I_{DRM}$	Peak Forward Blocking Current
$V_{RRM}$	Peak Repetitive Off State Reverse Voltage
$I_{RRM}$	Peak Reverse Blocking Current
$V_{TM}$	Peak On State Voltage
$I_H$	Holding Current



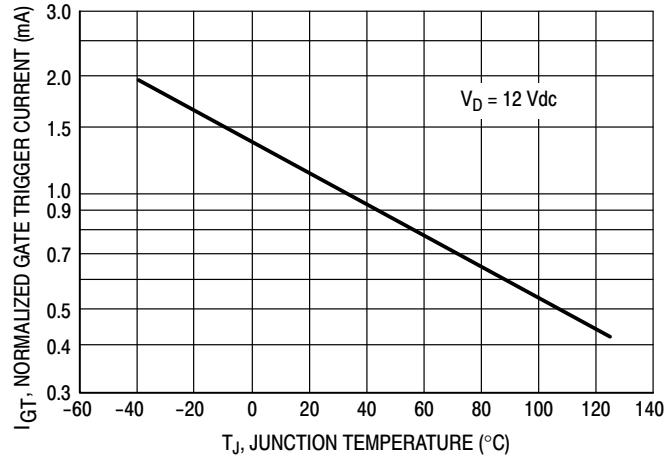
## MCR218-2G, MCR218-4G, MCR218-6G



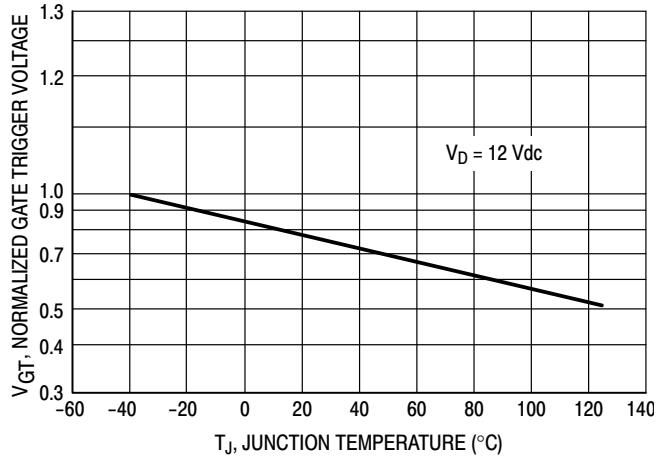
**Figure 1. Current Derating**



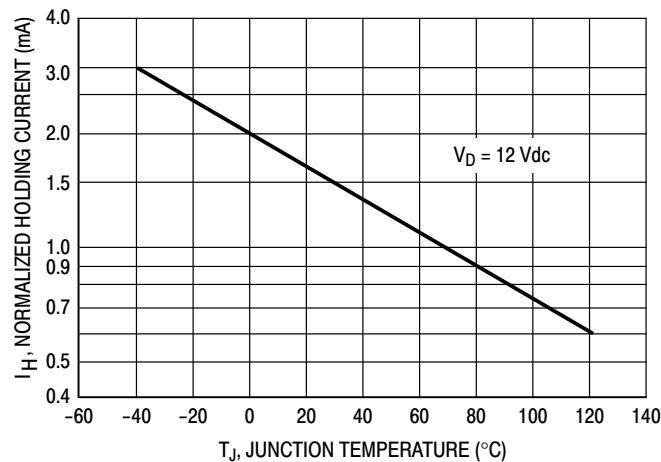
**Figure 2. On-State Power Dissipation**



**Figure 3. Typical Gate Trigger Current versus Temperature**



**Figure 4. Typical Gate Trigger Voltage versus Temperature**

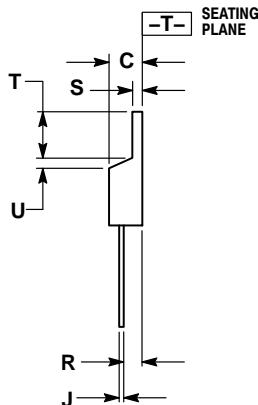
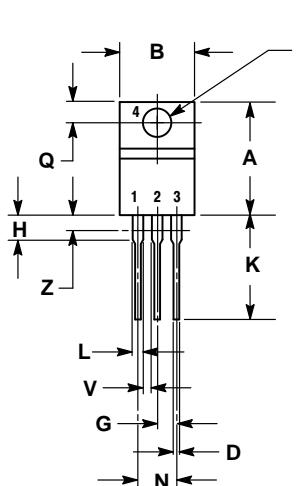


**Figure 5. Typical Holding Current versus Temperature**

# MCR218-2G, MCR218-4G, MCR218-6G

## 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.

DIM	INCHES		MILLIMETERS	
	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

ON Semiconductor and the  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## 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](mailto: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](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
 Sales Representative