MCR218-2, MCR218-4, MCR218-6

Preferred Device

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, 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®

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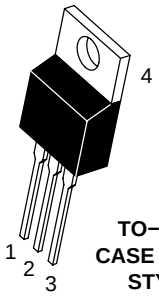
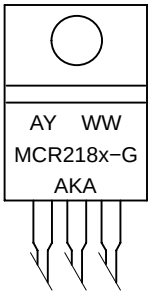
SCRs
8 AMPERES RMS
50 thru 400 VOLTS

MARKING DIAGRAM



TO−220AB
CASE 221A−07
STYLE 3



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
MCR218−2	TO220AB	500 Units/Bulk
MCR218−2G	TO220AB (Pb−Free)	500 Units/Bulk
MCR218−4	TO220AB	500 Units/Bulk
MCR218−4G	TO220AB (Pb−Free)	500 Units/Bulk
MCR218−6	TO220AB	500 Units/Bulk
MCR218−6G	TO220AB (Pb−Free)	500 Units/Bulk

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

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

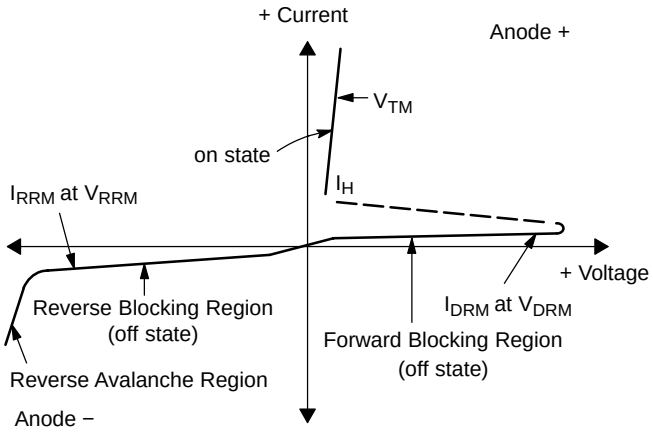
ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, Gate Open) T_J = 25°C	I_{DRM}, I_{RRM}	−	−	10	μA
T_J = 125°C		−	−	2.0	mA
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°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°C)	dv/dt	−	100	−	V/μs

2. Pulse Test: Pulse Width = 1.0 ms, Duty Cycle ≤ 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



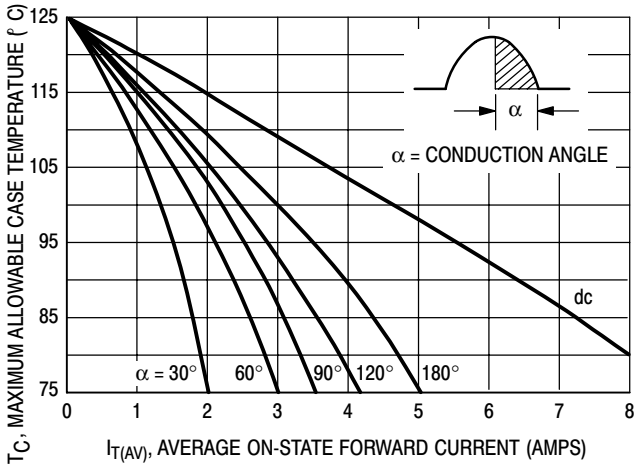


Figure 1. Current Derating

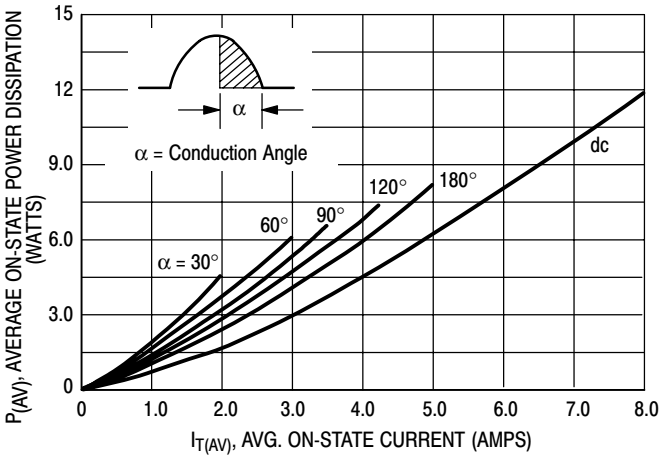


Figure 2. On−State Power Dissipation

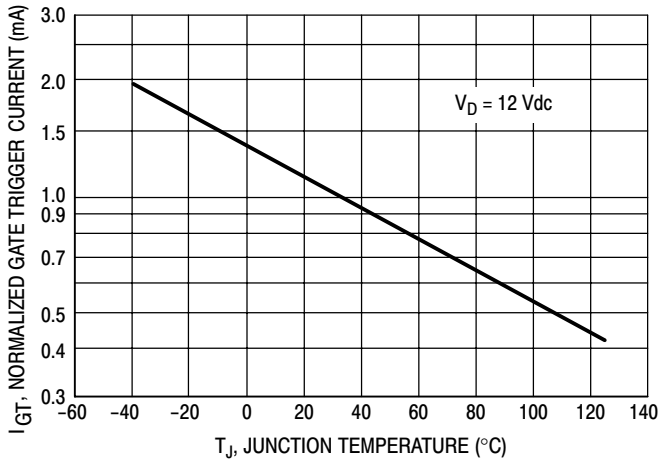


Figure 3. Typical Gate Trigger Current versus Temperature

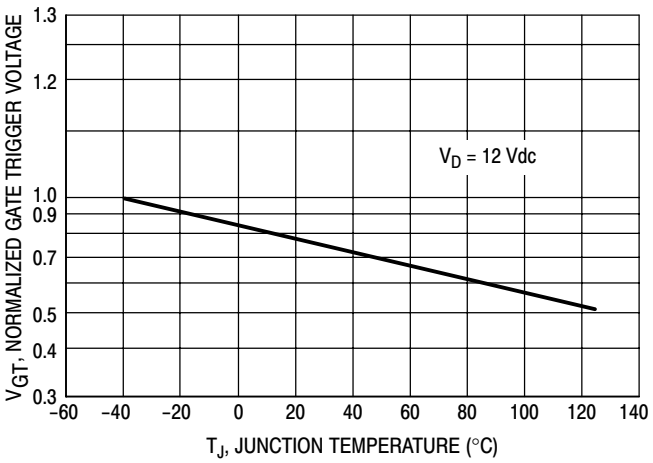


Figure 4. Typical Gate Trigger Voltage versus Temperature

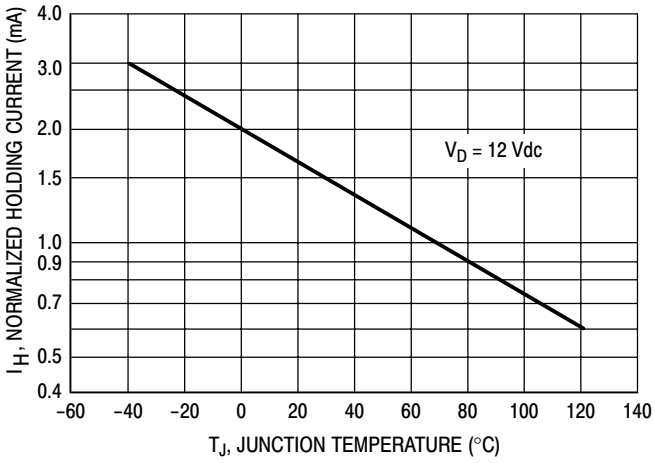
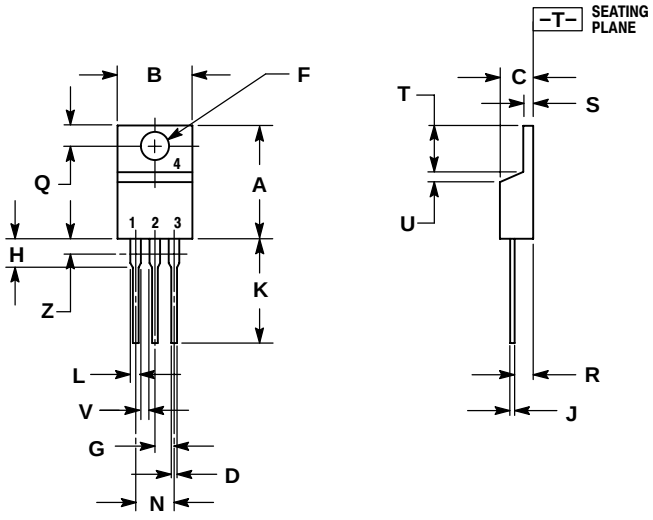


Figure 5. Typical Holding Current versus Temperature

PACKAGE DIMENSIONS

TO−220AB
CASE 221A−07
ISSUE AA



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

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MCR218/D