

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°C , Gate Open) MCR218-2G MCR218-4G MCR218-6G | V_{DRM} , V_{RRM} | 50 200 400 | V |
| On-State RMS Current (180° Conduction Angles; $T_C = 70^\circ\text{C}$) | $I_{\text{T(RMS)}}$ | 8.0 | A |
| Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, $T_J = 125^\circ\text{C}$) | 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 , $T_C = 70^\circ\text{C}$) | P_{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 ≤ 1.0 μs , $T_C = 70^\circ\text{C}$) | I_{GM} | 2.0 | A |
| Operating Junction Temperature Range | T_J | -40 to $+125$ | $^\circ\text{C}$ |
| Storage Temperature Range | T_{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_{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.



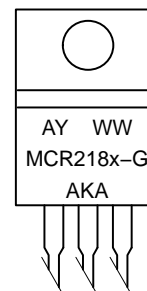
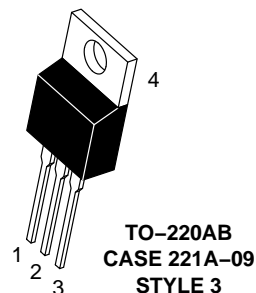
ON Semiconductor®

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SCRs
8 AMPERES RMS
50 thru 400 VOLTS



MARKING DIAGRAM



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 |

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THERMAL CHARACTERISTICS

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

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|--------------------|--------|--------|-----------|------------------------------|
| Peak Repetitive Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, Gate Open) $T_J = 25^{\circ}\text{C}$ $T_J = 125^{\circ}\text{C}$ | I_{DRM}, I_{RRM} | – – | – – | 10 2.0 | μA mA |
|---|--------------------|--------|--------|-----------|------------------------------|

ON CHARACTERISTICS

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

DYNAMIC CHARACTERISTICS

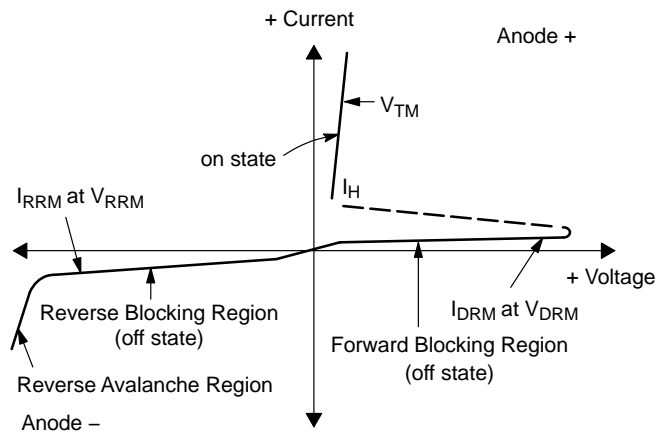
| | | | | | |
|--|---------|---|-----|---|------------------------|
| Critical Rate-of-Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Waveform, Gate Open, $T_J = 125^{\circ}\text{C}$) | dv/dt | – | 100 | – | $\text{V}/\mu\text{s}$ |
|--|---------|---|-----|---|------------------------|

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 |



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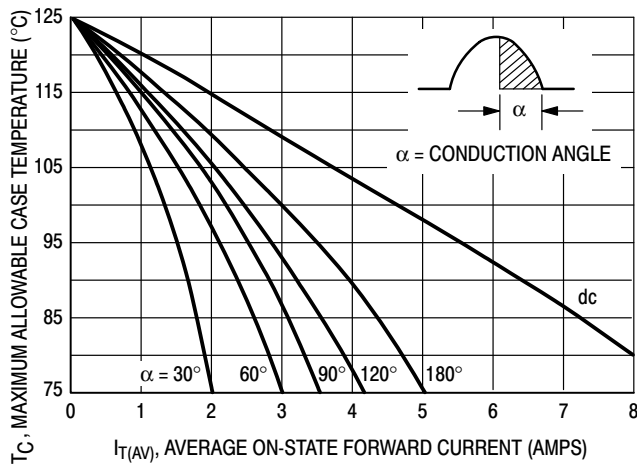


Figure 1. Current Derating

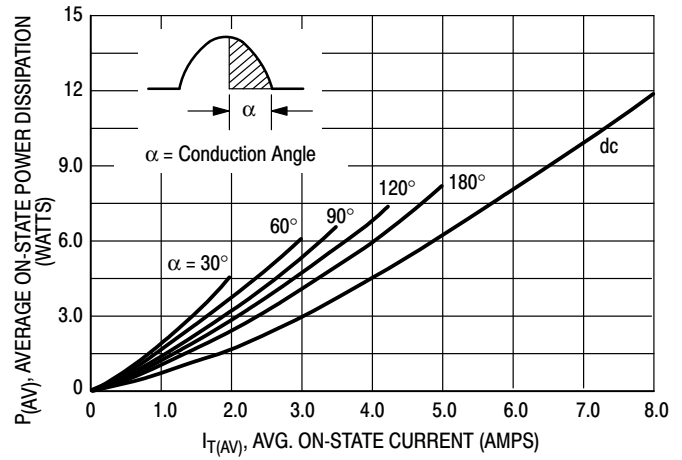


Figure 2. On-State Power Dissipation

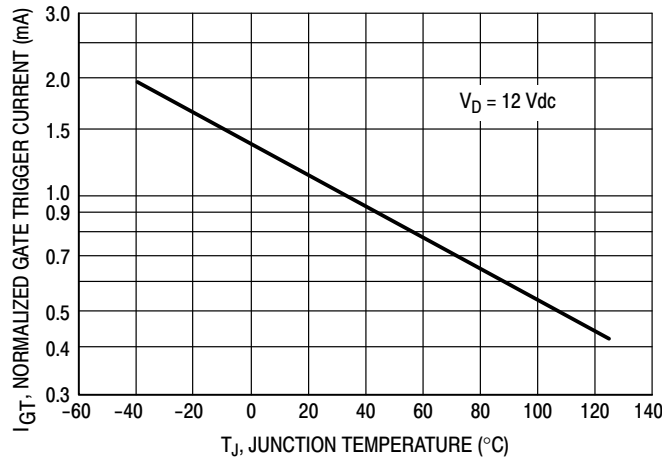


Figure 3. Typical Gate Trigger Current versus Temperature

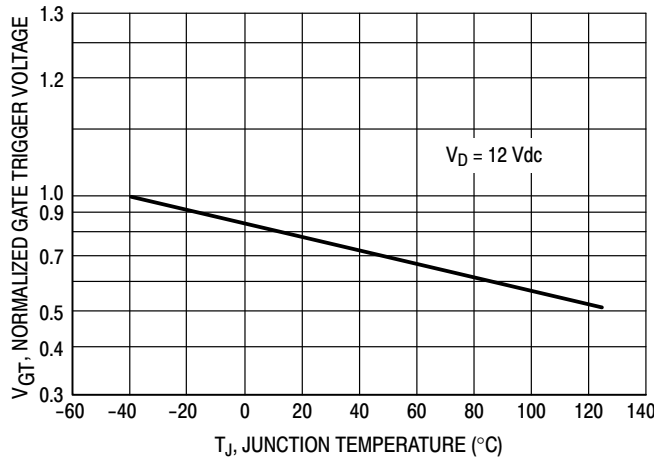


Figure 4. Typical Gate Trigger Voltage versus Temperature

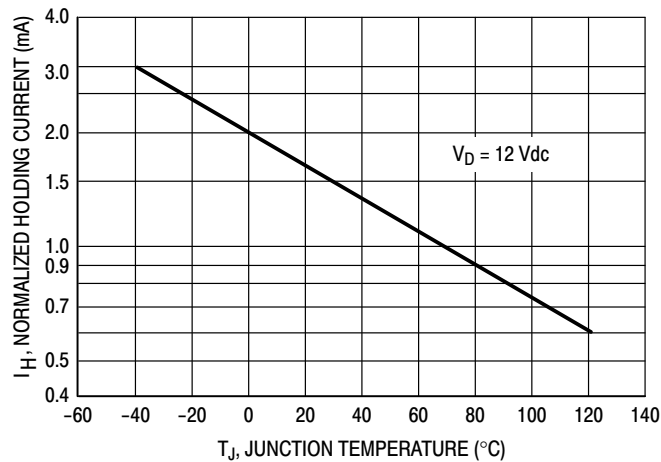
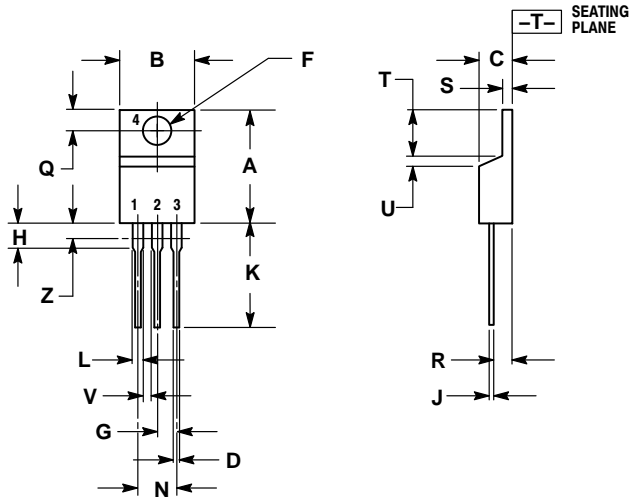


Figure 5. Typical Holding Current versus Temperature

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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

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