

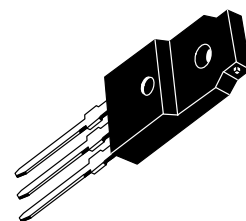
## MCR225FP Series

### Silicon Controlled Rectifiers Reverse Blocking Thyristors

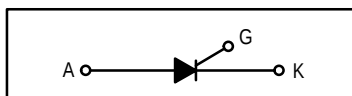
... designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supply crowbar circuits.

- Glass Passivated Junctions with Center Gate Fire for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Constructed for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 Volts
- 300 A Surge Current Capability
- Insulated Package Simplifies Mounting

**ISOLATED SCRs**  
**25 AMPERES RMS**  
**50 thru 800 VOLTS**



**CASE 221C-02  
STYLE 2**



**MAXIMUM RATINGS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted.)

| Rating                                                                                                                          | Symbol                 | Value                          | Unit                 |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------|----------------------|
| Peak Repetitive Forward and Reverse Blocking Voltage <sup>(1)</sup><br>( $T_J = -40$ to $+125^\circ\text{C}$ , Gate Open)       | $V_{DRM}$<br>$V_{RRM}$ | 50<br>200<br>400<br>600<br>800 | Volts                |
| On-State RMS Current ( $T_C = +70^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz <sup>(2)</sup>                              | $I_T(\text{RMS})$      | 25                             | Amps                 |
| Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +70^\circ\text{C}$ )<br>Preceded and followed by rated current | $I_{TSM}$              | 300                            | Amps                 |
| Circuit Fusing ( $t = 8.3$ ms)                                                                                                  | $I^2t$                 | 375                            | $\text{A}^2\text{s}$ |
| Peak Gate Power ( $T_C = +70^\circ\text{C}$ , Pulse Width = 10 $\mu\text{s}$ )                                                  | $P_{GM}$               | 20                             | Watts                |
| Average Gate Power ( $T_C = +70^\circ\text{C}$ , $t = 8.3$ ms)                                                                  | $P_{G(AV)}$            | 0.5                            | Watt                 |
| Peak Gate Current ( $T_C = +70^\circ\text{C}$ , Pulse Width = 10 $\mu\text{s}$ )                                                | $I_{GM}$               | 2                              | Amps                 |
| RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ )                                              | $V_{(ISO)}$            | 1500                           | Volts                |
| Operating Junction Temperature Range                                                                                            | $T_J$                  | $-40$ to $+125$                | $^\circ\text{C}$     |
| Storage Temperature Range                                                                                                       | $T_{stg}$              | $-40$ to $+125$                | $^\circ\text{C}$     |

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.
2. The case temperature reference point for all  $T_C$  measurements is a point on the center lead of the package as close as possible to the plastic body.

## MCR225FP Series

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max       | Unit                        |
|-----------------------------------------|-----------------|-----------|-----------------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 1.5       | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Case to Sink        | $R_{\theta CS}$ | 2.2 (typ) | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 60        | $^{\circ}\text{C}/\text{W}$ |

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

| Characteristic                                                                                                                                                                               | Symbol    | Min    | Typ      | Max     | Unit                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|----------|---------|------------------------|
| Peak Forward Blocking Current<br>( $V_D = \text{Rated } V_{DRM}$ , Gate Open)<br>$T_J = 25^{\circ}\text{C}$<br>$T_J = 125^{\circ}\text{C}$                                                   | $I_{DRM}$ | —<br>— | —<br>—   | 10<br>2 | $\mu\text{A}$<br>mA    |
| Peak Reverse Blocking Current<br>( $V_R = \text{Rated } V_{RRM}$ )<br>$T_J = 125^{\circ}\text{C}$                                                                                            | $I_{RRM}$ | —      | —        | 2       | mA                     |
| Forward "On" Voltage <sup>(1)</sup><br>( $I_{TM} = 50 \text{ A}$ )                                                                                                                           | $V_{TM}$  | —      | —        | 1.8     | Volts                  |
| Gate Trigger Current (Continuous dc)<br>(Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ )                                                                                                  | $I_{GT}$  | —      | —        | 40      | mA                     |
| Gate Trigger Voltage (Continuous dc)<br>(Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ )                                                                                                  | $V_{GT}$  | —      | 0.8      | 1.5     | Volts                  |
| Gate Non-Trigger Voltage<br>(Anode Voltage = Rated $V_{DRM}$ , $R_L = 100 \text{ Ohms}$ , $T_J = 125^{\circ}\text{C}$ )                                                                      | $V_{GD}$  | 0.2    | —        | —       | Volts                  |
| Holding Current<br>(Anode Voltage = 12 Vdc)                                                                                                                                                  | $I_H$     | —      | 20       | 40      | mA                     |
| Turn-On Time<br>( $I_{TM} = 25 \text{ A}$ , $I_{GT} = 40 \text{ mAdc}$ )                                                                                                                     | $t_{gt}$  | —      | 1.5      | —       | $\mu\text{s}$          |
| Turn-Off Time ( $V_{DRM} = \text{Rated Voltage}$ )<br>( $I_{TM} = 25 \text{ A}$ , $I_R = 25 \text{ A}$ )<br>( $I_{TM} = 25 \text{ A}$ , $I_R = 25 \text{ A}$ , $T_J = 125^{\circ}\text{C}$ ) | $t_q$     | —<br>— | 15<br>35 | —<br>—  | $\mu\text{s}$          |
| Critical Rate-of-Rise of Off-State Voltage<br>(Gate Open, $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform)                                                                              | $dv/dt$   | —      | 100      | —       | $\text{V}/\mu\text{s}$ |

1. Pulse Test: Pulse Width = 1 ms, Duty Cycle  $\leq 2\%$ .

### TYPICAL CHARACTERISTICS

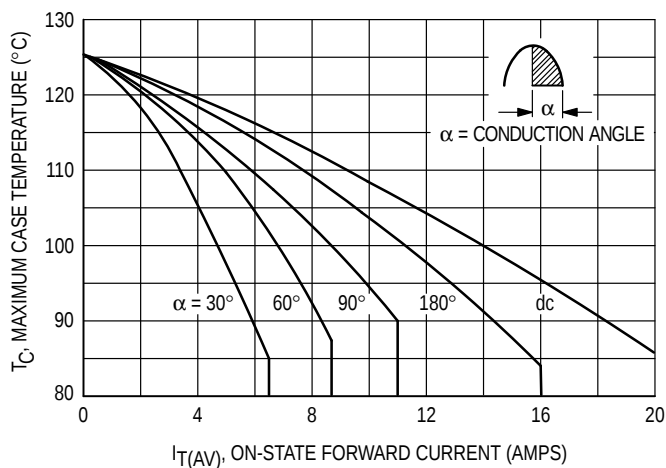


Figure 1. Average Current Derating

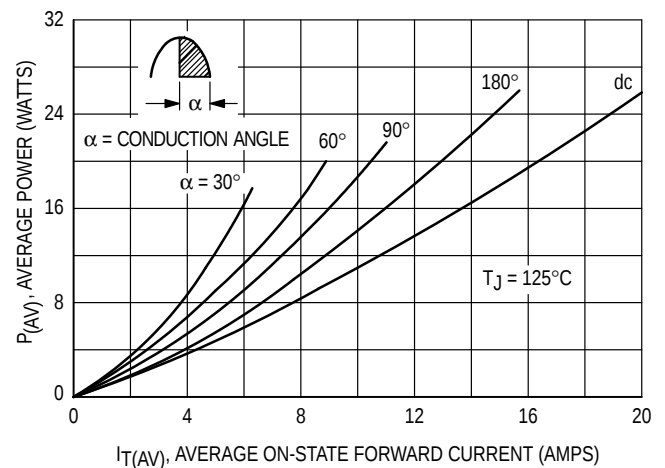


Figure 2. Maximum On-State Power Dissipation

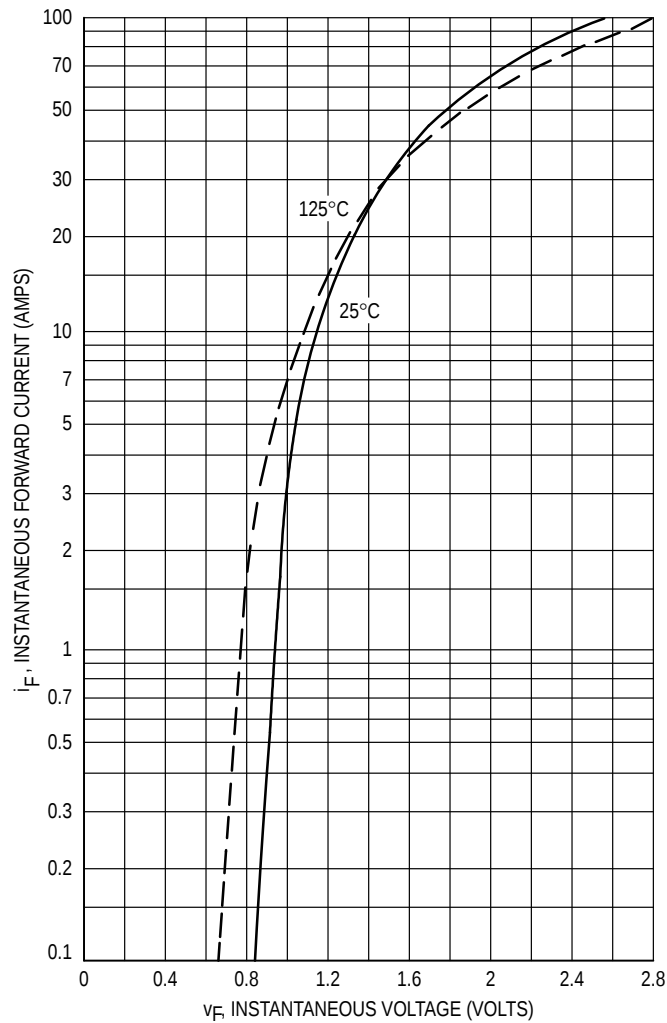


Figure 3. Maximum Forward Voltage

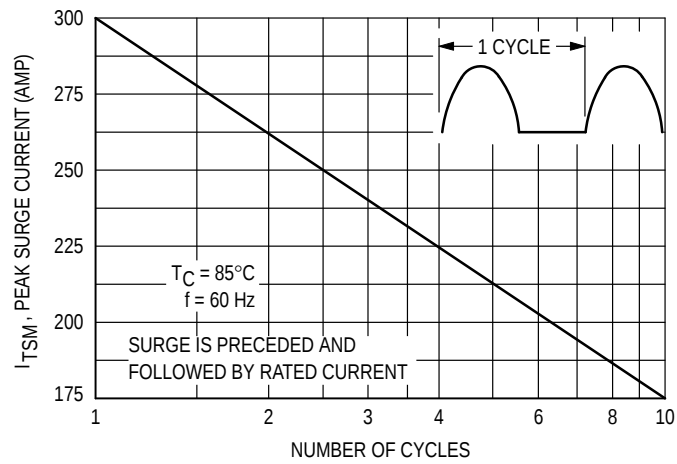


Figure 4. Maximum Non-Repetitive Surge Current

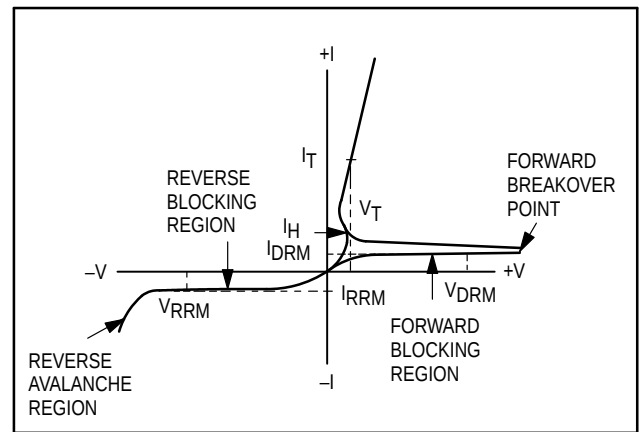


Figure 5. Characteristics and Symbols

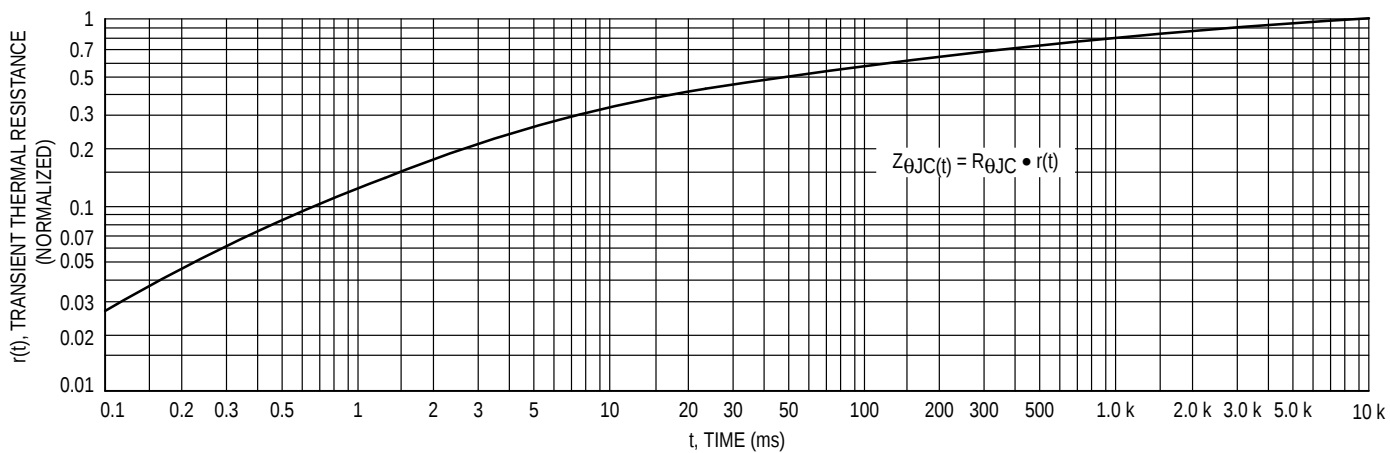


Figure 6. Thermal Response

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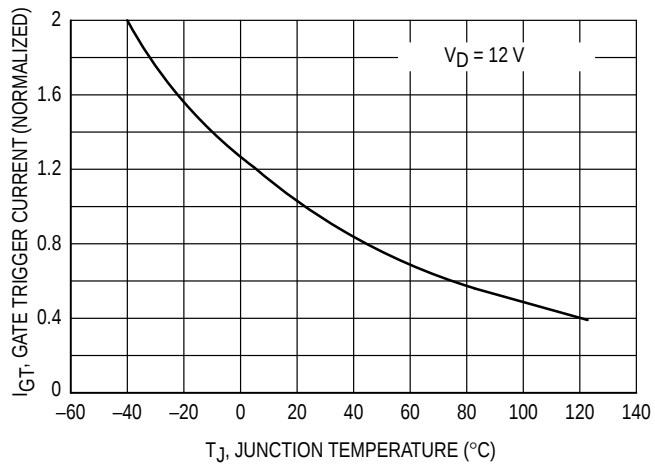


Figure 7. Gate Trigger Current versus Temperature

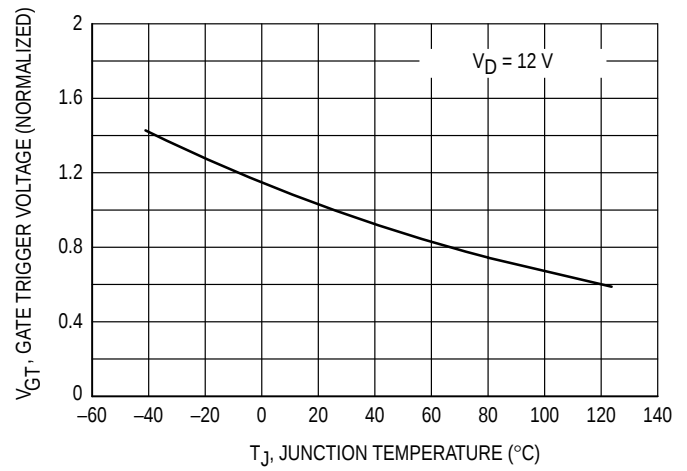


Figure 8. Gate Trigger Voltage versus Temperature

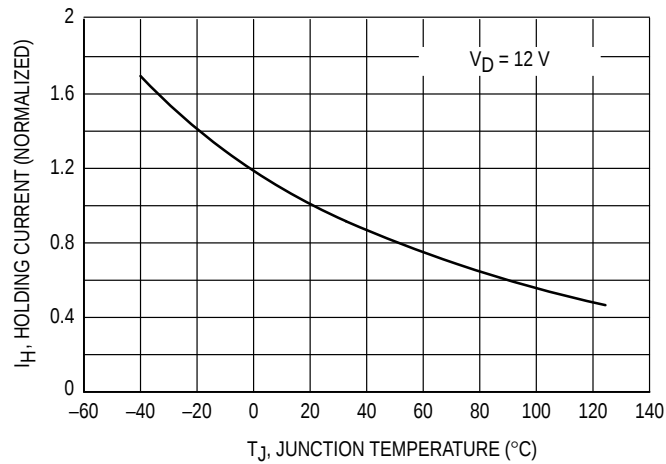
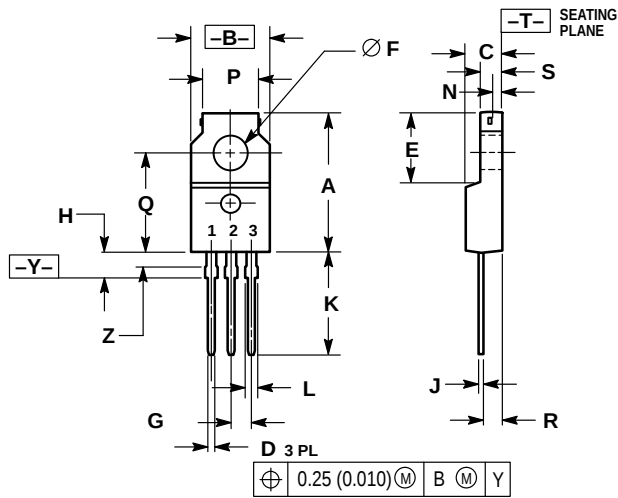


Figure 9. Holding Current versus Temperature

PACKAGE DIMENSIONS



STYLE 2:  
PIN 1. CATHODE  
2. ANODE  
3. GATE

- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.  
3. LEAD DIMENSIONS UNCONTROLLED WITHIN DIMENSION Z.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.680     | 0.700 | 17.28       | 17.78 |
| B   | 0.388     | 0.408 | 9.86        | 10.36 |
| C   | 0.175     | 0.195 | 4.45        | 4.95  |
| D   | 0.025     | 0.040 | 0.64        | 1.01  |
| E   | 0.340     | 0.355 | 8.64        | 9.01  |
| F   | 0.140     | 0.150 | 3.56        | 3.81  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.110     | 0.155 | 2.80        | 3.93  |
| J   | 0.018     | 0.028 | 0.46        | 0.71  |
| K   | 0.500     | 0.550 | 12.70       | 13.97 |
| L   | 0.045     | 0.070 | 1.15        | 1.77  |
| N   | 0.049     | —     | 1.25        | —     |
| P   | 0.270     | 0.290 | 6.86        | 7.36  |
| Q   | 0.480     | 0.500 | 12.20       | 12.70 |
| R   | 0.090     | 0.120 | 2.29        | 3.04  |
| S   | 0.105     | 0.115 | 2.67        | 2.92  |
| Z   | 0.070     | 0.090 | 1.78        | 2.28  |

CASE 221C-02

## MCR225FP Series

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MCR225FP/D

