


# MCR225-8FP, MCR225-10FP

Preferred Device


## 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
-  Indicates UL Registered — File #E69369
- Device Marking: Logo, Device Type, e.g., MCR225-8FP, Date Code

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


Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> ( $T_J = -40$ to $+125^\circ\text{C}$ , Sine Wave, 50 to 60 Hz, Gate Open) MCR225-8FP MCR225-10FP	$V_{\text{DRM}}$ , $V_{\text{RRM}}$	600 800	Volts
On-State RMS Current ( $T_C = +70^\circ\text{C}$ ) (180° Conduction Angles)	$I_{\text{T(RMS)}}$	25	Amps
Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, $T_C = +70^\circ\text{C}$ )	$I_{\text{TSM}}$	300	Amps
Circuit Fusing ( $t = 8.3$ ms)	$I^2t$	375	$\text{A}^2\text{s}$
Forward Peak Gate Power ( $T_C = +70^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$P_{\text{GM}}$	20	Watts
Forward Average Gate Power ( $T_C = +70^\circ\text{C}$ , $t = 8.3$ ms)	$P_{\text{G(AV)}}$	0.5	Watt
Forward Peak Gate Current ( $T_C = +70^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$I_{\text{GM}}$	2.0	Amps
RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ ) 	$V_{\text{(ISO)}}$	1500	Volts
Operating Junction Temperature Range	$T_J$	$-40$ to $+125$	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	$-40$ to $+150$	$^\circ\text{C}$

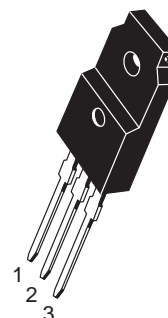
(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



ON Semiconductor

<http://onsemi.com>

**ISOLATED SCRs (  )**  
**25 AMPERES RMS**  
**600 thru 800 VOLTS**



**ISOLATED TO-220 Full Pack**  
**CASE 221C**  
**STYLE 2**

#### PIN ASSIGNMENT

1	Cathode
2	Anode
3	Gate

#### ORDERING INFORMATION

Device	Package	Shipping
MCR225-8FP	ISOLATED TO220FP	500/Box
MCR225-10FP	ISOLATED TO220FP	500/Box

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

# MCR225–8FP, MCR225–10FP

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	°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 Seconds	$T_L$	260	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current ( $V_D = \text{Rated } V_{DRM}, V_{RRM}$ ; Gate Open)	$I_{DRM}, I_{RRM}$	—	—	10	$\mu\text{A}$
$T_J = 125^\circ\text{C}$		—	—	2	mA

## ON CHARACTERISTICS

Peak Forward On-State Voltage <sup>(1)</sup> ( $I_{TM} = 50\text{ A}$ )	$V_{TM}$	—	—	1.8	Volts
Gate Trigger Current (Continuous dc) ( $V_{AK} = 12\text{ Vdc}, R_L = 100\text{ Ohms}$ )	$I_{GT}$	—	—	40	mA
Gate Trigger Voltage (Continuous dc) ( $V_{AK} = 12\text{ Vdc}, R_L = 100\text{ Ohms}$ )	$V_{GT}$	—	0.8	1.5	Volts
Gate Non-Trigger Voltage ( $V_{AK} = 12\text{ Vdc}, R_L = 100\text{ Ohms}, T_J = 125^\circ\text{C}$ )	$V_{GD}$	0.2	—	—	Volts
Holding Current ( $V_{AK} = 12\text{ Vdc}$ , Initiating Current = 200 mA, Gate Open)	$I_H$	—	20	40	mA
Turn-On Time ( $I_{TM} = 25\text{ A}, I_{GT} = 40\text{ mAdc}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
Turn-Off Time ( $V_{DRM} = \text{Rated Voltage}$ ) ( $I_{TM} = 25\text{ A}, I_R = 25\text{ A}$ ) ( $I_{TM} = 25\text{ A}, I_R = 25\text{ A}, T_J = 125^\circ\text{C}$ )	$t_q$	— —	15 35	— —	$\mu\text{s}$

## DYNAMIC CHARACTERISTICS

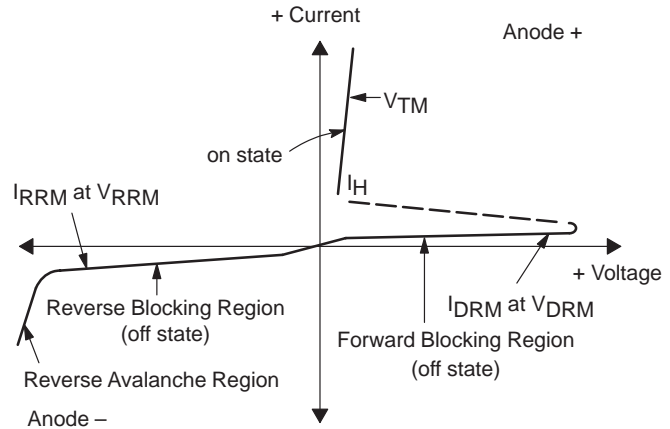
Critical Rate-of-Rise of Off-State Voltage (Gate Open, $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform)	$dv/dt$	—	100	—	V/ $\mu\text{s}$
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(1) Pulse Test: Pulse Width = 1.0 ms, Duty Cycle  $\leq 2\%$ .

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## 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



## TYPICAL CHARACTERISTICS

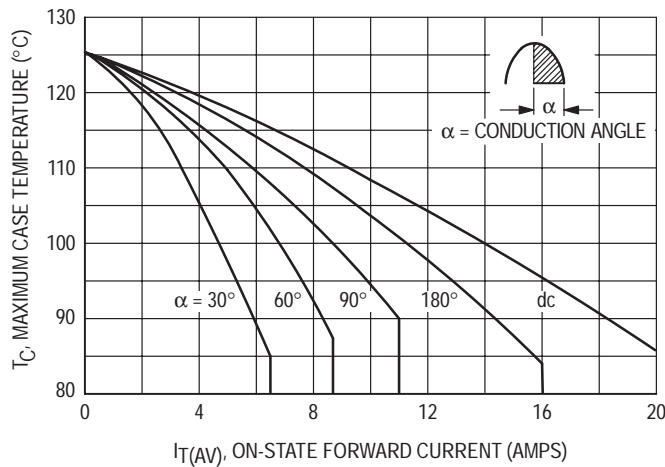


Figure 1. Average Current Derating

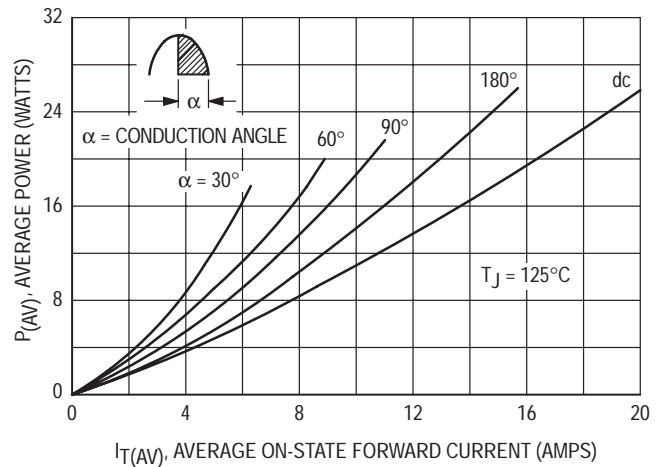


Figure 2. Maximum On-State Power Dissipation

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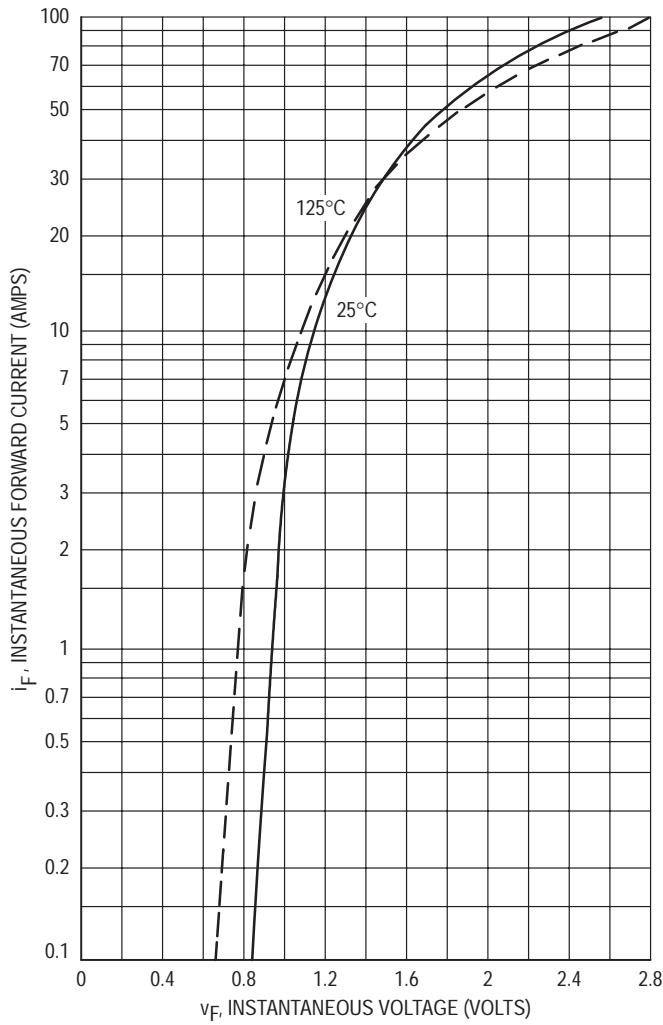


Figure 3. Maximum Forward Voltage

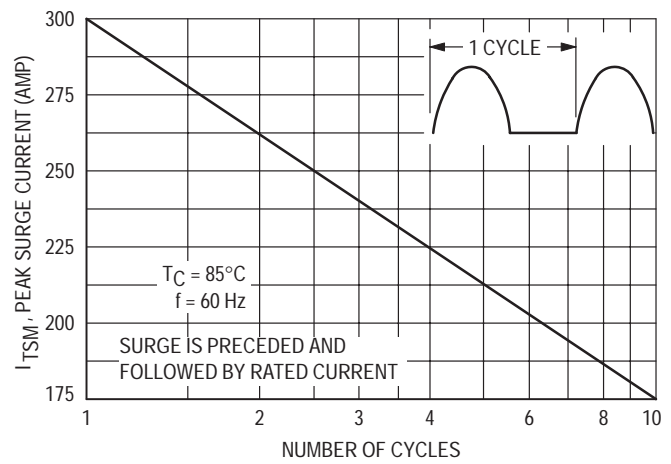


Figure 4. Maximum Non-Repetitive Surge Current

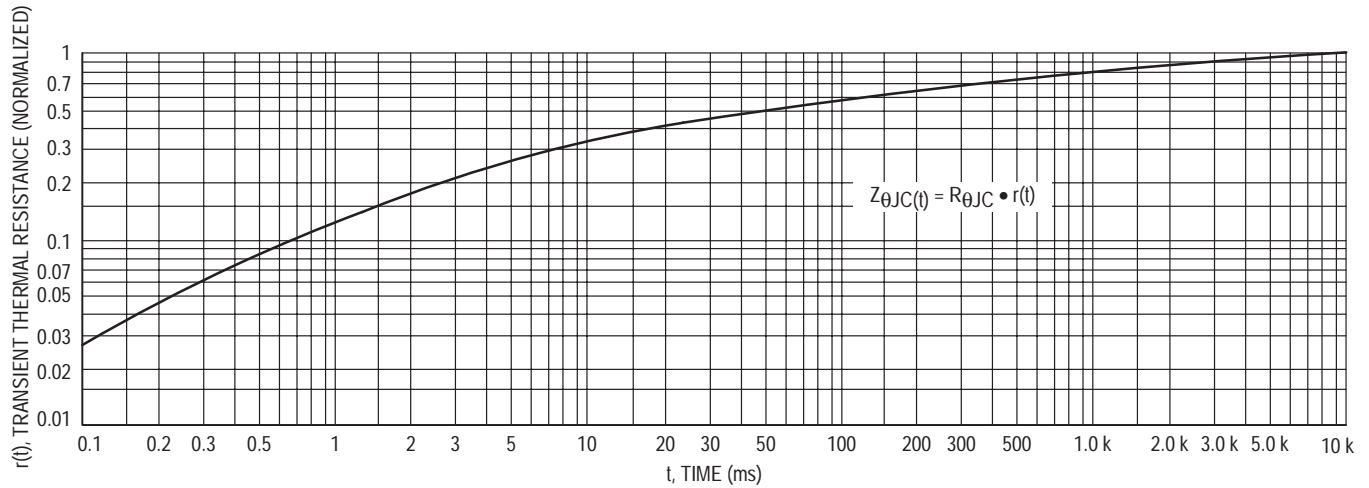
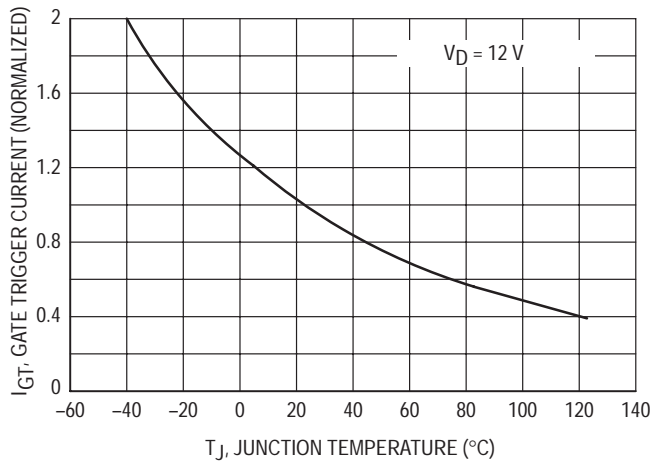
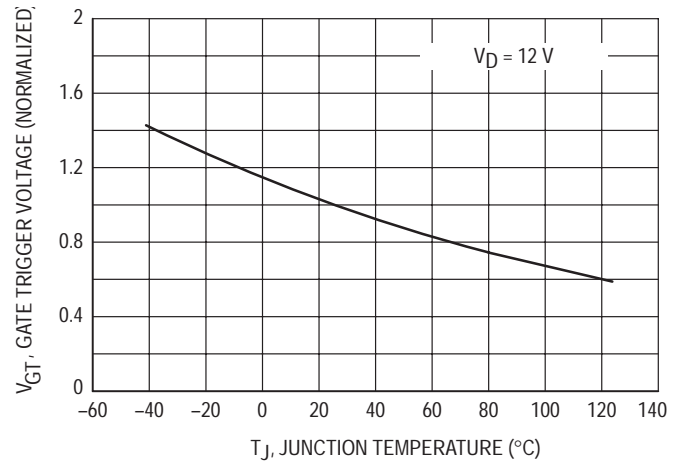


Figure 5. Thermal Response

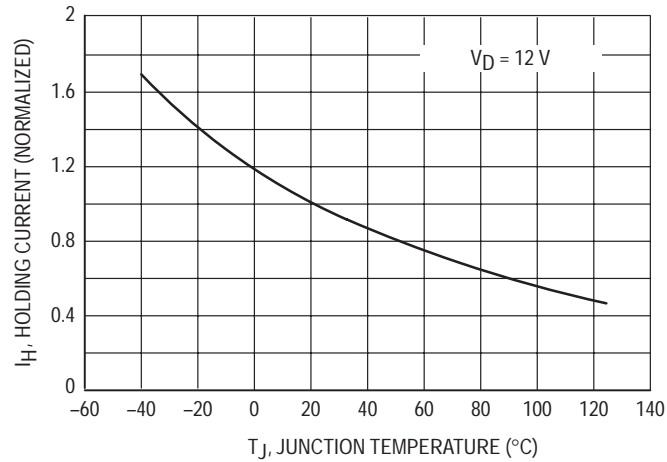
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**Figure 6. Typical Gate Trigger Current versus Temperature**



**Figure 7. Typical Gate Trigger Voltage versus Temperature**



**Figure 8. Typical Holding Current versus Temperature**



## **Notes**

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