

# 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 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)	$V_{\text{DRM}}$ , $V_{\text{RRM}}$		Volts
MCR225-8FP		600	
MCR225-10FP		800	
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.



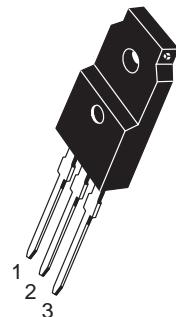
**ON Semiconductor**

<http://onsemi.com>

**ISOLATED SCR (UL)**

**25 AMPERES RMS**

**600 thru 800 VOLTS**



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

<b>PIN ASSIGNMENT</b>	
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 ( $V_D$ = Rated $V_{DRM}$ ; $V_{RRM}$ ; Gate Open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	$I_{DRM}$ , $I_{RRM}$	—	—	10 2	$\mu\text{A}$ mA
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## 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 ( $I_{TM} = 25 \text{ A}$ , $I_{GT} = 40 \text{ mA dc}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
Turn-Off Time ( $V_{DRM}$ = 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	— —	$\mu\text{s}$

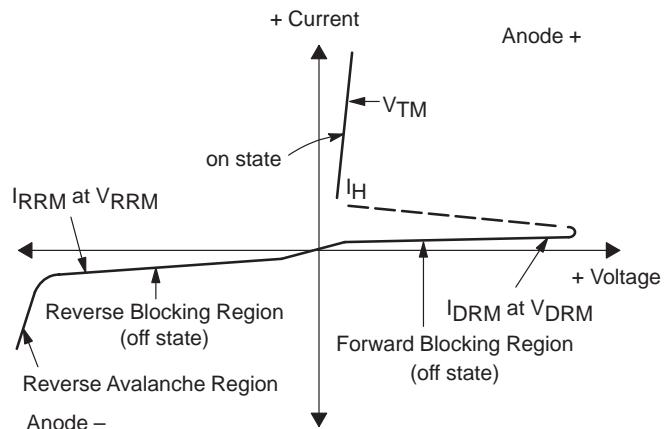
## DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage (Gate Open, $V_D$ = Rated $V_{DRM}$ , Exponential Waveform)	$dv/dt$	—	100	—	$\text{V}/\mu\text{s}$
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(1) 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



**TYPICAL CHARACTERISTICS**

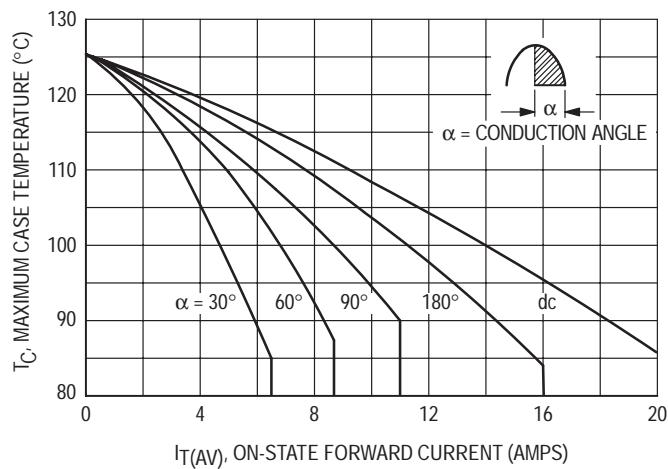


Figure 1. Average Current Derating

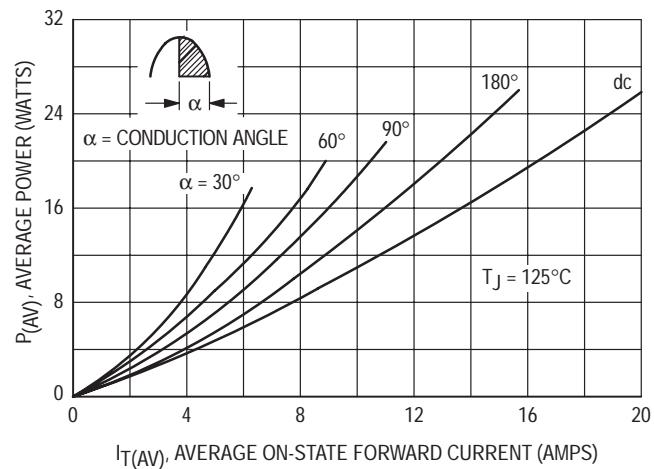
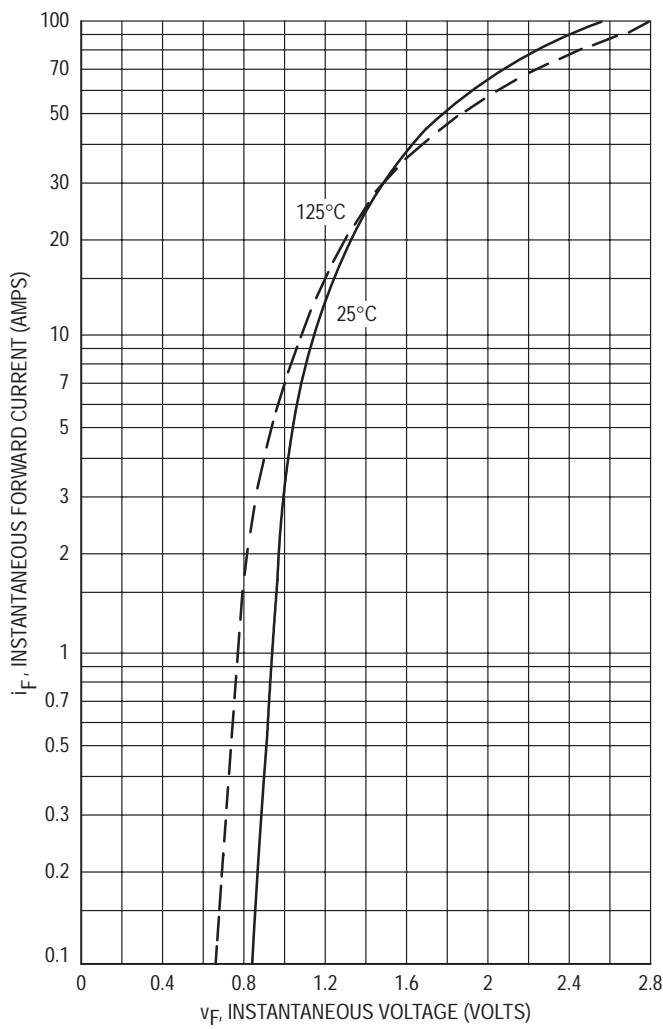
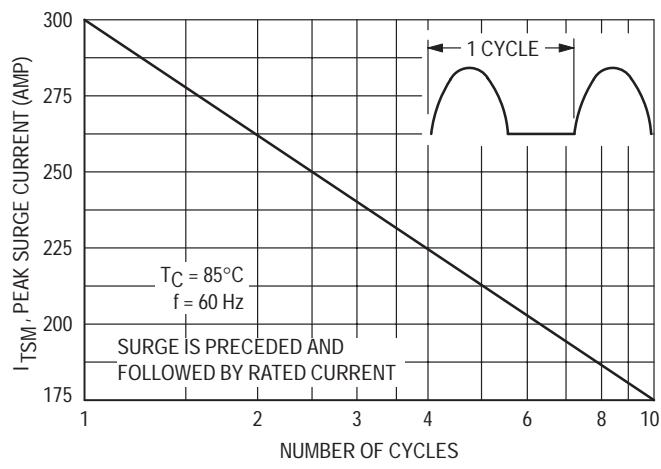


Figure 2. Maximum On-State Power Dissipation

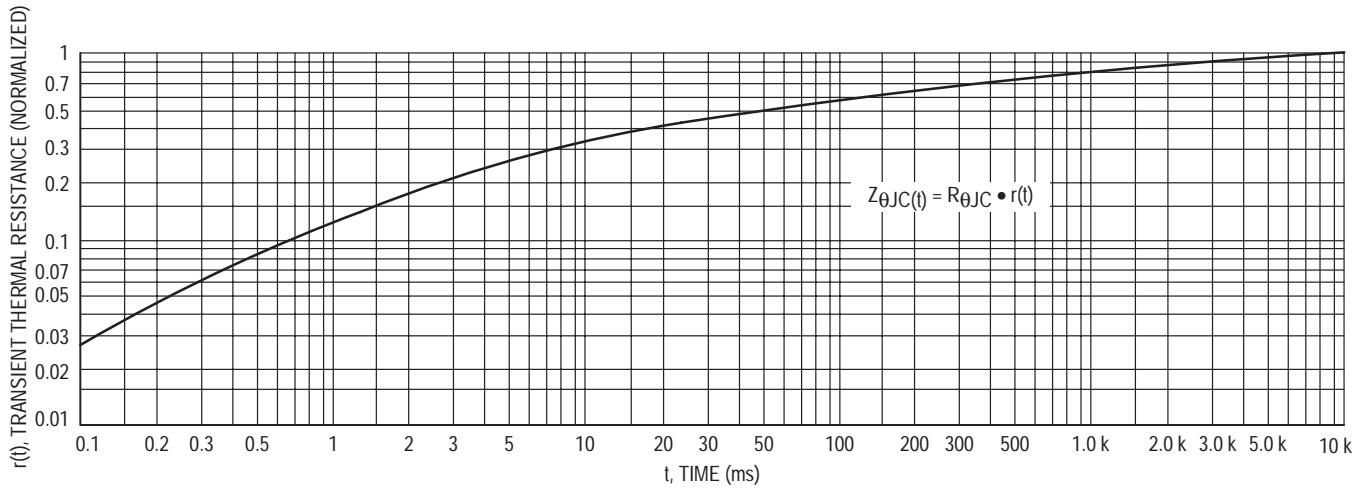
## MCR225-8FP, MCR225-10FP



**Figure 3. Maximum Forward Voltage**

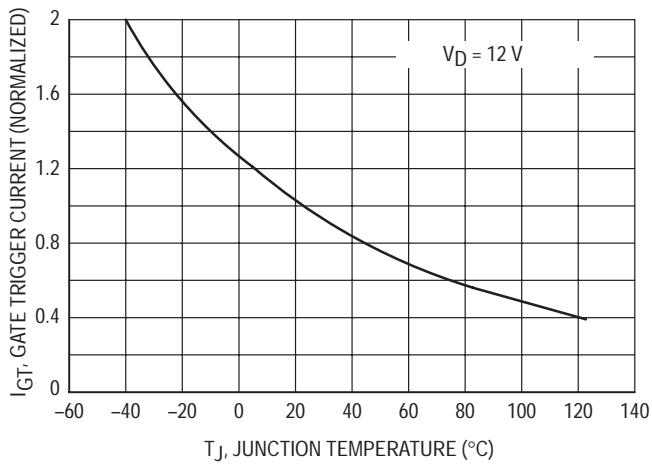


**Figure 4. Maximum Non-Repetitive Surge Current**

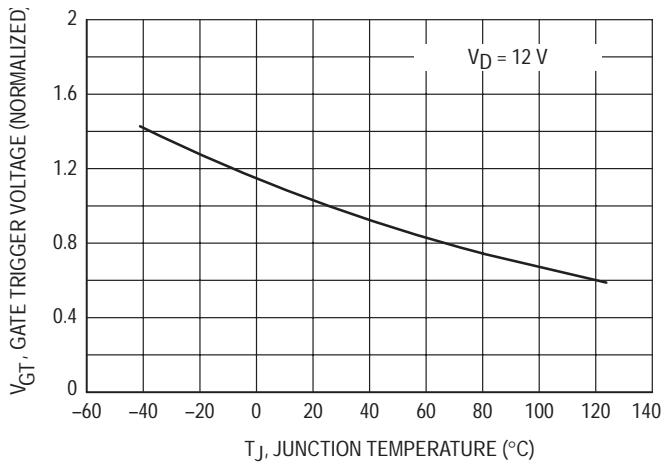


**Figure 5. Thermal Response**

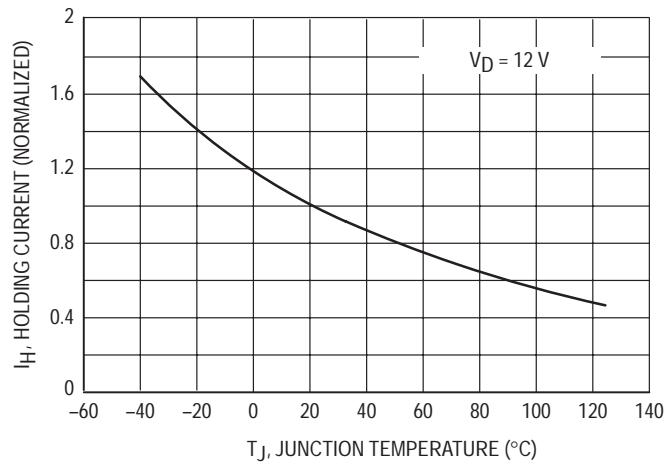
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**Figure 6. Typical Gate Trigger Current versus Temperature**



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

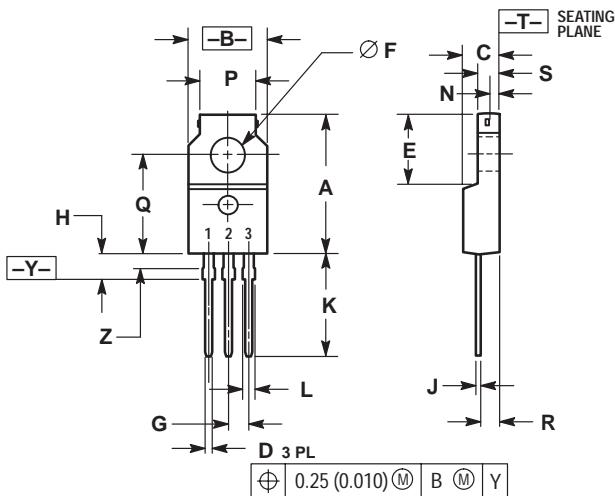


**Figure 8. Typical Holding Current versus Temperature**

# MCR225-8FP, MCR225-10FP

## PACKAGE DIMENSIONS

### ISOLATED TO-220 Full Pack CASE 221C-02 ISSUE C



#### 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

#### STYLE 2:

1. CATHODE
2. ANODE
3. GATE

## **Notes**

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