


# 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	$V_{DRM}$ , $V_{RRM}$	600 800	Volts
On-State RMS Current ( $T_C = +70^\circ\text{C}$ ) ( $180^\circ$ Conduction Angles)	$I_T(\text{RMS})$	25	Amps
Peak Non-repetitive Surge Current (1/2 Cycle, Sine Wave 60 Hz, $T_C = +70^\circ\text{C}$ )	$I_{TSM}$	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 $\leq 1.0$ $\mu\text{s}$ )	$P_{GM}$	20	Watts
Forward Average Gate Power ( $T_C = +70^\circ\text{C}$ , $t = 8.3$ ms)	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current ( $T_C = +70^\circ\text{C}$ , Pulse Width $\leq 1.0$ $\mu\text{s}$ )	$I_{GM}$	2.0	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 +150	$^\circ\text{C}$

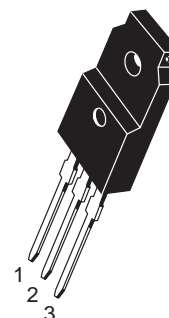
(1)  $V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source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



**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

## THEMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	$^{\circ}C/W$
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	$^{\circ}C$

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}C$ 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)	$I_{DRM}, I_{RRM}$	$T_J = 25^{\circ}C$	—	—	10	$\mu A$
		$T_J = 125^{\circ}C$	—	—	2	mA

## ON CHARACTERISTICS

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

## DYNAMIC CHARACTERISTICS

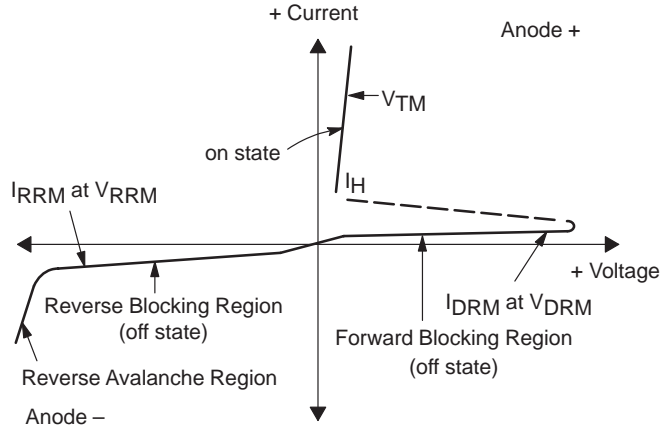
Critical Rate-of-Rise of Off-State Voltage (Gate Open, $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform)	$dv/dt$	—	100	—	$V/\mu s$
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(1) Pulse Test: Pulse Width = 1.0 ms, Duty Cycle  $\leq 2\%$ .

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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

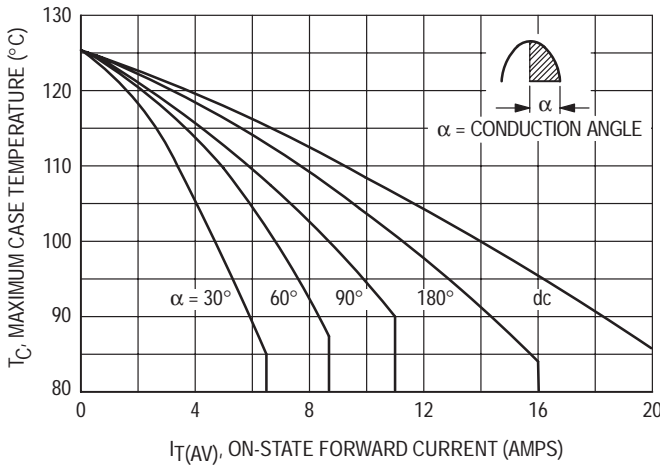


Figure 1. Average Current Derating

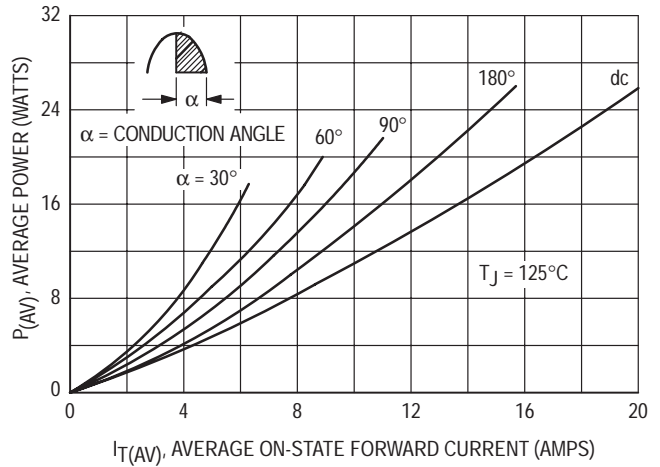


Figure 2. Maximum On-State Power Dissipation

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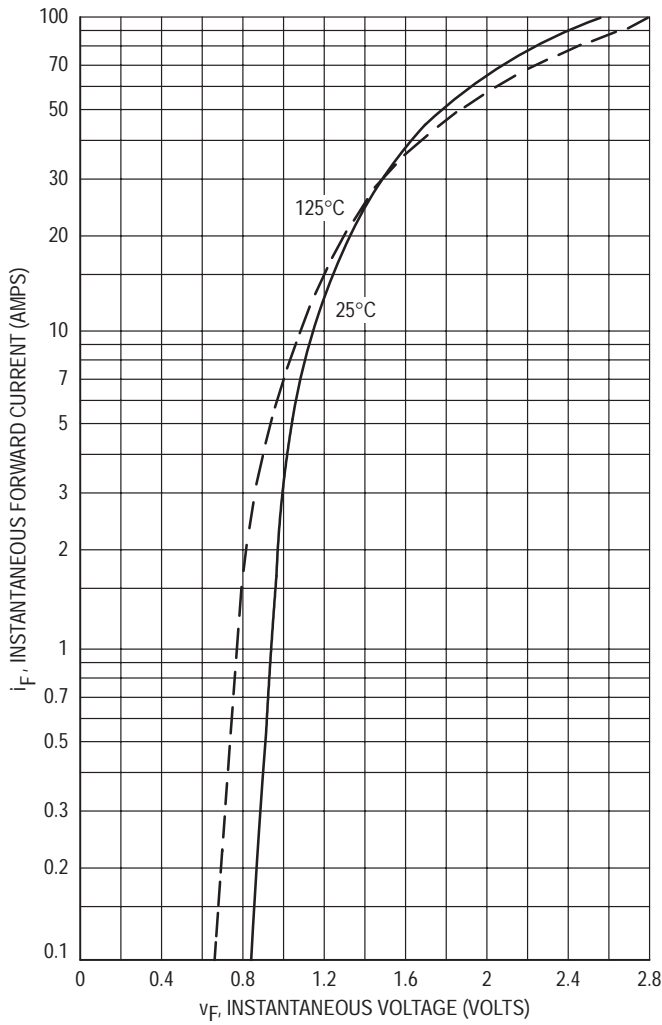


Figure 3. Maximum Forward Voltage

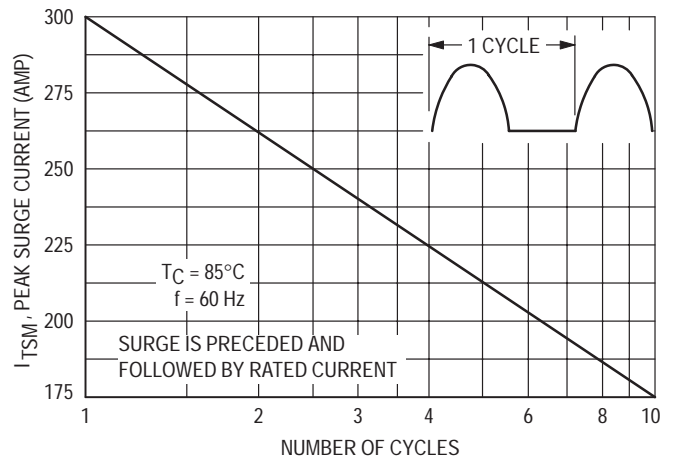


Figure 4. Maximum Non-Repetitive Surge Current

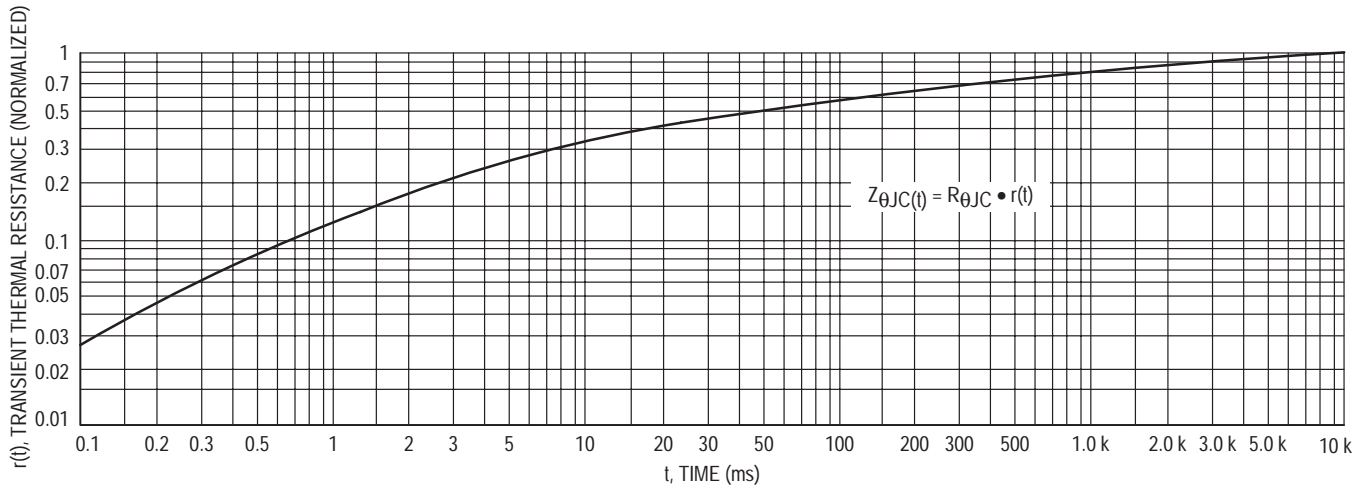
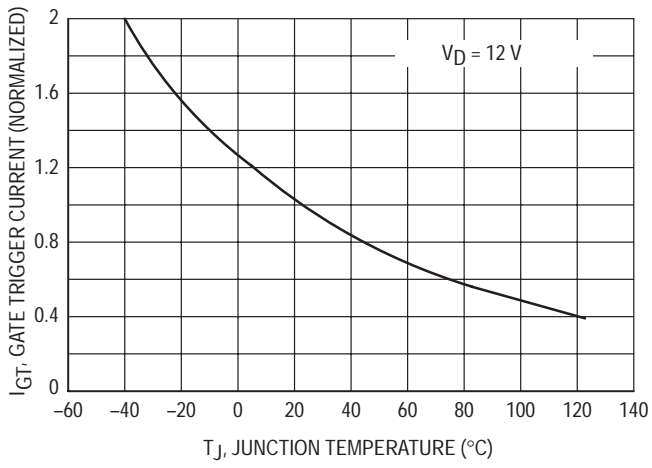
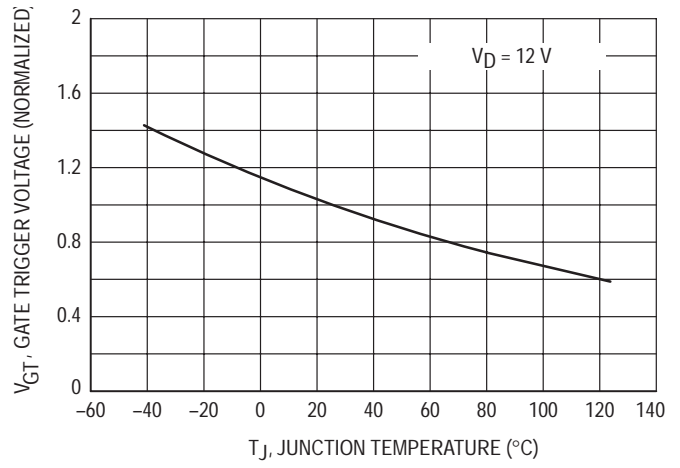


Figure 5. Thermal Response

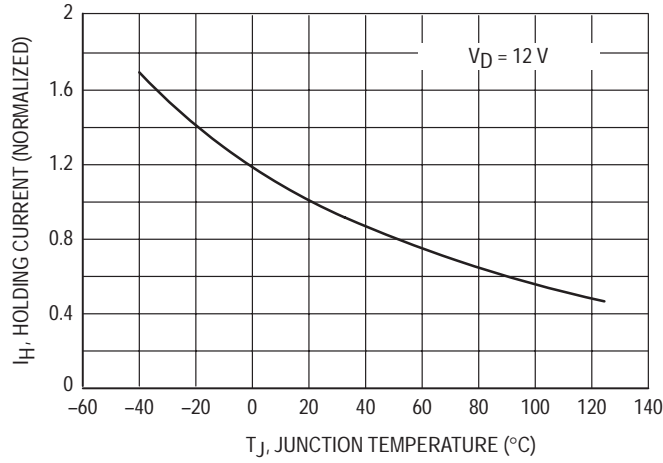
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**Figure 6. Typical Gate Trigger Current versus Temperature**



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

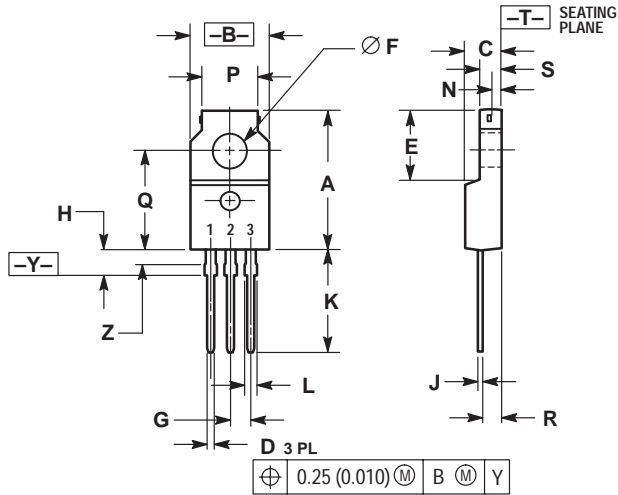


**Figure 8. Typical Holding Current versus Temperature**

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## 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

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