



# 50 Amp Silicon Controlled Rectifier

## DESCRIPTION

This SCR (Silicon Controlled Rectifier) has superior circuit-commutated turn-off time (tq) of <math><50 \mu\text{s}</math>.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

## FEATURES

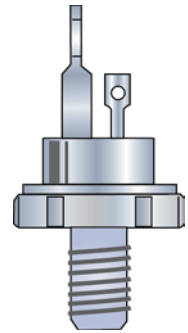
- Compact TO-208AC package.
- 1200 Amperes max surge current.
- $dv/dt = 200 \text{ V}/\mu\text{sec}$ .
- RoHS compliant version available.

## APPLICATIONS / BENEFITS

- Economical for medium power applications.

## MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction Temperature	$T_J$	-65 to 125	$^{\circ}\text{C}$
Storage Temperature	$T_{\text{STG}}$	-65 to 150	$^{\circ}\text{C}$
Thermal Resistance Junction-to-Case	$R_{\theta\text{JC}}$	0.35	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Case-to-Sink	$R_{\theta\text{CS}}$	0.20	$^{\circ}\text{C}/\text{W}$
Maximum Leakage Current @ $T_J = 125^{\circ}\text{C}$ & 1200 V	$I_{\text{DRM}}$	6	mA
Maximum Reverse Leakage @ $T_J = 125^{\circ}\text{C}$ & 1200 V	$I_{\text{RRM}}$	6	mA



**TO-208AC (TO-65)  
Package**

### **MSC – Lawrence**

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

### **MSC – Ireland**

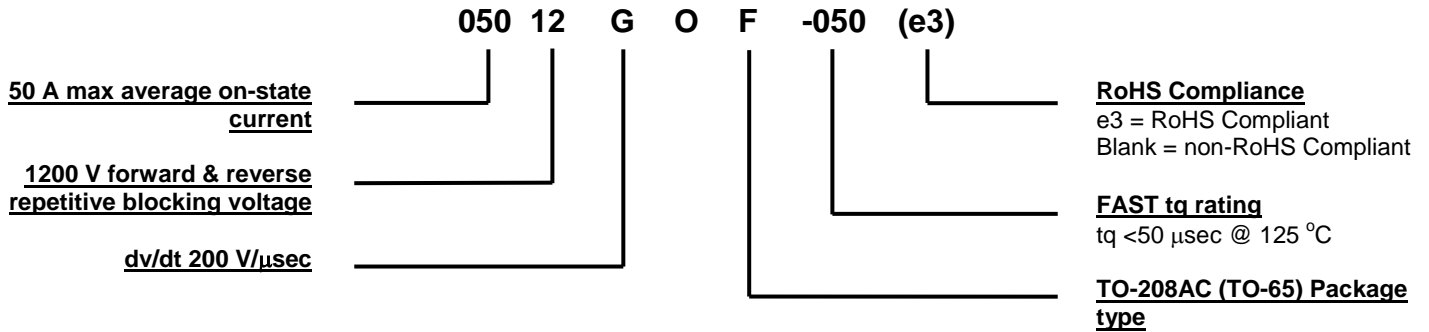
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

### **Website:**

[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: Metal TO-65.
- TERMINALS: Long = Cathode, Short = Gate, Stud = Anode.
- MARKING: SCR symbol, MSC (Microsemi Corporation), Part#, D/C (date code).
- POLARITY: See SCR symbol on package.
- WEIGHT: 0.56 ounces (16 grams) typical.
- Mounting Torque: 25 – 30 inch pounds.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

Symbol	Definition
dv/dt	Critical rate of rise of off-state voltage. (Any higher will cause false triggering.)
$I_{TM}$	On-state Current: The maximum (peak) total value.
tq	Turn off time.
$T_C$	Case Temperature: The temperature measured at the case.
$T_J$	Junction Temperature: The temperature of the semiconductor junction.
$t_p$	Pulse Time: The time interval between a reference point on a leading edge of a pulse waveform and a reference point on the trailing edge of the same waveform.
$V_{DRM}$	Repetitive Peak Off-State Voltage: The maximum (peak) total value of repetitive peak off-state voltage.
$V_R$	Reverse Voltage: The reverse voltage dc value, no alternating component.

**ELECTRICAL CHARACTERISTICS**

Description	Condition	Rating	Notes
Max. RMS on-state current	$I_{T(RMS)}$	80 A	$T_C = 94\text{ }^\circ\text{C}$
Max. average on-state current	$I_{T(AV)}$	50 A	$T_C = 94\text{ }^\circ\text{C}$
Max. peak on-state voltage	$V_{TM}$	2.3 V	$I_{TM} = 140\text{ A(peak)}$
Max. holding current	$I_H$	200 mA	
Max. peak one cycle surge current	$I_{TSM}$	1200 A	$T_C = 94\text{ }^\circ\text{C}$ 60 Hz
Max. $I^2t$ capability for fusing (Note 1)	$I^2t$	6000 $\text{A}^2\text{S}$	$t = 8.3\text{ ms}$

**NOTES:** 1. Above this rating terminals will melt.

**Switching:**

Description	Condition	Rating	Notes
Critical rate of rise of on-state current (Note 2)	di/dt	200 A/ $\mu\text{s}$	$T_J = 125\text{ }^\circ\text{C}$
Typical delay time (Note 2)	td	3.0 $\mu\text{s}$	
Typical circuit commuted turn-off time (Note 3)	tq	50 $\mu\text{s}$	$T_J = 125\text{ }^\circ\text{C}$

**NOTES:** 2.  $I_{TM} = 50\text{ A}$ ,  $V_D = V_{DRM}$ . GT = 12 V open circuit, 20 ohm – 0.1  $\mu\text{sec}$ , rise time.

3.  $I_{TM} = 50\text{ A}$ , di/dt = 5 A/ $\mu\text{sec}$ ,  $V_R$  during turn-off interval = 50 V min, reapplied dv/dt = 20 V/ $\mu\text{sec}$ , linear to rated  $V_{DRM}$ ,  $V_{GT} = 0\text{ V}$ .

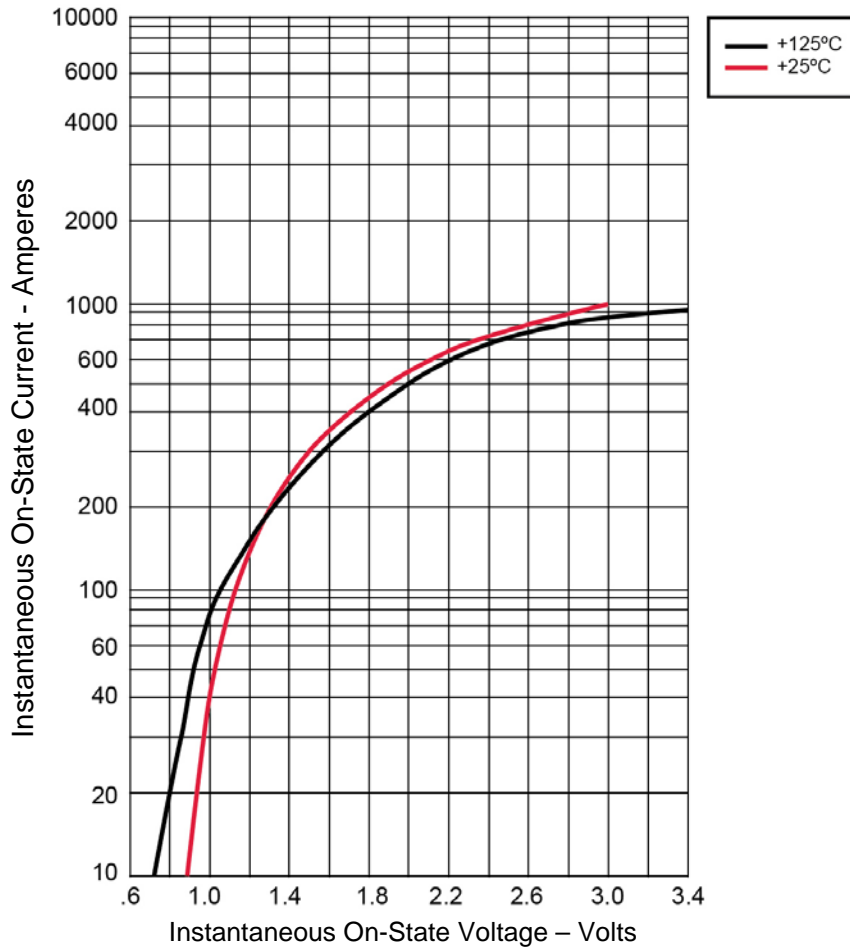
**Triggering:**

Description	Condition	Rating	Notes
Max. gate voltage to trigger	$V_{GT}$	3.0 V	
Max. non-triggering gate voltage	$V_{GD}$	0.25 V	$T_J = 125\text{ }^\circ\text{C}$
Max. gate current to trigger	$I_{GT}$	100 mA	
Max. peak gate power	$P_{GM}$	10 W	
Average gate power	$P_{G(AV)}$	1.0 W	tp = 10 $\mu\text{s}$
Max. peak gate current	$I_{GM}$	3.0 A	
Max. peak gate voltage (forward)	$V_{GM}$	20 V	
Max. peak gate voltage (reverse)	$V_{GM}$	10 V	

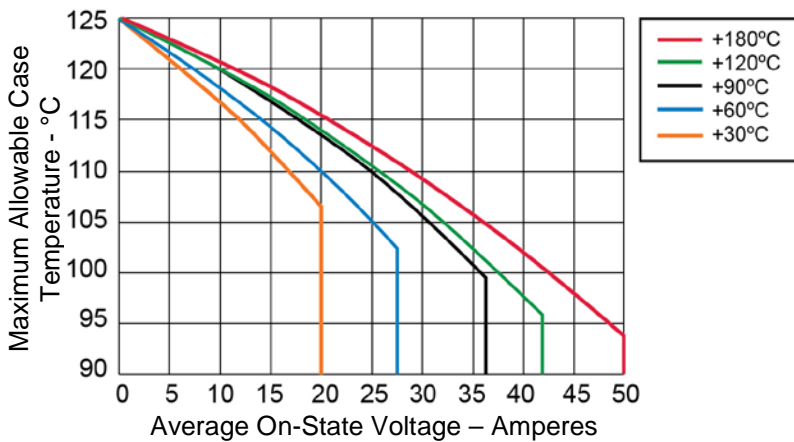
**Blocking:**

Description	Condition	Rating	Notes
Max. leakage current	$I_{DRM}$	6 mA	$T_J = 125\text{ }^\circ\text{C}$ & 1200 V
Max. reverse leakage	$I_{RRM}$	6 mA	$T_J = 125\text{ }^\circ\text{C}$ & 1200 V
Critical rate of rise of off-state voltage as above false triggering of device	dv/dt	200 V/ $\mu\text{s}$	$T_J = 125\text{ }^\circ\text{C}$

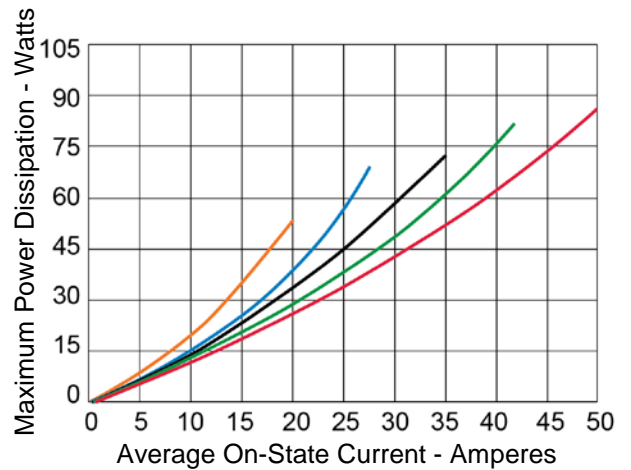
GRAPHS



**FIGURE 1**  
Typical Forward On-State Characteristics

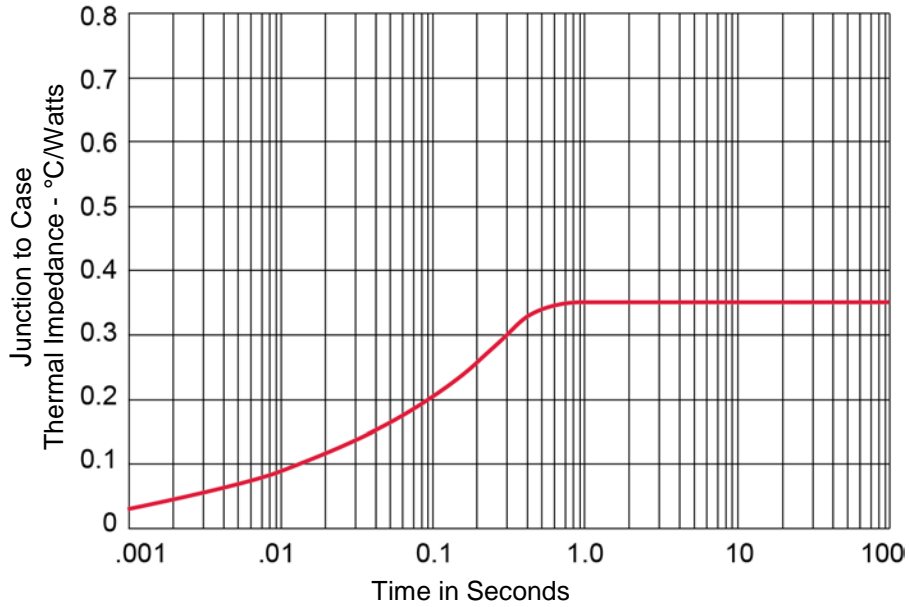


**FIGURE 2**  
Forward Current Derating

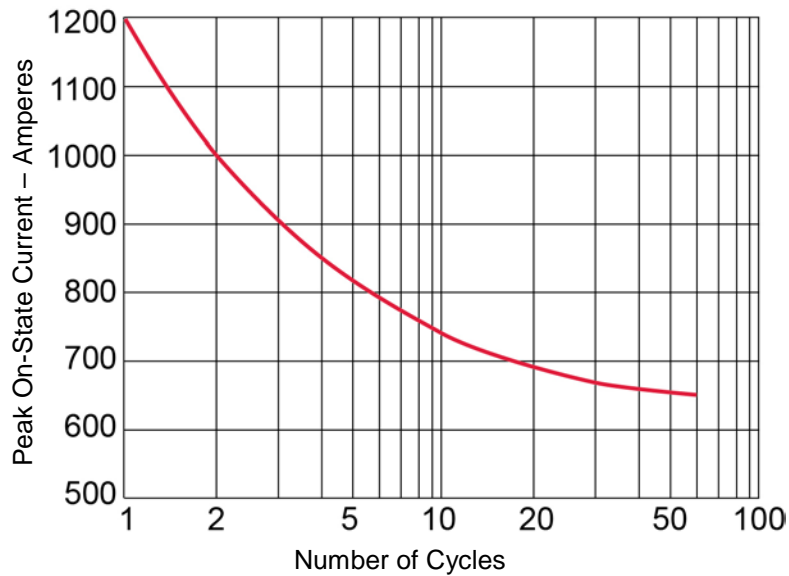


**FIGURE 3**  
Maximum Power Dissipation

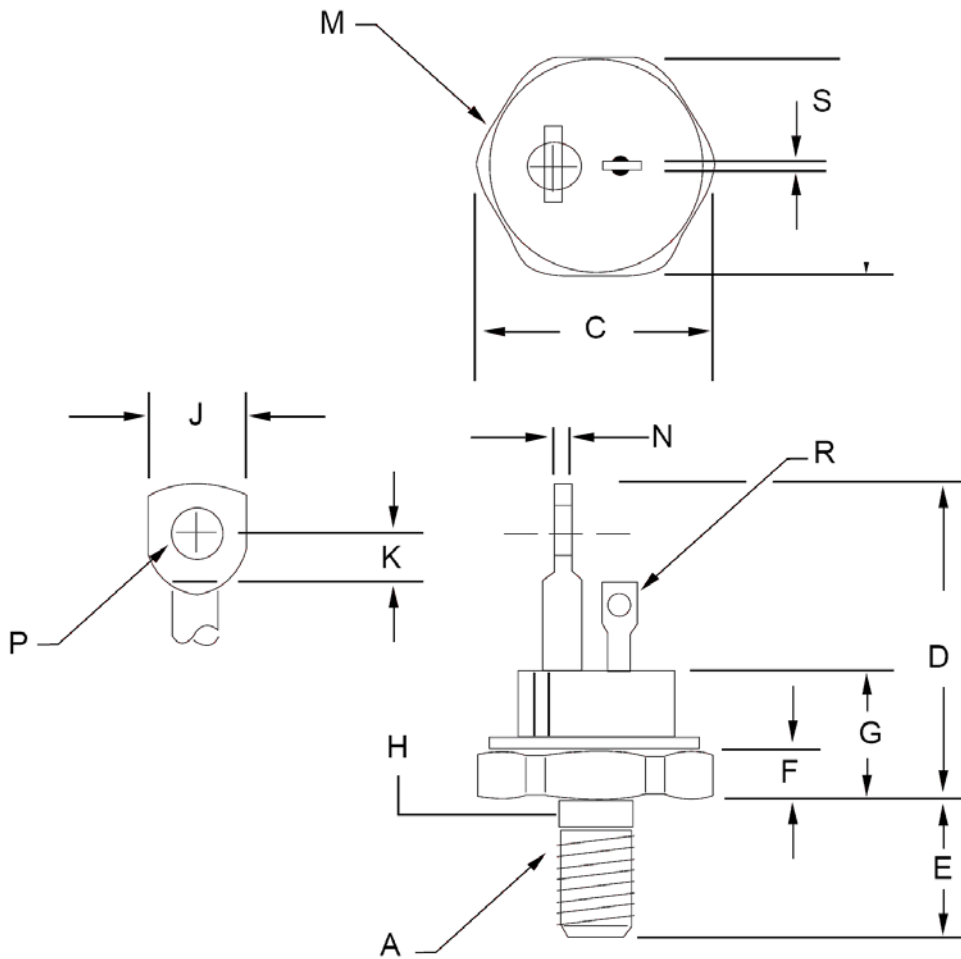
GRAPHS (continued)



**FIGURE 4**  
Transient Thermal Impedance



**FIGURE 5**  
Maximum Non-repetitive Surge Current

**PACKAGE DIMENSIONS**


- Notes: 1.  $\frac{1}{4}$  - 28 UNF - 3A.  
 2. Full thread within 2  $\frac{1}{2}$  threads.

Dim.	Inches		Millimeter		Notes
	Minimum	Maximum	Minimum	Maximum	
<b>A</b>	---	---	---	---	1
<b>B</b>	.677	.685	17.20	17.40	
<b>C</b>	---	.770	---	19.56	
<b>D</b>	1.200	1.250	30.48	31.75	
<b>E</b>	.427	.447	10.84	11.35	
<b>F</b>	.115	.155	2.92	3.94	
<b>G</b>	---	.515	---	13.08	
<b>H</b>	.220	.249	5.58	6.32	2
<b>J</b>	.200	.300	5.08	7.62	
<b>K</b>	.120	---	3.05	---	
<b>M</b>	---	.667	---	16.94	Dia.
<b>N</b>	.065	.085	1.65	2.15	
<b>P</b>	.145	.155	3.68	3.93	Dia.
<b>R</b>	.055	.065	1.40	1.65	Dia.
<b>S</b>	.025	.030	.64	.76	