



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

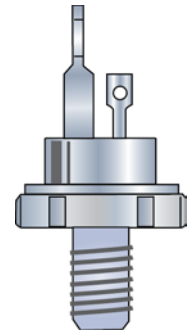
- Compact TO-208AC package.
- 1200 Amperes max surge current.
- $dv/dt = 200 \text{ V}/\mu\text{sec}$.
- RoHS compliant version available.

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_{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_{DRM}	6	mA
Maximum Reverse Leakage @ $T_J = 125^{\circ}\text{C}$ & 1200 V	I_{RRM}	6	mA



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

MSC – Lawrence

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Lawrence, MA 01841
Tel: 1-800-446-1158 or
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MSC – Ireland

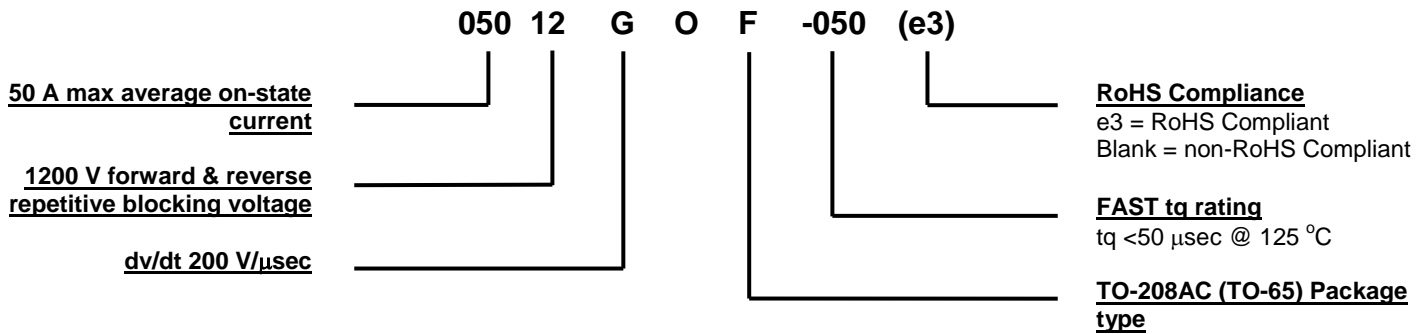
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Ennis, Co. Clare, Ireland
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Website:

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 A ² 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/ μ s	$T_J = 125\text{ }^\circ\text{C}$
Typical delay time (Note 2)	td	3.0 μ s	
Typical circuit commuted turn-off time (Note 3)	tq	50 μ 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 μ sec, rise time.

3. $I_{TM} = 50\text{ A}$, di/dt = 5 A/ μ sec, V_R during turn-off interval = 50 V min, reapplied dv/dt = 20 V/ μ 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 μ 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/ μ s	$T_J = 125\text{ }^\circ\text{C}$

GRAPHS

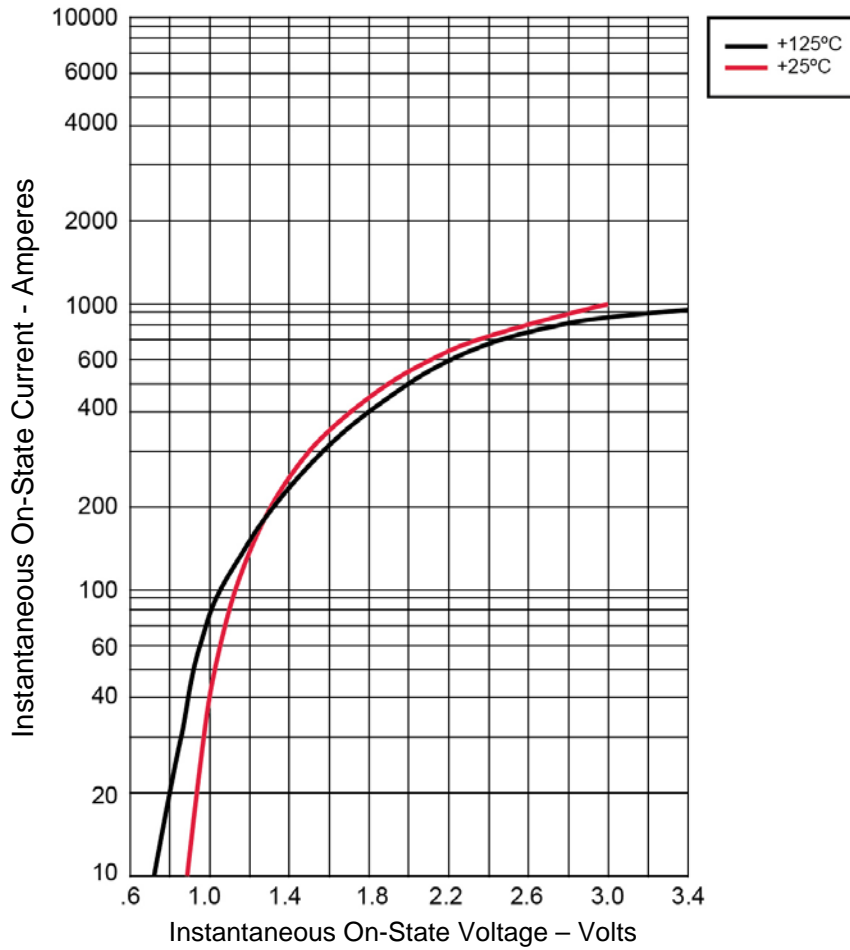


FIGURE 1
Typical Forward On-State Characteristics

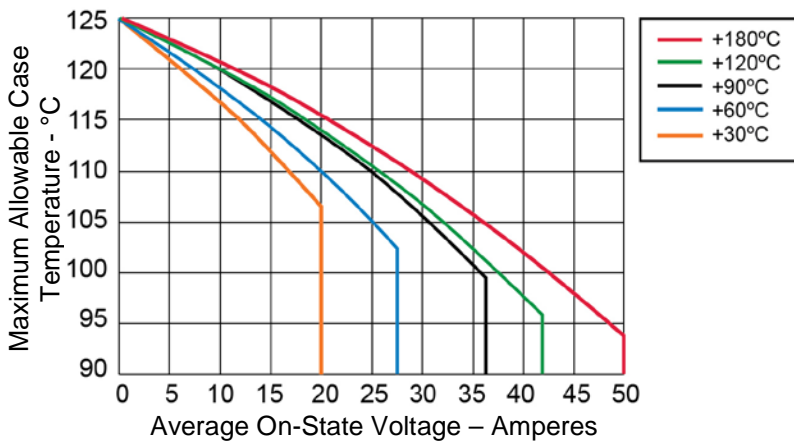


FIGURE 2
Forward Current Derating

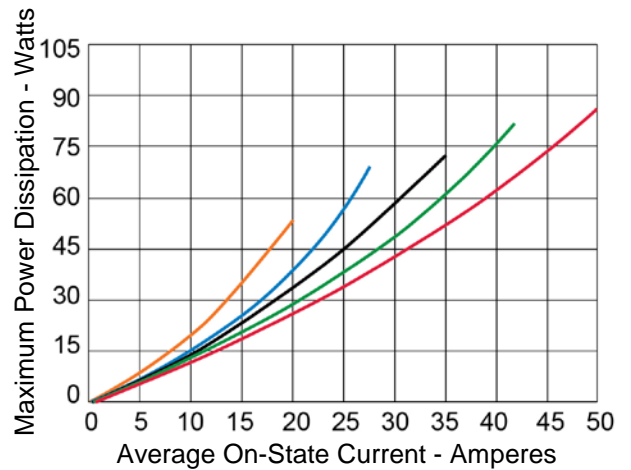


FIGURE 3
Maximum Power Dissipation

GRAPHS (continued)

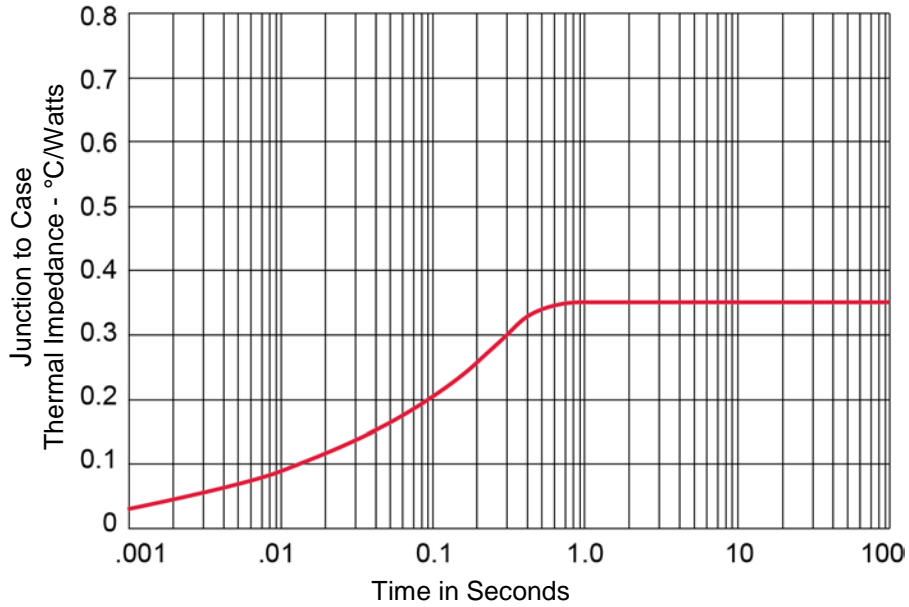


FIGURE 4
Transient Thermal Impedance

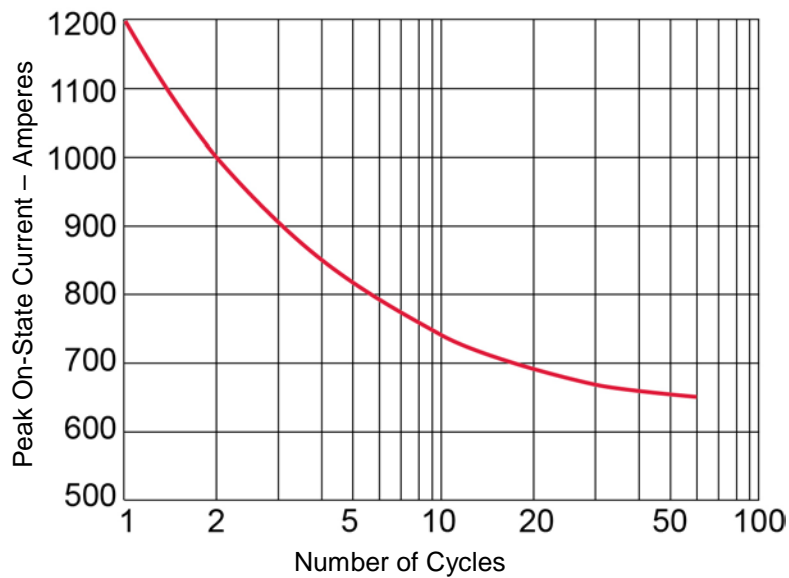
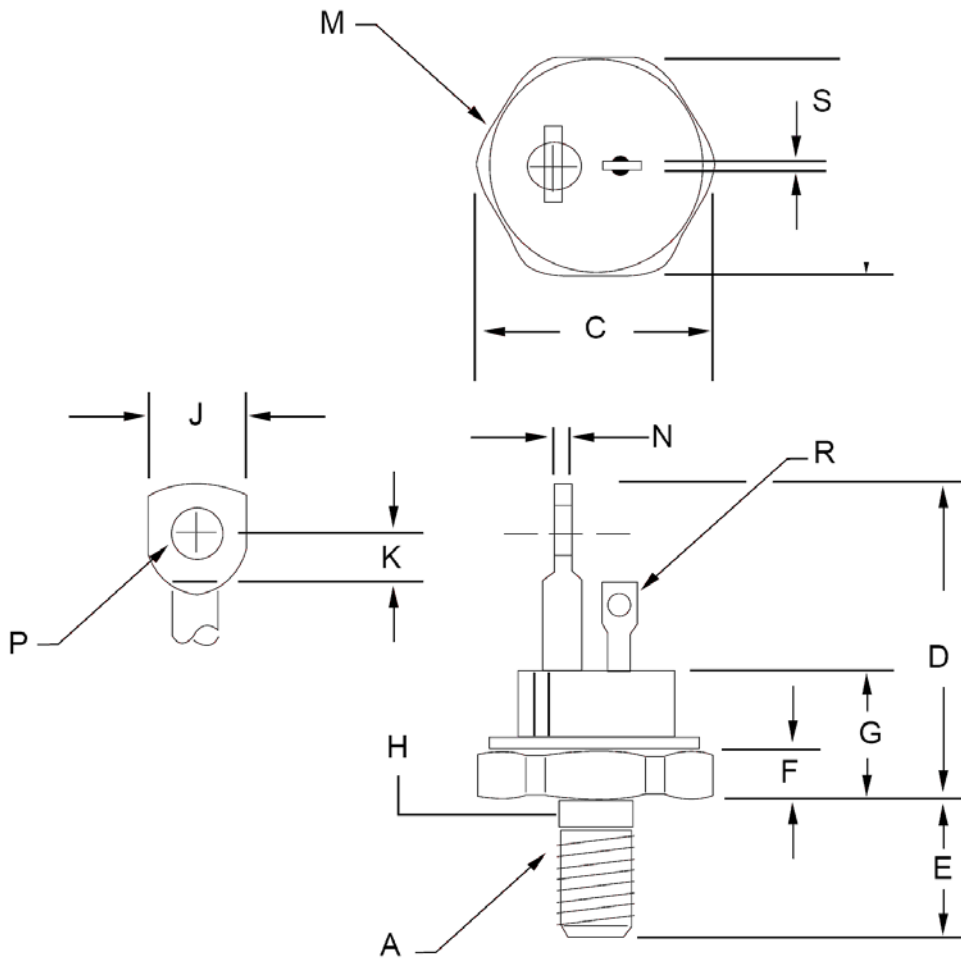


FIGURE 5
Maximum Non-repetitive Surge Current

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