

# C122F1G

## Silicon Controlled Rectifiers

### Reverse Blocking Thyristors

Designed primarily for full-wave ac control applications, such as motor controls, heating controls and power supplies; or wherever half-wave silicon gate-controlled, solid-state devices are needed.

#### Features

- Glass Passivated Junctions and Center Gate Fire for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 50 Volts
- This is a Pb-Free Device\*

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) ( $T_J = 25$ to $100^\circ\text{C}$ , Sine Wave, 50 to 60 Hz; Gate Open)	$V_{\text{DRM}}$ , $V_{\text{RRM}}$	50	V
On-State RMS Current ( $180^\circ$ Conduction Angles; $T_C = 75^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	8.0	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_C = 75^\circ\text{C}$ )	$I_{\text{TSM}}$	90	A
Circuit Fusing Considerations ( $t = 8.3$ ms)	$I^2t$	34	$\text{A}^2\text{s}$
Forward Peak Gate Power (Pulse Width = 10 $\mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$P_{\text{GM}}$	5.0	W
Forward Average Gate Power ( $t = 8.3$ ms, $T_C = 70^\circ\text{C}$ )	$P_{\text{G(AV)}}$	0.5	W
Forward Peak Gate Current (Pulse Width = 10 $\mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$I_{\text{GM}}$	2.0	A
Operating Junction Temperature Range	$T_J$	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-40 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

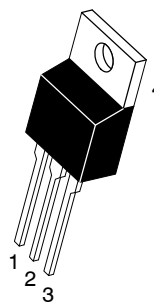
1.  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant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



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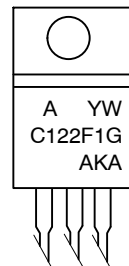
<http://onsemi.com>

SCRs  
8 AMPERES RMS  
50 VOLTS



TO-220AB  
CASE 221A  
STYLE 3

#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
W = Work Week  
C122F1 = Device Code  
G = Pb-Free Package  
AKA = Diode Polarity

#### PIN ASSIGNMENT

1	Cathode
2	Anode
3	Gate
4	Anode

#### ORDERING INFORMATION

Device	Package	Shipping
C122F1G	TO220AB (Pb-Free)	500 Units / Box

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# C122F1G

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.8	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$
Maximum Lead Temperature for Soldering Purposes 1/8 in. from Case for 10 Seconds	$T_L$	260	$^{\circ}\text{C}$

## 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 ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ , Gate Open)	$I_{DRM}, I_{RRM}$	–	–	10	$\mu\text{A}$
$T_C = 25^{\circ}\text{C}$		–	–	0.5	$\text{mA}$
$T_C = 125^{\circ}\text{C}$		–	–		

## ON CHARACTERISTICS

Peak On-State Voltage (Note 2) ( $I_{TM} = 16 \text{ A Peak}$ , $T_C = 25^{\circ}\text{C}$ )	$V_{TM}$	–	–	1.83	V
Gate Trigger Current (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \Omega$ )	$I_{GT}$	–	–	25	$\text{mA}$
$T_C = 25^{\circ}\text{C}$		–	–	40	
$T_C = -40^{\circ}\text{C}$		–	–		
Gate Trigger Voltage (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \Omega$ )	$V_{GT}$	–	–	1.5	V
$T_C = 25^{\circ}\text{C}$		–	–	2.0	
$T_C = -40^{\circ}\text{C}$		–	–		
Gate Non-Trigger Voltage (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \Omega$ , $T_C = 125^{\circ}\text{C}$ )	$V_{GD}$	0.2	–	–	V
Holding Current ( $V_{AK} = 12 \text{ Vdc}$ , Initiating Current = 200 mA, Gate Open)	$I_H$	–	–	30	$\text{mA}$
$T_C = 25^{\circ}\text{C}$		–	–	60	
$T_C = -40^{\circ}\text{C}$		–	–		
Turn-Off Time ( $V_D = \text{Rated } V_{DRM}$ ) ( $I_{TM} = 8 \text{ A}$ , $I_R = 8 \text{ A}$ )	$t_q$	–	50	–	$\mu\text{s}$

## DYNAMIC CHARACTERISTICS

Critical Rate-of-Rise of Off-State Voltage ( $V_{AK} = \text{Rated } V_{DRM}$ , Exponential Waveform, Gate Open, $T_C = 100^{\circ}\text{C}$ )	$dv/dt$	–	50	–	$\text{V}/\mu\text{s}$
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2. Pulse Test: Pulse Width  $\leq 1 \text{ ms}$ , 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

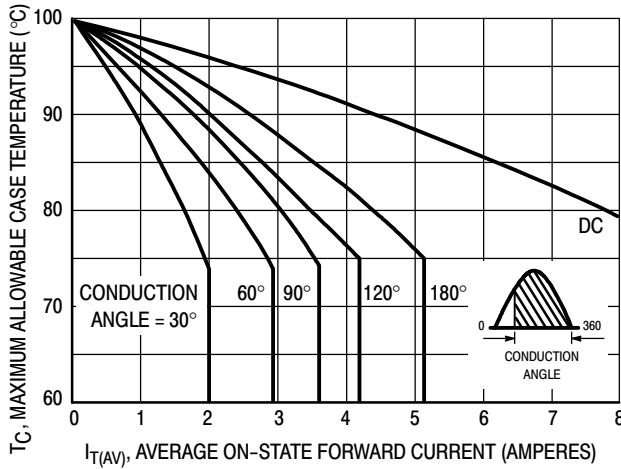
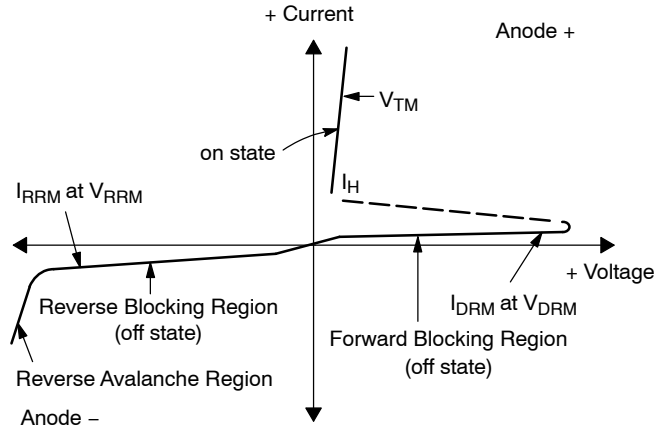


Figure 1. Current Derating (Half-Wave)

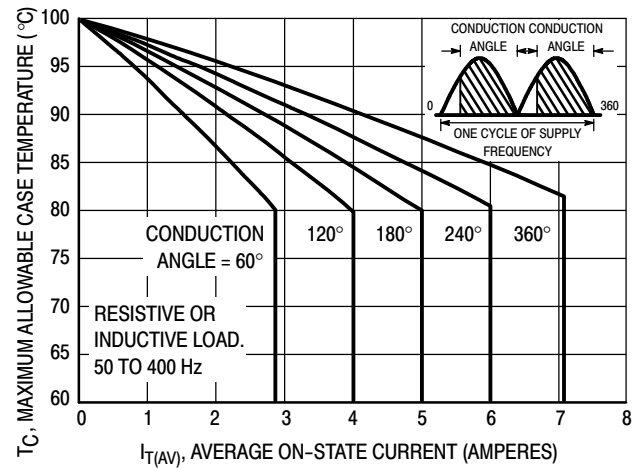


Figure 2. Current Derating (Full-Wave)

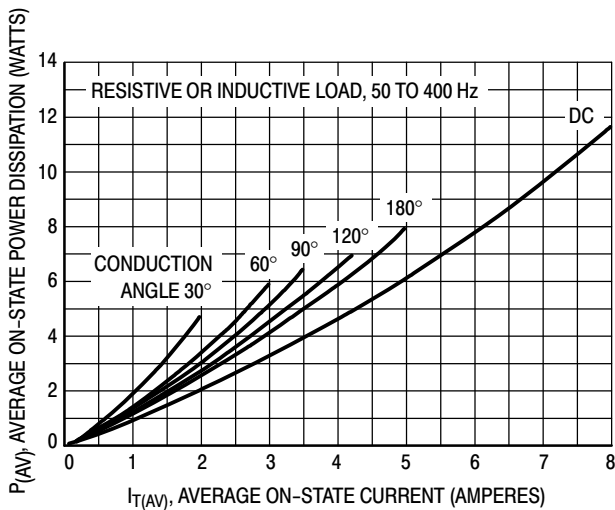


Figure 3. Maximum Power Dissipation (Half-Wave)

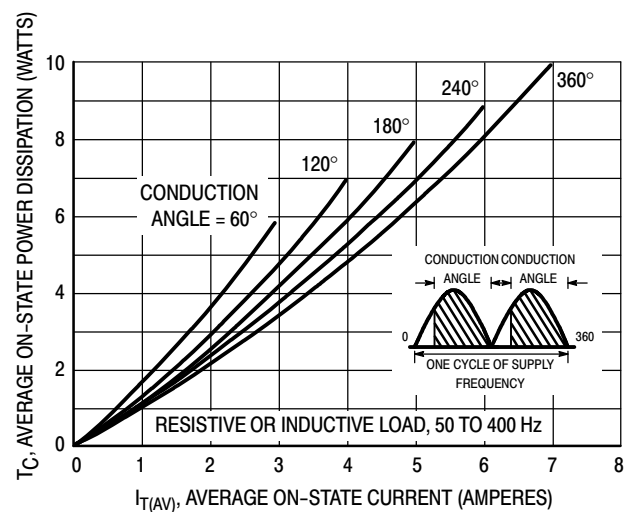
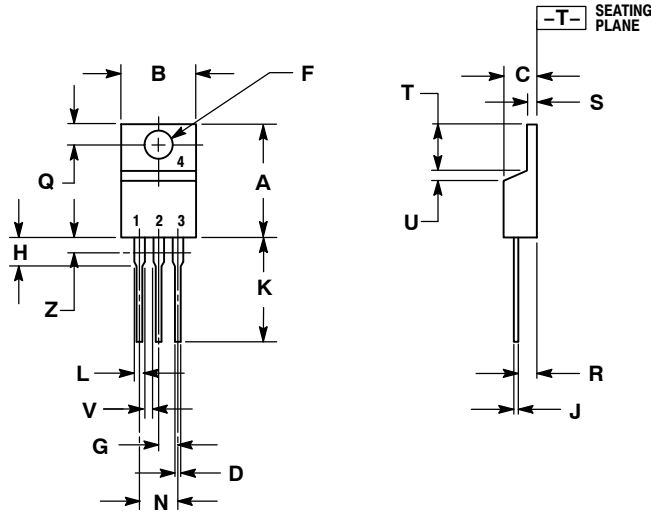


Figure 4. Maximum Power Dissipation (Full-Wave)

# C122F1G

## PACKAGE DIMENSIONS

TO-220AB  
CASE 221A-07  
ISSUE AA




### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

### STYLE 3:

- PIN 1. CATHODE
- 2. ANODE
- 3. GATE
- 4. ANODE

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