

# C122F1, C122B1

## 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 200 Volts
- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1) (T <sub>J</sub> = 25 to 100°C, Sine Wave, 50 to 60 Hz; Gate Open) C122F1 C122B1	V <sub>DRM</sub> , V <sub>RRM</sub>	50 200	V
On-State RMS Current (180° Conduction Angles; T <sub>C</sub> = 75°C)	I <sub>T(RMS)</sub>	8.0	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T <sub>C</sub> = 75°C)	I <sub>TSM</sub>	90	A
Circuit Fusing Considerations (t = 8.3 ms)	I <sup>2</sup> t	34	A <sup>2</sup> s
Forward Peak Gate Power (Pulse Width = 10 μs, T <sub>C</sub> = 70°C)	P <sub>GM</sub>	5.0	W
Forward Average Gate Power (t = 8.3 ms, T <sub>C</sub> = 70°C)	P <sub>G(AV)</sub>	0.5	W
Forward Peak Gate Current (Pulse Width = 10 μs, T <sub>C</sub> = 70°C)	I <sub>GM</sub>	2.0	A
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. V<sub>DRM</sub> and V<sub>RRM</sub> 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.

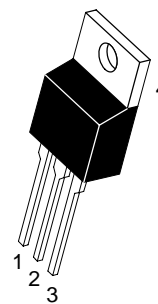
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



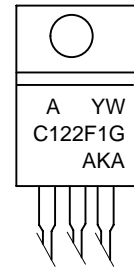
ON Semiconductor®

<http://onsemi.com>

SCRs  
8 AMPERES RMS  
50 thru 200 VOLTS



#### MARKING DIAGRAM



TO-220AB  
CASE 221A  
STYLE 3

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

#### PIN ASSIGNMENT

Pin	Assignment
1	Cathode
2	Anode
3	Gate
4	Anode

#### ORDERING INFORMATION

Device	Package	Shipping
C122F1	TO220AB	500 Units / Box
C122F1G	TO220AB (Pb-Free)	500 Units / Box
C122B1	TO220AB	500 Units / Box
C122B1G	TO220AB (Pb-Free)	500 Units / Box

# C122F1, C122B1

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.8	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$
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 ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}, \text{ Gate Open}$ )	$I_{DRM}, I_{RRM}$	-	-	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	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 ( $V_{AK} = 12 \text{ Vdc}, \text{ Initiating Current} = 200 \text{ mA}, \text{ Gate Open}$ )	$I_H$	-	-	30	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 ( $V_{AK} = \text{Rated } V_{DRM}, \text{ Exponential Waveform}, \text{ Gate Open}, T_C = 100^{\circ}\text{C}$ )	$dv/dt$	-	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

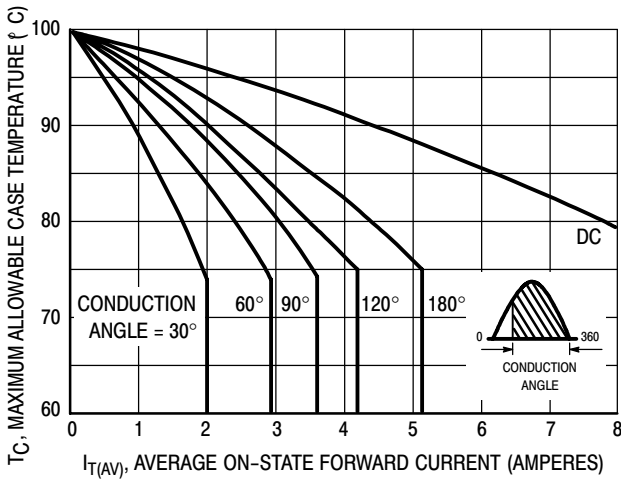
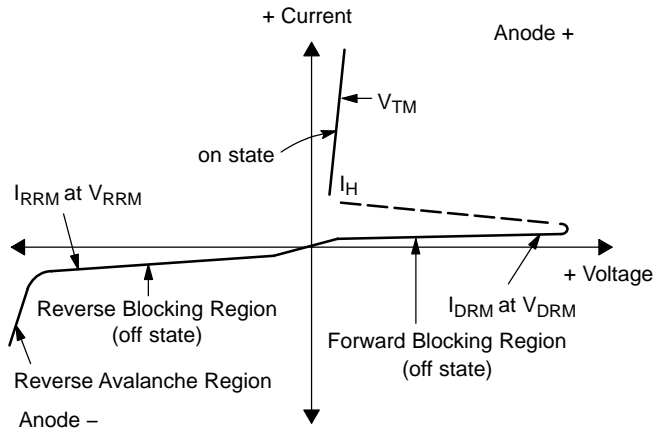


Figure 1. Current Derating (Half-Wave)

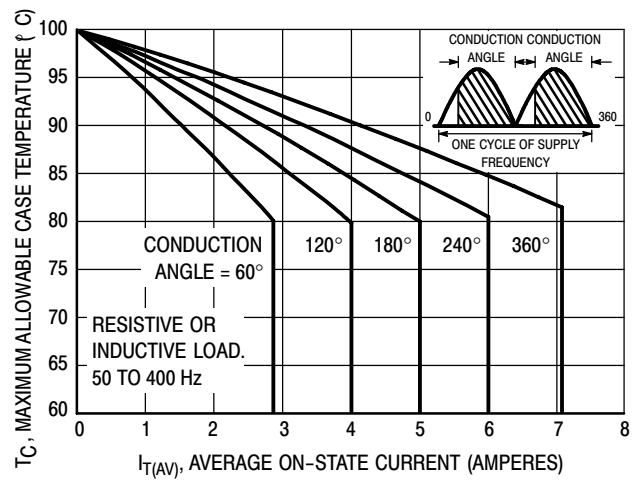


Figure 2. Current Derating (Full-Wave)

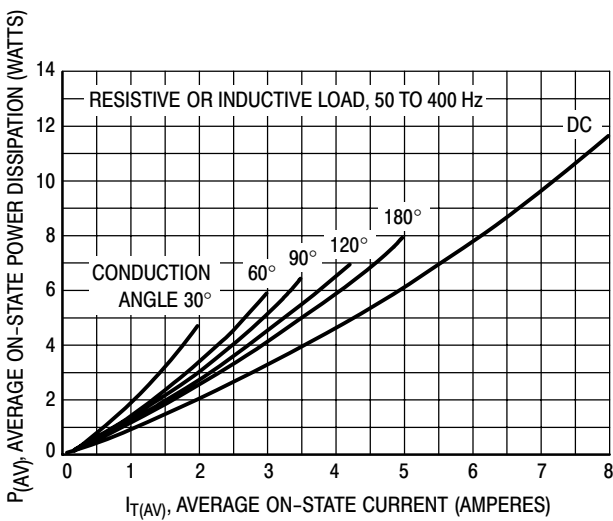


Figure 3. Maximum Power Dissipation (Half-Wave)

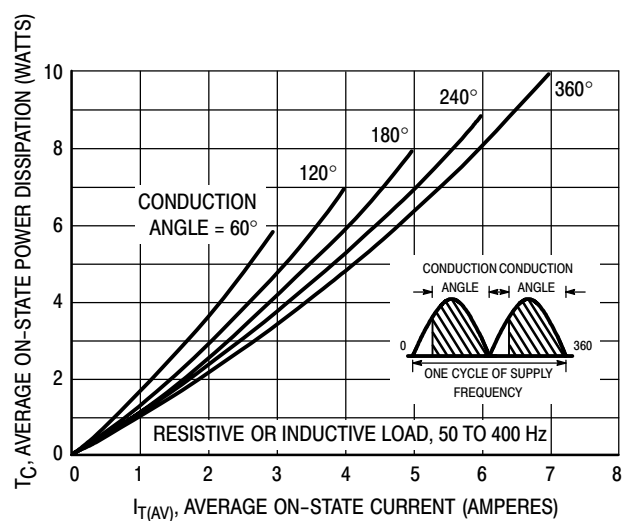
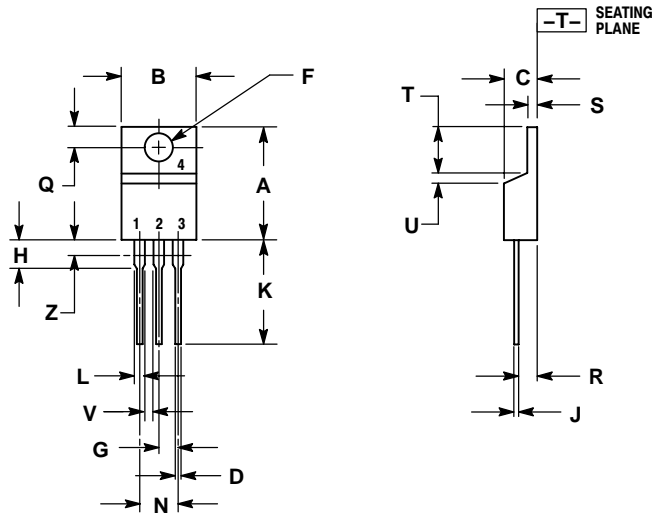


Figure 4. Maximum Power Dissipation (Full-Wave)

# C122F1, C122B1

## 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:
1. CATHODE
  2. ANODE
  3. GATE
  4. ANODE

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