

# 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.

- 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
- Device Marking: Logo, Device Type, e.g., C122F1, 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> ( $T_J = 25$ to $100^\circ\text{C}$ , Sine Wave, 50 to 60 Hz; Gate Open)	$V_{DRM}$ , $V_{RRM}$	50 200	Volts
On-State RMS Current ( $180^\circ$ Conduction Angles; $T_C = 75^\circ\text{C}$ )	$I_T(\text{RMS})$	8.0	Amps
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_C = 75^\circ\text{C}$ )	$I_{TSM}$	90	Amps
Circuit Fusing Considerations ( $t = 8.3$ ms)	$I^2t$	34	$\text{A}^2\text{s}$
Forward Peak Gate Power (Pulse Width = $10 \mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$P_{GM}$	5.0	Watts
Forward Average Gate Power ( $t = 8.3$ ms, $T_C = 70^\circ\text{C}$ )	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current (Pulse Width = $10 \mu\text{s}$ , $T_C = 70^\circ\text{C}$ )	$I_{GM}$	2.0	Amps
Operating Junction Temperature Range	$T_J$	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to +150	$^\circ\text{C}$

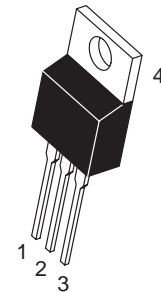
(1)  $V_{DRM}$  and  $V_{RRM}$  for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source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



**ON Semiconductor**

<http://onsemi.com>

**SCRs**  
**8 AMPERES RMS**  
**50 thru 200 VOLTS**



**TO-220AB**  
**CASE 221A**  
**STYLE 3**

PIN ASSIGNMENT	
1	Cathode
2	Anode
3	Gate
4	Anode

#### ORDERING INFORMATION

Device	Package	Shipping
C122F1	TO220AB	500/Box
C122B1	TO220AB	500/Box

# C122F1, C122B1

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.8	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}C/W$
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 ( $V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$ , Gate Open)	$I_{DRM}, I_{RRM}$	—	—	10	$\mu A$
$T_C = 25^{\circ}C$		—	—	0.5	$mA$
$T_C = 125^{\circ}C$		—	—		

## ON CHARACTERISTICS

Peak On-State Voltage <sup>(1)</sup> ( $I_{TM} = 16 \text{ A Peak}$ , $T_C = 25^{\circ}C$ )	$V_{TM}$	—	—	1.83	Volts
Gate Trigger Current (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \text{ Ohms}$ )	$I_{GT}$	—	—	25	$mA$
$T_C = 25^{\circ}C$		—	—	40	
$T_C = -40^{\circ}C$		—	—		
Gate Trigger Voltage (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \text{ Ohms}$ )	$V_{GT}$	—	—	1.5	Volts
$T_C = 25^{\circ}C$		—	—	2.0	
$T_C = -40^{\circ}C$		—	—		
Gate Non-Trigger Voltage (Continuous dc) ( $V_{AK} = 12 \text{ V}$ , $R_L = 100 \text{ Ohms}$ , $T_C = 125^{\circ}C$ )	$V_{GD}$	0.2	—	—	Volts
Holding Current ( $V_{AK} = 12 \text{ Vdc}$ , Initiating Current = 200 $mA$ , Gate Open)	$I_H$	—	—	30	$mA$
$T_C = 25^{\circ}C$		—	—	60	
$T_C = -40^{\circ}C$		—	—		
Turn-Off Time ( $V_D = \text{Rated } V_{DRM}$ ) ( $I_{TM} = 8 \text{ A}$ , $I_R = 8 \text{ A}$ )	$t_q$	—	50	—	$\mu s$

## DYNAMIC CHARACTERISTICS

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

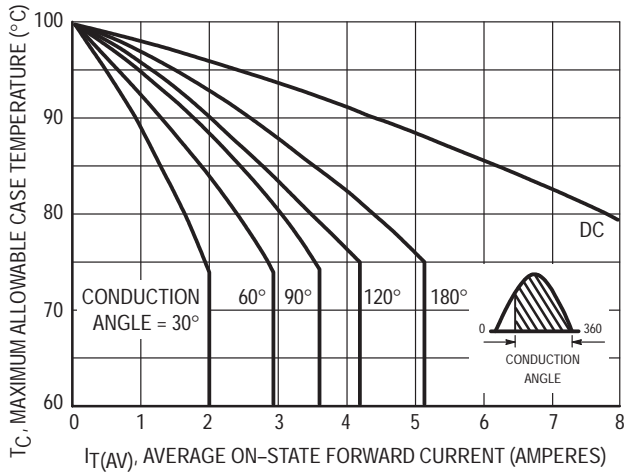
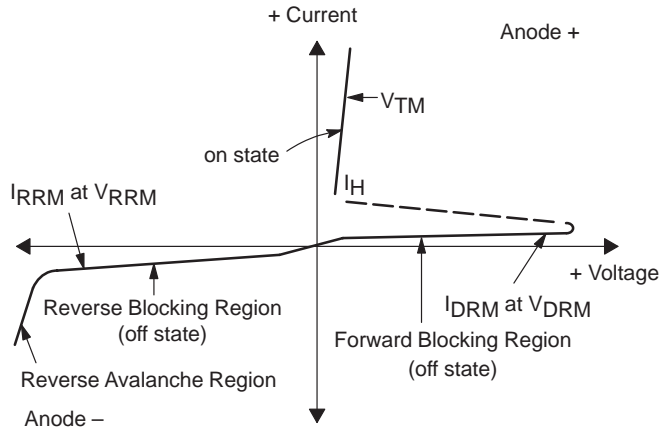


Figure 1. Current Derating (Half-Wave)

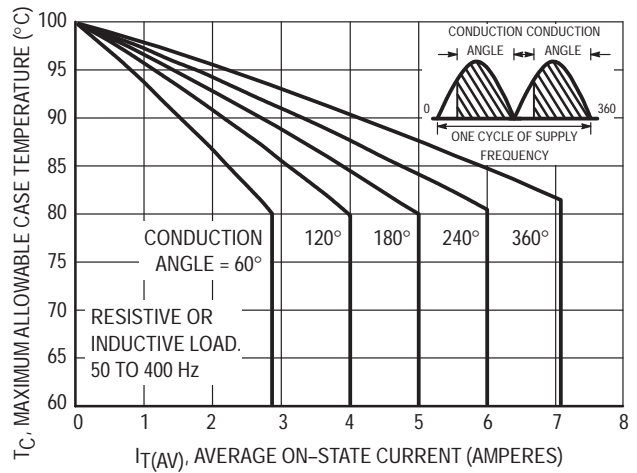


Figure 2. Current Derating (Full-Wave)

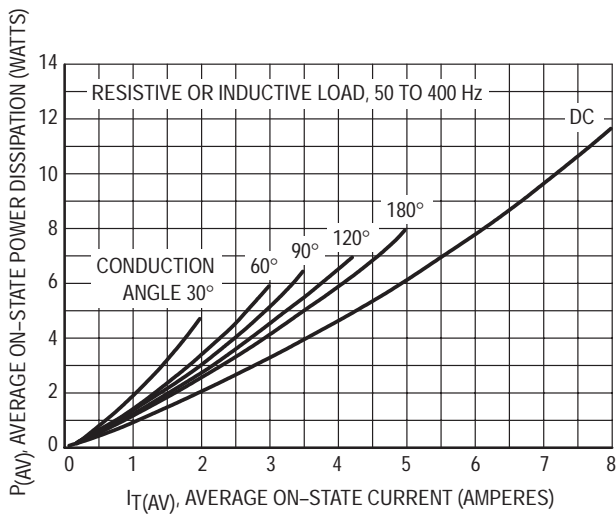


Figure 3. Maximum Power Dissipation (Half-Wave)

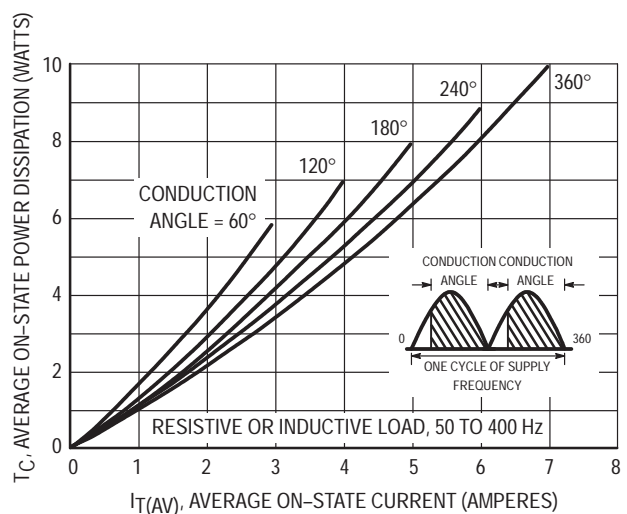
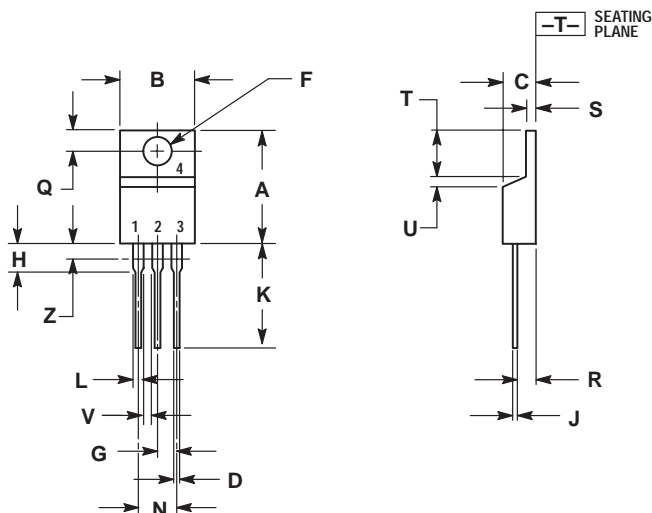


Figure 4. Maximum Power Dissipation (Full-Wave)

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## PACKAGE DIMENSIONS


TO-220AB  
CASE 221A-07  
ISSUE Z



- 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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