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_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage (Note 1) (T_J = 25 to 100°C, Sine Wave, 50 to 60 Hz; Gate Open) C122F1 C122B1	V_{DRM}, V_{RRM}	 50 200	V
On-State RMS Current (180° Conduction Angles; T_C = 75°C)	$I_{T(RMS)}$	8.0	A
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_C = 75°C)	I_{TSM}	90	A
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	34	A^2s
Forward Peak Gate Power (Pulse Width = 10 μs, T_C = 70°C)	P_{GM}	5.0	W
Forward Average Gate Power (t = 8.3 ms, T_C = 70°C)	$P_{G(AV)}$	0.5	W
Forward Peak Gate Current (Pulse Width = 10 μs, T_C = 70°C)	I_{GM}	2.0	A
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−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_{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.
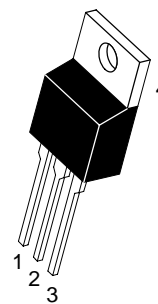
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.
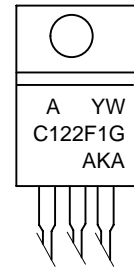
ON Semiconductor®

http://onsemi.com

SCRs
8 AMPERES RMS
50 thru 200 VOLTS

A o—▷|—o K   G

TO−220AB
CASE 221A
STYLE 3

MARKING DIAGRAM

A   YW
C122F1G
AKA

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
C122F1	TO220AB	500 Units / Box
C122F1G	TO220AB (Pb−Free)	500 Units / Box
C122B1	TO220AB	500 Units / Box
C122B1G	TO220AB (Pb−Free)	500 Units / Box

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Publication Order Number:
C122F1/D

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, Gate Open) T_C = 25°C T_C = 125°C	I_{DRM}, I_{RRM}	– –	– –	10 0.5	µA mA
ON CHARACTERISTICS					
Peak On–State Voltage (Note 2) (I_{TM} = 16 A Peak, T_C = 25°C)	V_{TM}	–	–	1.83	V
Gate Trigger Current (Continuous dc) (V_{AK} = 12 V, R_L = 100 Ω) T_C = 25°C T_C = –40°C	I_{GT}	– –	– –	25 40	mA
Gate Trigger Voltage (Continuous dc) (V_{AK} = 12 V, R_L = 100 Ω) T_C = 25°C T_C = –40°C	V_{GT}	– –	– –	1.5 2.0	V
Gate Non–Trigger Voltage (Continuous dc) (V_{AK} = 12 V, R_L = 100 Ω, T_C = 125°C)	V_{GD}	0.2	–	–	V
Holding Current (V_{AK} = 12 Vdc, Initiating Current = 200 mA, Gate Open) T_C = 25°C T_C = –40°C	I_H	– –	– –	30 60	mA
Turn-Off Time (V_D = Rated V_{DRM}) (I_{TM} = 8 A, I_R = 8 A)	t_q	–	50	–	µs
DYNAMIC CHARACTERISTICS					
Critical Rate–of–Rise of Off–State Voltage (V_{AK} = Rated V_{DRM}, Exponential Waveform, Gate Open, T_C = 100°C)	dv/dt	–	50	–	V/µs

2. Pulse Test: Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%.

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Voltage Current Characteristic of SCR

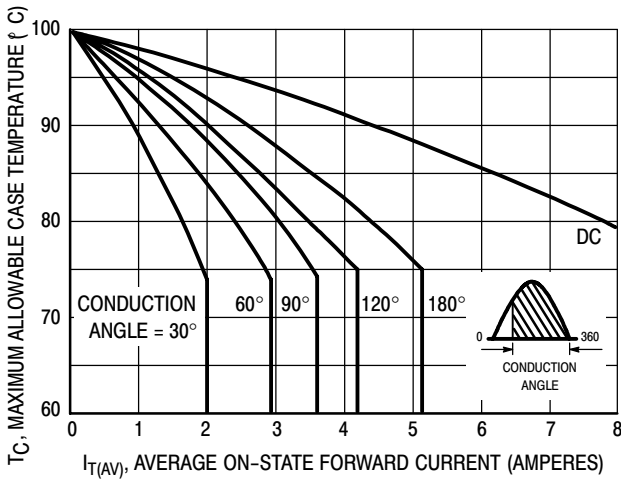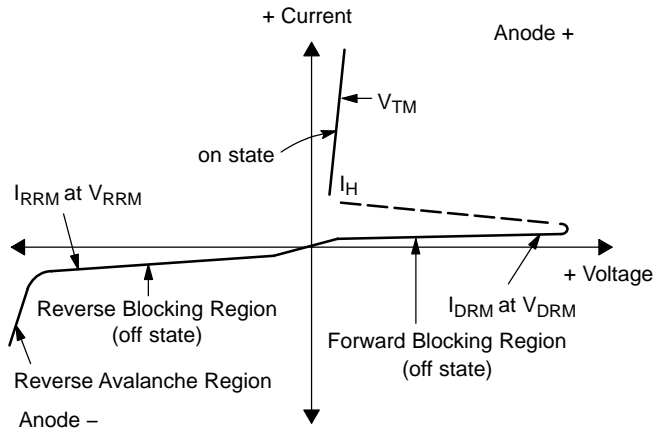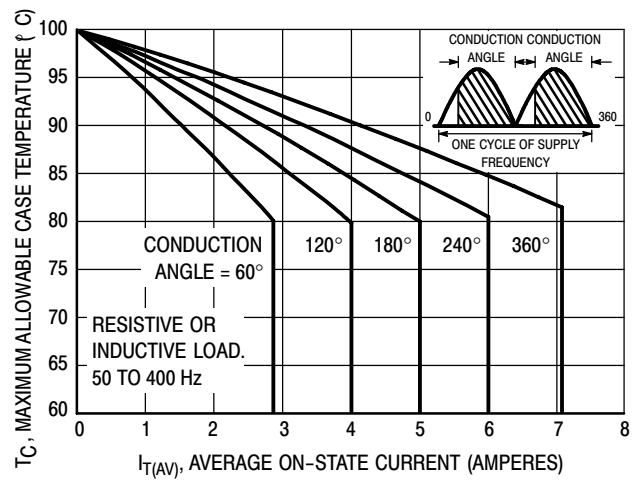| Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current

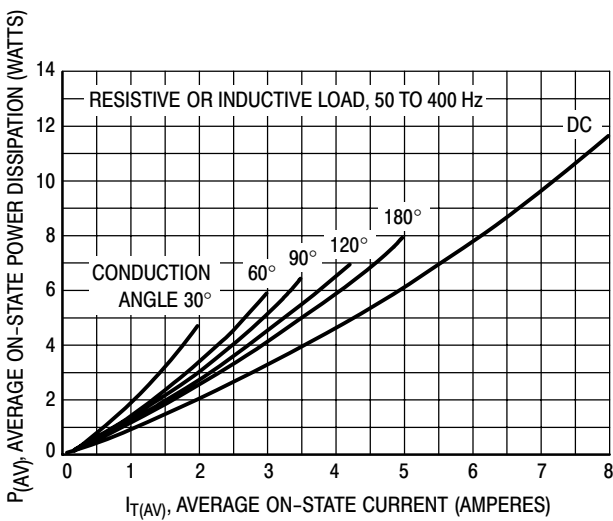Figure 1. Current Derating (Half–Wave)

Figure 2. Current Derating (Full–Wave)

Figure 3. Maximum Power Dissipation
(Half–Wave)
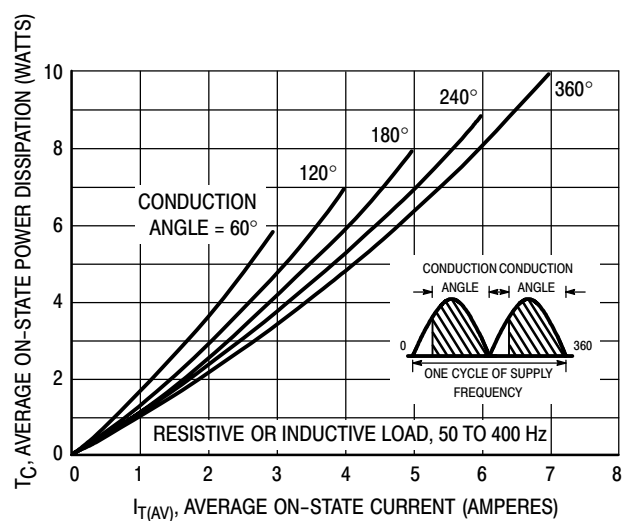
Figure 4. Maximum Power Dissipation
(Full–Wave)

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PACKAGE DIMENSIONS

TO−220AB
CASE 221A−07
ISSUE AA
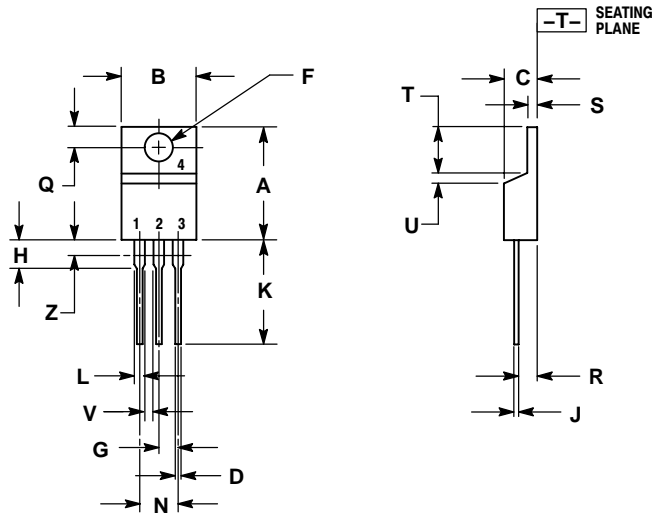
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

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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