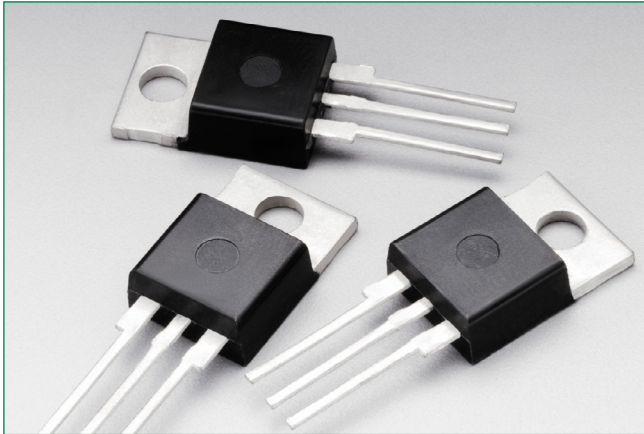


# C122F1G

## Surface Mount – 50V



### Additional Information



Resources



Accessories



Samples

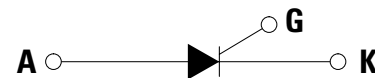
### Description

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.

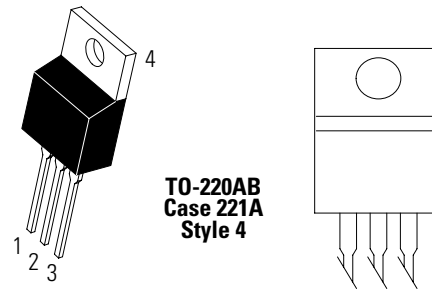
### Features

- 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

### Functional Diagram



### Pin Out



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

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

### Thermal Characteristics

| Rating                                                                         |                       | Symbol          | Value | Unit                 |
|--------------------------------------------------------------------------------|-----------------------|-----------------|-------|----------------------|
| Thermal Resistance                                                             | Junction-to-Case (AC) | $R_{\theta JC}$ | 1.8   | $^{\circ}\text{C/W}$ |
|                                                                                | Junction-to-Ambient   | $R_{\theta JA}$ | 62.5  |                      |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds |                       | $T_L$           | 260   | $^{\circ}\text{C}$   |

### Electrical Characteristics - OFF (T<sub>C</sub> = 25°C unless otherwise noted)

| Characteristic                                                                                           | Symbol                 | Min | Typ | Max | Unit |
|----------------------------------------------------------------------------------------------------------|------------------------|-----|-----|-----|------|
| †Peak Repetitive Blocking Current<br>(V <sub>AK</sub> = V <sub>DRM</sub> = V <sub>RRM</sub> ; Gate Open) | $I_{DRM}$<br>$I_{RRM}$ | -   | -   | 10  | μA   |
|                                                                                                          |                        | -   | -   | 0.5 | mA   |

### Electrical Characteristics - ON (T<sub>C</sub> = 25°C unless otherwise noted; Electricals apply in both directions)

| Characteristic                                                                                                       | Symbol          | Min | Typ | Max  | Unit |
|----------------------------------------------------------------------------------------------------------------------|-----------------|-----|-----|------|------|
| Peak On-State Voltage (Note 2) (I <sub>TM</sub> = 16 A Peak, T <sub>C</sub> = 25°C)                                  | V <sub>TM</sub> | –   | –   | 1.83 | V    |
| Gate Trigger Current (Continuous dc)<br>(V <sub>AK</sub> = 12 V, R <sub>L</sub> = 100 Ω)                             | $I_{GT}$        | –   | –   | 25   | mA   |
|                                                                                                                      |                 | –   | –   | 40   |      |
| Gate Trigger Voltage (Continuous dc)<br>(V <sub>AK</sub> = 12 V, R <sub>L</sub> = 100 Ω)                             | V <sub>GT</sub> | –   | –   | 1.5  | V    |
|                                                                                                                      |                 | –   | –   | 2.0  |      |
| Gate Non-Trigger Voltage (Continuous dc)<br>(V <sub>AK</sub> = 12 V, R <sub>L</sub> = 100 Ω, T <sub>C</sub> = 125°C) | V <sub>GD</sub> | 0.2 | –   | –    |      |
| Holding Current<br>(V <sub>D</sub> = 12 V, Gate Open, Initiating Current = 200 mA)                                   | V <sub>GD</sub> | –   | –   | 30   | mA   |
|                                                                                                                      |                 | –   | –   | 60   |      |
| Turn-Off Time (V <sub>D</sub> = Rated V <sub>DRM</sub> )<br>(I <sub>TM</sub> = 8 A, I <sub>R</sub> = 8 A)            | t <sub>q</sub>  | –   | 30  | –    | μS   |

2. Indicates Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.

### Dynamic Characteristics

| Characteristic                                                                                                                                     | Symbol | Min | Typ | Max | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|-----|-----|------|
| Critical Rate of Rise of Off-State Voltage<br>(V <sub>D</sub> = 0.66 × V <sub>DRM</sub> , Exponential Waveform, Gate Open, T <sub>J</sub> = 100°C) | dV/dt  | –   | 200 | –   | V/μs |

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### Voltage Current Characteristic of SCR

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

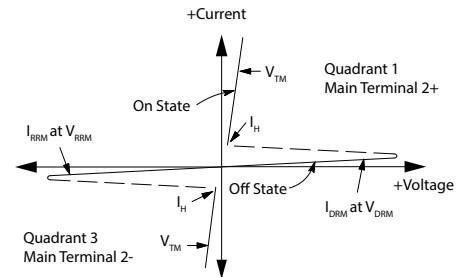


Figure 1. Current Derating (Half-Wave)

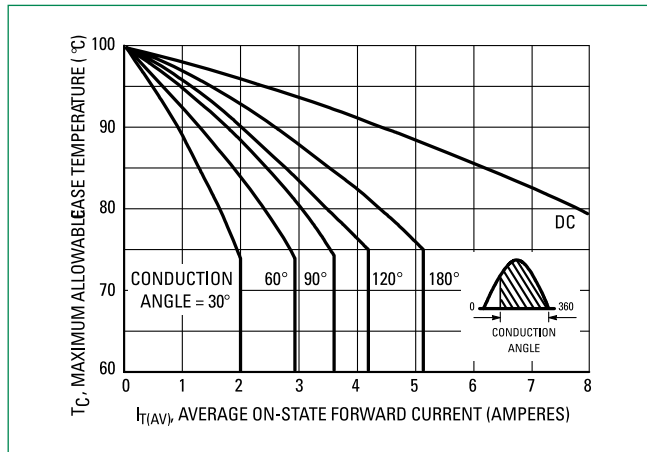


Figure 3. Maximum Power Dissipation (Half-Wave)

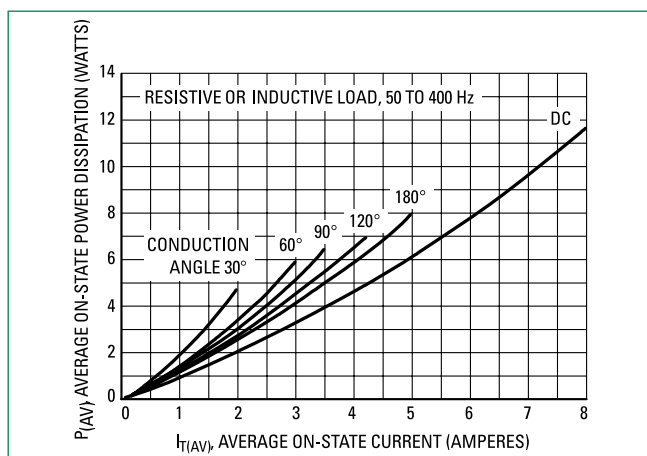


Figure 2. Current Derating (Full-Wave)

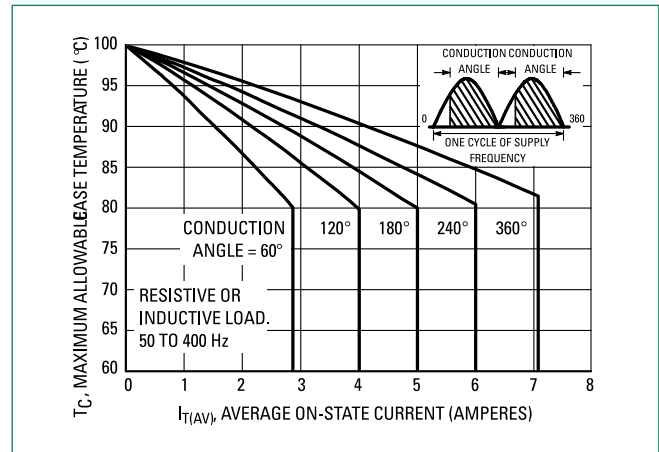
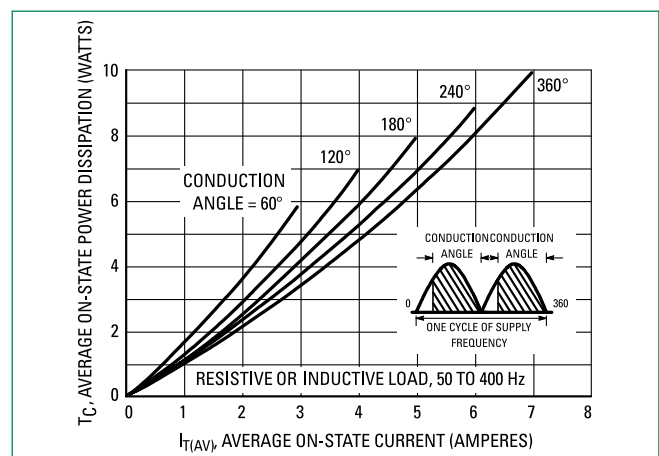


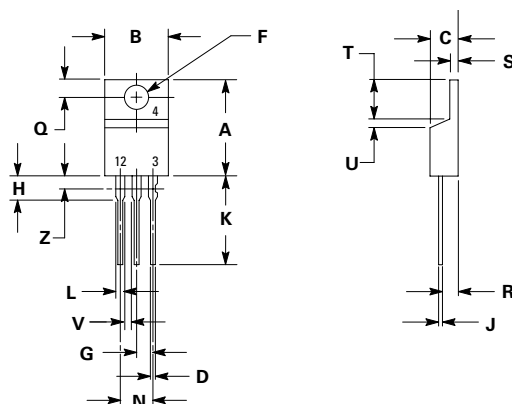
Figure 4. Maximum Power Dissipation (Full-Wave)



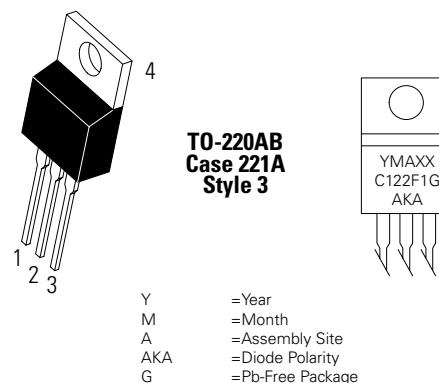
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## Surface Mount – 50V

### Dimensions



### Part Marking System



| Dim | Inches |       | Millimeters |       |
|-----|--------|-------|-------------|-------|
|     | Min    | Max   | Min         | Max   |
| A   | 0.590  | 0.620 | 14.99       | 15.75 |
| B   | 0.380  | 0.420 | 9.65        | 10.67 |
| C   | 0.178  | 0.188 | 4.52        | 4.78  |
| D   | 0.025  | 0.035 | 0.64        | 0.89  |
| F   | 0.142  | 0.147 | 3.61        | 3.73  |
| G   | 0.095  | 0.105 | 2.41        | 2.67  |
| H   | 0.110  | 0.130 | 2.79        | 3.30  |
| J   | 0.018  | 0.024 | 0.46        | 0.61  |
| K   | 0.540  | 0.575 | 13.72       | 14.61 |
| L   | 0.060  | 0.075 | 1.52        | 1.91  |
| N   | 0.195  | 0.205 | 4.95        | 5.21  |
| Q   | 0.105  | 0.115 | 2.67        | 2.92  |
| R   | 0.085  | 0.095 | 2.16        | 2.41  |
| S   | 0.045  | 0.060 | 1.14        | 1.52  |
| 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  |

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.

| Pin Assignment |         |
|----------------|---------|
| 1              | Cathode |
| 2              | Anode   |
| 3              | Gate    |
| 4              | Anode   |

### Ordering Information

| Device  | Package            | Shipping         |
|---------|--------------------|------------------|
| C122F1G | TO-220AB (Pb-Free) | 1000 Units / Box |

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