



## Three Phase Standard And Fast Recovery Rectifiers

### DESCRIPTION

This series of high-current three-phase bridge rectifiers are constructed with hermetically sealed rectifiers built with the same design and construction techniques used in military applications for the upmost in reliability. These include voidless glass encapsulation and internal "Category 1" metallurgical bonds. These 15A to 25A rectifier bridges are available with working peak reverse voltage ratings of 100 to 600 V per leg.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- Current ratings to 25 amps
- $V_{RWM}$  from 100 to 600 volts (see [part nomenclature](#) for all options)
- 150 °C junction temperature
- Surge ratings to 150 amps
- Recovery times to 500 ns
- MIL-PRF-19500 similarity
- RoHS compliant versions available

### APPLICATIONS / BENEFITS

- Electrically isolated aluminum case
- Controlled avalanche characteristics

### MAXIMUM RATINGS

| Parameters/Test Conditions                                    | Symbol              | Value                  | Unit |
|---|---------------------|------------------------|------|
| Junction and Storage Temperature                              | $T_J$ and $T_{STG}$ | -65 to +150            | °C   |
| Thermal Resistance Junction-to-Case<br>(678 and 682 series)   | $R_{\theta JC}$     | 1.5                    | °C/W |
| Thermal Resistance Junction-to-Case<br>(695 and 696 series)   | $R_{\theta JC}$     | 3.0                    | °C/W |
| Maximum Average DC Output Current:<br>@ $T_C = 55\text{ °C}$  | $I_o$               | 25<br>15<br>20<br>15   | A    |
| Maximum Average DC Output Current:<br>@ $T_C = 100\text{ °C}$ | $I_o$               | 18.5<br>9<br>14<br>9   | A    |
| Forward Surge Current (Peak):<br>@ $T_C = 100\text{ °C}$      | $I_{FSM}$           | 150<br>80<br>150<br>60 | A    |
| Solder Temperature @ 10 s                                     |                     | 260                    | °C   |



(Actual appearance may vary)

### NC Package

#### MSC – Lawrence

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

#### MSC – Ireland

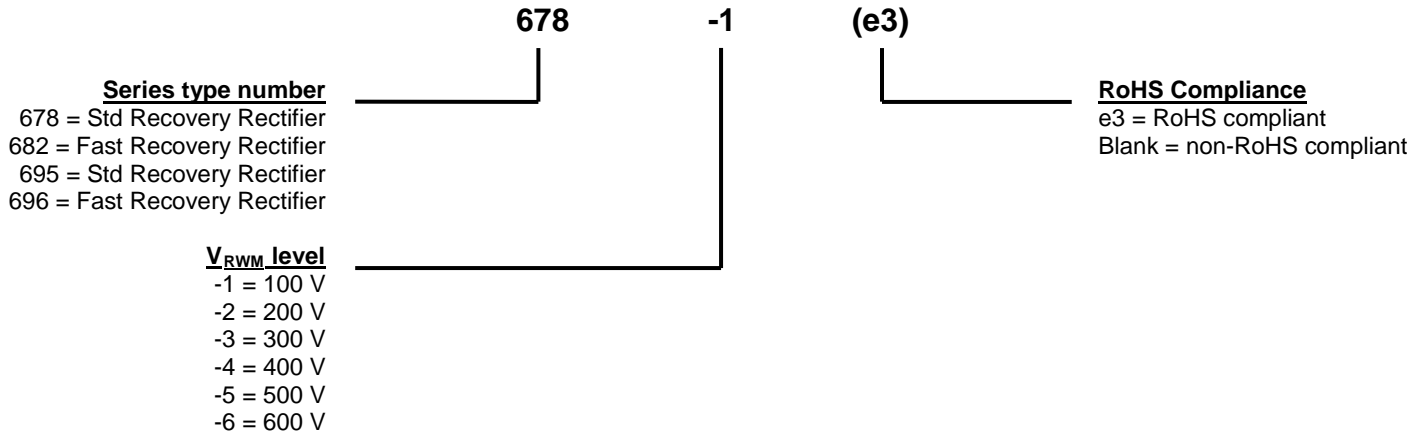
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

#### Website:

[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: Aluminum
- TERMINALS: Tin/lead or RoHS compliant matte tin
- MARKING: Alternating current input: AC  
Cathode positive output: +  
Anode negative: -  
Part number is printed on the body
- WEIGHT: Approximately 30 grams
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**SYMBOLS & DEFINITIONS**

| Symbol     | Definition  |
|------------|---|
| $I_{FSM}$  | Surge Peak Forward Current: The forward current including all nonrepetitive transient currents but excluding all repetitive transients (ref JESD282-B)  |
| $I_O$      | Average Rectified Output Current: The Output Current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.  |
| $V_F$      | Forward Voltage: A positive dc anode-cathode voltage the device will exhibit at a specified forward current.  |
| $I_R$      | Reverse Current: The dc current flowing from the external circuit into the cathode terminal at the specified voltage $V_R$ .  |
| $V_{(BR)}$ | Breakdown Voltage: A voltage in the breakdown region.   |
| $V_{RWM}$  | Working Peak Reverse Voltage: The peak voltage excluding all transient voltages (ref JESD282-B). Also sometimes known historically as PIV.  |
| $t_{rr}$   | Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified decay point after a peak reverse current occurs. |

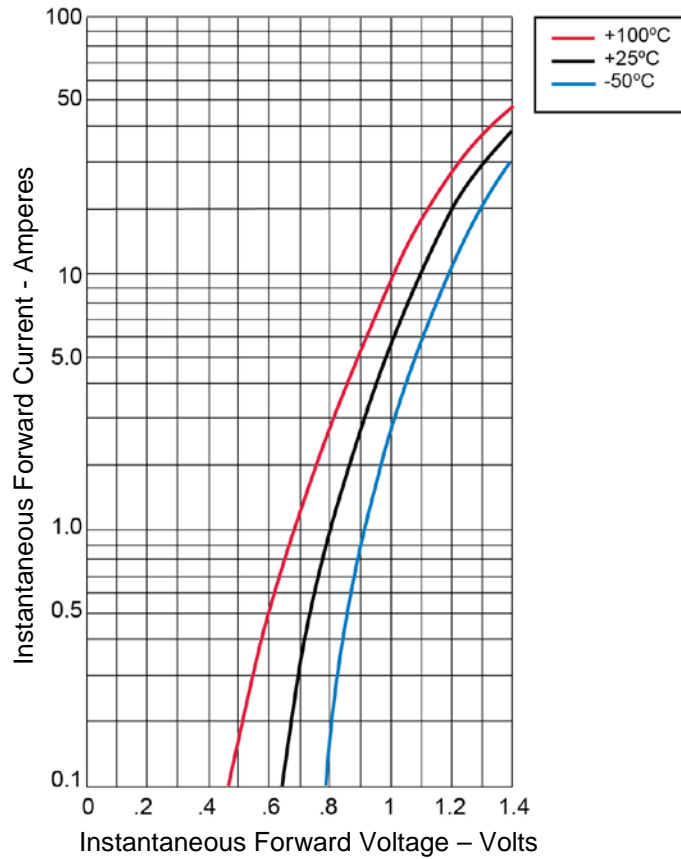
**ELECTRICAL CHARACTERISTICS**

| PART NUMBER<br>(Note 1) | MAX FORWARD VOLTAGE PER LEG<br>$V_F$<br>(Note 2) | MAX REVERSE PEAK CURRENT<br>$I_R @ V_{RWM}$<br>(Note 1) |          | MAX RECOVERY TIME<br>$t_{rr}$<br>( $I_F = 1.0 A$ ,<br>$I_{RM} = 1.0 A$ ,<br>$I_{R(REC)} = 0.5 A$ ) |
|-------------------------|--|---|----------|--|
|                         | @ 25 °C  | @ 25 °C   | @ 100 °C |  |
|                         | Volts  | $\mu A$   | $\mu A$  | ns   |
| <b>678</b>              | 1.2 @ 10 A                                       | 10  | 200      | -  |
| <b>682</b>              | 1.2 @ 6 A  | 10  | 200      | 500  |
| <b>695</b>              | 1.2 @ 2 A  | 5   | 150      | -  |
| <b>696</b>              | 1.2 @ 2 A  | 5   | 150      | 500  |

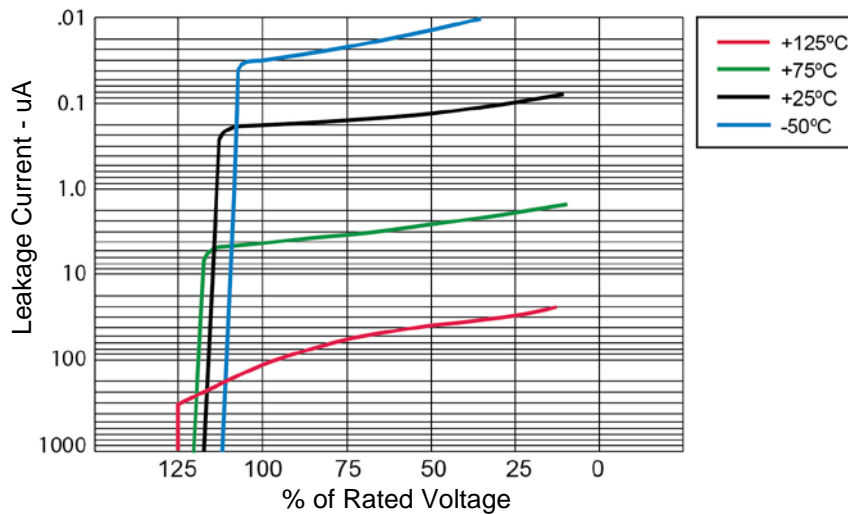
**NOTES:** 1. MAX WORKING PEAK REVERSE VOLTAGE ( $V_{RWM}$ ) numbering:

| PART NUMBER   |              |               |              | WORKING PEAK REVERSE VOLTAGE<br>$V_{RWM}$ | MINIMUM BREAKDOWN VOLTAGE<br>$V_{(BR)}$ |
|---------------|--------------|---------------|--------------|---|---|
| Std. Recovery |              | Fast Recovery |              | Volts                                     | Volts                                   |
| <b>678-1</b>  | <b>695-1</b> | <b>682-1</b>  | <b>696-1</b> | 100                                       | 110                                     |
| <b>678-2</b>  | <b>695-2</b> | <b>682-2</b>  | <b>696-2</b> | 200                                       | 220                                     |
| <b>678-3</b>  | <b>695-3</b> | <b>682-3</b>  | <b>696-3</b> | 300                                       | 330                                     |
| <b>678-4</b>  | <b>695-4</b> | <b>682-4</b>  | <b>696-4</b> | 400                                       | 440                                     |
| <b>678-5</b>  | <b>695-5</b> | <b>682-5</b>  | <b>696-5</b> | 500                                       | 550                                     |
| <b>678-6</b>  | <b>695-6</b> | <b>682-6</b>  | <b>696-6</b> | 600                                       | 660                                     |

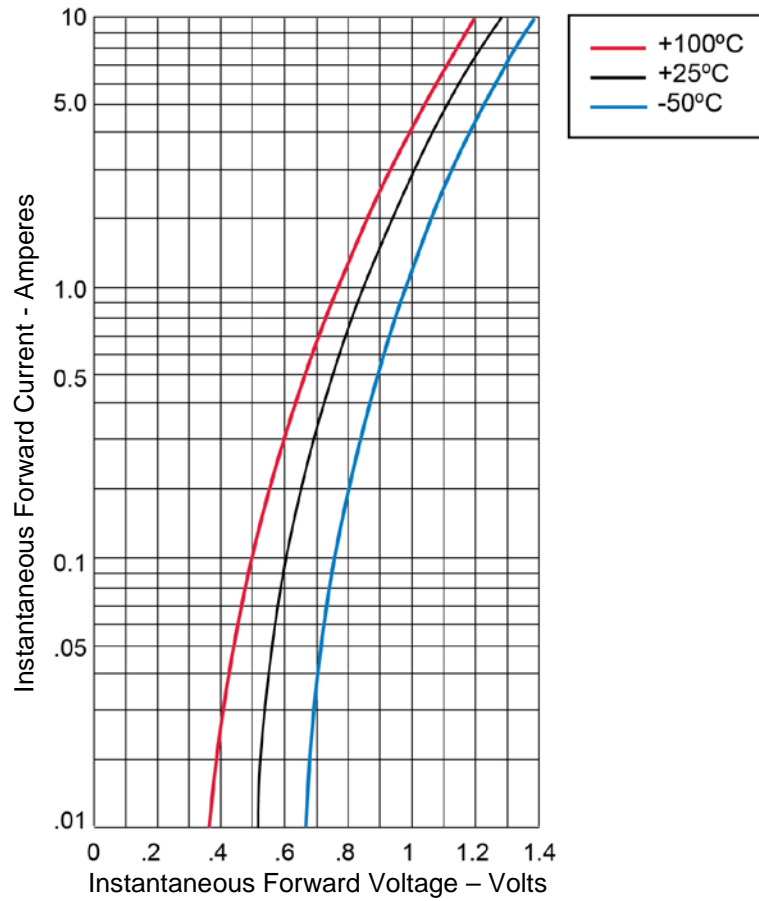
2. Pulse test: Pulse width 300  $\mu$ sec, duty cycle 2%.

**GRAPHS**


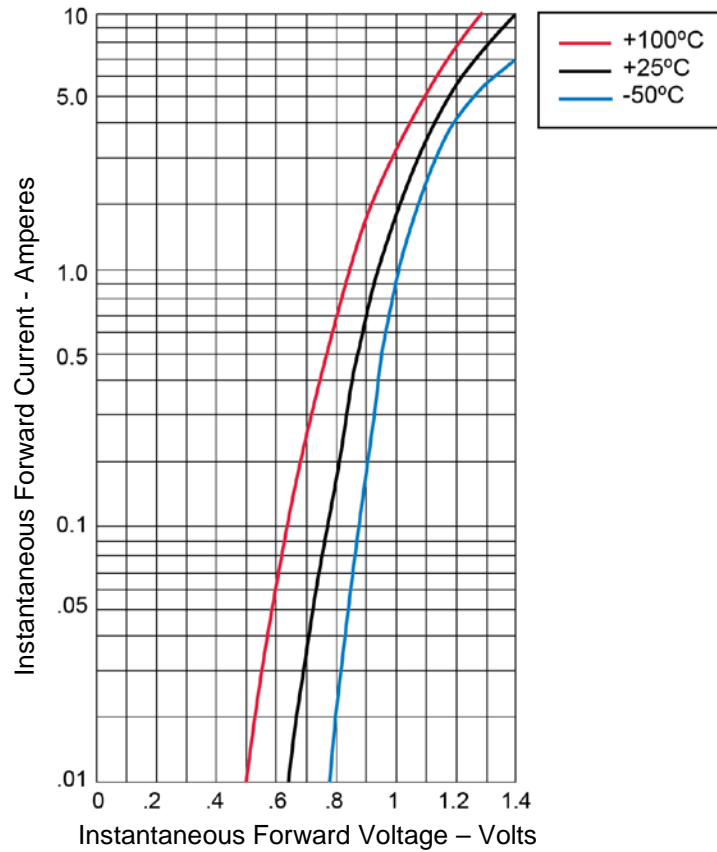
**FIGURE 1**  
Typical Forward Characteristics – Per Leg 678 Series



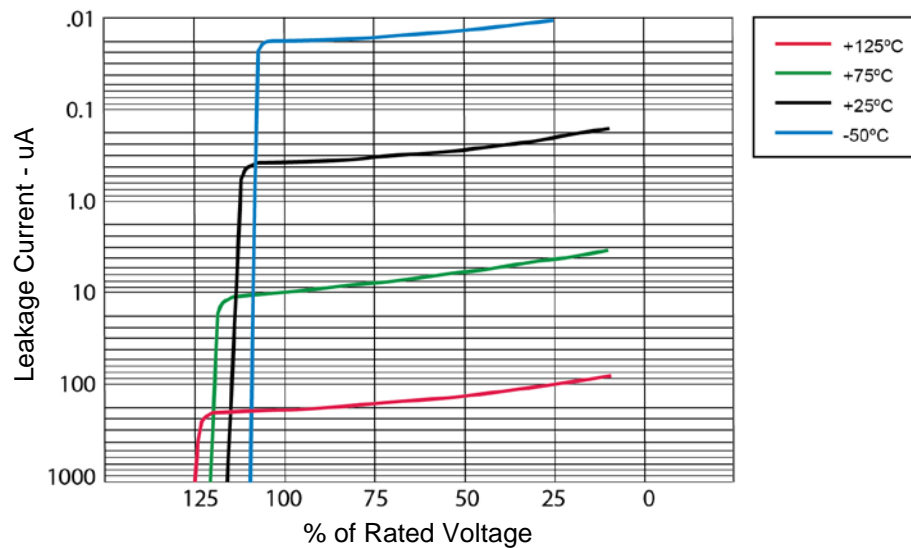
**FIGURE 2**  
Typical Reverse Leakage Current – Per Leg 678 & 682 Series

**GRAPHS (continued)**


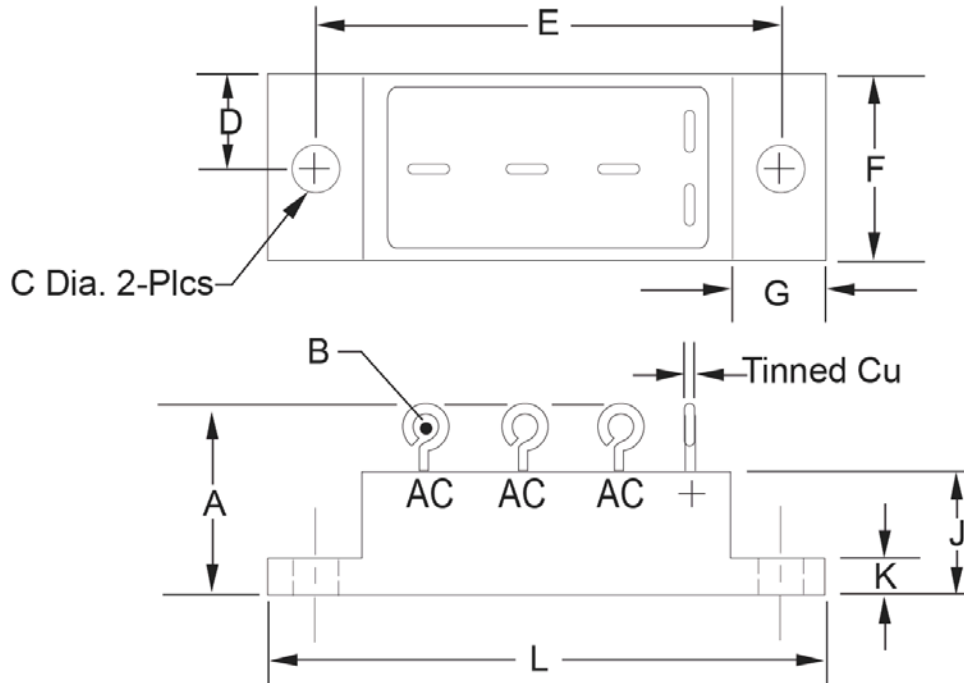
**FIGURE 3**  
Typical Forward Characteristics – Per Leg 682 Series

**GRAPHS (continued)**


**FIGURE 5**  
Typical Forward Characteristics – Per Leg 695 & 696 Series



**FIGURE 6**  
Typical Reverse Leakage Current – Per Leg 695 & 696 Series

**PACKAGE DIMENSIONS**


| Ltr     | Dimensions |       | Dimensions  |       |
|---------|------------|-------|-------------|-------|
|         | Inches     |       | Millimeters |       |
|         | MIN        | MAX   | MIN         | MAX   |
| A       | -          | 0.820 |             | 20.83 |
| B       | 0.09 TYP   |       | 2.29 TYP    |       |
| C (dia) | 0.164      | 0.174 | 4.17        | 4.42  |
| D       | 0.365      | 0.385 | 9.27        | 9.78  |
| E       | 1.870      | 1.880 | 47.50       | 47.75 |
| F       | 0.740      | 0.760 | 18.80       | 19.30 |
| G       | 0.370      | 0.390 | 9.40        | 9.91  |
| H       | 0.40 TYP   |       | 1.02 TYP    |       |
| J       | 0.486      | 0.506 | 12.34       | 12.85 |
| K       | 0.115      | 0.135 | 2.92        | 3.42  |
| L       | 2.240      | 2.260 | 56.90       | 57.40 |

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