

# Super Fast Surface Mount Rectifiers

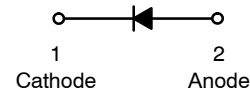
## US1AFA-US1MFA

### Features

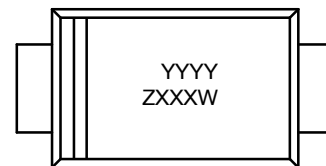
- Glass Passivated Chip Junction
- Low Power Loss, High Efficiency
- Fast Switching Reverse Recovery Time: 50~75 ns Maximum
- High Surge Capacity
- UL Flammability 94V-0 Classification
- MSL 1 per J-STD-020
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



SOD-123FL  
CASE 425AB



### MARKING DIAGRAM



YYY Y = Binary Calendar Year Code Scheme  
Z = Assembly Plant Code  
XXX = Specific Device Code  
W = Single Digit Week Code

### ORDERING INFORMATION

| Part Number        | Device Code Marking | Package                               | Shipping <sup>†</sup> |
|--------------------|---------------------|---------------------------------------|-----------------------|
| US1AFA, NRVUS1AFA* | HAL                 | SOD-123FL<br>(Pb-Free / Halogen Free) | 3,000 / Tape & Reel   |
| US1BFA, NRVUS1BFA* | HBL                 |                                       |                       |
| US1DFA, NRVUS1DFA* | HDL                 |                                       |                       |
| US1FFA, NRVUS1FFA* | HFL                 |                                       |                       |
| US1GFA, NRVUS1GFA* | HGL                 |                                       |                       |
| US1JFA, NRVUS1JFA* | HJL                 |                                       |                       |
| US1KFA, NRVUS1KFA* | HKL                 |                                       |                       |
| US1MFA, NRVUS1MFA* | HML                 |                                       |                       |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

# US1AFA-US1MFA

## ABSOLUTE MAXIMUM RATINGS (Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol      | Parameter                                                                           | US1 AFA     | US1 BFA | US1 DFA | US1 FFA | US1 GFA | US1 JFA | US1 KFA | US1 MFA | Unit             |
|-------------|-------------------------------------------------------------------------------------|-------------|---------|---------|---------|---------|---------|---------|---------|------------------|
| $V_{RRM}$   | Repetitive Peak Reverse Voltage                                                     | 50          | 100     | 200     | 300     | 400     | 600     | 800     | 1000    | V                |
| $V_{RMS}$   | RMS Reverse Voltage                                                                 | 35          | 70      | 140     | 210     | 280     | 420     | 560     | 700     | V                |
| $V_R$       | DC Blocking Voltage                                                                 | 50          | 100     | 200     | 300     | 400     | 600     | 800     | 1000    | V                |
| $I_{F(AV)}$ | Average Forward Rectified Current                                                   | 1           |         |         |         |         |         |         |         | A                |
| $I_{FSM}$   | Peak Forward Surge Current: 8.3 ms Single Half Sine-Wave Superimposed on Rated Load | 30          |         |         |         |         |         |         |         | A                |
| $T_J$       | Operating Junction Temperature Range                                                | -55 to +150 |         |         |         |         |         |         |         | $^\circ\text{C}$ |
| $T_{STG}$   | Storage Temperature Range                                                           | -55 to +150 |         |         |         |         |         |         |         | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## THERMAL CHARACTERISTICS (Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol          | Parameter                                       | Value | Unit                      |
|-----------------|-------------------------------------------------|-------|---------------------------|
| $\Psi_{JL}$     | Typical Thermal Resistance, Junction to Lead    | 21    | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Typical Thermal Resistance, Junction to Ambient | 153   | $^\circ\text{C}/\text{W}$ |

NOTE: Device mounted at minimum pad.

## ELECTRICAL CHARACTERISTICS (Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted)

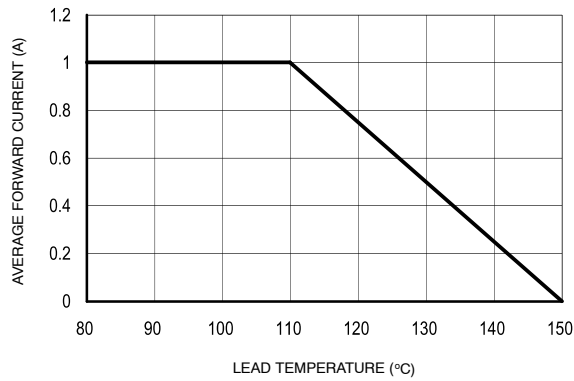
| Symbol          | Parameter                                       | Conditions                                                                   | US1<br>AFA | US1<br>BFA | US1<br>DFA | US1<br>FFA | US1<br>GFA | US1<br>JFA | US1<br>KFA | US1<br>MFA | Unit |
|-----------------|-------------------------------------------------|------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------|
| V <sub>F</sub>  | Maximum Instantaneous Forward Voltage (Note 1)  | I <sub>F</sub> = 1 A                                                         | 0.95       |            |            |            | 1.30       | 1.70       |            |            | V    |
| I <sub>R</sub>  | Maximum Reverse Current at Rated V <sub>R</sub> | T <sub>J</sub> = 25°C                                                        | 5          |            |            |            |            |            |            |            | μA   |
|                 |                                                 | T <sub>J</sub> = 125°C                                                       | 150        |            |            |            |            |            |            |            |      |
| C <sub>J</sub>  | Typical Junction Capacitance                    | V <sub>R</sub> = 4.0 V,<br>f = 1.0 MHz                                       | 20         |            |            |            |            | 15         |            |            | pF   |
| T <sub>rr</sub> | Maximum Reverse Recovery Time                   | I <sub>F</sub> = 0.5 A,<br>I <sub>R</sub> = 1 A,<br>I <sub>rr</sub> = 0.25 A | 50         |            |            |            |            | 75         |            |            | ns   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

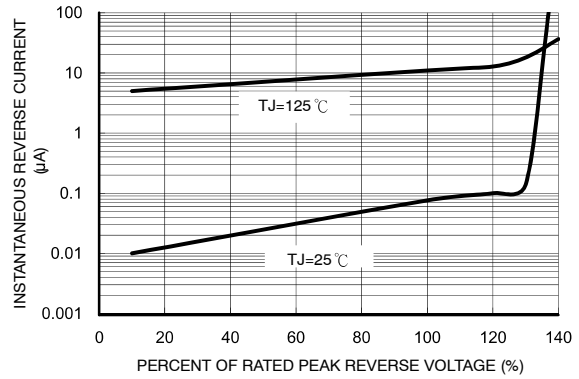
1. Pulse test with  $PW = 300\text{ }\mu\text{s}$ , 1% duty cycle.

# US1AFA-US1MFA

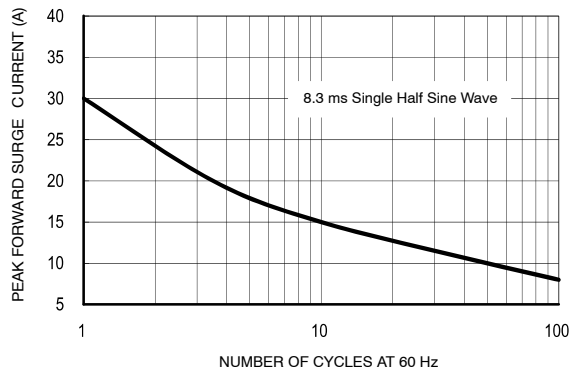
## TYPICAL PERFORMANCE CHARACTERISTICS



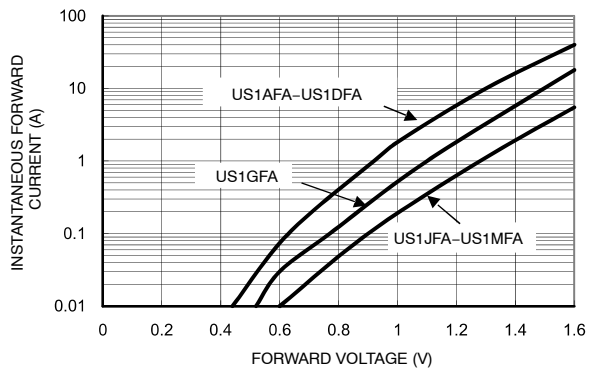
**Figure 1. Maximum Forward Current Derating Voltage**



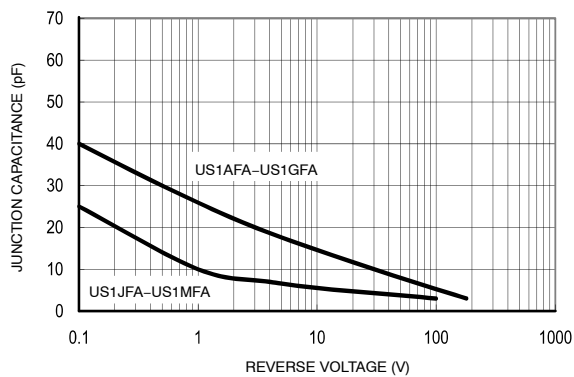
**Figure 2. Typical Reverse Characteristics**



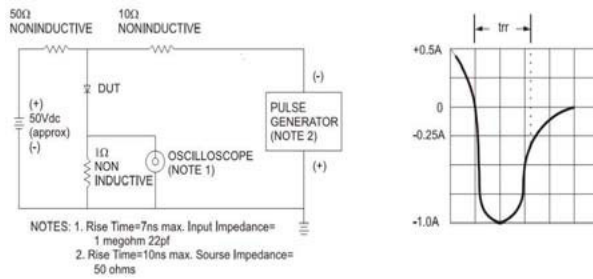
**Figure 3. Maximum Non-Repetitive Forward Surge Current**



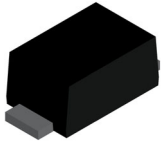
**Figure 4. Typical Instantaneous Forward Characteristics**



**Figure 5. Typical Junction Capacitance**

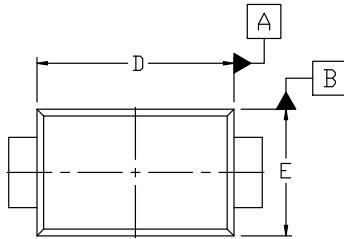


**Figure 6. Reverse Recovery Time Characteristic and Test Circuit Diagram**

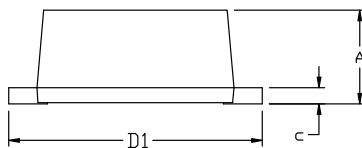


**SOD-123FA**  
**CASE 425AB**  
**ISSUE A**

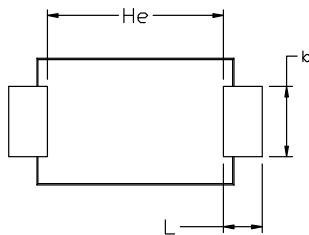
DATE 11 AUG 2022



TOP VIEW



FRONT VIEW

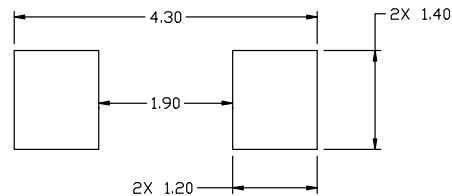


BOTTOM VIEW

NOTES:

1. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND THE BAR PROTRUSIONS.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 1.23        | 1.33 | 1.43 |
| b   | 0.80        | 1.00 | 1.20 |
| c   | 0.16        | 0.23 | 0.30 |
| D   | 2.70        | 2.80 | 2.90 |
| D1  | 3.40        | 3.60 | 3.80 |
| E   | 1.70        | 1.80 | 1.90 |
| He  | 2.45        | ---  | 2.60 |
| L   | 0.35        | 0.60 | 0.85 |



**RECOMMENDED**  
**MOUNTING FOOTPRINT\***

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

|                         |                    |                                                                                                                                                                                  |
|-------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DOCUMENT NUMBER:</b> | <b>98AON13722G</b> | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| <b>DESCRIPTION:</b>     | <b>SOD-123FA</b>   | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at  
[www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)