



## VOIDLESS HERMETICALLY SEALED SURFACE MOUNT STANDARD RECOVERY GLASS RECTIFIERS

*Qualified to MIL-PRF-19500/420*

*Qualified Levels:  
JAN, JANTX, JANTXV  
and JANS*

### DESCRIPTION

This "standard recovery" surface mount rectifier diode series is military qualified and is ideal for high-reliability applications where a failure cannot be tolerated. These industry-recognized 5.0 amp rated rectifiers for working peak reverse voltages from 200 to 1000 volts are hermetically sealed with voidless-glass construction using an internal "Category 1" metallurgical bond. These devices are also available in axial-leaded packages for thru-hole mounting. Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time speeds.

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

### FEATURES

- Surface mount equivalent of JEDEC registered 1N5550 thru 1N5554 series.
- Voidless hermetically sealed glass package.
- Extremely robust construction.
- Quadruple-layer passivation.
- Internal "Category 1" metallurgical bonds.
- JAN, JANTX, JANTXV and JANS qualified versions available per MIL-PRF-19500/420.
- RoHS compliant versions available (commercial grade only).

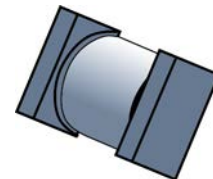
### APPLICATIONS / BENEFITS

- Standard recovery 5 amp 200 to 1000 volts rectifiers series.
- Military and other high-reliability applications.
- General rectifier applications including bridges, half-bridges, catch diodes, etc.
- High forward surge current capability.
- Low thermal resistance.
- Controlled avalanche with peak reverse power capability.
- Extremely robust construction.
- Inherently radiation hard as described in Microsemi "[MicroNote 050](#)".

### MAXIMUM RATINGS @ $T_A = 25^\circ\text{C}$ unless otherwise noted.

| Parameters/Test Conditions                                                                                 | Symbol                  | Value       | Unit               |
|------------------------------------------------------------------------------------------------------------|-------------------------|-------------|--------------------|
| Junction and Storage Temperature                                                                           | $T_J$ and $T_{STG}$     | -65 to +175 | $^\circ\text{C}$   |
| Thermal Resistance Junction-to-End Cap                                                                     | $R_{\theta JEC}$        | 6.5         | $^\circ\text{C/W}$ |
| Thermal Impedance @ 10 ms heating time <sup>(1)</sup>                                                      | $Z_{\theta JX}$         | 1.5         | $^\circ\text{C/W}$ |
| Maximum Forward Surge Current (8.3 ms half sine)                                                           | $I_{FSM}$               | 100         | A                  |
| Average Rectified Forward Current <sup>(2)</sup> @ $T_{EC} = 130^\circ\text{C}$                            | $I_{OL}$                | 5           | A                  |
| Average Rectified Forward Current <sup>(3)</sup> @ $T_A = 55^\circ\text{C}$<br>@ $T_A = 100^\circ\text{C}$ | $I_{O2}$ <sup>(2)</sup> | 3           | A                  |
|                                                                                                            | $I_{O3}$ <sup>(4)</sup> | 2           | A                  |
| Working Peak Reverse Voltage                                                                               | $V_{RWM}$               | 200         | V                  |
|                                                                                                            |                         | 400         |                    |
|                                                                                                            |                         | 600         |                    |
|                                                                                                            |                         | 800         |                    |
|                                                                                                            |                         | 1000        |                    |
| Solder Temperature @ 10 s                                                                                  | $T_{SP}$                | 260         | $^\circ\text{C}$   |

See notes on next page.



**"B" SQ-MELF (D-5B)  
Package**

Also available in:

**"B" Package**  
(axial-leaded)

 [1N5550 – 1N5554](#)

#### **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)

## MAXIMUM RATINGS

- Notes:**
- Derate linearly at 66.6 mA/°C above  $T_{EC} = 100^{\circ}\text{C}$ . An  $I_O$  of up to 6 Amps is allowable provided that appropriate heat sinking or forced air cooling maintains the junction temperature at or below  $+200^{\circ}\text{C}$ .
  - Derate linearly at 22.2 mA/°C from  $+55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ .
  - These  $I_O$  ratings are for a thermally (PC boards or other) mounting methods where the lead or end-cap temperatures cannot be maintained and where thermal resistance from mounting point to ambient is still sufficiently controlled where  $T_{J(MAX)}$  does not exceed  $175^{\circ}\text{C}$ . This equates to  $R_{\theta JX} \leq 47^{\circ}\text{C/W}$ .
  - Derate linearly at 26.7 mA/°C above  $T_A = +100^{\circ}\text{C}$  to  $+175^{\circ}\text{C}$  ambient.

## MECHANICAL and PACKAGING

- CASE: Hermetically sealed voidless hard glass with tungsten slugs.
- TERMINALS: End caps are copper with tin/lead (Sn/Pb) finish. RoHS compliant matte-tin is available for commercial only.
- MARKING: Cathode band only.
- POLARITY: Cathode indicated by band.
- TAPE & REEL option: Standard per EIA-481-B. Consult factory for quantities.
- WEIGHT: 539 milligrams.
- See [Package Dimensions](#) and recommended [Pad Layout](#) on last page.

## PART NOMENCLATURE

**JAN 1N5550 US (e3)**

### Reliability Level

JAN = JAN Level  
JANTX = JANTX Level  
JANTXV = JANTXV Level  
JANS = JANS Level  
Blank = Commercial

### JEDEC type number

See [Electrical Characteristics](#) table

### RoHS Compliance

e3 = RoHS compliant (available on commercial grade only)  
Blank = non-RoHS compliant

### MELF Package

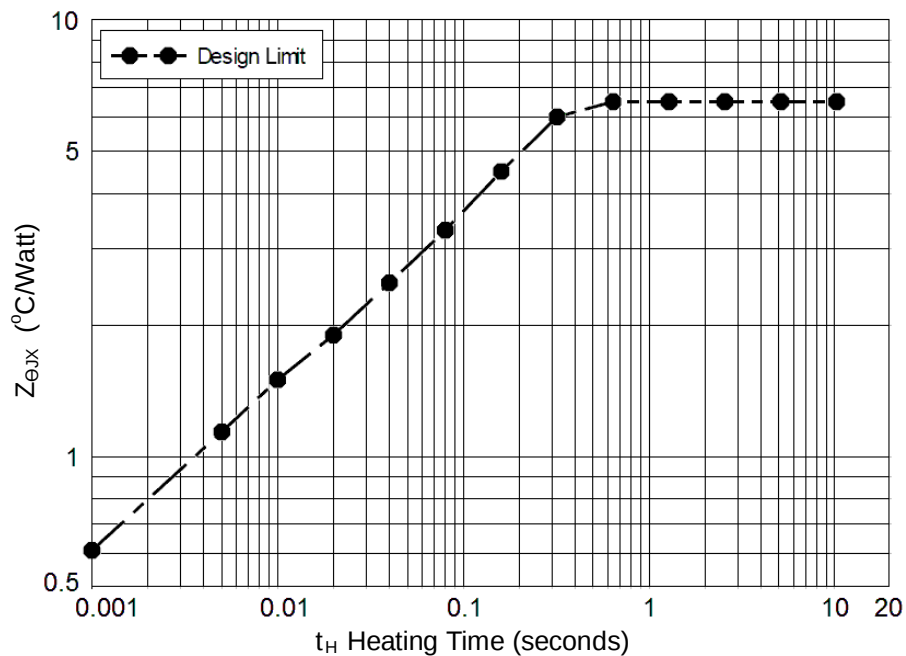
## SYMBOLS & DEFINITIONS

| Symbol    | Definition                                                                                                                                                                                                                      |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{BR}$  | Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.                                                                                                                                  |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range excluding all transient voltages (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.                                                                        |
| $V_F$     | Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.                                                                                                                            |
| $I_R$     | Maximum Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.                                                                                                         |
| $t_{rr}$  | 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. |

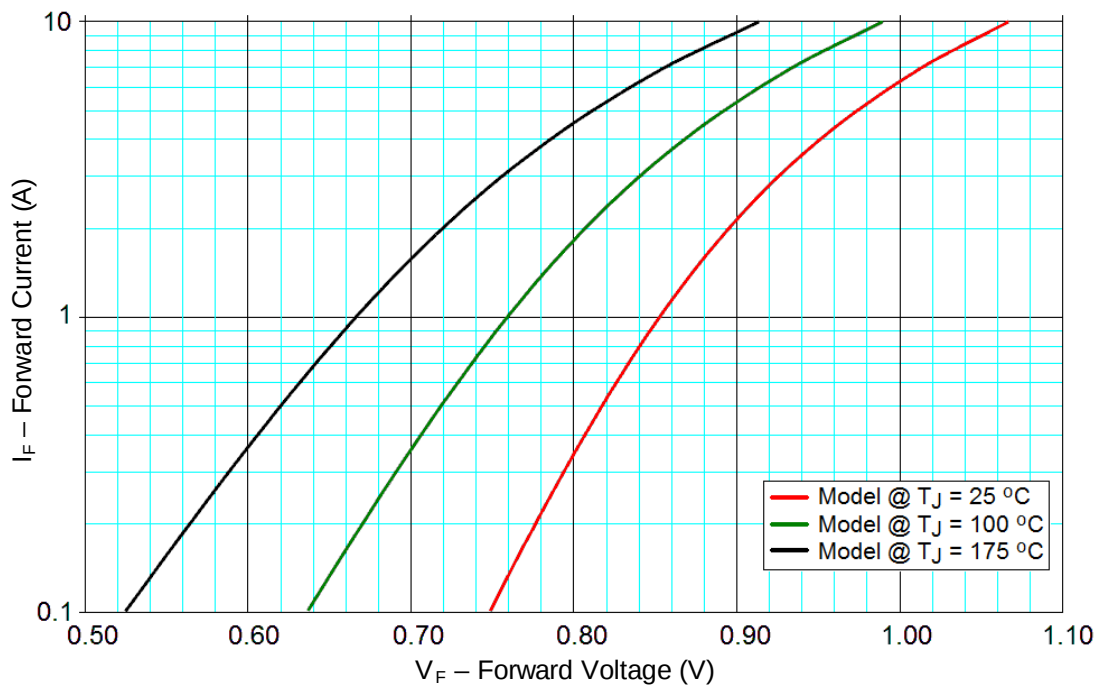
**ELECTRICAL CHARACTERISTICS @  $T_A = 25^\circ\text{C}$  unless otherwise noted.**

| TYPE     | MINIMUM<br>BREAKDOWN<br>VOLTAGE<br>$V_{BR}$<br>$I_R @ 50 \mu\text{A}$<br>Volts | FORWARD VOLTAGE<br>$V_F @ 9 \text{ A (pk)}$ |               | MAXIMUM<br>REVERSE<br>CURRENT<br>$I_R @ V_{RWM}$<br><br>$\mu\text{A}$ | REVERSE<br>RECOVERY<br>$t_{rr}$<br>(Note 1)<br><br>$\mu\text{s}$ |
|----------|--------------------------------------------------------------------------------|---------------------------------------------|---------------|-----------------------------------------------------------------------|------------------------------------------------------------------|
|          |                                                                                | MIN.<br>Volts                               | MAX.<br>Volts |                                                                       |                                                                  |
| 1N5550US | 220                                                                            | 0.6 V (pk)                                  | 1.2 V (pk)    | 1.0                                                                   | 2.0                                                              |
| 1N5551US | 440                                                                            | 0.6 V (pk)                                  | 1.2 V (pk)    | 1.0                                                                   | 2.0                                                              |
| 1N5552US | 660                                                                            | 0.6 V (pk)                                  | 1.2 V (pk)    | 1.0                                                                   | 2.0                                                              |
| 1N5553US | 880                                                                            | 0.6 V (pk)                                  | 1.3 V (pk)    | 1.0                                                                   | 2.0                                                              |
| 1N5554US | 1100                                                                           | 0.6 V (pk)                                  | 1.3 V (pk)    | 1.0                                                                   | 2.0                                                              |

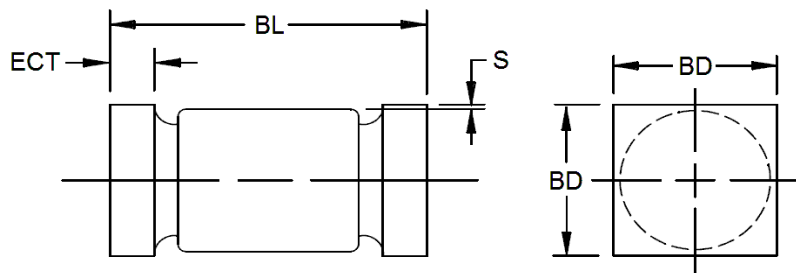
**NOTE 1:**  $I_F = 0.5 \text{ A}$ ,  $I_{RM} = 1.0 \text{ A}$ ,  $I_{R(REC)} = .250 \text{ A}$ .

**GRAPHS**


**FIGURE 1**  
Maximum Thermal Impedance



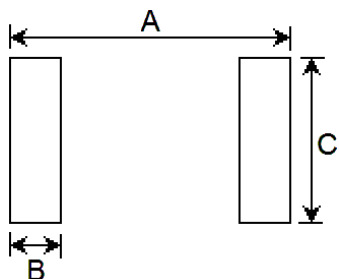
**FIGURE 4**  
Typical Forward Voltage vs. Forward Current

**PACKAGE DIMENSIONS**


| Ltr        | Inch |      | Millimeters |      |
|------------|------|------|-------------|------|
|            | MIN  | MAX  | MIN         | MAX  |
| <b>BL</b>  | .200 | .275 | 5.08        | 6.99 |
| <b>BD</b>  | .137 | .186 | 3.48        | 4.72 |
| <b>ECT</b> | .019 | .034 | 0.48        | 0.86 |
| <b>S</b>   | .003 | ---  | 0.08        | ---  |

**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are pre-solder dip.
4. Minimum clearance of glass body to mounting surface on all orientations.
5. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi$ x symbology.
6. This package outline has also previously been identified as "D5B".

**PAD LAYOUT**


| Ltr      | Inch  | Millimeters |
|----------|-------|-------------|
| <b>A</b> | 0.288 | 7.32        |
| <b>B</b> | 0.070 | 1.78        |
| <b>C</b> | 0.155 | 3.94        |

**Note:** If mounting requires adhesive separate from the solder, an additional 0.080 inch diameter contact may be placed in the center between the pads as an optional spot for cement.

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105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

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