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RoHS
*Available on commercial versions*

# Voidless Hermetically Sealed High Voltage Rectifier

***Qualified per MIL-PRF-19500/279***

*Qualified Levels:*
*JAN and JANTX*
*(1N3644 – 1N3647 only)*

## DESCRIPTION

These "standard recovery" high voltage rectifier diode series are military qualified to MIL-PRF-19500/279 for the 1N3644 through 1N3647 part numbers. They are ideal for high voltage, high-reliability applications where a failure cannot be tolerated. These 0.10 and 0.25 Amp rated rectifiers with working peak reverse voltages from 1000 to 10,000 volts are hermetically sealed with voidless-glass construction.

**S Package**

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

## FEATURES

- JEDEC registered 1N3643 – 1N3647, 1N4254 – 1N4257, and 1N5181 – 1N5184 series.
- Voidless hermetically sealed glass package.
- Triple-layer passivation.
- Lowest reverse leakage available.
- Absolute high voltage / high temperature stability.
- JAN and JANTX qualifications are available only for 1N3644 – 1N3647 per MIL-PRF-19500/279.
- RoHS compliant versions available (commercial grade only).

## APPLICATIONS / BENEFITS

- High voltage standard recovery rectifiers 1000 to 10,000 V.
- Military and other high-reliability applications.
- Applications include bridges, half-bridges, catch diodes, voltage multipliers, X-ray machines, power supplies, transmitters, and radar equipment.
- High forward surge current capability.
- Extremely robust construction.
- Low thermal resistance.
- Inherently radiation hard as described in Microsemi MicroNote 050.

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## MAXIMUM RATINGS @ $T_A$= 25 °C unless otherwise specified

| Parameters/Test Conditions | | Symbol | Value | Unit |
|---|---|---|---|---|
| Junction and Storage Temperature | | $T_J$ & $T_{STG}$ | -65 to +175 | °C |
| Steady State Power Dissipation @ $T_A$ = 25 ºC | | $P_D$ | 1.5 | W |
| Thermal Resistance Junction-to-Lead @ 3/8 inch (10mm) lead length from body | | $R_{\Theta JL}$ | 38 | °C/W |
| Working Peak Reverse Voltage: | 1N3643 | $V_{RWM}$ | 1000 | V |
| | 1N3644 & 1N4254 | | 1500 | |
| | 1N3645 & 1N4255 | | 2000 | |
| | 1N3646 & 1N4256 | | 2500 | |
| | 1N3647 & 1N4257 | | 3000 | |
| | 1N5181 | | 4000 | |
| | 1N5182 | | 5000 | |
| | 1N5183 | | 7500 | |
| | 1N5184 | | 10,000 | |
| Reverse Voltage: | 1N3644 | $V_R$ | 1050 | V |
| | 1N3645 | | 1400 | |
| | 1N3646 | | 1750 | |
| | 1N3647 | | 2100 | |
| Average Rectified Forward Current: | | | | |
| 1N3643 – 1N3647 | @ $T_A$ = 55 ºC | $I_O$ | 0.250 | A |
| | @ $T_A$ = 100 ºC | | 0.100 | |
| 1N4254 – 1N4257 | @ $T_A$ = 55 ºC | $I_O$ | 0.250 | A |
| | @ $T_A$ = 100 ºC | | 0.150 | |
| 1N5181 – 1N5184 | @ $T_A$ = 55 ºC | $I_O$ | 0.100 | A |
| | @ $T_A$ = 100 ºC | | 0.060 | |
| Solder Temperature @ 10 s | | $T_{SP}$ | 260 | °C |

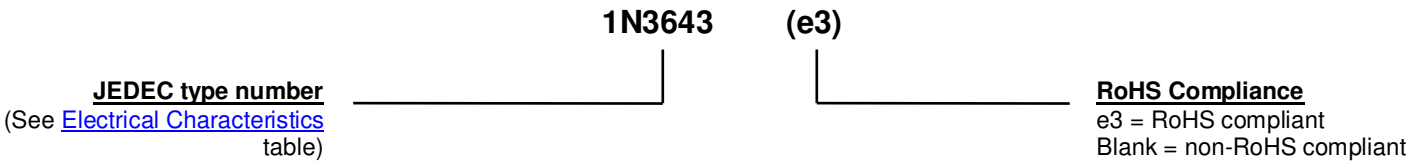
## MECHANICAL and PACKAGING

- CASE: Hermetically sealed voidless hard glass with tungsten slugs.
- TERMINALS: Tin/lead or RoHS compliant matte/tin (commercial grade only) over copper.
- MARKING: Part number.
- POLARITY: Cathode indicated by band.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: Approximately 400 milligrams.
- See Package Dimensions on last page.

## PART NOMENCLATURE

*Applicable to 1N3644 thru 1N3647 only:*


*Applicable to 1N3643, 1N4254 – 1N4257, and 1N5181 – 1N5184 only:*




## SYMBOLS & DEFINITIONS

| Symbol | Definition |
|---|---|
| $I_O$ | Average Rectified Forward 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. |
| $I_R$ | Maximum Leakage Current: The maximum leakage current that will flow at the specified voltage and temperature. |
| $I_{ZSM}$ | Maximum Rated Surge Current: The non-repetitive peak value of rated surge current at a specified wave form. |
| $V_{(BR)}$ | Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current. |
| $V_F$ | Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current. |
| $V_R$ | Reverse Voltage: The reverse voltage dc value, no alternating component. |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range. |

## ELECTRICAL CHARACTERISTICS

| TYPE | MINIMUM BREAKDOWN VOLTAGE $V_{(BR)}$ | MAXIMUM FORWARD VOLTAGE $V_F$ (See Notes 1 & 2) | REVERSE CURRENT (MAX.) $I_R$ @ $V_{RWM}$ | | | | AVERAGE REVERSE CURRENT $I_{R(AV)}$ @ $V_R$ | MAXIMUM SURGE CURRENT @ 8.3 ms $I_{ZSM}$ |
|---|---|---|---|---|---|---|---|---|
| | Volts | Volts | µA | | | | µA | Amps |
| | | | 25 °C | 55 °C | 125 °C | 175 °C | +100 °C | |
| 1N3643 | - | 5.0 (1) | 5 | - | - | - | - | 14 |
| 1N3644* | 1800 | 5.0 (1) | 5 | - | - | - | 100 | 14 |
| 1N3645* | 2400 | 5.0 (1) | 5 | - | - | - | 100 | 14 |
| 1N3646* | 3000 | 5.0 (1) | 5 | - | - | - | 100 | 14 |
| 1N3647* | 3600 | 5.0 (1) | 5 | - | - | - | 100 | 14 |
| 1N4254 | - | 3.5 (2) | 1 | - | 20 | - | - | 10 |
| 1N4255 | - | 3.5 (2) | 1 | - | 20 | - | - | 10 |
| 1N4256 | - | 3.5 (2) | 1 | - | 20 | - | - | 10 |
| 1N4257 | - | 3.5 (2) | 1 | - | 20 | - | - | 10 |
| 1N5181 | - | 10 (2) | - | 5 | - | 1000 | - | 4 |
| 1N5182 | - | 10 (2) | - | 5 | - | 1000 | - | 4 |
| 1N5183 | - | 10 (2) | - | 5 | - | 1000 | - | 4 |
| 1N5184 | - | 10 (2) | - | 5 | - | 1000 | - | 4 |

* Also applicable to JAN and JANTX levels.

**NOTE 1:** $V_F$ @ 250mA
**NOTE 2:** $V_F$ @ 100mA

## GRAPHS

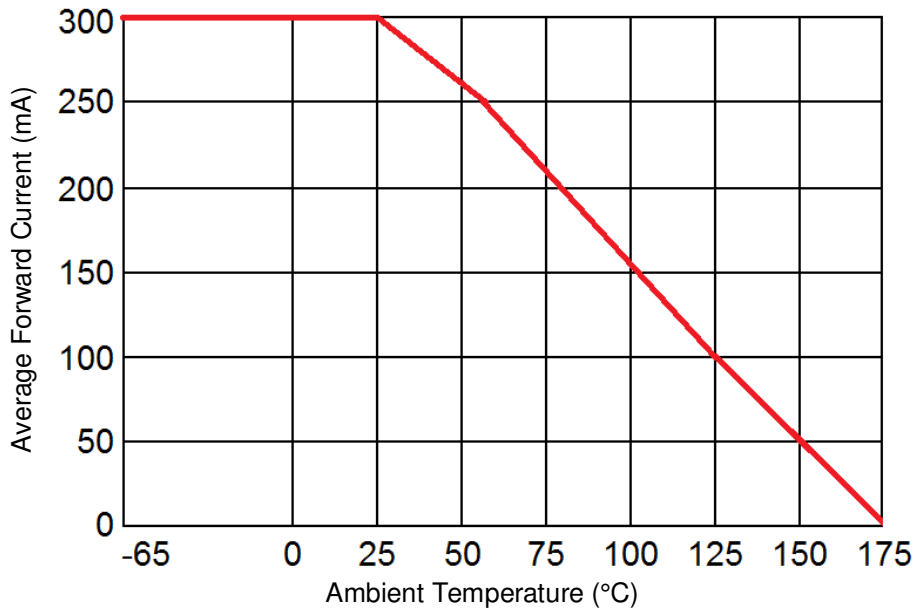



**FIGURE 1**
1N3643 – 1N3647 and 1N4254 – 1N4257

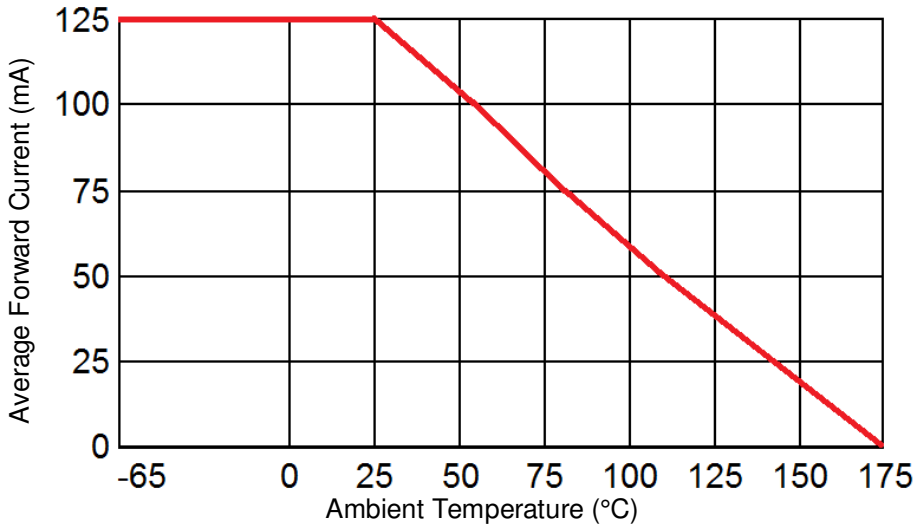
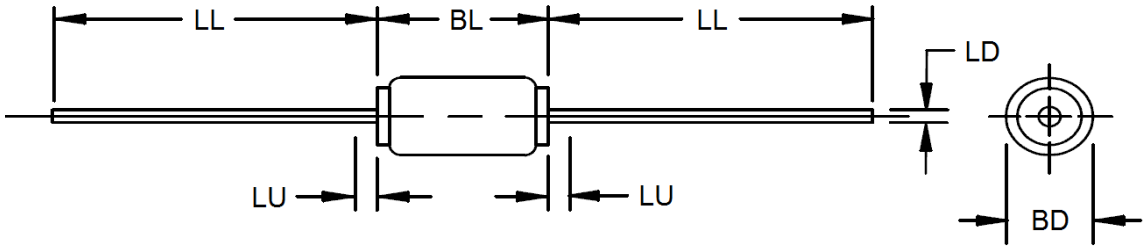



**FIGURE 2**
1N5181 – 1N5184

## PACKAGE DIMENSIONS




**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Package contour optional with BD and length BL. Heat slugs, if any, shall be included within this cylinder length but shall not be subject to minimum limit of BD.
4. The specified lead diameters apply in the zone between .050 inch (1.27 mm) from the diode body and the end of the lead.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
6. Max dimension BL will be .225" / 5.72mm for 1N5181 – 1N5184

| Ltr | DIMENSIONS | | | | Notes |
|---|---|---|---|---|---|
| | INCH | | MILLIMETERS | | |
| | Min | Max | Min | Max | |
| BD | 0.065 | 0.110 | 1.65 | 2.79 | 3 |
| BL | 0.190 | 0.215 | 4.83 | 5.46 | 3, 6 |
| LD | 0.029 | 0.033 | 0.74 | 0.84 | |
| LL | 1.00 | 1.25 | 25.40 | 31.75 | |
| LU | | 0.050 | | 1.27 | 4 |