RoHS
*Available on commercial versions*

# Schottky Barrier Rectifier

***Qualified per MIL-PRF-19500/554***

*Qualified Levels: JAN, JANTX, and JANTXV*

## DESCRIPTION

This schottky barrier diode provides low forward voltage and offers military grade qualifications for high-reliability applications. This rugged DO-213AA rectifier is ideal for extreme environments. It is applicable as a free-wheeling diode, for reverse battery protection, and power supplies and converters.

**DO-213AA (DO-5) Package**

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

## FEATURES

- Internal solder bond construction.
- Hermetically sealed (welded).
- 1000 Amps surge rating.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/554.
- RoHS compliant devices available by adding “e3” suffix (commercial grade only).

## APPLICATIONS / BENEFITS

- Metal and glass construction.
- Reverse energy tested.
- Fast recovery.

## MAXIMUM RATINGS @ $T_A$ = +25 ºC unless otherwise stated

| Parameters/Test Conditions | Symbol | Value | Unit |
|---|---|---|---|
| Junction and Storage Temperature | $T_J$ and $T_{STG}$ | -55 to +175 | °C |
| Thermal Resistance Junction-to-Case | $R_{\Theta JC}$ | 1.0 | °C/W |
| Reverse Voltage, Repetitive Peak and Working Peak Reverse Voltage (1) | $V_{RRM}$ and $V_{RWM}$ | 45 | V |
| Reverse Voltage, Nonrepetitive Peak | $V_{RSM}$ | 54 | V |
| Reverse Voltage (1) | $V_R$ | 45 | V |
| Surge Peak Forward Current @ 8.3 ms half-sine wave | $I_{FSM}$ | 1000 | A |
| Average Forward Current 50% duty cycle square wave @ $T_C$ = +115 ºC (2) | $I_{FM}$ | 60 | A |
| Average Rectified Output Current @ $T_C$ = +115 ºC (3) | $I_O$ | 54 | A |
| Solder Pad Temperature @ 10 s | | 260 | ºC |

**NOTES:**
1. Full rated $V_{RRM}$ and $V_{RWM}$ with 50% duty cycle is applicable over the range of $T_C$ = –55°C to +173°C for $I_{FM}$ = 0. Full rated continuous $V_R$ (dc) is applicable over the temperature range of $T_C$ = –55 to +166°C. When $V_R$ = 45 V and $T_C$ = +166°C, then $T_J$ = 175 °C.
2. Average current with a 50 percent duty cycle square wave including reverse amplitude equal to the magnitude of full rated $V_{RWM}$. (See Figure 4)
3. Average current with an applied sine wave peak value equal to the magnitude of full rated $V_{RWM}$. For temperature-current derating curves, see Figure 4.

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## MECHANICAL and PACKAGING

- CASE: Hermetically sealed metal and glass case body.
- TERMINALS: Tin-lead plated or RoHS compliant matte-tin (commercial grade only) on nickel.
- MARKING: Part number.
- POLARITY: Cathode to stud.
- MOUNTING HARDWARE: Nut, flat steel washer and lock washer available upon request.
- WEIGHT: Approximately 14 grams.
- See Package Dimensions on last page.

## PART NOMENCLATURE


## SYMBOLS & DEFINITIONS

| Symbol | Definition |
|---|---|
| f | Frequency |
| $I_{FM}$ | Forward Current: The current flowing from the external circuit into the anode terminal. Also see first page ratings and test conditions for $I_{FM}$ with 50% duty cycle square wave. |
| $I_{FSM}$ | Surge Peak Forward Current: The forward current including all nonrepetitive transient currents but excluding all repetitive transients (ref JESD282-B). |
| $I_O$ | Average Rectified 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. |
| $V_{FM}$ | Maximum Forward Voltage |
| $V_R$ | Reverse Voltage: A positive dc cathode-anode voltage below the breakdown region. |
| $V_{RRM}$ | Repetitive Peak Reverse Voltage: The peak reverse voltage including all repetitive transient voltages but excluding all non-repetitive transient voltages. |
| $V_{RSM}$ | Non-Repetitive Peak Inverse Voltage: The peak reverse voltage including all non-repetitive transient voltages but excluding all repetitive transient voltages. |
| $V_{RWM}$ | Working Peak Reverse Voltage: The peak voltage excluding all transient voltages (ref JESD282-B). Also sometimes known historically as PIV. |

## ELECTRICAL CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Typ. | Unit |
|---|---|---|---|---|---|
| Forward Voltage<br>$I_{FM}$ = 120 A, $T_C$ = 25 °C *<br>$I_{FM}$ = 60 A, $T_C$ = 25 °C *<br>$I_{FM}$ = 10 A, $T_C$ = 25 °C * | $V_{FM}$ | | 0.82<br>0.68<br>0.51 | | V |
| Reverse Current Leakage<br>$V_{RM}$ = 45 V, $T_J$ = 25 °C<br>$V_{RM}$ = 45 V, $T_J$ = 175 °C *<br>$V_{RM}$ = 45 V, $T_J$ = 125 °C *<br>$V_{RM}$ = 45 V, $T_C$ = -55 °C * | $I_{RM}$ | | 2.0<br>200<br>60<br>400 | | mA |
| Junction Capacitance<br>$V_R$ = 5 V, f = 1 MHz, 100 KHz ≤ f ≤ 1 MHz | $C_J$ | | 3000 | | pF |

*Pulse test: pulse width 300 μsec, duty cycle 2%

## GRAPHS

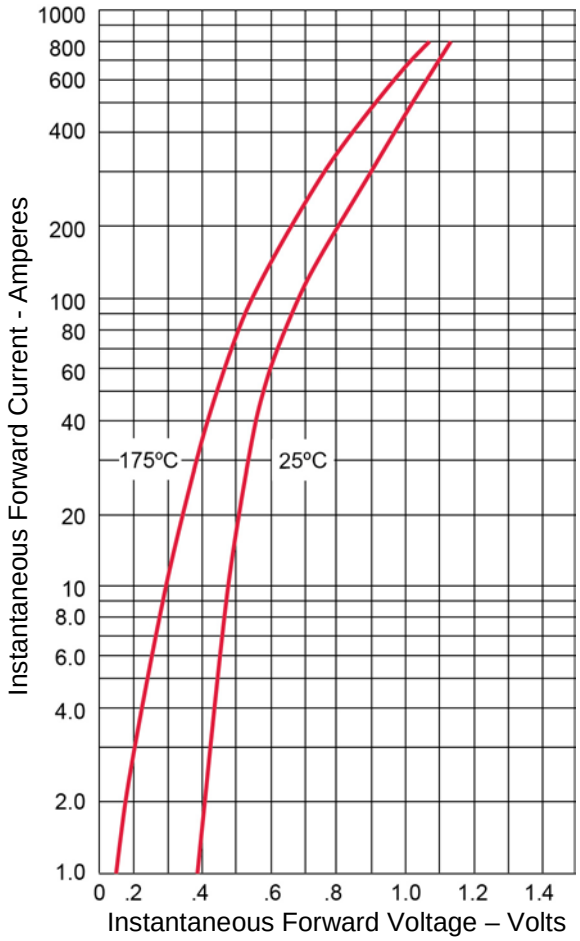



**FIGURE 1**
Typical Forward Characteristics

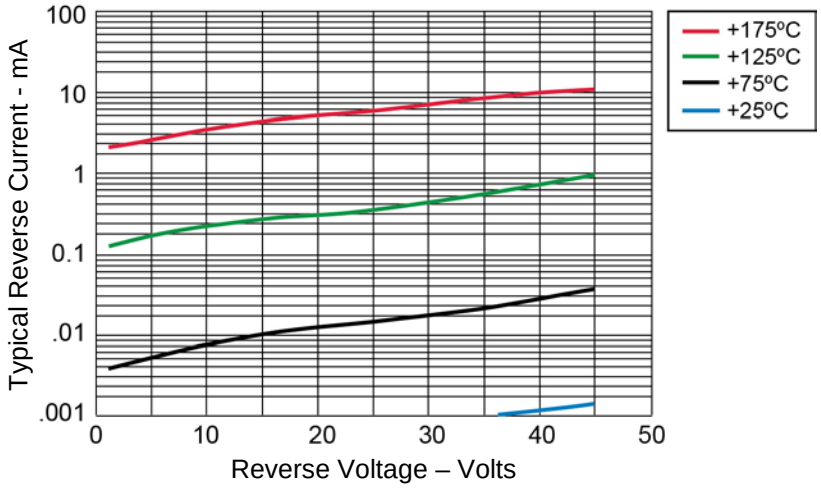



**FIGURE 2**
Typical Reverse Characteristics

## GRAPHS

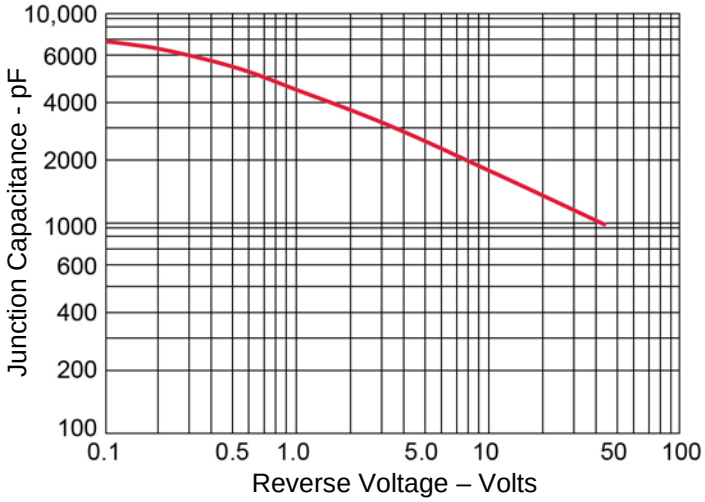



**FIGURE 3**

Typical Junction Capacitance

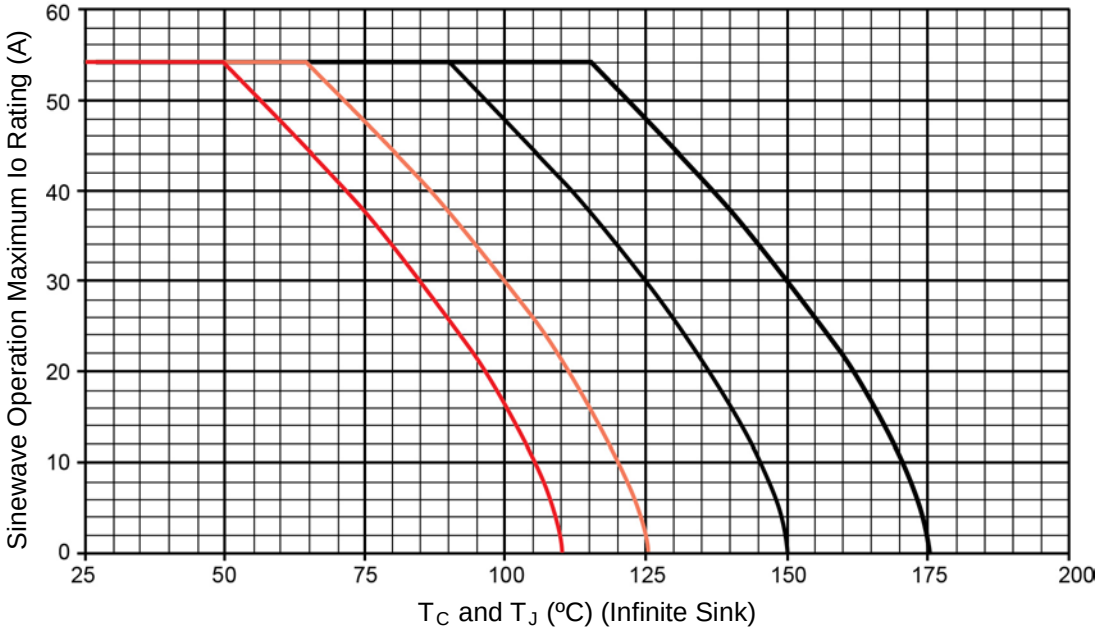
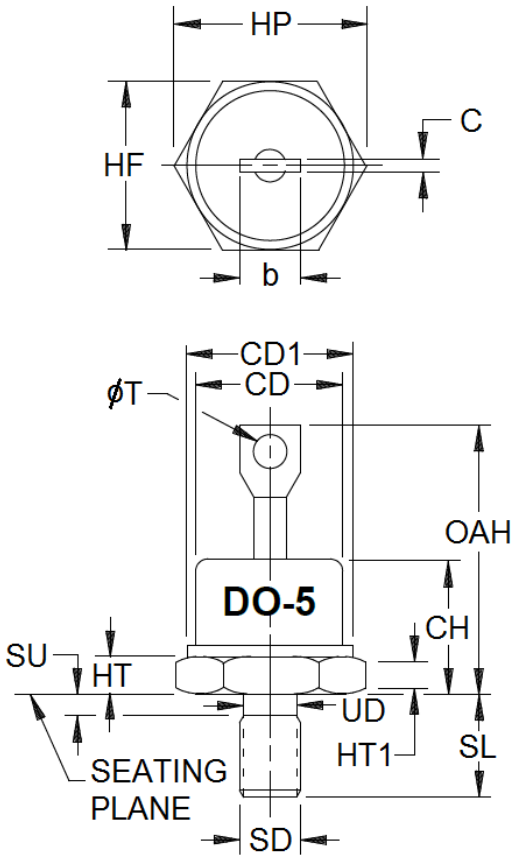



**FIGURE 4**

Temperature Current Derating Curve

(Derate design curve constrained by the maximum rated junction temperature ($T_J \leq 175°C$) and current rating specified. Derate design curves chosen at $T_J \leq 150$ °C, 125 °C, and 110 °C to show current rating where most users want to limit $T_J$ in their application.)

## PACKAGE DIMENSIONS




| Ltr | Dimensions | | | | Notes |
|---|---|---|---|---|---|
| | Inch | | Millimeters | | |
| | Min | Max | Min | Max | |
| C | - | 0.375 | - | 9.53 | 7 |
| C1 | 0.025 | 0.080 | 0.64 | 2.03 | |
| CD | - | 0.667 | - | 16.94 | |
| CH | - | 0.450 | - | 11.43 | |
| HF | 0.669 | 0.688 | 17.00 | 17.48 | |
| HT1 | 0.115 | 0.200 | 2.92 | 5.08 | |
| HT2 | 0.060 | - | 1.52 | - | 6 |
| OAH | 0.750 | 1.00 | 19.05 | 25.40 | |
| SD | - | - | - | - | 5 |
| SL | 0.422 | 0.453 | 10.72 | 11.51 | |
| SU | - | 0.090 | - | 2.29 | 4 |
| UD | 0.220 | 0.249 | 5.59 | 6.32 | |
| ΦT | 0.140 | 0.175 | 3.56 | 4.45 | |

**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for information only.
3. Units must not be damaged by torque of 30 inch-pound applied to .25-28 UNF-2B nut assembled on thread.
4. Length of incomplete or undercut threads of UD.
5. Maximum pitch diameter of plated threads shall be basic pitch diameter 0.2268 inch (5.76 mm) reference (FED-STD-H28, “Screw-Thread Standards for Federal Services”).
6. A chamfer or undercut on one or both ends of the hex portion is optional; minimum base diameter at seating plane 0.600 inch (15.24 mm).
7. The angular orientation and peripheral configuration of terminal 1 is undefined, however, the major surfaces over dimensions C and C1 shall be flat and the minimum cross-sectional area from the hole to any point on the periphery shall be 0.0025 $in^2$ (1.59 $mm^2$).
8. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.