## Product Summary (@ $T_A$ = +25°C)

| $V_{RRM}$ (V) | $I_O$ (A) | $V_F$ Max (V) | $I_R$ Max (mA) |
|---|---|---|---|
| 20 | 0.5 | 0.39 | 0.05 |

## Features and Benefits

- Ultra-Low Forward Voltage Drop
- Superior Reverse Avalanche Capability
- Patented Super Barrier Rectifier Technology
- Soft, Fast Switching Capability
- +150°C Operating Junction Temperature
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Description and Applications

Packaged in the compact DFN1006 package, the TrenchSBR® SBRT05U20LP provides ultra-low forward voltage drop ($V_F$) and provides excellent low reverse leakage stability at high temperatures. It is ideal for use as a rectification, freewheeling or polarity protection diode in applications such as:

- SMPS
- Free Wheeling Diodes
- Reverse Polarity Protection
- DC-DC Converters
- General Switching Applications

## Mechanical Data

- Case: X1-DFN1006-2
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: Cathode Dot
- Terminals: Finish - NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

**X1-DFN1006-2**

Top View

Bottom View

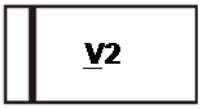
## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| SBRT05U20LP-7B | X1-DFN1006-2 | 10,000/Tape & Reel |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information

**X1-DFN1006-2**




V2 = Product Type Marking Code

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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.
For capacitance load, derate current by 20%.

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_{RM}$ | 20 | V |
| RMS Reverse Voltage | $V_{R(RMS)}$ | 14 | V |
| Average Rectified Output Current (See Figure 4) | $I_O$ | 500 | mA |
| Non-Repetitive Peak Forward Surge Current 8.3ms<br>Single Half Sine-Wave Superimposed on Rated Load | $I_{FSM}$ | 10 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Typical Thermal Resistance Junction to Ambient (Note 5) | $R_{\theta JA}$ | 236 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | °C |

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Forward Voltage Drop | $V_F$ | —<br>—<br>— | 0.28<br>0.30<br>0.35 | 0.32<br>0.34<br>0.39 | V | $I_F$ = 0.1A, $T_J$ = +25°C<br>$I_F$ = 0.2A, $T_J$ = +25°C<br>$I_F$ = 0.5A, $T_J$ = +25°C |
| Leakage Current (Note 6) | $I_R$ | — | 11<br>2.5 | 50<br>10 | µA<br>mA | $V_R$ = 20V, $T_J$ = +25°C<br>$V_R$ = 20V, $T_J$ = +125°C |
| Total Capacitance | $C_T$ | — | 14 | — | pF | f = 1MHz, $V_R$ = 20V |
| Reverse Recovery Time | $t_{rr}$ | —<br>— | 15<br>6 | —<br>— | ns | $I_F$ =$I_R$ =10mA, $I_{R(REC)}$ = 1mA, $R_L$ = 100Ω<br>$I_F$ = 500mA, di/dt = 600A/µs, $V_R$ = 10V |

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Short duration pulse test used to minimize self-heating effect.


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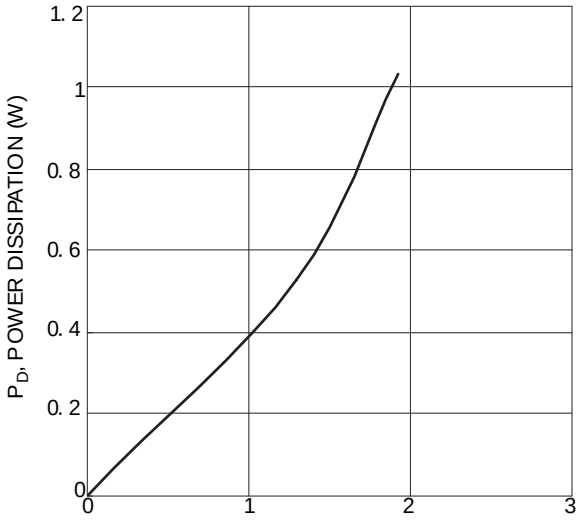

Figure 1 Forward Power Dissipation

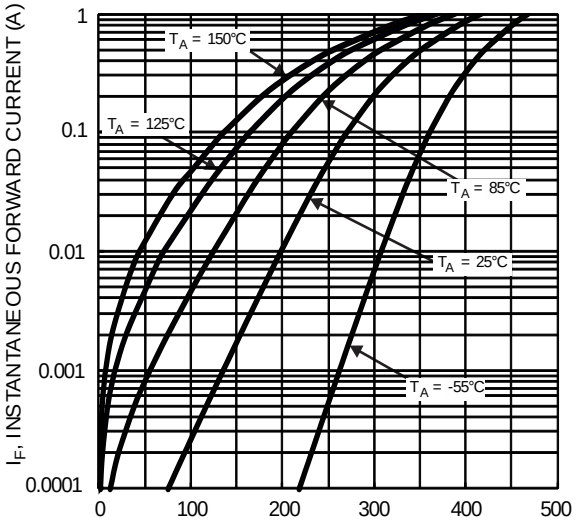

Figure 2 Typical Forward Characteristics

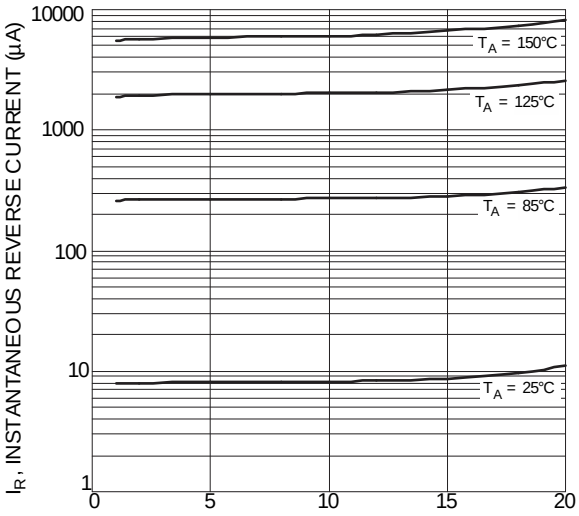

Figure 3 Typical Reverse Characteristics

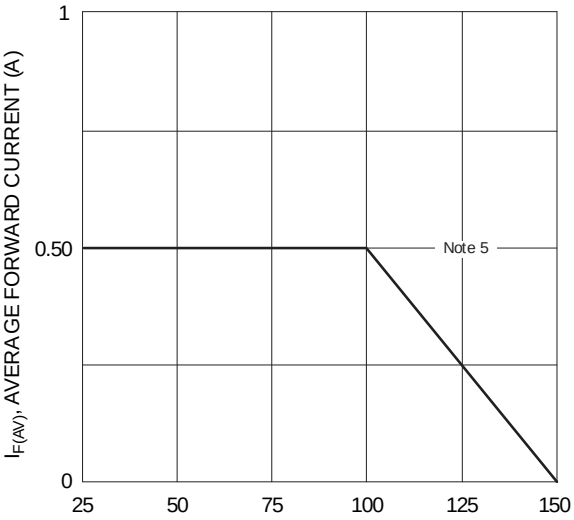

Figure 4 Forward Current Derating Curve

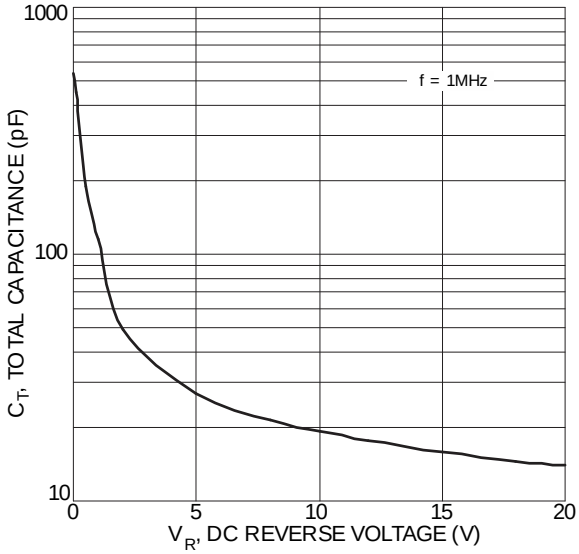

Figure 5 Total Capacitance vs. Reverse Voltage


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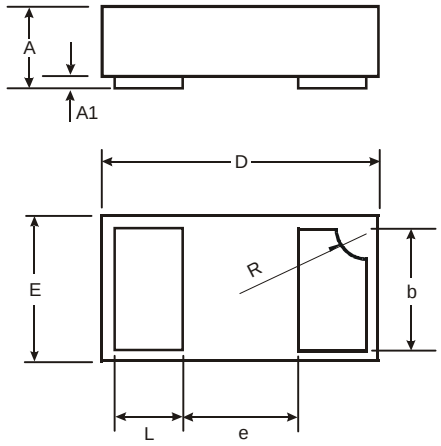
## Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

**X1-DFN1006-2**

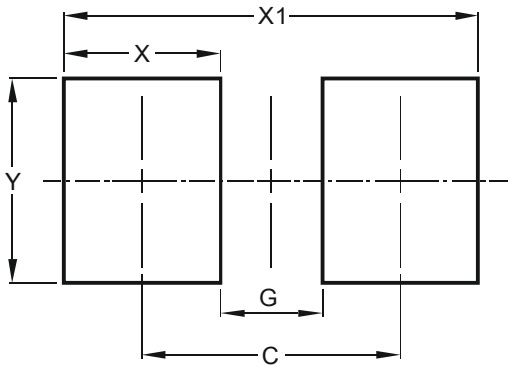



| X1-DFN1006-2 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.47 | 0.53 | 0.50 |
| **A1** | 0 | 0.05 | 0.03 |
| **b** | 0.45 | 0.55 | 0.50 |
| **D** | 0.95 | 1.075 | 1.00 |
| **E** | 0.55 | 0.675 | 0.60 |
| **e** | — | — | 0.40 |
| **L** | 0.20 | 0.30 | 0.25 |
| **R** | 0.05 | 0.15 | 0.10 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

**X1-DFN1006-2**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.70 |
| **G** | 0.30 |
| **X** | 0.40 |
| **X1** | 1.10 |
| **Y** | 0.70 |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