



FFD10UP20S 10 A, 200 V, Ultrafast Diode

Features

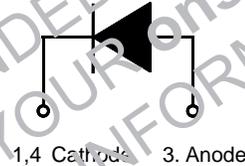
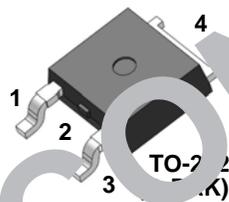
- Ultrafast Recovery, $T_{rr} = 20.8 \text{ ns}$ (@ $I_F = 10 \text{ A}$)
- Max Forward Voltage, $V_F = 1.15 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage : $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

Description

The FFD10UP20S is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial applications as welder and UPS application.

Applications

- SMPS, Power Switching Circuits
- Output Rectifiers
- Freewheeling Diodes



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Rating | Unit |
|----------------|--|-------------|------------------|
| V_{RM} | Peak Repetitive Reverse Voltage | 200 | V |
| V_{RSM} | Working Peak Reverse Voltage | 200 | V |
| $I_{F(AV)}$ | Average Rectified Forward Current @ $T_C = 115^\circ\text{C}$ | 10 | A |
| I_{FSM} | Non-repetitive Peak Surge Current 100Hz Single Half-Sine Wave | 100 | A |
| T_J, T_{STG} | Operating and Storage Temperature Range | -65 to +175 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Max. | Unit |
|-----------------|--|------|--------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 3.0 | $^\circ\text{C/W}$ |

Package Marking and Ordering Information

| Part Number | Top Mark | Package | Packing Method | Reel Size | Tape Width | Quantity |
|-------------|----------|---------------|----------------|-----------|------------|----------|
| FFD10UP20S | F10UP20S | TO-252(D-PAK) | Reel | 13" Dia | N/A | 2500 |

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Min. | Typ. | Max. | Unit | |
|-----------|--|---------------------------|------|------|------|---------------|
| V_F^* | Maximum Instantaneous Forward Voltage $I_F = 10\text{ A}$ $I_F = 10\text{ A}$ | $T_C = 25^\circ\text{C}$ | - | - | 1.15 | V |
| | | $T_C = 100^\circ\text{C}$ | - | - | 1.10 | |
| I_R^* | Maximum Instantaneous Reverse Current @ rated V_R | $T_C = 25^\circ\text{C}$ | - | - | 100 | μA |
| | | $T_C = 100^\circ\text{C}$ | - | - | 500 | |
| t_{rr} | Reverse Recovery Time | - | 20.8 | - | ns | |
| I_{rr} | Reverse Recovery Current | - | 2.8 | - | A | |
| Q_{rr} | Reverse Recovery Charge ($I_F = 10\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 130\text{ V}$) | - | 28.5 | - | nC | |
| t_{rr} | Maximum Reverse Recovery Time ($I_F = 1\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$) | - | - | 35 | ns | |
| W_{AVL} | Avalanche Energy ($L = 40\text{ mH}$) | 10 | - | - | mJ | |

* Pulse Test: Pulse Width = $300\mu\text{s}$, Duty Cycle = 2%

Test Circuit and Waveforms

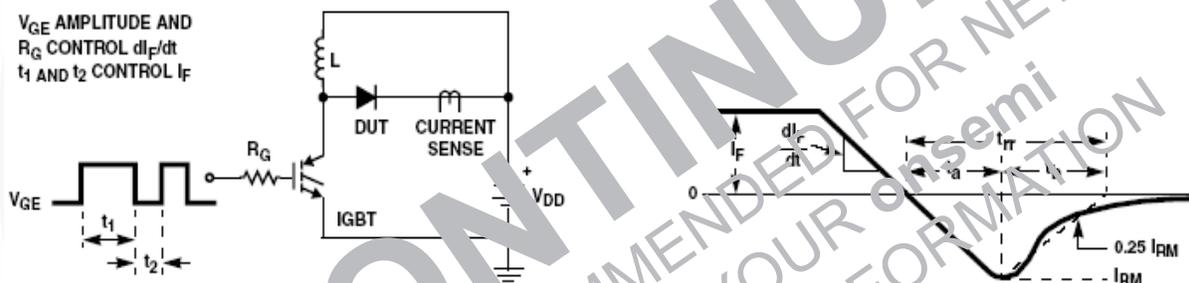


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$

$R < 0.1\Omega$

$V_{DD} = 50\text{V}$

$F_{RR} = 1/2 \cdot [(V_{RR} - V_{AVL}) - V_{DD}]$

$Q1 = \text{IGBT (Ebers - Moll } > \text{ DUT } V_{RR}/V_{AVL})$

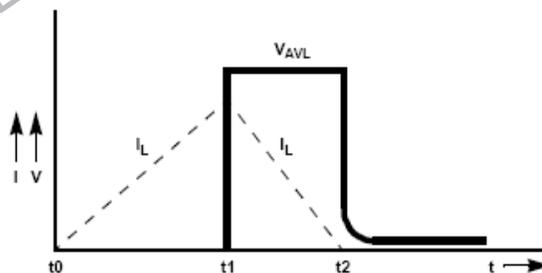
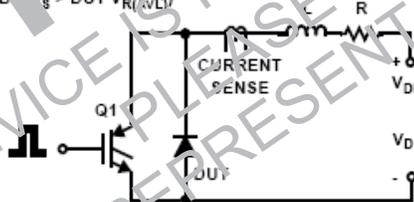


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

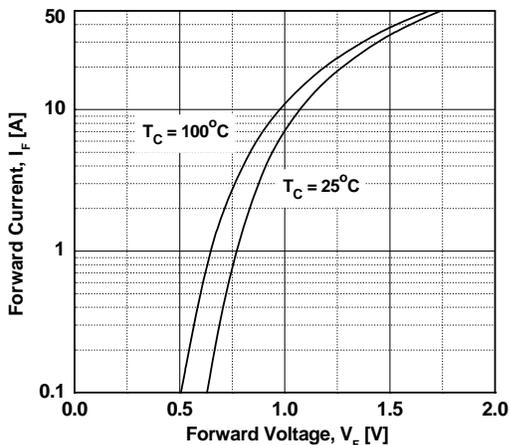


Figure 4. Typical Reverse Current vs. Reverse Voltage

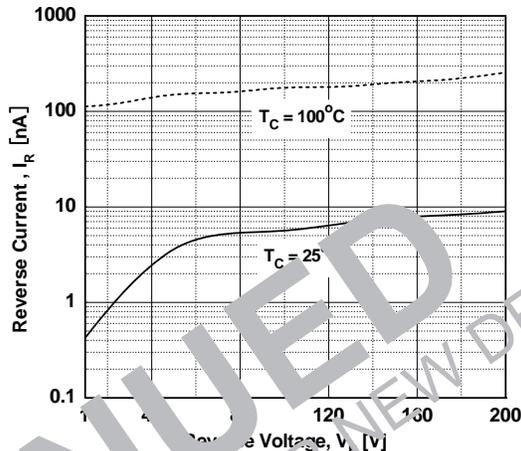


Figure 5. Typical Junction Capacitance

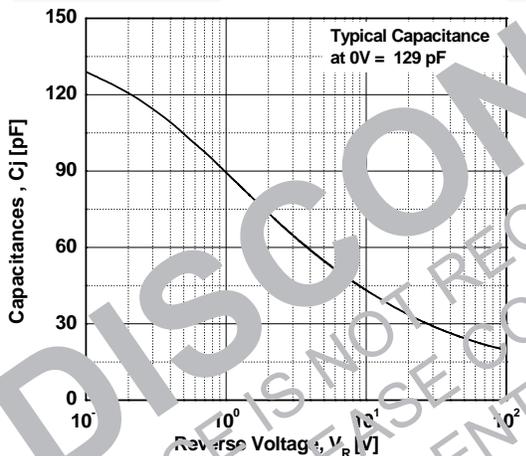


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

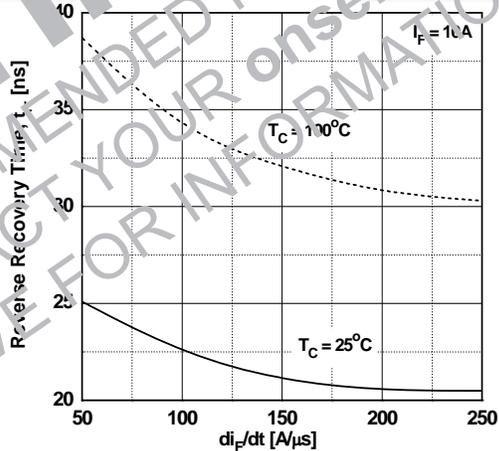


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

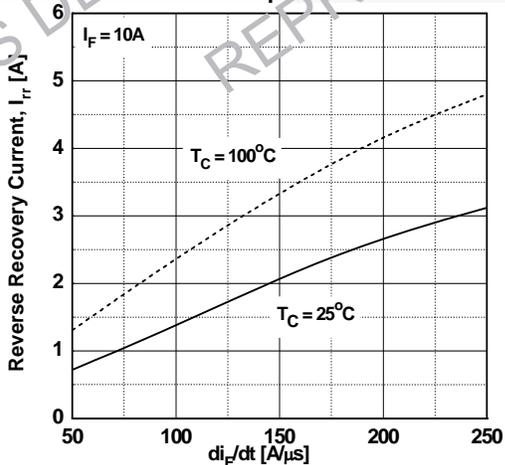
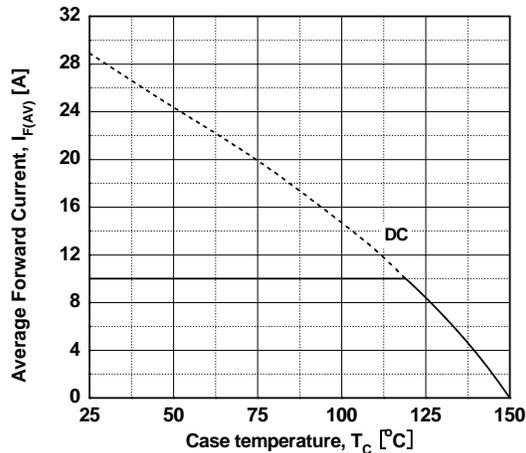
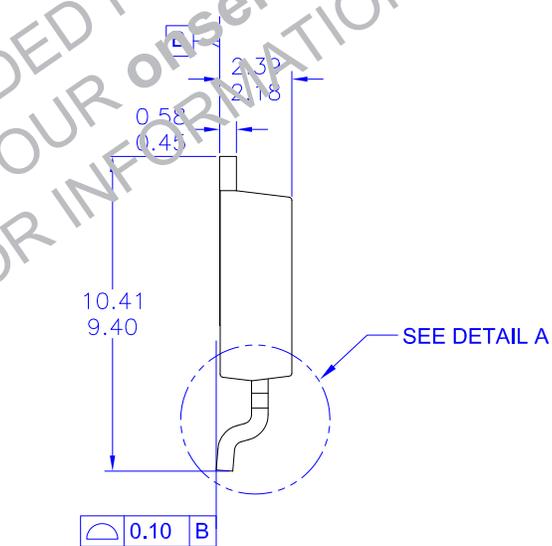
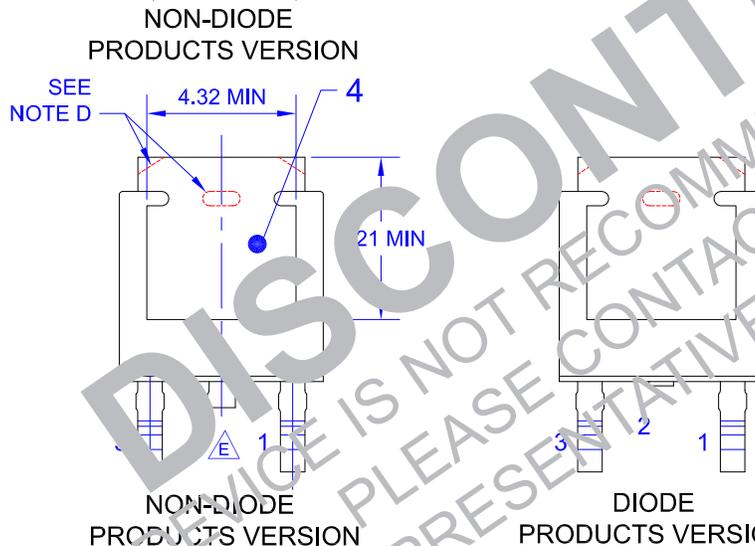
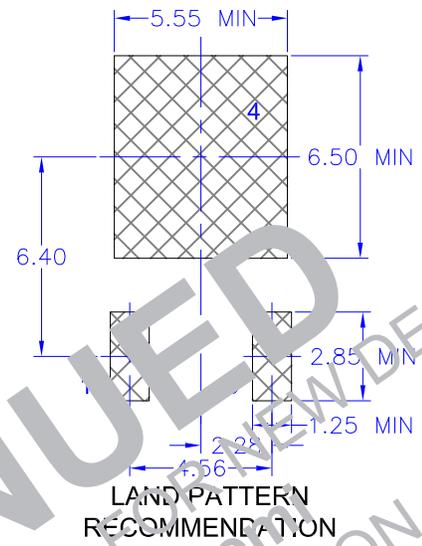
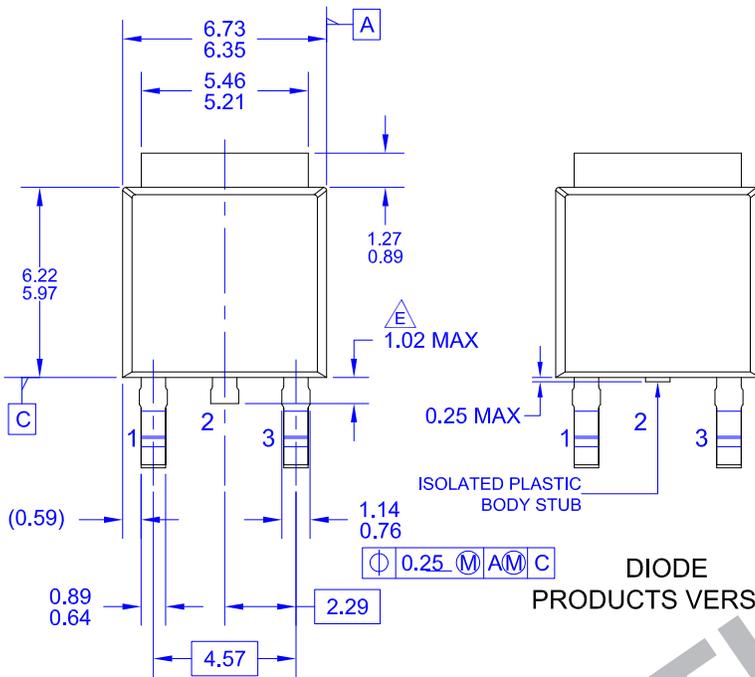
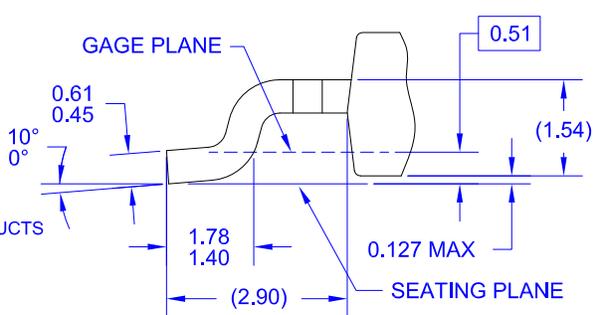


Figure 8. Forward Current Derating Curve





- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.
 - B) ALL DIMENSIONS ARE IN MILLIMETERS.
 - C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
 - D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
 - E) TRIMMED METAL CENTER LEAD IS PRESENT ON FOR NON-DIODE PRODUCTS
 - F) DIMENSIONS ARE EXCLUSIVE OF BURS, MOLD FLASH AND TIE BAR EXTRUSIONS.
 - G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.
 - H) DRAWING NUMBER AND REVISION: MKT-TO252A03REV11



DETAIL A
(ROTATED -90°)
SCALE: 12X





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