



December 2014



FFPF20UP20DN

20 A, 200 V, Ultrafast Dual Diode

Features

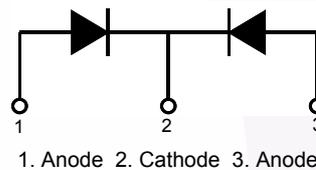
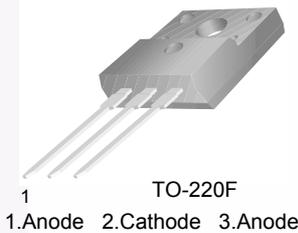
- Ultrafast Recovery $t_{rr} = 45 \text{ ns}$ (@ $I_F = 10 \text{ A}$)
- Max Forward Voltage, $V_F = 1.15 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage, $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

Description

The FFPF20UP20DN is an ultrafast dual 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

- Output Rectifiers
- SMPS, Power Switching Circuits
- Free-Wheeling Diode for Motor Application



Absolute Maximum Ratings (per diode) $T_a = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Rating | Unit |
|----------------|---|--------------|------------------|
| V_{RRM} | Peak Repetitive Reverse Voltage | 200 | V |
| V_{RWM} | Working Peak Reverse Voltage | 200 | V |
| V_R | DC Blocking 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 60Hz Single Half-Sine Wave | 100 | A |
| T_J, T_{STG} | Operating Junction and Storage Temperature | - 65 to +175 | $^\circ\text{C}$ |

Thermal Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Max. | Unit |
|-----------------|--|------|--------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 4.3 | $^\circ\text{C/W}$ |

Package Marking and Ordering Information

| Part Number | Top Mark | Package | Packing Method | Reel Size | Tape Width | Quantity |
|--------------|--------------|---------|----------------|-----------|------------|----------|
| FFPF20UP20DN | FFPF20UP20DN | TO-220F | Tube | N/A | N/A | 30 |

FFPF20UP20DN — Ultrafast Dual Diode

Electrical Characteristics (per diode) $T_a = 25^\circ\text{C}$ unless otherwise noted

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|----------------------------|---|--------------------------|------|------|---------------|
| V_F * | $I_F = 10\text{ A}$ | - | - | 1.15 | V |
| | $I_F = 10\text{ A}$ | - | - | 1.0 | V |
| I_R * | $V_R = 200\text{ V}$ | - | - | 100 | μA |
| | $V_R = 200\text{ V}$ | - | - | 500 | μA |
| t_{rr} | $I_F = 1\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}$ | - | - | 35 | ns |
| | $I_F = 10\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 130\text{ V}$ | - | - | 45 | ns |
| t_a t_b Q_{rr} | $I_F = 10\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 130\text{ V}$ | $T_C = 25^\circ\text{C}$ | - | 15 | ns |
| | | $T_C = 25^\circ\text{C}$ | - | 12 | ns |
| | | $T_C = 25^\circ\text{C}$ | - | 36 | nC |
| W_{AVL} | Avalanche Energy (L = 20 mH) | 10 | - | - | mJ |

*Pulse Test: Pulse Width=300 μs , Duty Cycle=2%

Test Circuit and Waveforms

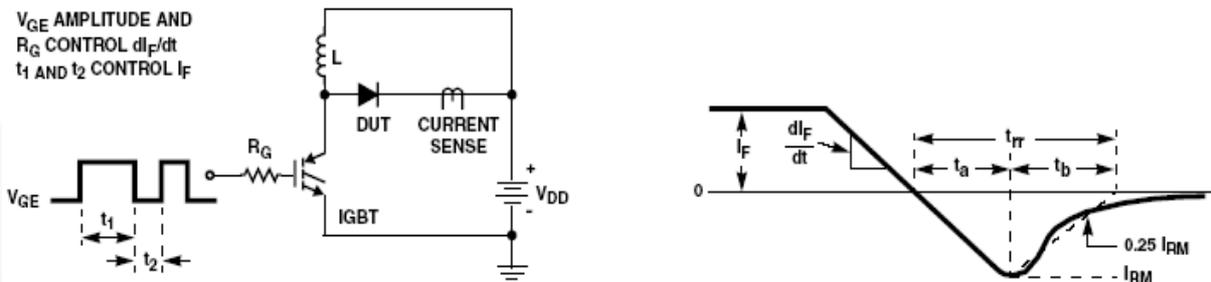


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

L = 40mH
R < 0.1 Ω
 $V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q1 = IGBT ($BV_{CES} > DUT V_{R(AVL)}$)

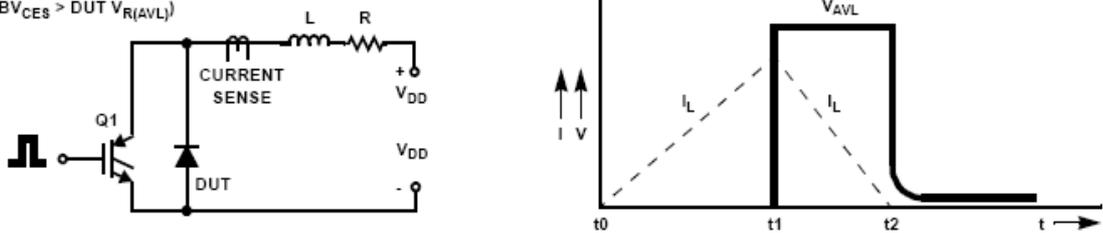


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop

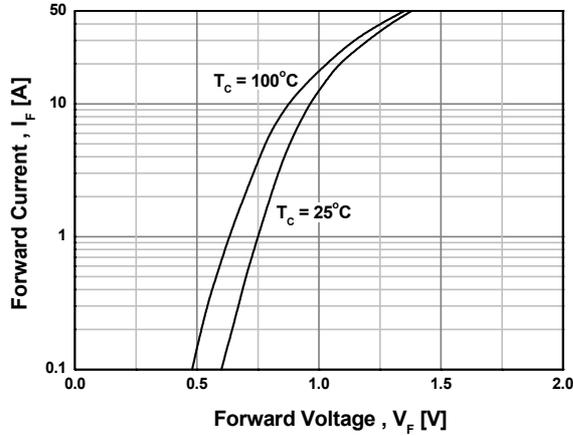


Figure 4. Typical Reverse Current

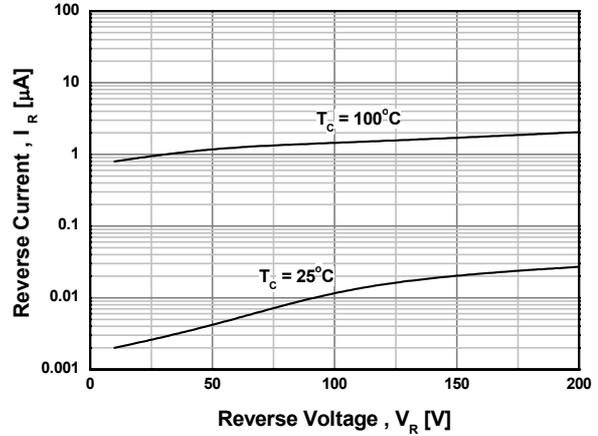


Figure 5. Typical Junction Capacitance

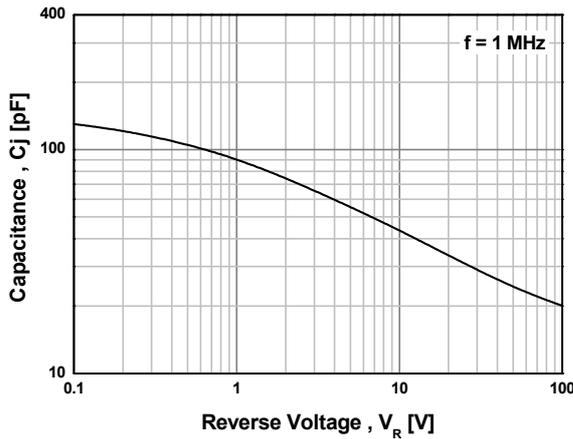


Figure 6. Typical Reverse Recovery Time

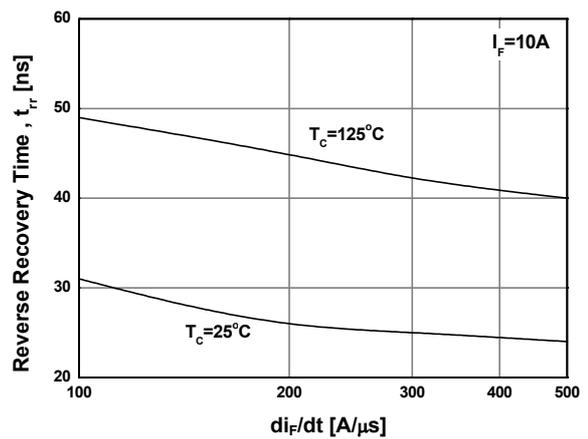


Figure 7. Typical Reverse Recovery Current

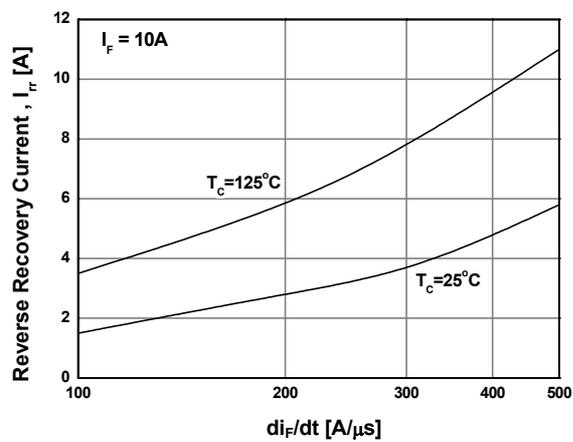


Figure 8. Forward Current Deration Curve

