



FFP12UP20DN

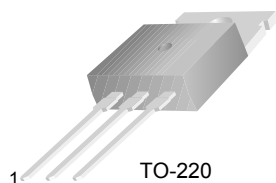
Ultrafast Recovery Power Rectifier

Features

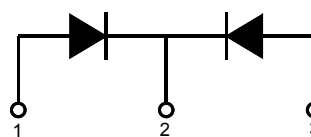
- Ultrafast with Soft Recovery : < 35ns (@ $I_F = 6A$)
- High Reverse Voltage : $V_{RRM} = 200V$
- Enhanced Avalanche Energy Rated
- Planar Construction

Applications

- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling Diode
- Power Switching Circuits



1.Anode 2.Cathode 3.Anode



1. Anode 2. Cathode 3. Anode

Absolute Maximum Ratings (per diode) $T_C = 25^\circ C$ unless otherwise noted

| Symbol | Parameter | Value | Units |
|----------------|---|--------------|------------|
| 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 @ $T_C = 125^\circ C$ | 6 | A |
| I_{FSM} | Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave | 60 | A |
| T_J, T_{STG} | Operating Junction and Storage Temperature | - 65 to +150 | $^\circ C$ |

Thermal Characteristics

| Symbol | Parameter | Max | Units |
|-----------------|--|-----|--------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 3.5 | $^\circ C/W$ |

Package Marking and Ordering Information

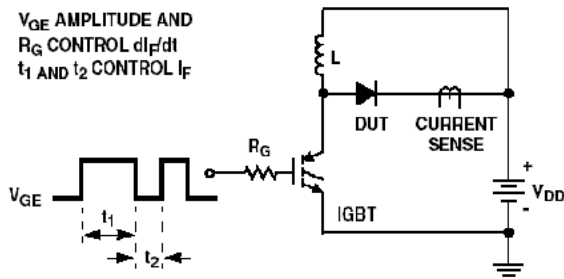
| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|----------------|---------------|---------|-----------|------------|----------|
| F12UP20DN | FFP12UP20DNTU | TO-220 | - | - | 50 |

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

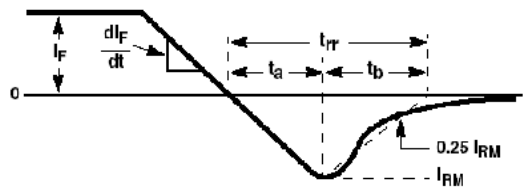
| Symbol | Parameter | Min. | Typ. | Max. | Units |
|----------------------------|--|--------------------------|------|------|---------------|
| V_{FM}^* | $I_F = 6\text{A}$ | - | - | 1.15 | V |
| | $I_F = 6\text{A}$ | - | - | 1.0 | V |
| I_{RM}^* | $V_R = 200\text{V}$ | - | - | 100 | μA |
| | $V_R = 200\text{V}$ | - | - | 500 | μA |
| t_{rr} | $I_F = 1\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{CC} = 30\text{V}$ | - | - | 30 | ns |
| | $I_F = 6\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 130\text{V}$ | - | - | 35 | ns |
| t_a t_b Q_{rr} | $I_F = 6\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 130\text{V}$ | $T_C = 25^\circ\text{C}$ | - | 12 | ns |
| | | $T_C = 25^\circ\text{C}$ | - | 12 | ns |
| | | $T_C = 25^\circ\text{C}$ | - | 24 | nC |
| W_{AVL} | Avalanche Energy (L = 20mH) | 10 | - | - | mJ |

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

Test Circuit and Waveforms

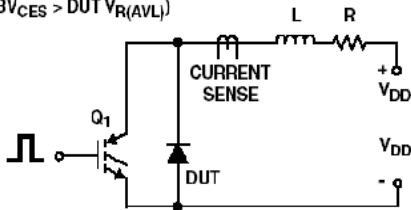


t_{rr} TEST CIRCUIT

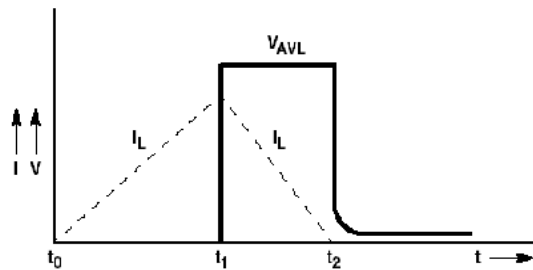


t_{rr} WAVEFORMS AND DEFINITIONS

- $I_{MAX} = 1\text{A}$
- $L = 20\text{mH}$
- $R < 0.1\Omega$
- $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
- $Q_1 = \text{IGBT (}BV_{CES} > \text{DUT } V_{R(AVL)}\text{)}$



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

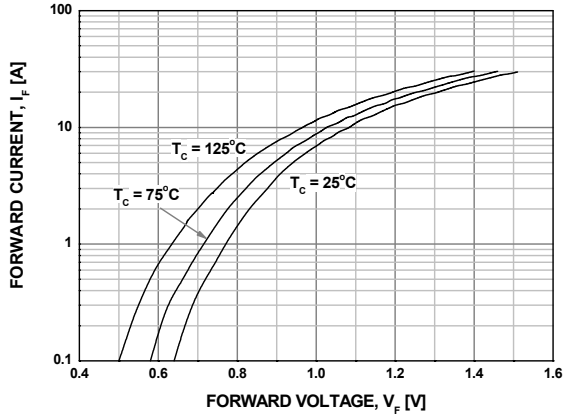


Figure 2. Typical Reverse Current

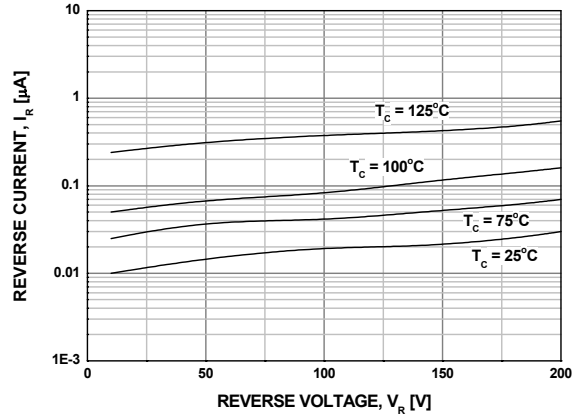


Figure 3. Typical Junction Capacitance

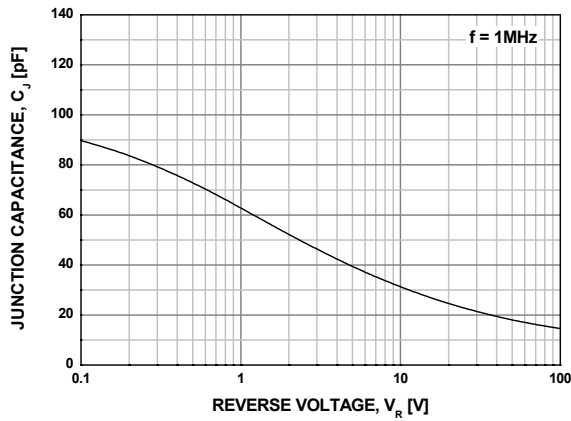


Figure 4. Typical Reverse Recovery Time

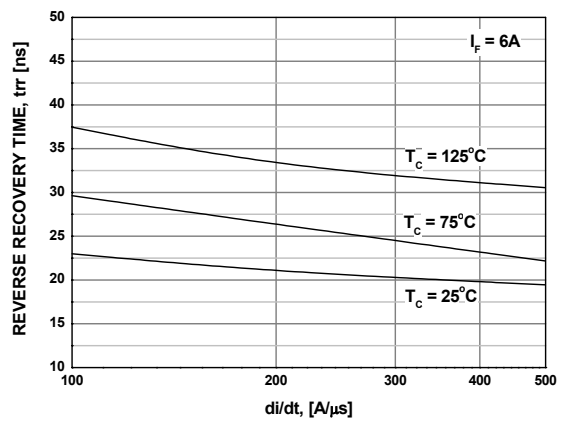


Figure 5. Typical Reverse Recovery Current

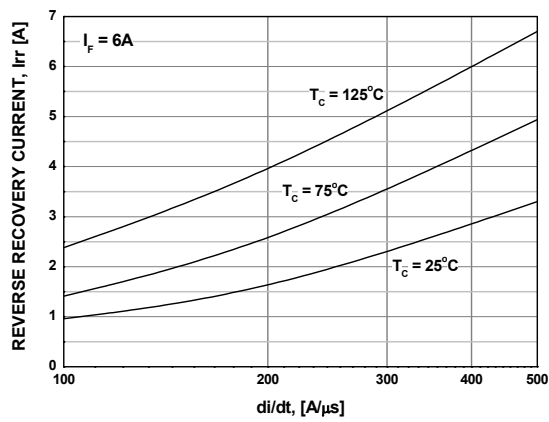
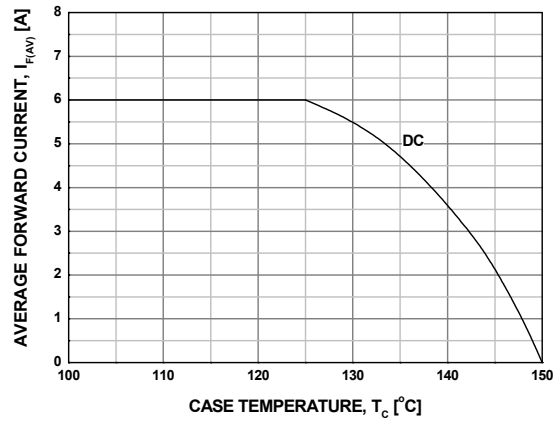
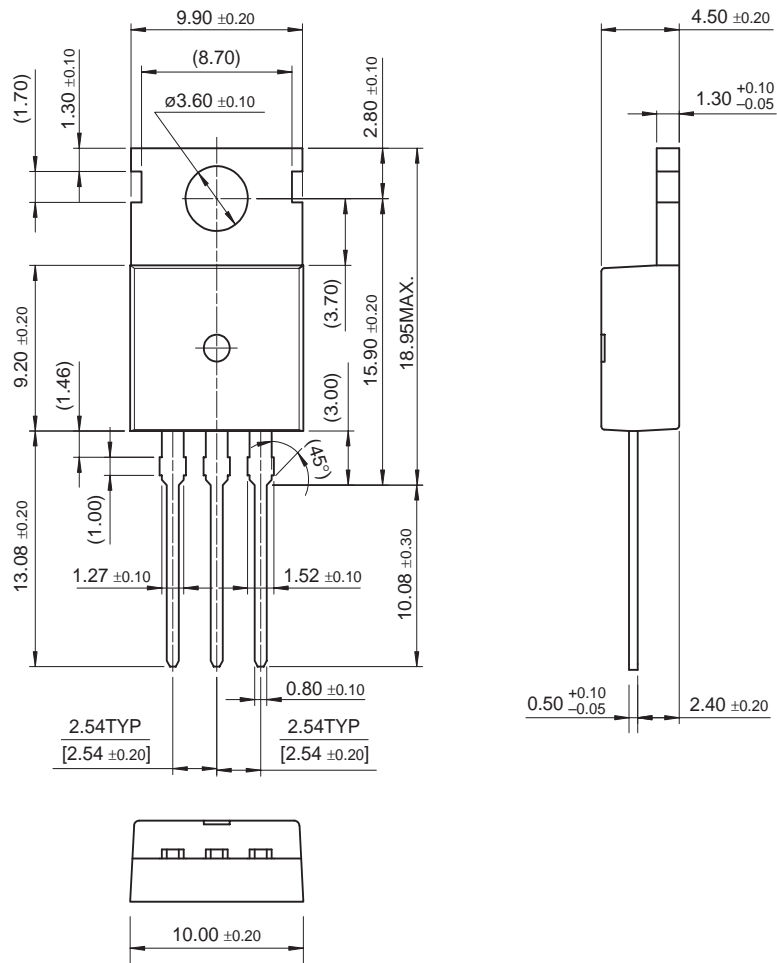


Figure 6. Forward Current Deration Curve



Package Demensions

TO-220



Dimensions in Millimeters

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