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July 2017

ON Semiconductor®

# FFPF20UP60DN

## 20 A, 600 V, Ultrafast Dual Diode

## Features

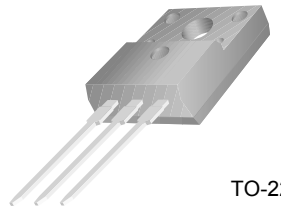
- Ultrafast Recovery $t_{rr}$ = 70 ns (@ $I_F$ = 10 A)
- Max Forward Voltage, $V_F$ = 2.2 V (@ $T_C$ = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

## Applications

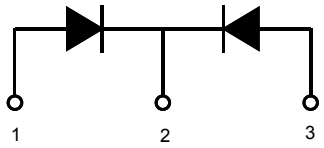
- General Purpose
- SMPS, Power Switching Circuits
- Boost Diode in Continuous Mode Power Factor Corrections

## Description

The FFPF20UP60DN is a ultrafast dual diode with low forward voltage drop. 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 application.




TO-220F




1. Anode 2. Cathode 3. Anode

## Absolute Maximum Ratings $T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $V_{RRM}$ | Peak Repetitive Reverse Voltage | 600 | V |
| $V_{RWM}$ | Working Peak Reverse Voltage | 600 | V |
| $V_R$ | DC Blocking Voltage | 600 | V |
| $I_{F(AV)}$ | Average Rectified Forward Current @ $T_C$ = 103°C | 10 | A |
| $I_{FSM}$ | Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave | 50 | A |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | -65 to +175 | °C |

## Thermal Characteristics

| Symbol | Parameter | Max. | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 7 | °C/W |

## Package Marking and Ordering Information

| Part Number | Top Mark | Package | Packing Method | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|---|
| FFPF20UP60DNTU | FFPF20UP60DN | TO-220F | Tube | N/A | N/A | 50 |

## Electrical Characteristics $T_C = 25^oC$ unless otherwise noted

| Symbol | Parameter | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_F1$ | $I_F$ = 10 A<br>$I_F$ = 10 A | $T_C = 25^oC$<br>$T_C = 100^oC$ | -<br>- | -<br>- | 2.2<br>2.0 | V |
| $I_R1$ | $V_R$ = 600 V<br>$V_R$ = 600 V | $T_C = 25^oC$<br>$T_C = 100^oC$ | -<br>- | -<br>- | 100<br>500 | μA |
| $t_{rr}$ | $I_F$ = 10 A, $di_F/dt$ = 200 A/μs, $V_R$ = 390 V | $T_C = 25^oC$ | - | 53 | 70 | ns |
| $t_{rr}$<br>$I_{rr}$<br>$Q_{rr}$ | $I_F$ = 1 A, $di_F/dt$ = 100 A/μs, $V_R$ = 30 V | $T_C = 25^oC$ | -<br>-<br>- | 30<br>1.5<br>20 | 40<br>2<br>30 | ns<br>A<br>nC |
| $W_{AVL}$ | Avalanche Energy ( L = 40 mH) | | 10 | - | - | mJ |

**Notes:**
1: Pulse: Test Pulse width = 300μs, Duty Cycle = 2%

## Test Circuit and Waveforms

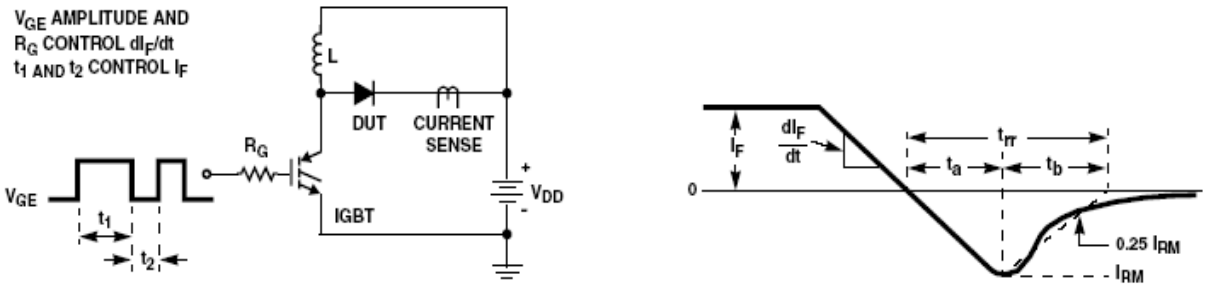



**Figure 1. Diode Reverse Recovery Test Circuit & Waveform**

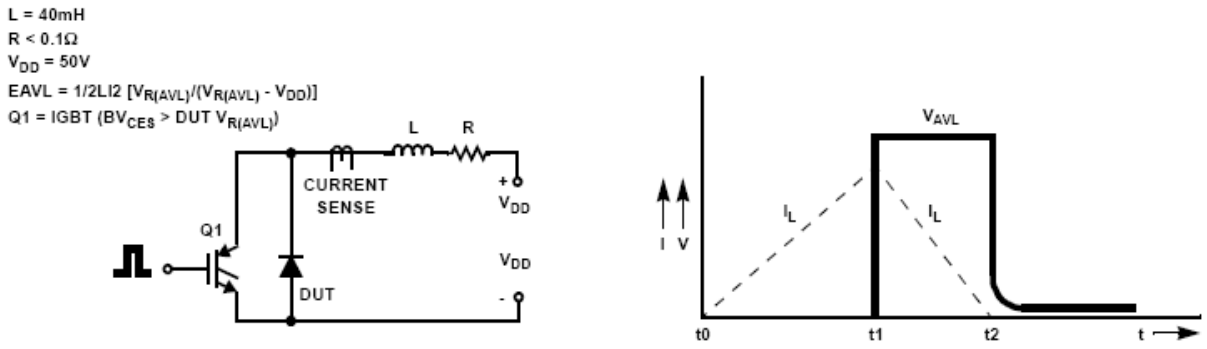



**Figure 2. Unclamped Inductive Switching Test Circuit & Waveform**

## Typical Performance Characteristics

**Figure 3. Typical Forward Voltage Drop vs. Forward Current**

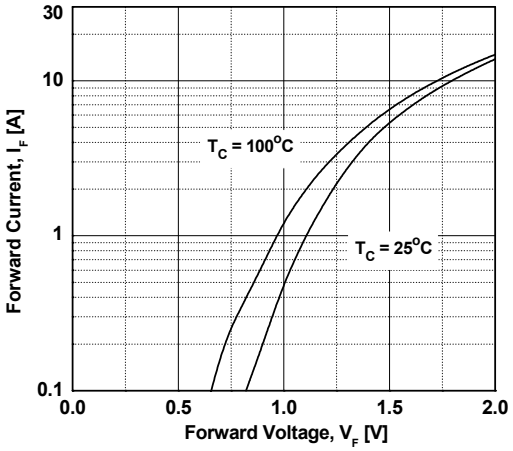



**Figure 4. Typical Reverse Current vs. Reverse Voltage**

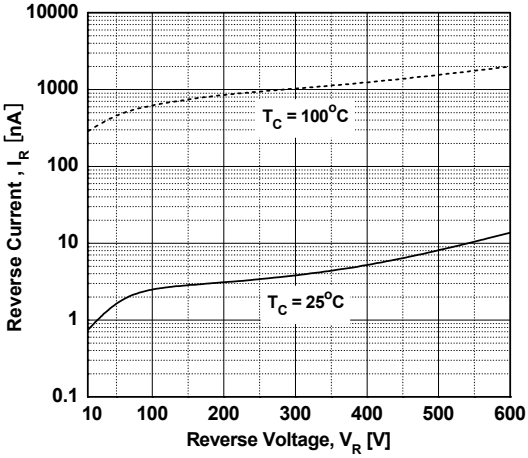



**Figure 5. Typical Junction Capacitance**

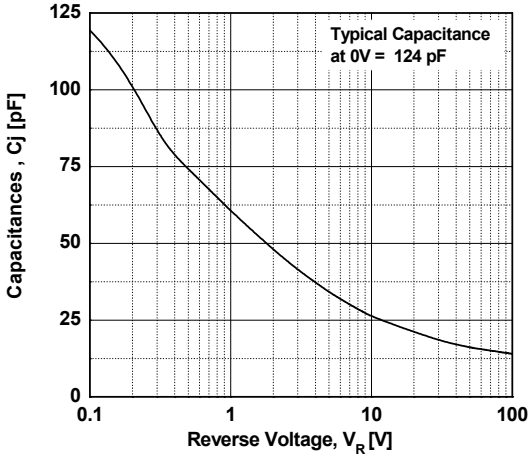



**Figure 6. Typical Reverse Recovery Time vs. $di_F/dt$**

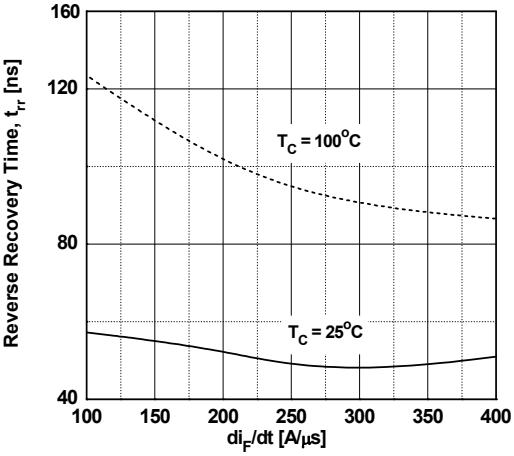



**Figure 7. Typical Reverse Recovery Current vs. $di_F/dt$**

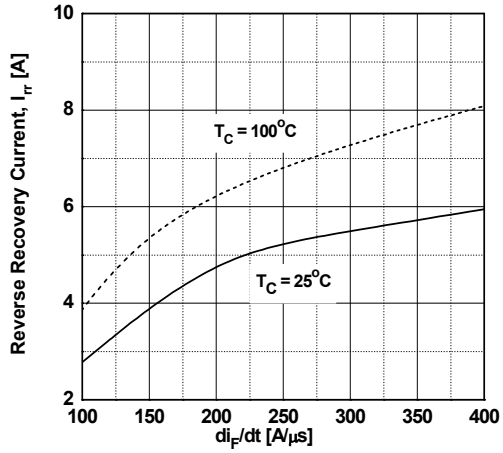
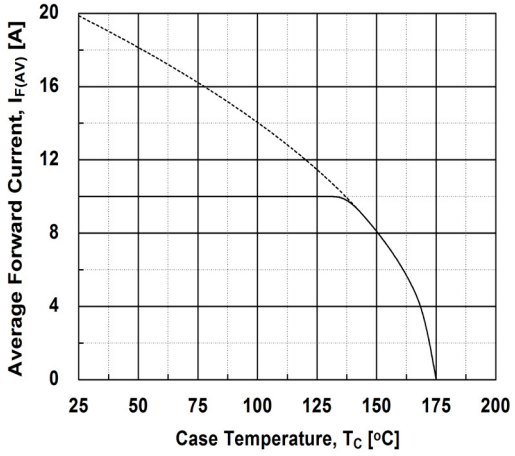



**Figure 8. Forward Current Derating Curve**



## Package Dimensions

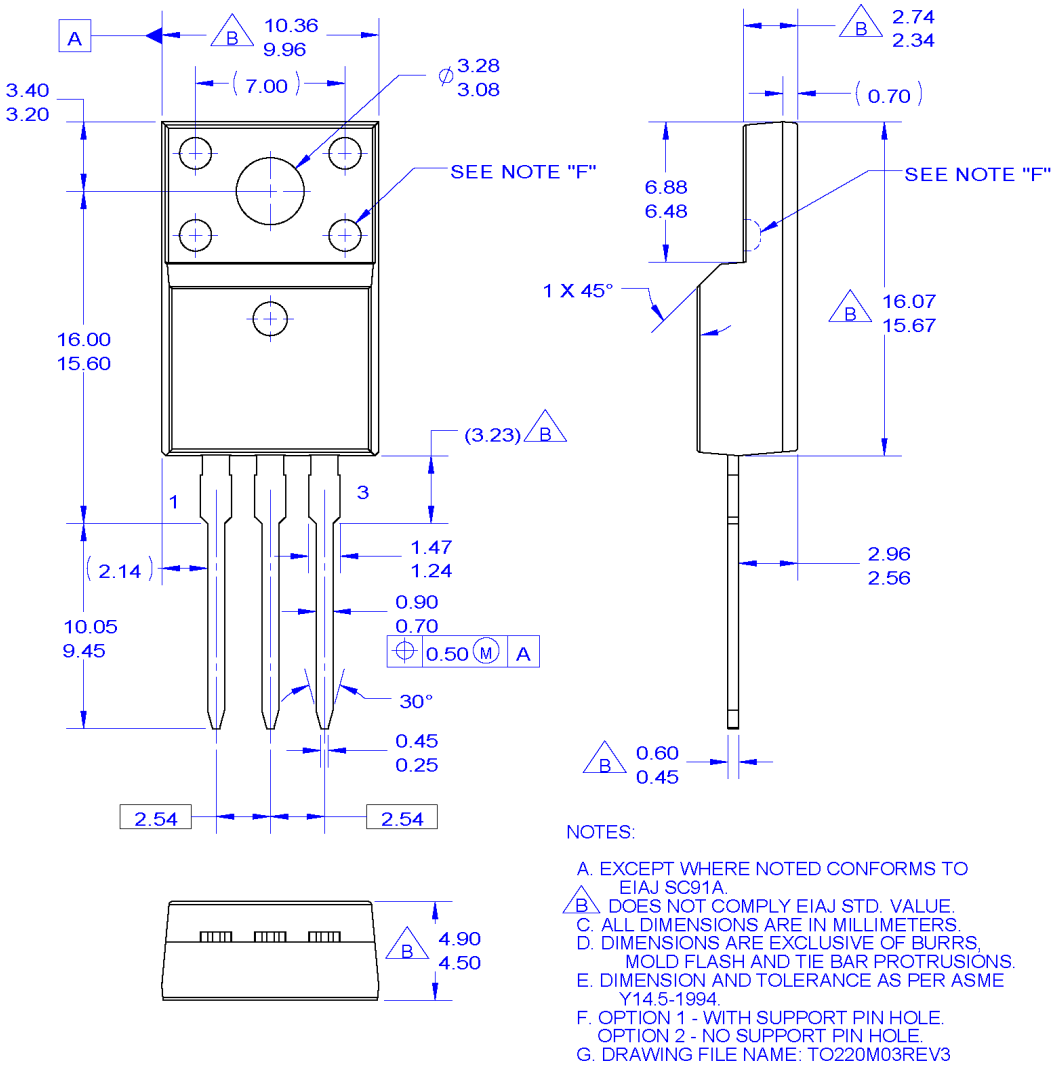



**Figure 9. TO-220F 3L - TO220, MOLDED, 3LD, FULL PACK, EIAJ SC91, STRAIGHT LEAD**



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