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December 2014



# FFPF20UP20DN

## 20 A, 200 V, Ultrafast Dual Diode

### Features

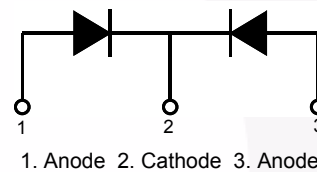
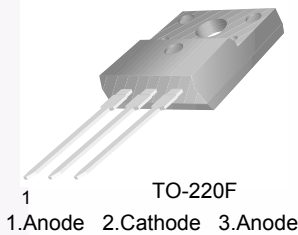
- Ultrafast Recovery  $t_{rr} = 45 \text{ ns}$  (@  $I_F = 10 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage,  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

### 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	$\mu\text{A}$	
	$V_R = 200\text{ V}$	-	-	500	$\mu\text{A}$	
$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	-	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  $\mu\text{s}$ , Duty Cycle=2%

### Test Circuit and Waveforms

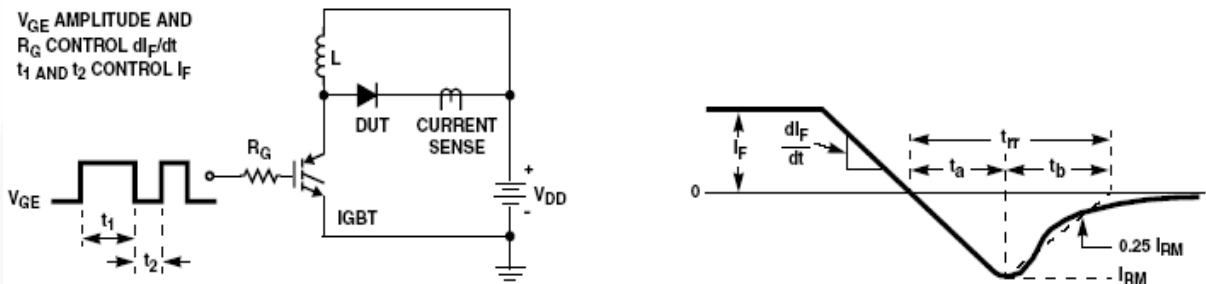


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

L = 40mH  
R < 0.1 $\Omega$   
V<sub>DD</sub> = 50V

EA<sub>VL</sub> = 1/2LI<sub>2</sub> [V<sub>R(AVL)</sub>/(V<sub>R(AVL)</sub> - V<sub>DD</sub>)]  
Q1 = IGBT (BV<sub>CEs</sub> > DUT V<sub>R(AVL)</sub>)

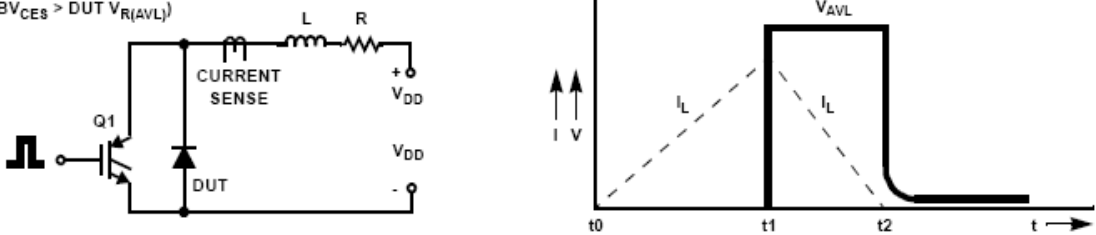
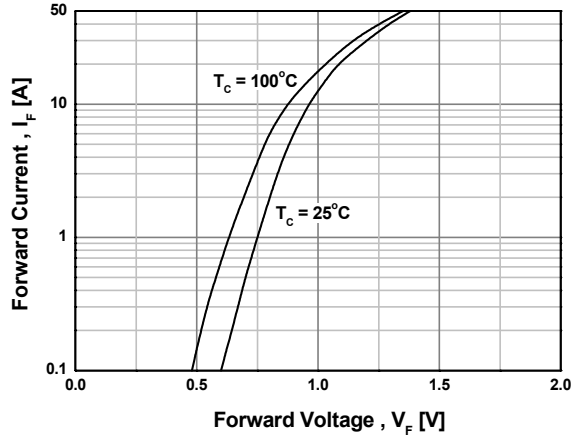


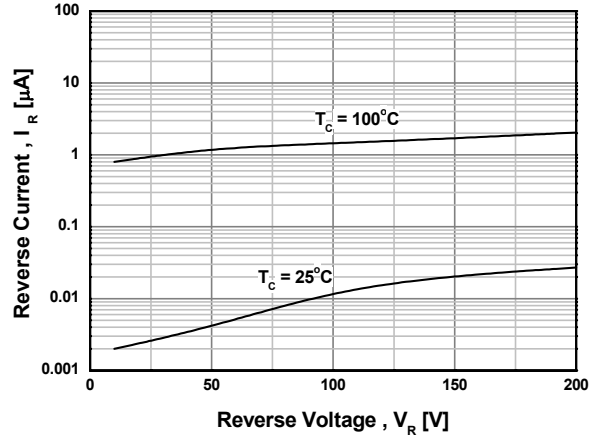
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## Typical Performance Characteristics

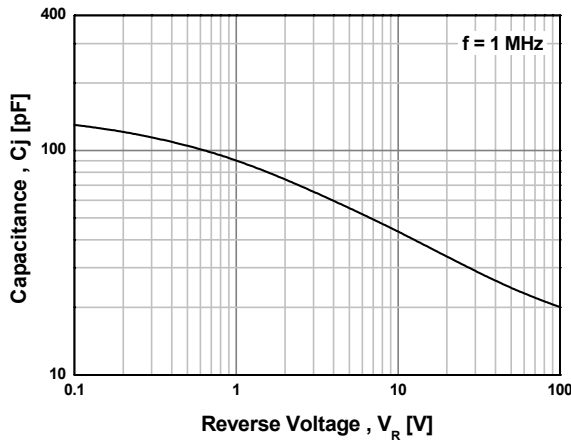
**Figure 3. Typical Forward Voltage Drop**



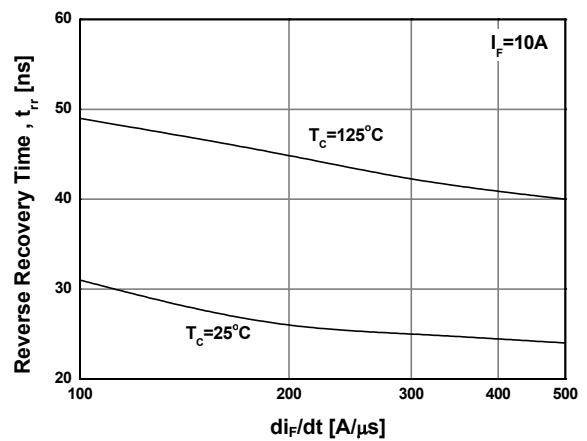
**Figure 4. Typical Reverse Current**



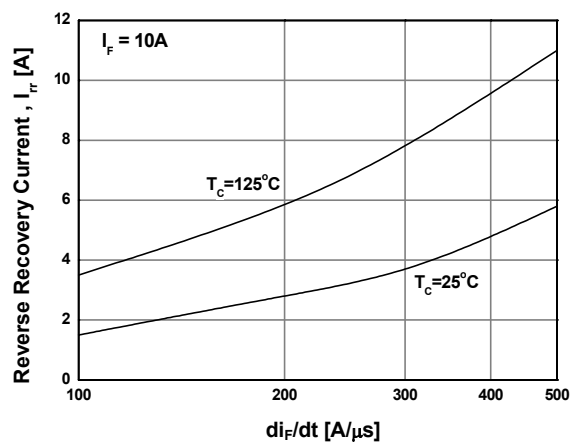
**Figure 5. Typical Junction Capacitance**



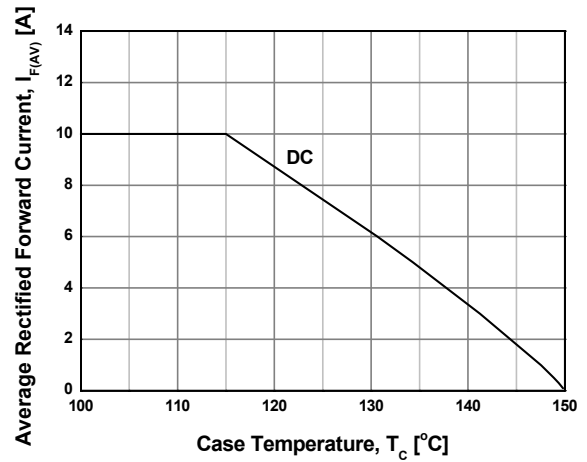
**Figure 6. Typical Reverse Recovery Time**



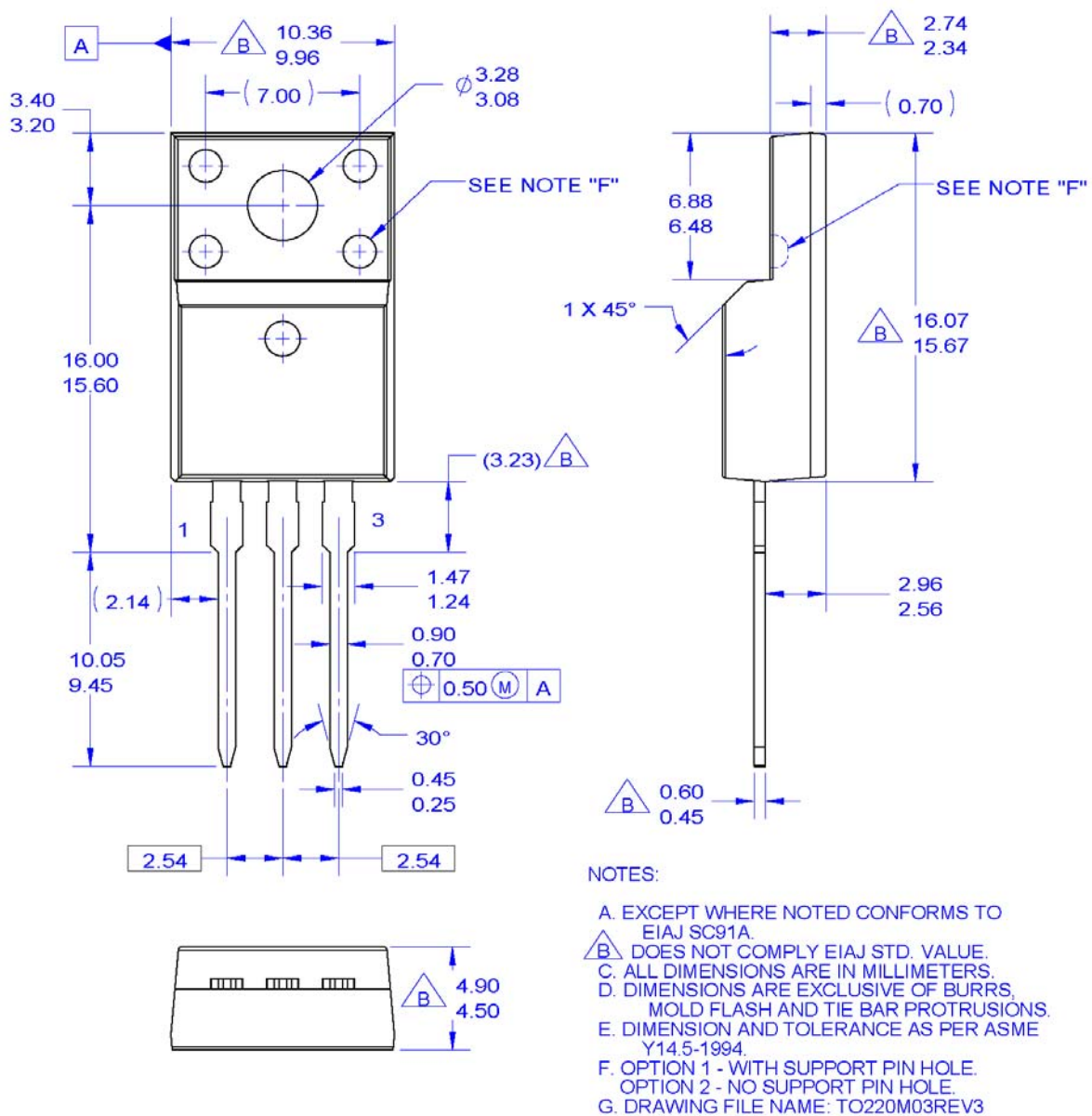
**Figure 7. Typical Reverse Recovery Current**



**Figure 8. Forward Current Deration Curve**



## Package Dimensions



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

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