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December 2014



# FFPF20UP20DN

## 20 A, 200 V, Ultrafast Dual Diode

### Features

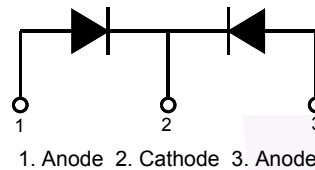
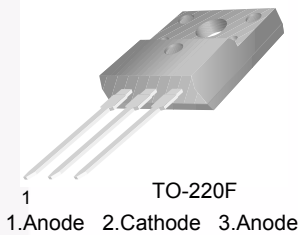
- Ultrafast Recovery  $t_{rr} = 45 \text{ ns}$  (@  $I_F = 10 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage,  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

### 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

### 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

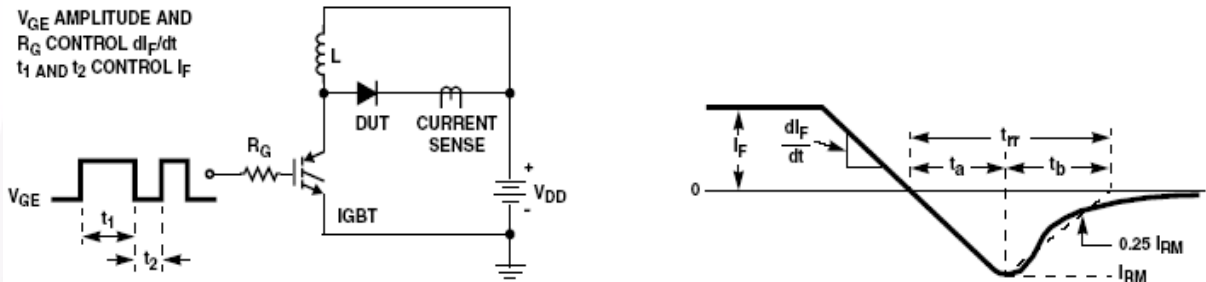


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

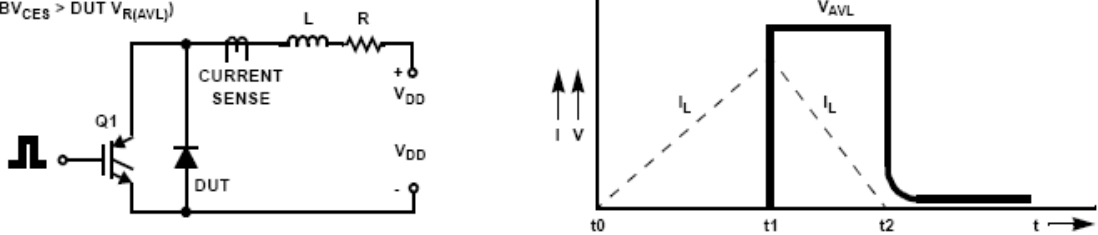


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop

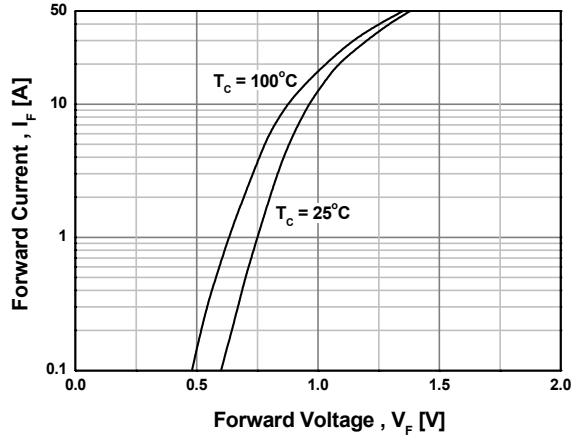


Figure 4. Typical Reverse Current

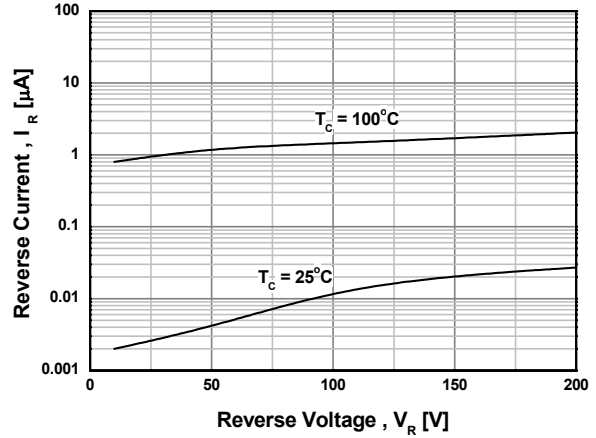


Figure 5. Typical Junction Capacitance

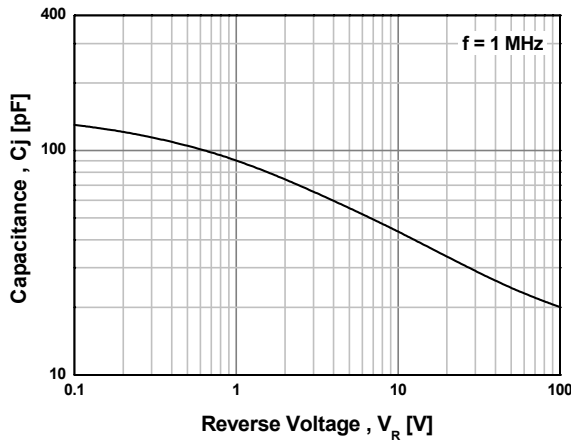


Figure 6. Typical Reverse Recovery Time

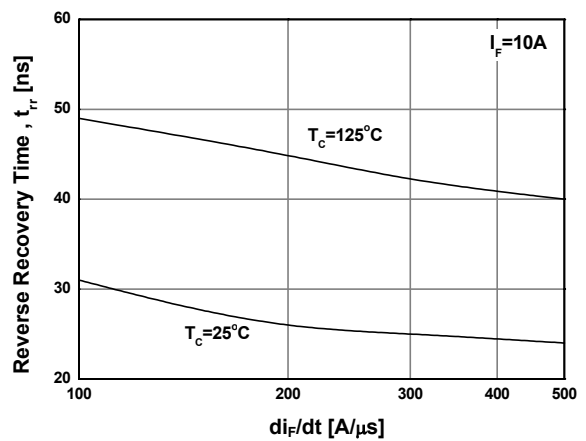


Figure 7. Typical Reverse Recovery Current

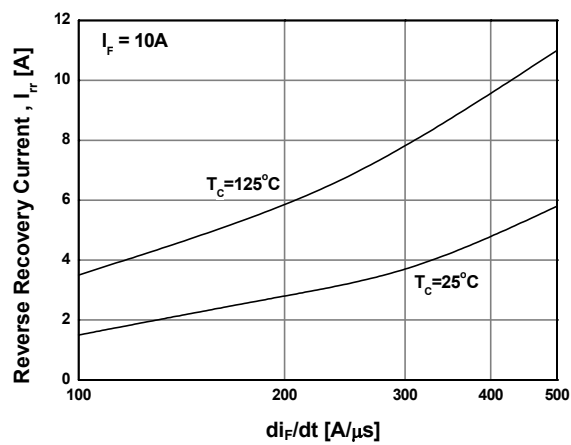
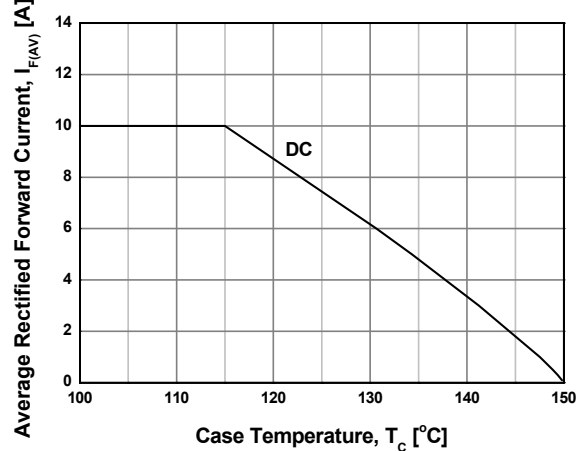


Figure 8. Forward Current Deration Curve








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