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December 2014

FFPF10UP20S

10 A, 200 V, Ultrafast Diode

Features

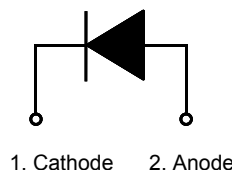
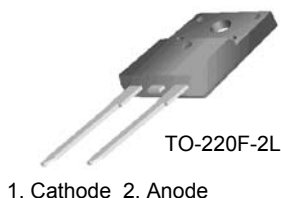
- Ultrafast Recovery $t_{rr} = 35 \text{ ns}$ (@ $I_F = 1 \text{ A}$)
- Max Forward Voltage, $V_F = 1.15 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage, $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

Applications

- Power Switching Circuits, SMPS
- Output Rectifiers
- Freewheeling Diodes

Description

The FFPF10UP20S is an ultrafast 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.



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{RRM}	Peak Repetitive Reverse Voltage	200	V
V_{RWM}	Working Peak Reverse Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 25^\circ\text{C}$	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 $T_C = 25^\circ\text{C}$ 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
FFPF10UP20STU	FFPF10UP20S	TO-220F-2L	Tube	N/A	N/A	50

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_F^1	Forward Voltage $I_F = 10\text{ A}$ $I_F = 10\text{ A}$	$T_C = 25^\circ\text{C}$	-	1.15	V
		$T_C = 125^\circ\text{C}$	-	1.10	
I_R^1	Reverse Current @ rated V_R	$T_C = 25^\circ\text{C}$	-	100	μA
		$T_C = 100^\circ\text{C}$	-	500	
t_{rr}	Reverse Recovery Time	-	32	-	ns
I_{rr}	Reverse Recovery Current	-	1.65	-	A
Q_{rr}	Reverse Recovery Charge ($I_F = 6\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 130\text{ V}$)	-	24.4	-	nC
W_{AVL}	Avalanche Energy ($L = 40\text{ mH}$)	5	-	-	mJ

Notes:

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

Test Circuit and Waveforms

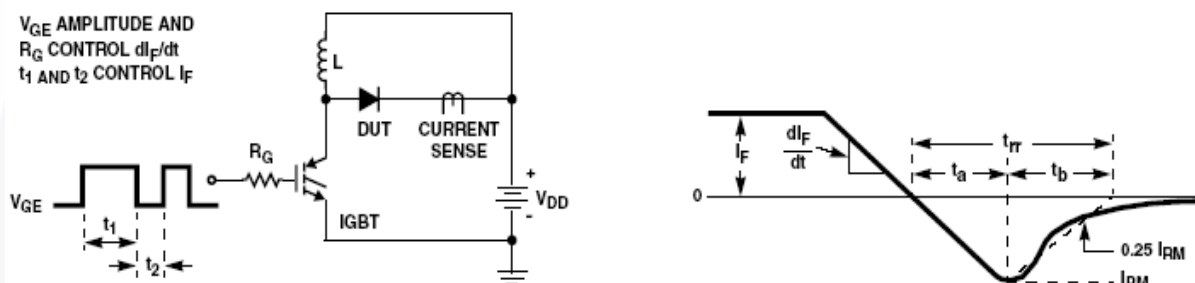


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{ mH}$

$R < 0.1\Omega$

$V_{DD} = 50\text{ V}$

$E_{AVL} = 1/2 L I_2^2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$

$Q1 = \text{IGBT } (BV_{CES} > V_{R(AVL)})$

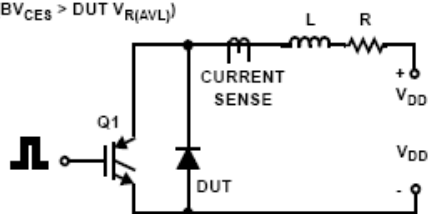


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

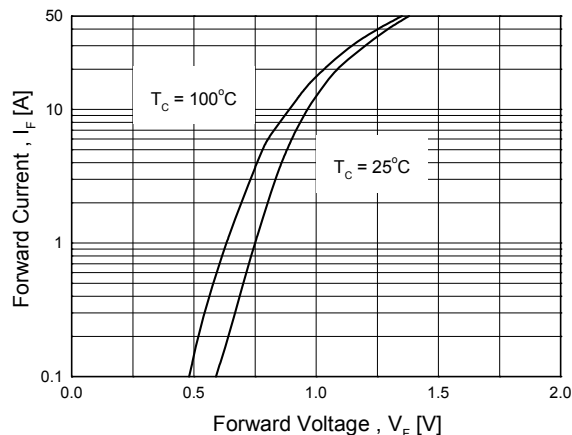


Figure 4. Typical Reverse Current vs. Reverse Voltage

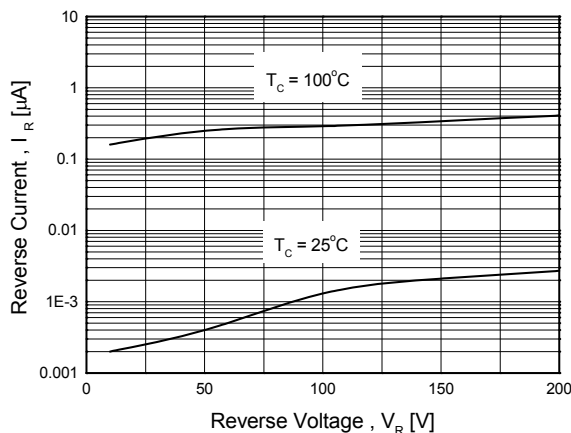


Figure 5. Typical Junction Capacitance

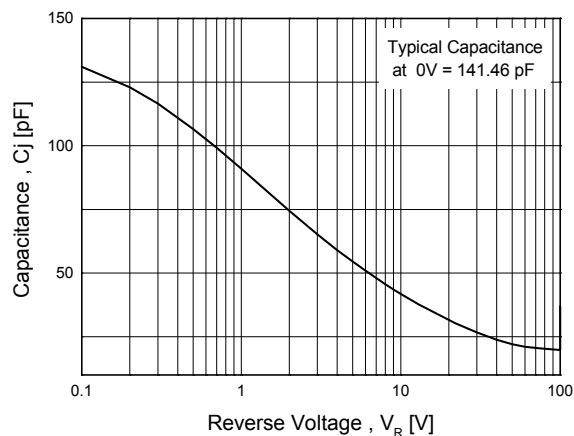


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

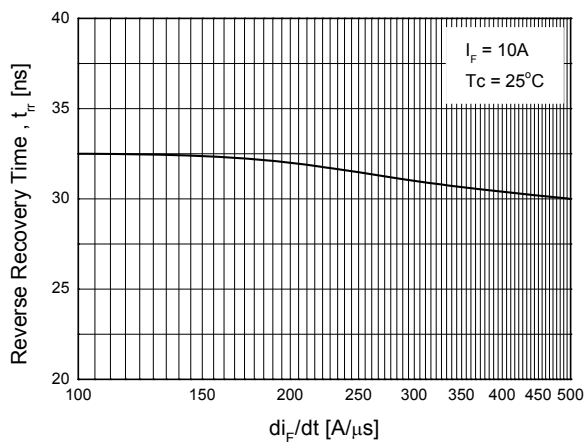


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

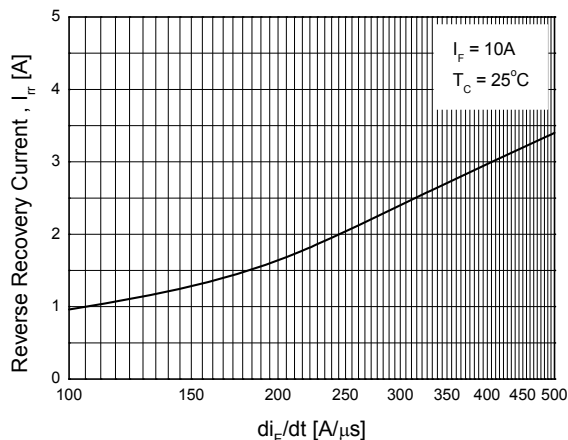
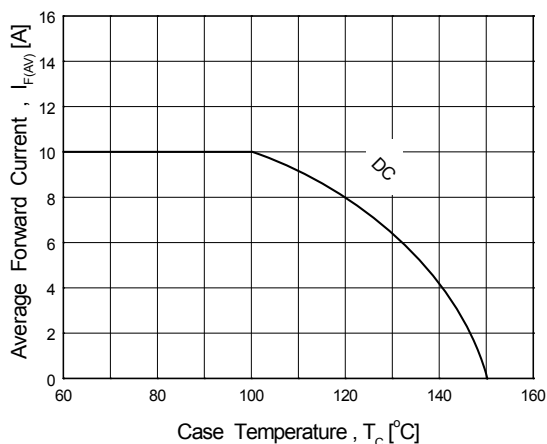
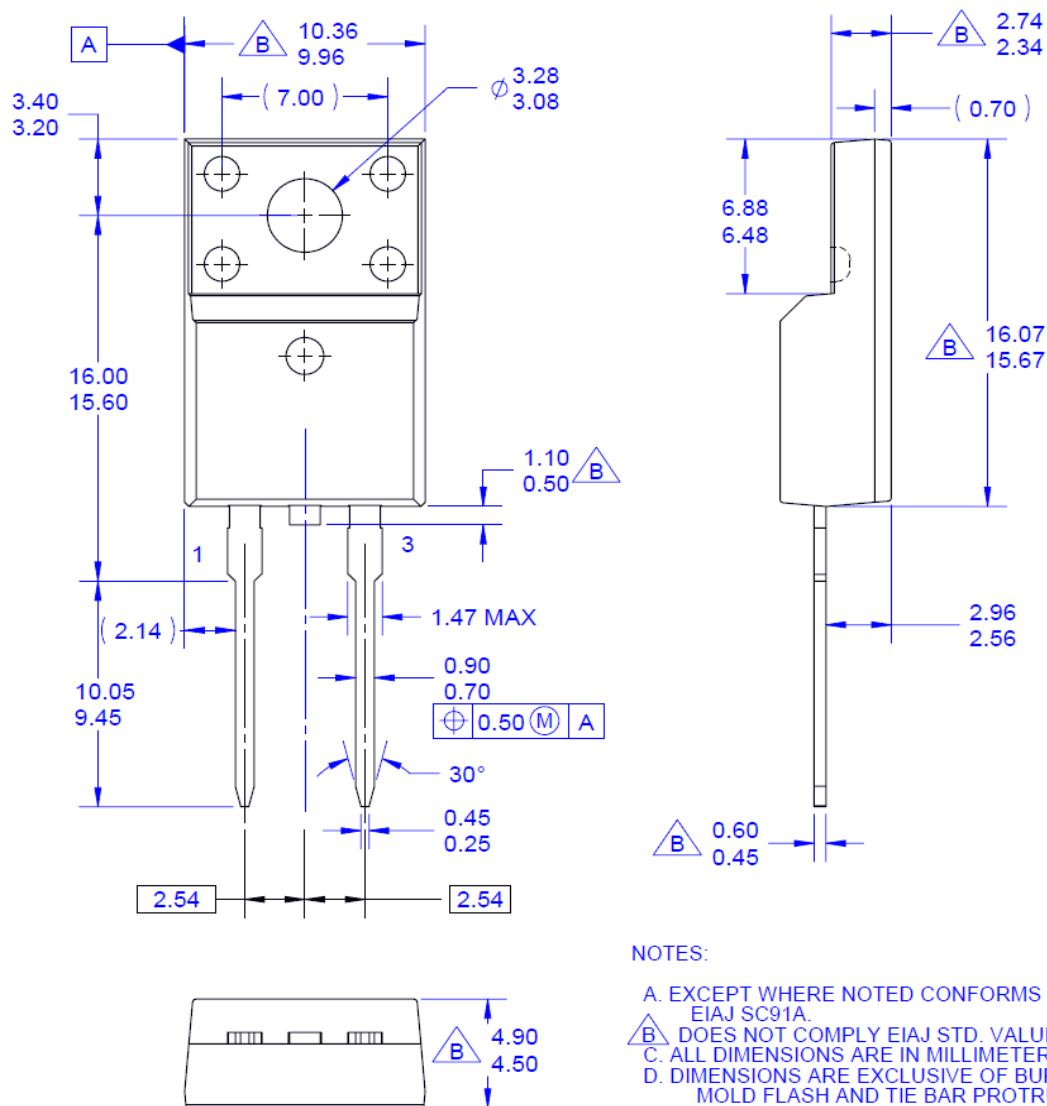


Figure 8. Forward Current Derating Curve



Mechanical Dimensions



NOTES:

- A. EXCEPT WHERE NOTED CONFORMS TO EIAJ SC91A.
- B. DOES NOT COMPLY EIAJ STD. VALUE.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- F. DRAWING FILE NAME: TO220C02REV2

Figure 9. TO-220F 2L - 2LD; TO220; MOLDED; FULL PACK

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