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November 2014

# FFPF10UP60S

## 10 A, 600 V Ultrafast Diode

FFPF10UP60S — Ultrafast Diode

### Features

- Ultrafast Recovery  $t_{rr} = 40 \text{ ns}$  (@  $I_F = 1 \text{ A}$ )
- Max Forward Voltage,  $V_F = 2.2 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

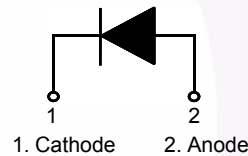
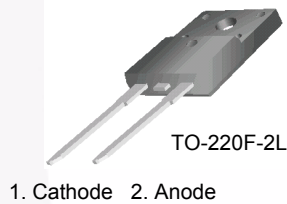
### Description

The FFPF10UP60S 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.

### Applications

- General Purpose
- SMPS, Power Switching Circuits
- Free-Wheeling Diode for Motor Application
- Welder, UPS

### Pin Assignments



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

Symbol	Parameter	Rating	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	600	V
$V_{RWM}$	Working Peak Reverse Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 60^\circ\text{C}$	10	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	50	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	4.5	$^\circ\text{C/W}$

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFPF10UP60STU	FFPF10UP60S	TO-220F-2L	Tube	N/A	N/A	30

## Electrical Characteristics T<sub>C</sub> = 25°C unless otherwise noted

Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>F</sub> <sup>1</sup>	Maximum Instantaneous Forward Voltage I <sub>F</sub> = 10 A I <sub>F</sub> = 10 A	T <sub>C</sub> = 25 °C T <sub>C</sub> = 100 °C	- -	2.2 2.0	V
I <sub>R</sub> <sup>1</sup>	Maximum Instantaneous Reverse Current @ rated V <sub>R</sub>	T <sub>C</sub> = 25 °C T <sub>C</sub> = 100 °C	- -	100 500	μA
t <sub>rr</sub>	I <sub>F</sub> = 1 A, di <sub>F</sub> /dt = 100 A/μs, V <sub>R</sub> = 30 V	T <sub>C</sub> = 25 °C	-	25	ns
t <sub>rr</sub> I <sub>rr</sub> Q <sub>rr</sub>	Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge (I <sub>F</sub> = 8 A, di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 390 V)		- - -	34 1.0 17	ns A nC
t <sub>rr</sub>	Maximum Reverse Recovery Time (I <sub>F</sub> = 10 A, di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 390 V)		-	58	ns
W <sub>AVL</sub>	Avalanche Energy (L = 40 mH)		20	-	mJ

### Notes:

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

## Test Circuit and Waveforms

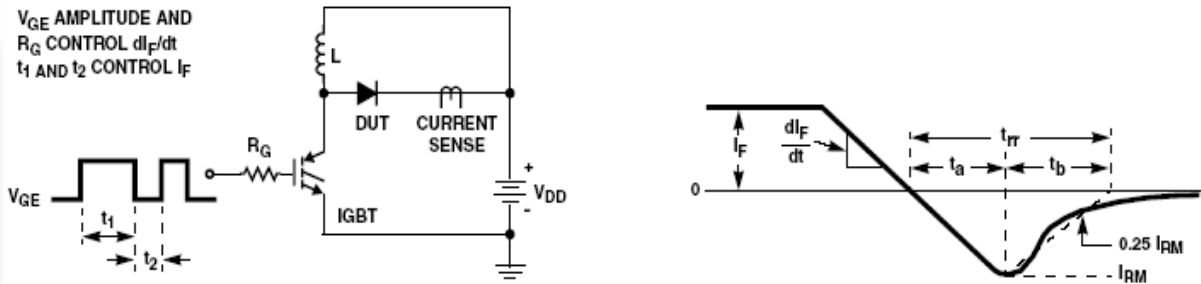


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

L = 40mH  
R < 0.1Ω  
V<sub>DD</sub> = 50V

EAVL = 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>)

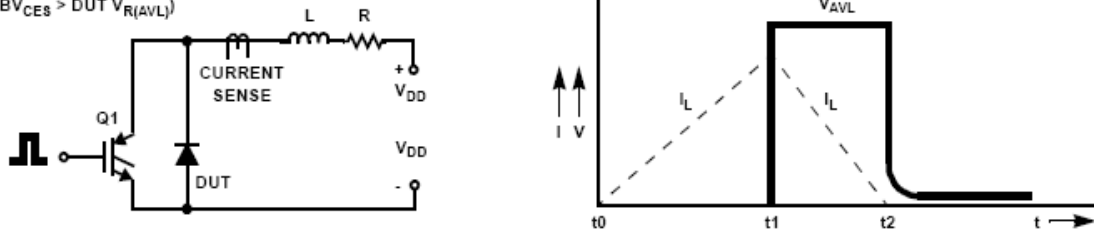
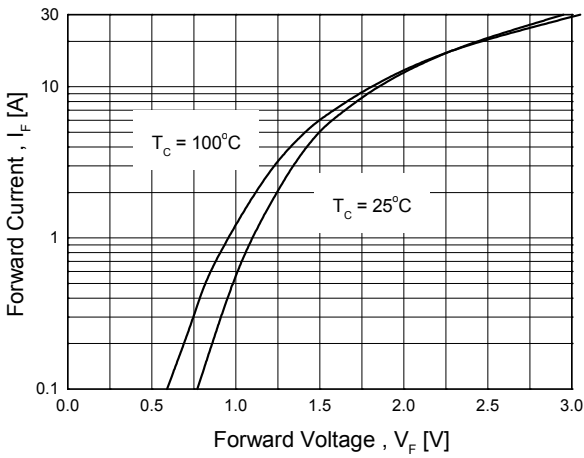


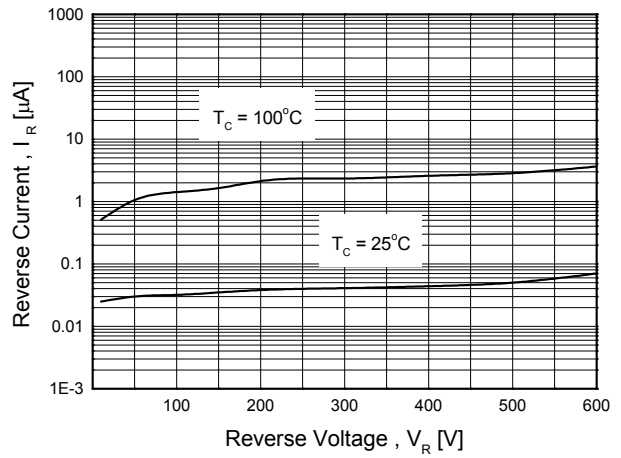
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

**Typical Performance Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

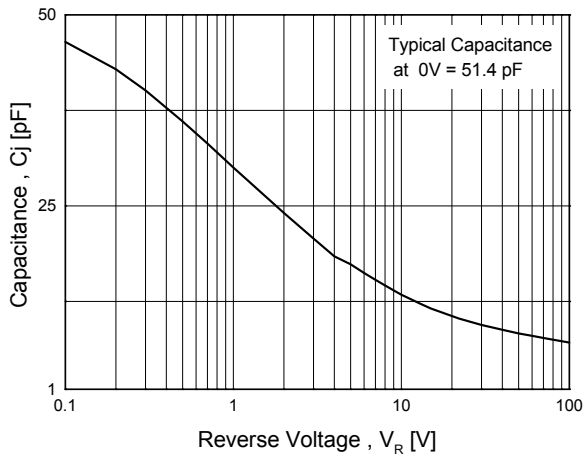
**Figure 3. Typical Forward Voltage Drop**



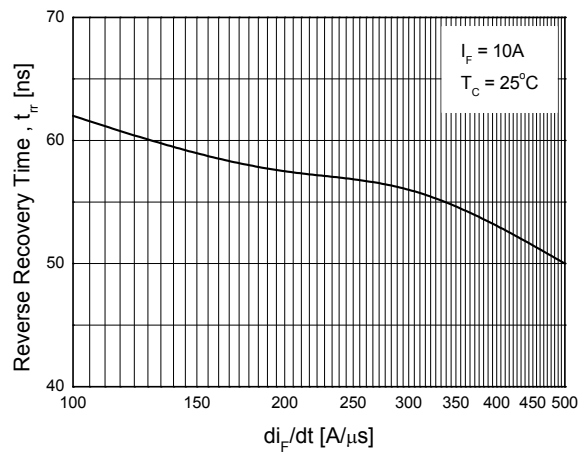
**Figure 4. Typical Reverse Current**



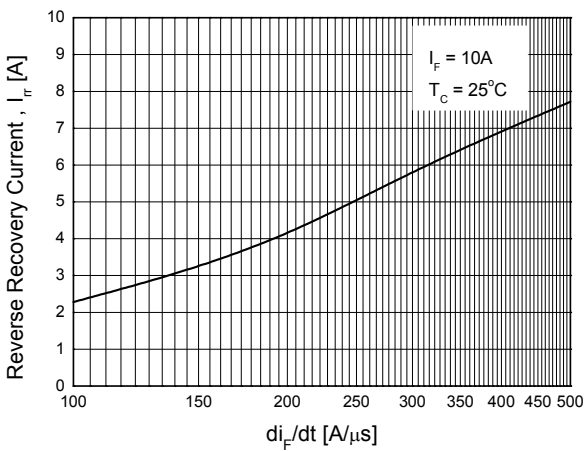
**Figure 5. Typical Junction Capacitance**



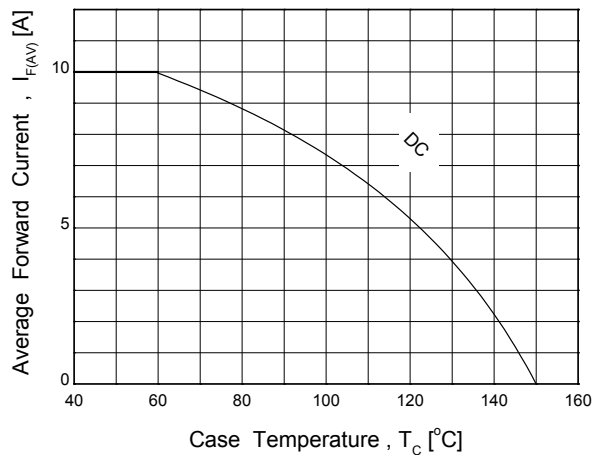
**Figure 6. Typical Reverse Recovery Time**



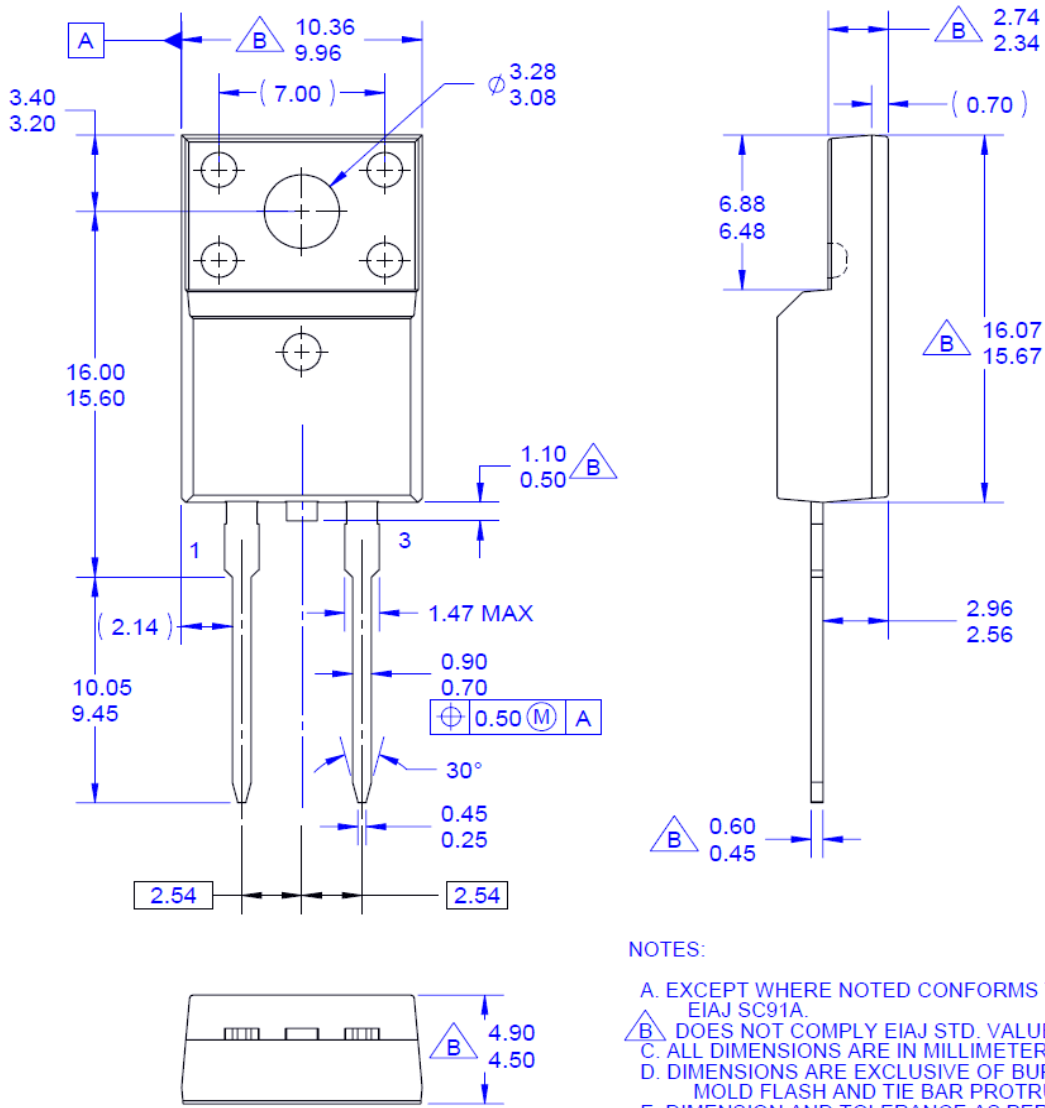
**Figure 7. Typical Reverse Recovery Current**



**Figure 8. Forward Current Deration Curve**



**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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| Build it Now™   | Green FPS™                                      | QS™                                   | TinyCalc™        |
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