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November 2014



FFPF30UA60S — Ultrafast II Diode

FFPF30UA60S

30 A, 600 V, Ultrafast II Diode

Features

- Ultrafast Recovery, $t_{rr} = 90 \text{ ns}$ ($@I_F = 30 \text{ A}$)
- 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

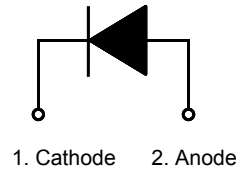
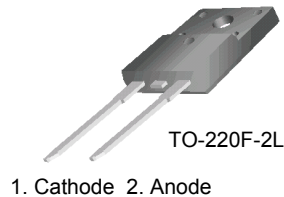
Description

The FFPF30UA60S is a ultrafast II 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.

Applications

- Boost Diode in PFC and SMPS
- Welder, UPS and Motor Control Application

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
V_R	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 43^\circ\text{C}$	30	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	180	A
T_J, T_{STG}	Operating and Storage Temperature Range	-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	2.5	$^\circ\text{C/W}$

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFPF30UA60S	FFPF30UA60S	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_{F1}	$I_F = 30\text{ A}$ $I_F = 30\text{ A}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	2.2 2.0	V	
I_{R1}	$V_R = 600\text{ V}$ $V_R = 600\text{ V}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	100 150	μA	
t_{rr}	$I_F = 30\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	-	90	ns
I_{rr}			-	-	8	A
Q_{rr}			-	-	360	nC
W_{AVL}	Avalanche Energy ($L = 40\text{ mH}$)		20	-	-	mJ

Notes:

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

Test Circuit and Waveforms

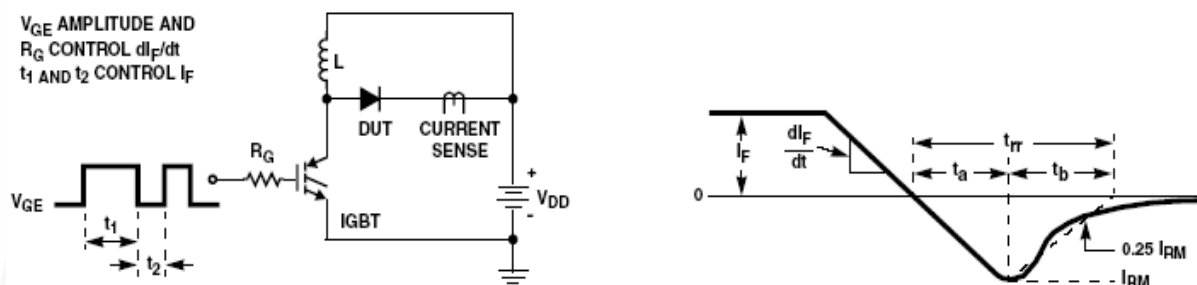


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

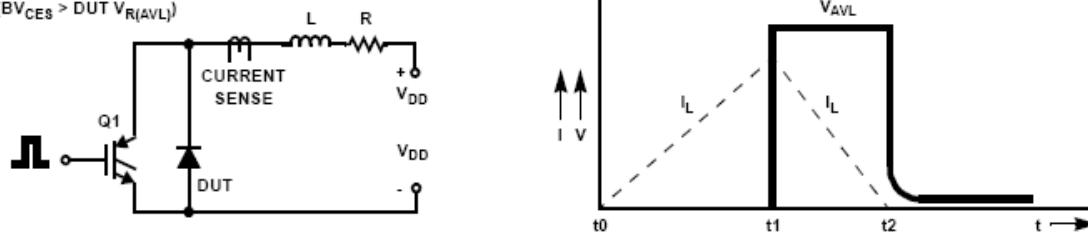


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

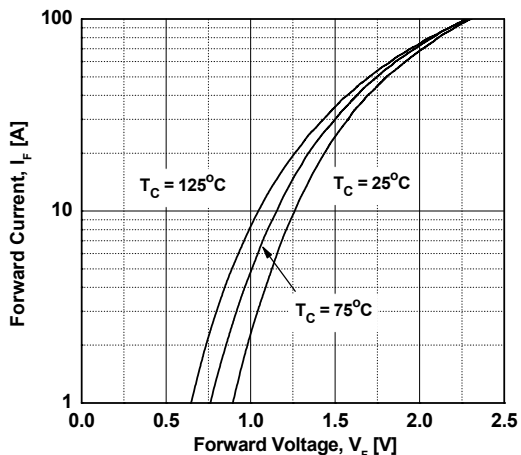


Figure 5. Typical Junction Capacitance

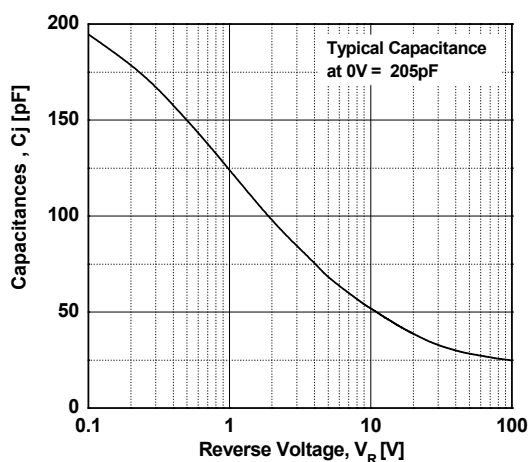


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

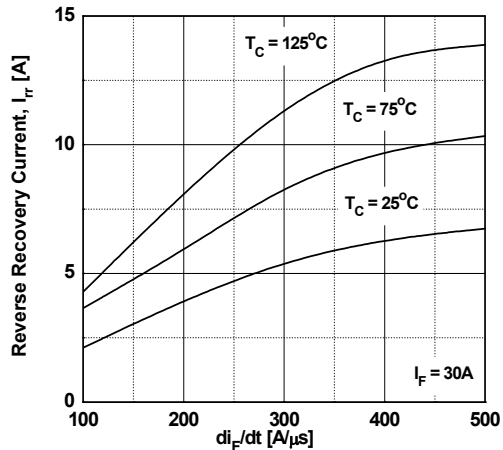


Figure 4. Typical Reverse Current vs. Reverse Voltage

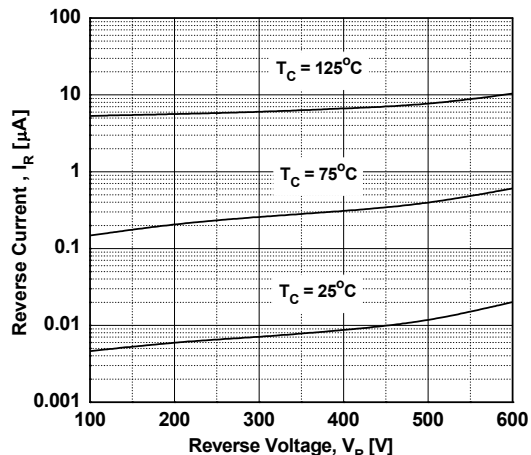


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

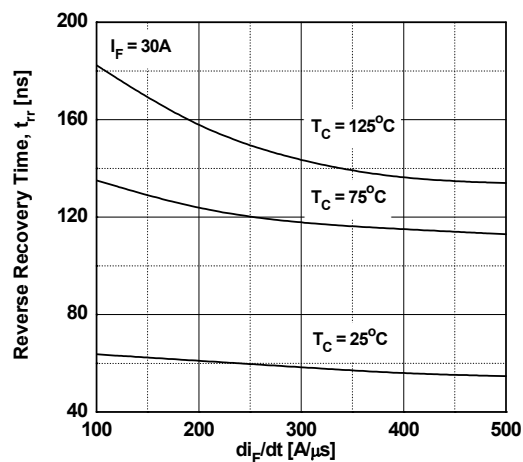
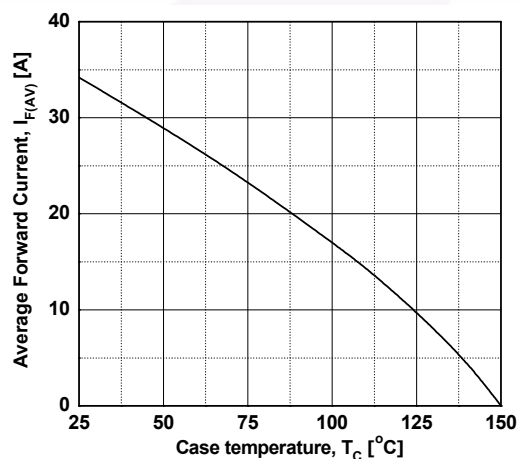
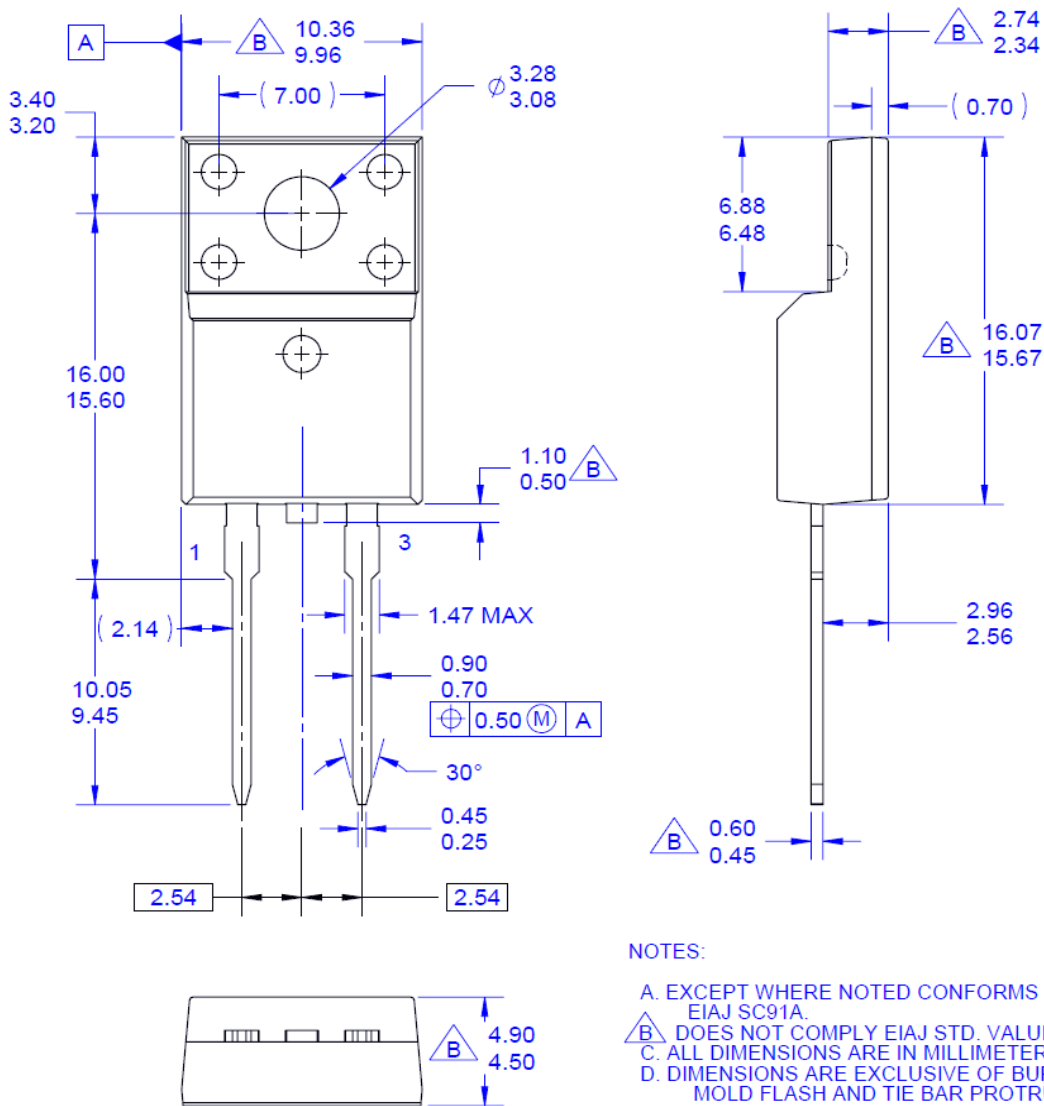


Figure 8. Forward Current Derating Curve



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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