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November 2014

# FFPF15S60S

## 15 A, 600 V, STEALTH™ II Diode

### Features

- Stealth Recovery  $T_{rr} = 35\text{ns}$  (@  $I_F = 15\text{ A}$ )
- Max Forward Voltage,  $V_F = 2.6\text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- 600V Reverse Voltage and High Reliability
- Improved  $dv/dt$  Capability
- RoHS Compliant

### Applications

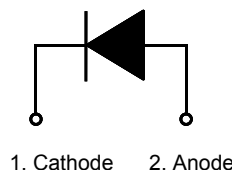
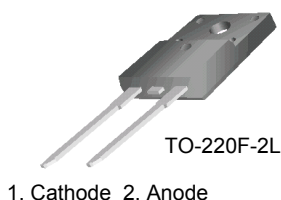
- General Purpose
- Switching Mode Power Supply
- Boost Diode in Continuous Mode Power Factor Corrections

- Power Switching Circuits

### Description

The FFPF15S60S is STEALTH™ II rectifier with soft recovery characteristics. It is silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as freewheeling of boost diode in switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.



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

Symbol	Parameter	Ratings	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 @ $T_C = 52^\circ\text{C}$	15	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	150	A
$T_J, T_{STG}$	Operating and Storage Temperature Range	-65 to +175	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Max.	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	4.6	$^\circ\text{C/W}$

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFPF15S60STU	FFPF15S60S	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 <sub>FM1</sub>	I <sub>F</sub> = 15 A I <sub>F</sub> = 15 A	T <sub>C</sub> = 25°C T <sub>C</sub> = 125°C	- -	2.1 1.6	2.6 -	V
I <sub>RM1</sub>	V <sub>R</sub> = 600 V V <sub>R</sub> = 600 V	T <sub>C</sub> = 25°C T <sub>C</sub> = 125°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	-	21	30	ns
t <sub>rr</sub>	I <sub>F</sub> = 15 A, di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 390 V	T <sub>C</sub> = 25°C	-	23	35	ns
I <sub>rr</sub>			-	2.5	-	A
S factor			-	0.7	-	
Q <sub>rr</sub>			-	29	-	nC
t <sub>rr</sub>	I <sub>F</sub> = 15 A, di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 390 V	T <sub>C</sub> = 125°C	-	55	-	ns
I <sub>rr</sub>			-	4.3	-	A
S factor			-	1.1	-	
Q <sub>rr</sub>			-	118	-	nC
W <sub>AVL</sub>	Avalanche Energy ( L = 40 mH)		20	-	-	mJ

## Notes:

1: Pulse: Test Pulse width = 300 $\mu\text{s}$ , Duty Cycle = 2%

## Test Circuit and Waveforms

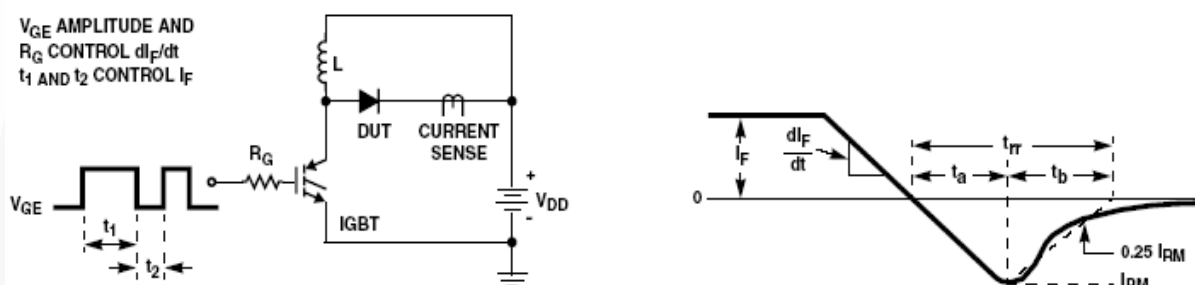


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{ mH}$   
 $R < 0.1\Omega$   
 $V_{DD} = 50\text{ V}$   
 $E_{AVL} = 1/2 L I_2^2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$   
 $Q1 = \text{IGBT } (BV_{CES} > V_{R(AVL)})$

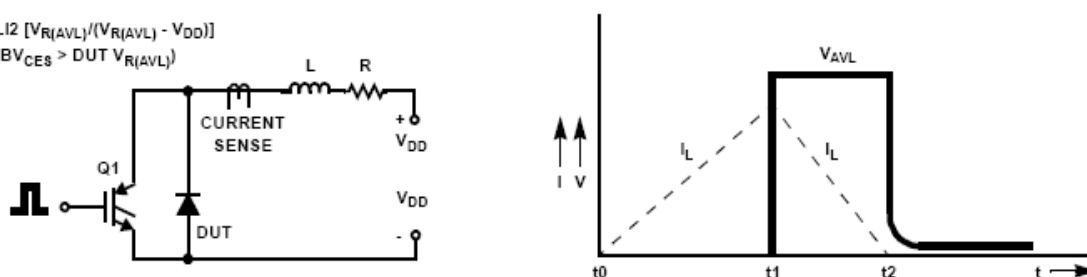


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

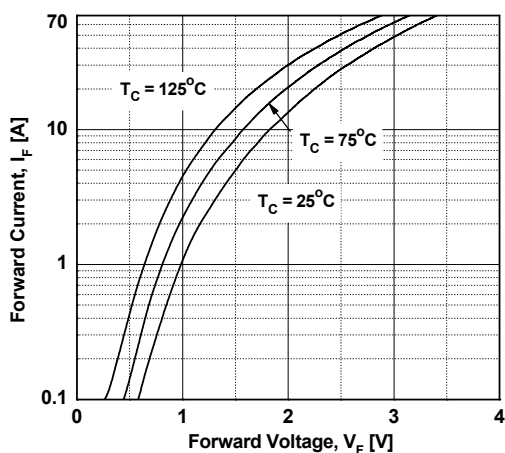


Figure 4. Typical Reverse Current vs. Reverse Voltage

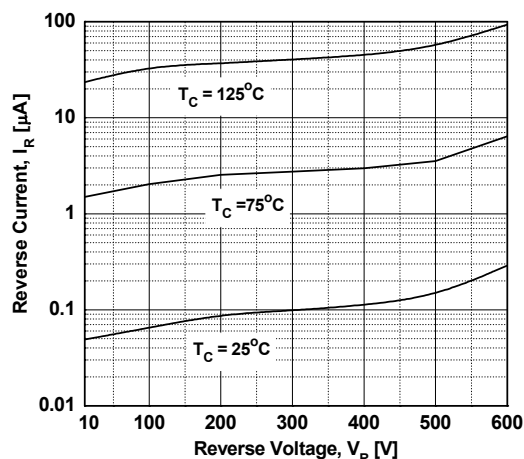


Figure 5. Typical Junction Capacitance

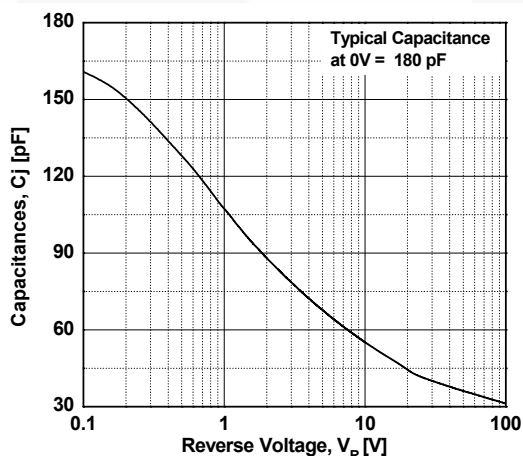


Figure 6. Typical Reverse Recovery Time vs. di/dt

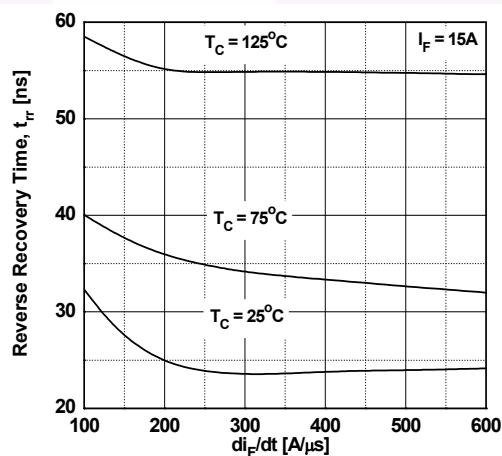


Figure 7. Typical Reverse Recovery Current vs. di/dt

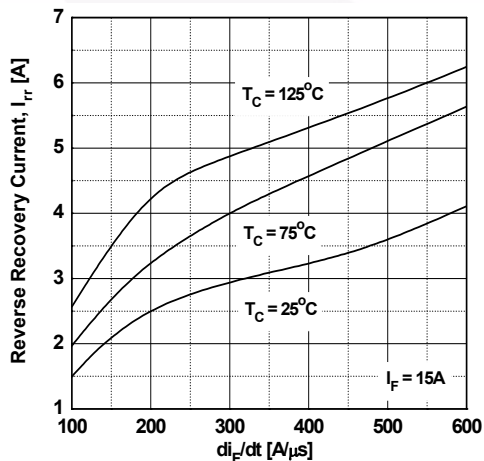
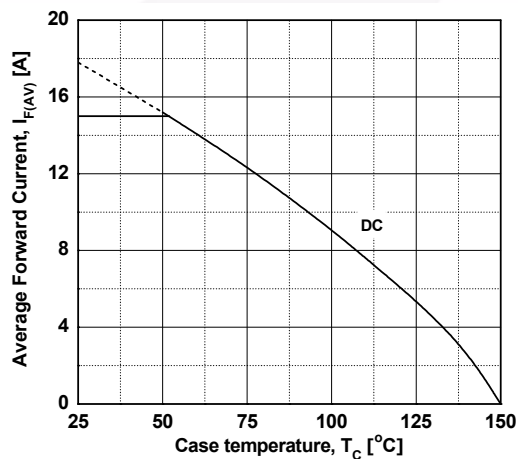
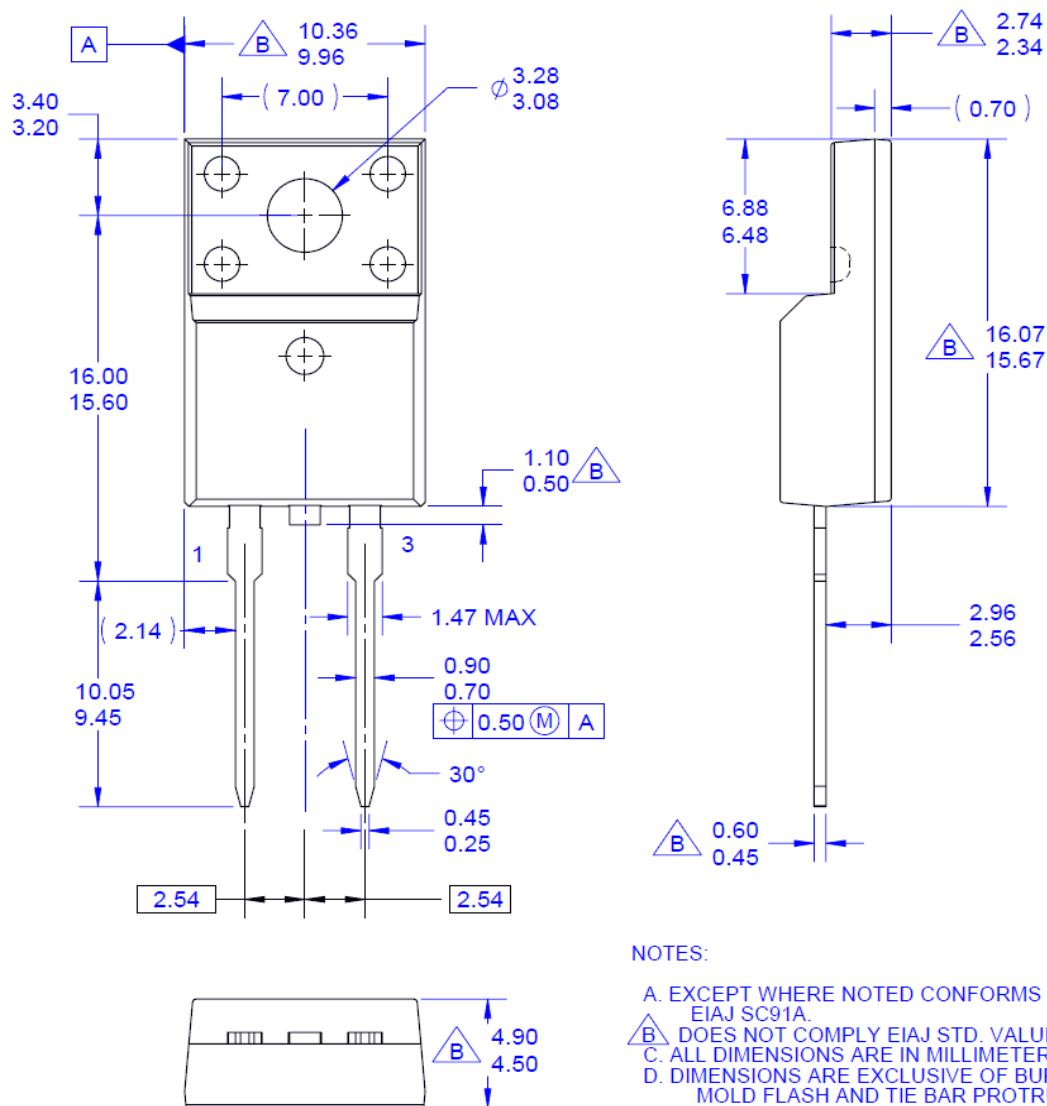


Figure 8. Forward Current Derating Curve



## 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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