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November 2014

# FFAF60UA60DN

## 60 A, 600 V, Ultrafast II Dual Diode

### Features

- Ultrafast Recovery,  $T_{rr} < 90\text{ns}$  (@  $I_F = 30\text{ A}$ )
- Max Forward Voltage,  $V_F = 2.2\text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- 600V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

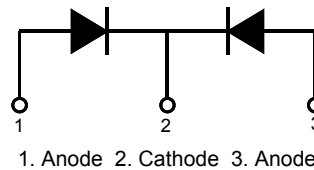
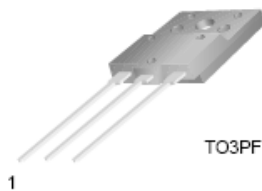
### Applications

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

### Description

The FFAF60UA60DN is an ultrafast II 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 application as welder and UPS application.

### Pin Assignments



### Absolute Maximum Ratings

 Per leg at  $T_C = 25^\circ\text{C}$  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 @ $T_C = 45^\circ\text{C}$	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

 Per leg at  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	2.4	$^\circ\text{C/W}$

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFAF60UA60DN	F60UA60DN	TO-3PF	Tube	N/A	N/A	30

FFAF60UA60DN — Ultrafast II Dual Diode

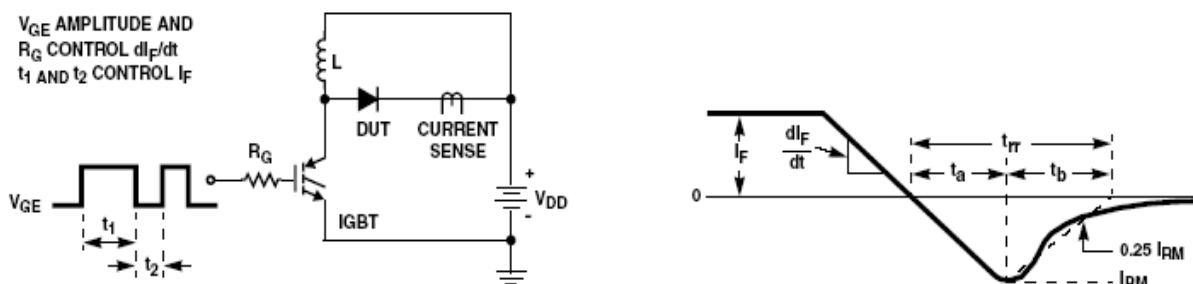
**Electrical Characteristics** Per leg at  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{FM1}$	$I_F = 30\text{ A}$ $I_F = 30\text{ A}$	-	-	2.2 2.0	V
$I_{RM1}$	$V_R = 600\text{ V}$ $V_R = 600\text{ V}$	-	-	100 150	$\mu\text{A}$
$t_{rr}$ $I_{rr}$ $Q_{rr}$	$I_F = 30\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$	-	-	90 8 360	ns A nC
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	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**

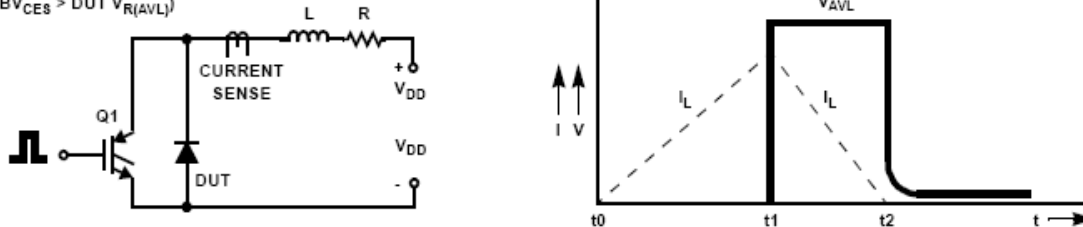
$L = 40\text{mH}$

$R < 0.1\Omega$

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

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

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



**Figure 2. Unclamped Inductive Switching Test Circuit & Waveform**

### Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

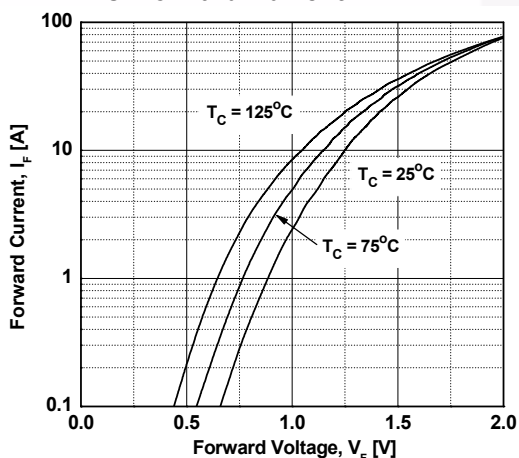


Figure 4. Typical Reverse Current vs. Reverse Voltage

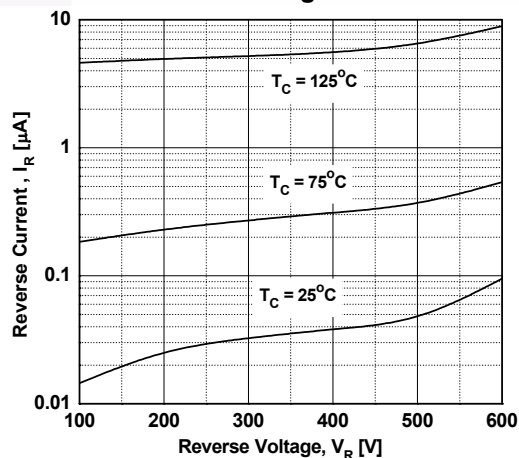


Figure 5. Typical Junction Capacitance

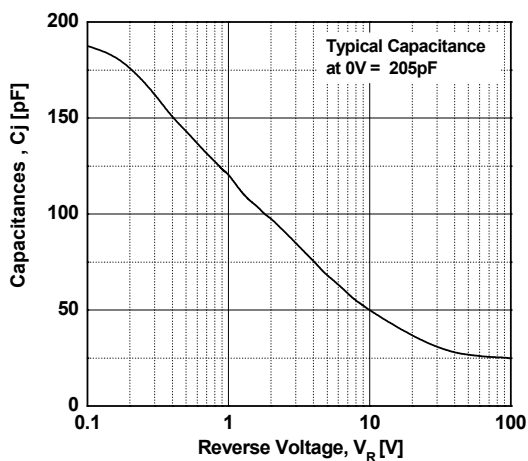


Figure 6. Typical Reverse Recovery Time vs.  $di_F/dt$

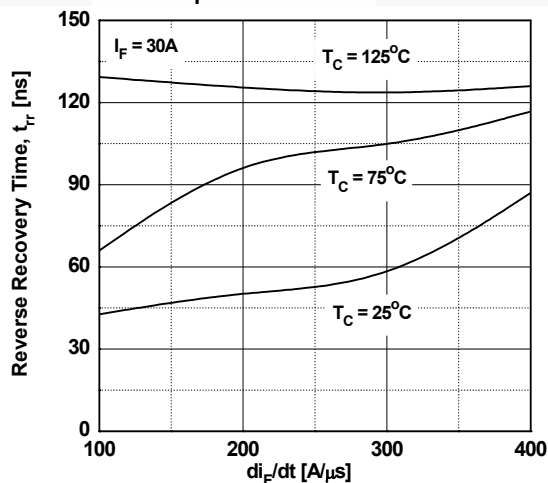


Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$

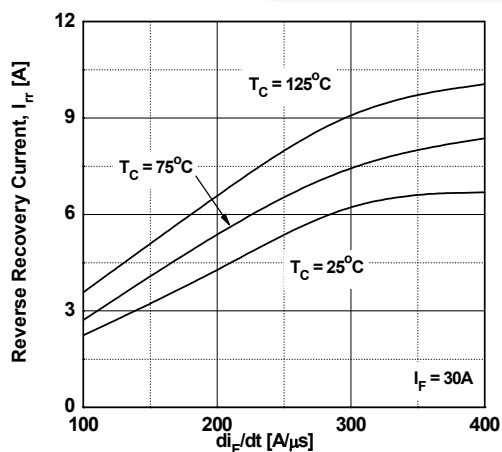
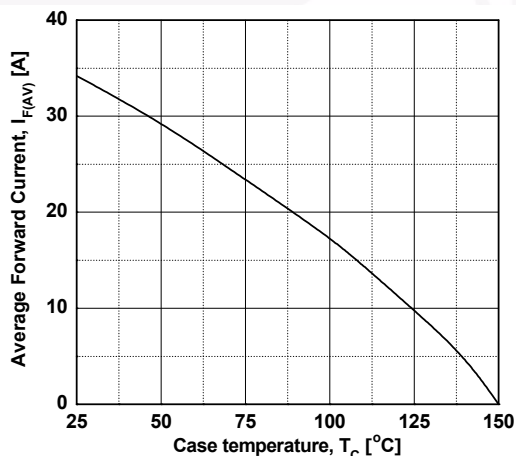
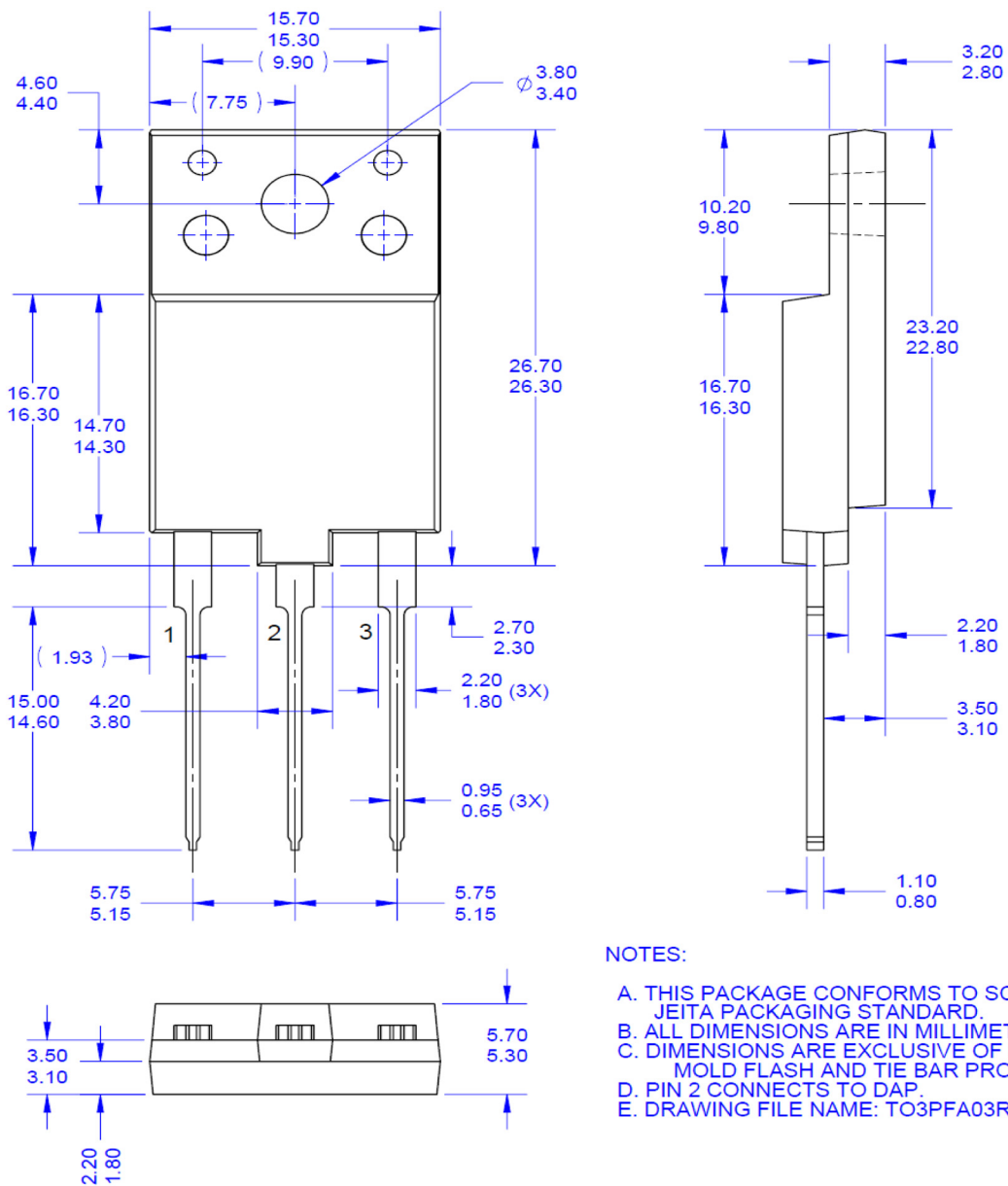


Figure 8. Forward Current Derating Curve



## Package Dimensions



## NOTES:

- A. THIS PACKAGE CONFORMS TO SC94 JEITA PACKAGING STANDARD.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- D. PIN 2 CONNECTS TO DAP.
- E. DRAWING FILE NAME: TO3PFA03REV1

**Figure 9. TO-3PF 3L - TO3PF, MOLDED, 3LD, FULL PACK, EIAJ SC91, STRAIGHT LEAD**

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