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ON Semiconductor®

February 2018

FFPF20UA60DN

20 A, 600 V, Ultrafast II Dual Diode

Features

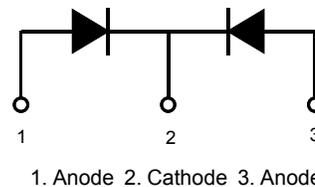
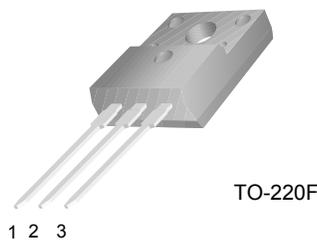
- Ultrafast Recovery $t_{rr} = 120 \text{ ns}$ (@ $I_F = 10 \text{ A}$)
- Max Forward Voltage, $V_F = 2.3 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Description

The FFPF20UA60DN 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 applications as welder and UPS application.

Applications

- Boost Diode in PFC and SMPS



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 @ $T_C = 25^\circ\text{C}$	10	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	50	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	6.3	$^\circ\text{C/W}$

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFPF20UA60DN	FFPF20UA60DN	TO-220F	Tube	N/A	N/A	50

FFPF20UA60DN — Ultrafast II Dual Diode

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{FM1}	$I_F = 10\text{ A}$ $I_F = 10\text{ A}$	-	1.8 1.7	2.3 2.2	V
I_{RM1}	$V_R = 600\text{ V}$ $V_R = 600\text{ V}$	-	-	100 500	μA
t_{rr} I_{rr} Q_{rr}	$I_F = 10\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$		74 6 213	120 10 600	ns A nC
t_{rr} I_{rr} Q_{rr}	$I_F = 10\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$		120 8.8 530	200 15 1500	ns A nC
W_{AVL}	Avalanche Energy ($L = 40\text{ mH}$)	10	-	-	mJ

Notes:

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

Test Circuit and Waveforms

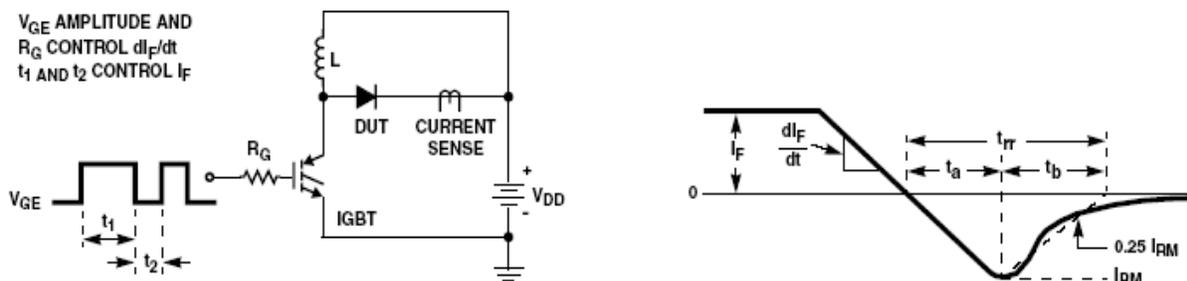


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

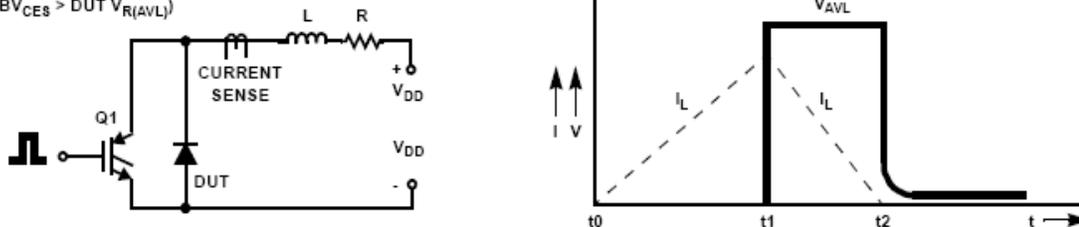


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

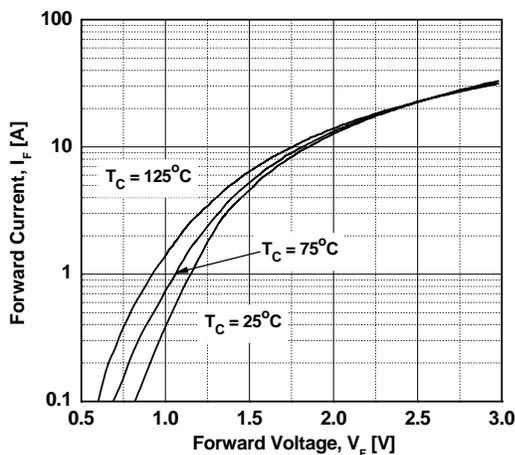


Figure 4. Typical Reverse Current vs. Reverse Voltage

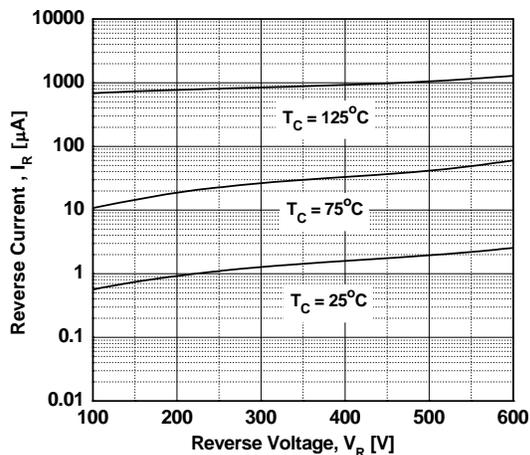


Figure 5. Typical Junction Capacitance

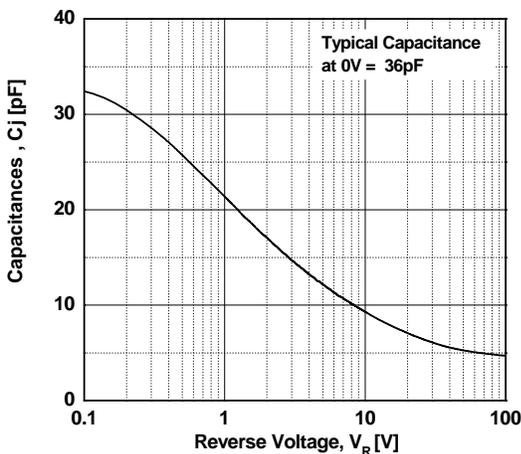


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

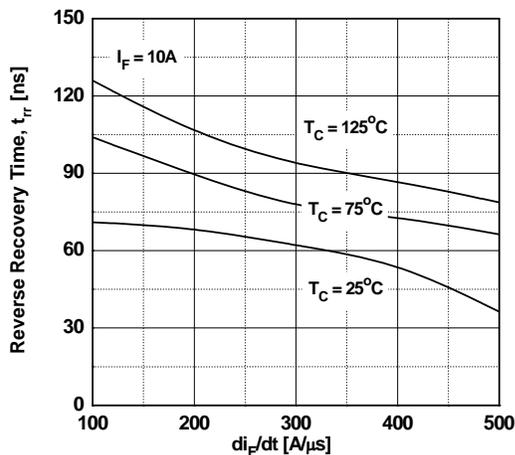


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

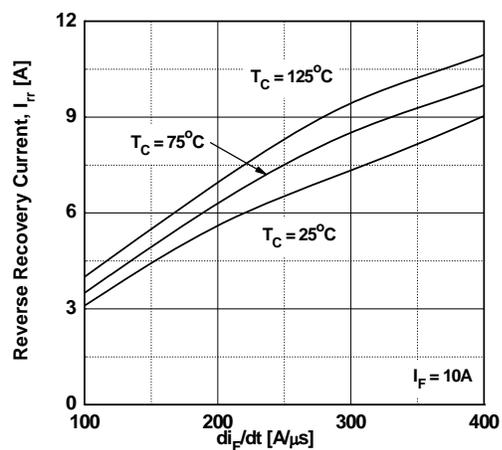
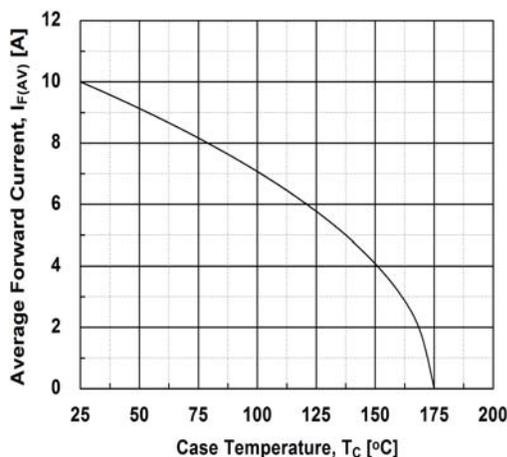
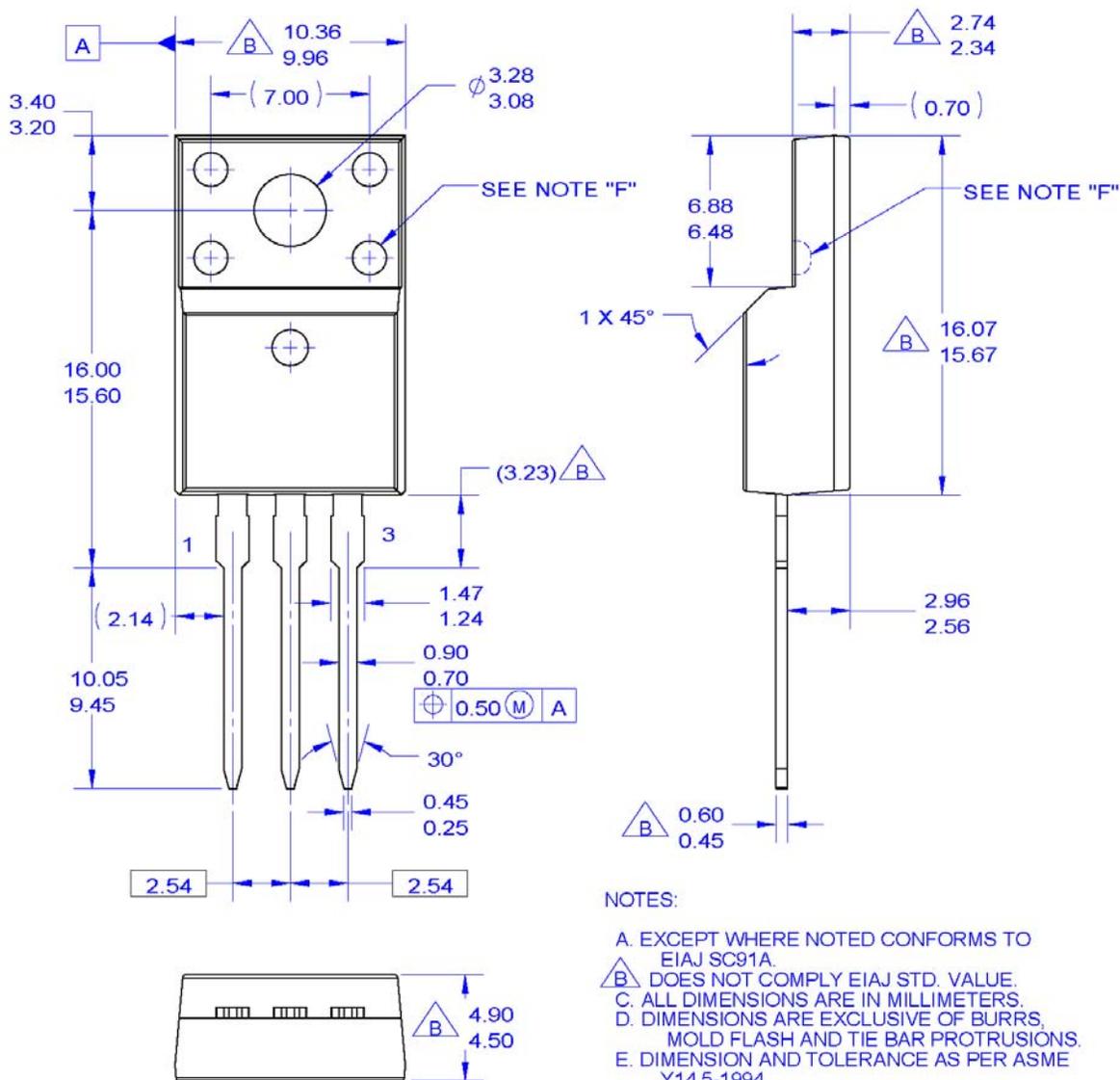


Figure 8. Forward Current Derating Curve



Package Dimensions



- NOTES:
- A. 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. OPTION 1 - WITH SUPPORT PIN HOLE.
OPTION 2 - NO SUPPORT PIN HOLE.
 - G. DRAWING FILE NAME: TO220M03REV3

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