



# FFPF20UP60DN

## Features

- High Speed Switching,  $t_{rr} < 70\text{ns}$  @  $I_F = 10\text{A}$
- High Reverse Voltage and High Reliability
- RoHS compliant

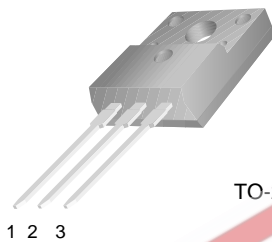
## Applications

- General Purpose
- Switching Mode Power Supply
- Boost Diode in continuous mode power factor corrections
- Power switching circuits

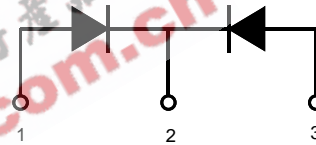
## 20A, 600V Ultrafast Rectifier

The FFPF20UP60DN is a ultrafast 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. Its low stored charge and ultrafast soft recovery with soft recovery characteristics minimize ringing and electrical noise in many power switching, thus reducing power loss in the switching transistors.



TO-220F



1. Anode 2. Cathode 3. Anode

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

Symbol	Parameter	Ratings	Units
$V_{RRM}$	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 @ $T_C = 103^\circ\text{C}$	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 +150	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	7	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP60DN	FFPF20UP60DNTU	TO-220F	-	-	50

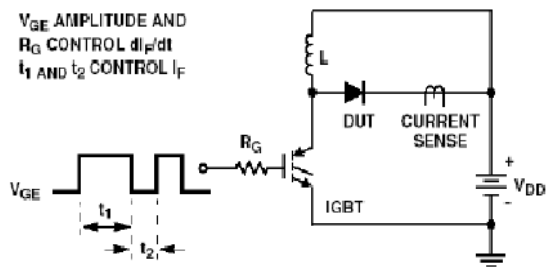
## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM1}$	$I_F = 10\text{A}$ $I_F = 10\text{A}$	-	-	2.2 2.0	V
$I_{RM1}$	$V_R = 600\text{V}$ $V_R = 600\text{V}$	-	-	100 500	$\mu\text{A}$
$t_{rr}$	$I_F = 10\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ , $V_R = 390\text{V}$	-	53	70	ns
$t_{rr}$ $I_{rr}$ $Q_{rr}$	$I_F = 1\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$ , $V_R = 30\text{V}$	-	30 1.5 20	40 2 30	ns A nC
$W_{AVL}$	Avalanche Energy ( $L = 40\text{mH}$ )	10	-	-	mJ

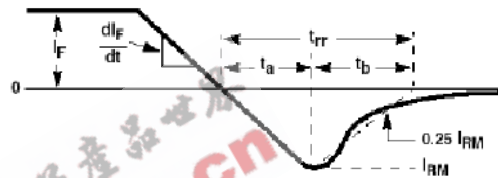
### Notes:

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

## Test Circuit and Waveforms

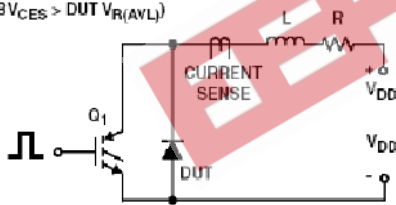


$t_{rr}$  TEST CIRCUIT

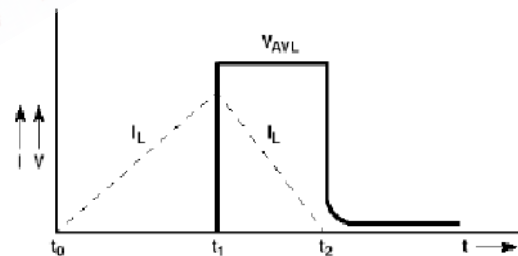


$t_{rr}$  WAVEFORMS AND DEFINITIONS

$L = 40\text{mH}$   
 $R < 0.1\Omega$   
 $E_{AVL} = 1/2LI^2$   
 $Q_1 = \text{IGBT (} BV_{CES} > \text{DUT } V_{R(AVL)} \text{)}$



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

### Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

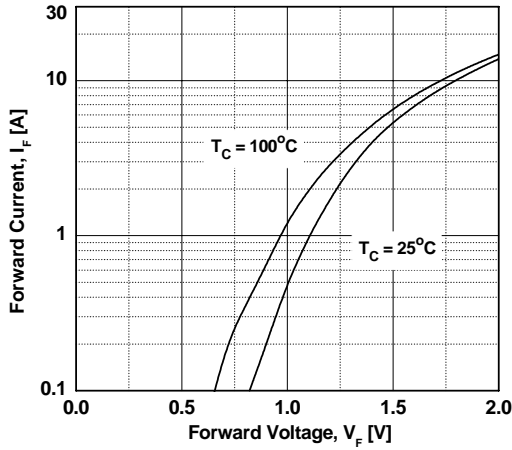


Figure 2. Typical Reverse Current vs. Reverse Voltage

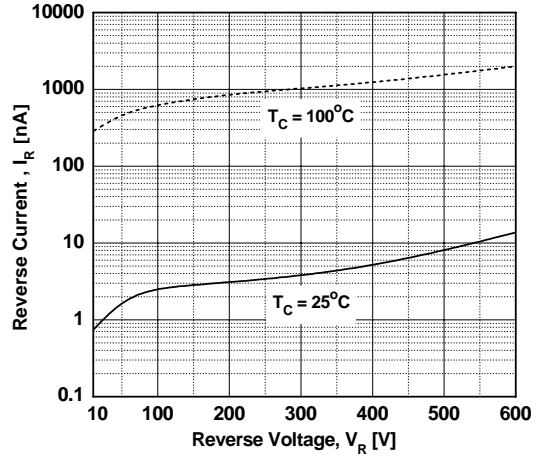


Figure 3. Typical Junction Capacitance

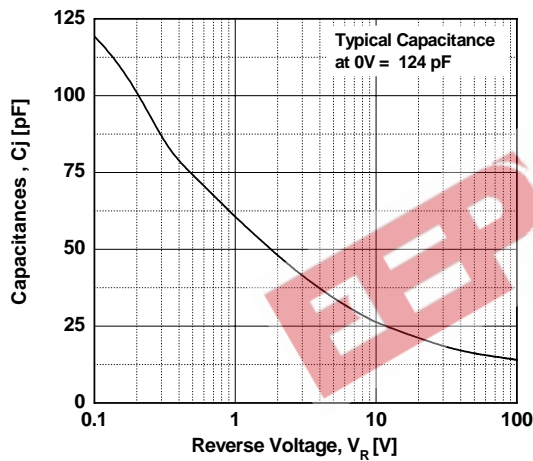


Figure 4. Typical Reverse Recovery Time vs. di/dt

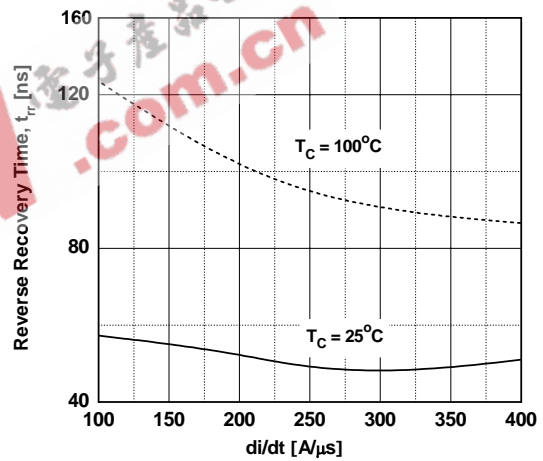


Figure 5. Typical Reverse Recovery Current vs. di/dt

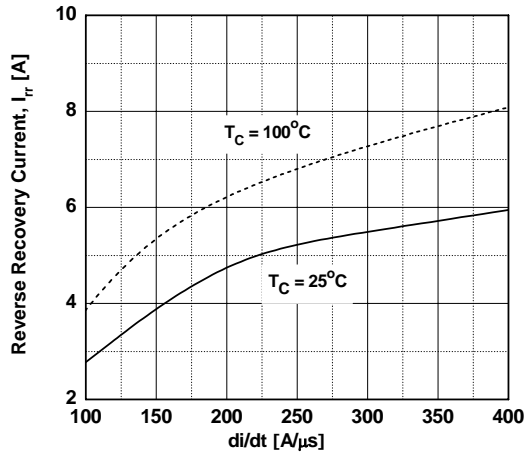
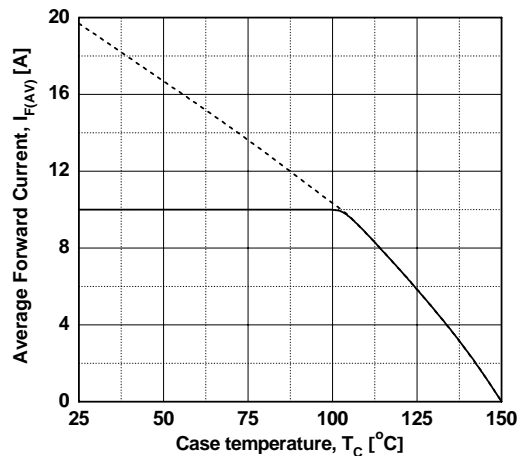
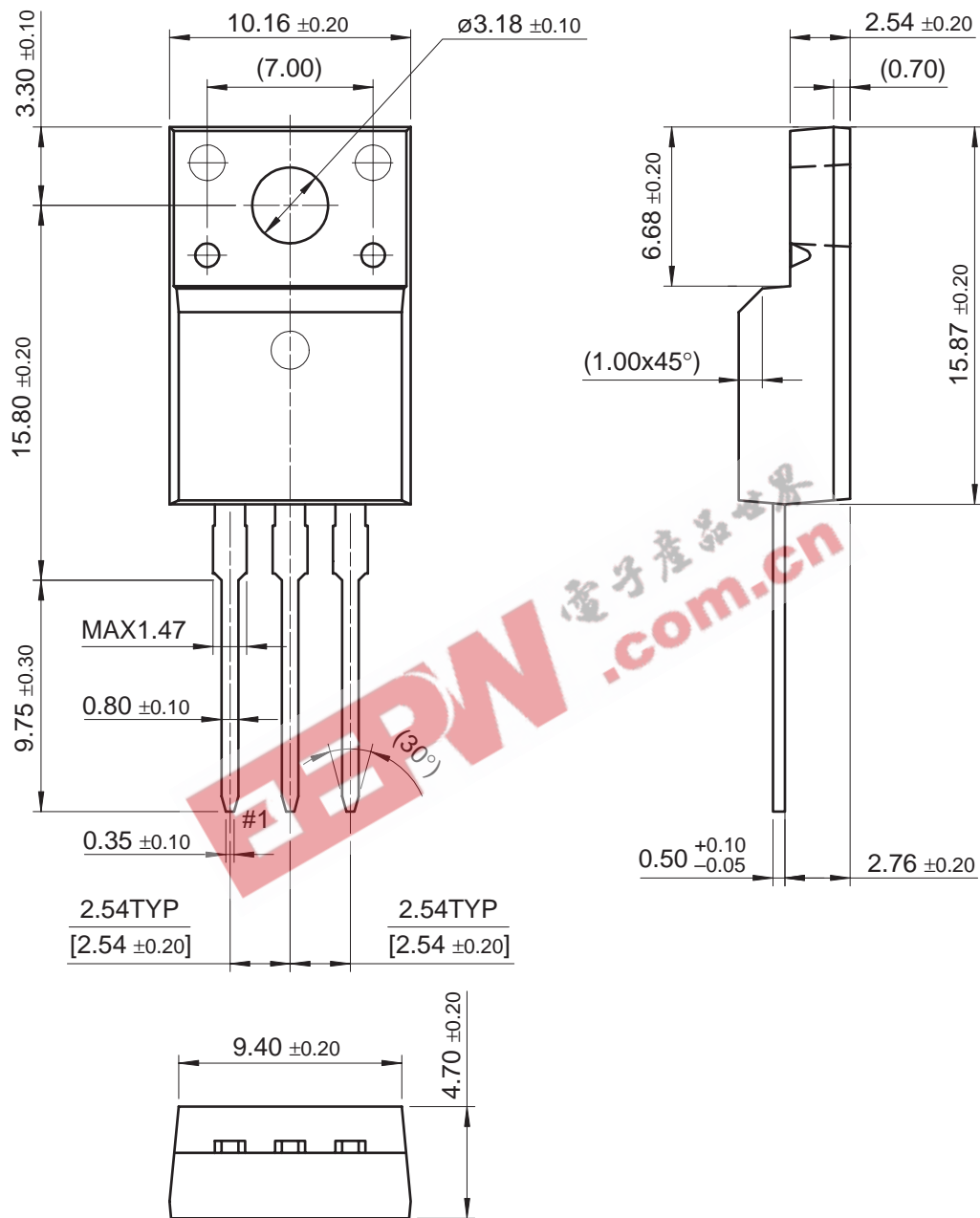


Figure 6. Forward Current Derating Curve



## Mechanical Dimensions

## TO-220F




Dimensions in Millimeters



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