

August 2008



# FFPF15UP20ST

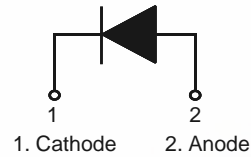
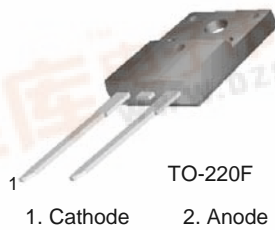
## Ultrafast Recovery Power Rectifier

### Features

- Ultrafast with Soft Recovery : < 45ns (@ $I_F = 15A$ )
- High Reverse Voltage :  $V_{RRM} = 200V$
- Avalanche Energy Rated
- Planar Construction

### Applications

- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits



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

Symbol	Parameter	Value	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	200	V
$V_{RWM}$	Working Peak Reverse Voltage	200	V
$V_R$	DC Blocking Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 105^\circ C$	15	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	150	A
$T_J, T_{STG}$	Operating Junction and Storage Temperature	- 65 to +150	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.8	$^\circ C/W$

### Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F15UP20ST	FFPF15UP20STTU	TO-220F	-	-	50

FFPF15UP20ST Ultrafast Recovery Power Rectifier

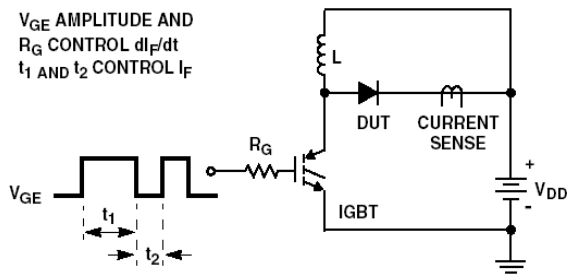


### Electrical Characteristics T<sub>C</sub> = 25°C unless otherwise noted

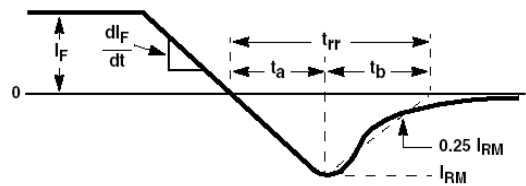
Symbol	Parameter	Min.	Typ.	Max.	Units	
V <sub>FM</sub> *	I <sub>F</sub> = 15A I <sub>F</sub> = 15A	T <sub>C</sub> = 25 °C	-	-	1.15	V
		T <sub>C</sub> = 100 °C	-	-	1.0	V
I <sub>RM</sub> *	V <sub>R</sub> = 200V V <sub>R</sub> = 200V	T <sub>C</sub> = 25 °C	-	-	100	μA
		T <sub>C</sub> = 100 °C	-	-	500	μA
t <sub>rr</sub>	I <sub>F</sub> = 1A, di/dt = 100A/μs, V <sub>CC</sub> = 30V I <sub>F</sub> = 15A, di/dt = 200A/μs, V <sub>CC</sub> = 130V	T <sub>C</sub> = 25 °C	-	-	35	ns
		T <sub>C</sub> = 25 °C	-	-	45	ns
t <sub>a</sub>	I <sub>F</sub> = 15A, di/dt = 200A/μs, V <sub>CC</sub> = 130V	T <sub>C</sub> = 25 °C	-	13	-	ns
t <sub>b</sub>		T <sub>C</sub> = 25 °C	-	11	-	ns
Q <sub>rr</sub>		T <sub>C</sub> = 25 °C	-	24	-	nC
W <sub>AVL</sub>	Avalanche Energy (L = 40mH)	20	-	-	mJ	

\* Pulse Test: Pulse Width=300μs, Duty Cycle=2%

### Test Circuit and Waveforms

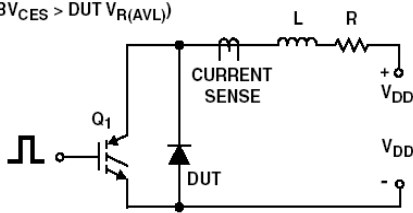


t<sub>rr</sub> TEST CIRCUIT

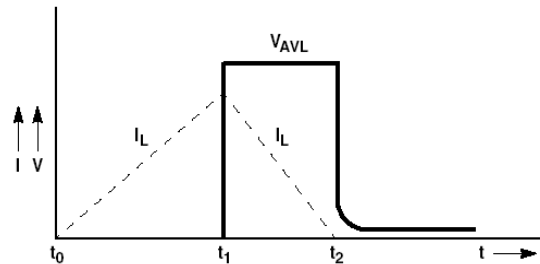


t<sub>rr</sub> WAVEFORMS AND DEFINITIONS

I<sub>MAX</sub> = 1A  
L = 40mH  
R < 0.1Ω  
E<sub>AVL</sub> = 1/2LI<sup>2</sup> [V<sub>R(AVL)</sub>/(V<sub>R(AVL)</sub> - V<sub>DD</sub>)]  
Q<sub>1</sub> = IGBT (BV<sub>CES</sub> > DUT V<sub>R(AVL)</sub>)



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

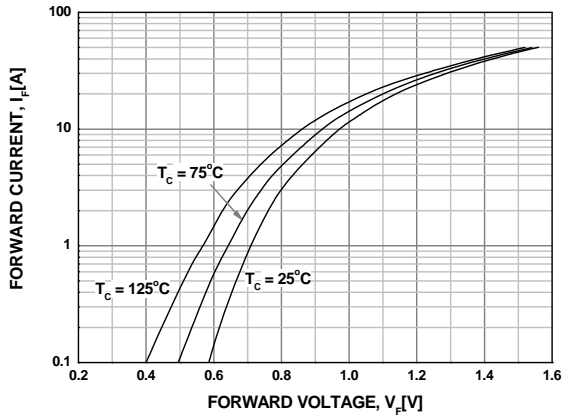


Figure 2. Typical Reverse Current

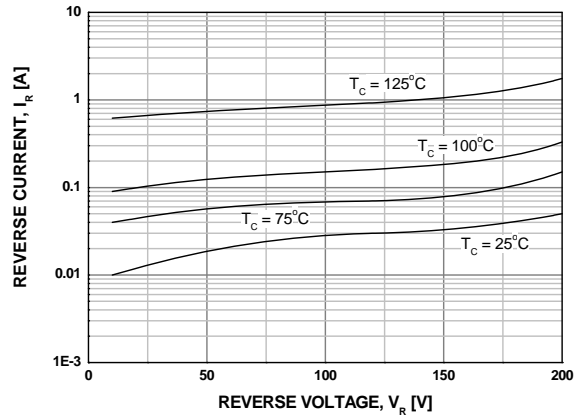


Figure 3. Typical Junction Capacitance

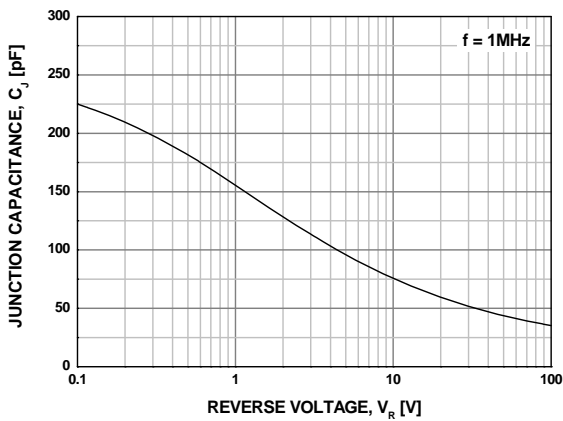


Figure 4. Typical Reverse Recovery Time

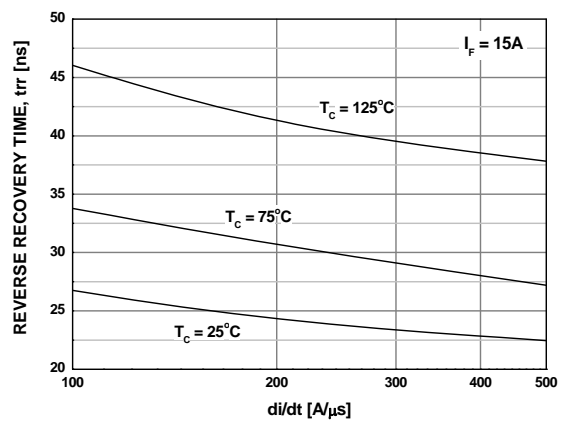


Figure 5. Typical Reverse Recovery Current

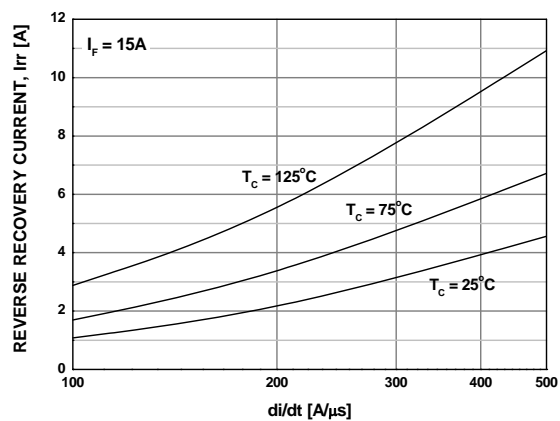
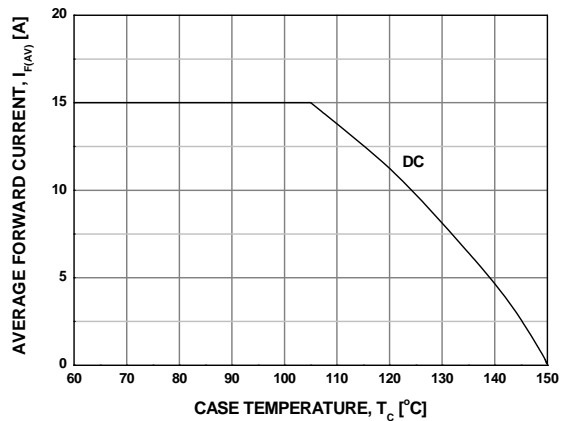
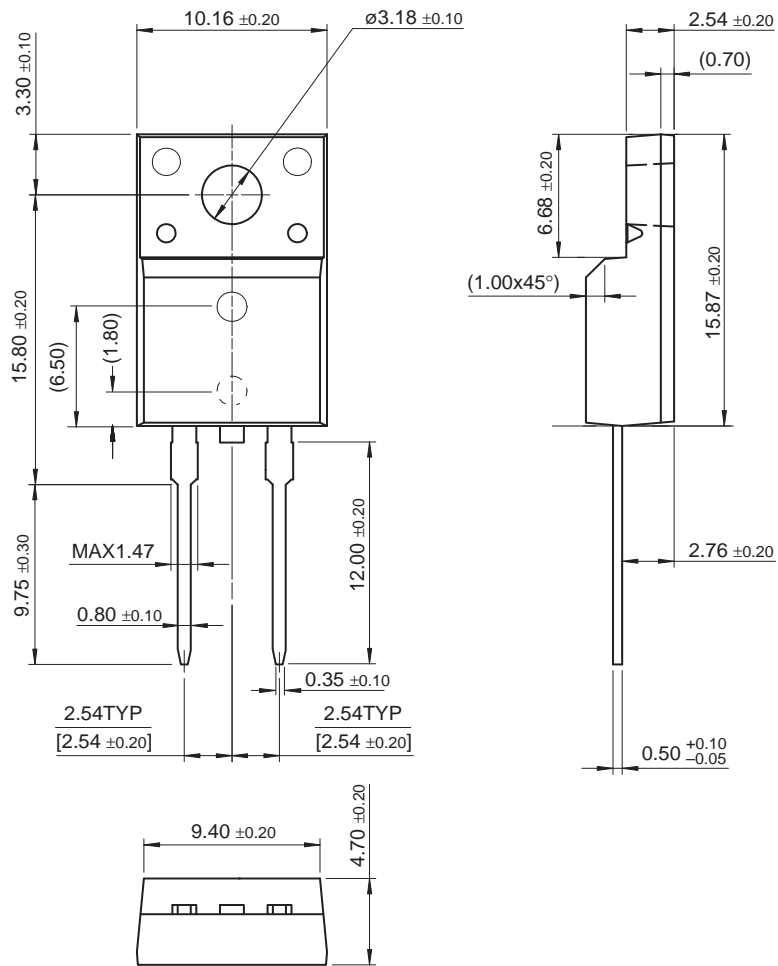


Figure 6. Forward Current Deration Curve



# Package Dimensions

## TO-220F 2L



Dimensions in Millimeters




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