



# FFPF20UP30S

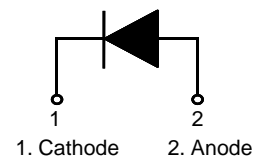
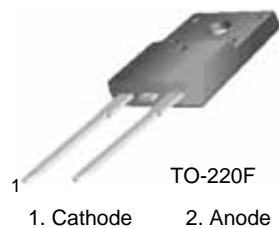
## Ultrafast Recovery Power Rectifier

### Features

- Ultrafast Switching Speed :  $t_{rr} < 35\text{ns}$  (@ $I_F=20\text{A}$ )
- High Reverse Voltage :  $V_{RRM} = 300\text{V}$
- Avalanche Energy Rated
- Planar Construction

### Applications

- General purpose
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits



### Absolute Maximum Ratings

(per diode)  $T_a = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Value	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	300	V
$V_{RWM}$	Working Peak Reverse Voltage	300	V
$V_R$	DC Blocking Voltage	300	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 85^\circ\text{C}$	20	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	200	A
$T_J, T_{STG}$	Operating Junction and Storage Temperature	- 65 to +150	$^\circ\text{C}$

### Thermal Characteristics

$T_a = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.7	$^\circ\text{C}/\text{W}$

### Package Marking and Ordering Information

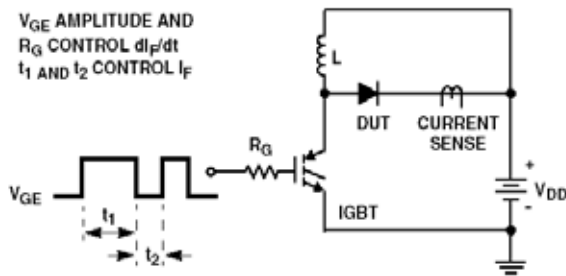
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP30S	FFPF20UP30STU	TO-220F	-	-	50

### Electrical Characteristics (per diode) $T_a = 25^\circ\text{C}$ unless otherwise noted

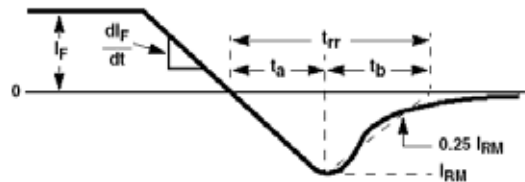
Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM}^*$	$I_F = 20\text{A}$ $I_F = 20\text{A}$	$T_C = 25^\circ\text{C}$	-	1.5	V
		$T_C = 150^\circ\text{C}$	-	1.3	V
$I_{RM}^*$	$V_R = 300\text{V}$ $V_R = 300\text{V}$	$T_C = 25^\circ\text{C}$	-	100	$\mu\text{A}$
		$T_C = 150^\circ\text{C}$	-	500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{CC} = 30\text{V}$ $I_F = 20\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 195\text{V}$ $I_F = 20\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 195\text{V}$	$T_C = 25^\circ\text{C}$	-	30	ns
		$T_C = 25^\circ\text{C}$	-	35	ns
		$T_C = 125^\circ\text{C}$	-	60	ns
$t_a$	$I_F = 20\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 195\text{V}$	$T_C = 25^\circ\text{C}$	-	13	ns
$t_b$		$T_C = 25^\circ\text{C}$	-	12	ns
$Q_{rr}$		$T_C = 25^\circ\text{C}$	-	25	nC
$W_{AVL}$	Avalanche Energy ( $L = 40\text{mH}$ )	20	-	-	mJ

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

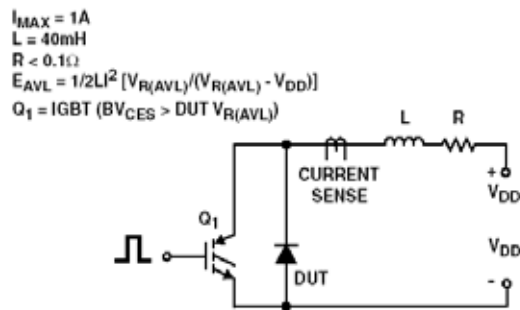
### Test Circuit and Waveforms



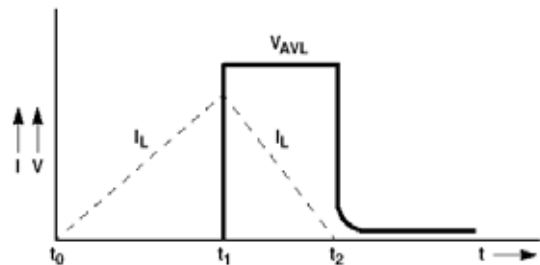
$t_{rr}$  TEST CIRCUIT



$t_{rr}$  WAVEFORMS AND DEFINITIONS



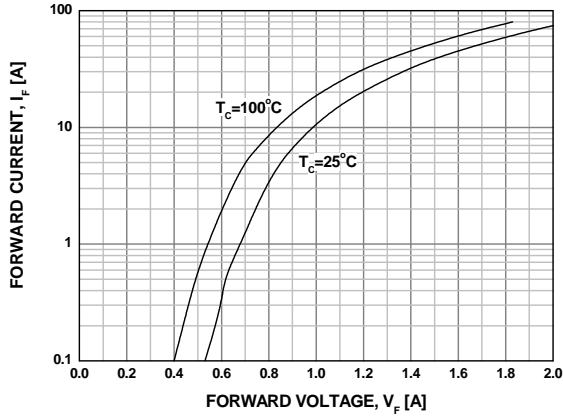
AVALANCHE ENERGY TEST CIRCUIT



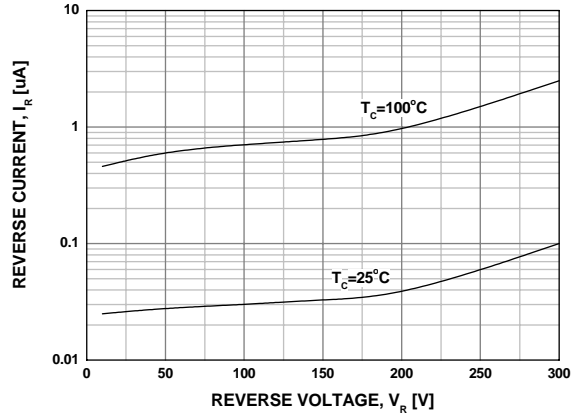
AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

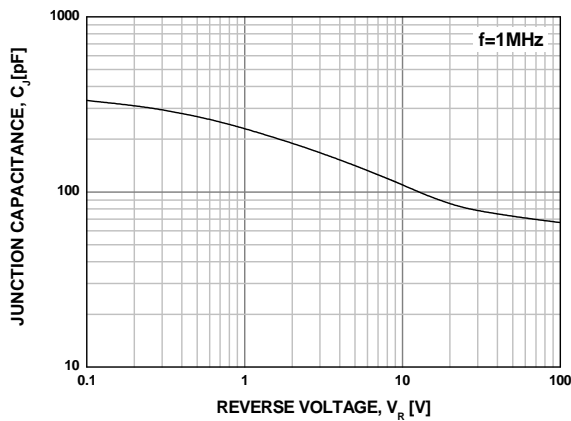
**Figure 1. Typical Forward Voltage Drop**



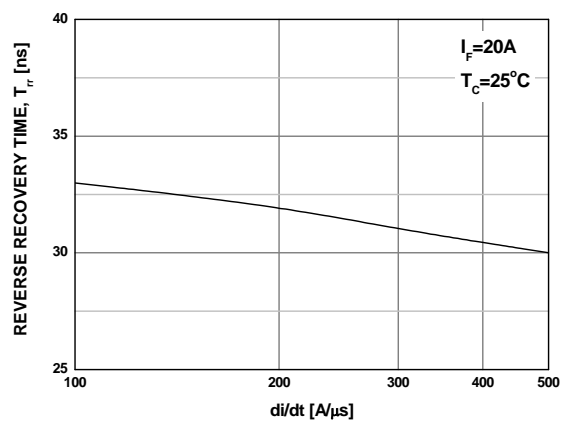
**Figure 2. Typical Reverse Current**



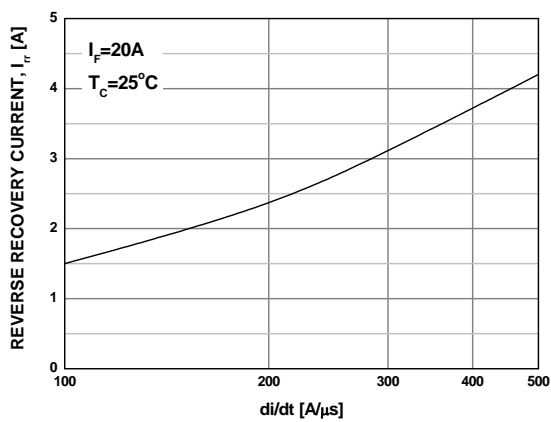
**Figure 3. Typical Junction Capacitance**



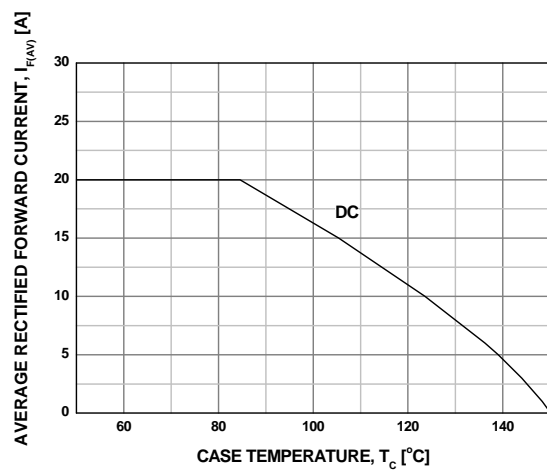
**Figure 4. Typical Reverse Recovery Time**



**Figure 5. Typical Reverse Recovery Current**

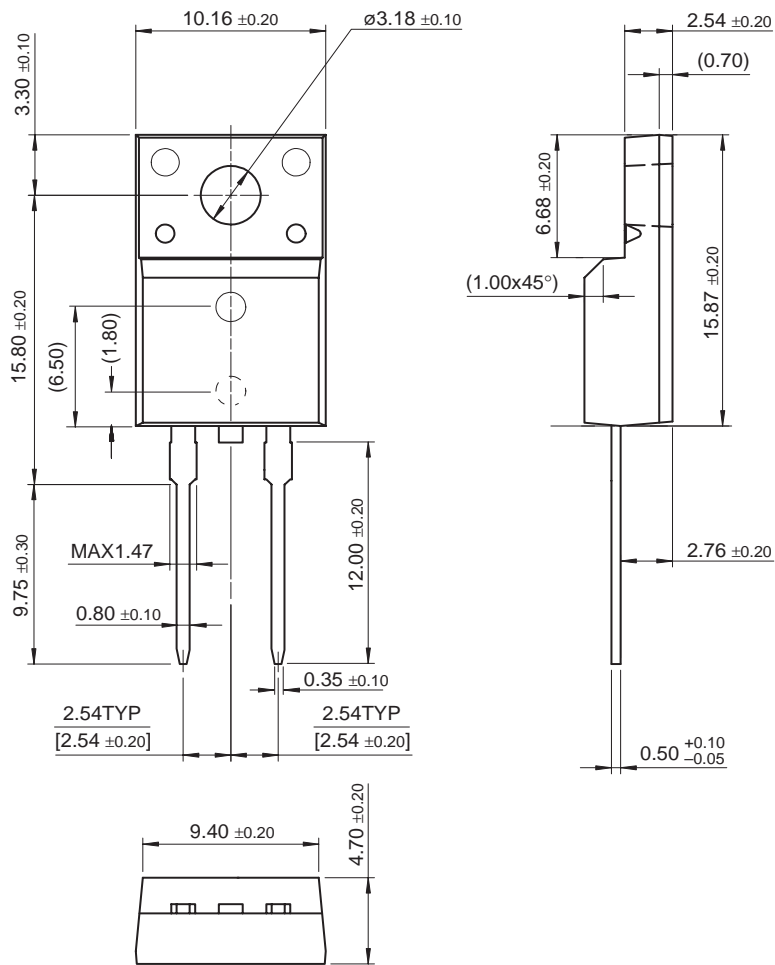


**Figure 6. Forward Current Deration Curve**



Package Demensions

TO-220F 2L



Dimensions in Millimeters

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CROSSVOLT™	GTO™	MICROWIRE™	Quiet Series™	TruTranslation™
DOMETM	HiSeCTM	MSXTM	RapidConfigure™	UHC™
EcoSPARK™	I <sup>2</sup> C™	MSXPro™	RapidConnect™	UltraFET®
E <sup>2</sup> C MOS™	i-Lo™	OCXTM	μSerDes™	UniFET™
EnSigna™	ImpliedDisconnect™	OCXPro™	Scalar Pump™	VCX™
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FACT Quiet Series™		OPTOPLANAR™	SMART START™	
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		PowerEdge™	SuperSOT™-3	

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