FAIRCHILD SEMICONDUCTOR®

February 2009

FFPF30UP20ST

30 A, 200 V, Ultrafast Diode

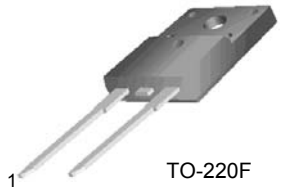
Features

- Ultrafast Recovery t_{rr} = 50 ns (@ I_F = 30 A)
- Max Forward Voltage, V_F = 1.15 V (@ T_C = 25°C)
- Reverse Voltage, V_{RRM} = 200 V
- Avalanche Energy Rated
- RoHS Compliant

Applications

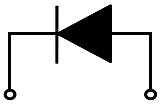
- Output Rectifiers
- Switching Mode Power Supply
- Free-Wheeling Diode for Motor Application
- Power Switching Circuits

The FFPF30UP20ST is a ultrafast diode with low forward voltage drop. 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.



TO-220F

1. Cathode 2. Anode



1. Cathode 2. Anode

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Value	Unit
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 = 85°C	30	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	300	A
T_J, T_{STG}	Operating Junction and Storage Temperature	- 65 to +150	°C

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.0	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F30UP20ST	FFPF30UP20STTU	TO-220F	-	-	50

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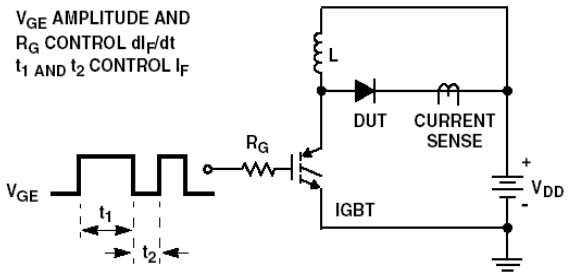
Electrical Characteristics T_C = 25°C unless otherwise noted

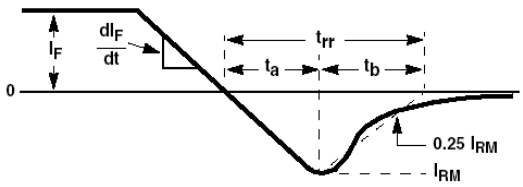
Symbol	Parameter		Min.	Typ.	Max.	Unit
V_F *	I_F = 30 A I_F = 30 A	T_C = 25 °C T_C = 100 °C	- -	- -	1.15 1.0	V V
I_R *	V_R = 200 V V_R = 200 V	T_C = 25 °C T_C = 100 °C	- -	- -	100 500	μA μA
t_{rr}	I_F = 1 A, di/dt = 100 A/μs, V_{CC} = 30 V I_F = 30 A, di/dt = 200 A/μs, V_{CC} = 130 V	T_C = 25 °C T_C = 25 °C	- -	- -	40 50	ns ns
t_a t_b Q_{rr}	I_F = 30 A, di/dt = 200 A/μs, V_{CC} = 130 V	T_C = 25 °C T_C = 25 °C T_C = 25 °C	- - -	22 14 67	- - -	ns ns nC
W_{AVL}	Avalanche Energy (L = 40 mH)		20	-	-	mJ

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

Test Circuit and Waveforms

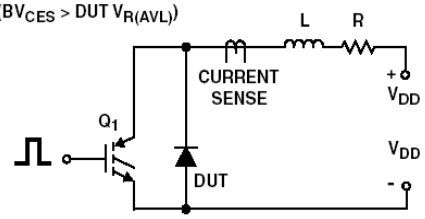


t_{rr} TEST CIRCUIT

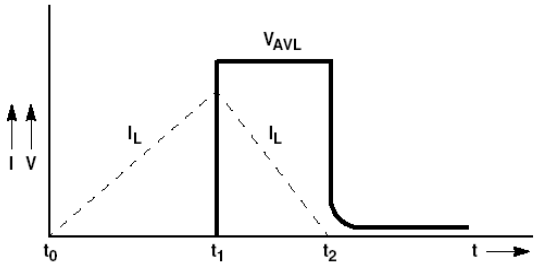


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 40mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

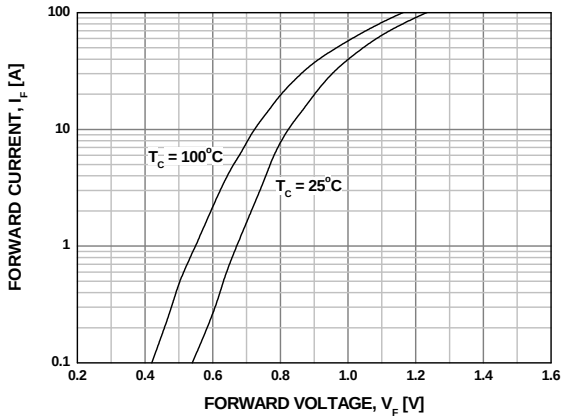


Figure 2. Typical Reverse Current

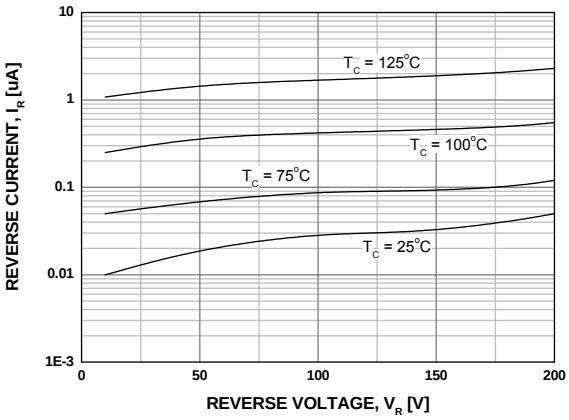


Figure 3. Typical Junction Capacitance

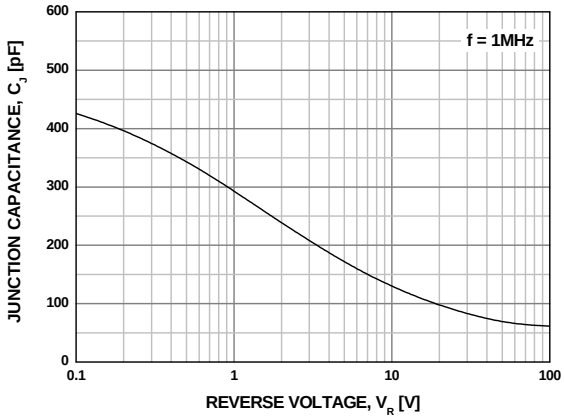


Figure 4. Typical Reverse Recovery Time

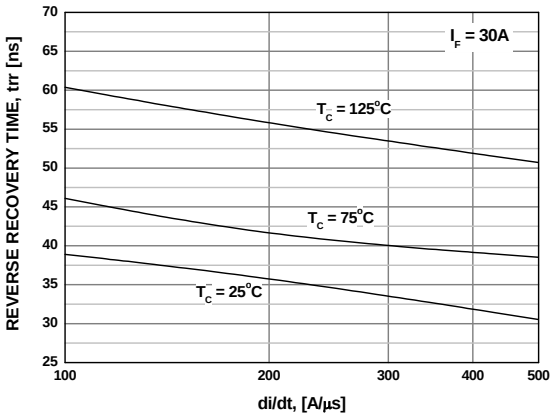


Figure 5. Typical Reverse Recovery Current

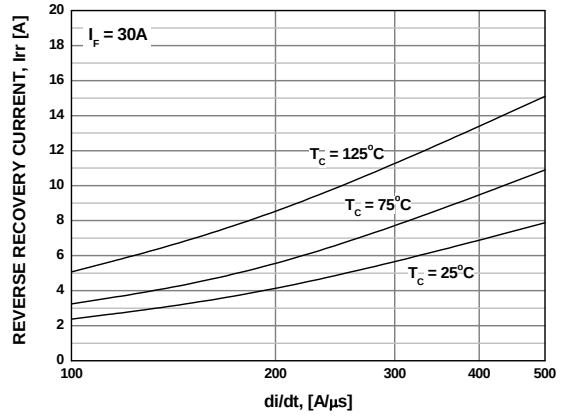
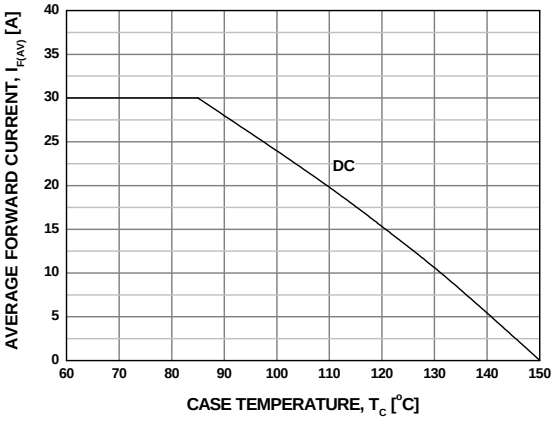


Figure 6. Forward Current Deration Curve



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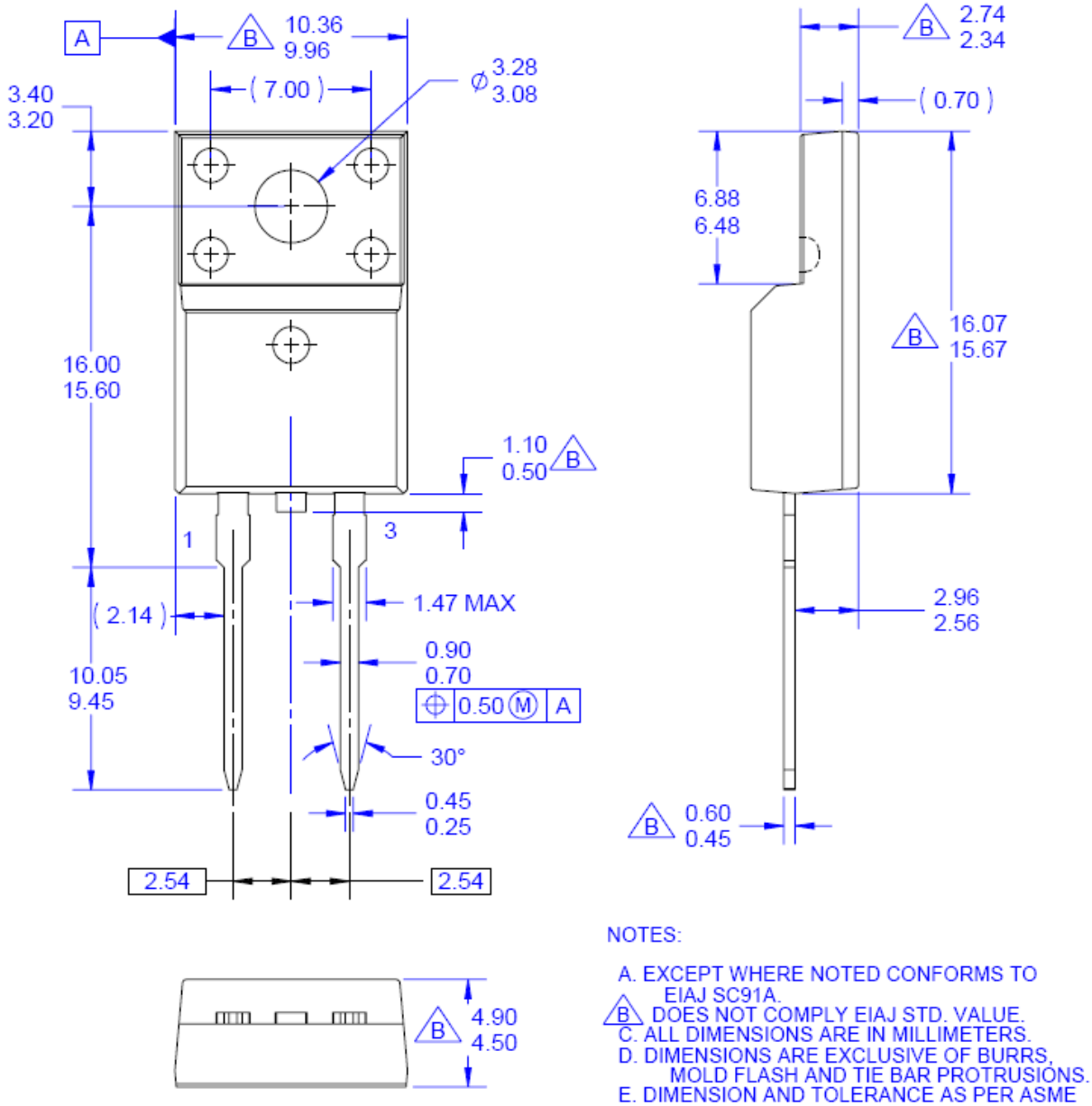
Mechanical Dimensions

TO-220F 2L Potting Type



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. DRAWING FILE NAME: TO220C02REV2

Dimensions in Millimeters

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