

FFPF20UP40S

Features

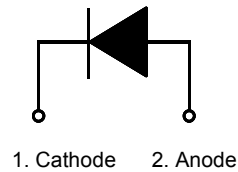
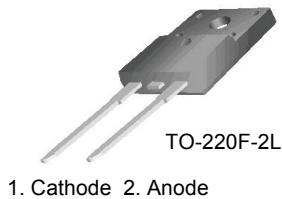
- High Speed Switching, $t_{rr} < 50\text{ns}$
- High Reverse Voltage and High Reliability
- Avalanche Energy Rated
- Max Forward Voltage, $V_F < 1.4\text{V}$
- RoHS Compliant

20A, 400V Ultra Fast Rectifier

The FFPF20UP40S is a ultrafast rectifier with low forward voltage drop. This device is intended for use as freewheeling and clamping rectifiers 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.

Applications

- Boost Diode in PFC and Switching Mode Power Supply
- Freewheeling diodes



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

Symbol	Parameter	Ratings	Units
V_{RRM}	Peak Repetitive Reverse Voltage	400	V
V_{RWM}	Working Peak Reverse Voltage	400	V
V_R	DC Blocking Voltage	400	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 100^\circ\text{C}$	20	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	200	A
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	2.6	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FFPF20UP40S	FFPF20UP40S	TO-220F	-	-	50

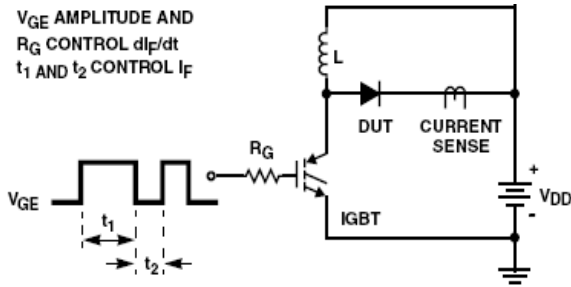
Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
V_{FM1}	$I_F = 20\text{A}$ $I_F = 20\text{A}$	-	-	1.4 1.4	V
I_{RM1}	$V_R = 400\text{V}$ $V_R = 400\text{V}$	-	-	50 50	μA
t_{rr}	$I_F = 20\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$	-	29	50	ns
I_{rr}		-	3.3	5.5	A
Q_{rr}		-	47	138	nC
W_{AVL}	Avalanche Energy ($L = 40\text{mH}$)	1	-	-	mJ

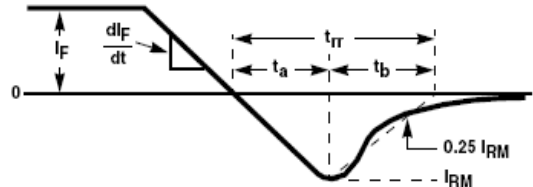
Notes:

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

Test Circuit and Waveforms

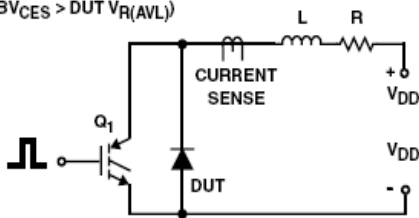


t_{rr} TEST CIRCUIT

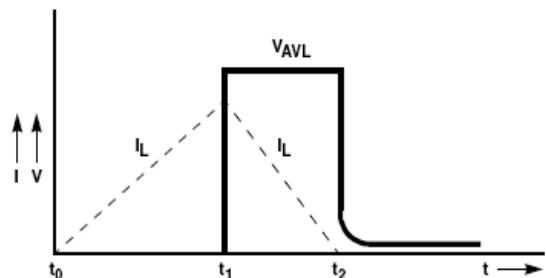


t_{rr} WAVEFORMS AND DEFINITIONS

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



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

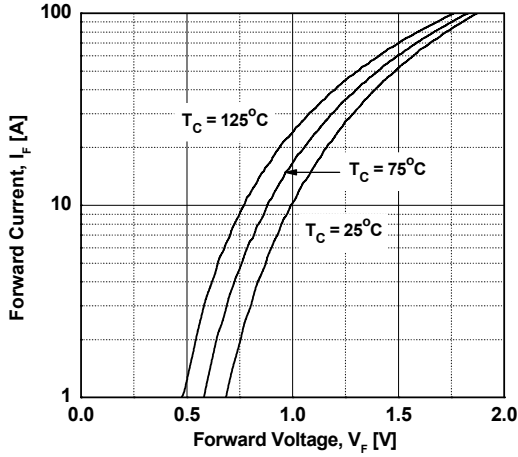


Figure 3. Typical Junction Capacitance

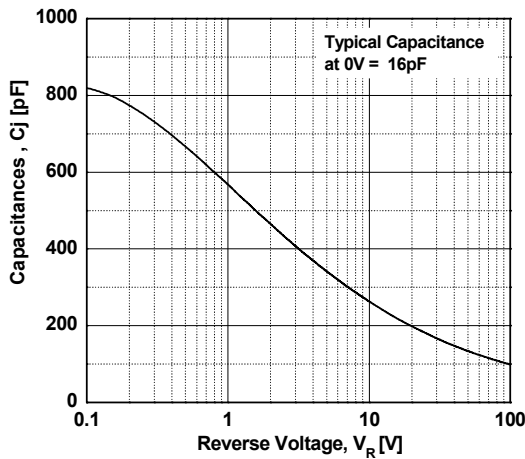


Figure 5. Typical Reverse Recovery Current vs. di/dt

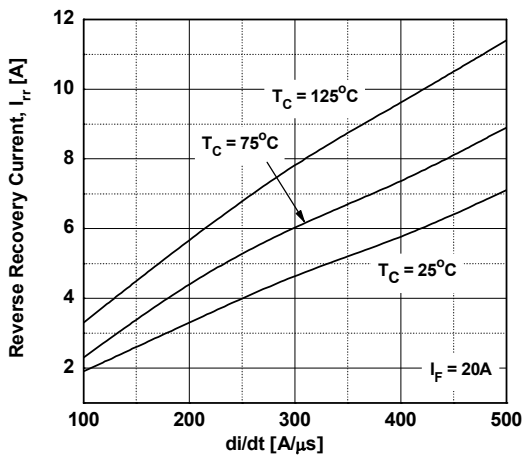


Figure 2. Typical Reverse Current vs. Reverse Voltage

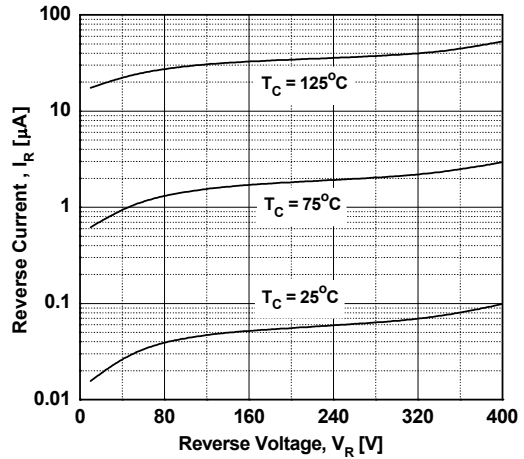


Figure 4. Typical Reverse Recovery Time vs. di/dt

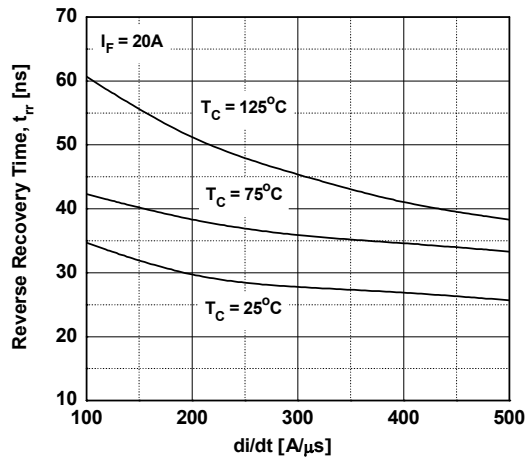
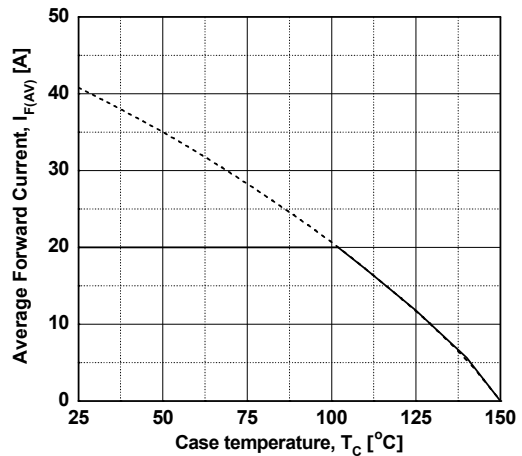
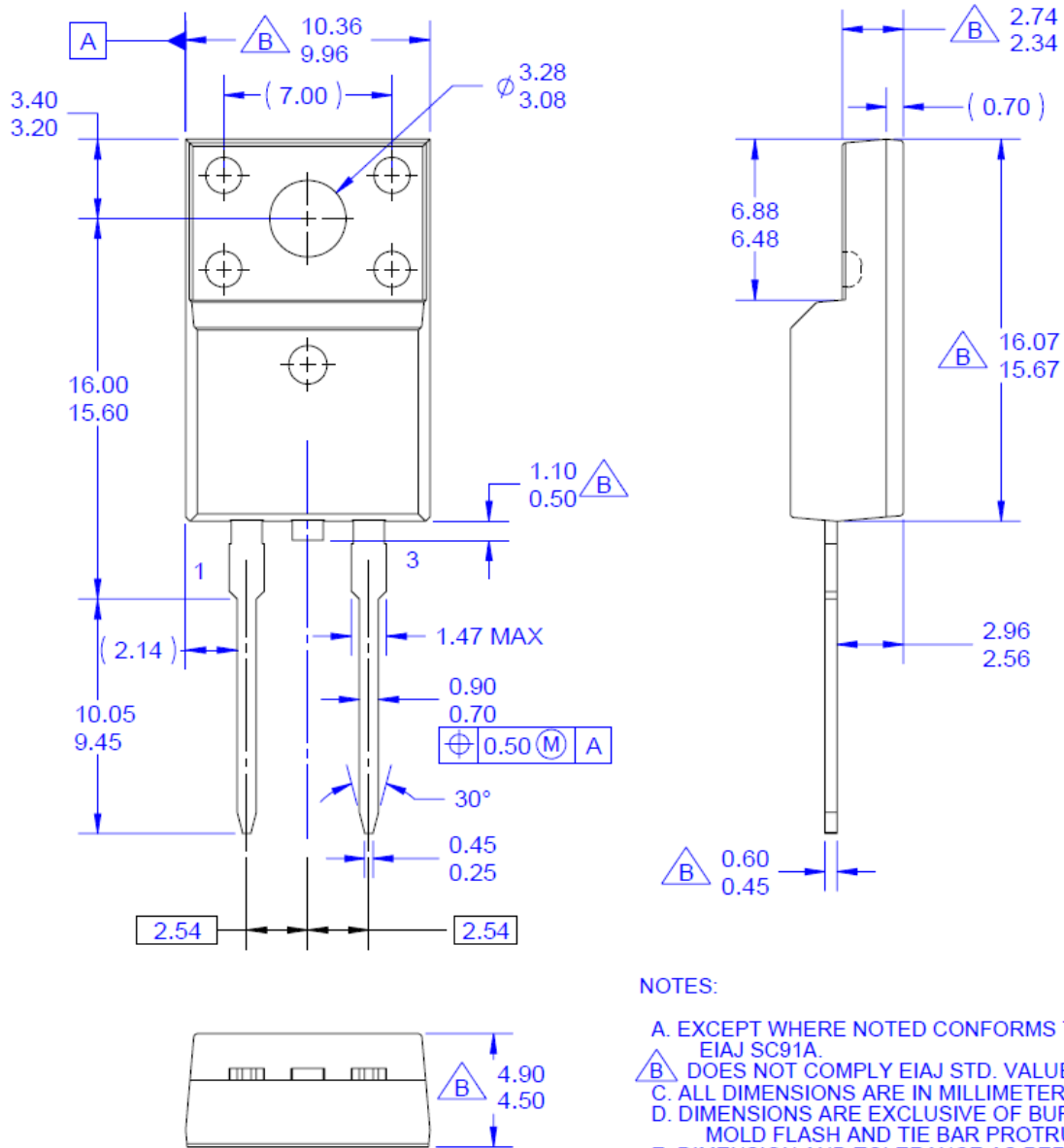


Figure 6. Forward Current Derating Curve



Mechanical Dimensions

TO-220F 2L








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

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Rev. 148