



# FFD10UP20S 10 A, 200 V, Ultrafast Diode



## Features

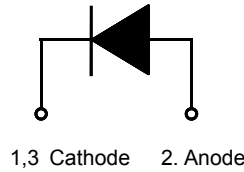
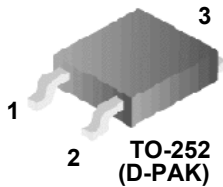
- Ultrafast Recovery,  $T_{rr} = 20.8 \text{ ns}$  (@  $I_F = 10 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage :  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

## Description

The FFD10UP20S is an ultrafast diode with low forward voltage drop and rugged UIS capability. 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 applications as welder and UPS application.

## Applications

- SMPS, Power Switching Circuits
- Output Rectifiers
- Freewheeling Diodes



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

Symbol	Parameter	Rating	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	200	V
$V_{RWM}$	Working Peak Reverse Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 115^\circ\text{C}$	10	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	100	A
$T_J, T_{STG}$	Operating and Storage Temperature Range	-65 to +175	$^\circ\text{C}$

## Thermal Characteristics

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

## Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFD10UP20S	F10UP20S	TO-252(D-PAK)	Reel	13" Dia	N/A	2500

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	
$V_F^*$	Maximum Instantaneous Forward Voltage $I_F = 10\text{ A}$ $I_F = 10\text{ A}$	$T_C = 25^\circ\text{C}$	-	-	1.15	V
		$T_C = 100^\circ\text{C}$	-	-	1.10	
$I_R^*$	Maximum Instantaneous Reverse Current @ rated $V_R$	$T_C = 25^\circ\text{C}$	-	-	100	$\mu\text{A}$
		$T_C = 100^\circ\text{C}$	-	-	500	
$t_{rr}$ $I_{rr}$ $Q_{rr}$	Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge ( $I_F = 10\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 130\text{ V}$ )	$t_{rr}$	-	20.8	-	ns
		$I_{rr}$	-	2.8	-	A
		$Q_{rr}$	-	28.5	-	nC
$t_{rr}$	Maximum Reverse Recovery Time ( $I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ )	-	-	35	ns	
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	10	-	-	mJ	

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

### Test Circuit and Waveforms

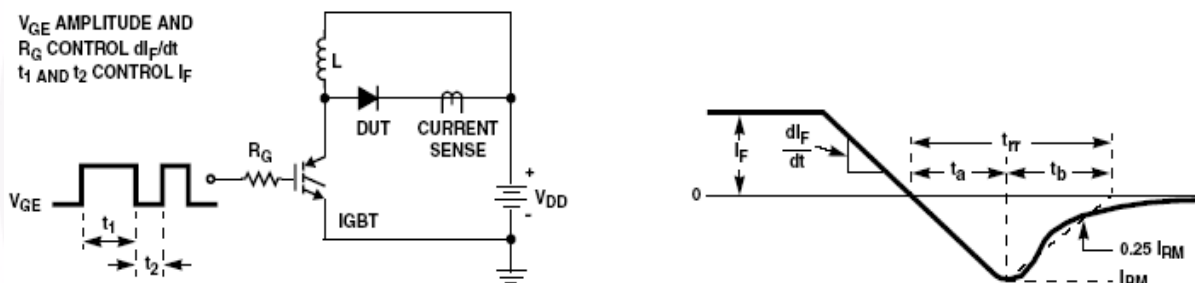


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$   
 $R < 0.1\Omega$   
 $V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

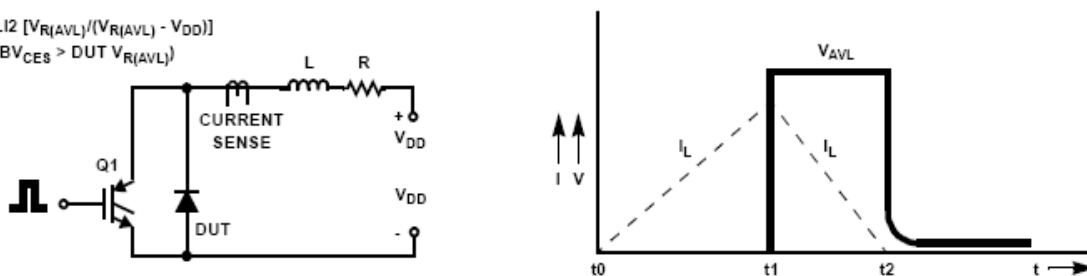
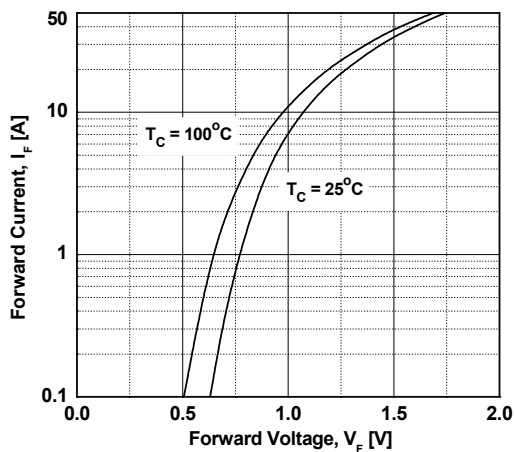


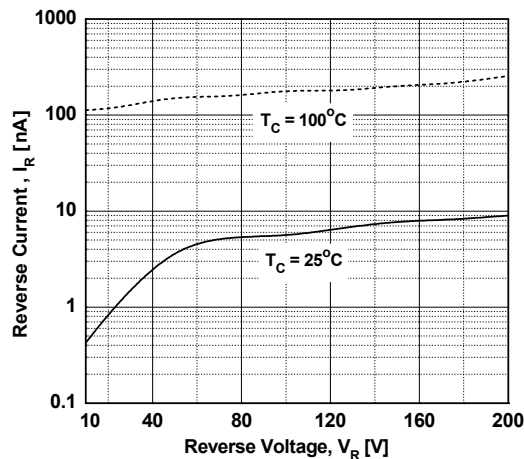
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

### Typical Performance Characteristics

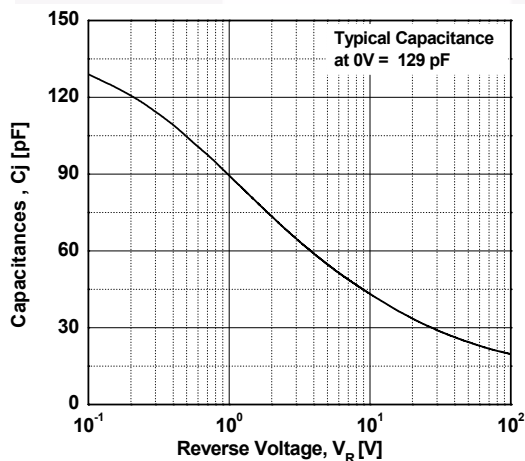
**Figure 3. Typical Forward Voltage Drop vs. Forward Current**



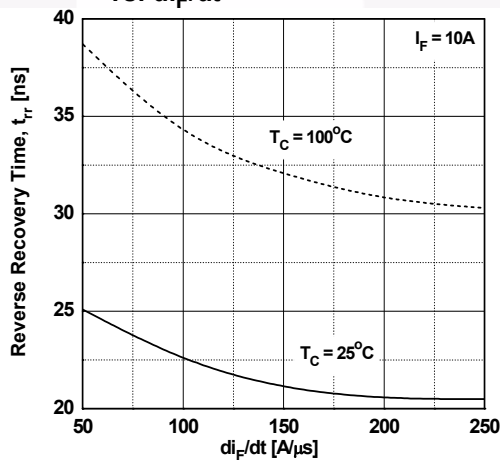
**Figure 4. Typical Reverse Current vs. Reverse Voltage**



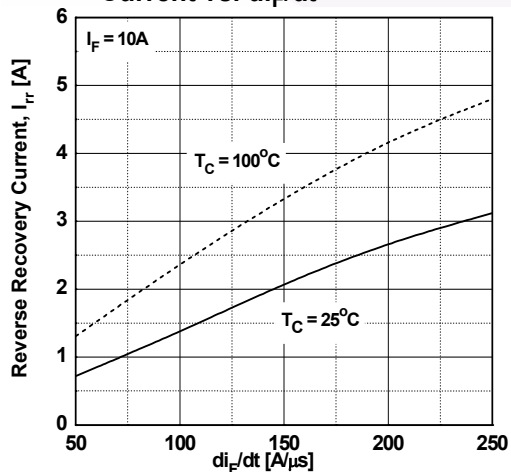
**Figure 5. Typical Junction Capacitance**



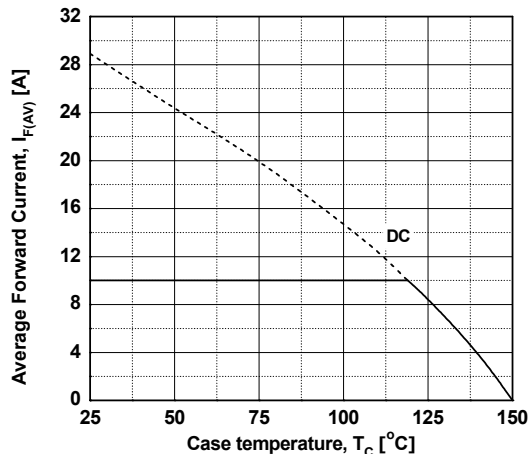
**Figure 6. Typical Reverse Recovery Time vs.  $di_F/dt$**



**Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$**



**Figure 8. Forward Current Derating Curve**



Mechanical Dimensions

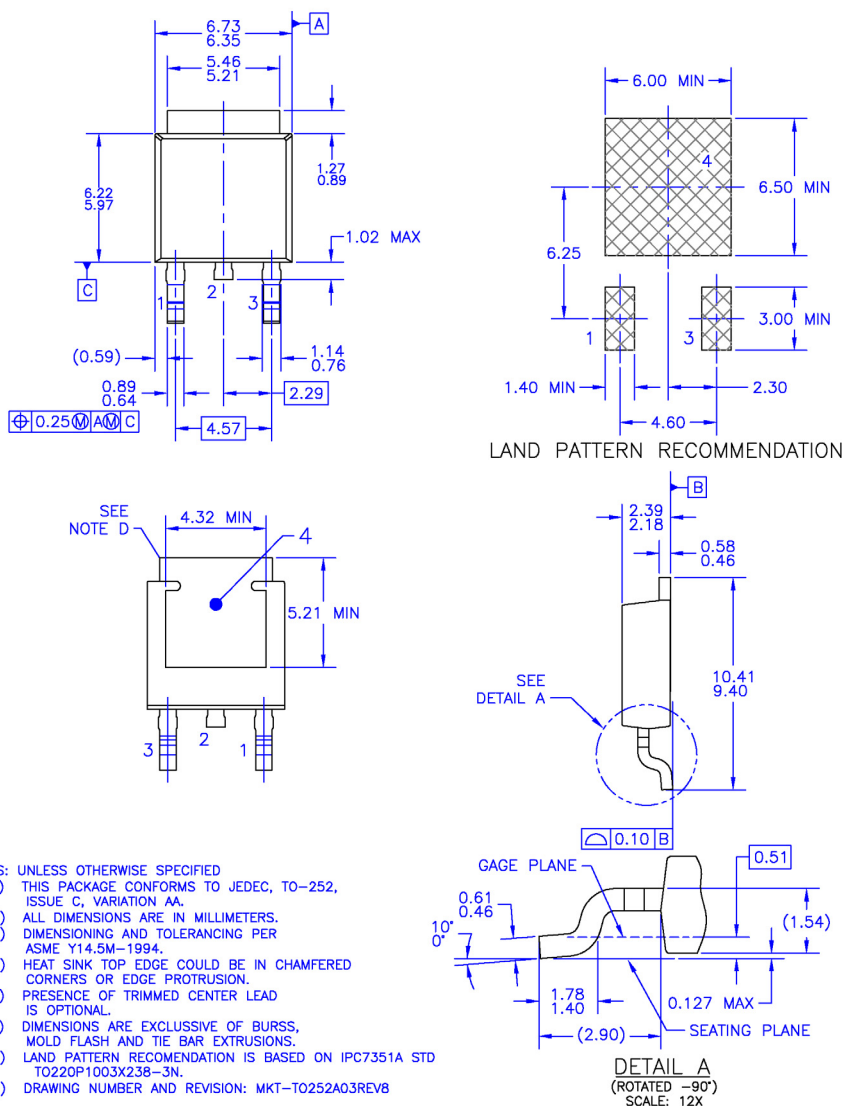


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&AB

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