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# FFD20UP20S

## Features

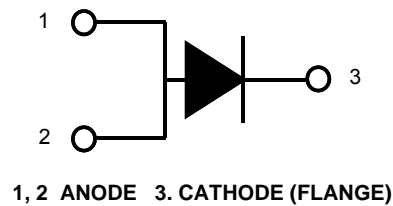
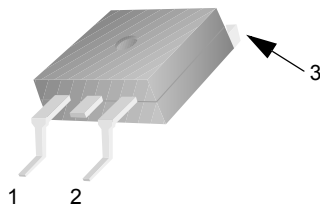
- Ultrafast Recovery,  $T_{rr} = 45 \text{ ns}$  (@  $I_F = 20 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage,  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

## Applications

- Power Switching Circuits
- Output Rectifiers
- Freewheeling Diodes
- Switching Mode Power Supply

## 20 A, 200 V, Ultrafast Diode

The FFD20UP20S 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.



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

Symbol	Parameter	Rating	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 123^\circ\text{C}$	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	-65 to +150	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	1.9	$^\circ\text{C/W}$

## Package Marking and Ordering Information

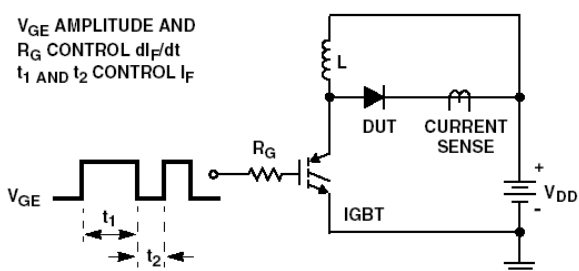
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP20S	FFD20UP20S	D-PAK	13" Dia	-	2500

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

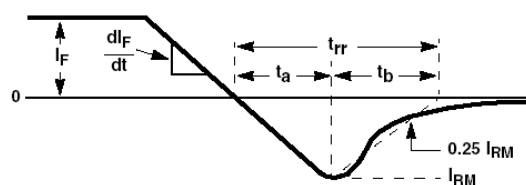
Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_F^*$	Maximum Instantaneous Forward Voltage				
	$I_F = 20\text{ A}$	$T_C = 25^\circ\text{C}$	0.94	1.15	V
	$I_F = 20\text{ A}$	$T_C = 100^\circ\text{C}$	0.84	1.05	
	$I_F = 30\text{ A}$	$T_C = 25^\circ\text{C}$	1.00	-	
$I_R^*$	Maximum Instantaneous Reverse Current @ rated $V_R$	$T_C = 25^\circ\text{C}$	-	100	$\mu\text{A}$
		$T_C = 100^\circ\text{C}$	-	500	
$t_{rr}$	Reverse Recovery Time ( $I_F = 20\text{ A}$ , $di/dt = 200\text{ A}/\mu\text{s}$ )	-	22	45	ns
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	20	-	-	mJ

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

## \* Test Circuit and Waveforms

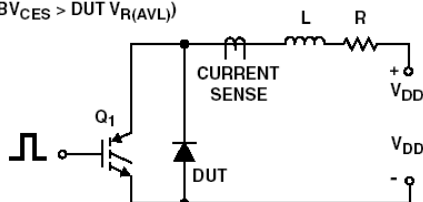


$t_{rr}$  TEST CIRCUIT

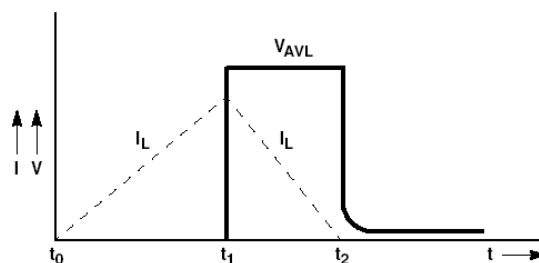


$t_{rr}$  WAVEFORMS AND DEFINITIONS

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



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

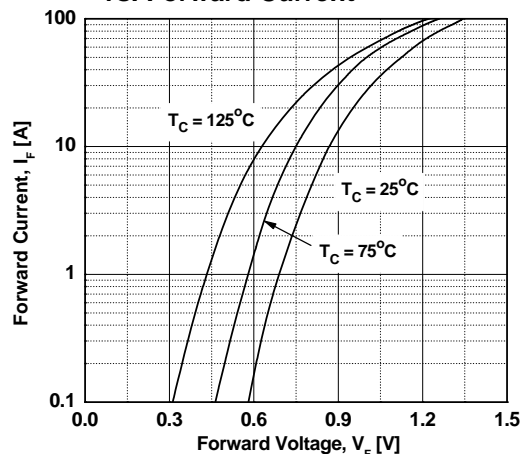


Figure 2. Typical Reverse Current vs. Reverse Voltage

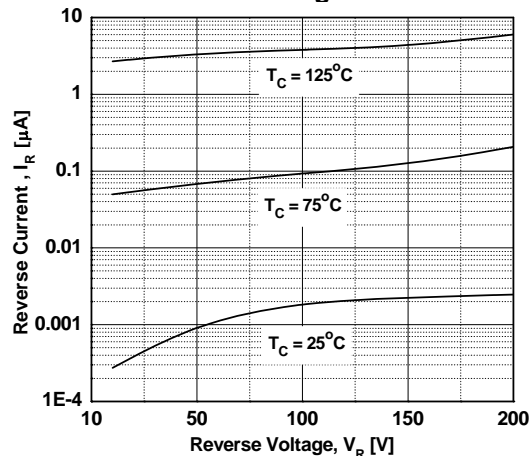


Figure 3. Typical Junction Capacitance

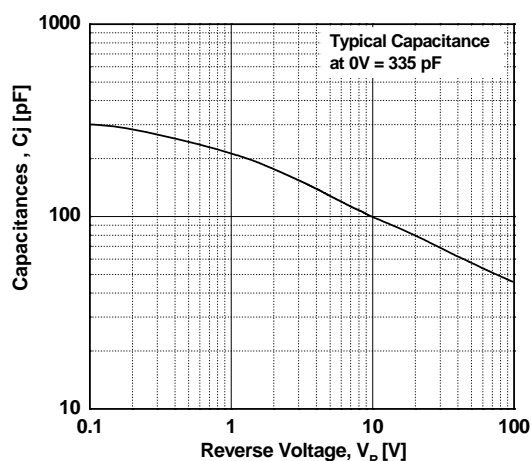


Figure 4. Typical Reverse Recovery Time vs. di/dt

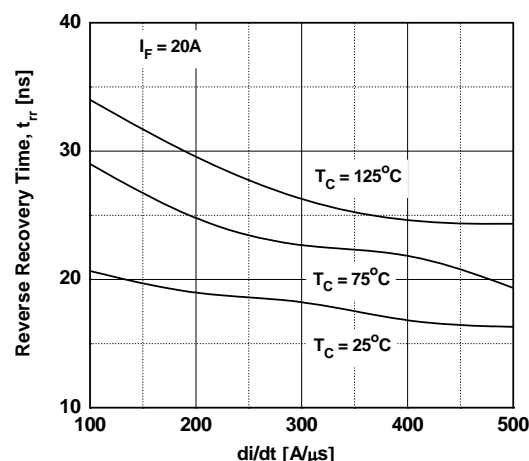


Figure 5. Typical Reverse Recovery Current vs. di/dt

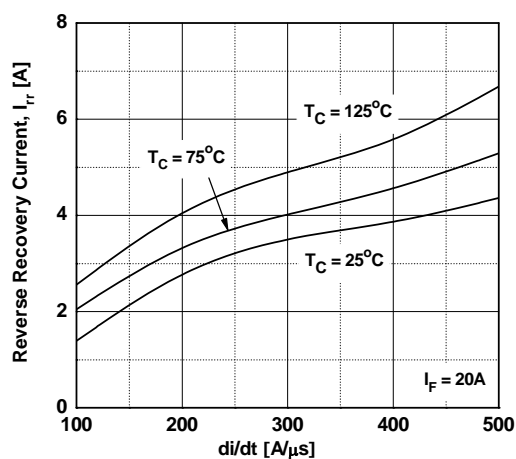
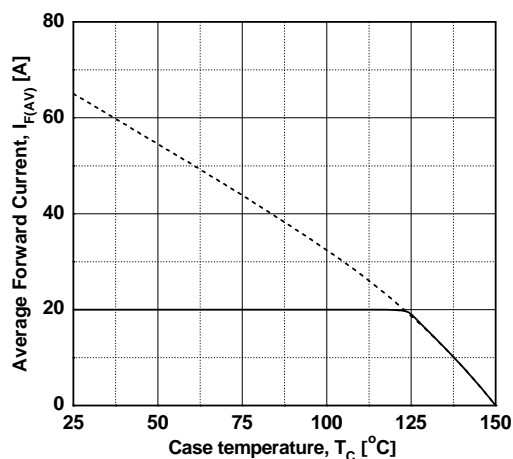
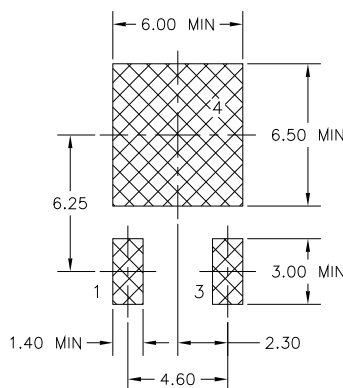
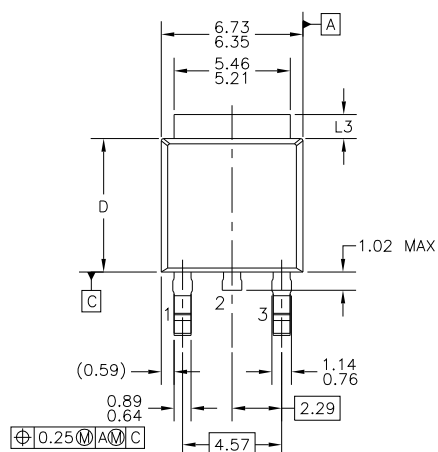


Figure 6. Forward Current Derating Curve

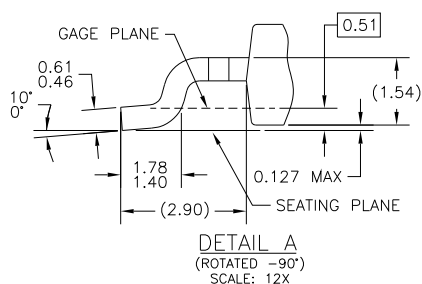
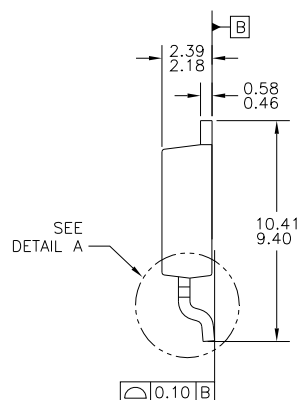
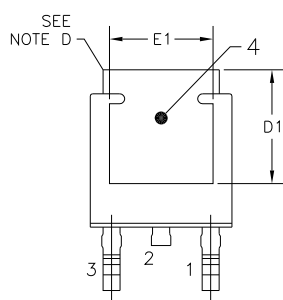


## Mechanical Dimensions

## D-PAK



LAND PATTERN RECOMMENDATION



NOTES: UNLESS OTHERWISE SPECIFIED

A) ALL DIMENSIONS ARE IN MILLIMETERS.  
B) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA & AB, DATED NOV. 1999.

C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.

D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.

E) DIMENSIONS L3, D, E1 &amp; D1 TABLE:

	OPTION AA	OPTION AB
L3	0.89-1.27	1.52-2.03
D	5.97-6.22	5.33-5.59
E1	4.32 MIN	3.81 MIN
D1	5.21 MIN	4.57 MIN





F) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.

Dimensions in Millimeters



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