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December 2014



# FFB20UP20S

## 20 A, 200 V, Ultrafast Diode Features

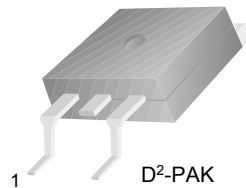
- Ultrafast Recovery,  $T_{rr} = 45 \text{ ns}$  (@  $I_F = 20 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage :  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

## Applications

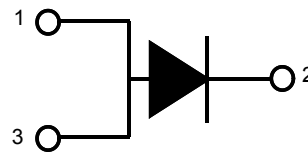
- Output Rectifiers
- SMPS, Welder, UPS
- Free-Wheeling Diode for Motor Application
- Power Switching Circuits

## Description

The FFB20UP20S 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 application.



1.Anode 2.Cathode 3.Anode



1. Anode 2. Cathode 3. Anode

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

Symbol	Parameter	Ratings	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 @ $T_C = 115^\circ\text{C}$	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 +175	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	2.0	$^\circ\text{C}/\text{W}$

## Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFB20UP20STM	FFB20UP20S	D <sup>2</sup> -PAK	Reel	13" Dia	N/A	800

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	
$V_F^*$	$I_F = 20\text{ A}$	-	-	1.15	V	
	$I_F = 20\text{ A}$	-	-	1.0	V	
$I_R^*$	$V_R = 200\text{ V}$	-	-	100	$\mu\text{A}$	
	$V_R = 200\text{ V}$	-	-	500	$\mu\text{A}$	
$t_{rr}$	$I_F = 1\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	-	35	ns	
	$I_F = 20\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 130\text{ V}$	-	-	45	ns	
$t_a$ $t_b$ $Q_{rr}$	$I_F = 20\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 130\text{ V}$	$T_C = 25^\circ\text{C}$	-	11	-	ns
		$T_C = 25^\circ\text{C}$	-	13	-	ns
		$T_C = 25^\circ\text{C}$	-	21	-	nC
$W_{AVL}$	Avalanche Energy (L = 40 mH)	20	-	-	mJ	

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

**Test Circuit and Waveforms**

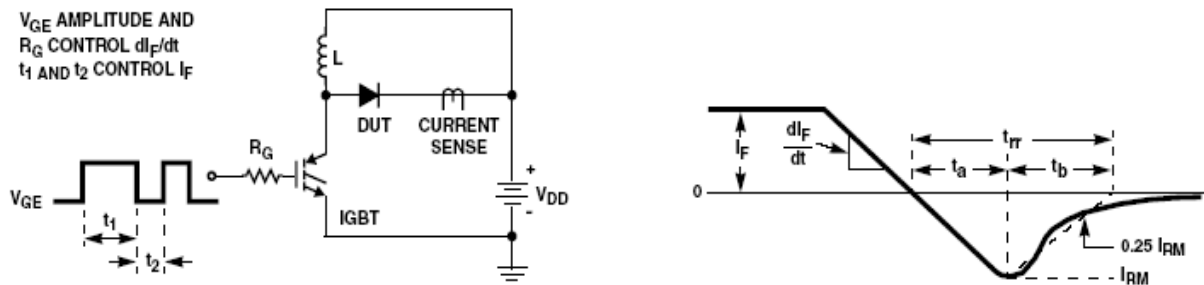


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

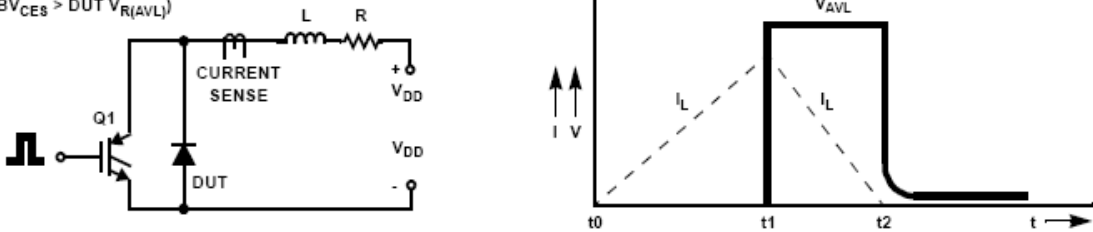
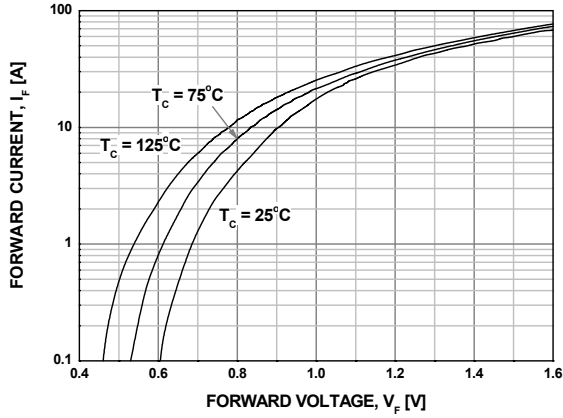


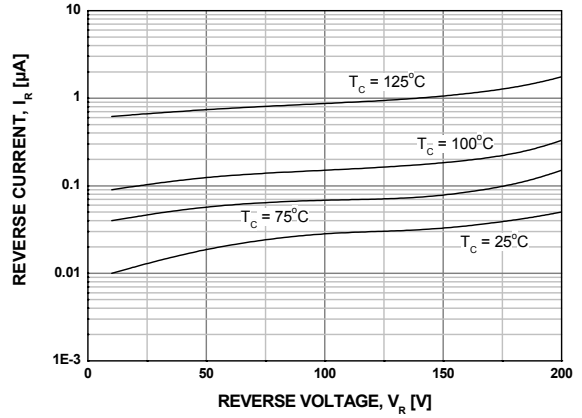
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## Typical Performance Characteristics

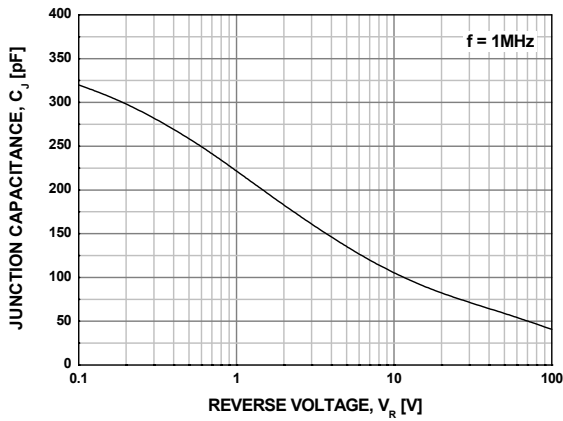
**Figure 3. Typical Forward Voltage Drop**



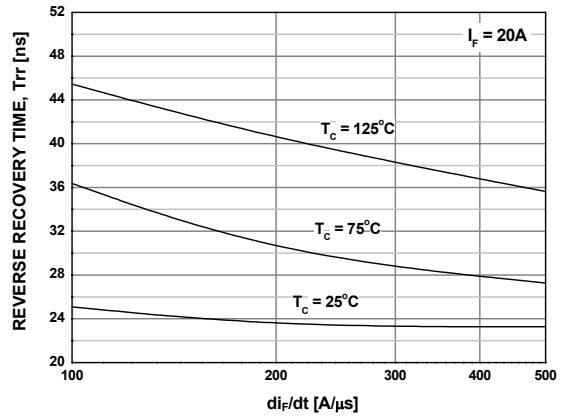
**Figure 4. Typical Reverse Current**



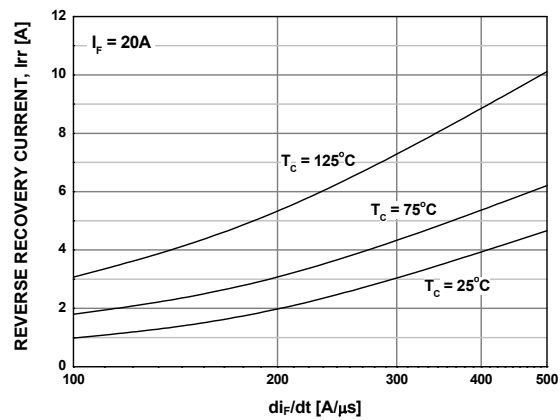
**Figure 5. Typical Junction Capacitance**



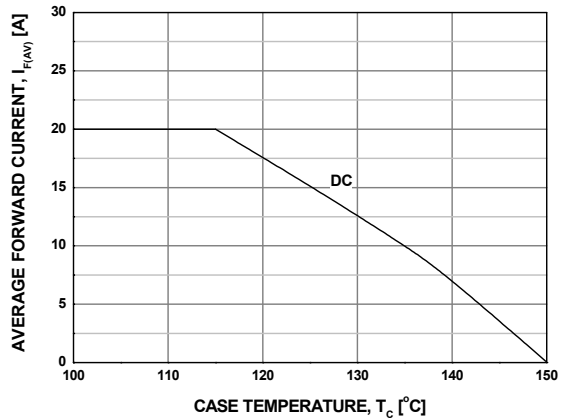
**Figure 6. Typical Reverse Recovery Time**



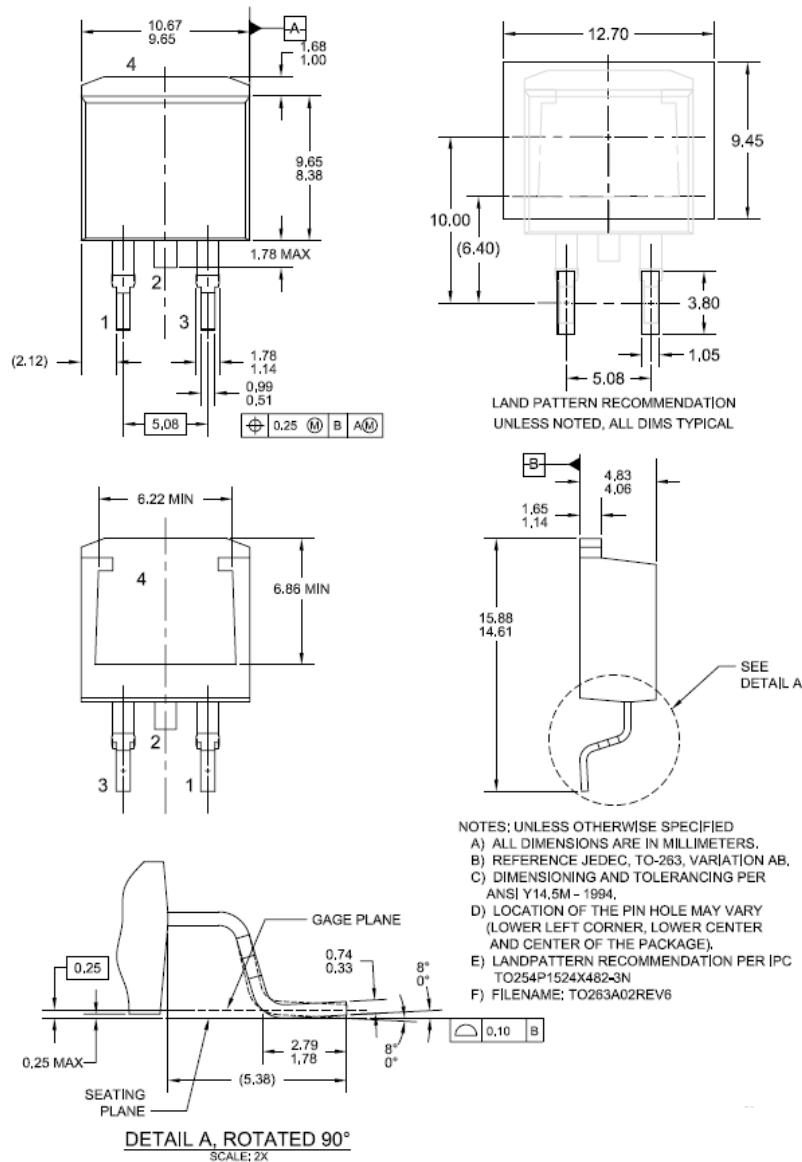
**Figure 7. Typical Reverse Recovery Current**



**Figure 8. Forward Current Deration Curve**



**Mechanical Dimensions**



**Figure 9. TO-263 2L (D<sup>2</sup>-PAK) - 2LD, TO263, SURFACE MOUNT**

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