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January 2016

# FFB20UP30DN

## 20 A, 300 V, Ultrafast Dual Diode



### Features

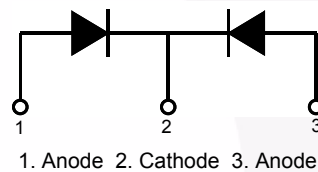
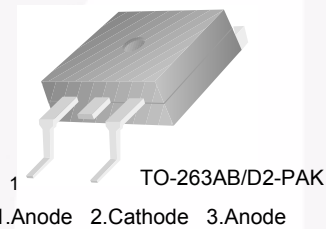
- Ultrafast Recovery,  $t_{rr} = 45 \text{ ns}$  (@  $I_F = 10 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.3 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage :  $V_{RRM} = 300 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

### Description

The FFB20UP30DN is an ultrafast dual 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.

### Applications

- General Purpose
- SMPS, Welder
- Free-Wheeling Diode for Motor Application
- Power Switching Circuits



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

Symbol	Parameter	Ratings	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	300	V
$V_{RWM}$	Working Peak Reverse Voltage	300	V
$V_R$	DC Blocking Voltage	300	V
$I_{F(AV)}$	Average Rectified Forward Current (per Diode) @ $T_C = 130^\circ\text{C}$	10	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	180	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	$^\circ\text{C/W}$

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFB20UP30DNTM	F20UP30DN	D <sup>2</sup> -PAK	Reel	13" Dia	N/A	800

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_F^*$	$I_F = 10\text{ A}$	-	-	1.3	V
	$I_F = 10\text{ A}$	-	-	1.2	V
$I_R^*$	$V_R = 300\text{ V}$	-	-	1	$\mu\text{A}$
	$V_R = 300\text{ V}$	-	-	500	$\mu\text{A}$
$T_{rr}$	$I_F = 0.5\text{ A}, I_{rr} = 1\text{ A}, V_{CC} = 30\text{ V}$	-	-	30	ns
	$I_F = 1\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	-	35	ns
	$I_F = 10\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 195\text{ V}$	-	-	45	ns
$t_a$	$I_F = 10\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 195\text{ V}$	-	11	-	ns
$t_b$		-	13	-	ns
$Q_{rr}$		-	20	-	nC
$W_{AVL}$	Avalanche Energy (L = 20 mH)	20	-	-	mJ

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

**Test Circuit and Waveforms**

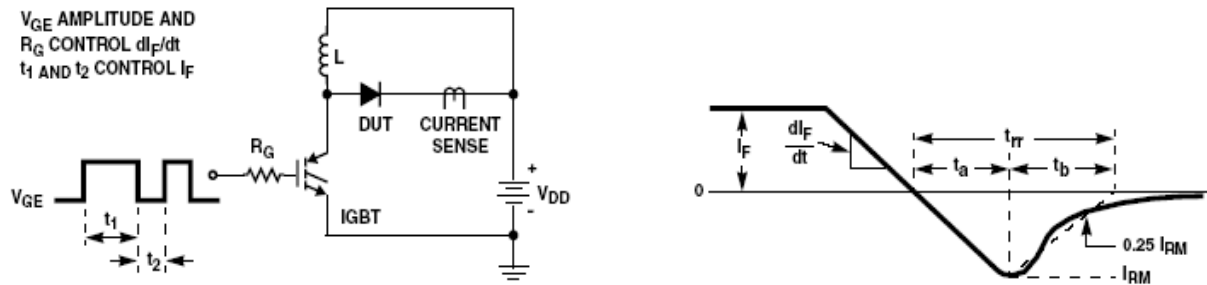


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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 ( $BV_{CES} > DUT V_{R(AVL)}$ )

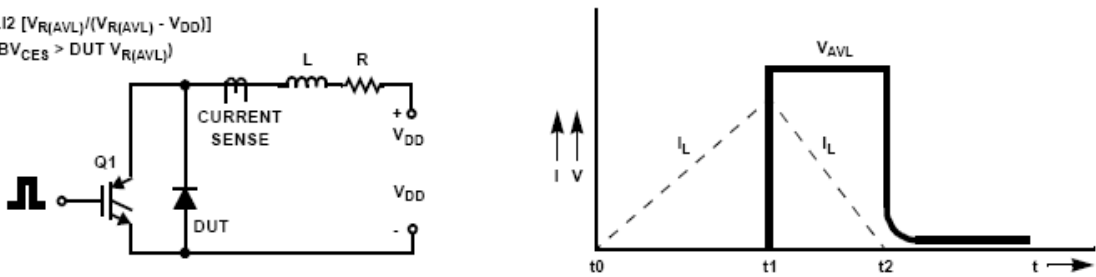
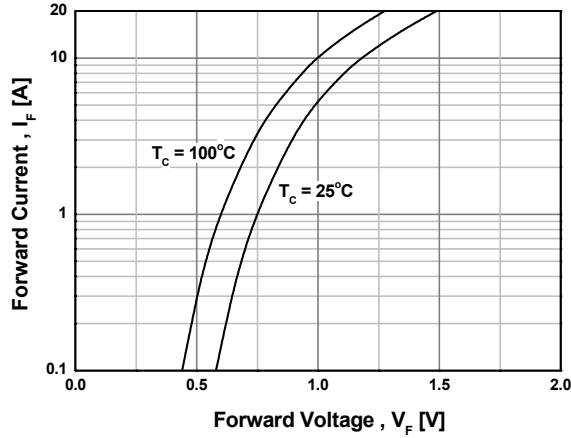


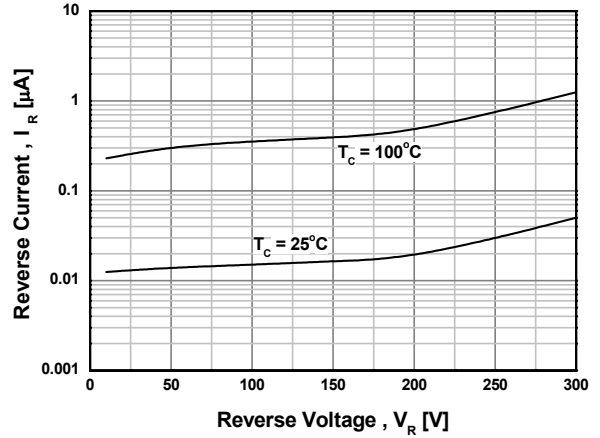
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## Typical Performance Characteristics

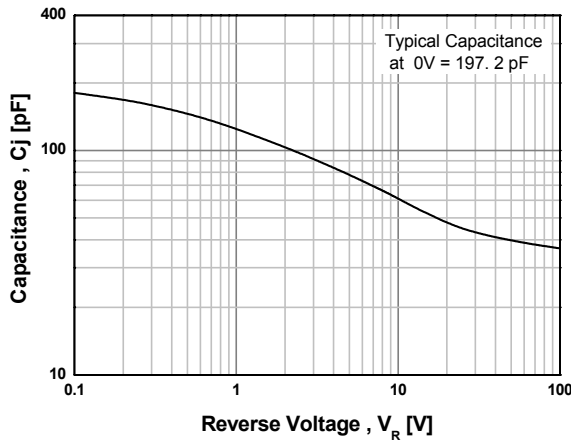
**Figure 3. Typical Forward Voltage Drop**



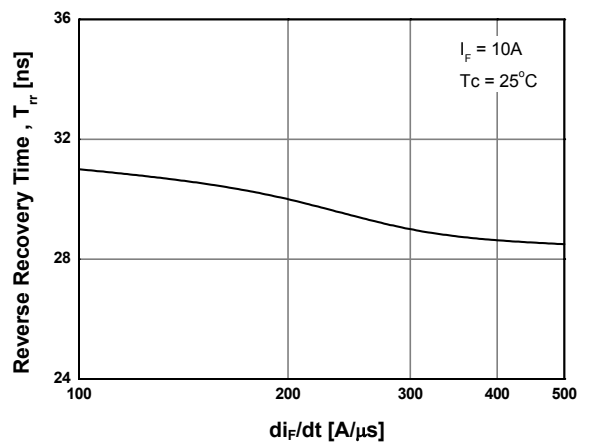
**Figure 4. Typical Reverse Current**



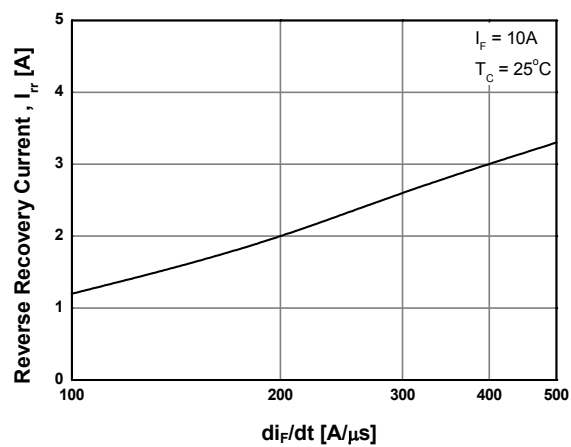
**Figure 5. Typical Junction Capacitance**



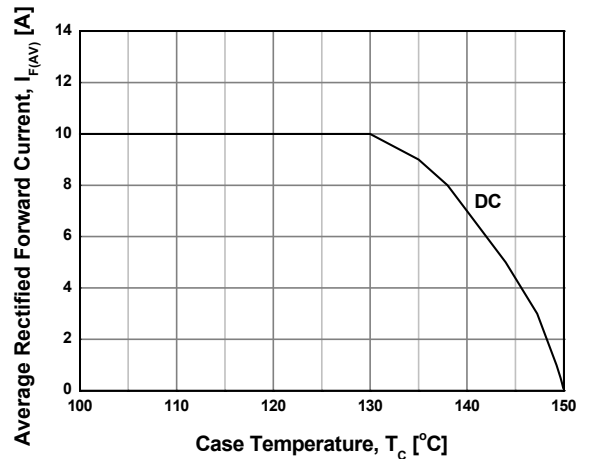
**Figure 6. Typical Reverse Recovery Time**

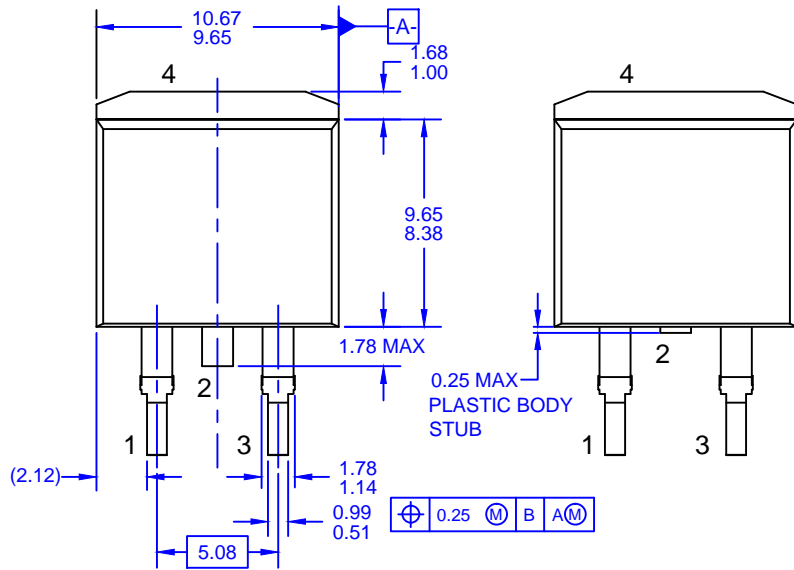


**Figure 7. Typical Reverse Recovery Current**

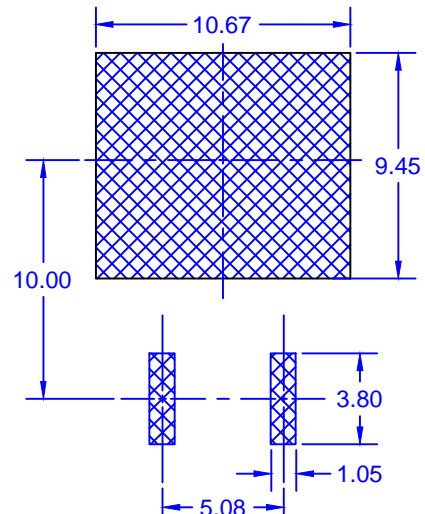


**Figure 8. Forward Current Deration Curve**

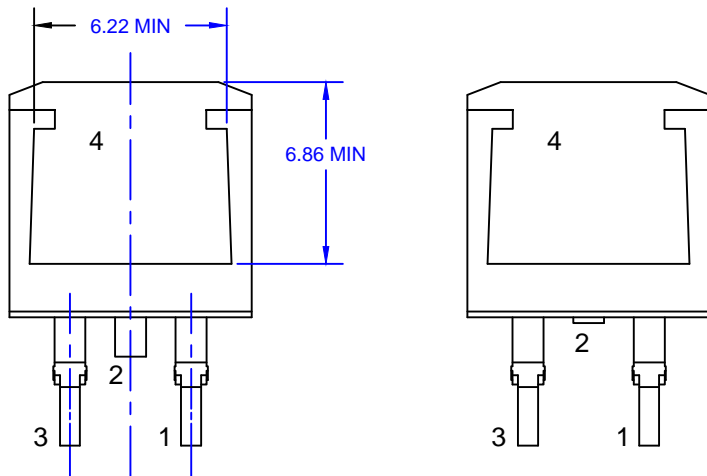




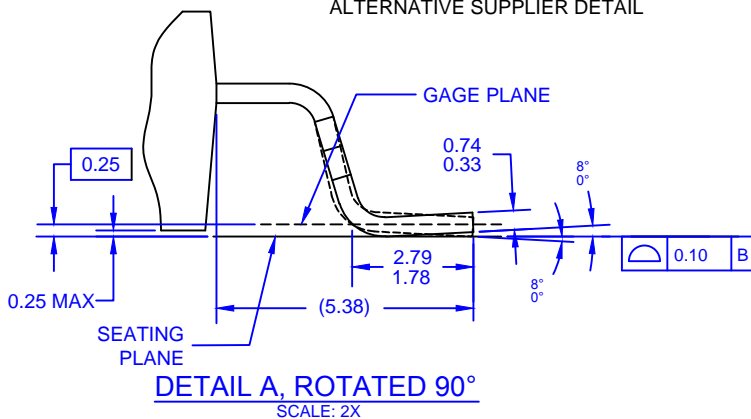
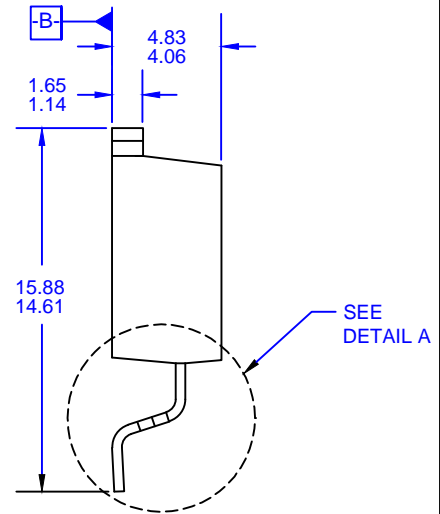
FRONT VIEW - DIODE PRODUCTS VERSION  
ALTERNATIVE SUPPLIER DETAIL



LAND PATTERN RECOMMENDATION  
UNLESS NOTED, ALL DIMS TYPICAL



BACK VIEW - DIODE PRODUCTS VERSION  
ALTERNATIVE SUPPLIER DETAIL



DETAIL A, ROTATED 90°  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) ALL DIMENSIONS ARE IN MILLIMETERS.
- B) REFERENCE JEDEC, TO-263, VARIATION AB.
- C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
- D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE).
- E) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N
- F) FILENAME: TO263A02REV8



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