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January 2016

FFB20UP30DN

20 A, 300 V, Ultrafast Dual Diode

Features

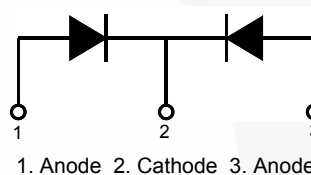
- Ultrafast Recovery, $t_{rr} = 45 \text{ ns}$ (@ $I_F = 10 \text{ A}$)
- Max Forward Voltage, $V_F = 1.3 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage : $V_{RRM} = 300 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

Applications

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

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.



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 ² -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	μA
	$V_R = 300\text{ V}$	-	-	500	μA
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 ($L = 20\text{ mH}$)	20	-	-	mJ

*Pulse Test: Pulse Width=300 μs , Duty Cycle=2%

Test Circuit and Waveforms

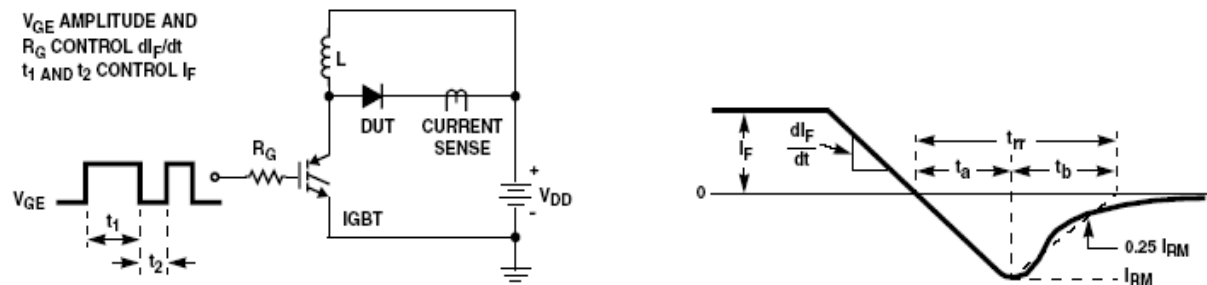


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{ mH}$

$R < 0.1\Omega$

$V_{DD} = 50\text{ V}$

$E_{AVL} = 1/2LI_2^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$

$Q_1 = \text{IGBT (BV}_{CES} > \text{DUT } V_{R(AVL)})$

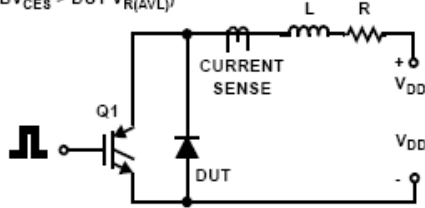


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop

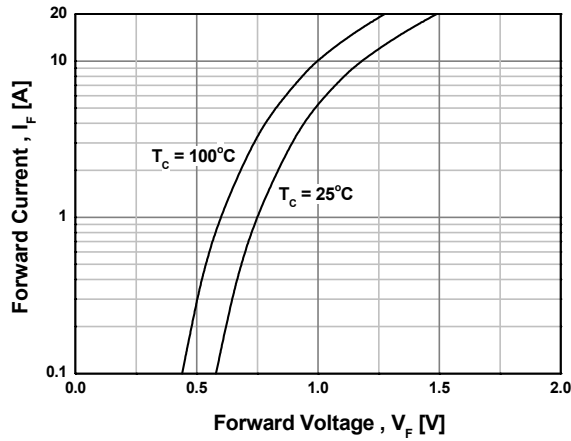


Figure 4. Typical Reverse Current

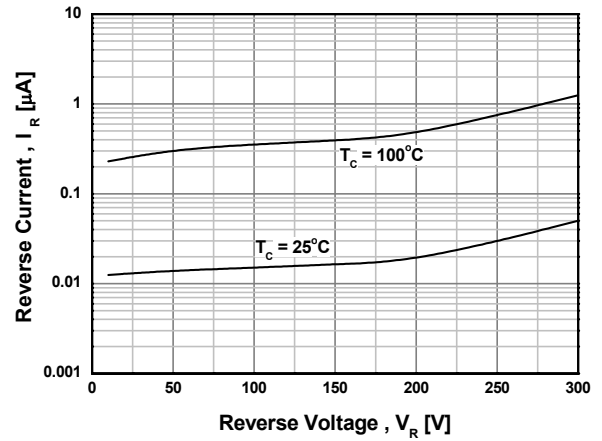


Figure 5. Typical Junction Capacitance

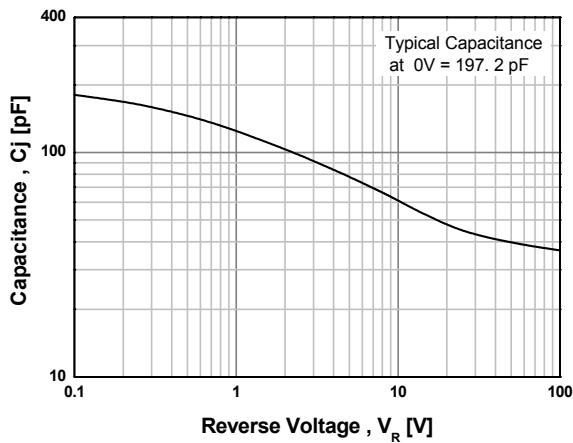


Figure 6. Typical Reverse Recovery Time

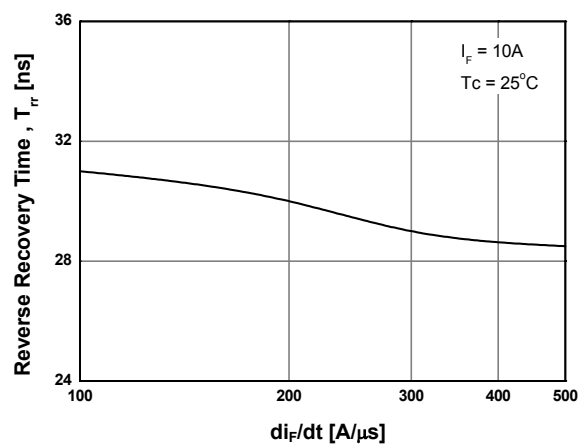


Figure 7. Typical Reverse Recovery Current

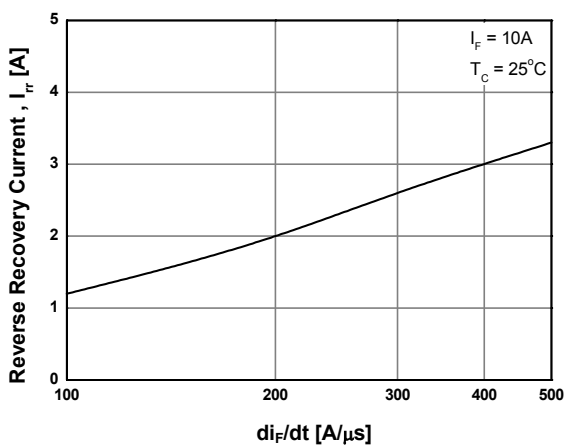
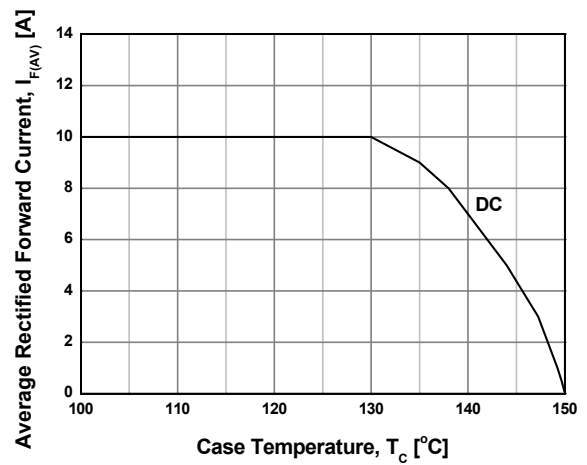
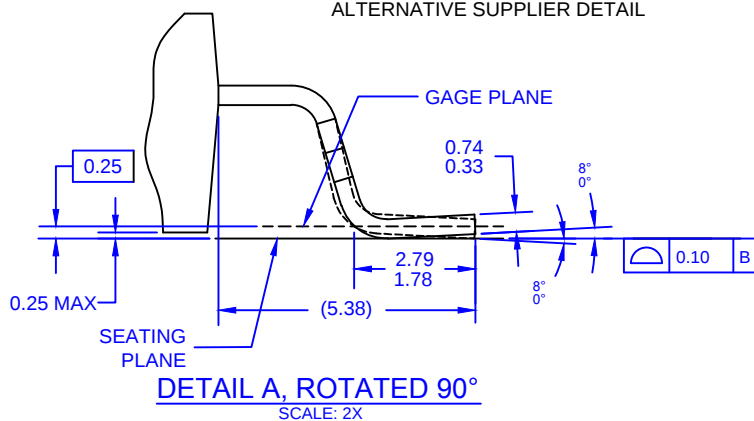
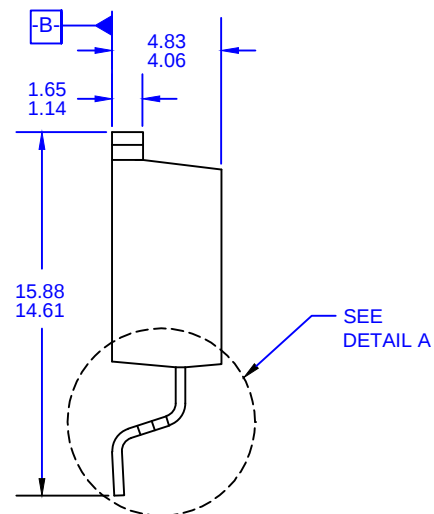
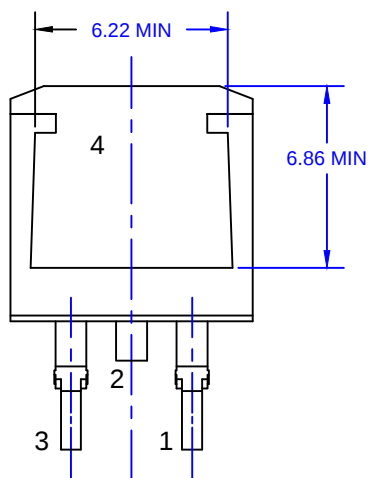
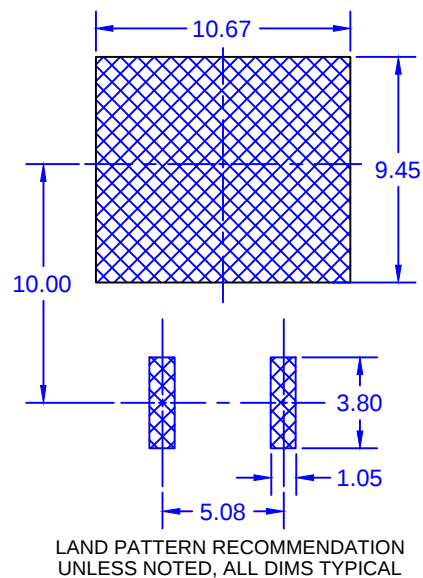
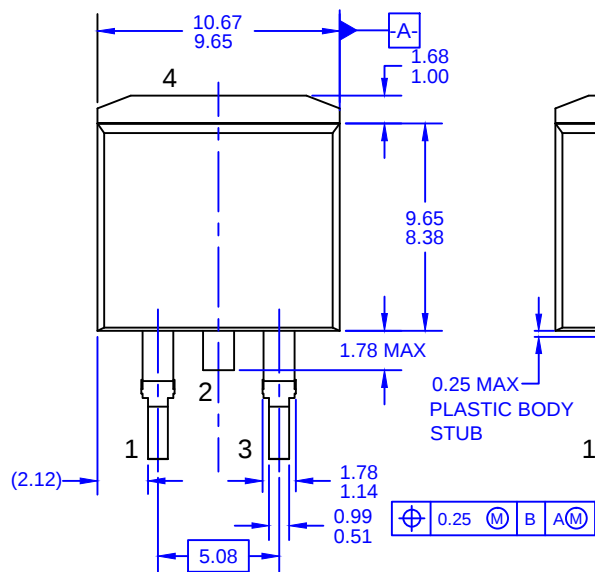


Figure 8. Forward Current Deration Curve





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).
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