FAIRCHILD SEMICONDUCTOR®

June 2006

FFB20UP20DN

10A, 200V Ultrafast Dual Rectifiers

Features

- High Reverse Voltage : V_{RRM} = 200V
- Avalanche Energy Rated
- Planar Construction

Applications

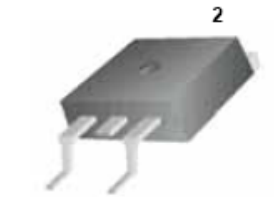
- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits

Description

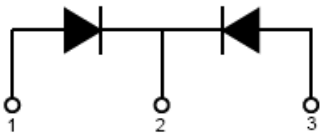
The FFB20UP20DN is an ultrafast rectifier. It has a low forward voltage drop and is a silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as a freewheeling/clamping rectifier in a variety of switching power supplies and other power switching applications. Its low stored charge and hyperfast recovery minimize ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistors.

Pin Assignments



1.Anode 2.Cathode 3.Anode



1. Anode 2. Cathode 3. Anode

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{RRM}	Peak Repetitive Reverse Voltage	200	V
V_{RWM}	Working Peak Reverse Voltage	200	V
V_R	DC Blocking Voltage	200	V
$I_{f(avg)}$	Average Rectified Forward Current @ T_C = 155°C	10	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	100	A
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	°C

Thermal Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$[1]	Maximum Thermal Resistance, Junction to Case	3.5	°C/W

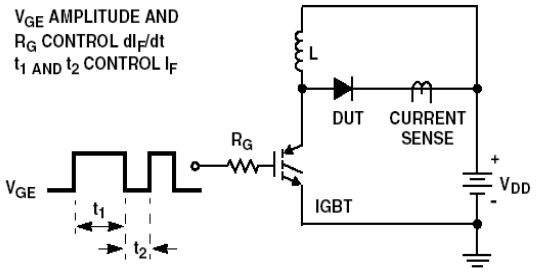
Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP20DN	F20UP20DN	TO-263	13”	24mm	800

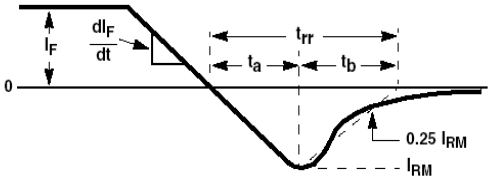
Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter		Min.	Typ.	Max	Units
V_F[2]	I_F = 10A I_F = 10A	T_C = 25°C T_C = 150°C	- -	- -	1.15 1.0	V V
I_R[2]	V_R = 200V V_R = 200V	T_C = 25°C T_C = 150°C	- -	- -	10 250	μA μA
t_{rr}	I_F =1A, di/dt = 200A/μs, V_{CC} = 130V I_F =10A, di/dt = 200A/μs, V_{CC} = 130V	T_C = 25 °C T_C = 25°C	- -	15 27	25 40	ns ns
t_a t_b Q_{rr}	I_F =10A, di/dt = 200A/μs, V_{CC} = 130V	T_C = 25°C T_C = 25°C T_C = 25°C	- - -	21 6 50	- - -	ns ns nC
W_{AVL}	Avalanche Energy (L = 20mH)		10	-	-	mJ

Notes
1: Rth_jc value is specified for each die
2: Pulse: Test Pulse width = 300S, Duty Cycle = 2%

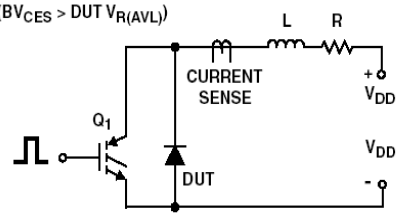


t_{rr} TEST CIRCUIT

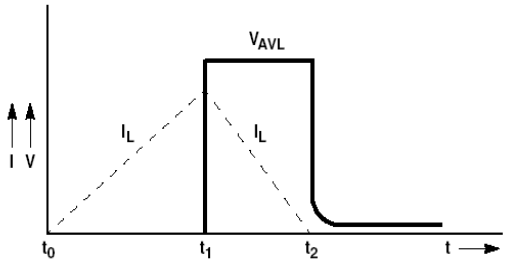


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 20mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Characteristics T_C = 25°C unless otherwise noted

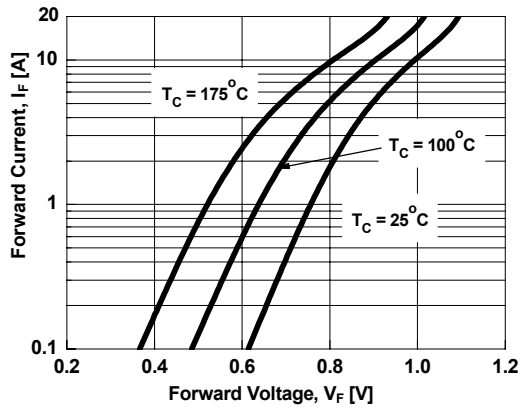


Figure 1. Typical Forward Voltage Drop

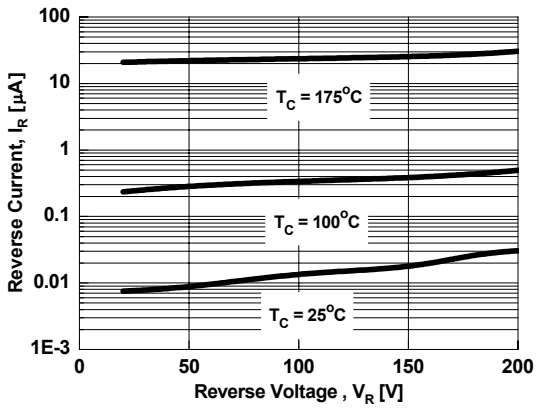


Figure 2. Typical Reverse Current

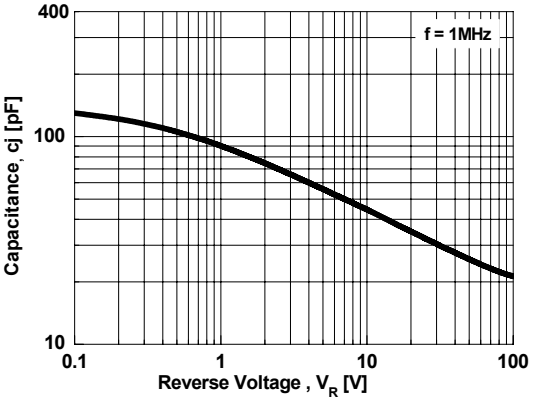


Figure 3. Typical Junction Capacitance

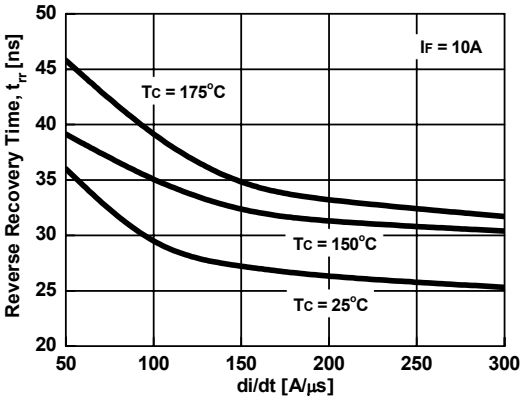


Figure 4. Typical Reverse Recovery Time

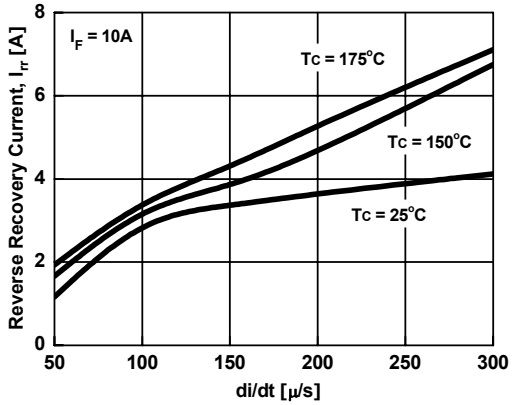


Figure 5. Typical Reverse Recovery Current

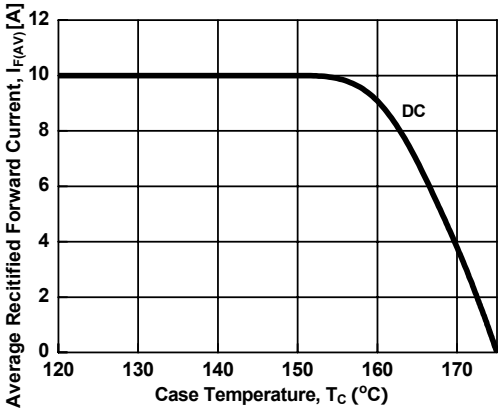
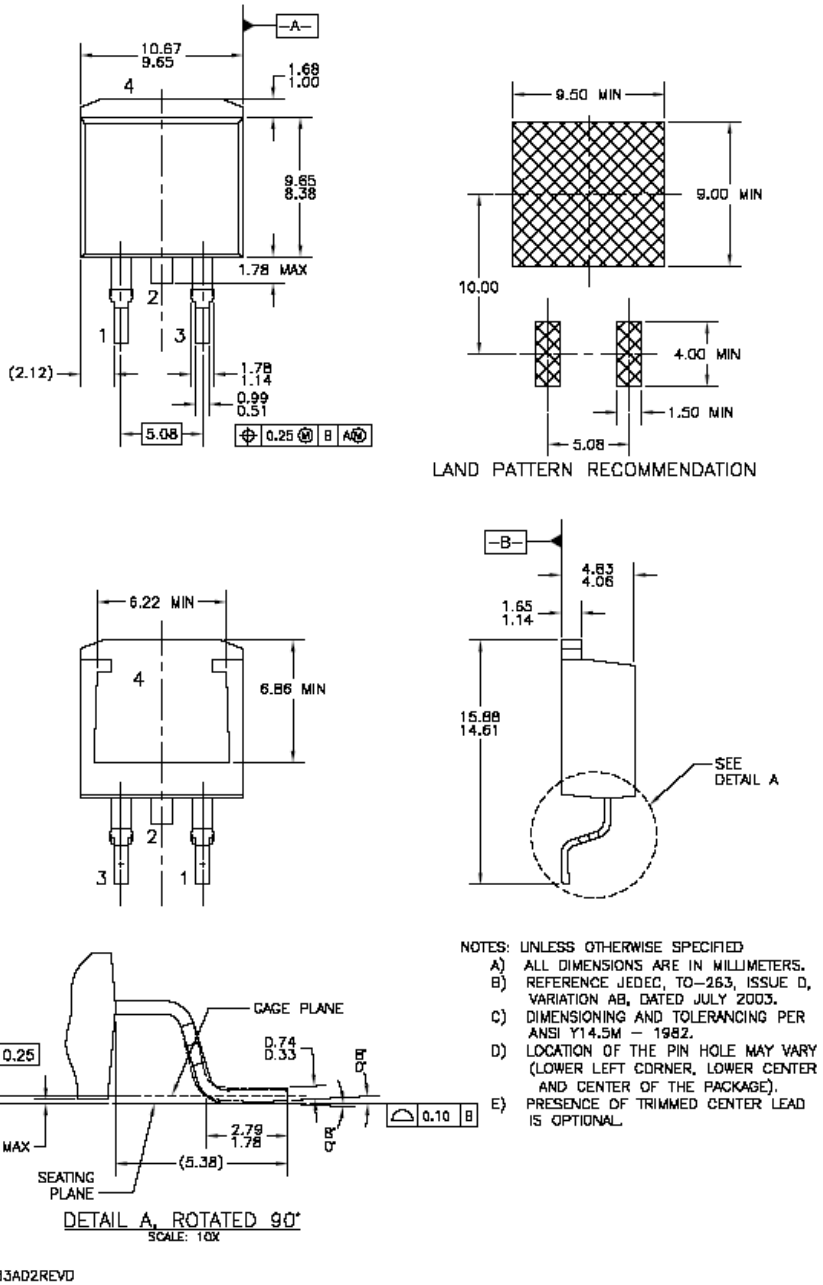


Figure 6. Case Temperature, T_C [°C]

Package Demensions

D2-PAK



Dimensions in Millimeters

Ultrafast Recovery Power Rectifier

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