March 2006

FAIRCHILD SEMICONDUCTOR®

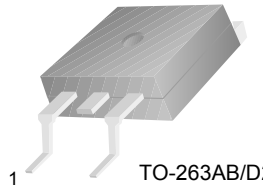
FFB20UP30DN
Ultrafast Recovery Power Rectifier

Features

- Ultrafast with Soft Recovery : < 45ns(@I_F=10A)
- High Reverse Voltage : V_{RRM} = 300V
- Avalanche Energy Rated
- Planar Construction

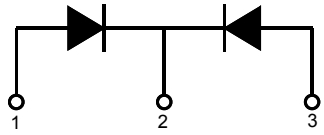
Applications

- General purpose
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits



TO-263AB/D2-PAK

1.Anode 2.Cathode 3.Anode



1. Anode 2. Cathode 3. Anode

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
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 Rating for each diode $I_{F(AV)}/2$ @ T_C = 130°C	20	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 +150	°C

Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	2.0	°C/W

Package Marking and Ordering Information

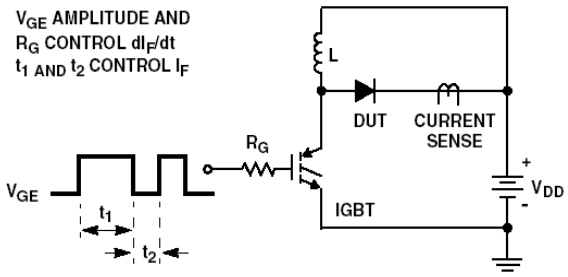
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP30DN	FFB20UP30DNTM	TO-263AB/D2-PAK	13” Dia	-	800

Electrical Characteristics (per diode) T_C = 25°C unless otherwise noted

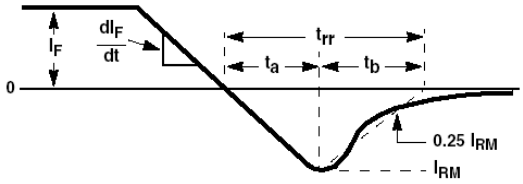
Symbol	Parameter		Min.	Typ.	Max.	Units
V_{FM} *	I_F = 10A I_F = 10A	T_C = 25 °C T_C = 150 °C	- -	- -	1.3 1.2	V V
I_{RM} *	V_R = 300V V_R = 300V	T_C = 25 °C T_C = 150 °C	- -	- -	1 500	μA μA
t_{rr}	I_F =0.5A, I_{rr}=1A, V_{CC} = 30V I_F =1A, di/dt = 100A/μs, V_{CC} = 30V I_F =10A, di/dt = 200A/μs, V_{CC} = 195V	T_C = 25 °C T_C = 25 °C T_C = 25 °C	- - -	- - -	30 35 45	ns ns ns
t_a t_b Q_{rr}	I_F =10A, di/dt = 200A/μs, V_{CC} = 195V	T_C = 25 °C T_C = 25 °C T_C = 25 °C	- - -	11 13 20	- - -	ns ns nC
W_{AVL}	Avalanche Energy (L = 20mH)		20	-	-	mJ

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

Test Circuit and Waveforms

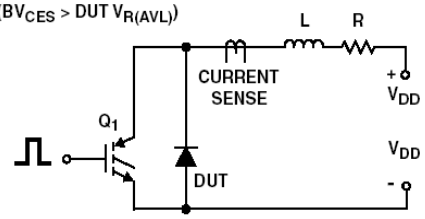


t_{rr} TEST CIRCUIT

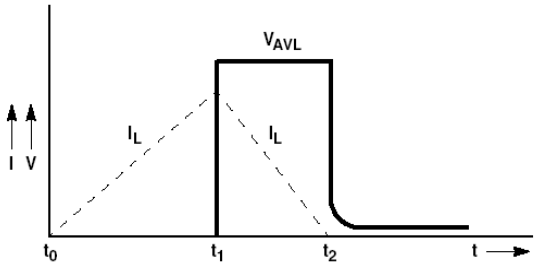


t_{rr} WAVEFORMS AND DEFINITIONS

I_{MAX} = 1A
L = 40mH
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 Performance Characteristics

Figure 1. Typical Forward Voltage Drop

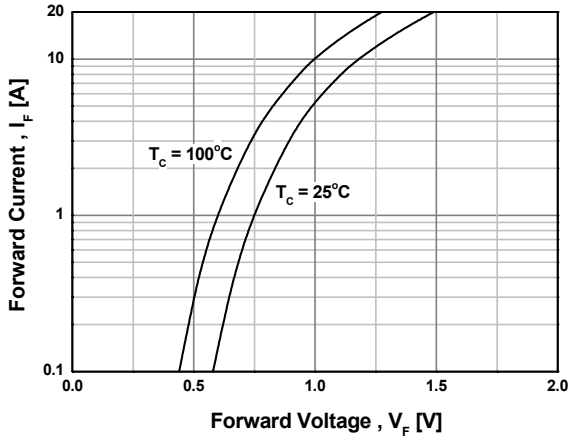


Figure 2. Typical Reverse Current

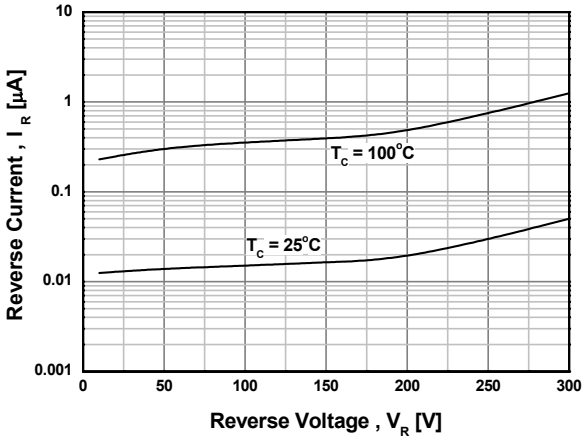


Figure 3. Typical Junction Capacitance

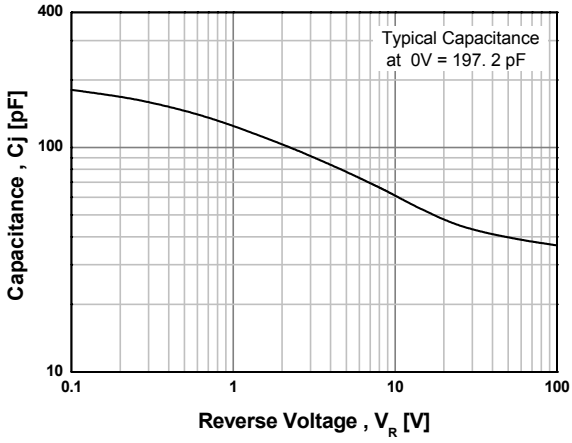


Figure 4. Typical Reverse Recovery Time

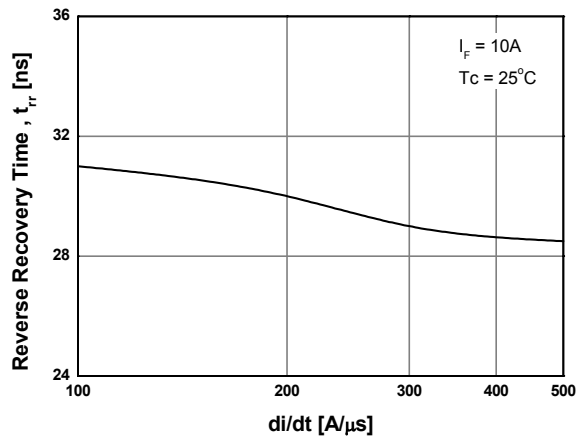


Figure 5. Typical Reverse Recovery Current

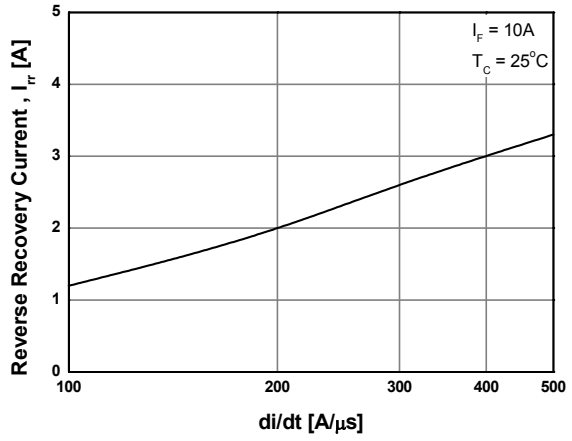
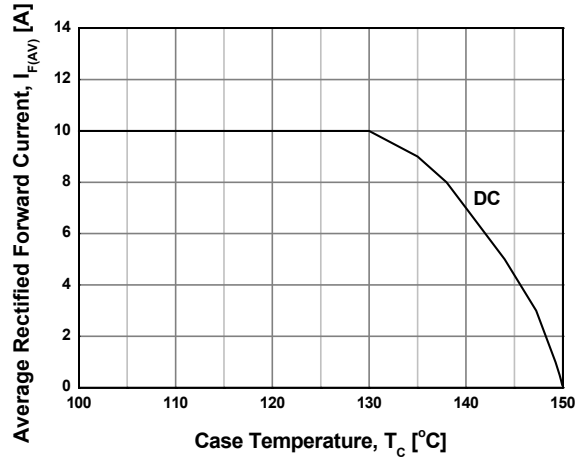
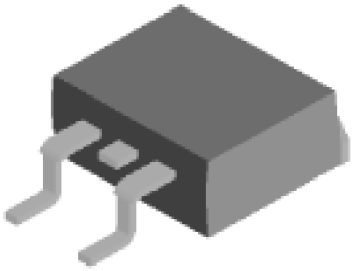


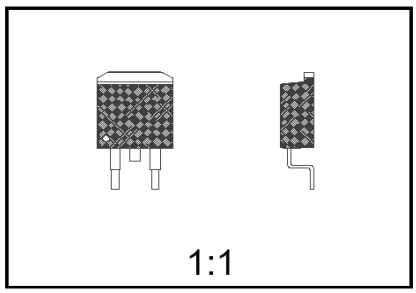
Figure 6. Forward Current Deration Curve



Package Demensions

TO-263AB/D^2-PAK

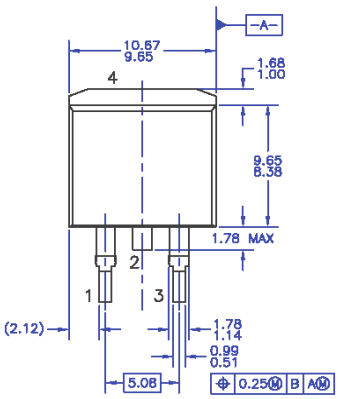


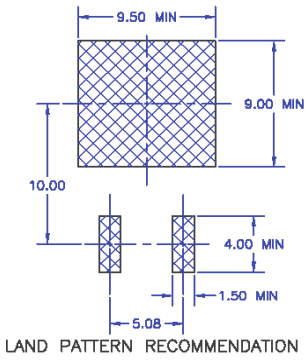


Scale 1:1 on letter size paper

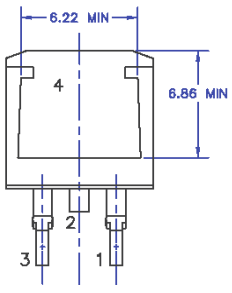
Dimensions shown below are in:
millimeters

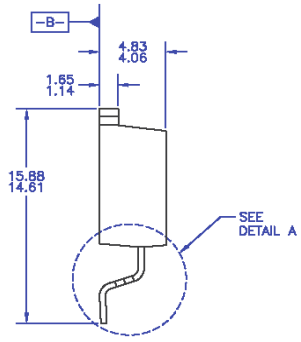
Part Weight per unit (gram): 1.4378

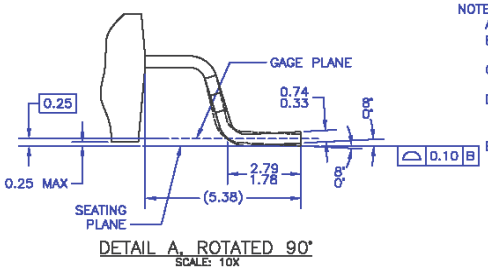




LAND PATTERN RECOMMENDATION







DETAIL A, ROTATED 90°
SCALE: 10X

NOTES: UNLESS OTHERWISE SPECIFIED
A) ALL DIMENSIONS ARE IN MILLIMETERS.
B) REFERENCE JEDEC, TO-263, ISSUE D, VARIATION AB, DATED JULY 2003.
C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5M – 1982.
D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE).
E) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.

TO263A02REVD

Dimensions in Millimeters

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Rev. I18