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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

February 2010

FFB20UP20DN_F085
10A, 200V Ultrafast Dual Rectifiers

Features

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

Applications

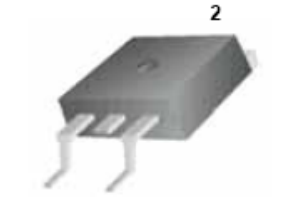
- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits
- Qualified to AEC Q101
- RoHS Compliant

Description

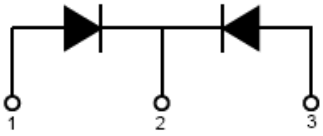
The FFB20UP20DN_F085 is an ultrafast rectifier. It has a low forward voltage drop and is a silicon nitride passivated ion-implanted epitaxial planar construction.

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

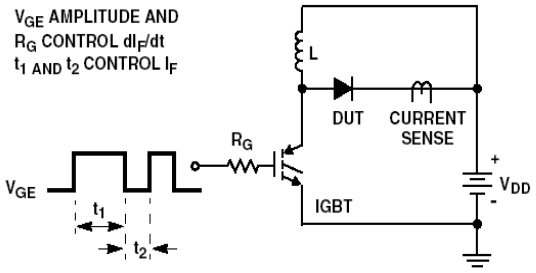
Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP20DN	FFB20UP20DN_F085	TO-263	13”	24mm	800

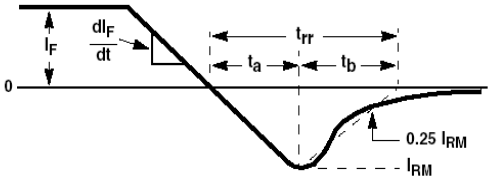
Electrical Characteristics T_C = 25°C unless otherwise noted

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%

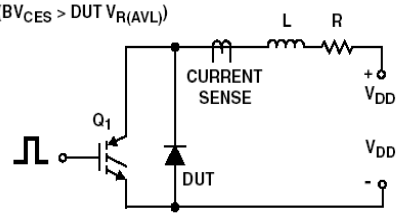


t_{rr} TEST CIRCUIT

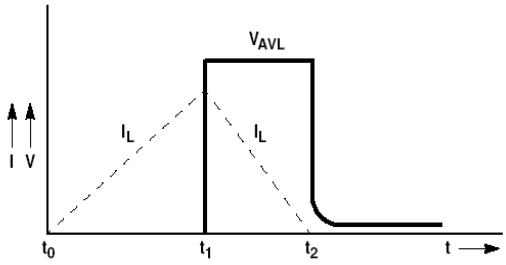


t_{rr} WAVEFORMS AND DEFINITIONS

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

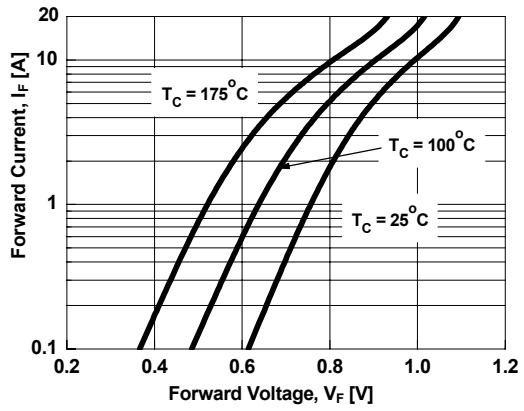


Figure 1. Typical Forward Voltage Drop

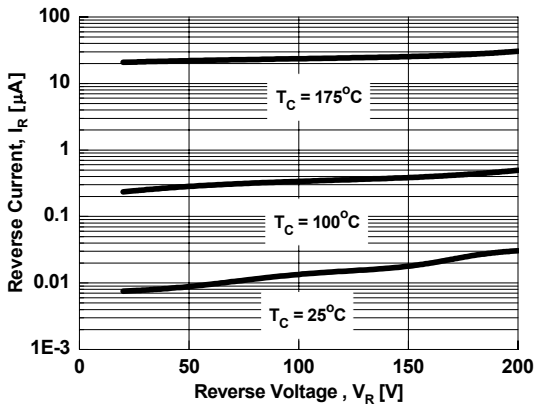


Figure 2. Typical Reverse Current

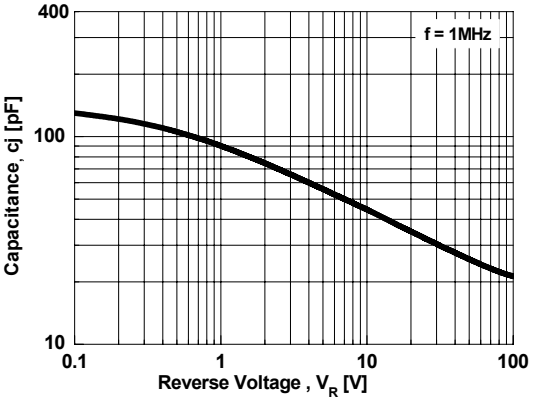


Figure 3. Typical Junction Capacitance

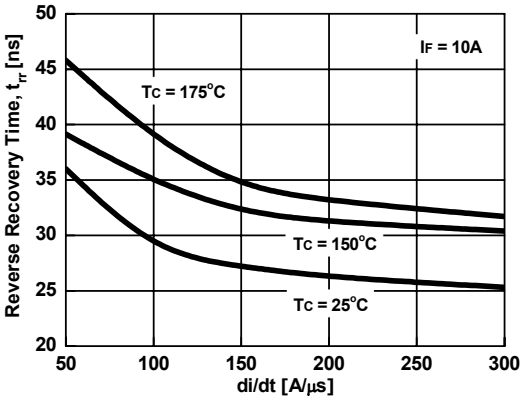


Figure 4. Typical Reverse Recovery Time

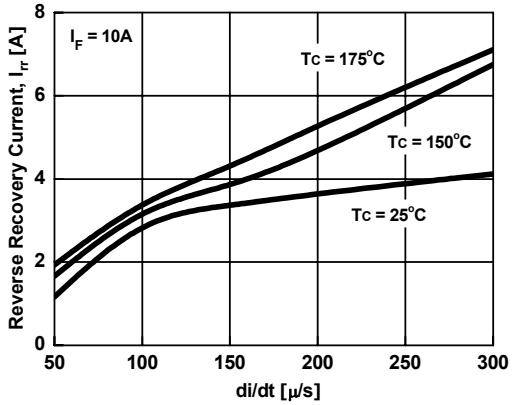


Figure 5. Typical Reverse Recovery Current

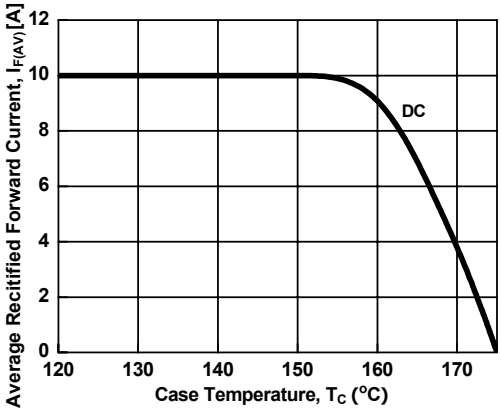
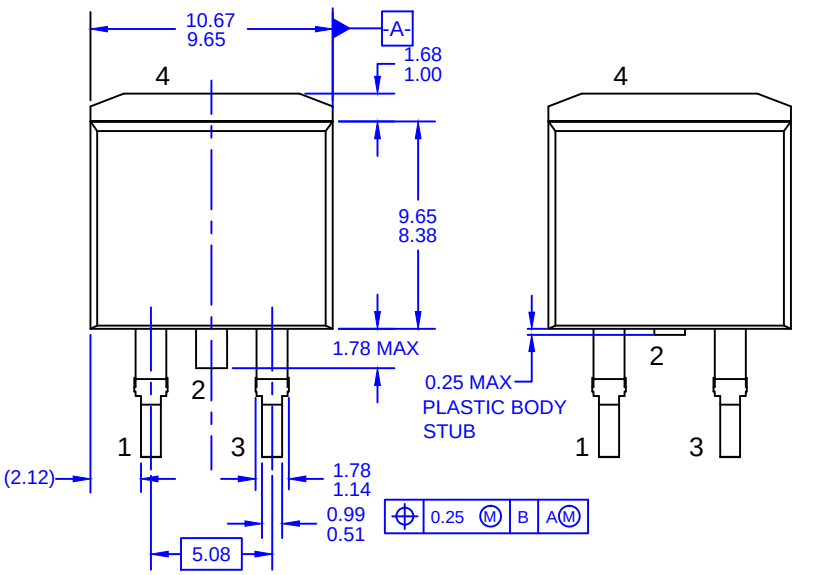
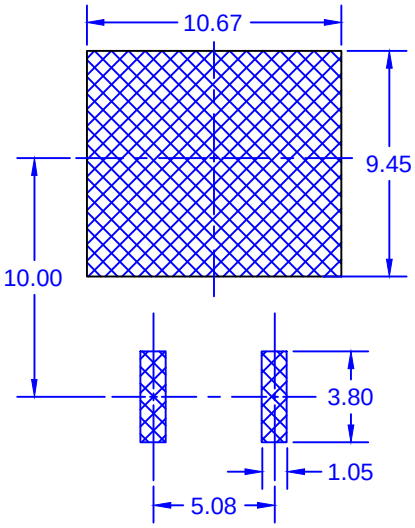


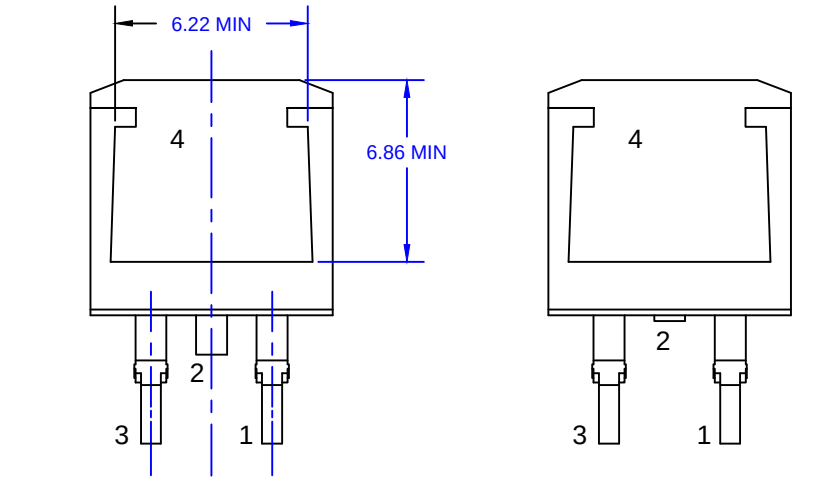
Figure 6. Case Temperature, T_C [°C]



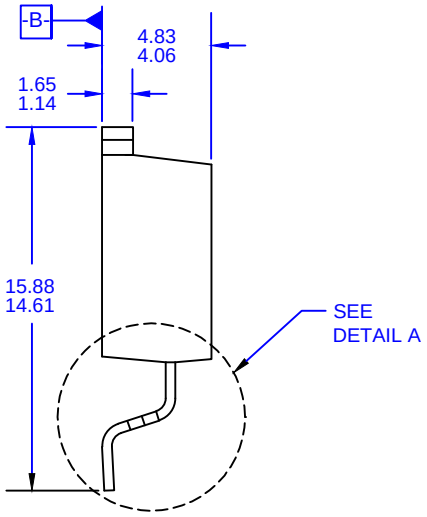
FRONT VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

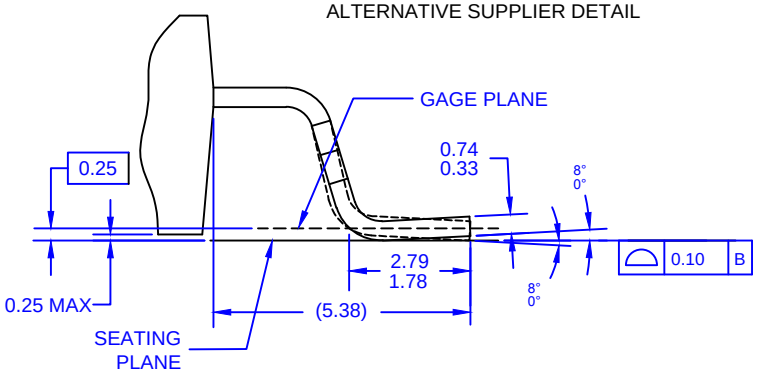


BACK VIEW - DIODE PRODUCTS VERSION
ALTERNATIVE SUPPLIER DETAIL



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



DETAIL A, ROTATED 90°
SCALE: 2X

FAIRCHILD.

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