

# FFB20UP20DN

## 10A, 200V Ultrafast Dual Rectifiers

### Features

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

### Applications

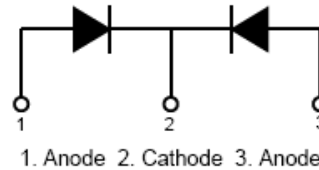
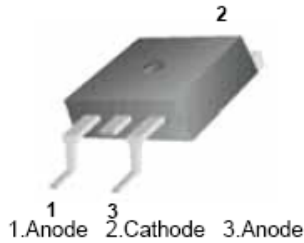
- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits

### 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



### Absolute Maximum Ratings $T_C = 25^\circ C$ 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
$I_{f(av)}$	Average Rectified Forward Current @ $T_C = 155^\circ C$	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	$^\circ C$

### Thermal Characteristics $T_C = 25^\circ C$ unless otherwise noted

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

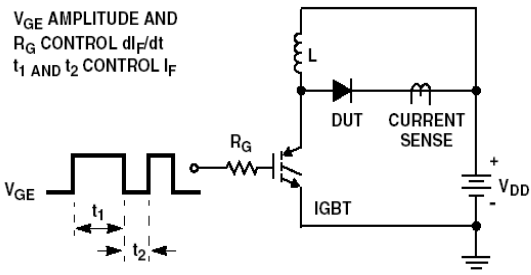
### Package Marking and Ordering Information

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

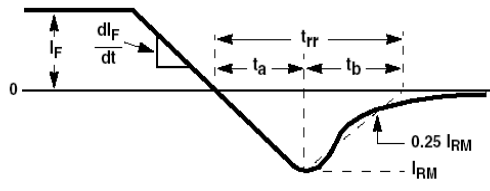
**Electrical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max	Units
$V_F^2$	$I_F = 10\text{A}$	-	-	1.15	V
	$I_F = 10\text{A}$	-	-	1.0	V
$I_R^2$	$V_R = 200\text{V}$	-	-	10	$\mu\text{A}$
	$V_R = 200\text{V}$	-	-	250	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ , $V_{CC} = 130\text{V}$	-	15	25	ns
	$I_F = 10\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ , $V_{CC} = 130\text{V}$	-	27	40	ns
$t_a$	$I_F = 10\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ , $V_{CC} = 130\text{V}$	-	21	-	ns
$t_b$		-	6	-	ns
$Q_{rr}$		-	50	-	nC
$W_{AVL}$	Avalanche Energy ( $L = 20\text{mH}$ )	10	-	-	mJ

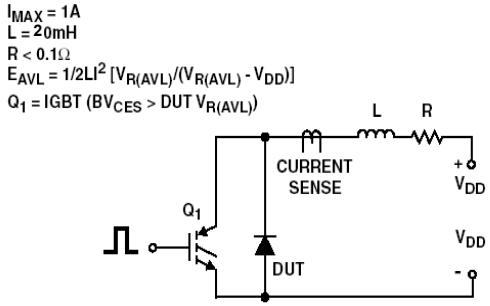
Notes  
 1:  $R_{th\_jc}$  value is specified for each die  
 2: Pulse: Test Pulse width = 300S, Duty Cycle = 2%



$t_{rr}$  TEST CIRCUIT

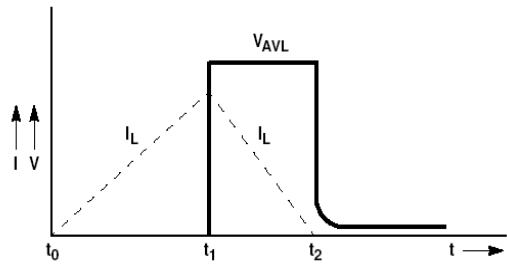


$t_{rr}$  WAVEFORMS AND DEFINITIONS



AVLANCHE ENERGY TEST CIRCUIT

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



AVLANCHE CURRENT AND VOLTAGE WAVEFORMS

**Typical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

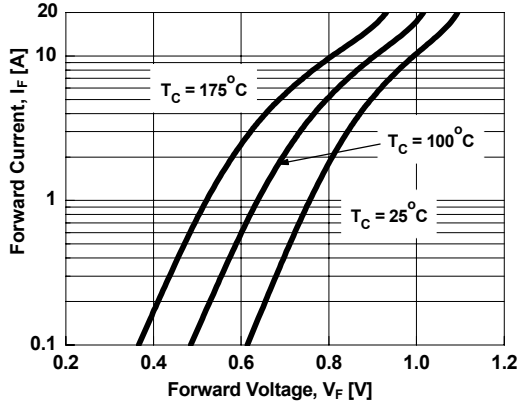


Figure 1. Typical Forward Voltage Drop

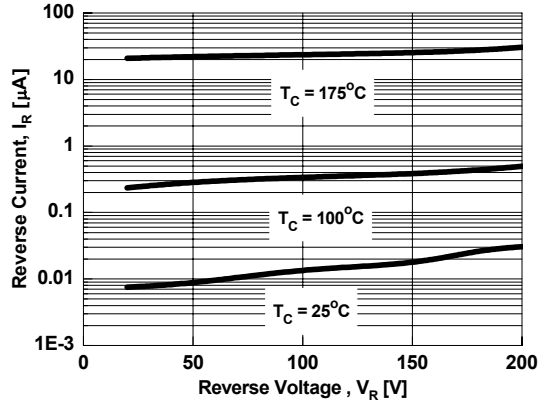


Figure 2. Typical Reverse Current

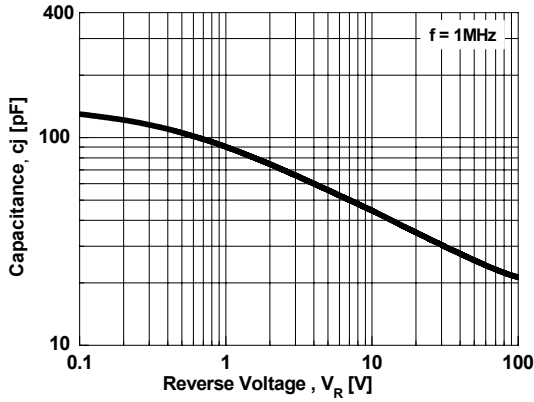


Figure 3. Typical Junction Capacitance

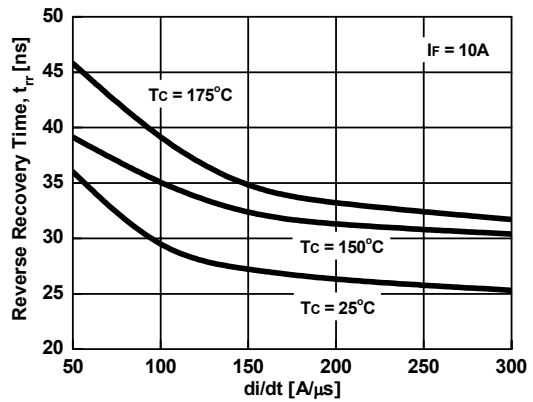


Figure 4. Typical Reverse Recovery Time

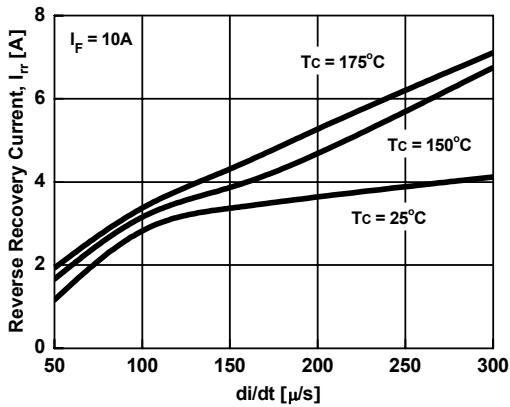


Figure 5. Typical Reverse Recovery Current

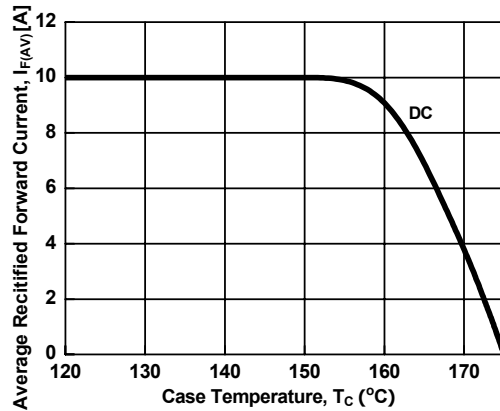
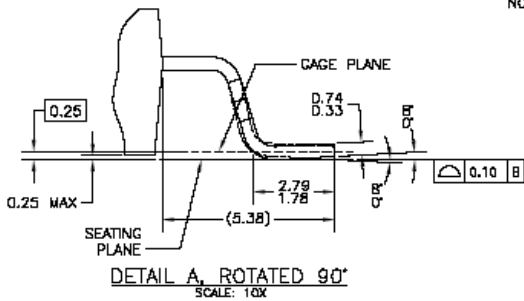
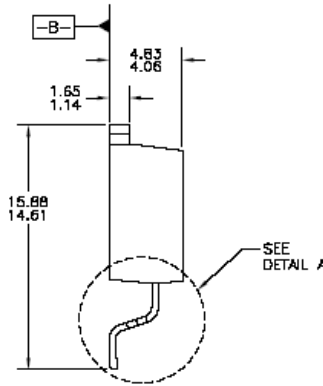
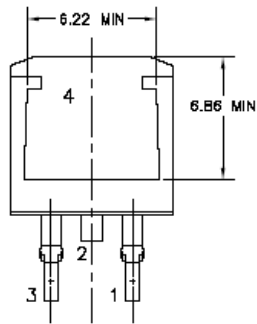
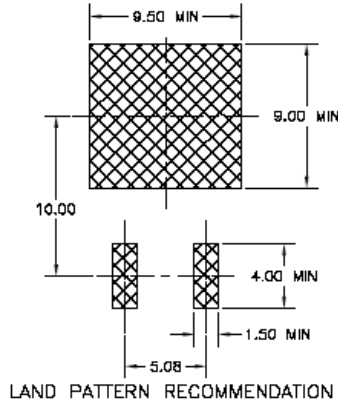
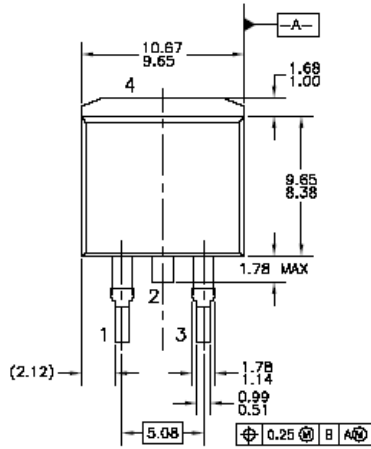


Figure 6. Case Temperature,  $T_C$  [°C]

# Package Dimensions

## D2-PAK



- 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.

T02B3AD2REVD

Dimensions in Millimeters

Ultrafast Recovery Power Rectifier

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CoolFET <sup>™</sup>	I <sup>2</sup> C <sup>™</sup>	PACMAN <sup>™</sup>	SuperFET <sup>™</sup>	
CROSSVOLT <sup>™</sup>	<i>i-Lo</i> <sup>™</sup>	POP <sup>™</sup>	SuperSOT <sup>™</sup> -3	
DOMET <sup>™</sup>	ImpliedDisconnect <sup>™</sup>	Power247 <sup>™</sup>	SuperSOT <sup>™</sup> -6	
EcoSPARK <sup>™</sup>	IntelliMAX <sup>™</sup>	PowerEdge <sup>™</sup>	SuperSOT <sup>™</sup> -8	
E <sup>2</sup> CMOS <sup>™</sup>	ISOPLANAR <sup>™</sup>	PowerSaver <sup>™</sup>	SyncFET <sup>™</sup>	
EnSigna <sup>™</sup>	LittleFET <sup>™</sup>	PowerTrench <sup>®</sup>	TCM <sup>™</sup>	
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