

FFD10UP20S

Features

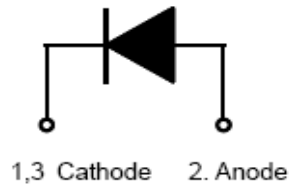
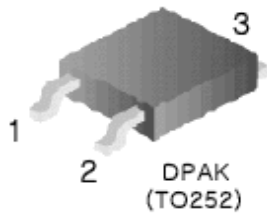
- Ultrafast Recovery, $T_{rr} = 20.8 \text{ ns}$ (@ $I_F = 10 \text{ A}$)
- Max Forward Voltage, $V_F = 1.15 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage : $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

10 A, 200 V, Ultrafast Diode

The FFD10UP20S is an ultrafast 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 and UPS application.

Applications

- Power Switching Circuits
- Output Rectifiers
- Freewheeling Diodes
- Switching Mode Power Supply



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{RRM}	Peak Repetitive Reverse Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 115^\circ\text{C}$	10	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	100	A
T_J, T_{STG}	Operating and Storage Temperature Range	-65 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.0	$^\circ\text{C/W}$

Package Marking and Ordering Information

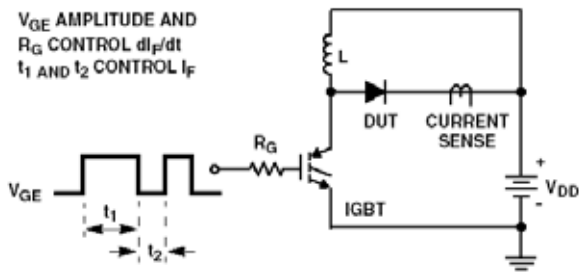
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F10UP20S	FFD10UP20S	TO-252	13" Dia	-	2500

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

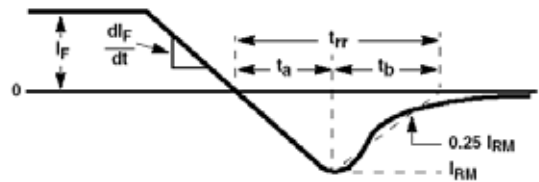
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_F^*	Maximum Instantaneous Forward Voltage $I_F = 10\text{ A}$ $I_F = 10\text{ A}$	- -	- -	1.15 1.10	V
I_R^*	Maximum Instantaneous Reverse Current @ rated V_R	- -	- -	100 500	μA
t_{rr}	Reverse Recovery Time	-	20.8	-	ns
I_{rr}	Reverse Recovery Current	-	2.8	-	A
Q_{rr}	Reverse Recovery Charge ($I_F = 10\text{ A}$, $di/dt = 200\text{ A}/\mu\text{s}$)	-	28.5	-	nC
t_{rr}	Maximum Reverse Recovery Time ($I_F = 1\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$)	-	-	35	ns
W_{AVL}	Avalanche Energy ($L = 40\text{ mH}$)	10	-	-	mJ

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

Test Circuit and Waveforms

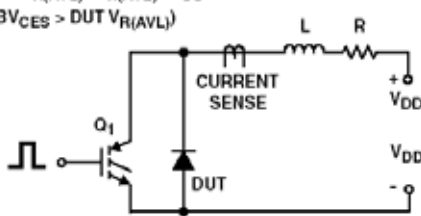


t_{rr} TEST CIRCUIT

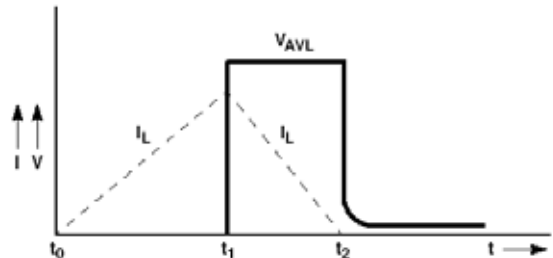


t_{rr} WAVEFORMS AND DEFINITIONS

$I_{MAX} = 1\text{ A}$
 $L = 40\text{ mH}$
 $R < 0.1\Omega$
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$
 $Q_1 = \text{IGBT (} BV_{CES} > \text{DUT } V_{R(AVL)} \text{)}$



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

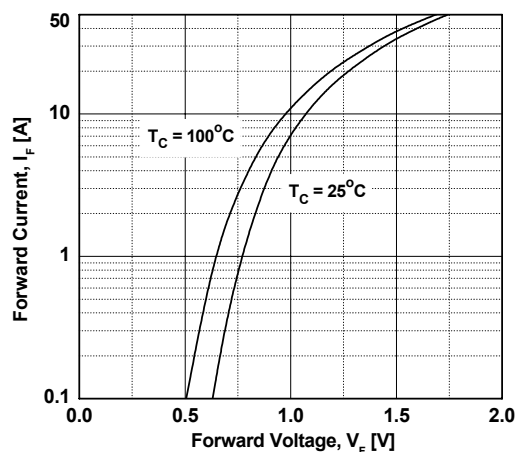


Figure 2. Typical Reverse Current vs. Reverse Voltage

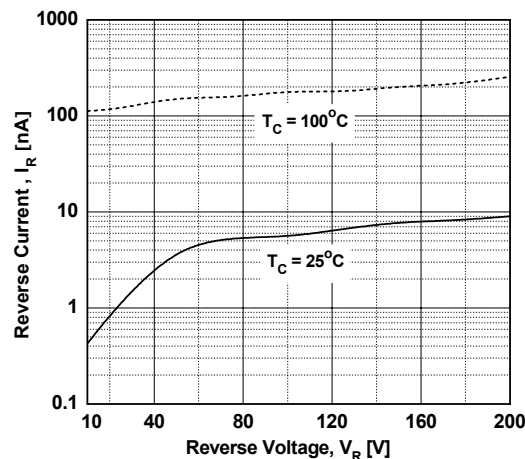


Figure 3. Typical Junction Capacitance

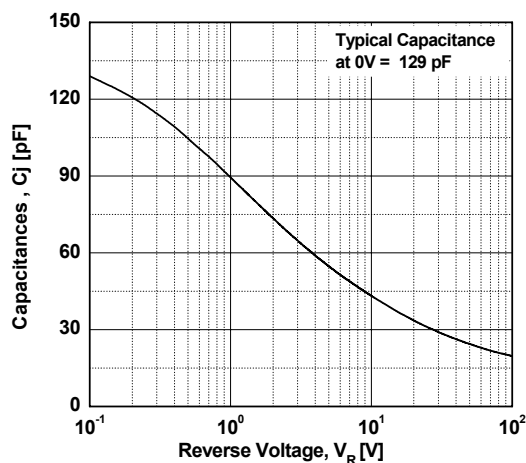


Figure 4. Typical Reverse Recovery Time vs. di/dt

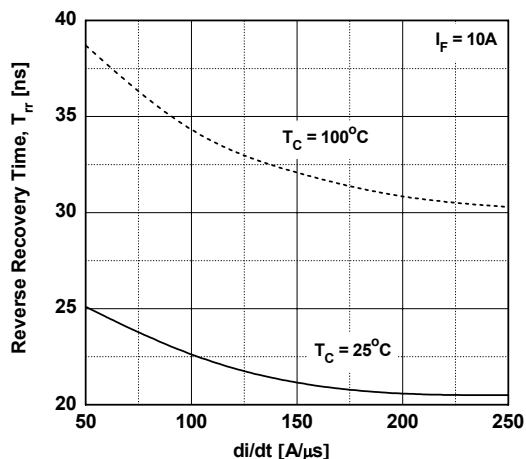


Figure 5. Typical Reverse Recovery Current vs. di/dt

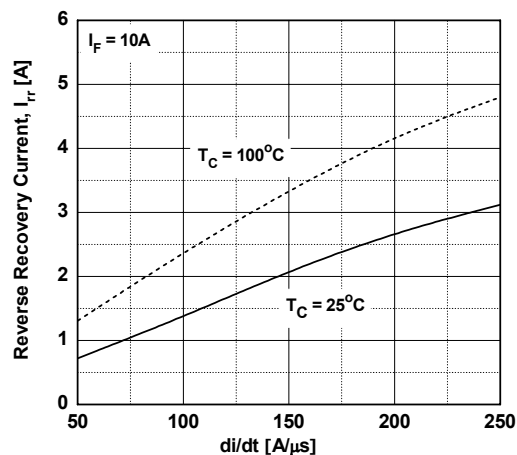
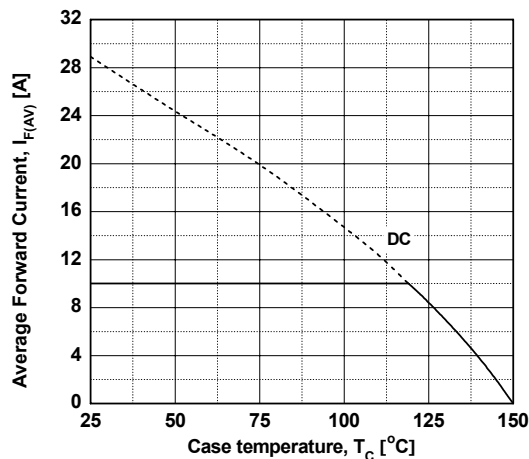
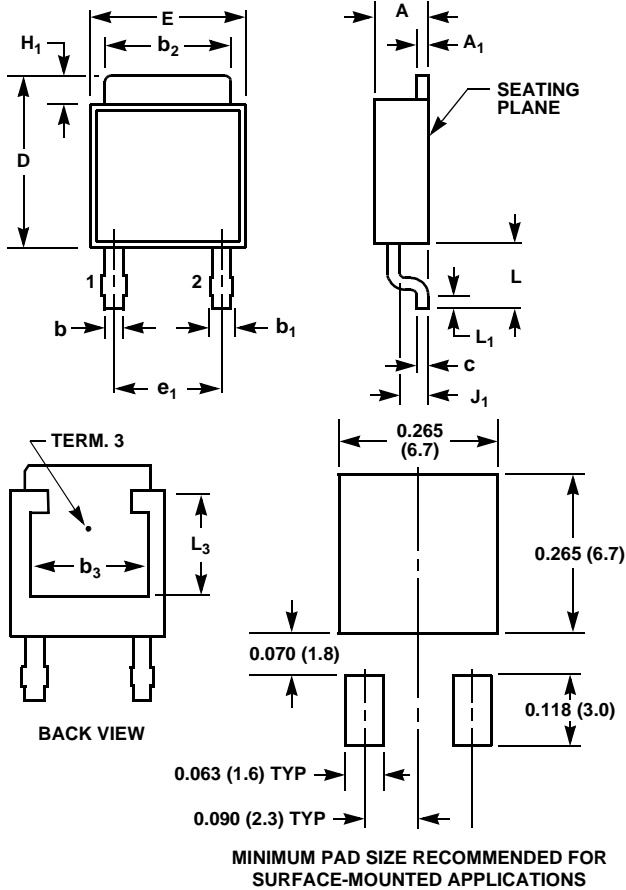


Figure 6. Forward Current Derating Curve



Mechanical Dimensions

D-PAK



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.19	2.38	-
A ₁	0.018	0.022	0.46	0.55	3, 4
b	0.028	0.032	0.72	0.81	3, 4
b ₁	0.033	0.040	0.84	1.01	3
b ₂	0.205	0.215	5.21	5.46	3, 4
b ₃	0.190	-	4.83	-	2
c	0.018	0.022	0.46	0.55	3, 4
D	0.270	0.290	6.86	7.36	-
E	0.250	0.265	6.35	6.73	-
e ₁	0.180 BSC		4.57 BSC		6
H ₁	0.035	0.045	0.89	1.14	-
J ₁	0.040	0.045	1.02	1.14	-
L	0.100	0.115	2.54	2.92	-
L ₁	0.020	-	0.51	-	3, 5
L ₃	0.170	-	4.32	-	2

NOTES:

1. No current JEDEC outline for this package.
2. L₃ and b₃ dimensions establish a minimum mounting surface for terminal 3.
3. Dimension (without solder).
4. Add typically 0.002 inches (0.05mm) for solder plating.
5. L₁ is the terminal length for soldering.
6. Position of lead to be measured 0.090 inches (2.28mm) from bottom of dimension D.
7. Controlling dimension: Inch.
8. Revision 8 dated 5-99.

Dimensions in Millimeters



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