

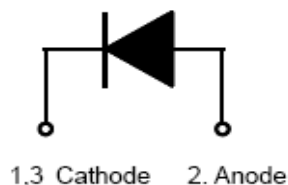
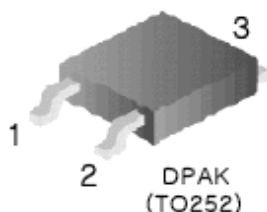
# FFD10UP20S

## Features

- Ultrafast with soft recovery,  $t_{rr} < 35\text{ns}$
- Reverse Voltage, 200V
- Forward Voltage  $< 1.1\text{V}$  @  $T_C 100^\circ\text{C}$
- RoHS compliant

## 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	Ratings	Units
$V_{RRM}$	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	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.0	$^\circ\text{C/W}$

## Package Marking and Ordering Information

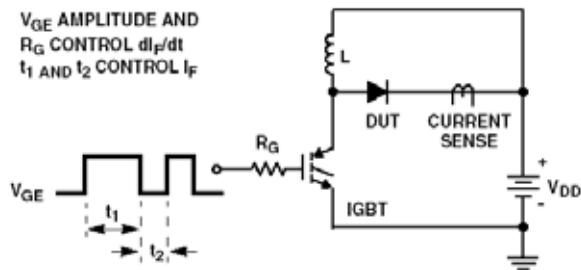
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F10UP20S	FFD10UP20S	TO-252	13" Dia	-	2500

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

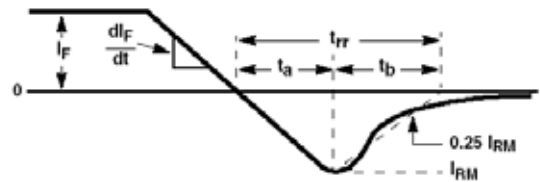
Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM}^*$	Maximum Instantaneous Forward Voltage $I_F = 10\text{A}$ $I_F = 10\text{A}$	- -	- -	1.15 1.10	V
$I_{RM}^*$	Maximum Instantaneous Reverse Current @ rated $V_R$	- -	- -	100 500	$\mu\text{A}$
$t_{rr}$ $I_{rr}$ $Q_{rr}$	Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge ( $I_F = 10\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ )	- - -	20.8 2.8 28.5	- - -	ns A 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 =  $300\mu\text{s}$ , Duty Cycle = 2%

## Test Circuit and Waveforms

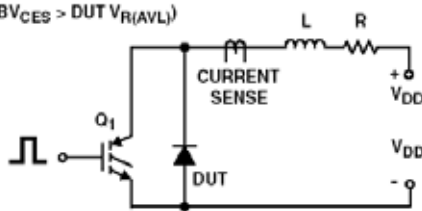


$t_{rr}$  TEST CIRCUIT

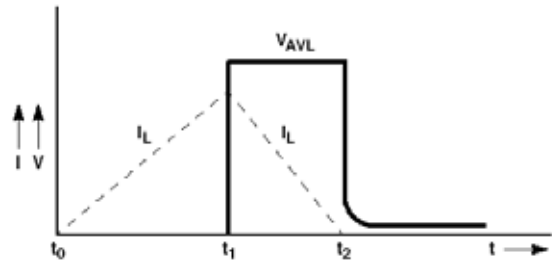


$t_{rr}$  WAVEFORMS AND DEFINITIONS

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



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

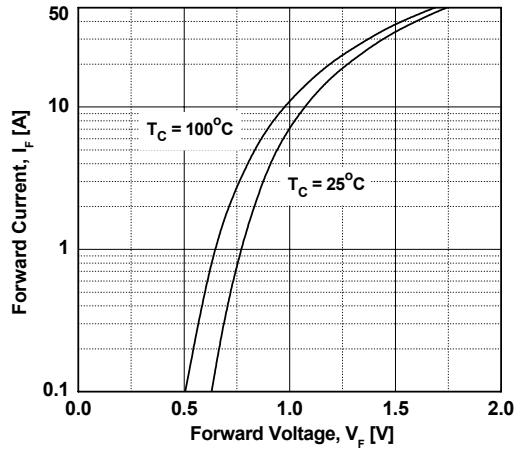


Figure 2. Typical Reverse Current vs. Reverse Voltage

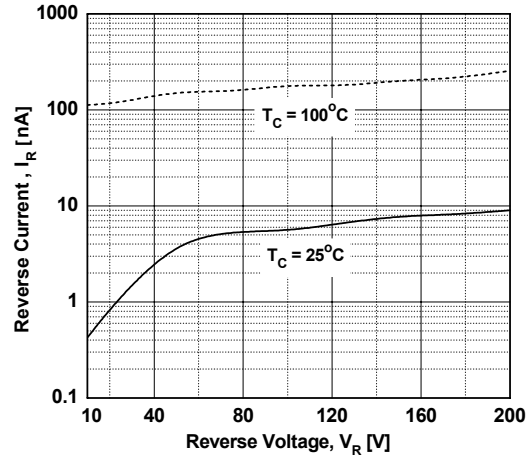


Figure 3. Typical Junction Capacitance

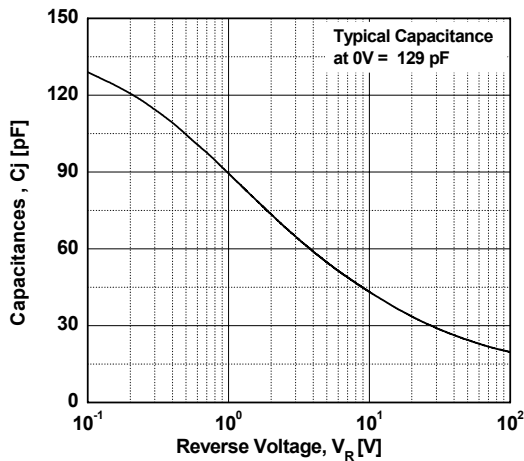


Figure 4. Typical Reverse Recovery Time vs. di/dt

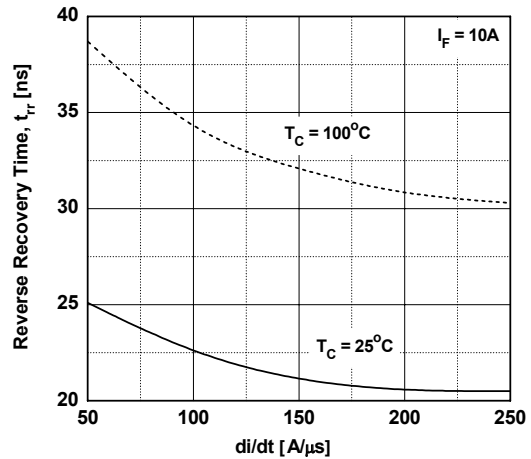


Figure 5. Typical Reverse Recovery Current vs. di/dt

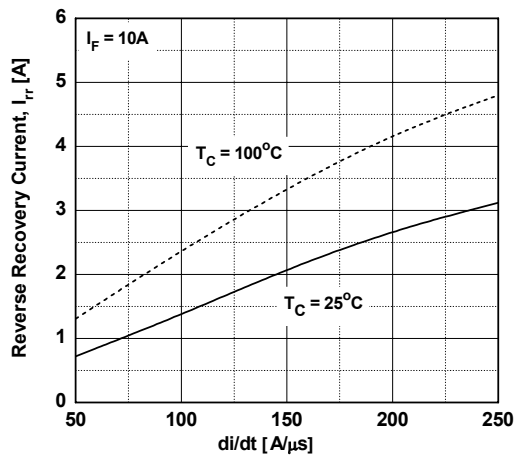
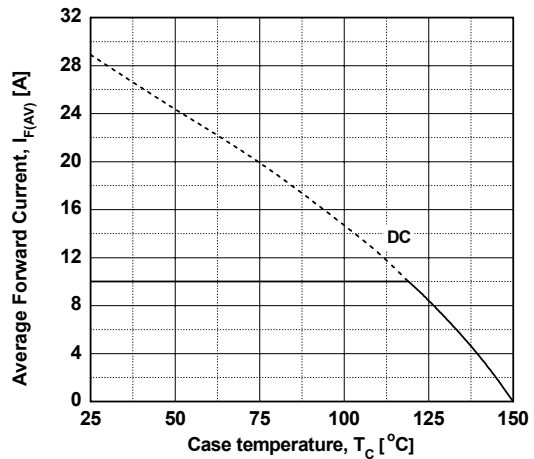
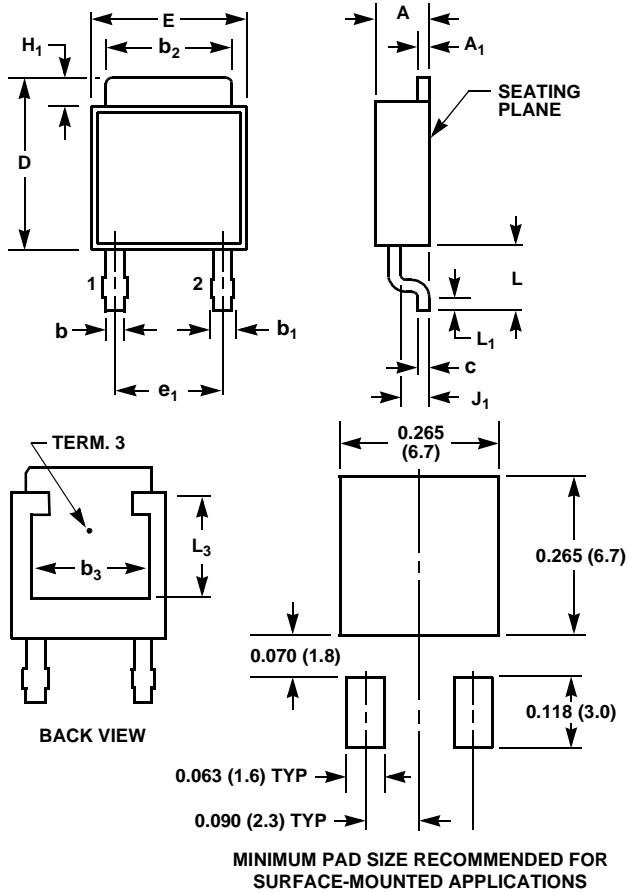


Figure 6. Forward Current Derating Curve



## Mechanical Dimensions

## D-PAK



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.19	2.38	-
A <sub>1</sub>	0.018	0.022	0.46	0.55	3, 4
b	0.028	0.032	0.72	0.81	3, 4
b <sub>1</sub>	0.033	0.040	0.84	1.01	3
b <sub>2</sub>	0.205	0.215	5.21	5.46	3, 4
b <sub>3</sub>	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 <sub>1</sub>	0.180 BSC		4.57 BSC		6
H <sub>1</sub>	0.035	0.045	0.89	1.14	-
J <sub>1</sub>	0.040	0.045	1.02	1.14	-
L	0.100	0.115	2.54	2.92	-
L <sub>1</sub>	0.020	-	0.51	-	3, 5
L <sub>3</sub>	0.170	-	4.32	-	2

## NOTES:

1. No current JEDEC outline for this package.
2. L<sub>3</sub> and b<sub>3</sub> 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. L<sub>1</sub> 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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