



June 2007

# Ultrafast Rectifier

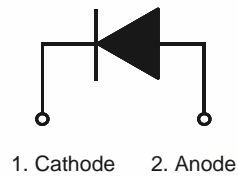
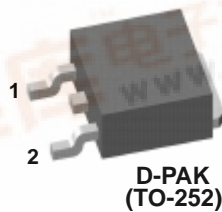
## FFD10UP20S

### 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	$^\circ\text{C}/\text{W}$

### Package Marking and Ordering Information

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

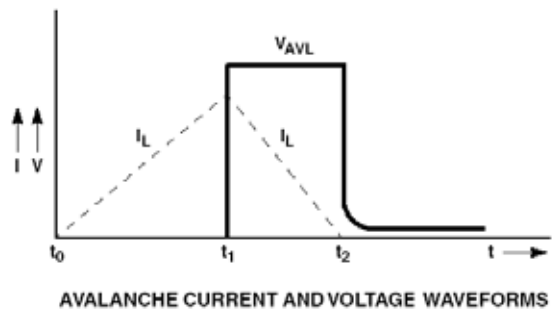
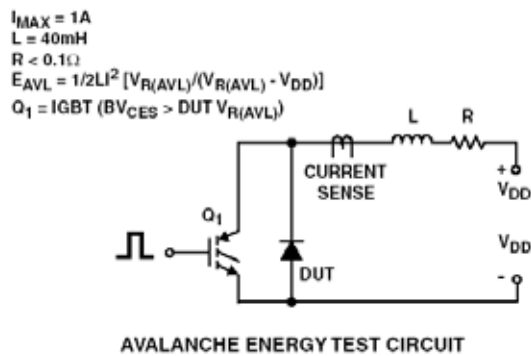
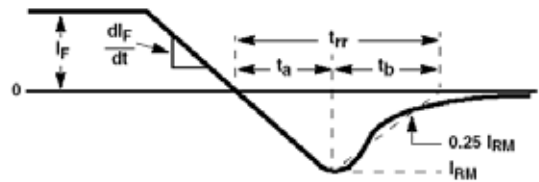
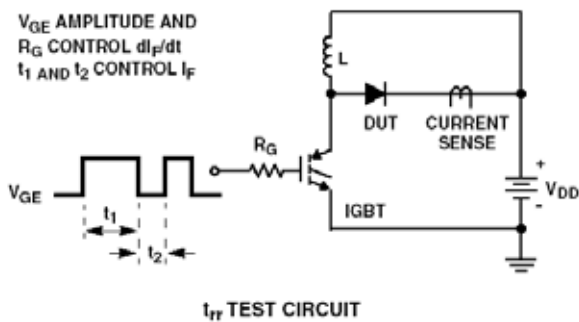


### Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM}^*$	Maximum Instantaneous Forward Voltage	-	-	1.15	V
	$I_F = 10\text{A}$ $I_F = 10\text{A}$	-	-	1.10	
$I_{RM}^*$	Maximum Instantaneous Reverse Current	-	-	100	$\mu\text{A}$
	@ rated $V_R$	-	-	500	
$t_{rr}$ $I_{rr}$ $Q_{rr}$	Reverse Recovery Time	-	20.8	-	ns
	Reverse Recovery Current	-	2.8	-	A
	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

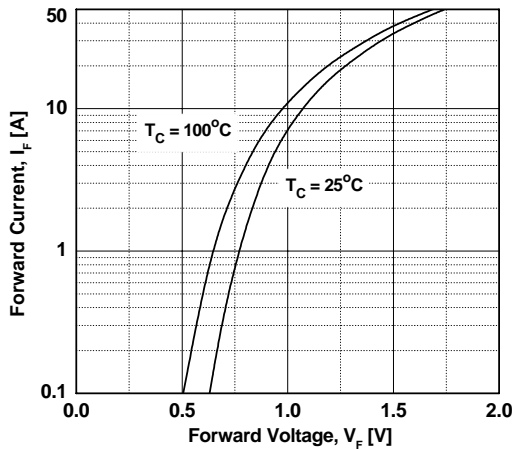
\* Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle = 2%

### Test Circuit and Waveforms

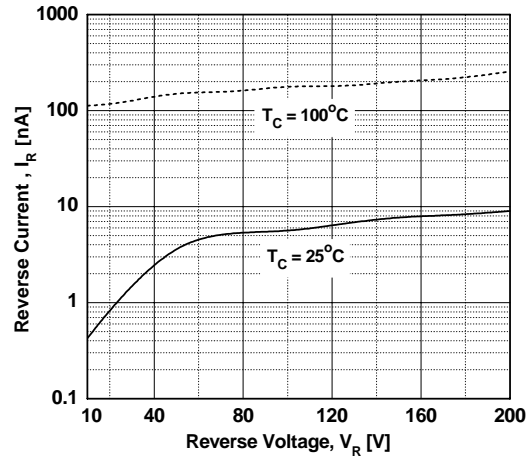


## Typical Performance Characteristics

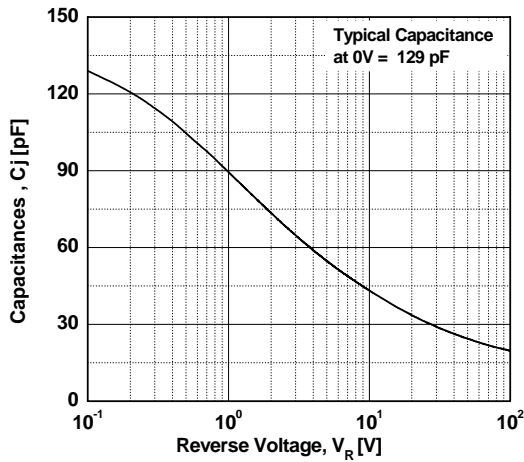
**Figure 1. Typical Forward Voltage Drop vs. Forward Current**



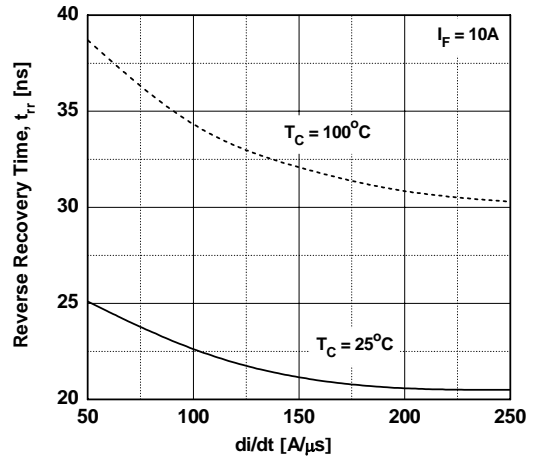
**Figure 2. Typical Reverse Current vs. Reverse Voltage**



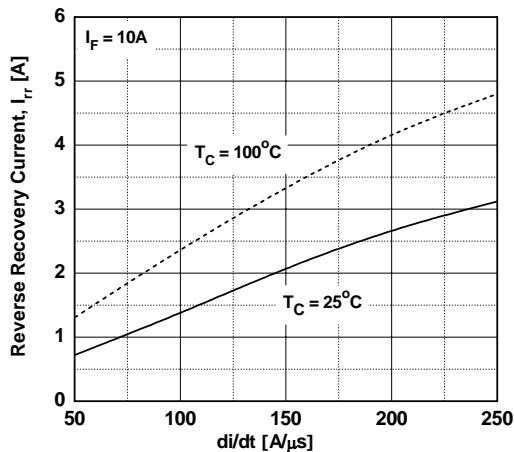
**Figure 3. Typical Junction Capacitance**



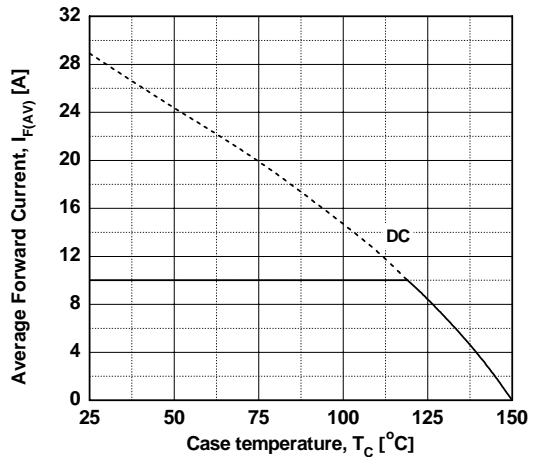
**Figure 4. Typical Reverse Recovery Time vs. di/dt**



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

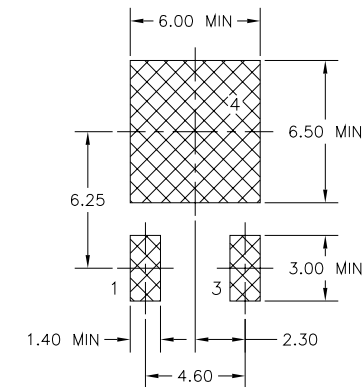
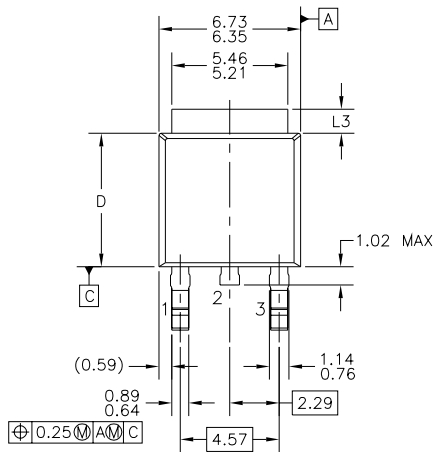


**Figure 6. Forward Current Derating Curve**

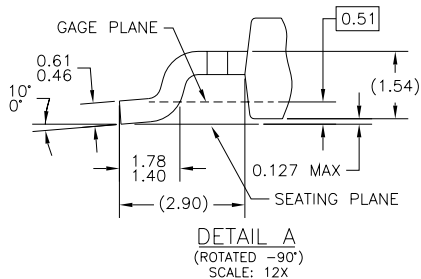
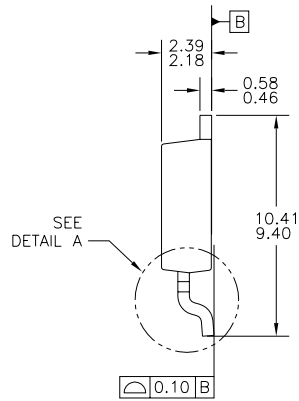
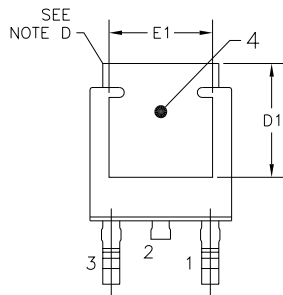


Mechanical Dimensions

D-PAK



LAND PATTERN RECOMMENDATION




- NOTES: UNLESS OTHERWISE SPECIFIED
- A) ALL DIMENSIONS ARE IN MILLIMETERS.
  - B) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA & AB, DATED NOV. 1999.
  - C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
  - D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.
  - E) DIMENSIONS L3,D,E1&D1 TABLE:
- |    | OPTION AA | OPTION AB |
|----|-----------|-----------|
| L3 | 0.89-1.27 | 1.52-2.03 |
| D  | 5.97-6.22 | 5.33-5.59 |
| E1 | 4.32 MIN  | 3.81 MIN  |
| D1 | 5.21 MIN  | 4.57 MIN  |
- F) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.

Dimensions in Millimeters



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FRFET®	Power220®	SuperSOT™-3	UniFET™
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No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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