

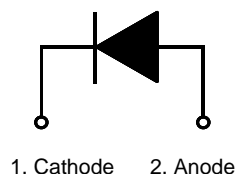
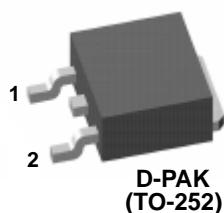
# FFD10UP20S

## 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

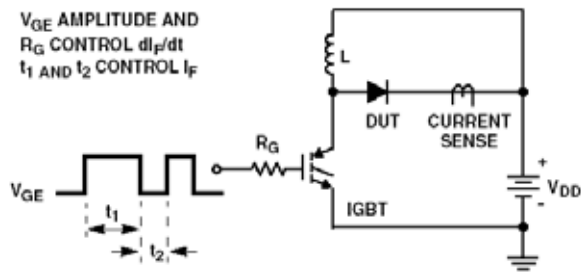
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F10UP20S	FFD10UP20S	TO-252	13" Dia	-	2500

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

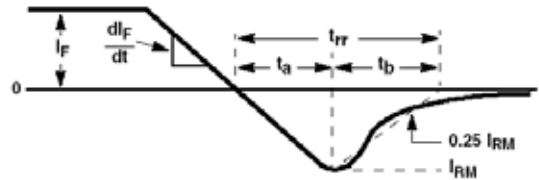
Symbol	Parameter	Min.	Typ.	Max.	Units	
$V_{FM}^*$	Maximum Instantaneous Forward Voltage $I_F = 10\text{A}$ $I_F = 10\text{A}$	$T_C = 25^\circ\text{C}$	-	-	1.15	V
		$T_C = 100^\circ\text{C}$	-	-	1.10	
$I_{RM}^*$	Maximum Instantaneous Reverse Current @ rated $V_R$	$T_C = 25^\circ\text{C}$	-	-	100	$\mu\text{A}$
		$T_C = 100^\circ\text{C}$	-	-	500	
$t_{rr}$	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 $\mu\text{s}$ , Duty Cycle = 2%

### Test Circuit and Waveforms

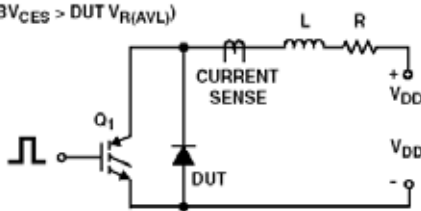


$t_{rr}$  TEST CIRCUIT

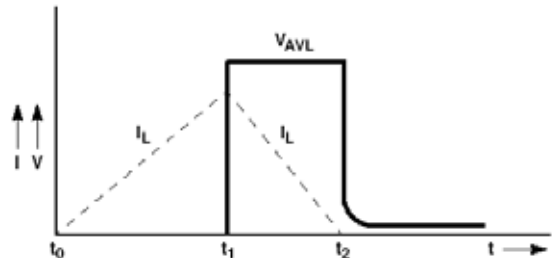


$t_{rr}$  WAVEFORMS AND DEFINITIONS

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



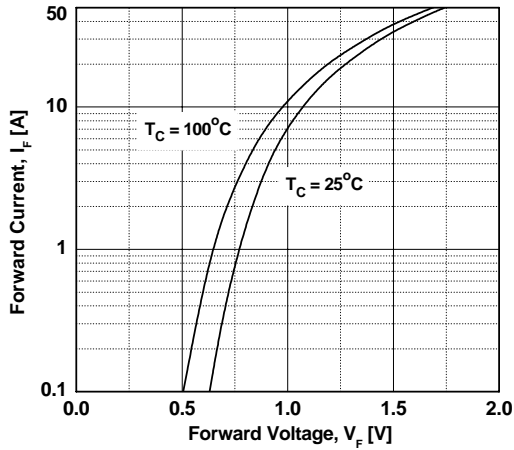
AVALANCHE ENERGY TEST CIRCUIT



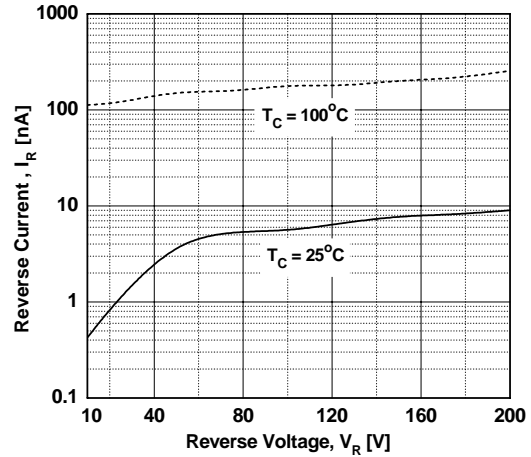
AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

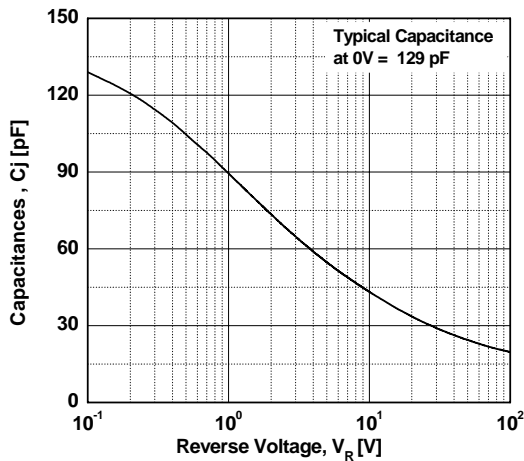
**Figure 1. Typical Forward Voltage Drop vs. Forward Current**



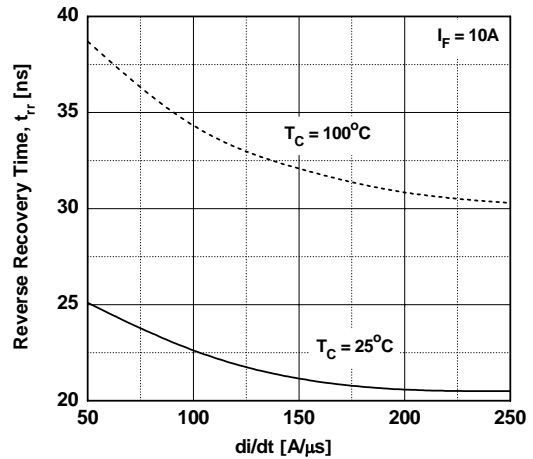
**Figure 2. Typical Reverse Current vs. Reverse Voltage**



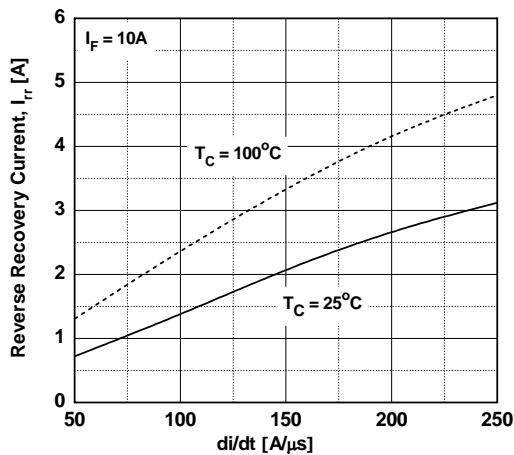
**Figure 3. Typical Junction Capacitance**



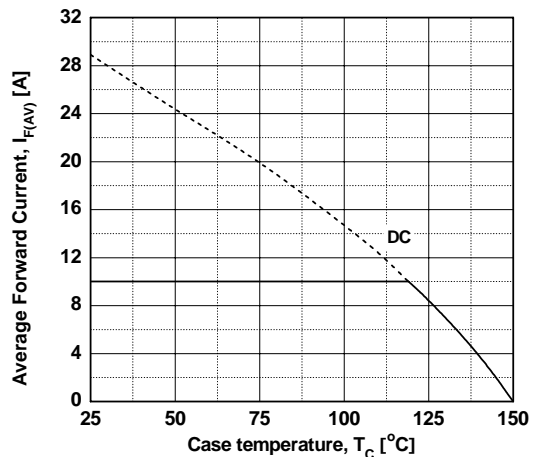
**Figure 4. Typical Reverse Recovery Time vs. di/dt**



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

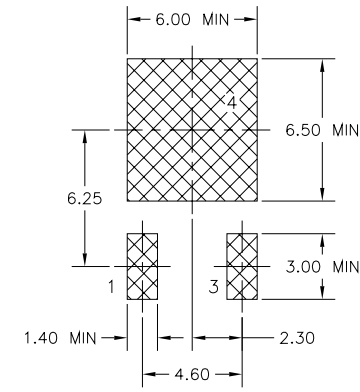
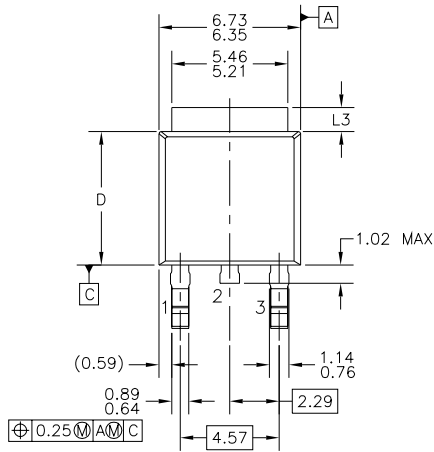


**Figure 6. Forward Current Derating Curve**

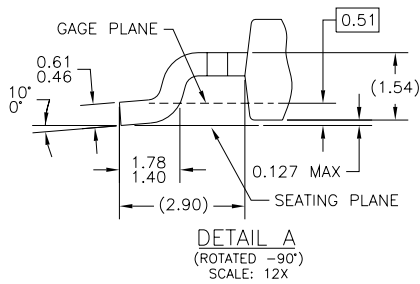
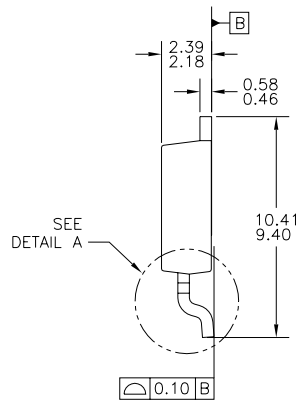
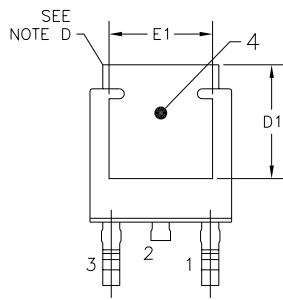


Mechanical Dimensions

D-PAK



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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FACT Quiet Series™	MicroPak™	RapidConfigure™	TinyPower™
FACT®	Motion-SPM™	SMART START™	TinyPWM™
FAST®	OPTOLOGIC®	SPM®	TinyWire™
FastvCore™	OPTOPLANAR®	STEALTH™	µSerDes™
FPST™	PDP-SPM™	SuperFET™	UHC®
FRFET®	Power220®	SuperSOT™-3	UniFET™
Global Power Resource <sup>SM</sup>	Power247®	SuperSOT™-6	VCX™
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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.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

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