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# FFD20UP20S

## Features

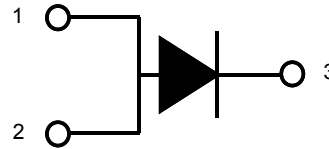
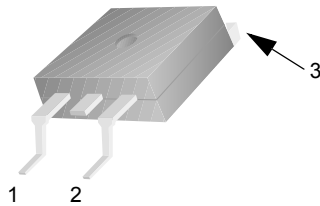
- Ultrafast Recovery,  $T_{rr} = 45 \text{ ns}$  (@  $I_F = 20 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.15 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Reverse Voltage,  $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

## 20 A, 200 V, Ultrafast Diode

The FFD20UP20S 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



1, 2 ANODE 3. CATHODE (FLANGE)

## 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 @ $T_C = 123^\circ\text{C}$	20	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	200	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	1.9	$^\circ\text{C/W}$

## Package Marking and Ordering Information

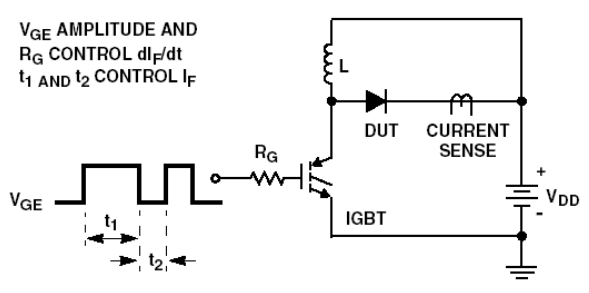
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F20UP20S	FFD20UP20S	D-PAK	13" Dia	-	2500

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

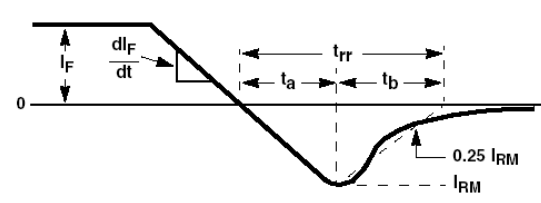
Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_F^*$	Maximum Instantaneous Forward Voltage $I_F = 20\text{ A}$	-	0.94	1.15	V
	$T_C = 25^\circ\text{C}$	-	0.84	1.05	
	$T_C = 100^\circ\text{C}$	-	1.00	-	
$I_R^*$	Maximum Instantaneous Reverse Current @ rated $V_R$	$T_C = 25^\circ\text{C}$	-	100	$\mu\text{A}$
		$T_C = 100^\circ\text{C}$	-	500	
$t_{rr}$	Reverse Recovery Time ( $I_F = 20\text{ A}$ , $di/dt = 200\text{ A}/\mu\text{s}$ )	-	22	45	ns
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	20	-	-	mJ

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

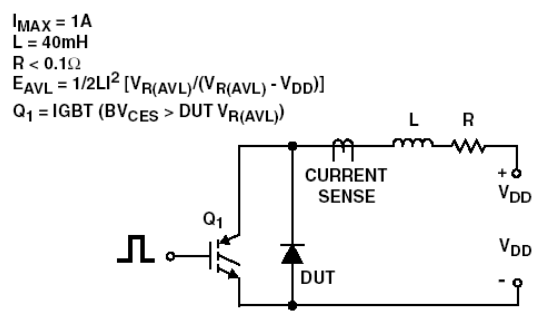
**\* Test Circuit and Waveforms**



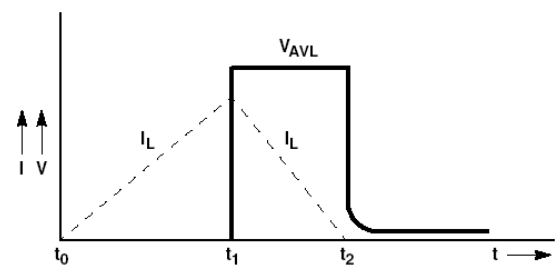
$t_{rr}$  TEST CIRCUIT



$t_{rr}$  WAVEFORMS AND DEFINITIONS



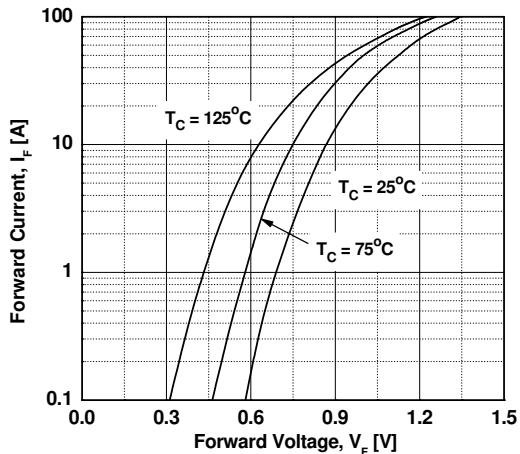
AVALANCHE ENERGY TEST CIRCUIT



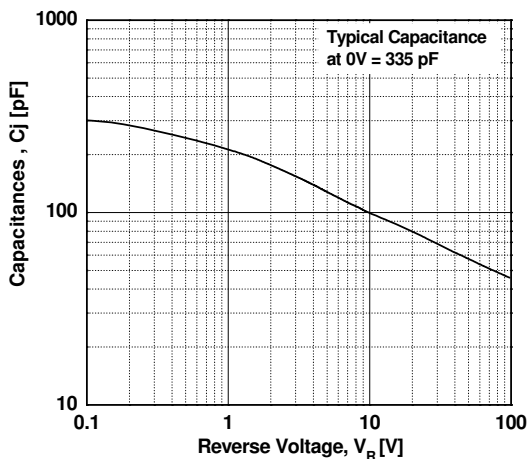
AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

## Typical Performance Characteristics

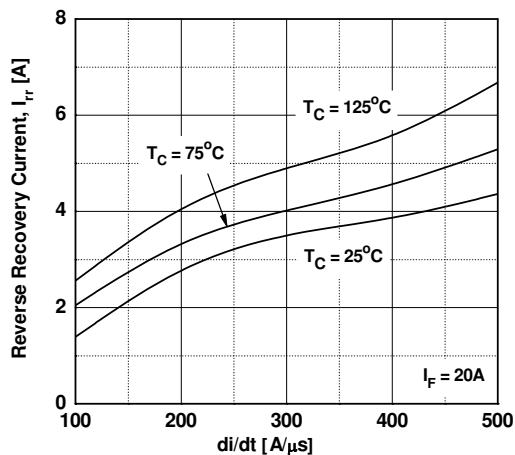
**Figure 1. Typical Forward Voltage Drop vs. Forward Current**



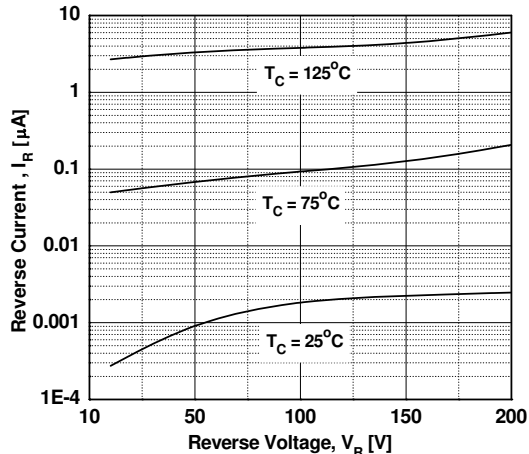
**Figure 3. Typical Junction Capacitance**



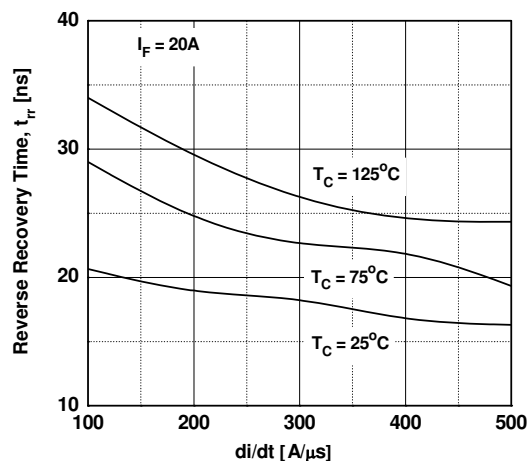
**Figure 5. Typical Reverse Recovery Current vs. di/dt**



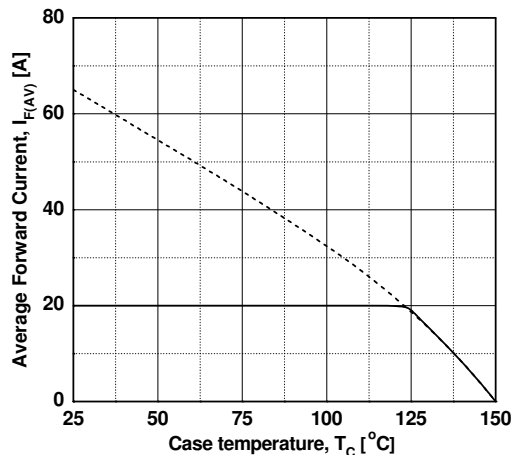
**Figure 2. Typical Reverse Current vs. Reverse Voltage**



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

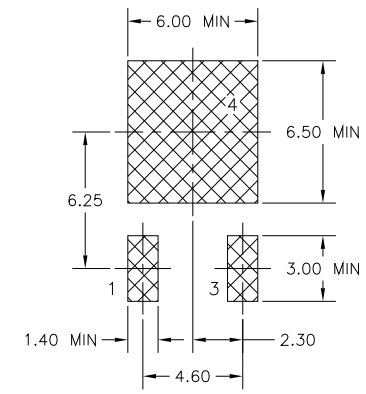
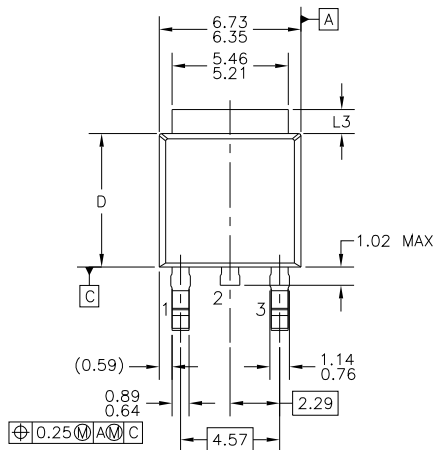


**Figure 6. Forward Current Derating Curve**

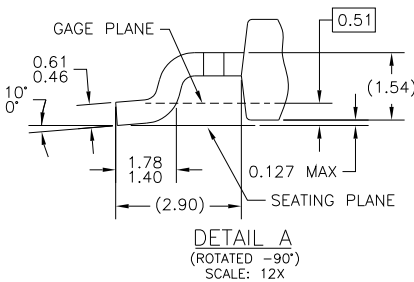
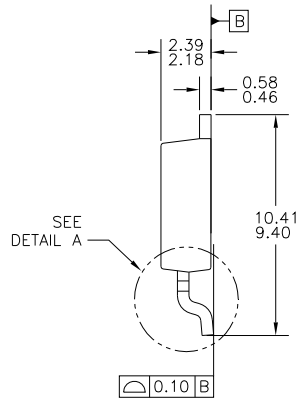
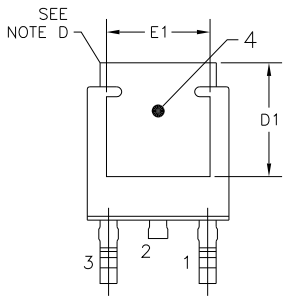


## Mechanical Dimensions

### 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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| AccuPower™  | F-PFS™   | PowerTrench®  |  |
| AX-CAP®*  | FRFET®   | PowerXS™  | TinyBoost™  |
| BitSiC™   | Global Power Resource™                         | Programmable Active Droop™  | TinyBuck™   |
| Build it Now™   | GreenBridge™                                   | QFET®   | TinyCalc™   |
| CorePLUS™   | Green FPS™                                     | QS™   | TinyLogic®  |
| CorePOWER™  | Green FPS™ e-Series™                           | Quiet Series™   | TINYOPTO™   |
| CROSSVOLT™  | Gmax™  | RapidConfigure™   | TinyPower™  |
| CTL™  | GTO™   |  | TinyPWM™  |
| Current Transfer Logic™   | IntelliMAX™                                    | Saving our world, 1mW/W/kW at a time™   | TinyWire™   |
| DEUXPEED®   | ISOPLANAR™                                     | SignalWise™   | TranSiC™  |
| Dual Cool™  | Making Small Speakers Sound Louder and Better™ | SmartMax™   | TriFault Detect™  |
| EcoSPARK®   | MegaBuck™                                      | SMART START™  | TRUECURRENT®*   |
| EfficientMax™   | MICROCOUPLER™                                  | Solutions for Your Success™   | µSerDes™  |
| ESBC™   | MicroFET™                                      | SPM®  |  |
|  | MicroPak™                                      | STEALTH™  | UHC®  |
| Fairchild®  | MillerDrive™                                   | SuperFET®   | Ultra FRFET™  |
| Fairchild Semiconductor®  | MotionMax™                                     | SuperSOT™-3   | UniFET™   |
| FACT Quiet Series™  | mWSaver™                                       | SuperSOT™-6   | VCX™  |
| FACT®   | OptoHiT™                                       | SuperSOT™-8   | VisualMax™  |
| FAST®   | OPTOLOGIC®                                     | SupreMOS®   | VoltagePlus™  |
| FastvCore™  | OPTOPLANAR®                                    | SyncFET™  | XS™   |
| FETBench™   |  |   |   |

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Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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