FAIRCHILD SEMICONDUCTOR®

June 2007

Ultrafast Rectifier

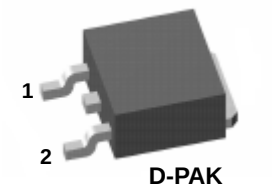
FFD10UP20S

Features

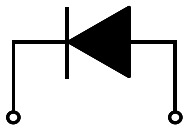
- Ultrafast with soft recovery, trr < 35ns
- Reverse Voltage, 200V
- Forward Voltage < 1.1V @ T_C 100°C
- RoHS compliant

Applications

- Power switching circuits
- Output rectifiers
- Freewheeling diodes
- Switching mode power supply



D-PAK
(TO-252)



1. Cathode 2. Anode

Absolute Maximum Ratings T_C = 25°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°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	°C

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.0	°C/W

Package Marking and Ordering Information

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

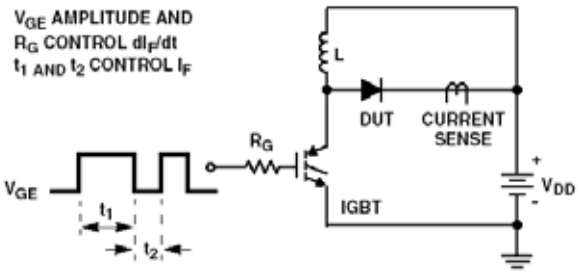
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Electrical Characteristics $T_C = 25^oC$ unless otherwise noted

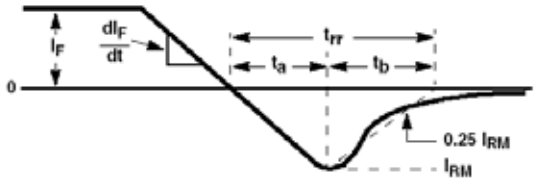
Symbol	Parameter		Min.	Typ.	Max.	Units
V_{FM}*	Maximum Instantaneous Forward Voltage I_F = 10A I_F = 10A	 $T_C = 25^oC$ $T_C = 100^oC$	 - -	 - -	 1.15 1.10	V
I_{RM}*	Maximum Instantaneous Reverse Current @ rated V_R	$T_C = 25^oC$ $T_C = 100^oC$	- -	- -	100 500	μA
t_{rr} I_{rr} Q_{rr}	Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge (I_F = 10A, di/dt = 200A/μs)		- - -	20.8 2.8 28.5	- - -	ns A nC
t_{rr}	Maximum Reverse Recovery Time (I_F = 1A, di/dt = 100A/μs)		-	-	35	ns
W_{AVL}	Avalanche Energy (L = 40mH)		10	-	-	mJ

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

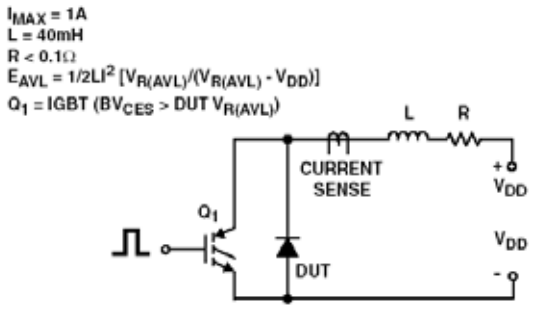
Test Circuit and Waveforms



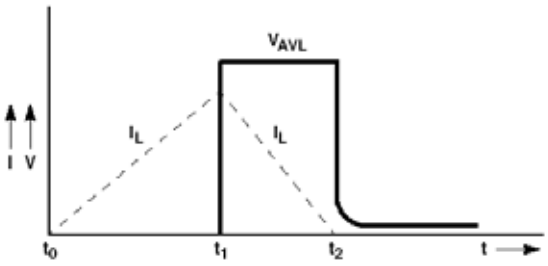
t_{rr} TEST CIRCUIT



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

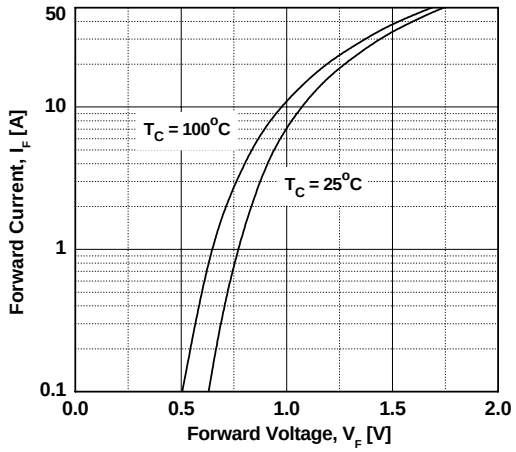


Figure 2. Typical Reverse Current vs. Reverse Voltage

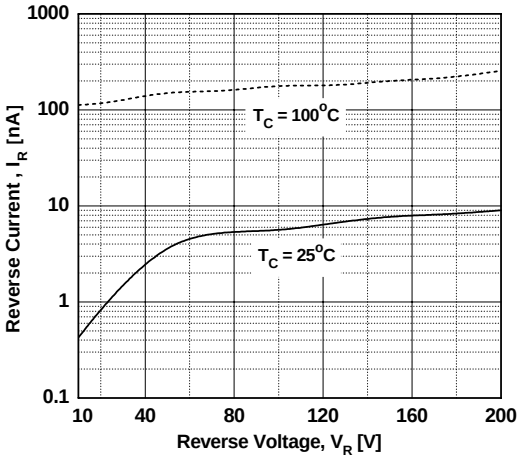


Figure 3. Typical Junction Capacitance

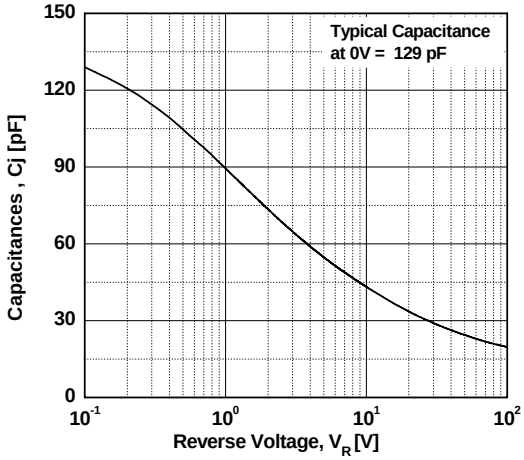


Figure 4. Typical Reverse Recovery Time vs. di/dt

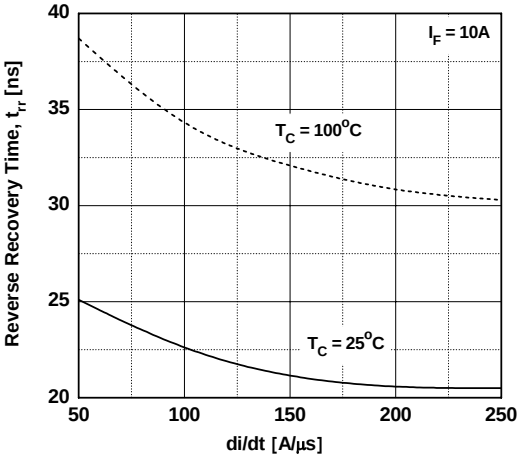


Figure 5. Typical Reverse Recovery Current vs. di/dt

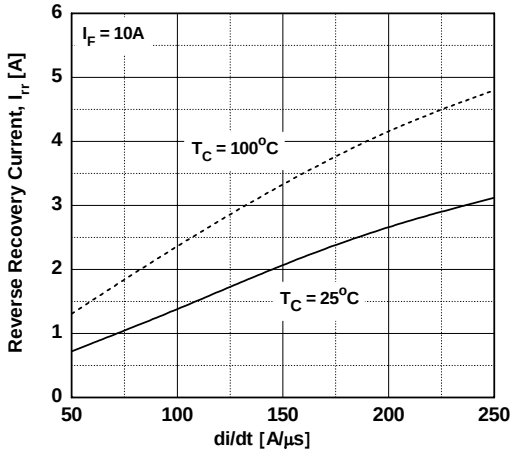
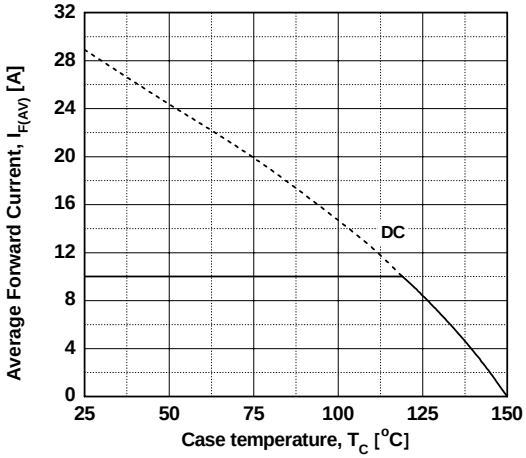
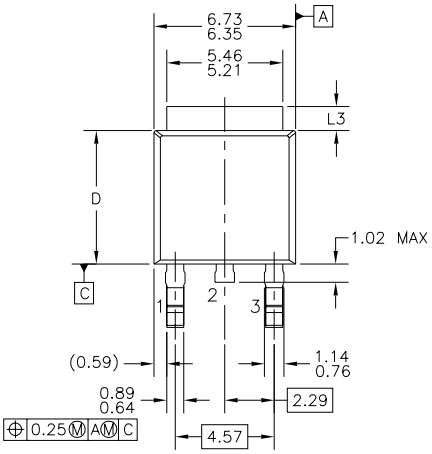


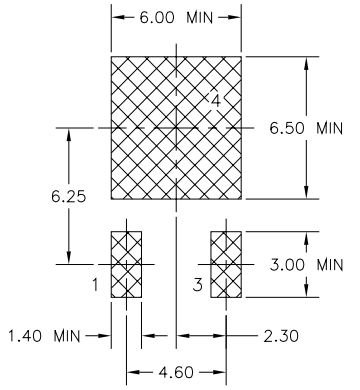
Figure 6. Forward Current Derating Curve



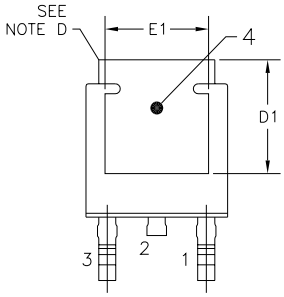
Mechanical Dimensions

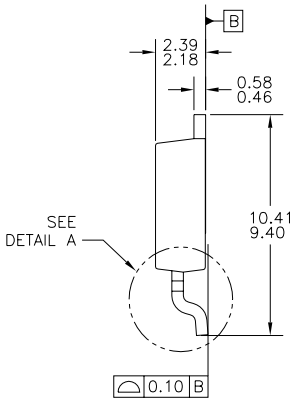
D-PAK

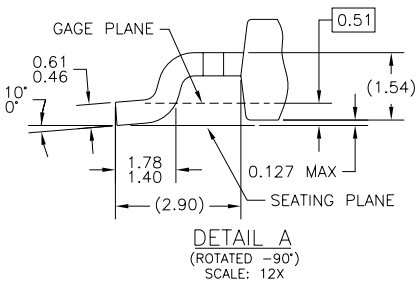




LAND PATTERN RECOMMENDATION







DETAIL A
(ROTATED −90°)
SCALE: 12X

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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CorePLUS™	*i-Lo*™	Programmable Active Droop™	™
CROSSVOLT™	IntelliMAX™	QFET®	TinyBoost™
CTL™	ISOPLANAR™	QS™	TinyBuck™
Current Transfer Logic™	MegaBuck™	QT Optoelectronics™	TinyLogic®
EcoSPARK®	MICROCOUPLER™	Quiet Series™	TINYOPTO™
FACT Quiet Series™	MicroPak™	RapidConfigure™	TinyPower™
FACT®	Motion-SPM™	SMART START™	TinyPWM™
FAST®	OPTOLOGIC®	SPM®	TinyWire™
FastvCore™	OPTOPLANAR®	STEALTH™	µSerDes™
FPS™	PDP-SPM™	SuperFET™	UHC®
FRFET®	Power220®	SuperSOT™-3	UniFET™
Global Power Resourse^{SM}	Power247®	SuperSOT™-6	VCX™
Green FPS™	POEWEREDGE®	SuperSOT™-8	

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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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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