FAIRCHILD SEMICONDUCTOR®

February 2009

FFD04H60S

4 A, 600 V, Hyperfast II Diode

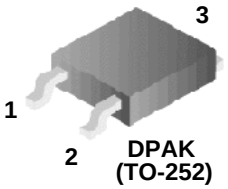
The FFD04H60S is a hyperfast II diode and silicon nitride passivated ion-implanted epitaxial planar construction. This device is intended for use as freewheeling/clamping diodes in a variety of switching power supplies and other power switching applications. Its low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Features

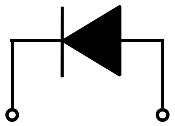
- Hyperfast Recovery, t_{rr} = 60 ns (@ I_F = 4 A)
- Max Forward Voltage, V_F = 2.1 V (@ T_C = 25°C)
- 600V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

- General Purpose
- Switching Mode Power Supply
- Free-Wheeling Diode for Motor Application
- Power Switching Circuits



DPAK
(TO-252)



1,3 Cathode 2. Anode

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{RRM}	Peak Repetitive Reverse Voltage	600	V
V_{RWM}	Working Peak Reverse Voltage	600	V
V_R	DC Blocking Voltage	600	V
$I_{F(AV)}$	Average Rectified Forward Current @ T_C = 130°C	4	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	40	A
T_J, T_{STG}	Operating and Storage Temperature Range	-65 to +150	°C

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	4.0	°C/W

Package Marking and Ordering Information

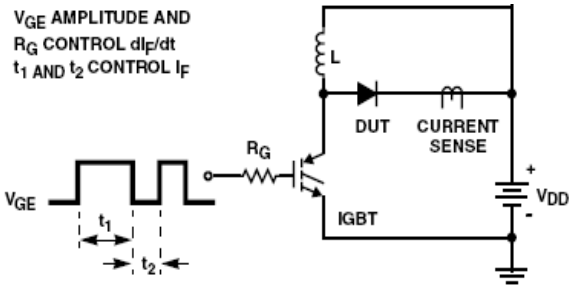
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F04H60S	FFD04H60S	D-PAK	13”Dia	-	2500

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

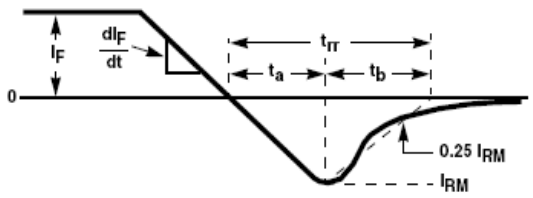
Symbol	Parameter		Min.	Typ.	Max.	Unit
V_F1	I_F = 4 A I_F = 4 A	$T_C = 25^oC$ $T_C = 125^oC$	- -	- -	2.1 1.7	V
I_R1	V_R = 600 V V_R = 600 V	$T_C = 25^oC$ $T_C = 125^oC$	- -	- -	100 200	μA
T_{rr}	I_F = 1 A, di/dt = 100 A/μs, V_{CC} = 30 V I_F = 4 A, di/dt = 100 A/μs, V_{CC} = 390 V	$T_C = 25^oC$ $T_C = 25^oC$	- -	19 25	- 60	ns
I_{rr} Q_{rr}	I_F = 4 A, di/dt = 100 A/μs, V_{CC} = 390 V	$T_C = 25^oC$	- -	1.5 18	- -	A nC
W_{AVL}	Avalanche Energy (L = 40 mH)		4	-	-	mJ

Notes:
1: Pulse: Test Pulse width = 300 μs, Duty Cycle = 2%

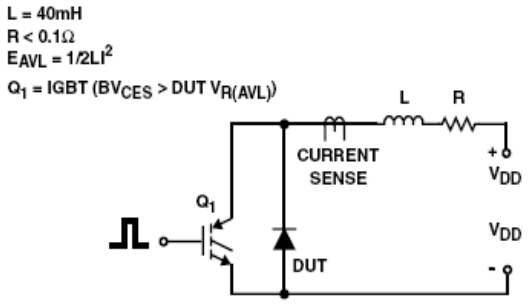
Test Circuit and Waveforms



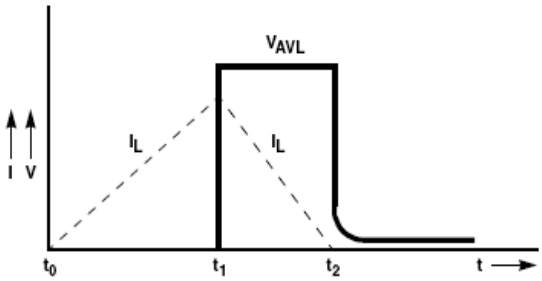
t_{rr} TEST CIRCUIT



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

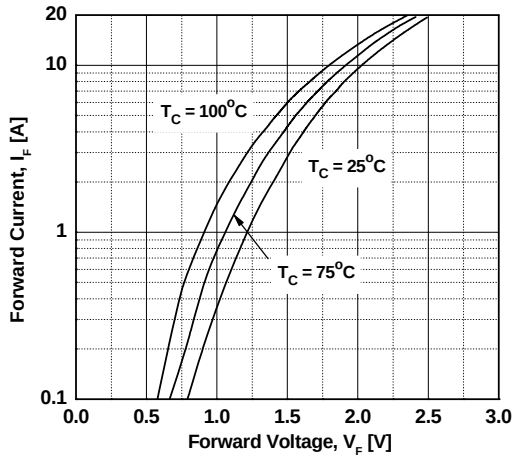


Figure 2. Typical Reverse Current vs. Reverse Voltage

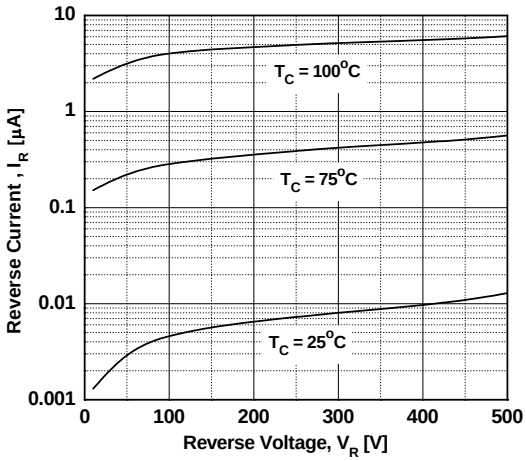


Figure 3.Typical Junction Capacitance

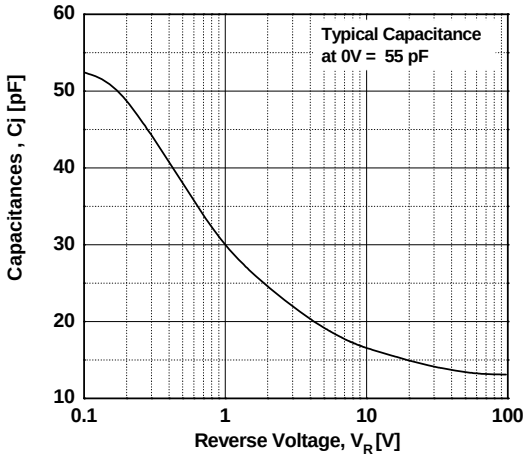


Figure 4. Typical Reverse Recovery Time vs. di/dt

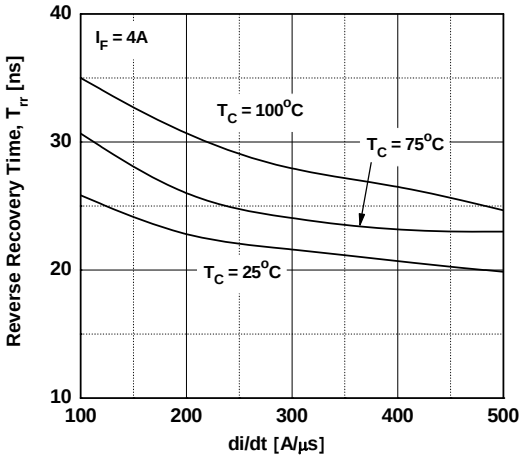


Figure 5. Typical Reverse Recovery Current vs. di/dt

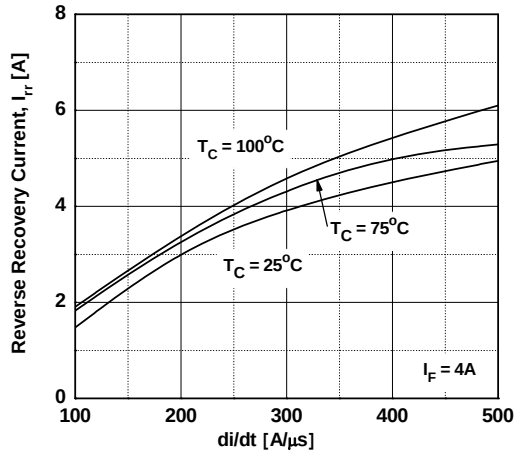
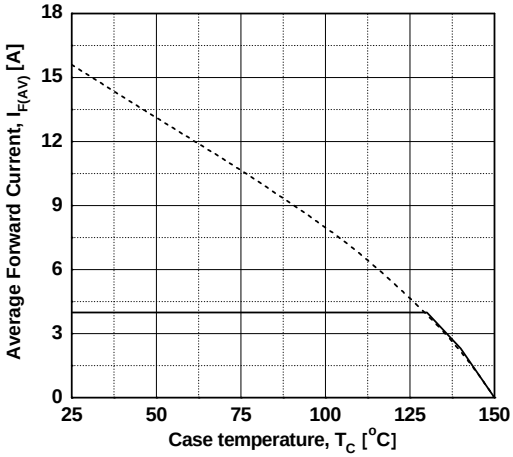
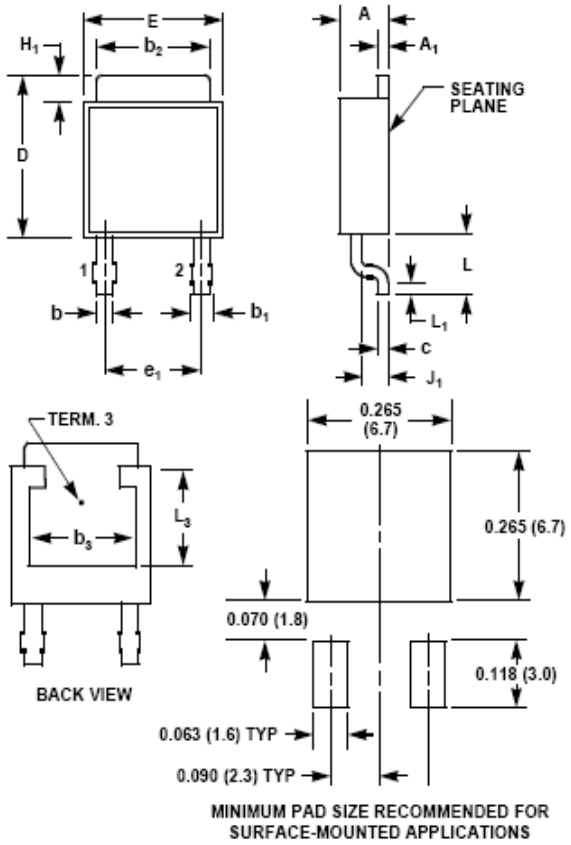


Figure 6. Forward Current Derating Curve



Mechanical Dimensions

D-PAK



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.19	2.38	-
A_1	0.018	0.022	0.46	0.55	3, 4
b	0.028	0.032	0.72	0.81	3, 4
b_1	0.033	0.040	0.84	1.01	3
b_2	0.205	0.215	5.21	5.46	3, 4
b_3	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_1	0.180 BSC		4.57 BSC		6
H_1	0.035	0.045	0.89	1.14	-
J_1	0.040	0.045	1.02	1.14	-
L	0.100	0.115	2.54	2.92	-
L_1	0.020	-	0.51	-	3, 5
L_3	0.170	-	4.32	-	2

NOTES:

1. No current JEDEC outline for this package.
2. L_3 and b_3 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_1 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.

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