



February 2009



FFD04H60S Hyperfast II Rectifier

## FFD04H60S

### Hyperfast II Rectifier

#### Features

- High Speed Switching,  $t_{rr} < 50\text{ns}$
- High Reverse Voltage and High Reliability
- High Reverse Voltage,  $V_F < 2.1\text{V}$  @ 4A
- RoHS Compliant

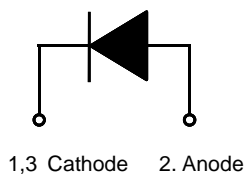
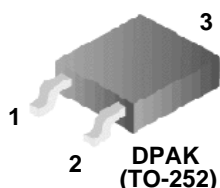
#### Applications

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

#### 4A, 600V Hyperfast II Rectifier

The FFD04H60S is a hyperfast II rectifier and silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as freewheeling/clamping rectifiers 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.



#### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{RRM}$	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 @ $T_C = 130^\circ\text{C}$	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	$^\circ\text{C}$

#### Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	4.0	$^\circ\text{C}/\text{W}$

#### Package Marking and Ordering Information

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

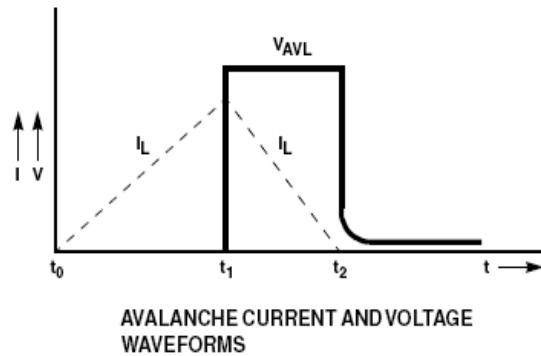
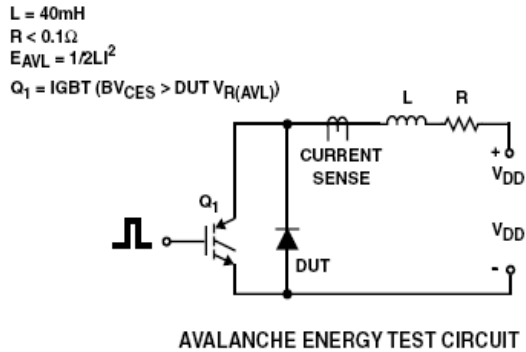
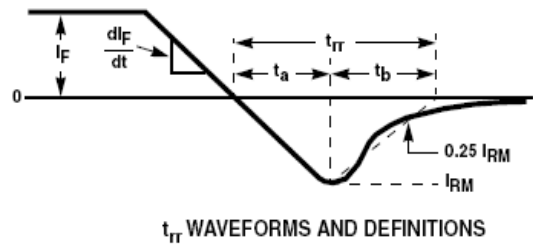
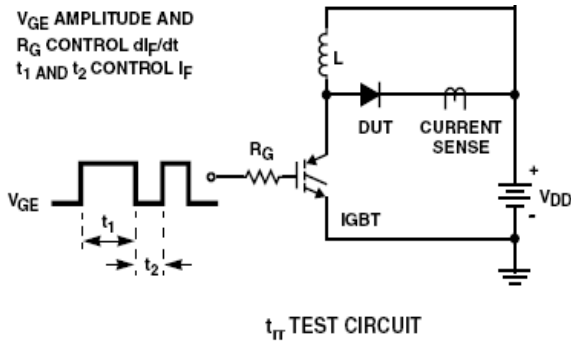
**Electrical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM1}$	$I_F = 4\text{A}$ $I_F = 4\text{A}$	-	-	2.1 1.7	V
$I_{RM1}$	$V_R = 600\text{V}$ $V_R = 600\text{V}$	-	-	100 200	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{CC} = 30\text{V}$ $I_F = 4\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{CC} = 390\text{V}$	-	19 25	- 60	ns
$I_{rr}$ $Q_{rr}$	$I_F = 4\text{A}, di/dt = 100\text{A}/\mu\text{s}, V_{CC} = 390\text{V}$	-	1.5 18	-	A nC
$W_{AVL}$	Avalanche Energy ( $L = 40\text{mH}$ )	4	-	-	mJ

**Notes:**

1: 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

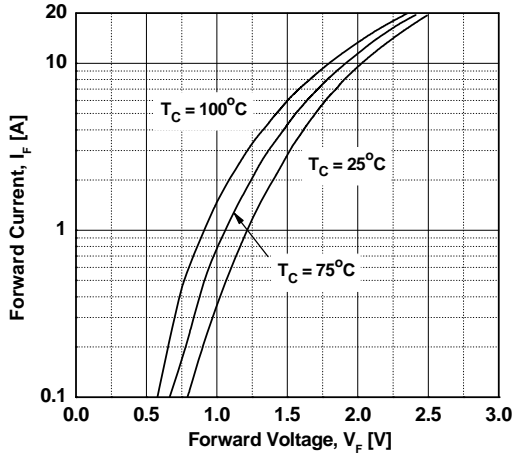


Figure 3. Typical Junction Capacitance

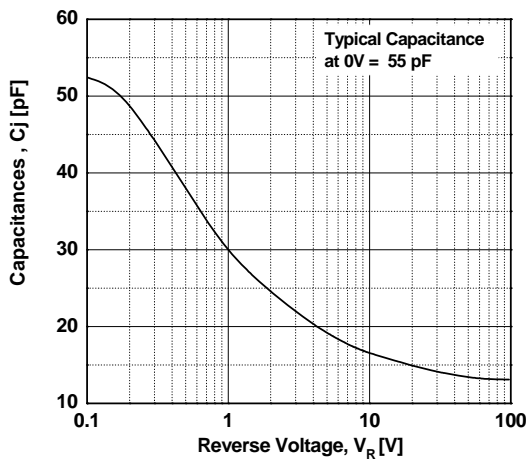


Figure 5. Typical Reverse Recovery Current vs. di/dt

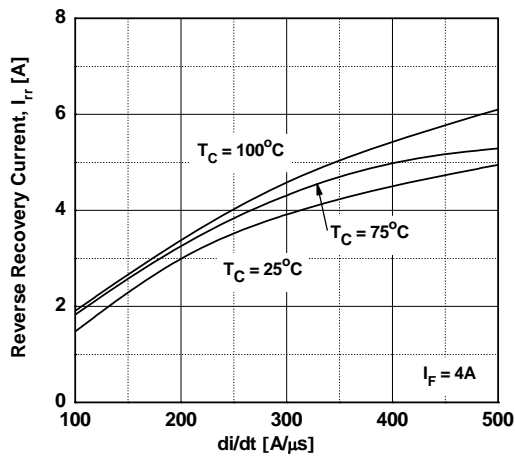


Figure 2. Typical Reverse Current vs. Reverse Voltage

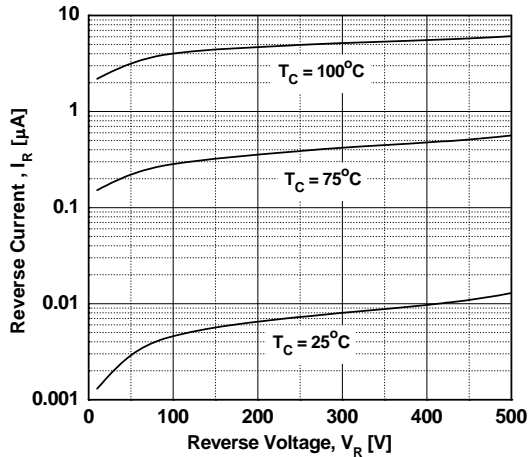


Figure 4. Typical Reverse Recovery Time vs. di/dt

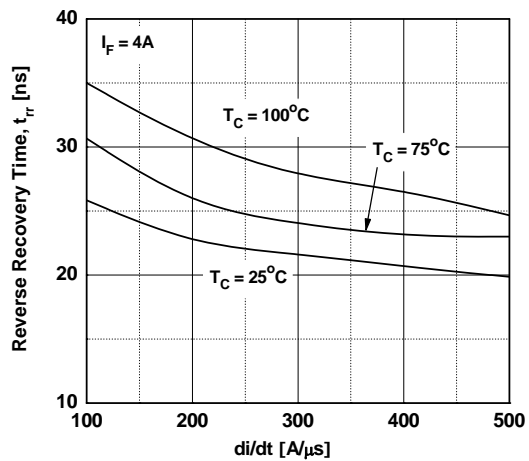
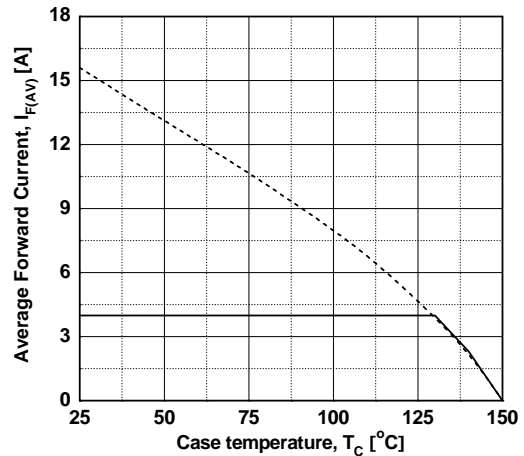
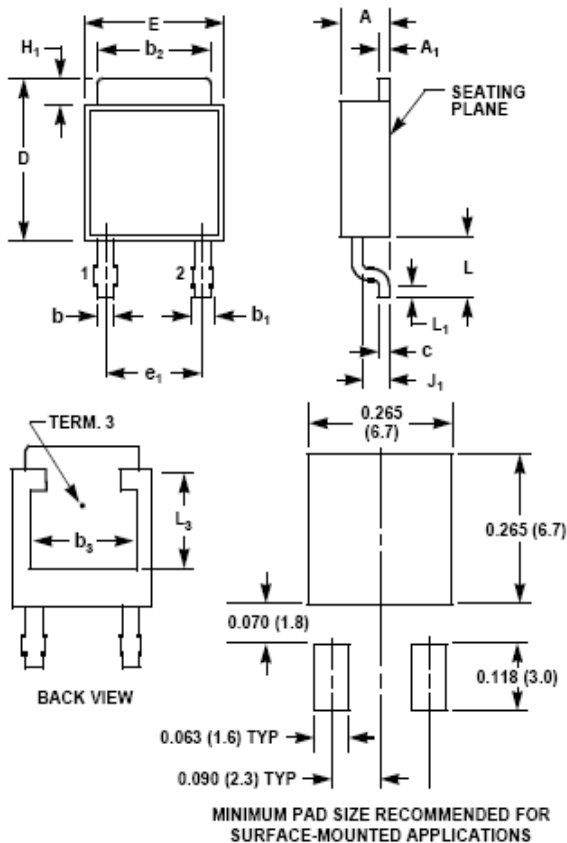


Figure 6. Forward Current Derating Curve



### Mechanical Dimensions

### D-PAK



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.086	0.094	2.19	2.38	-
A <sub>1</sub>	0.018	0.022	0.46	0.55	3, 4
b	0.028	0.032	0.72	0.81	3, 4
b <sub>1</sub>	0.033	0.040	0.84	1.01	3
b <sub>2</sub>	0.205	0.215	5.21	5.46	3, 4
b <sub>3</sub>	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 <sub>1</sub>	0.180 BSC		4.57 BSC		6
H <sub>1</sub>	0.035	0.045	0.89	1.14	-
J <sub>1</sub>	0.040	0.045	1.02	1.14	-
L	0.100	0.115	2.54	2.92	-
L <sub>1</sub>	0.020	-	0.51	-	3, 5
L <sub>3</sub>	0.170	-	4.32	-	2

NOTES:

1. No current JEDEC outline for this package.
2. L<sub>3</sub> and b<sub>3</sub> 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<sub>1</sub> 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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