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November 2014



FFD04H60S — Hyperfast II Diode

FFD04H60S

Hyperfast II Diode

Features

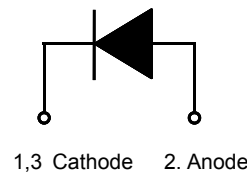
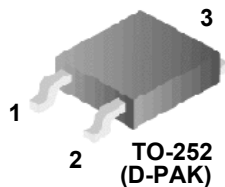
- Hyperfast Recovery, $t_{rr} = 60 \text{ ns}$ (@ $I_F = 4 \text{ A}$)
- Max Forward Voltage, $V_F = 2.1 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Description

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.

Applications

- General Purpose
- SMPS, Power Switching Circuits
- Free-Wheeling Diode for Motor Application



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

Symbol	Parameter	Ratings	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 @ $T_C = 130^\circ\text{C}$	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 +175	$^\circ\text{C}$

Thermal Characteristics

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

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFD04H60S	F04H60S	TO-252(D-PAK)	Reel	13" Dia	N/A	2500

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{F1}	$I_F = 4\text{ A}$ $I_F = 4\text{ A}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	2.1 1.7	V
I_{R1}	$V_R = 600\text{ V}$ $V_R = 600\text{ V}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	100 200	μA
t_{rr}	$I_F = 1\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ $I_F = 4\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 390\text{ V}$	$T_C = 25^\circ\text{C}$ $T_C = 25^\circ\text{C}$	- -	19 25 60	ns
I_{rr} Q_{rr}	$I_F = 4\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 390\text{ V}$	$T_C = 25^\circ\text{C}$	- -	1.5 18	A nC
W_{AVL}	Avalanche Energy ($L = 40\text{ mH}$)	4	-	-	mJ

Notes:

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

Test Circuit and Waveforms

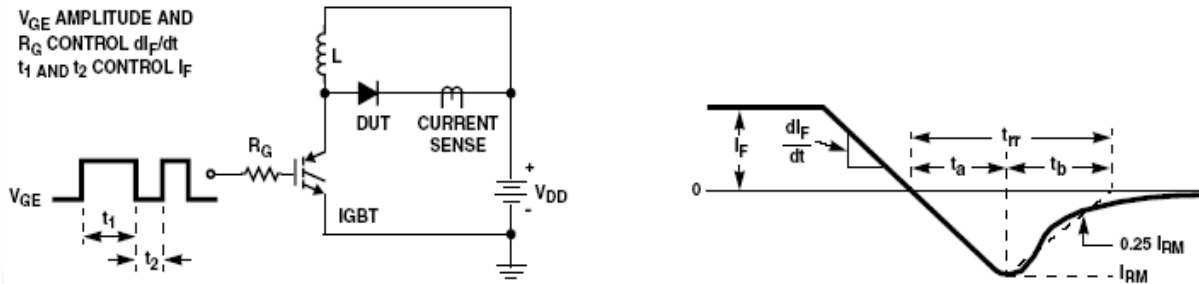


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$
 $R < 0.1\Omega$
 $V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

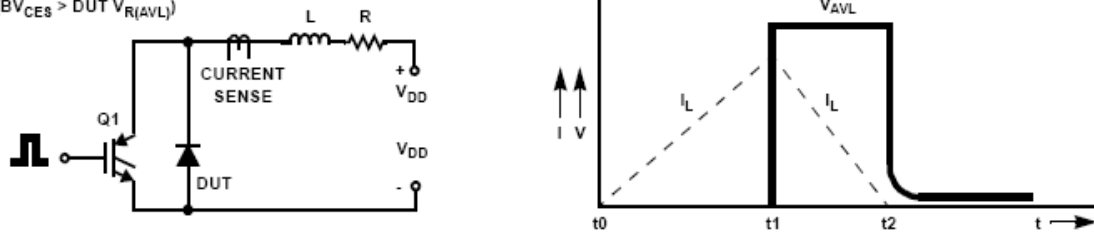


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

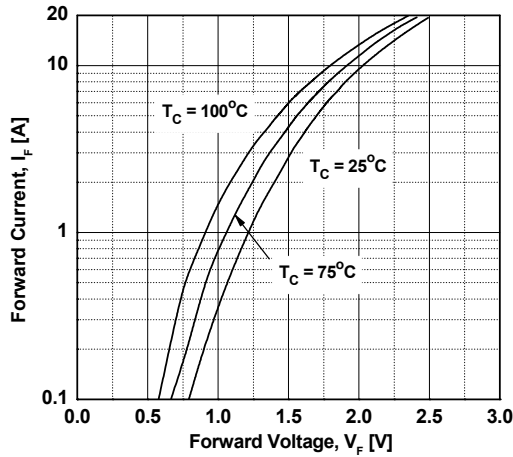


Figure 5. Typical Junction Capacitance

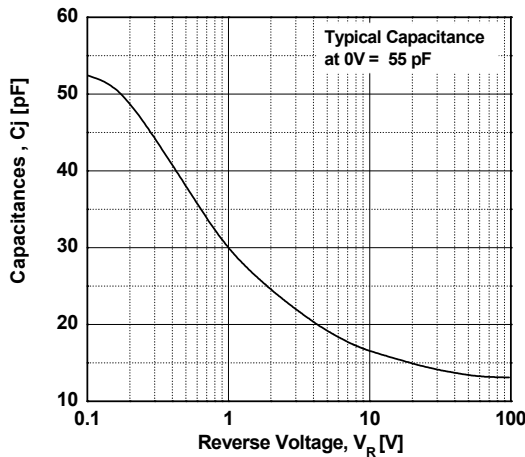


Figure 7. Typical Reverse Recovery Current vs. di/dt

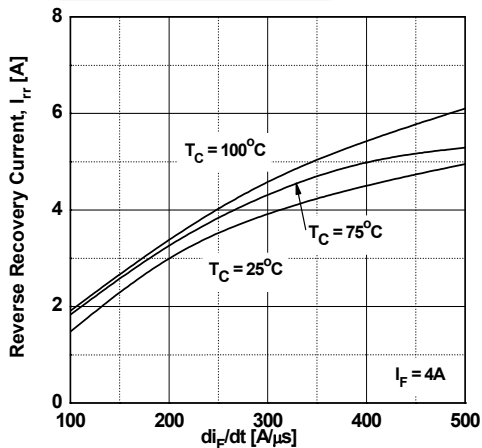


Figure 4. Typical Reverse Current vs. Reverse Voltage

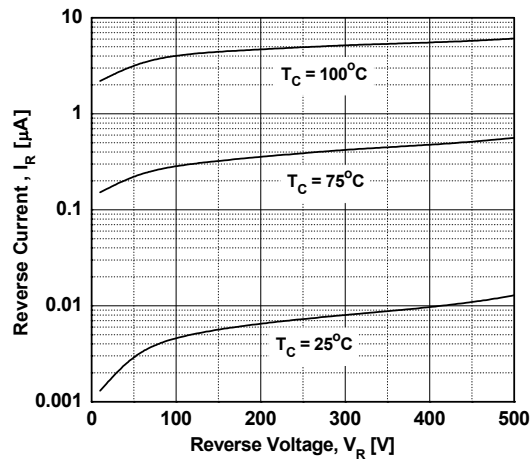


Figure 6. Typical Reverse Recovery Time vs. di/dt

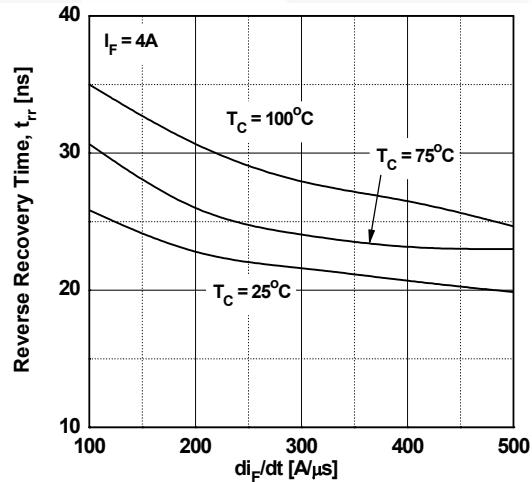
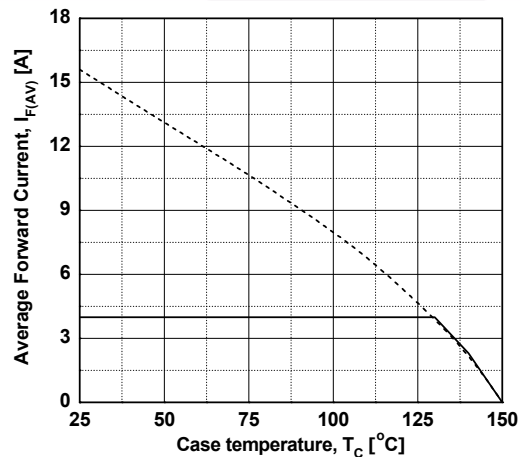


Figure 8. Forward Current Derating Curve



Mechanical Dimensions

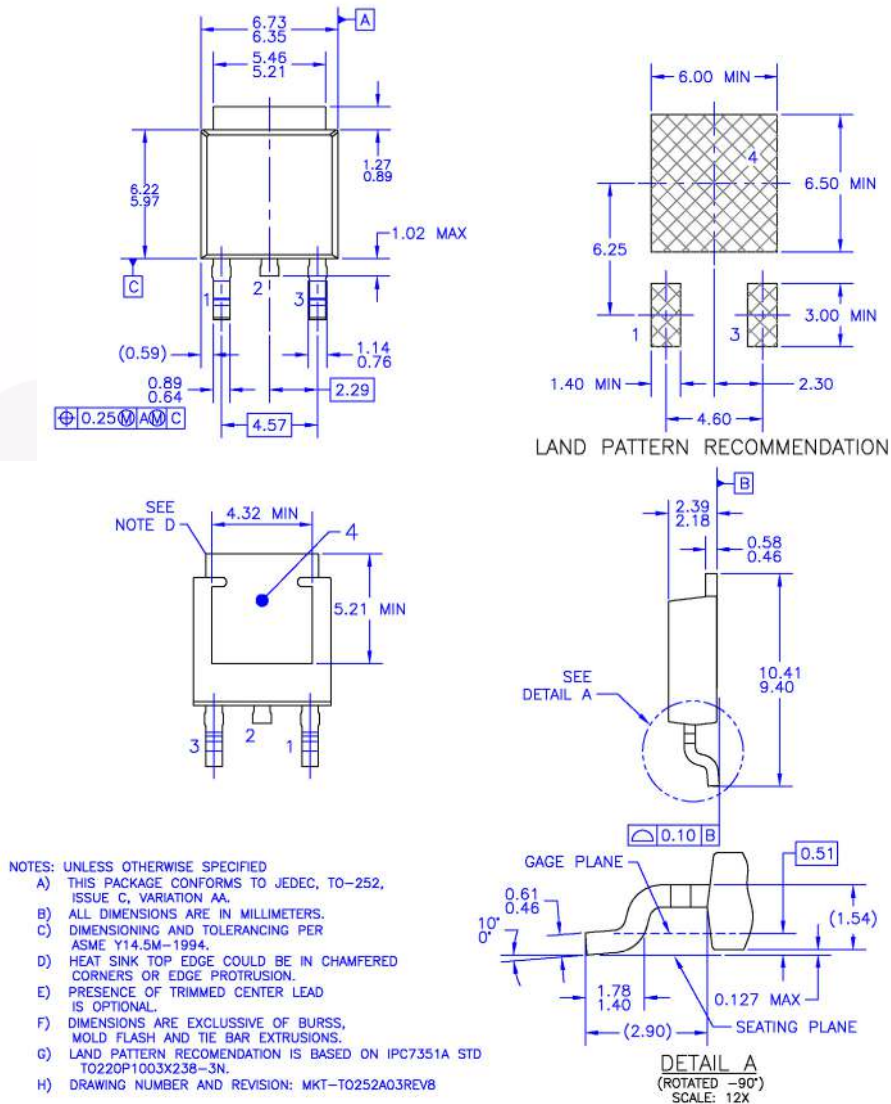


Figure 9. TO-252 3L (DPAK) - TO252 (D-PAK), MOLDED, 3 LEAD, OPTION AA&AB

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