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November 2014

# FFD04H60S

## Hyperfast II Diode

### Features

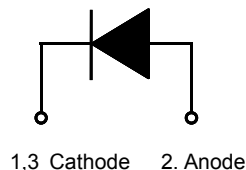
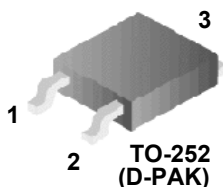
- Hyperfast Recovery,  $t_{rr} = 60$  ns (@  $I_F = 4$  A)
- Max Forward Voltage,  $V_F = 2.1$  V (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

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

### 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.



### 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<br>60Hz Single Half-Sine Wave | 40          | A                |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range                         | -65 to +175 | $^\circ\text{C}$ |

### Thermal Characteristics

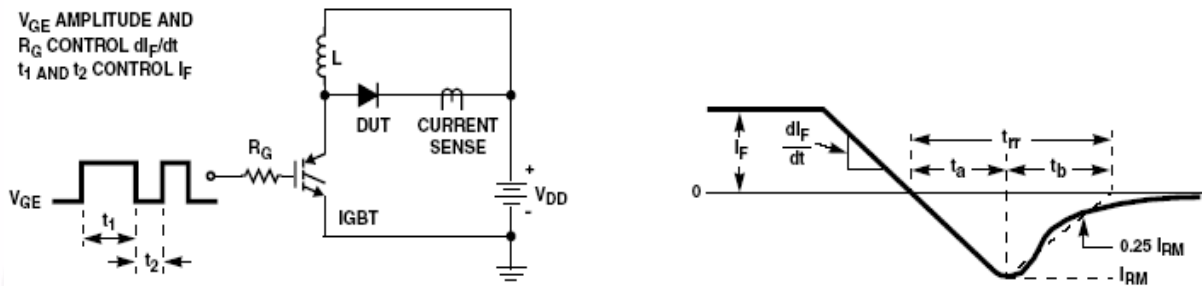
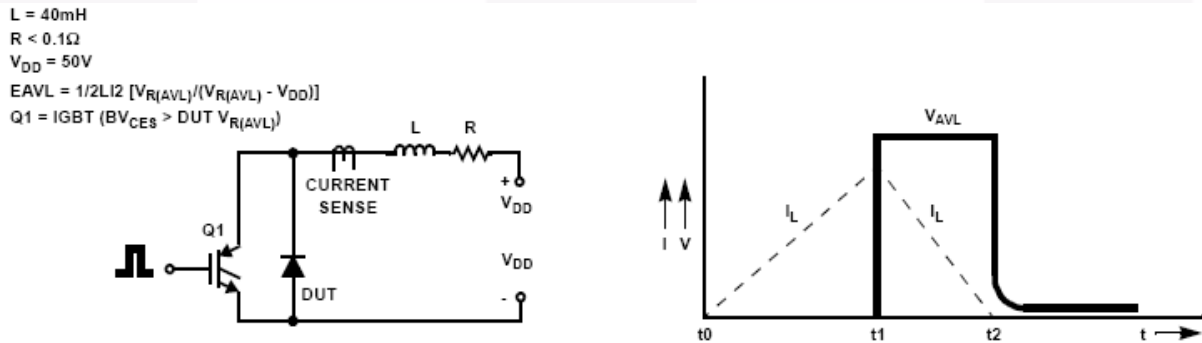
| Symbol          | Parameter                                    | Max. | Unit               |
|-----------------|----------------------------------------------|------|--------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 4.0  | $^\circ\text{C/W}$ |

### 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          |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------|------------|---------------|
| $V_{F1}$             | $I_F = 4\text{ A}$<br>$I_F = 4\text{ A}$                                                                                                                            | $T_C = 25^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$ | -<br>-    | 2.1<br>1.7 | V             |
| $I_{R1}$             | $V_R = 600\text{ V}$<br>$V_R = 600\text{ V}$                                                                                                                        | $T_C = 25^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$ | -<br>-    | 100<br>200 | $\mu\text{A}$ |
| $t_{rr}$             | $I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$<br>$I_F = 4\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 390\text{ V}$ | $T_C = 25^\circ\text{C}$<br>$T_C = 25^\circ\text{C}$  | 19<br>25  | -<br>60    | ns            |
| $I_{rr}$<br>$Q_{rr}$ | $I_F = 4\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 390\text{ V}$                                                                                    | $T_C = 25^\circ\text{C}$                              | 1.5<br>18 | -<br>-     | A<br>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****Figure 1. Diode Reverse Recovery Test Circuit & Waveform****Figure 2. Unclamped Inductive Switching Test Circuit & Waveform**

## Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

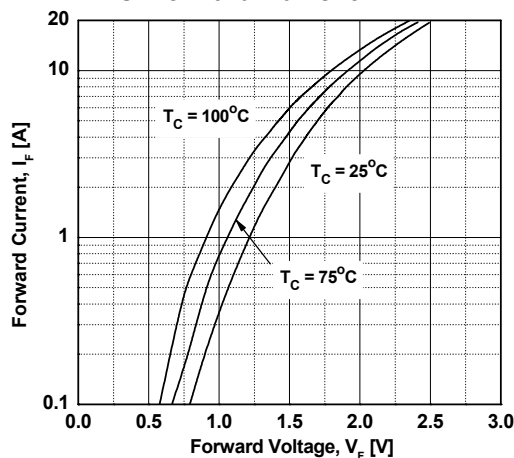


Figure 4. Typical Reverse Current vs. Reverse Voltage

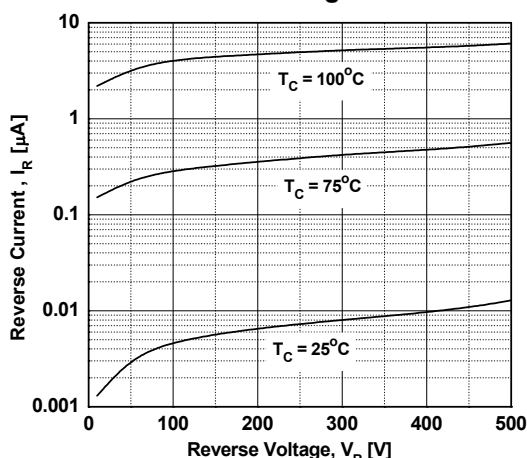


Figure 5. Typical Junction Capacitance

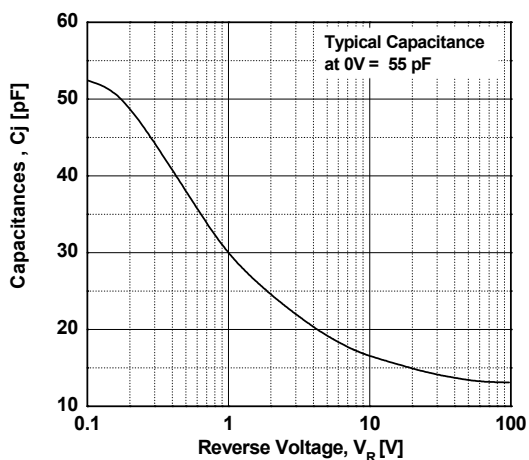


Figure 6. Typical Reverse Recovery Time vs. di/dt

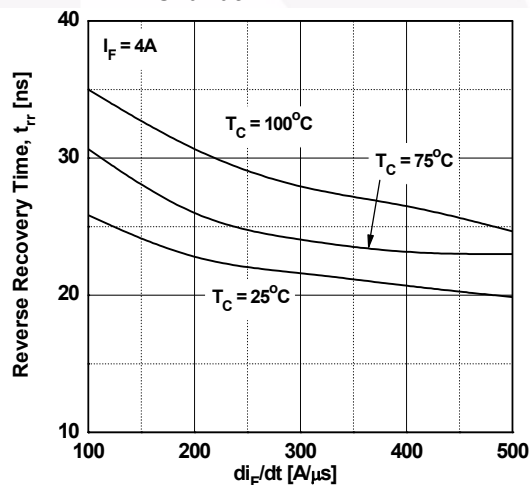


Figure 7. Typical Reverse Recovery Current vs. di/dt

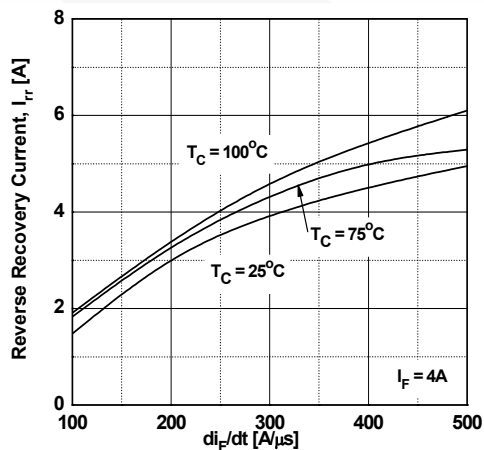
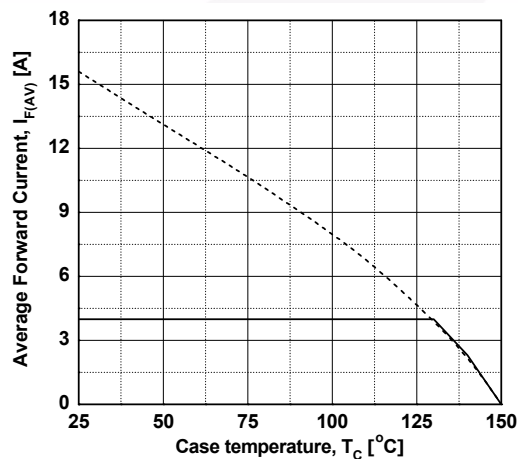
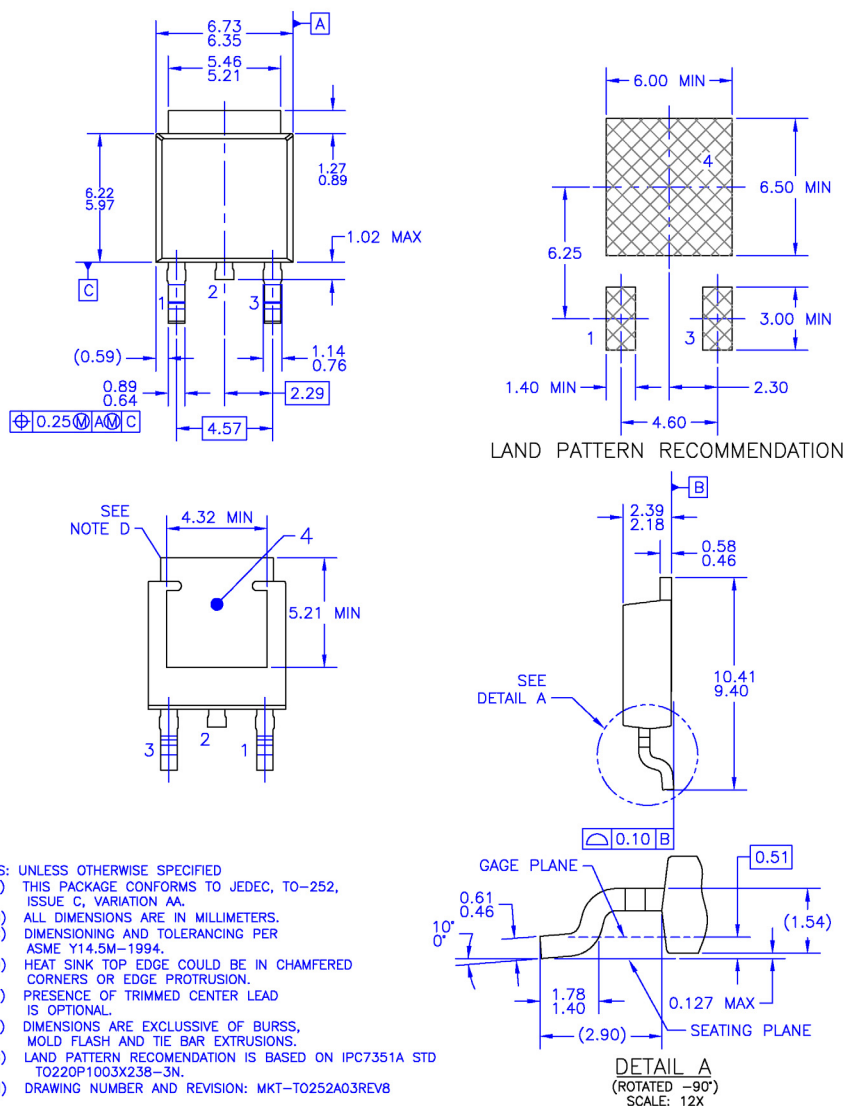


Figure 8. Forward Current Derating Curve



## Mechanical Dimensions



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

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