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ON Semiconductor®

April 2017

FFP30S60S 30 A, 600 V STEALTH™ II Diode

Features

- Stealth Recovery $t_{rr} = 40 \text{ ns}$ (@ $I_F = 30 \text{ A}$)
- Max Forward Voltage, $V_F = 2.6 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

Applications

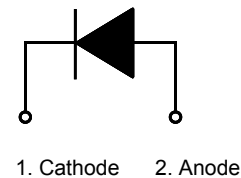
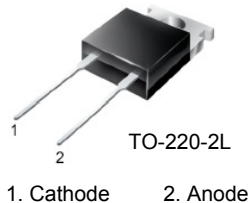
- General Purpose
- SMPS, Power Switching Circuits
- Boost Diode in Continuous Mode Power Factor Corrections

Description

The FFP30S60S is a STEALTH™ II diode with soft recovery characteristics. It is silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as freewheeling of boost diode in switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Pin Assignments



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ 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 @ $T_C = 103^\circ\text{C}$ | 30 | A |
| I_{FSM} | Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave | 300 | 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 | 1.1 | $^\circ\text{C}/\text{W}$ |

Package Marking and Ordering Information

| Part Number | Top Mark | Package | Packing Method | Reel Size | Tape Width | Quantity |
|-------------|----------|-----------|----------------|-----------|------------|----------|
| FFP30S60STU | F30S60S | TO-220-2L | Tube | N/A | N/A | 50 |

FFP30S60S — STEALTH™ II Diode

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

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|--|---|---|------------------|-------------------------|--------------------|
| V_{FM1} | $I_F = 30\text{ A}$ $I_F = 30\text{ A}$ | $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ | - 2.1 1.6 | 2.6 - | V |
| I_{RM1} | $V_R = 600\text{ V}$ $V_R = 600\text{ V}$ | $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ | - - | 100 500 | μA |
| t_{rr} | $I_F = 1\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$ | $T_C = 25^\circ\text{C}$ | - | 25 35 | ns |
| t_{rr} I_{rr} S factor Q_{rr} | $I_F = 30\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 390\text{ V}$ | $T_C = 25^\circ\text{C}$ | - - - - | 28 2.4 0.9 34 | ns A - nC |
| t_{rr} I_{rr} S factor Q_{rr} | $I_F = 30\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 390\text{ V}$ | $T_C = 125^\circ\text{C}$ | - - - - | 75 6.3 0.9 236 | ns A - nC |
| W_{AVL} | Avalanche Energy ($L = 40\text{ mH}$) | 20 | - | - | mJ |

Notes:

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

Test Circuit and Waveforms

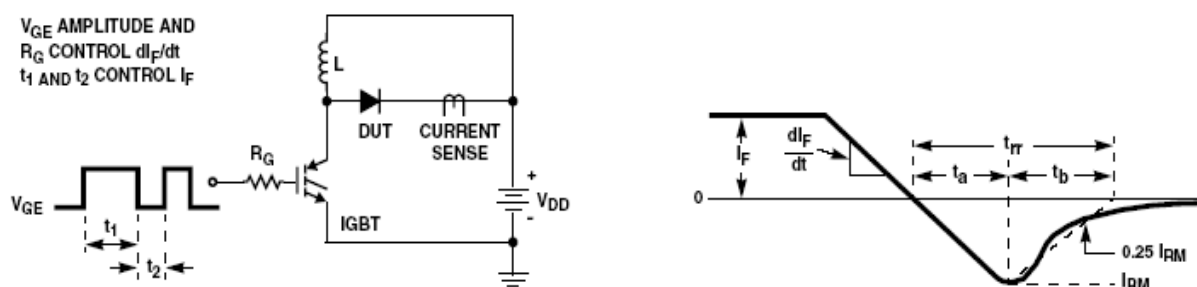


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

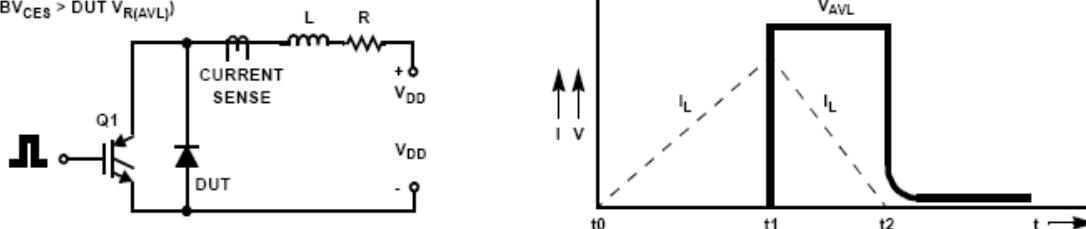


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

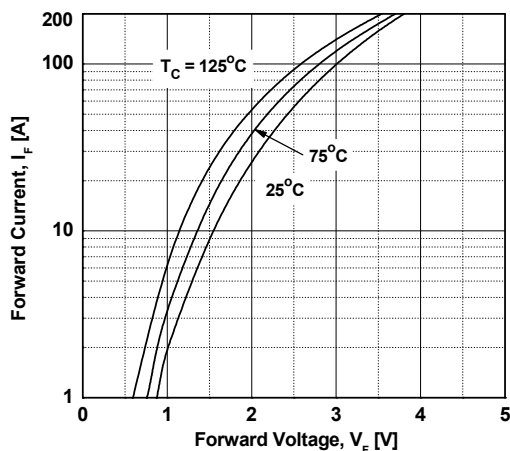


Figure 4. Typical Reverse Current vs. Reverse Voltage

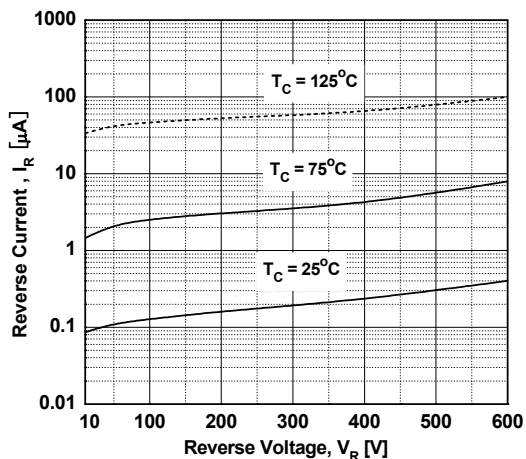


Figure 5. Typical Junction Capacitance

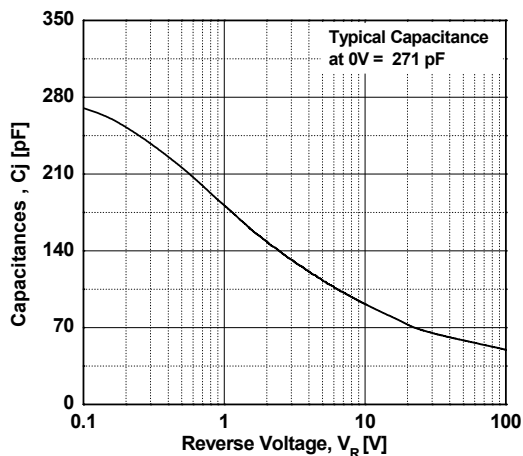


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

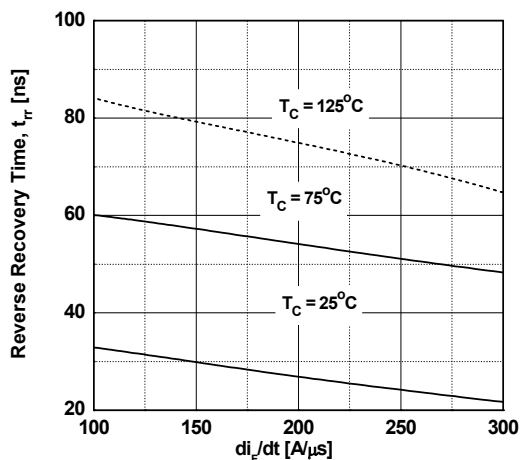


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

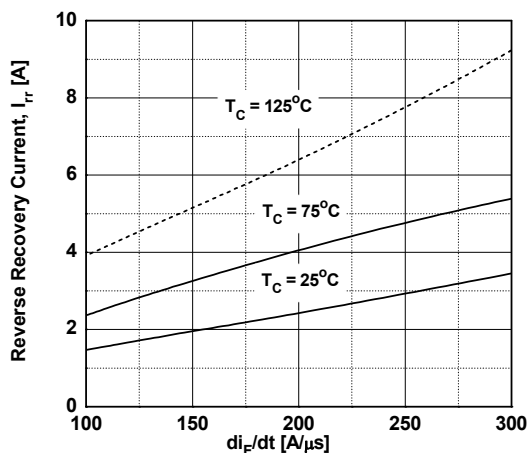
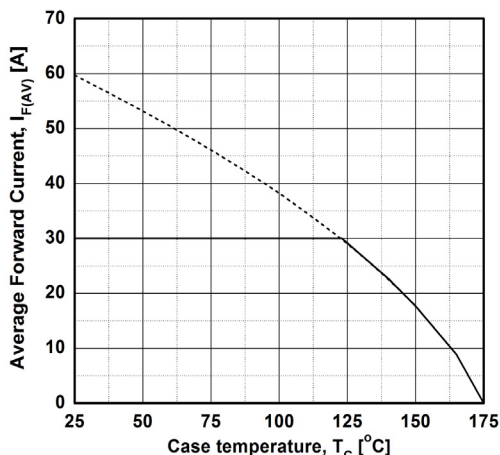
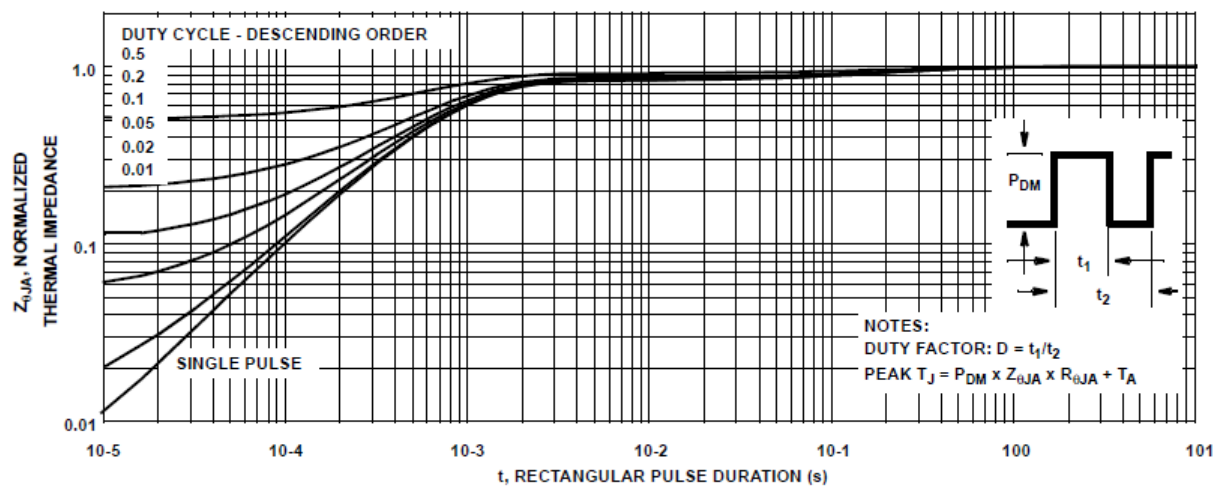


Figure 8. Forward Current Derating Curve



Typical Performance Characteristics

Figure 9. Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions

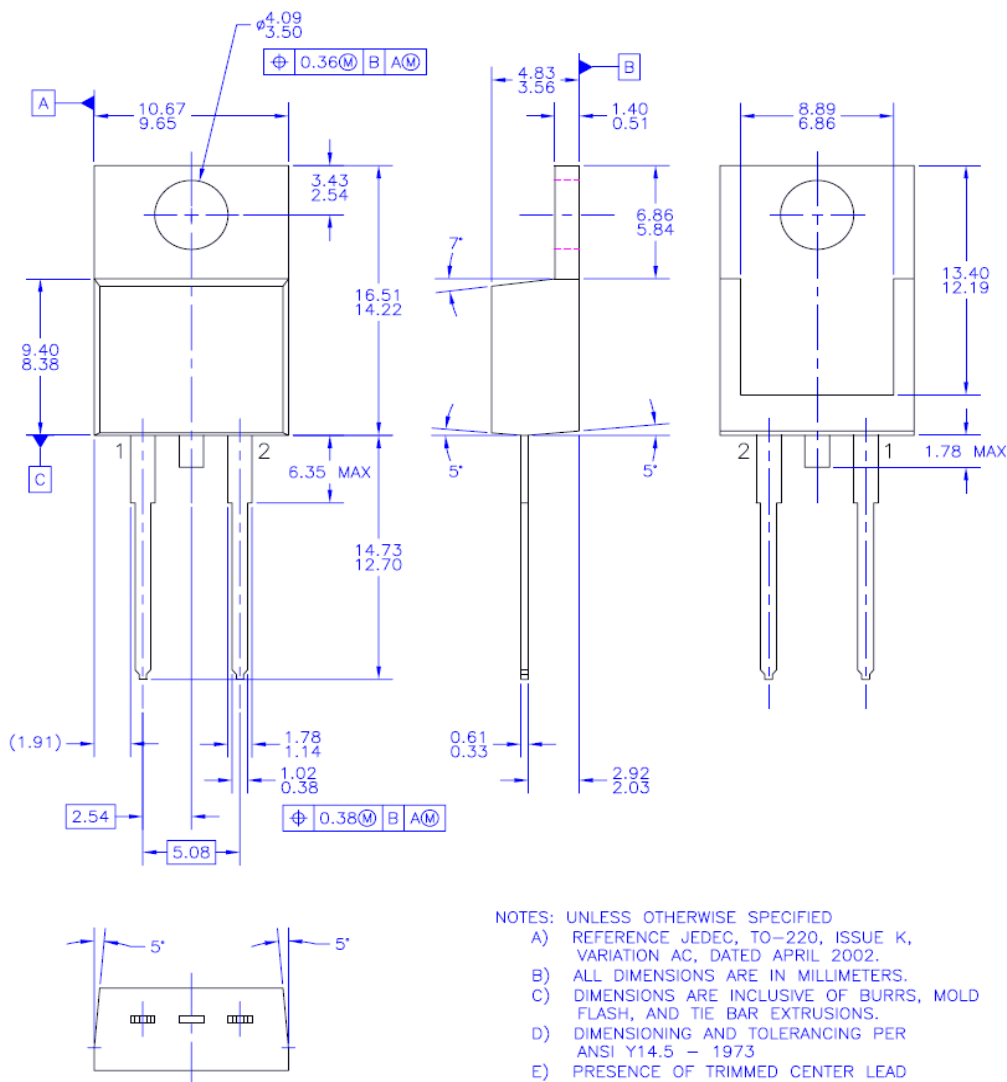


Figure 10. TO-220 2L - 2LD, TO220, JEDEC TO-220 VARIATION AC

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