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ON Semiconductor®

February 2017

# FFPF60SA60DS

## 8 A, 600 V, STEALTH™ Dual Series Diode

### Features

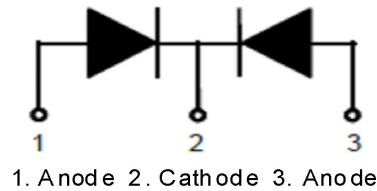
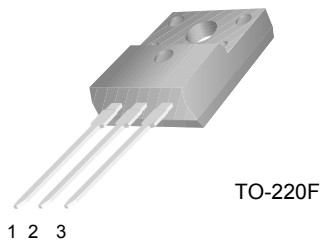
- Stealth Recovery  $t_{rr} = 39 \text{ ns}$  (@  $I_F = 8 \text{ A}$ )
- Max Forward Voltage,  $V_F = 2.4 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- RoHS Compliant

### Applications

- SMPS FWD, Motor Drive FWD, Snubber Diode
- Hard Switched PFC Boost Diode
- UPS FWD

### Description

The FFPF60SA60DS is STEALTH™ dual series diode with soft recovery characteristics. It is silicon nitride passivated ionimplanted 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.



### 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 @ $T_C = 95^\circ\text{C}$    | 8           | A                |
| $I_{FSM}$      | Non-repetitive Peak Surge Current<br>60Hz Single Half-Sine Wave | 80          | A                |
| $P_D$          | Power Dissipation   | 26          | W                |
| $W_{AVL}$      | Avalanche Energy (1 A, 40 mH)                                   | 20          | mJ               |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature                      | -65 to +175 | $^\circ\text{C}$ |

### Thermal Characteristics

| Symbol          | Parameter                                       | Max.  | Unit                      |
|-----------------|---|-------|---------------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case    | 3.125 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Maximum Thermal Resistance, Junction to Ambient | 62.5  | $^\circ\text{C}/\text{W}$ |

### Package Marking and Ordering Information

| Part Number    | Top Mark     | Package | Packing Method | Reel Size | Tape Width | Quantity |
|----------------|--------------|---------|----------------|-----------|------------|----------|
| FFPF60SA60DSTU | FFPF60SA60DS | TO-220F | Tube           | N/A       | N/A        | 30       |

FFPF60SA60DS — STEALTH™ Dual Series Diode

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

| Symbol   | Parameter  | Min.                      | Typ. | Max. | Unit |               |
|----------|--|---------------------------|------|------|------|---------------|
| $V_{F1}$ | Forward Voltage<br>$I_F = 8\text{ A}$<br>$I_F = 8\text{ A}$  | $T_C = 25^\circ\text{C}$  | -    | 2.0  | 2.4  | V             |
|          |  | $T_C = 125^\circ\text{C}$ | -    | 1.6  | 2.0  |               |
| $I_{R1}$ | Reverse Current<br>@rated $V_R$  | $T_C = 25^\circ\text{C}$  | -    | -    | 100  | $\mu\text{A}$ |
|          |  | $T_C = 125^\circ\text{C}$ | -    | -    | 1000 |               |
| $t_{rr}$ | Maximum Reverse Recovery Time<br>( $I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ ) | -                         | -    | 25   | ns   |               |
| $t_{rr}$ | Maximum Reverse Recovery Time<br>( $I_F = 8\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ ) | -                         | -    | 30   | ns   |               |
| $t_{rr}$ | Reverse Recovery Time  | -                         | 39   | -    | ns   |               |
| $I_{rr}$ | Reverse Recovery Current Reverse   | -                         | 2    | -    | A    |               |
| $Q_{rr}$ | Recovery Charge<br>( $I_F = 8\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 390\text{ V}$ )              | -                         | 39   | -    | nC   |               |

**Notes:**

1: Pulse: Test Pulse width = 300 $\mu\text{s}$ , Duty Cycle = 2%

### Test Circuit and Waveforms

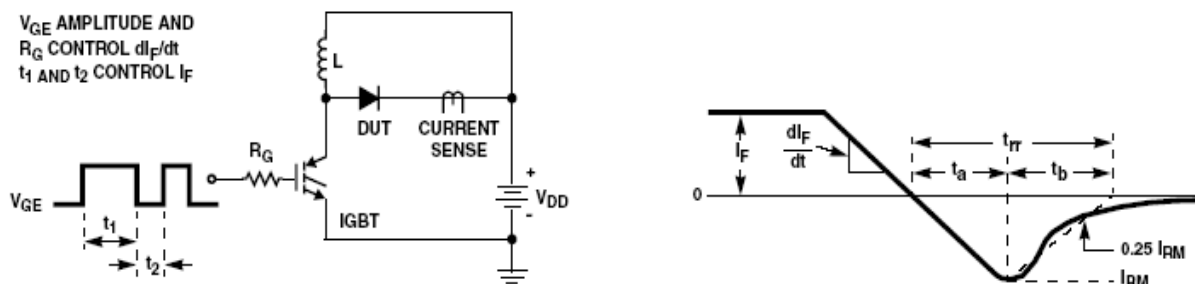


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

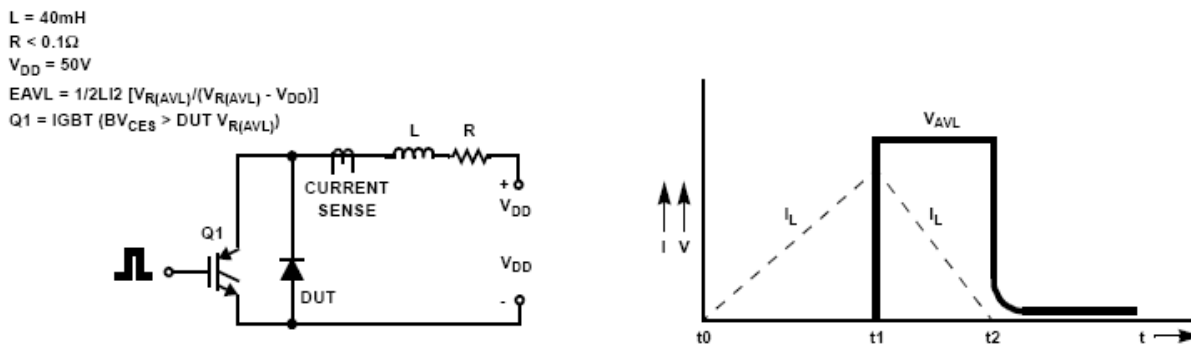
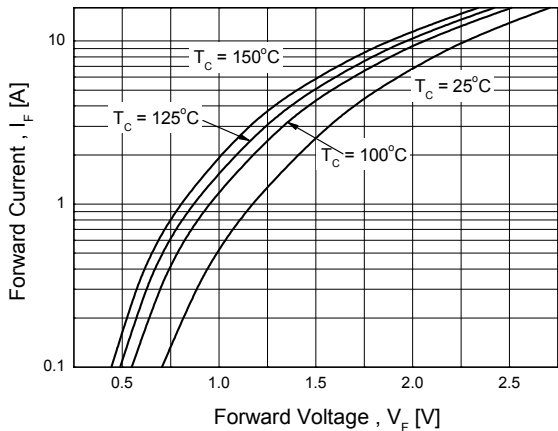


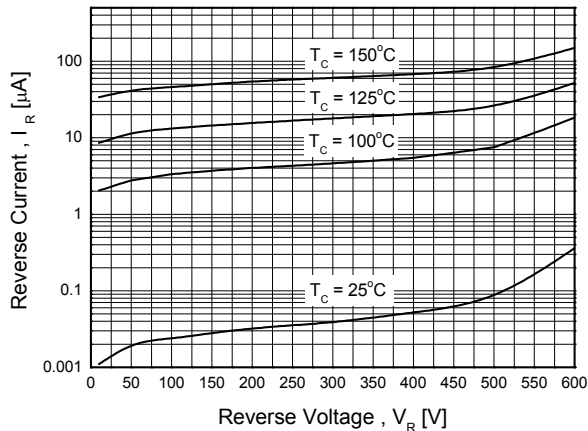
Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## Typical Performance Characteristics

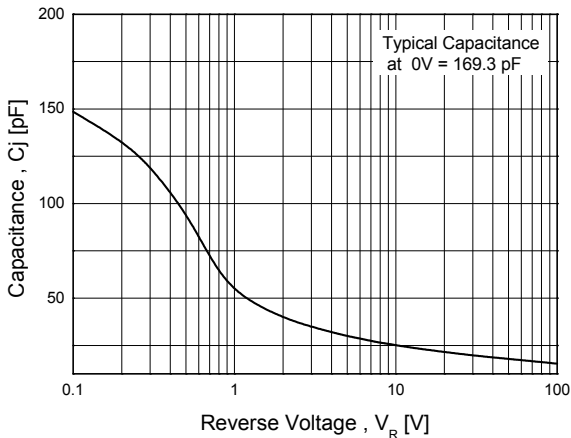
**Figure 3. Typical Forward Voltage Drop vs. Forward Current**



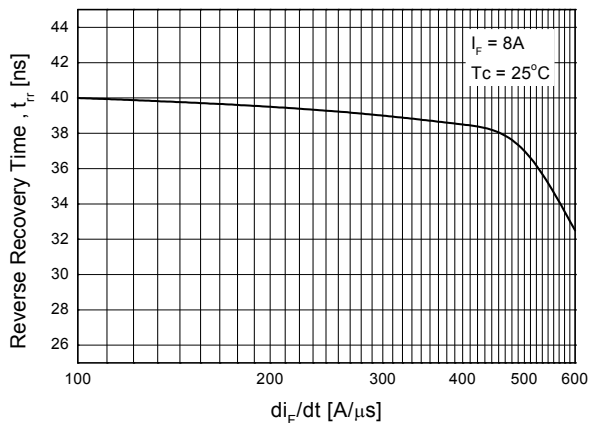
**Figure 4. Typical Reverse Current vs. Reverse Voltage**



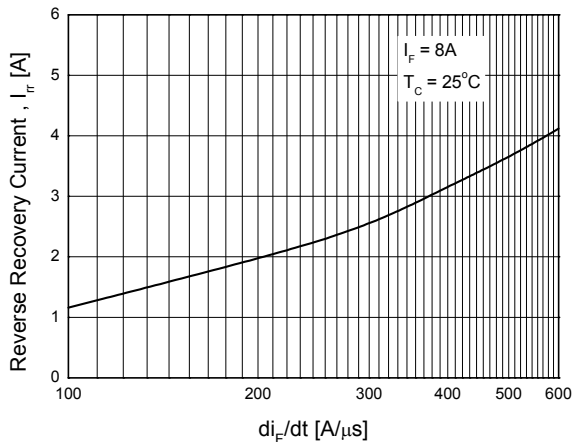
**Figure 5. Typical Junction Capacitance**



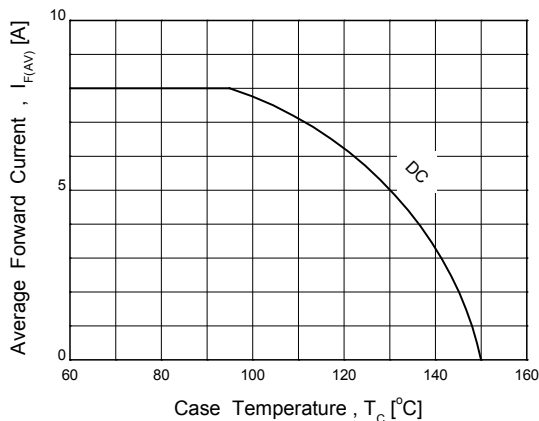
**Figure 6. Typical Reverse Recovery Time vs.  $di_F/dt$**



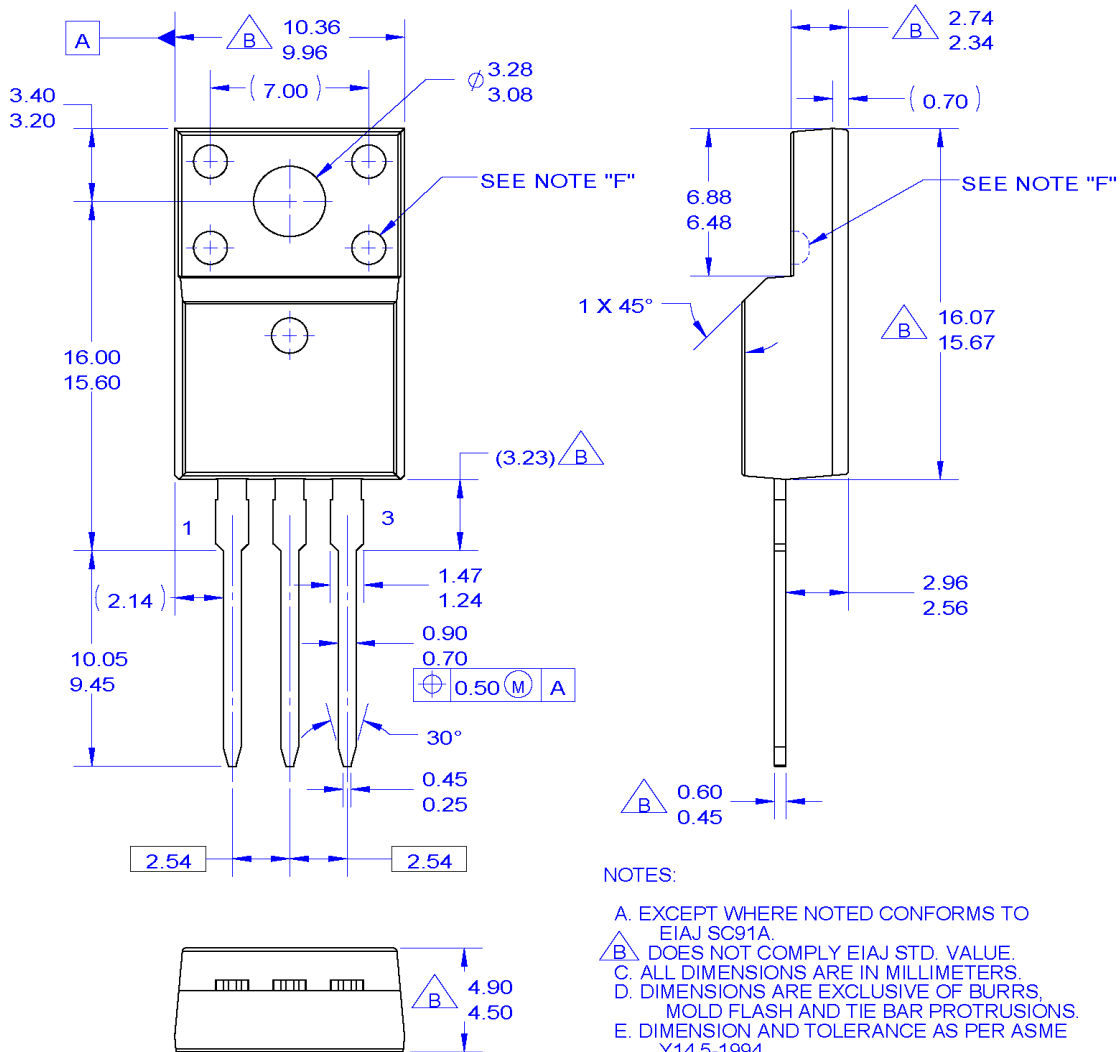
**Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$**



**Figure 8. Forward Current Derating Curve**



Package Dimensions



NOTES:

- A. EXCEPT WHERE NOTED CONFORMS TO EIAJ SC91A.
- B. DOES NOT COMPLY EIAJ STD. VALUE.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- F. OPTION 1 - WITH SUPPORT PIN HOLE. OPTION 2 - NO SUPPORT PIN HOLE.
- G. DRAWING FILE NAME: TO220M03REV3

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