FAIRCHILD SEMICONDUCTOR®

October 2004

FFPF60SA60DS

6 A, 600 V, STEALTH™ Dual Diode

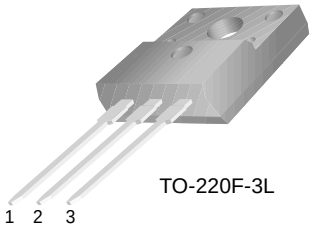
Features

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

The FFPF60SA60DS is STEALTH™ dual 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 swithching 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.

Applications

- Switch Mode Power Supplies
- Hard Swithed PFC Boost Diode
- UPS Free wheeling Diode
- Motor Drive FWD
- SMPS FWD
- Snubber Diode



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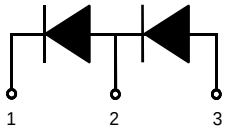

Absolute Maximum Ratings (per leg) T_C=25°C unless otherwise noted

Symbol	Parameter	Value	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 °C	8	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	80	A
P_D	Power Dissipation	26	W
W_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
$T_{J,}$ T_{STG}	Operating Junction and Storage Temperature	- 65 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.125	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	62.5	°C/W

Electrical Characteristics (per leg) T_C=25 °C unless otherwise noted

Symbol	Parameter		Min.	Typ.	Max.	Unit
V_F *	Forward Voltage					V
	I_F = 8 A	T_C = 25 °C	-	2.0	2.4	
	I_F = 8 A	T_C = 125 °C	-	1.6	2.0	
I_R *	Reverse Current					μA
	@ rated V_R	T_C = 25 °C	-	-	100	
		T_C = 125 °C	-	-	1000	
t_{rr}	Maximum Reverse Recovery Time (I_F = 1 A, di/dt = 100 A/μs, V_R = 30 V)		-	-	25	ns
t_{rr}	Maximum Reverse Recovery Time (I_F = 8 A, di/dt = 100 A/μs, V_R = 30 V)		-	-	30	ns
t_{rr}	Reverse Recovery Time		-	39	-	ns
I_{rr}	Reverse Recovery Current Reverse		-	2	-	A
Q_{rr}	Recovery Charge (I_F = 8 A, di/dt = 200 A/μs, V_R = 390 V)		-	39	-	nC

*Pulse Test: Pulse Width=300 μs, Duty Cycle=2%

Typical Characteristics

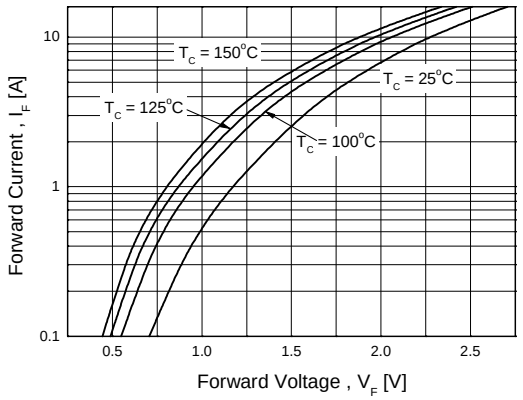

Figure 1. Typical Forward Voltage Drop vs. Forward Current

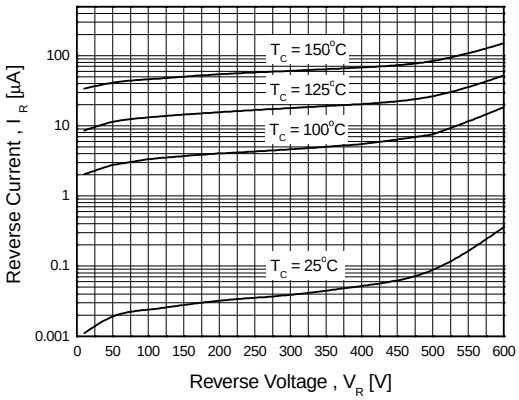

Figure 2. Typical Reverse Current vs. Reverse Voltage

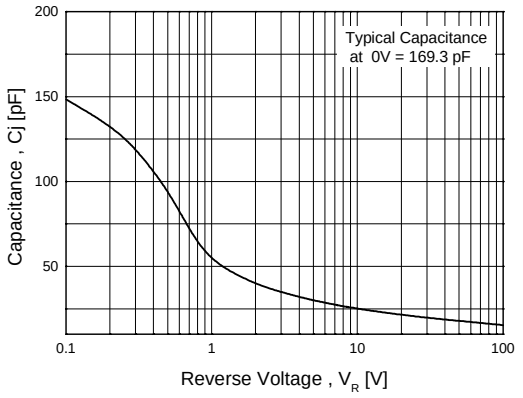

Figure 3. Typical Junction Capacitance

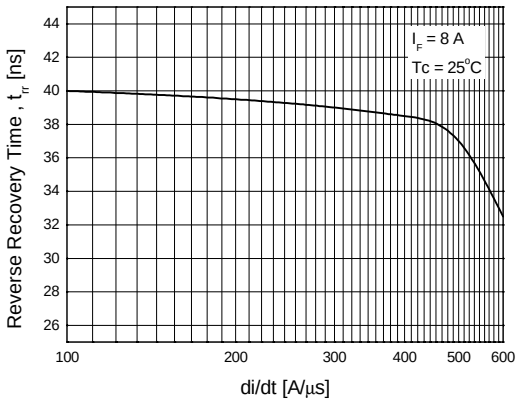

Figure 4. Typical Reverse Recovery Time vs. di/dt

Typical Characteristics (Continued)

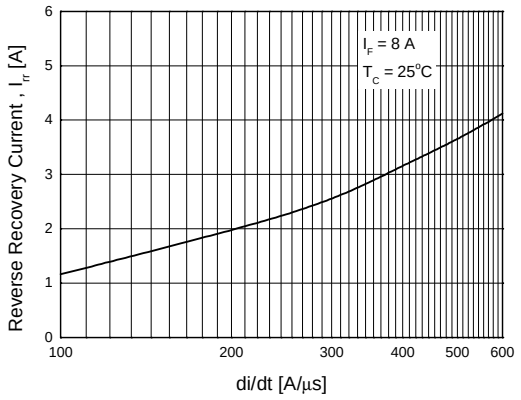

Figure 5. Typical Reverse Recovery Current vs. di/dt

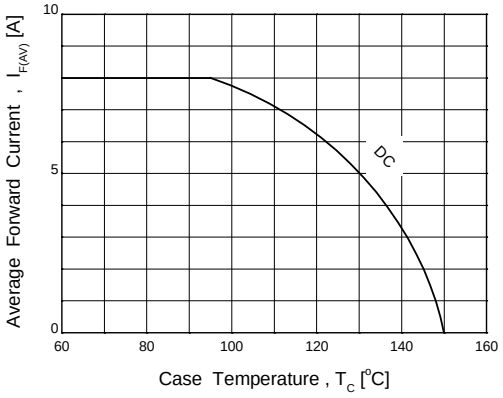

Figure 6. Forward Curent Derating Curve

Test Circuits and Waveforms

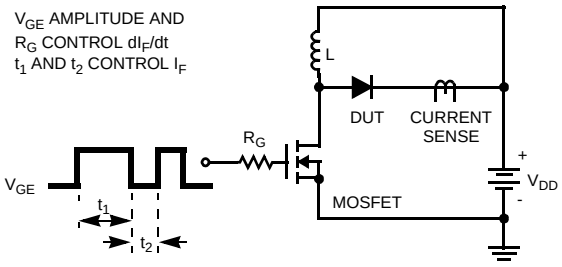

Figure 7. t_{rr} Test Circuit

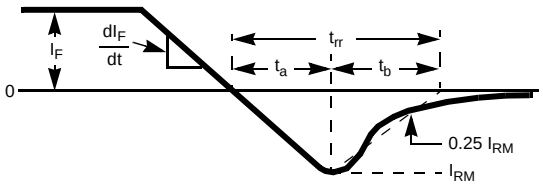

Figure 8. t_{rr} Waveforms and Definitions

I = 1A
L = 40mH
R < 0.1Ω
V_{DD} = 50V
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

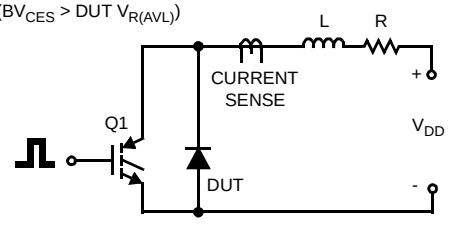

Figure 9. Avalanche Energy Test Circuit

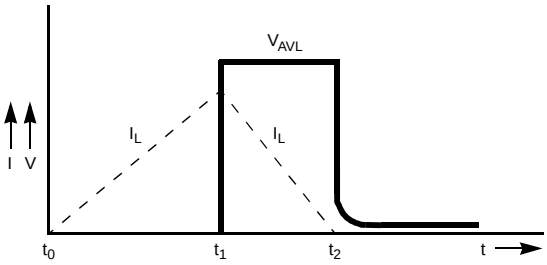

Figure 10. Avalanche Current and Voltage Waveforms

Package Dimensions

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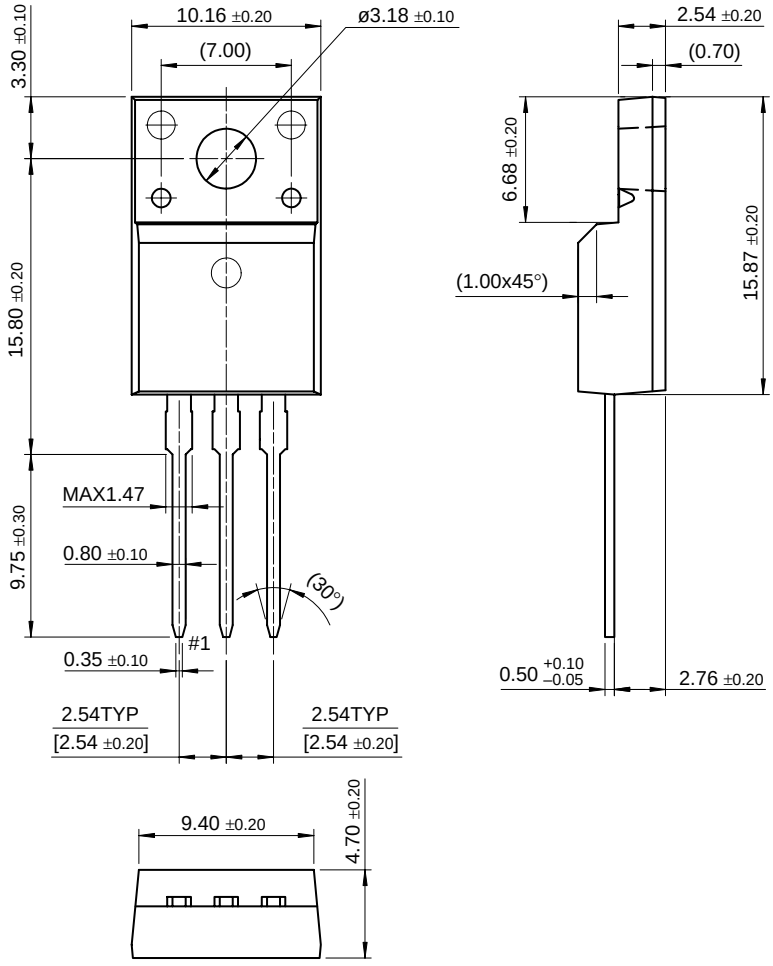

Dimensions in Millimeters

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