



January 2007

FFPF10H60S

Hyperfast Recovery Power Rectifier

Features

- High Speed Switching ($t_{rr}=25\text{ns(Typ.)}$ @ $I_F=10\text{A}$)
- High Reverse Voltage and High Reliability
- Avalanche Energy Rated
- Low Forward Voltage ($V_F=2.1\text{V(Typ.)}$ @ $I_F=10\text{A}$)

Applications

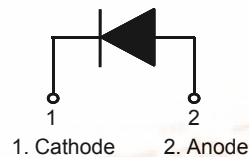
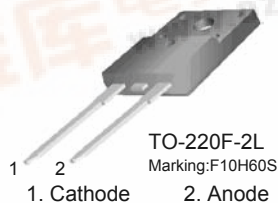
- General Purpose
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits

General Description

The FFPF10H60S is hyperfast rectifier ($t_{rr}=25\text{ns(Typ.)}$ @ $I_F=10\text{A}$). it has half the recovery time of ultrafast rectifier and is silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as freewheeling/clamping rectifiers 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.

Pin Assignments



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

Symbol	Parameter	Value	Units
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 @ $T_C = 85^\circ\text{C}$	10	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	100	A
T_J, T_{STG}	Operating Junction and Storage Temperature	- 65 to +150	$^\circ\text{C}$

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

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	3.4	$^\circ\text{C/W}$

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F10H60S	FFPF10H60STU	TO-220F	-	-	50

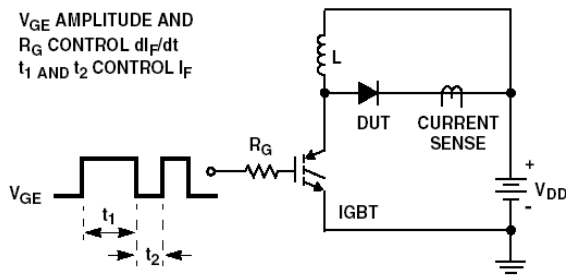
Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Parameter	Conditions		Min.	Typ.	Max	Units
V_{FM}^1	$I_F = 10\text{A}$	$T_C = 25^\circ\text{C}$	-	2.1	2.5	V
	$I_F = 10\text{A}$	$T_C = 125^\circ\text{C}$	-	-	2.2	V
I_{RM}^1	$V_R = 600\text{V}$	$T_C = 25^\circ\text{C}$	-	-	1	mA
	$V_R = 600\text{V}$	$T_C = 125^\circ\text{C}$	-	-	2	mA
t_{rr}	$I_F = 1\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, $V_{CC} = 30\text{V}$	$T_C = 25^\circ\text{C}$	-	-	35	ns
	$I_F = 10\text{A}$, $di/dt = 50\text{A}/\mu\text{s}$, $V_{CC} = 390\text{V}$	$T_C = 25^\circ\text{C}$	-	25	40	ns
	$I_F = 10\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$, $V_{CC} = 390\text{V}$	$T_C = 25^\circ\text{C}$	-	21	-	ns
	$I_F = 10\text{A}$, $di/dt = 50\text{A}/\mu\text{s}$, $V_{CC} = 390\text{V}$	$T_C = 25^\circ\text{C}$	-	15	-	ns
t_a	$I_F = 10\text{A}$, $di/dt = 50\text{A}/\mu\text{s}$, $V_{CC} = 390\text{V}$	$T_C = 25^\circ\text{C}$	-	10	-	ns
t_b		$T_C = 25^\circ\text{C}$	-	10	-	ns
Q_{rr}		$T_C = 25^\circ\text{C}$	-	9.0	-	nC
W_{AVL}	Avalanche Energy ($L = 40\text{mH}$)		20	-	-	mJ

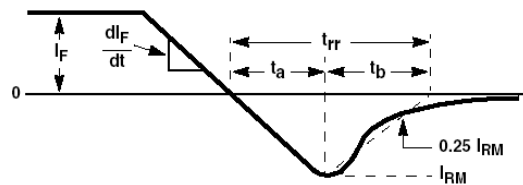
Notes:

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

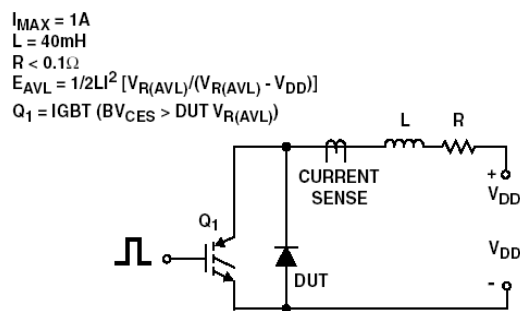
Test Circuit and Waveforms



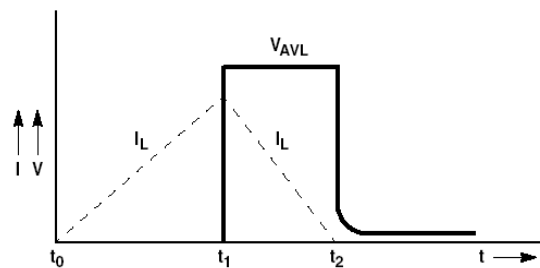
t_{rr} TEST CIRCUIT



t_{rr} WAVEFORMS AND DEFINITIONS



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics $T_c = 25^\circ\text{C}$ unless otherwise noted

Figure 1. Typical Forward Voltage Drop

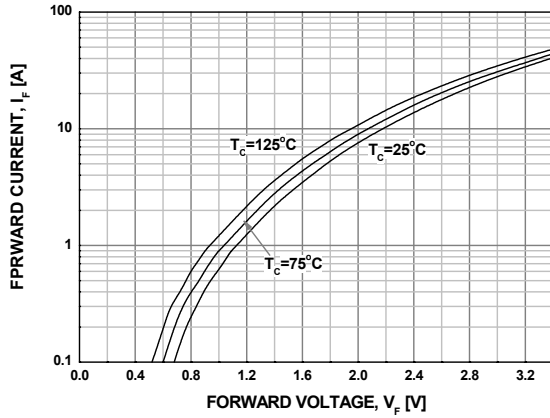


Figure 2. Typical Reverse Current

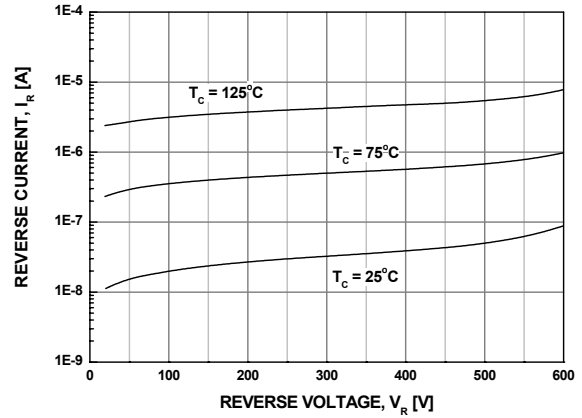


Figure 3. Typical Junction Capacitance

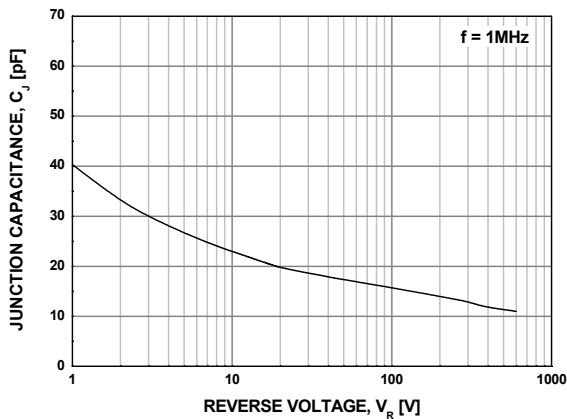


Figure 4. Typical Reverse Recovery Time

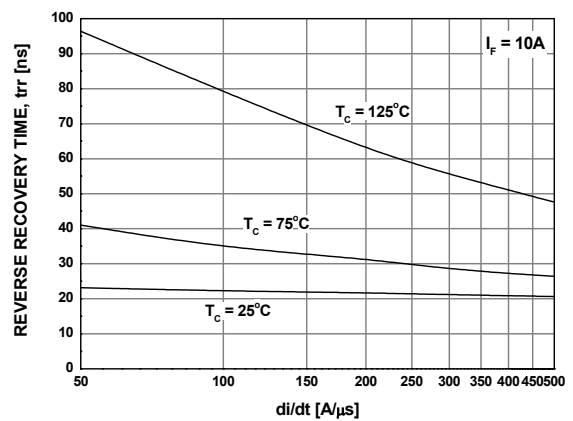


Figure 5. Typical Reverse Recovery Current

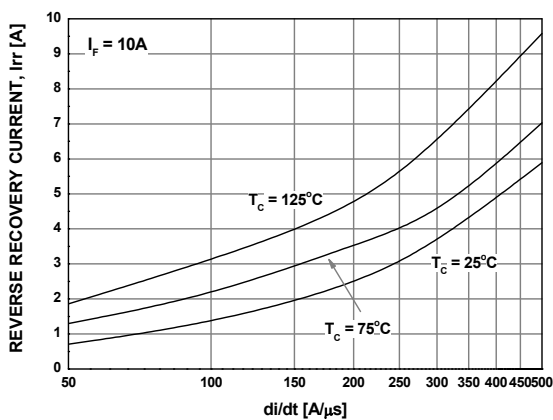
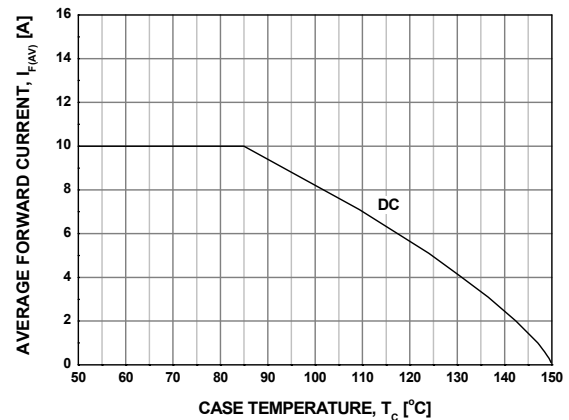


Figure 6. Forward Current Deration Curve



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