



# FFH60UP40S

## Features

- High Speed Switching,  $t_{rr} < 85\text{ns}$  @  $I_F = 60\text{A}$
- High Reverse Voltage and High Reliability
- Avalanche Energy Rated
- Low Forward Voltage,  $V_F < 1.4\text{V}$
- RoHS compliant

## 60A, 400V Ultrafast Rectifier

The FFH60UP40S is ultrafast rectifier with low forward voltage drop. It is silicon nitride passivated ion-implanted epitaxial planar construction.

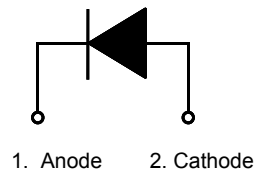
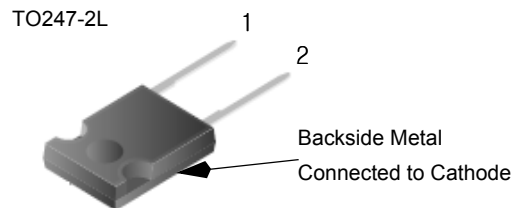
These devices are intended for use as freewheeling/clamping rectifiers in a variety of switching power supplies and other power switching applications. Its low stored charge minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

## Applications

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



## Pin Assignments



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

Symbol	Parameter	Ratings	Units
$V_{RRM}$	Peak Repetitive Reverse Voltage	400	V
$V_{RWM}$	Working Peak Reverse Voltage	400	V
$V_R$	DC Blocking Voltage	400	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 102^\circ\text{C}$	60	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	600	A
$T_J, T_{STG}$	Operating and Storage Temperature Range	-65 to +150	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.7	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FFH60UP40S	FFH60UP40S	TO247-2L	-	-	30

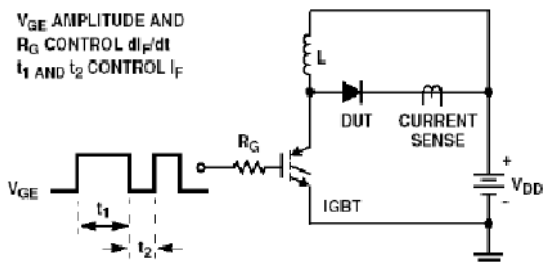
## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Units
$V_{FM1}$	$I_F = 60\text{A}$	-	1.06	1.4	V
	$I_F = 60\text{A}$	-	0.99	-	
$I_{RM1}$	$V_R = 400\text{V}$	-	-	100	$\mu\text{A}$
	$V_R = 400\text{V}$	-	-	500	
$t_{rr}$	$I_F = 60\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 260\text{V}$	-	59	85	ns
	$I_F = 60\text{A}, di/dt = 200\text{A}/\mu\text{s}, V_{CC} = 260\text{V}$	-	96	-	
$W_{AVL}$	Avalanche Energy ( $L = 40\text{mH}$ )	50	-	-	mJ

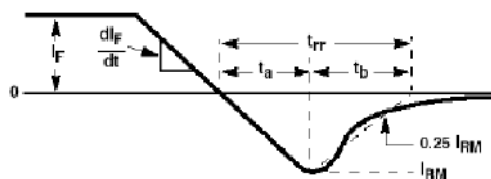
**Notes:**

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

### Test Circuit and Waveforms

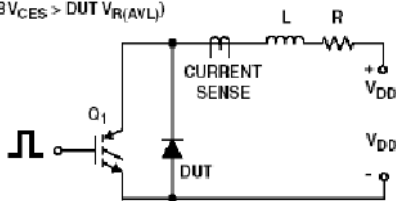


$t_{rr}$  TEST CIRCUIT

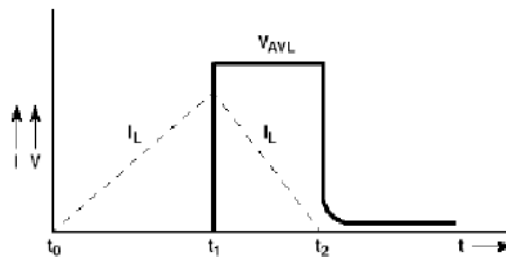


$t_{rr}$  WAVEFORMS AND DEFINITIONS

$L = 40\text{mH}$   
 $R < 0.1\Omega$   
 $E_{AVL} = 1/2LI^2$   
 $Q_1 = \text{IGBT (}BV_{CES} > \text{DUT } V_{R(AVL)}\text{)}$



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

### Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

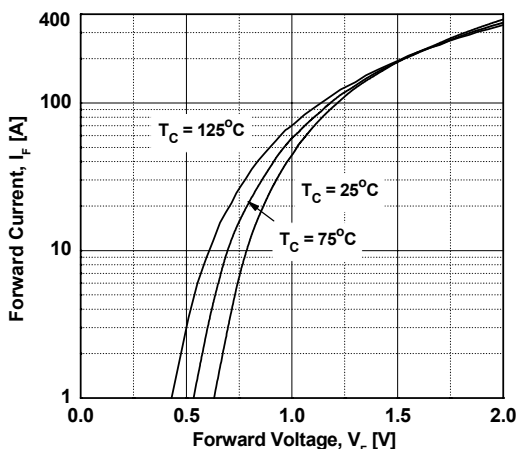


Figure 3. Typical Junction Capacitance

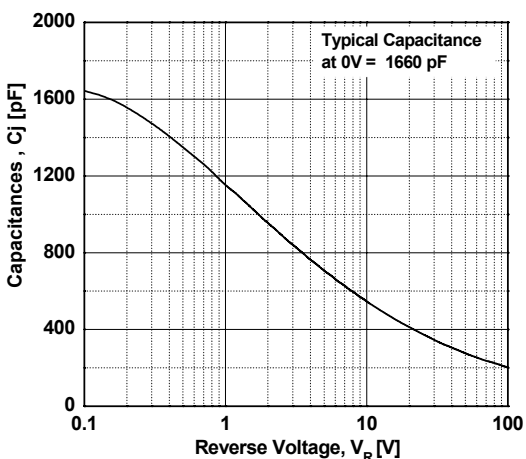


Figure 5. Typical Reverse Recovery Current vs. di/dt

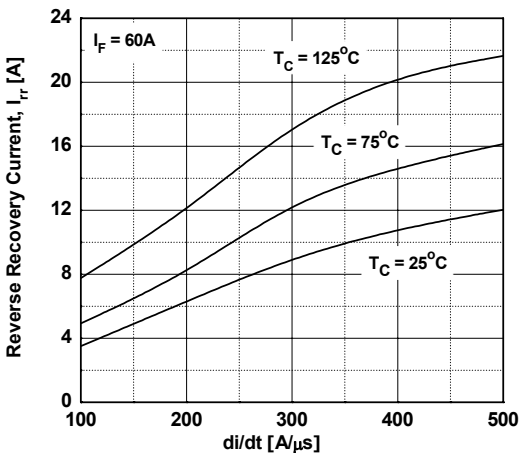


Figure 2. Typical Reverse Current vs. Reverse Voltage

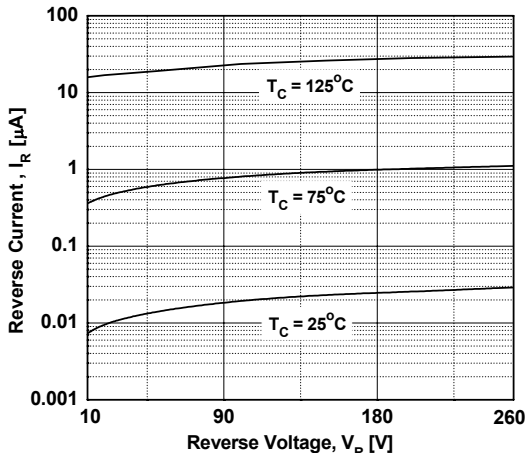


Figure 4. Typical Reverse Recovery Time vs. di/dt

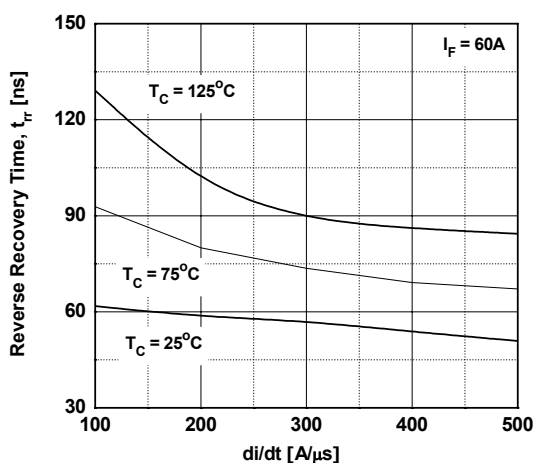
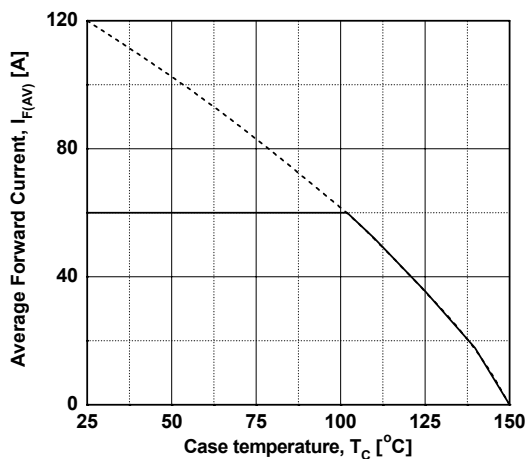


Figure 6. Forward Current Derating Curve













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