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# FFH60UP60S, FFH60UP60S3

## 60 A, 600 V Ultrafast Rectifier

### Features

- Ultrafast Recovery,  $t_{rr} = 80 \text{ ns}$  (@  $I_F = 60 \text{ A}$ )
- Max Forward Voltage,  $V_F = 1.7 \text{ V}$  (@  $T_C = 25^\circ\text{C}$ )
- Avalanche Energy Rated
- RoHS compliant

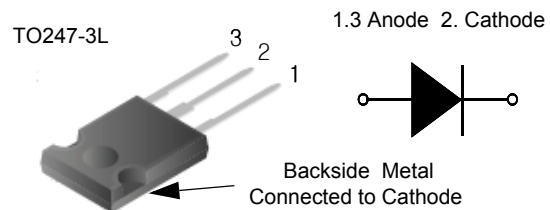
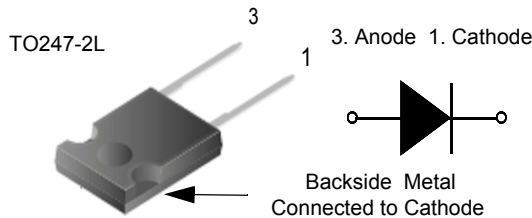
### Applications

- General Purpose
- SMPS, Welder, UPS
- Free-wheeling diode for motor application
- Power switching circuits

### Description

The FFH60UP60S, FFH60UP60S3 is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial applications as welder and UPS application.

### 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 @ $T_C = 93^\circ\text{C}$	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 +175	$^\circ\text{C}$

### Thermal Characteristics

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

### Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Reel Size	Tape Width	Quantity
FFH60UP60S	FFH60UP60S	TO247-2L	Tube	N/A	N/A	30
FFH60UP60S3	FFH60UP60S3	TO247-3L	Tube	N/A	N/A	30

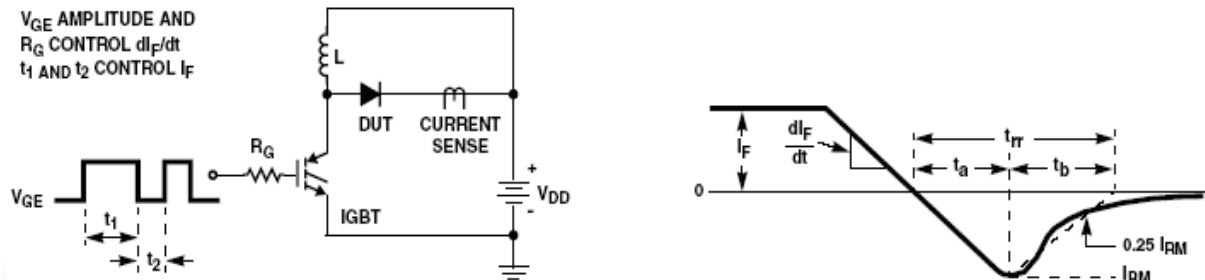
**Electrical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_F1$	$I_F = 60\text{ A}$ $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	-	1.4 1.3	1.7 -	V
$I_{R1}$	$V_R=600\text{ V}$ $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	-	- -	100 500	$\mu\text{A}$
$t_{rr}$	$I_F = 60\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 390\text{ V}$ $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	-	60 138	80 -	ns
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	50	-	-	mJ

**Notes:**

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

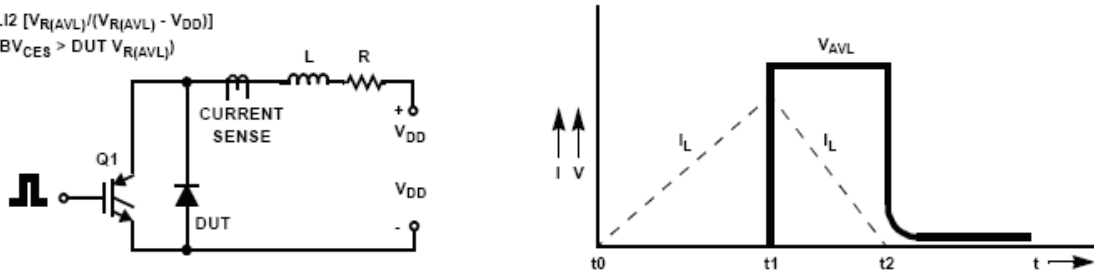
**Test circuit and waveform**



**Figure 1. Diode Reverse Recovery Test Circuit & Waveform**

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

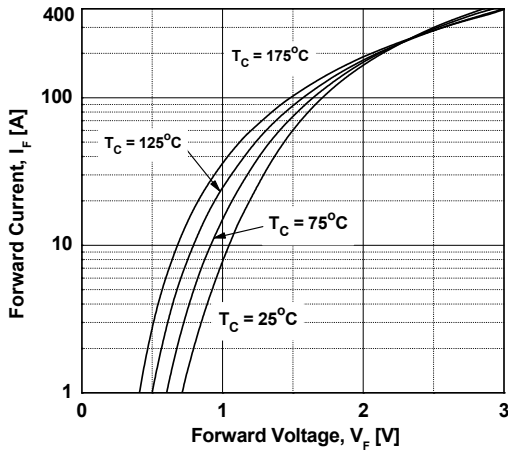
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q1 = \text{IGBT (}BV_{CES} > \text{DUT } V_{R(AVL)}\text{)}$



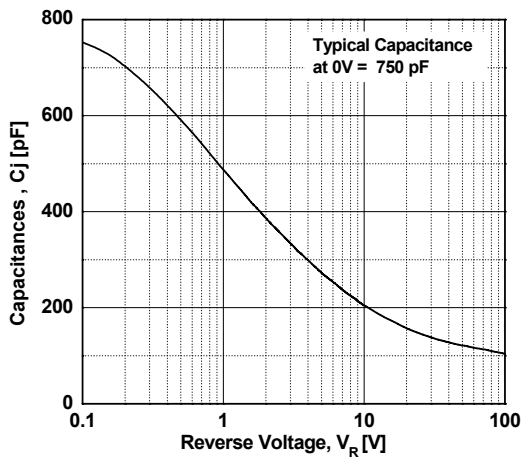
**Figure 2. Unclamped Inductive Switching Test Circuit & Waveform**

## Typical Performance Characteristics

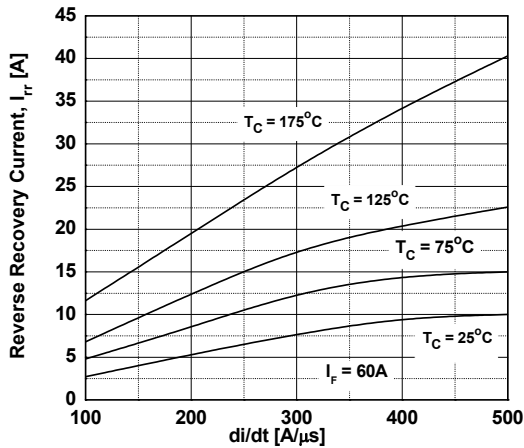
**Figure 3. Typical Forward Voltage Drop vs. Forward Current**



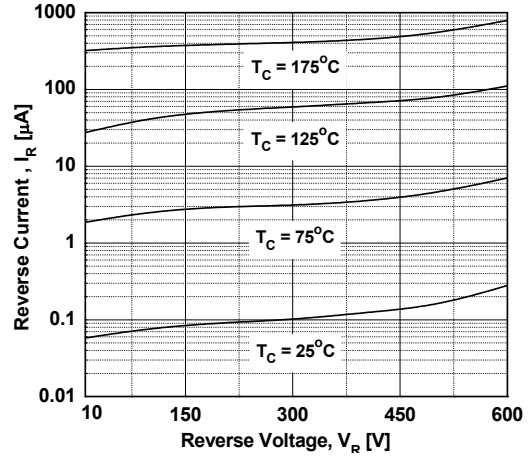
**Figure 5. Typical Junction Capacitance**



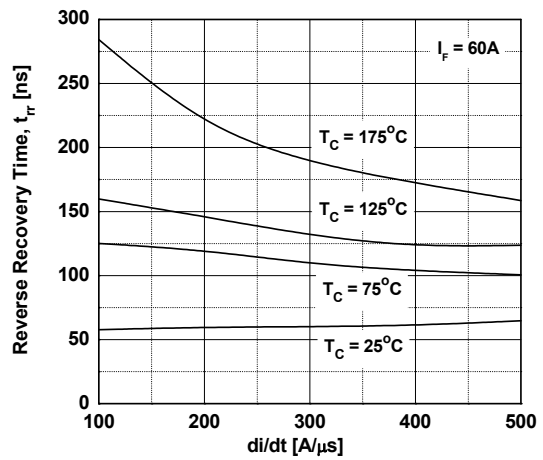
**Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$**



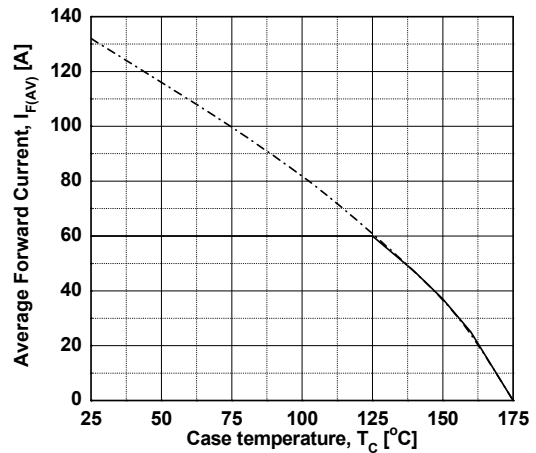
**Figure 4. Typical Reverse Current vs. Reverse Voltage**



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

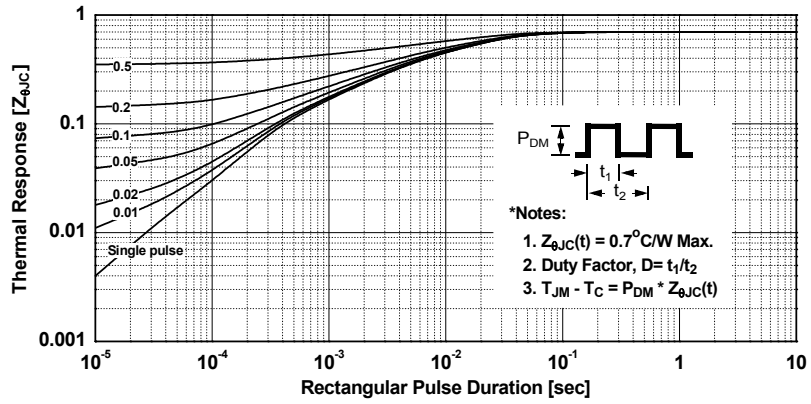


**Figure 8. Forward Current Derating Curve**



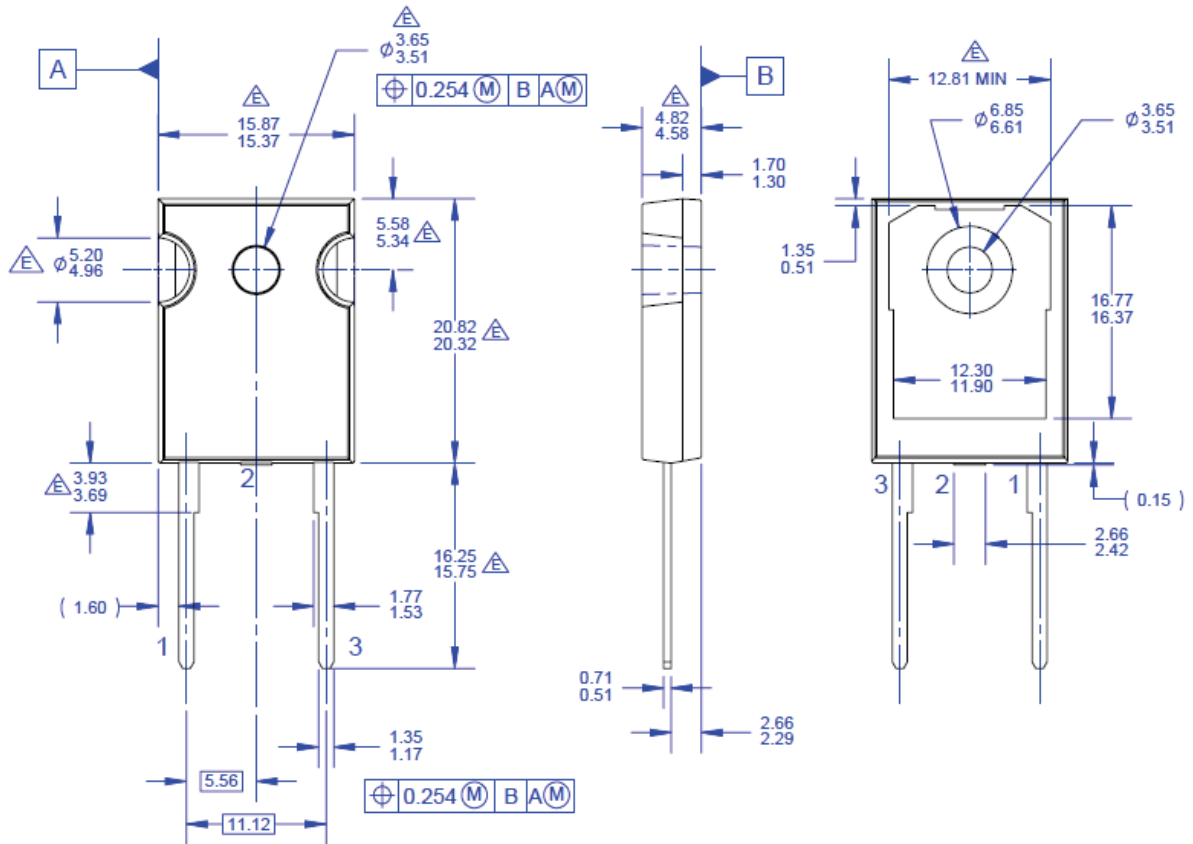
Typical Performance Characteristics (Continued)

Figure 9. Transient Thermal Response Curve



Mechanical Dimensions

TO247-2L



NOTES: UNLESS OTHERWISE SPECIFIED.

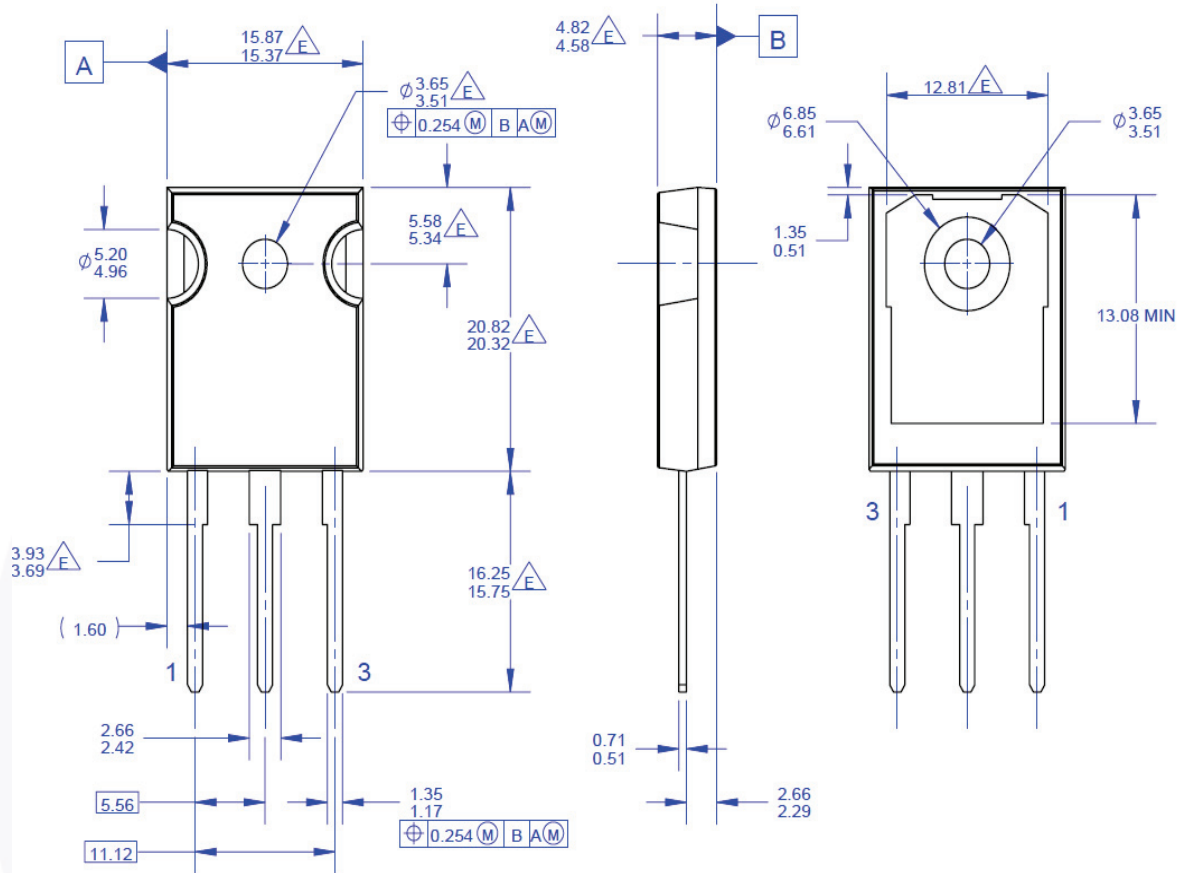
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Mechanical Dimensions

TO247-3L



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