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September 2016

FFH60UP60S, FFH60UP60S3

60 A, 600 V Ultrafast Rectifier

Features

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

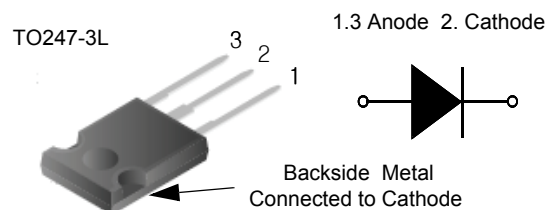
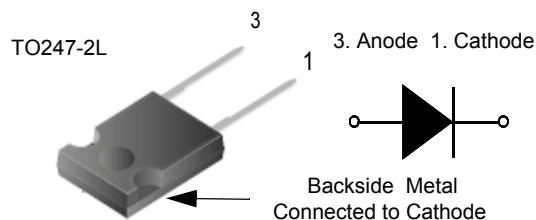
Applications

- 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	μA
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

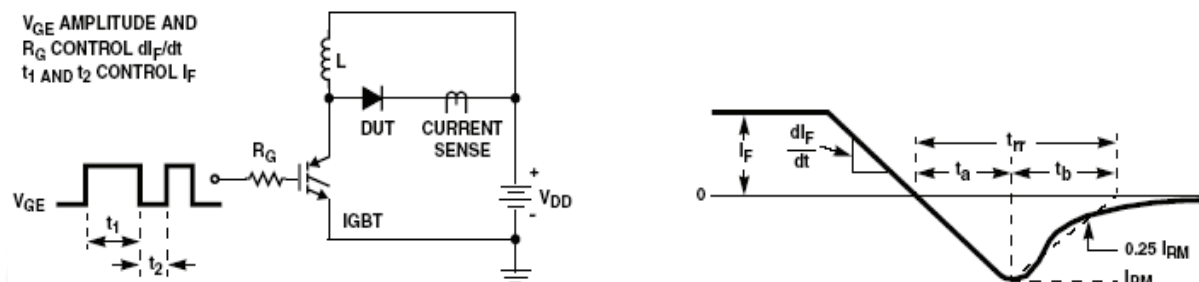


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

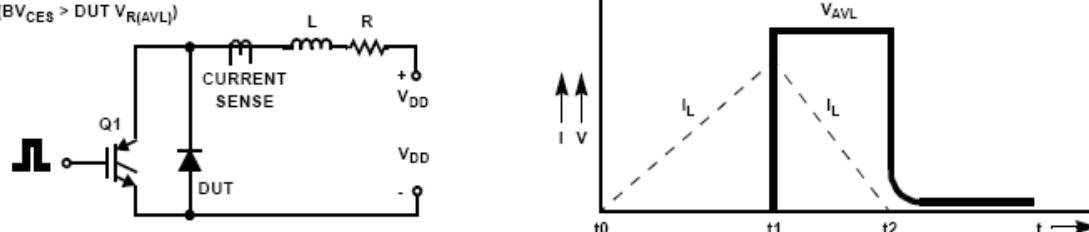


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

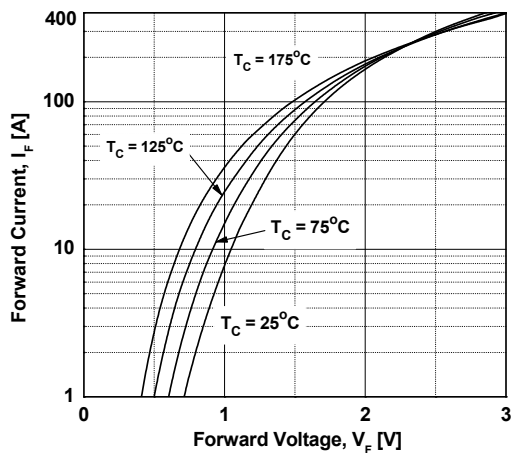


Figure 4. Typical Reverse Current vs. Reverse Voltage

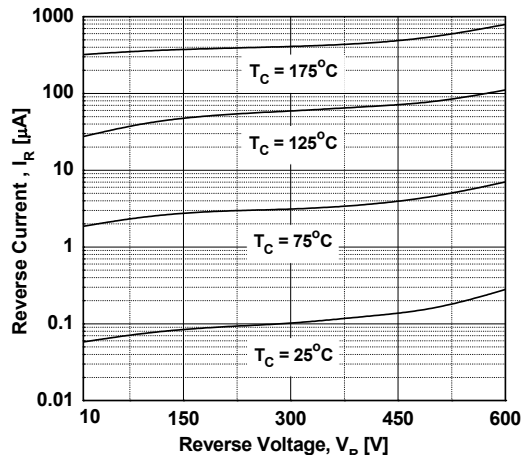


Figure 5. Typical Junction Capacitance

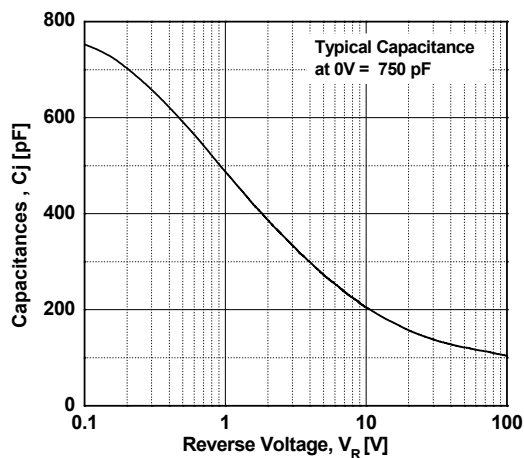


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

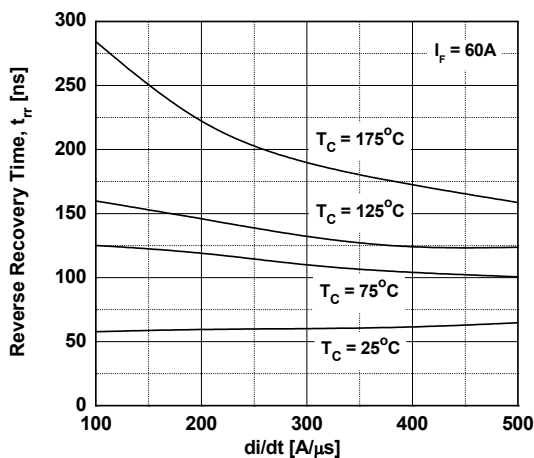


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

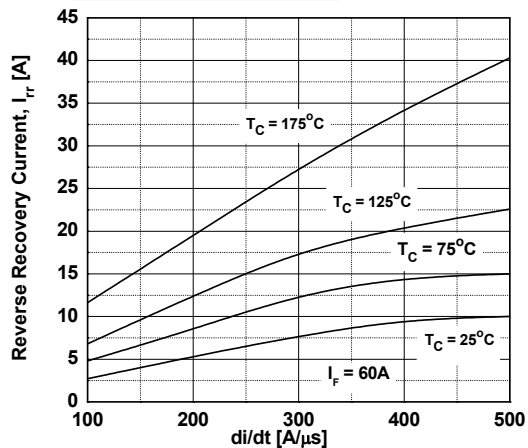
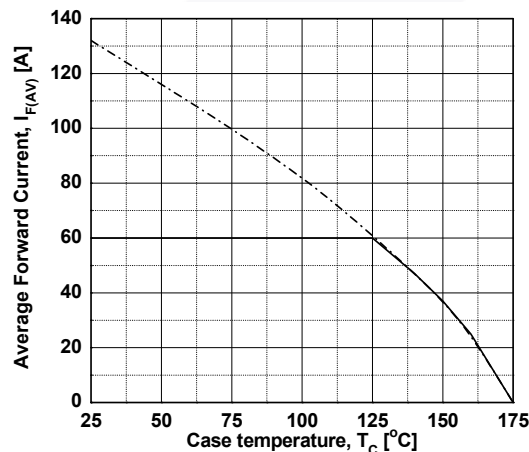
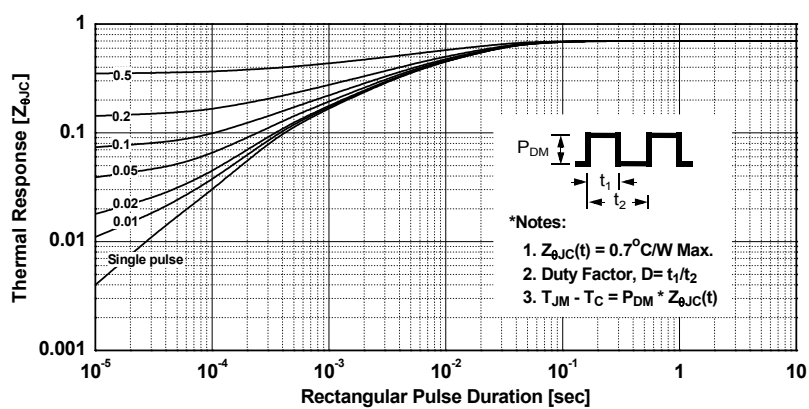


Figure 8. Forward Current Derating Curve



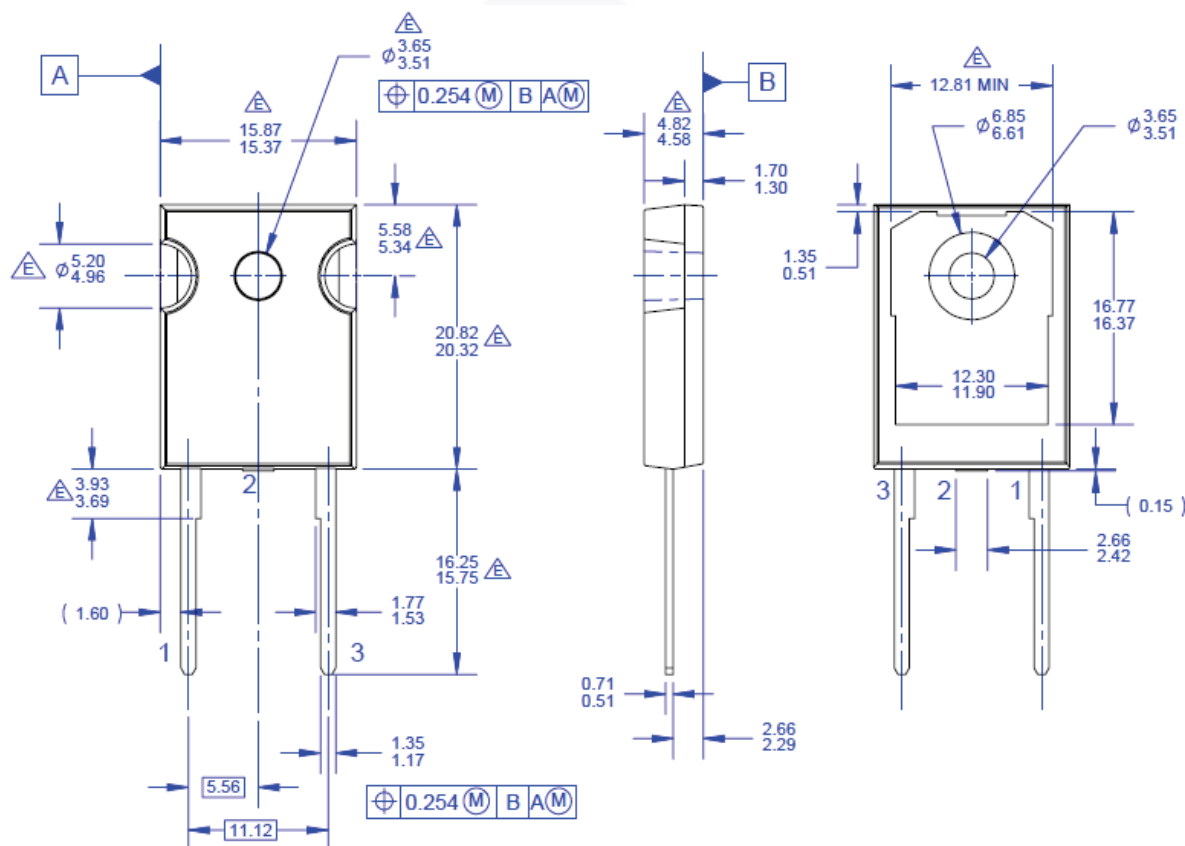
Typical Performance Characteristics (Continued)

Figure 9. Transient Thermal Response Curve



Mechanical Dimensions

TO247-2L



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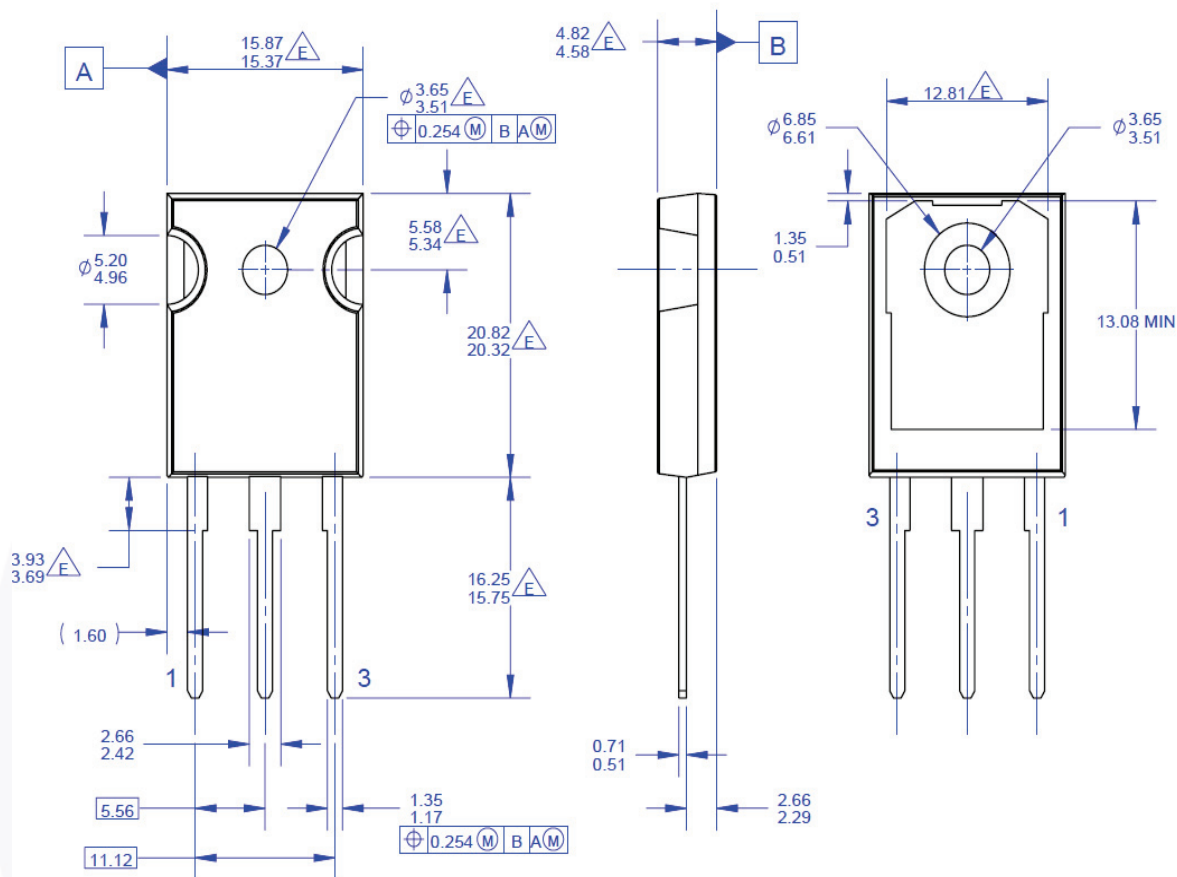
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Mechanical Dimensions

TO247-3L



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