FAIRCHILD SEMICONDUCTOR®

April 2009

FFH60UP60S, FFH60UP60S3

Features

- High Speed Switching, t_{rr} < 80ns
- High Reverse Voltage and High Reliability
- Avalanche Energy Rated
- Low Forward Voltage, V_F < 1.7V
- RoHS compliant

Applications

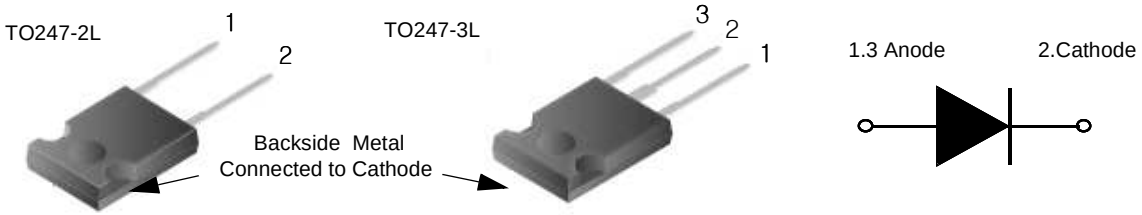
- General Purpose
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- Power switching circuits

60A, 600V Ultrafast Rectifier

The FFH60UP60S and FFH60UP60S3 are ultrafast rectifiers with low forward voltage drop. It is a 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 swithching applications. Its low stored charge minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

Pin Assignments



Absolute Maximum Ratings $T_C = 25^oC$ unless otherwise noted

Symbol	Parameter	Ratings	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 @ $T_C = 119^oC$	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	^oC

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.4	$^oC/W$

Package Marking and Ordering Information

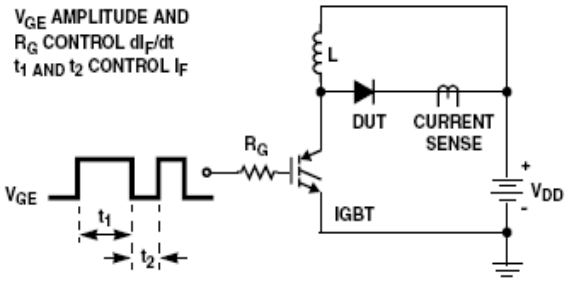
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FFH60UP60S	FFH60UP60S	TO247-2L	-	-	30
FFH60UP60S3	FFH60UP60S3	TO247-3L	-	-	30

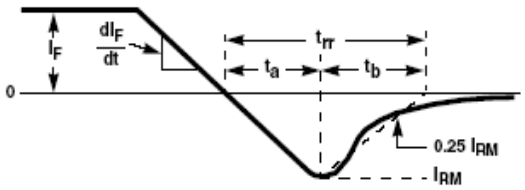
Electrical Characteristics $T_C = 25^oC$ unless otherwise noted

Symbol	Parameter		Min.	Typ.	Max.	Units
$V_{FM}1$	I_F = 60A	T_C = 25°C T_C = 125°C	- -	1.4 1.3	1.7 -	V
$I_{RM}1$	V_R=600V	T_C = 25°C T_C = 125°C	- -	- -	100 500	µA
t_{rr}	I_F = 60A, di/dt = 200A/µs, V_{CC} = 390V	T_C = 25°C T_C = 125°C	- -	60 138	80 -	ns
W_{AVL}	Avalanche Energy (L = 40mH)		50	-	-	mJ

Notes:
1: Pulse: Test Pulse width = 300µs, Duty Cycle = 2%

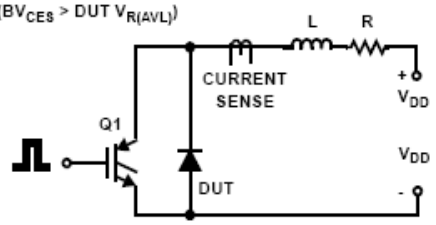
Trr test circuit and waveform

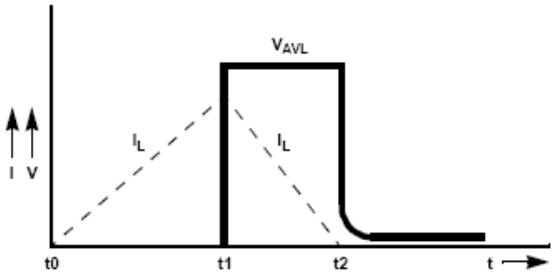




Avalanch energy test circuit and waveform

L = 40mH
R < 0.1Ω
V_{DD} = 50V
EAVL = 1/2LI2 [$V_{R(AVL)}$/($V_{R(AVL)}$ - V_{DD})]
Q1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)





Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

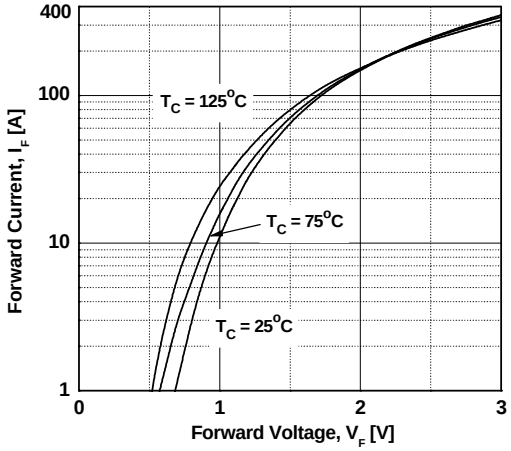


Figure 2. Typical Reverse Current vs. Reverse Voltage

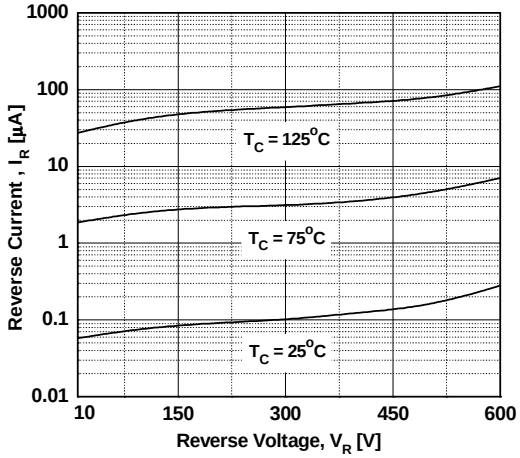


Figure 3.Typical Junction Capacitance

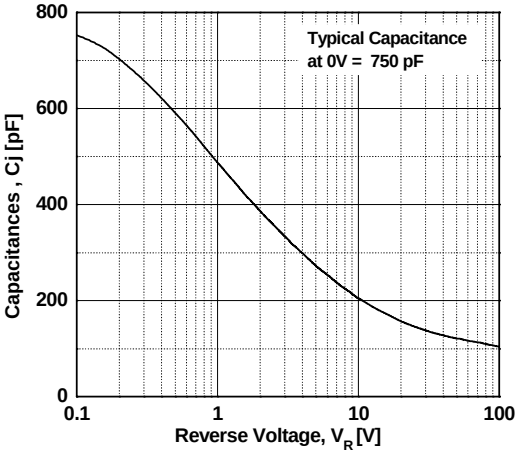


Figure 4. Typical Reverse Recovery Time vs. di/dt

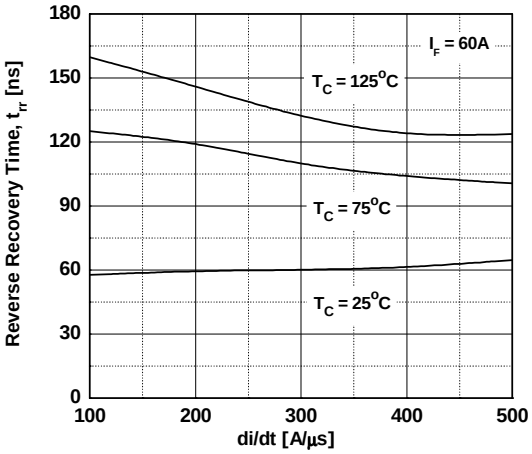


Figure 5. Typical Reverse Recovery Current vs. di/dt

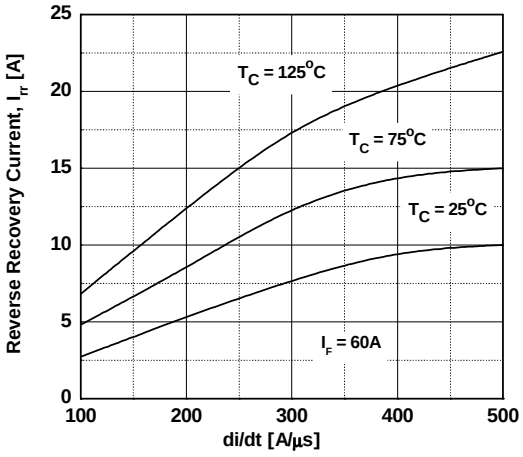
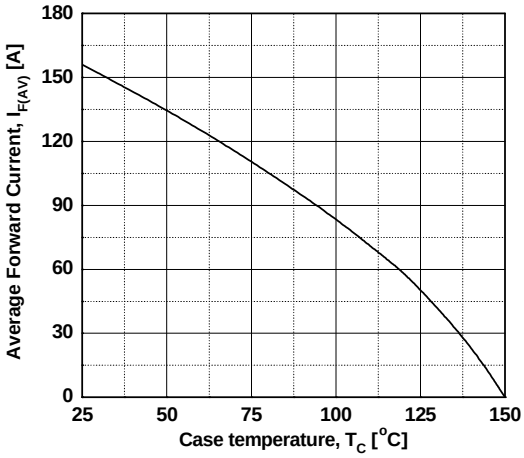
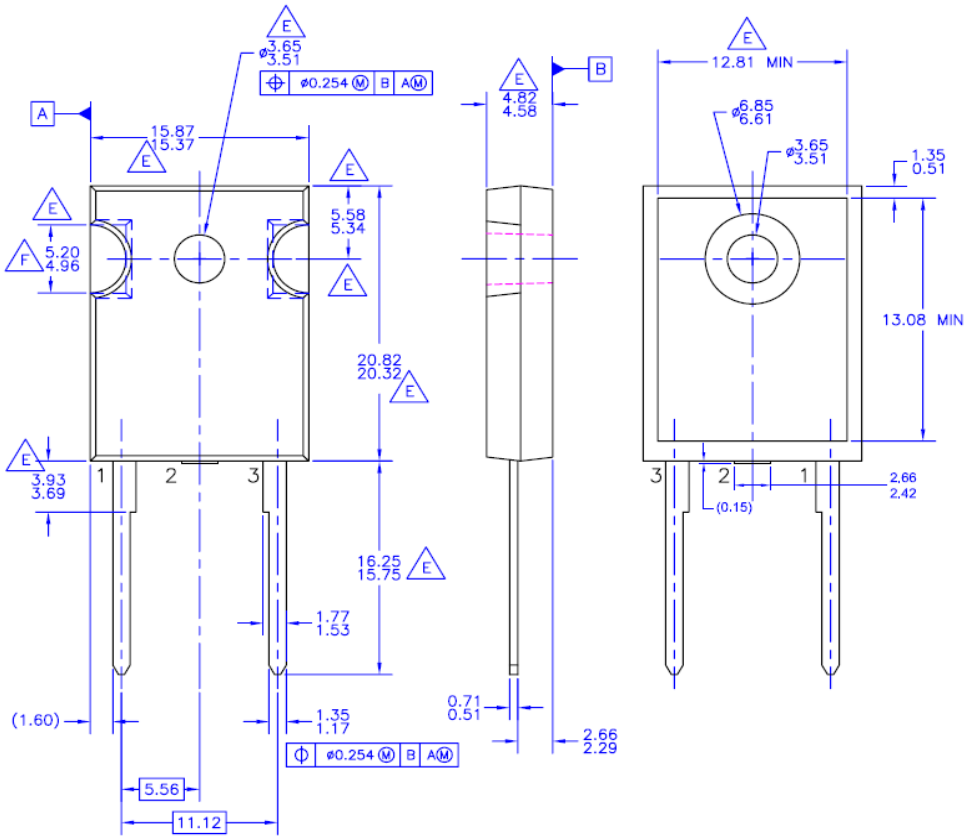


Figure 6. Forward Current Derating Curve



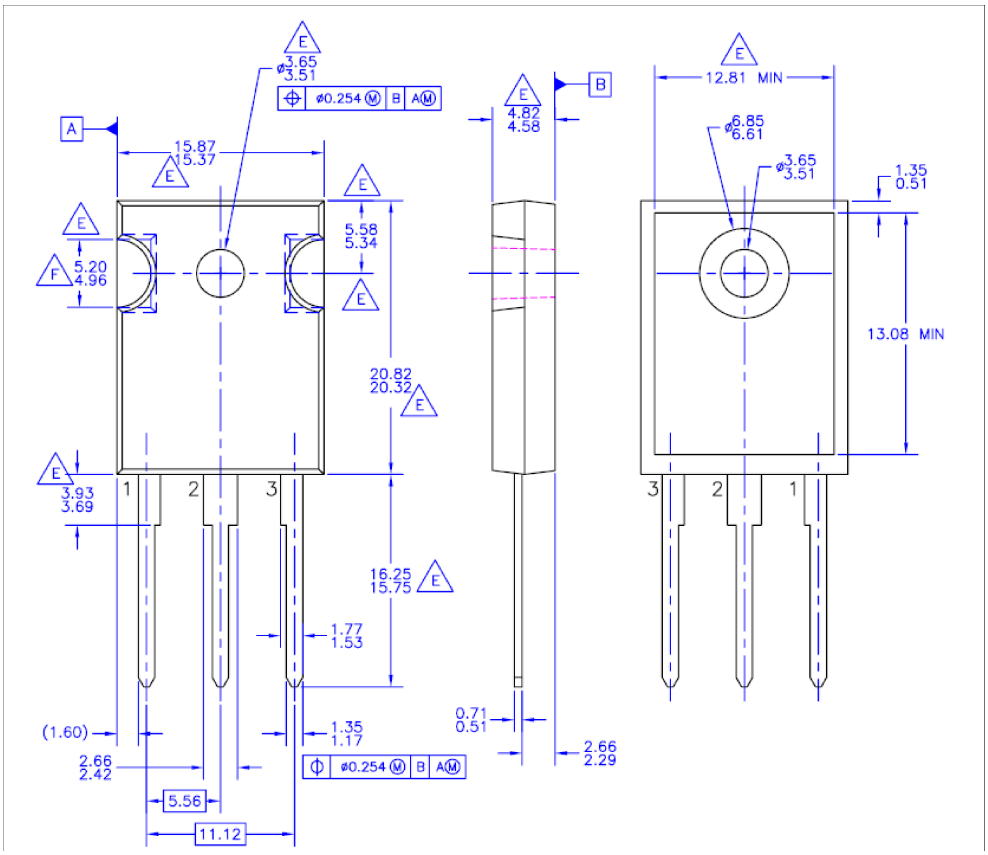
Mechanical Dimensions

TO247-2L



Dimensions in Millimeters

TO247-3L


15.87
15.37
5.20
4.96
5.58
5.34
20.82
20.32
3.93
3.69
16.25
15.75
1.77
1.53
(1.60)
2.66
2.42
1.35
1.17
5.56
11.12
4.82
4.58
0.71
0.51
2.66
2.29
12.81 MIN
6.85
6.61
1.35
0.51
13.08 MIN
1
2
3

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