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FAIRCHILD SEMICONDUCTOR®

November 2013

FFH50US60S
50 A, 600 V, STEALTH™ Diode

Features

- Stealth Recovery, t_{rr} = 113 ns (@ I_F = 50 A)
- Max Forward Voltage, V_F = 1.54 V (@ T_C = 25°C)
- 600V Reverse Voltage and High Reliability
- Operating Temperature = 175°C
- Avalanche Energy Rated
- RoHS Compliant

Applications

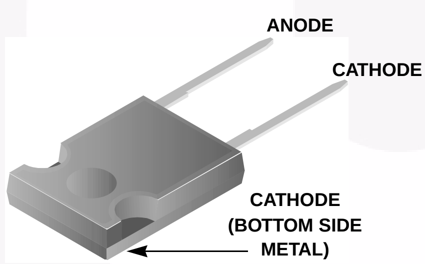
- SMPS, Welders
- Power Factor Correction
- Uninterruptible Power Supplies
- Motor Drives

Description

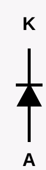
The FFH50US60S is a STEALTH™ diode optimized for low loss performance in output rectification. The STEALTH™ family exhibits low reverse recovery current (I_{RR}), low V_F and soft recovery under typical operating conditions. This device is intended for use as an output rectification diode in Telecom power supplies and other power switching applications. Lower V_F and I_{RR} reduces diode losses. Formerly developmental type TA49468.

Package

JEDEC STYLE 2 LEAD TO-247



Symbol



Device Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{RRM}	Repetitive Peak 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 = 120°C)	50	A
I_{FRM}	Repetitive Peak Surge Current (20kHz Square Wave)	100	A
I_{FSM}	Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60 Hz)	500	A
P_D	Power Dissipation	200	W
E_{AVL}	Avalanche Energy (1 A, 40 mH)	20	mJ
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 175	°C
T_L T_{PKG}	Maximum Temperature for Soldering Leads at 0.063 in (1.6mm) from Case for 10 s Package Body for 10s, See Application Note AN-7528	300 260	°C °C

CAUTION: Stresses above those listed in "Device Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Package Marking and Ordering Information

Device Marking	Device	Package	Packing Methode	Reel Size	Tape Width	Quantity
FFH50US60S	FFH50US60S	TO247-2L	Tube	N/A	N/A	30

Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
Off State Characteristics							
I_R	Instantaneous Reverse Current	V_R = 600 V	T_C = 25°C	-	-	100	µA
			T_C = 125°C	-	-	1	mA
On State Characteristics							
V_F	Instantaneous Forward Voltage	I_F = 50 A	T_C = 25°C	-	1.38	1.54	V
			T_C = 125°C	-	1.37	1.53	V
Dynamic Characteristics							
C_J	Junction Capacitance	V_R = 10 V, I_F = 0 A		-	110	-	pF
Switching Characteristics							
t_{rr}	Reverse Recovery Time	I_F = 1 A, dI_F/dt = 100 A/µs, V_R = 15 V		-	47	80	ns
		I_F = 50 A, dI_F/dt = 100 A/µs, V_R = 15 V		-	75	124	ns
t_{rr}	Reverse Recovery Time	I_F = 50 A, dI_F/dt = 200 A/µs, V_R = 390 V, T_C = 25°C		-	113	-	ns
I_{RR}	Reverse Recovery Current			-	9.6	-	A
Q_{RR}	Reverse Recovered Charge			-	0.9	-	µC
T_{rr}	Reverse Recovery Time	I_F = 50 A, dI_F/dt = 200 A/µs, V_R = 390V, T_C = 125°C		-	235	-	ns
S	Softness Factor (t_b/t_a)			-	1.5	-	-
I_{RR}	Reverse Recovery Current			-	15	-	A
Q_{RR}	Reverse Recovered Charge			-	2.3	-	µC
t_{rr}	Reverse Recovery Time	I_F = 50 A, dI_F/dt = 1000 A/µs, V_R = 390 V, T_C = 125°C		-	110	-	ns
S	Softness Factor (t_b/t_a)			-	0.8	-	-
I_{RR}	Reverse Recovery Current			-	46	-	A
Q_{RR}	Reverse Recovered Charge			-	3.1	-	µC
dI_M/dt	Maximum di/dt during t_b			-	1000	-	A/µs
Thermal Characteristics							
$R_{\theta JC}$	Thermal Resistance Junction to Case			-	-	0.75	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	TO-247		-	-	30	°C/W

Typical Performance Curves

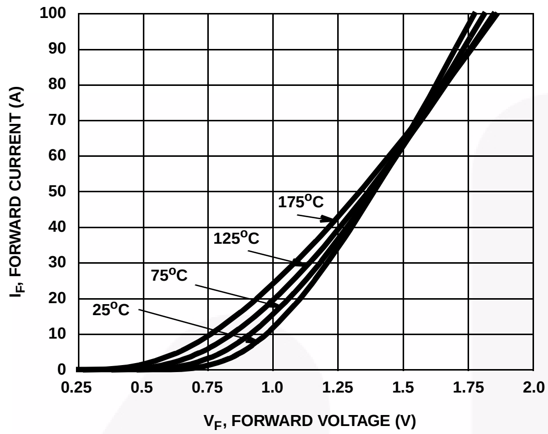


Figure 1. Forward Current vs Forward Voltage

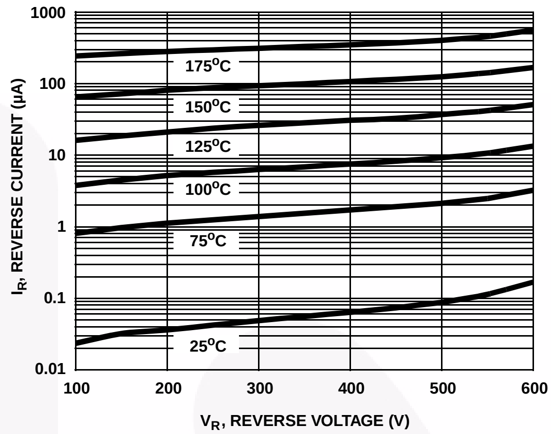


Figure 2. Reverse Current vs Reverse Voltage

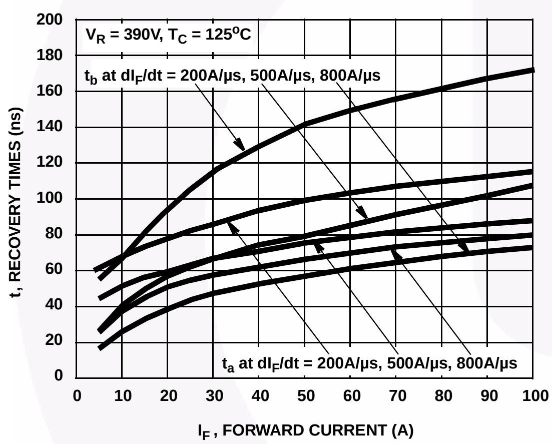


Figure 3. t_a and t_b Curves vs Forward Current

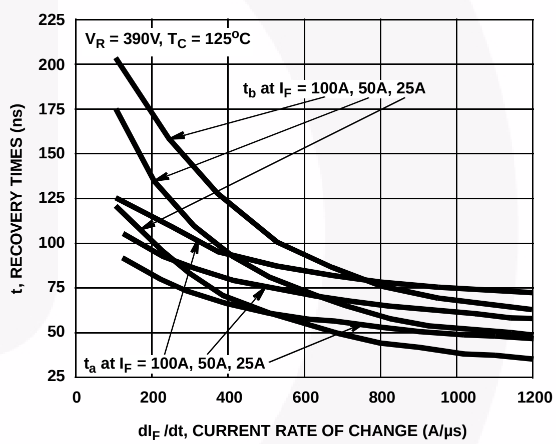


Figure 4. t_a and t_b Curves vs dI_F/dt

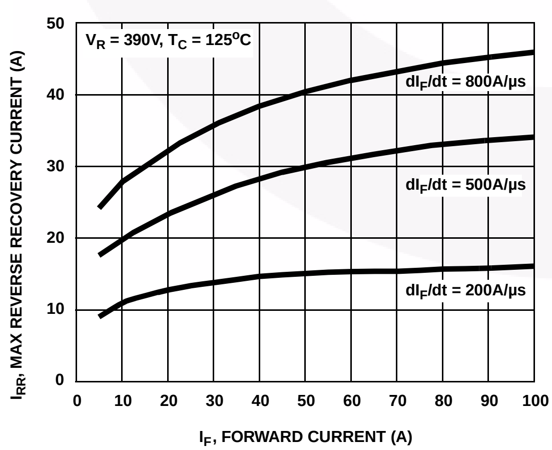


Figure 5. Maximum Reverse Recovery Current vs Forward Current

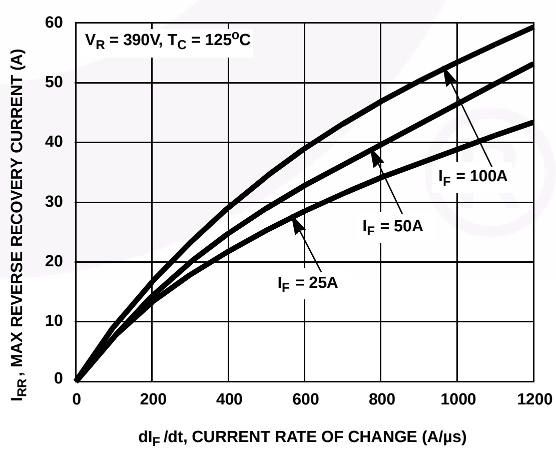


Figure 6. Maximum Reverse Recovery Current vs dI_F/dt

Typical Performance Curves (Continued)

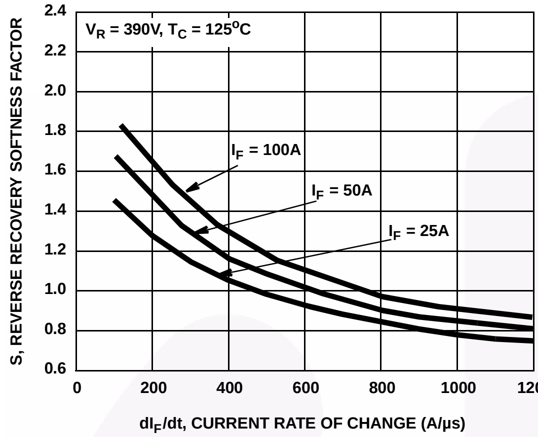


Figure 7. Reverse Recovery Softness Factor vs dI_F/dt

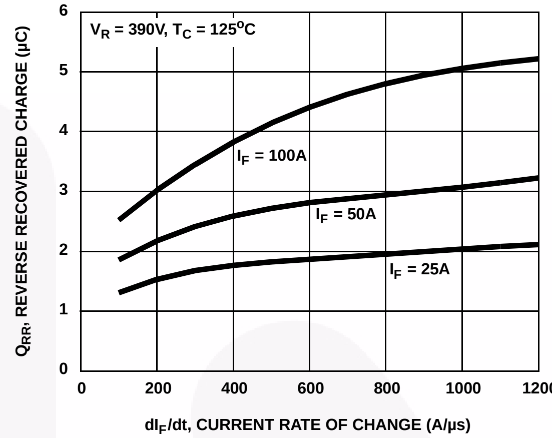


Figure 8. Reverse Recovery Charge vs dI_F/dt

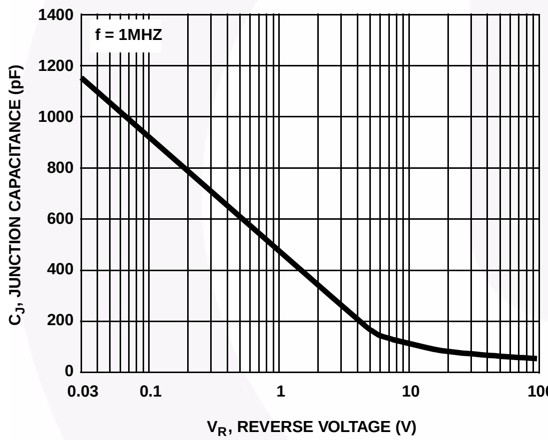


Figure 9. Junction Capacitance vs Reverse Voltage

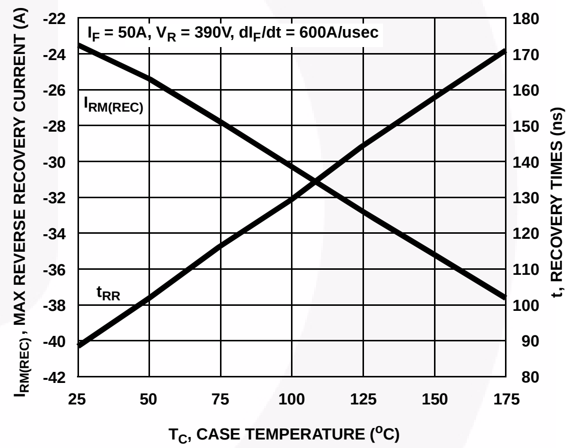


Figure 10. Maximum Reverse Recovery Current and t_{rr} vs Case Temperature

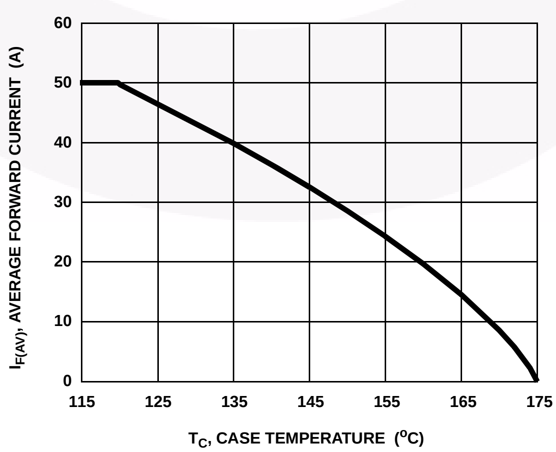


Figure 11. DC CURRENT DERATING CURVE

Typical Performance Curves (Continued)

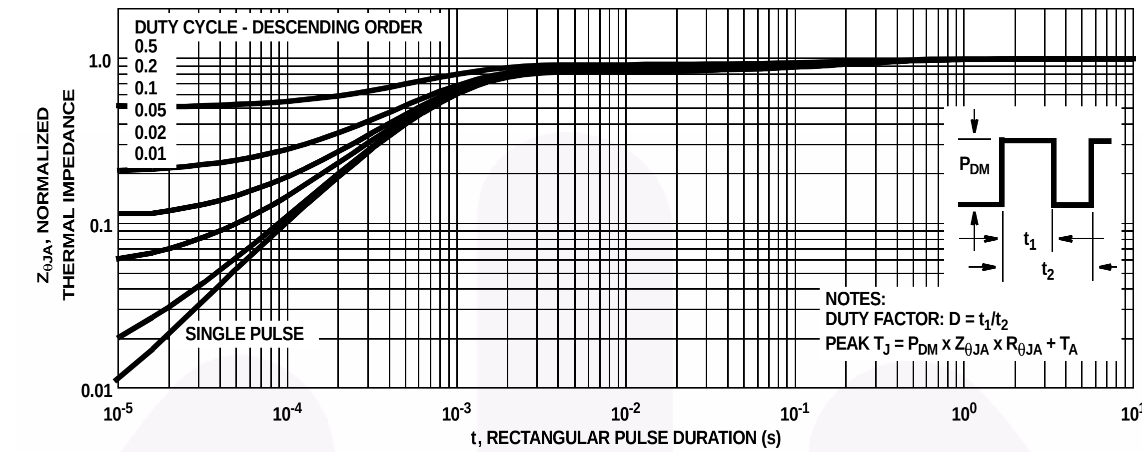


Figure 12. Normalized Maximum Transient Thermal Impedance

Test Circuit and Waveforms

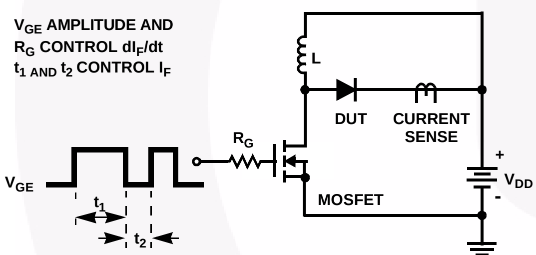


Figure 13. t_{rr} Test Circuit

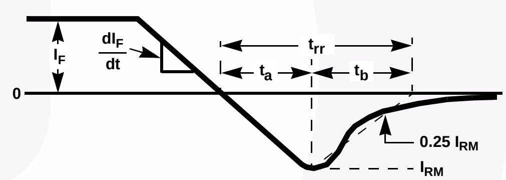


Figure 14. t_{rr} Waveforms and Definitions

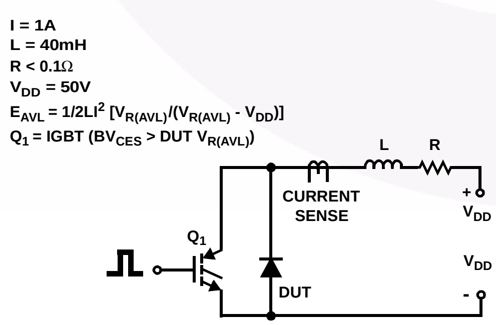


Figure 15. Avalanche Energy Test Circuit

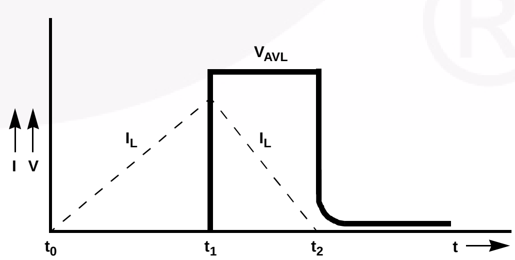
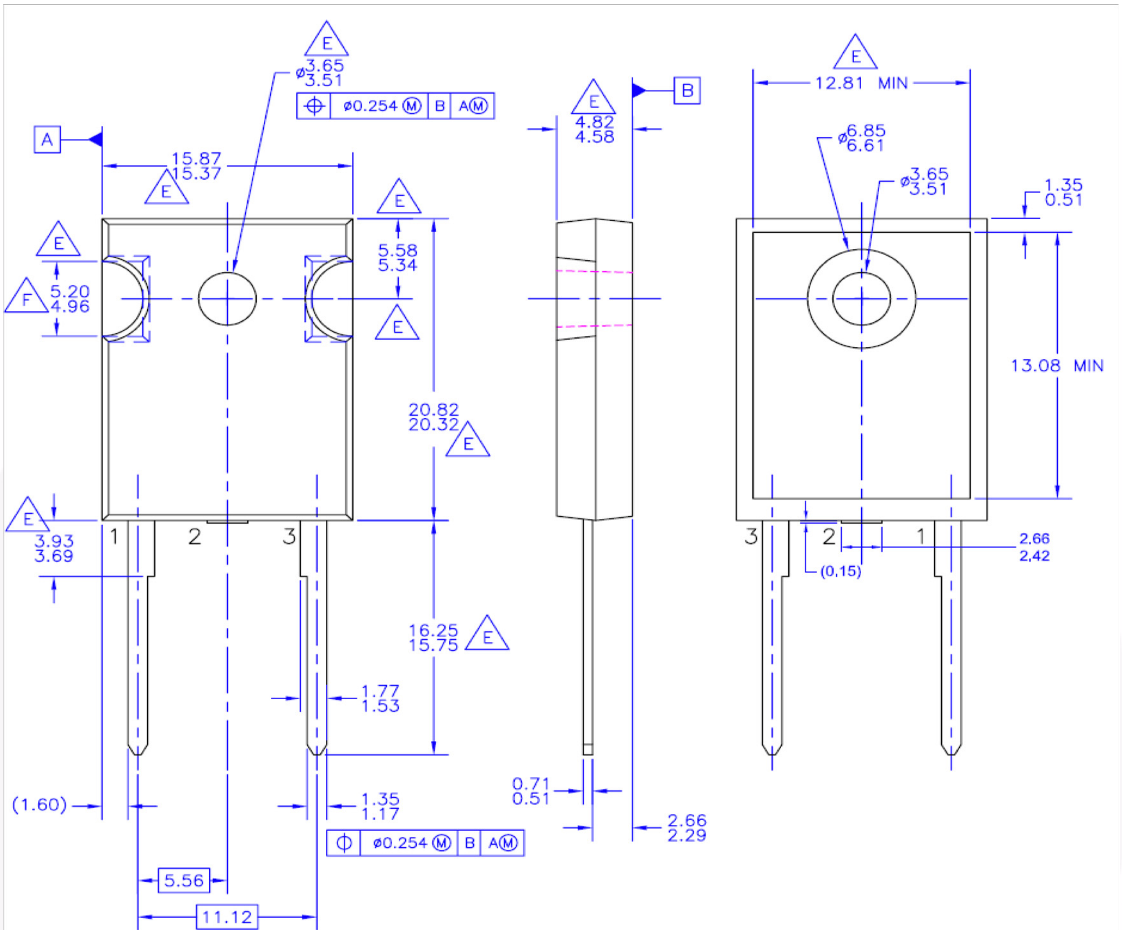


Figure 16. Avalanche Current and Voltage Waveforms

Mechanical Dimensions

TO247-2L



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E. DOES NOT COMPLY JEDEC STANDARD VALUE
F. NOTCH MAY BE SQUARE
G. DRAWING FILENAME: MKT-TO247B02_REV02

Figure 17. TO-247,Molded, 2LD, Jedec Option AB

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