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December 2014

FFH50US60S_F085
50A, 600V Stealth Diode

Features

- Stealth Recovery (t_{rr}=163ns(Typ.) @ I_F=50A)
- Low Forward Voltage(V_F=1.69V(Max.) @ I_F=50A)
- Avalanche Energy Rated
- AEC-Q101 Qualified

Applications

- Automotive DCDC Converter
- Automotive On Board Charger
- Switching Power Supply
- Power Switching Circuits

50A,600V Stealth Diode

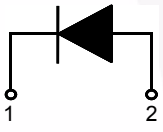
The FFH50US60S_F085 is a Stealth™ diode optimized for low loss performance in output rectification.The STEALTH™ family exhibits low reverse recovery current(I_{RR}),low V_F and soft recovery under typical operating conditions. It has a low forward-voltage drop and is of silicon nitride passivated.

This device is intended for use as a freewheel/clamping diode in various automotive switching power supplies and other power switching applications. Its low stored charge as well as Stealth™ and soft recovery characteristics minimize ringing and electrical noise while reduce the overall power loss.

Pin Assignments

TO-247-2L

1. Cathode 2. Anode



1. Cathode 2. Anode

Absolute Maximum Ratings T_C = 25°C 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 = 25°C	50	A
I_{FSM}	Non-repetitive Peak Surge Current (Halfwave 1 Phase 50Hz)	150	A
E_{AVL}	Avalanche Energy (1A, 40mH)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature	- 55 to +175	°C

Thermal Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.71	°C/W
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	30	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
FFH50US60S	FFH50US60S_F085	TO-247-2L	-	30

Electrical Characteristics T_C = 25°C unless otherwise noted

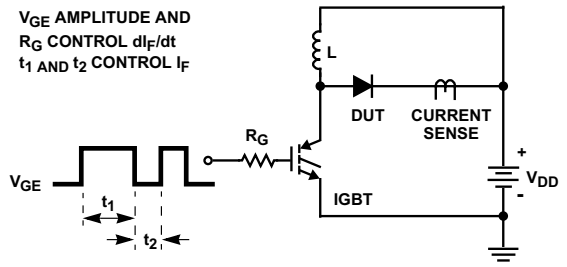
Symbol	Parameter	Conditions		Min.	Typ.	Max	Units
I_R	Instantaneous Reverse Current	V_R = 600V	T_C = 25 °C	-	-	100	uA
			T_C = 175 °C	-	-	1000	uA
V_{FM}[1]	Instantaneous Forward Voltage	I_F = 50A	T_C = 25 °C T_C = 175 °C	- -	1.27 1.19	1.69 1.57	V V
t_{rr}[2]	Reverse Recovery Time	I_F =1A, di/dt = 200A/μs, V_R = 390V	T_C = 25 °C	-	41	82	ns
		I_F = 50A, di/dt = 200A/μs, V_R= 390V	T_C = 25 °C T_C = 175 °C	- -	163 364	- -	ns ns
t_a t_b Q_{rr}	Reverse Recovery Time Reverse Recovery Charge	I_F = 50A, di/dt = 200A/μs, V_R= 390V	T_C = 25 °C	- - -	65 98 886	- - -	ns ns nC

Notes:

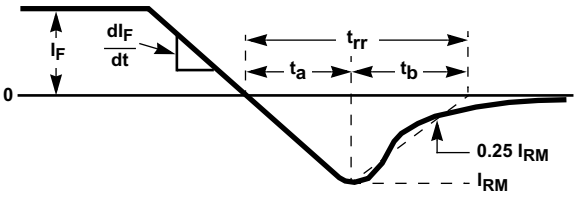
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%
2. Guaranteed by design

Test Circuit and Waveforms

t_{rr} Test Circuit

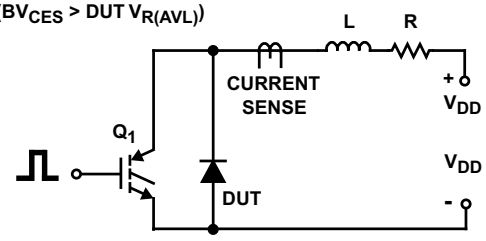


t_{rr} Waveforms and Definitions

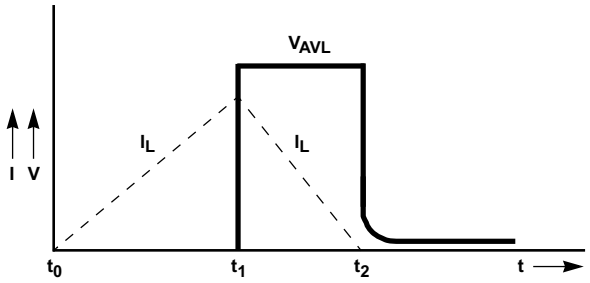


Avalanche Energy Test Circuit

I = 1A
L = 40mH
R < 0.1Ω
E_{AVL} = 1/2LI^2 [$V_{R(AVL)}$/($V_{R(AVL)}$ - V_{DD})]
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)



Avalanche Current and Voltage Waveforms



Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

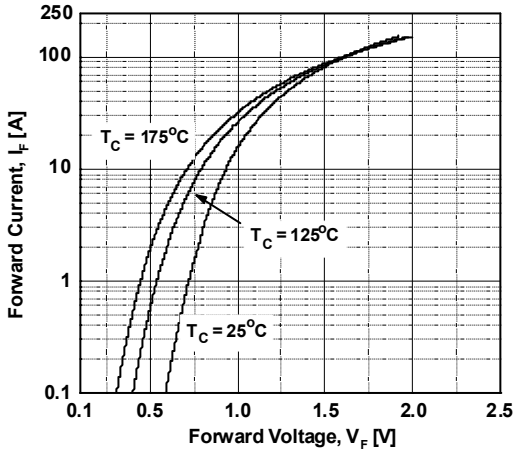


Figure 2. Typical Reverse Current vs. Reverse Voltage

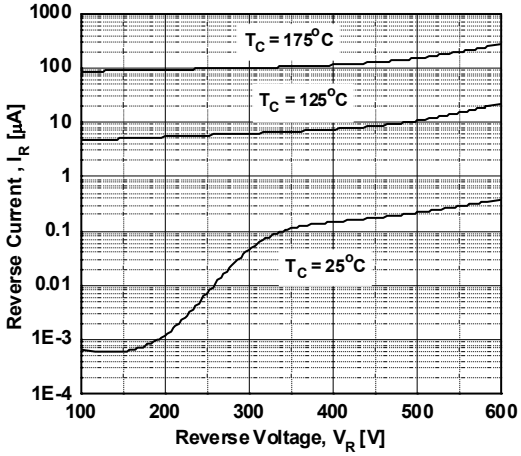


Figure 3.Typical Junction Capacitance

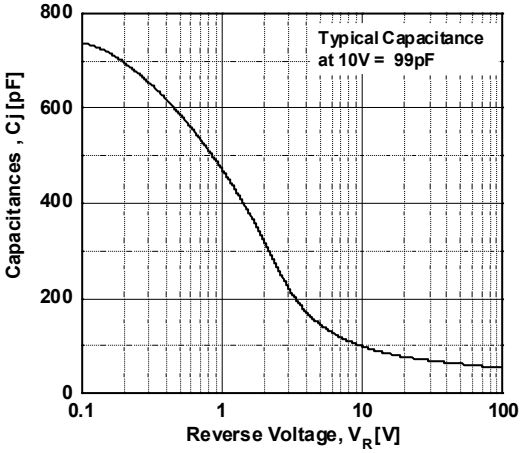


Figure 4. Typical Reverse Recovery Time vs. di/dt

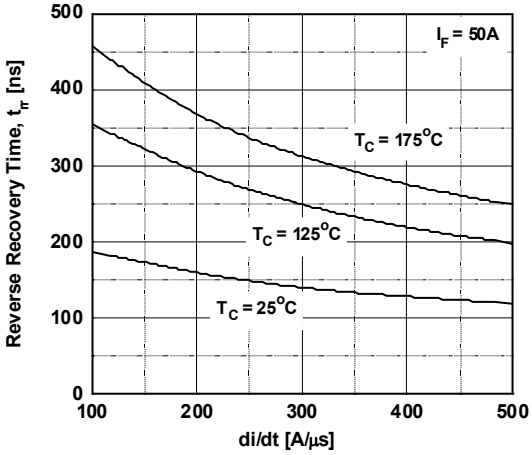


Figure 5. Typical Reverse Recovery Current vs. di/dt

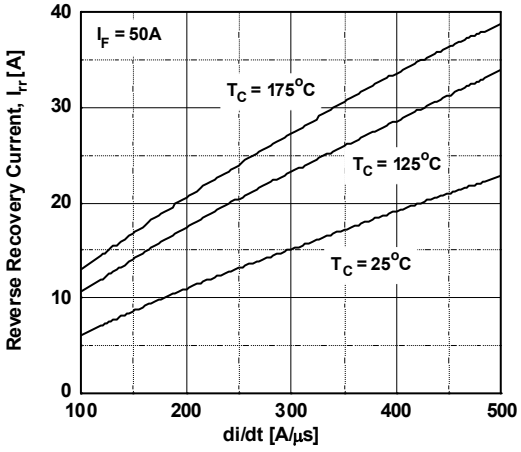
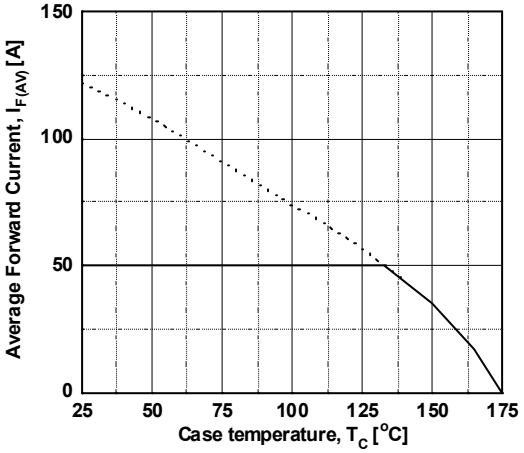


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

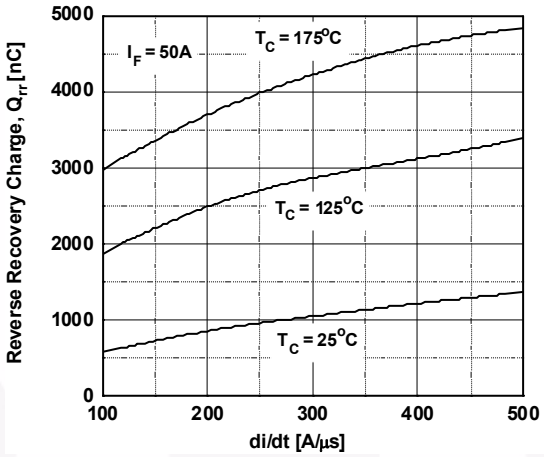
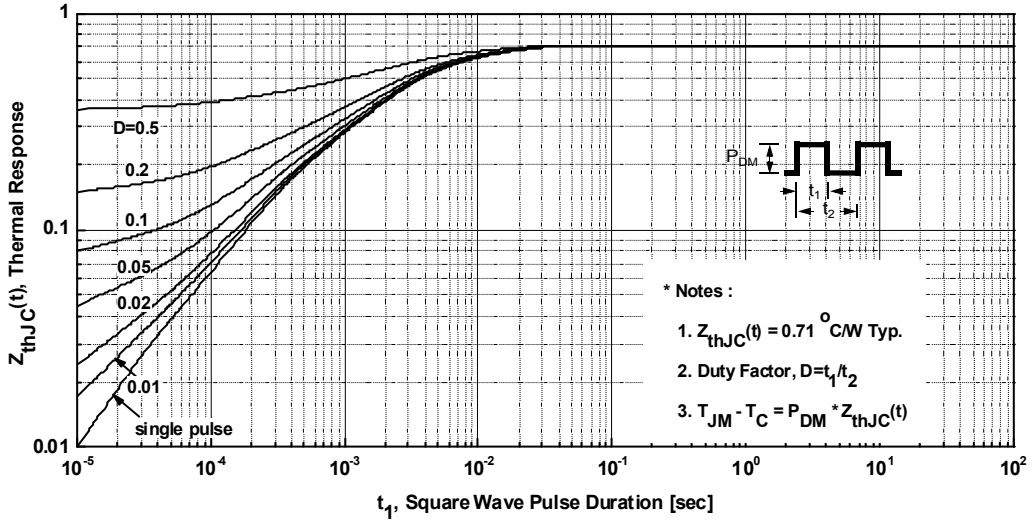
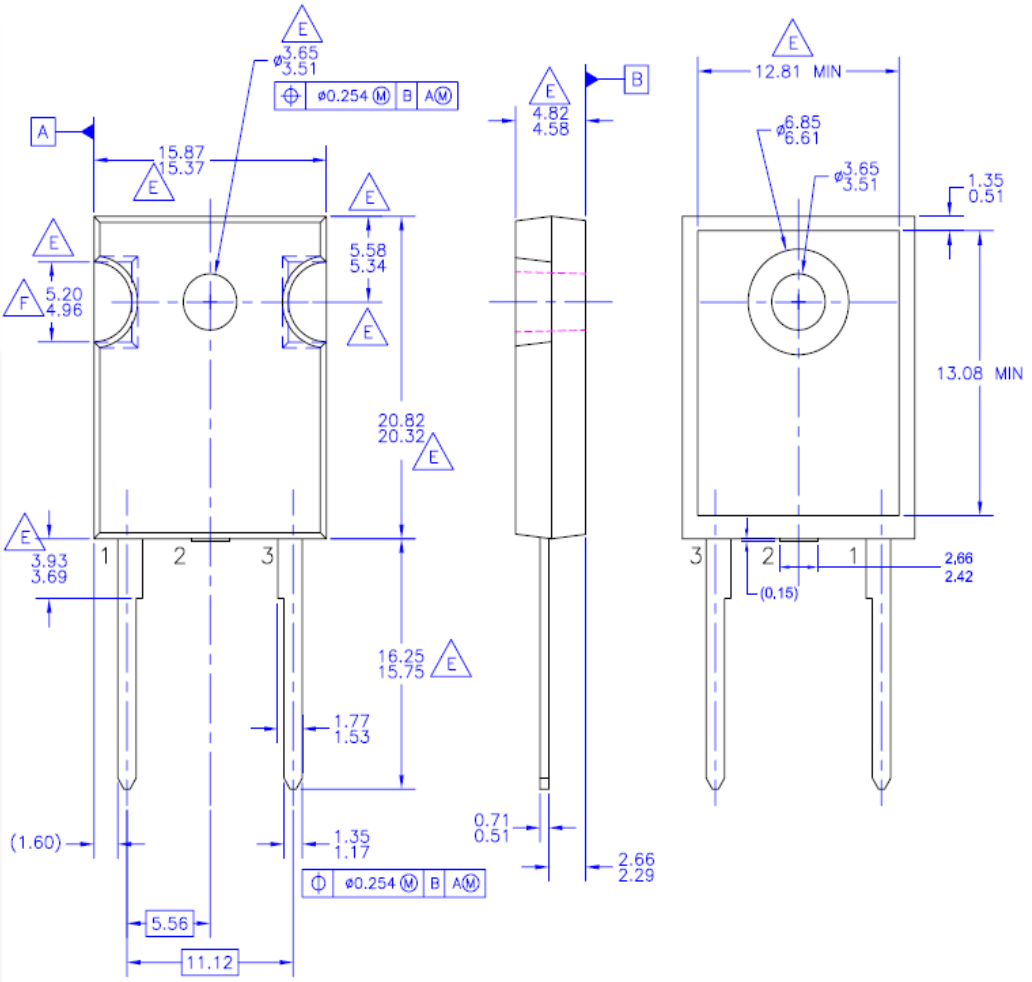


Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-2L



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F. NOTCH MAY BE SQUARE

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