



ON Semiconductor®

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

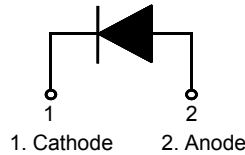
The FFH50US60S-F085 is a Stealth™ diode optimized for low loss performance in output rectification. The STEALTH™ family exhibits low reverse recovery current(I_{RR}), low V_F and soft recovery under typical operating conditions. It has a low forward-voltage drop and is of silicon nitride passivated.

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



1. Cathode 2. Anode



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ 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 @ $T_C = 25^\circ\text{C}$	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	$^\circ\text{C}$

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

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

Package Marking and Ordering Information

Device Marking	Device	Package	Tube	Quantity
FFH50US60S	FFH50US60S-F085	TO-247-2L	-	30

FFH50US60S-F085 50A, 600V Stealth Diode

Electrical Characteristics T_C = 25°C unless otherwise noted

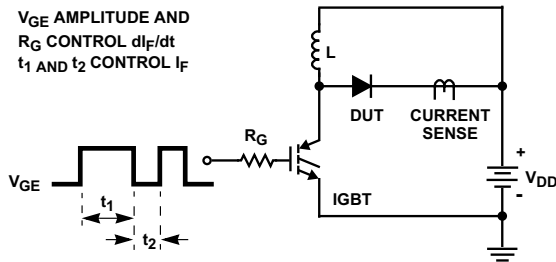
Symbol	Parameter	Conditions	Min.	Typ.	Max	Units	
I _R	Instantaneous Reverse Current	V _R = 600V	T _C = 25 °C	-	-	100	uA
			T _C = 175 °C	-	-	1000	uA
V _{FM} ¹	Instantaneous Forward Voltage	I _F = 50A	T _C = 25 °C	-	1.27	1.69	V
			T _C = 175 °C	-	1.19	1.57	V
t _{rr} ²	Reverse Recovery Time	I _F = 1A, 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	-	163	-
			T _C = 175 °C	-	364	-	ns
t _a	Reverse Recovery Time	I _F = 50A, di/dt = 200A/μs, V _R = 390V	T _C = 25 °C	-	65	-	ns
t _b	Reverse Recovery Time			-	98	-	ns
Q _{rr}	Reverse Recovery Charge			-	886	-	nC

Notes:

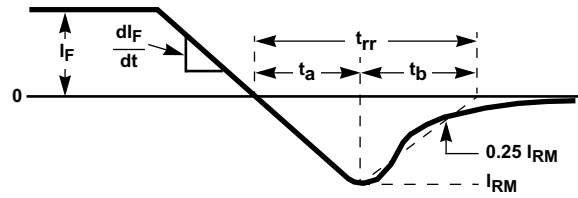
1. Pulse : Test Pulse width = 300μs, Duty Cycle = 2%
2. Guaranteed by design

Test Circuit and Waveforms

t_{rr} Test Circuit

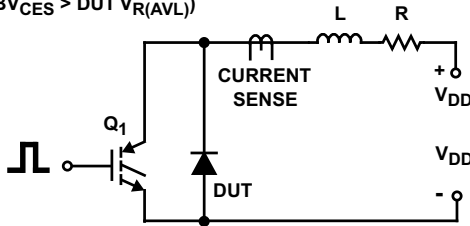


t_{rr} Waveforms and Definitions

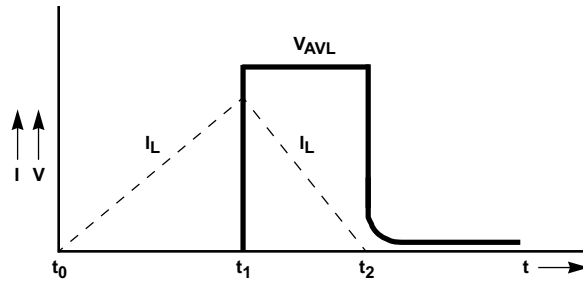


Avalanche Energy Test Circuit

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



Avalanche Current and Voltage Waveforms



Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop vs. Forward Current

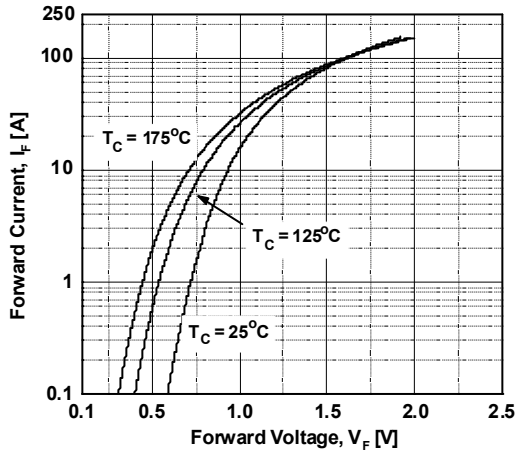


Figure 3. Typical Junction Capacitance

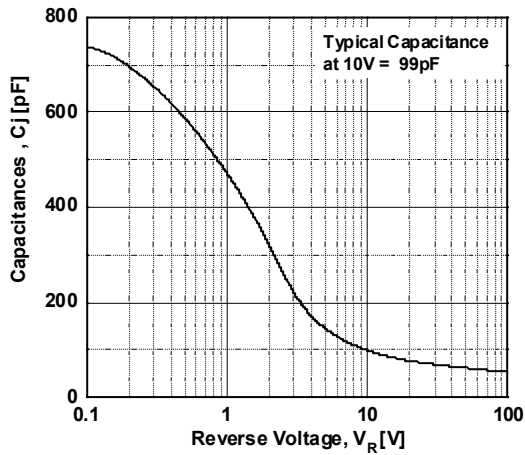


Figure 5. Typical Reverse Recovery Current vs. di/dt

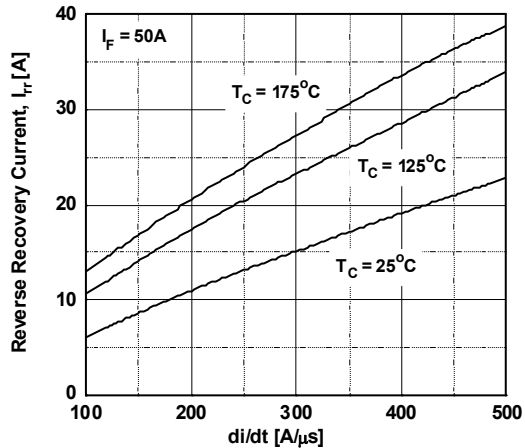


Figure 2. Typical Reverse Current vs. Reverse Voltage

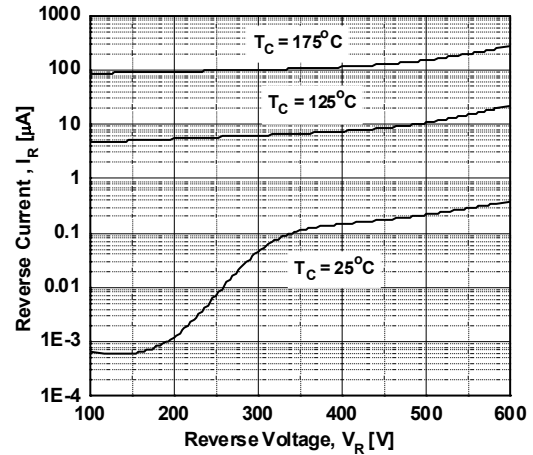


Figure 4. Typical Reverse Recovery Time vs. di/dt

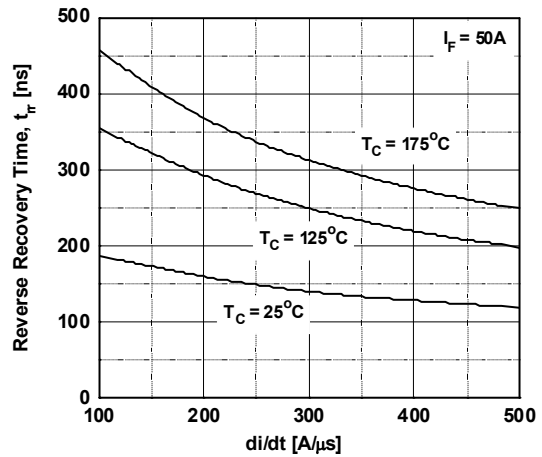
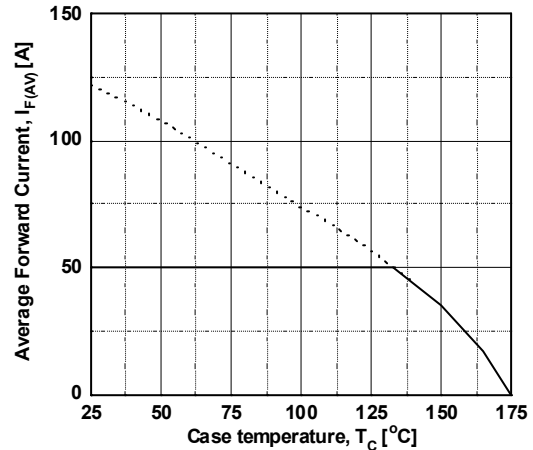


Figure 6. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

Figure 7. Reverse Recovery Charge

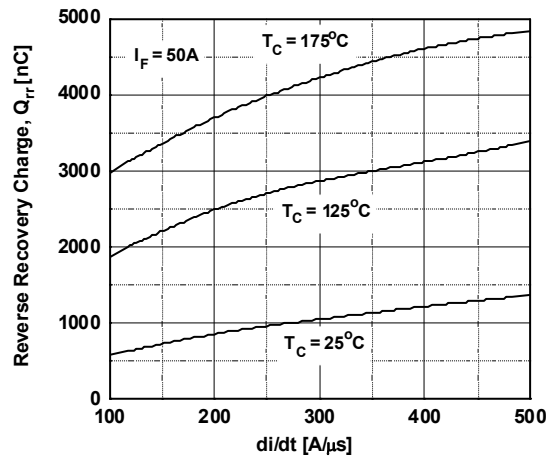
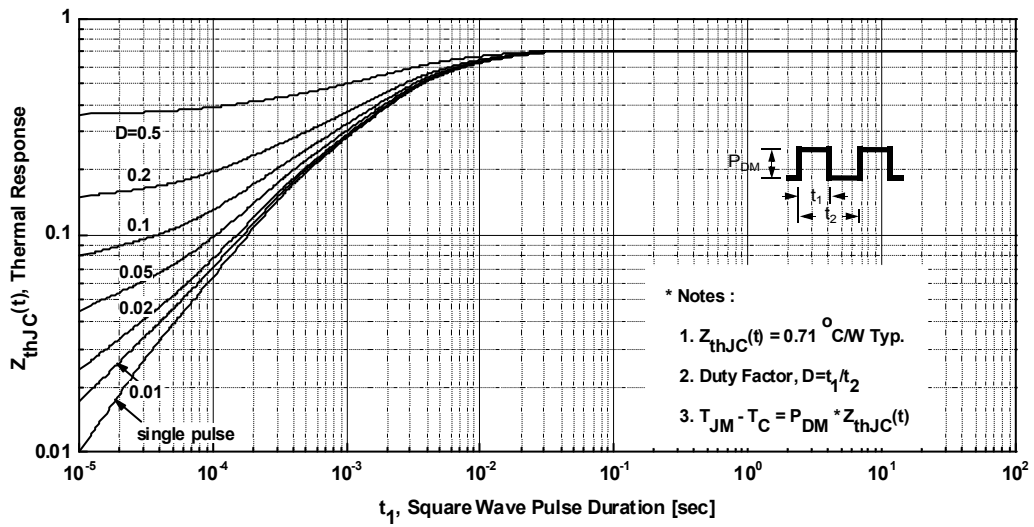
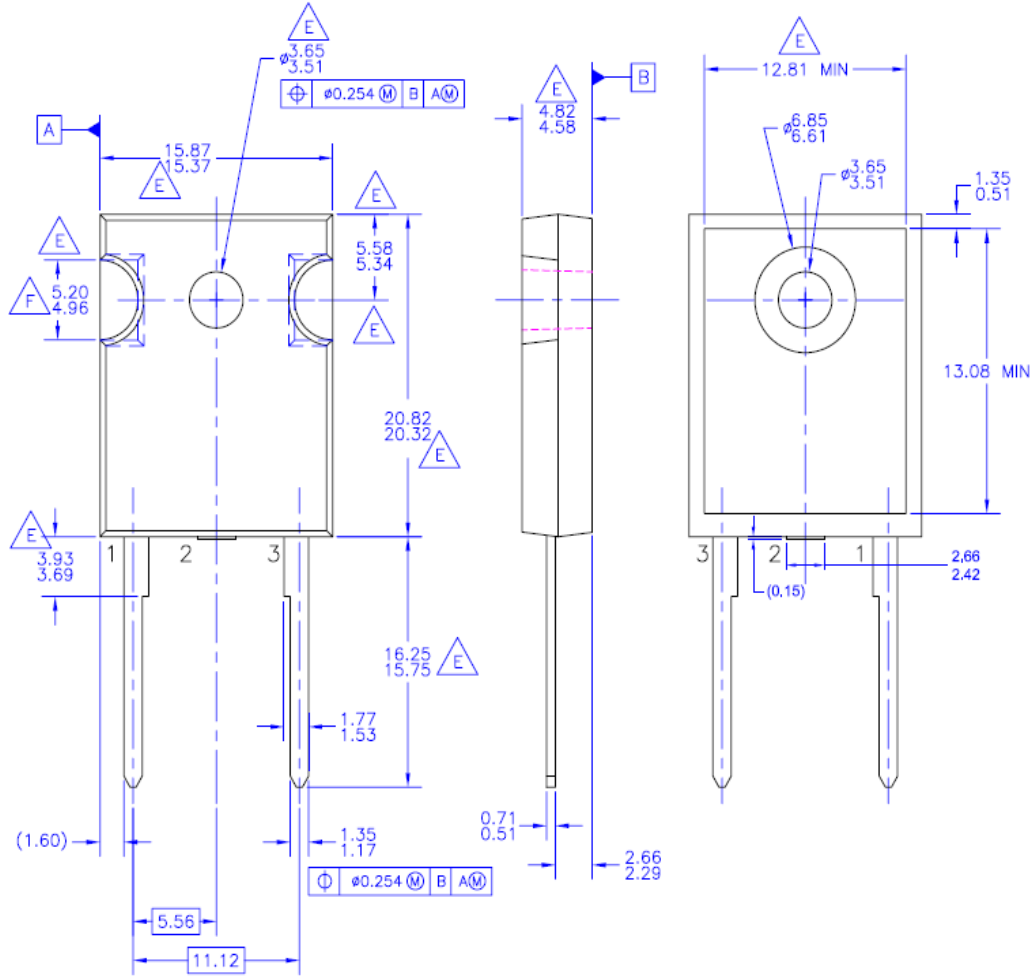




Figure 8. Transient Thermal Response Curve



Mechanical Dimensions

TO-247-2L



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Dimensions in Millimeters

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