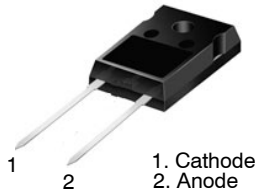
Hyperfast Diode

75 A, 600 V

FFH75H60S



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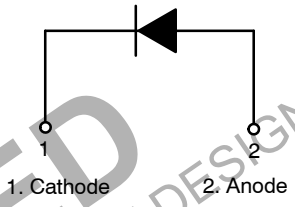
CASE 340CL



Description

The FFH75H60S is a hyperfast diode with soft recovery characteristics. It has the half recovery time of ultrafast diodes and is silicon nitride passivated ionimplanted epitaxial planar construction. These devices are intended to be used as freewheeling/clamping diodes and diodes in a variety of switching power supplies and other power switching applications. Their low stored charge and hyperfast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

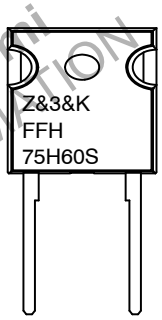
Features

- Hyperfast Recovery t_{rr} = 75 ns (@ I_F = 75 A)
- Max Forward Voltage, V_F = 1.8 V (@ T_C = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- This Device is Pb−Free and is RoHS Compliant

Applications

- General Purpose
- SMPS, Solar Inverter, UPC
- Power Switching Circuits
- Solar Inverter, UPC

MARKING DIAGRAM



&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
FFH75H60S	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	600	V
Working Peak Reverse Voltage	V_{RWM}	600	V
DC Blocking Voltage	V_R	600	V
Average Rectified Forward Current (T_C = 105°C)	$I_{F(AV)}$	75	A
Non−repetitive Peak Surge Current 60 Hz Single Half−Sine Wave	I_{FSM}	750	A
Operating Junction and Storage Temperature	T_J, T_{STG}	−65 to 175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Parameter	Symbol	Max	Unit
Maximum Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.4	°C/W

PACKAGE MARKING AND ORDERING INFORMATION

Device	Device Marking	Package	Packing Method	Reel Size	Tape Width	Quantity
FFH75H60S	FFH75H60S	TO−247−2LD	Tube	N/A	N/A	30

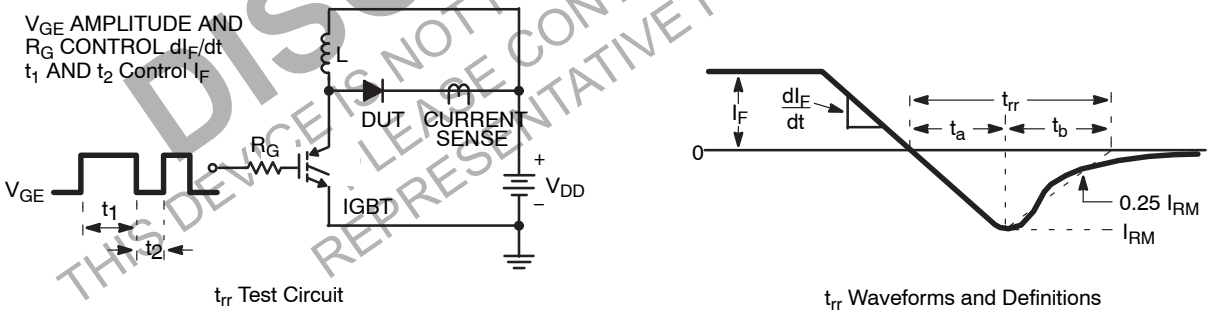
ELECTRICAL Characteristics (T_C = 25°C unless otherwise specified)

Parameter	Conditions		Min	Typ	Max	Unit
V_F (Note 1)	I_F = 75 A	T_C = 25°C	–	1.8	2.2	V
	I_F = 75 A	T_C = 125°C	–	1.6	2.0	V
I_R (Note 1)	V_R = 600 V	T_C = 25°C	–	–	100	μA
	V_R = 600 V	T_C = 125°C	–	–	1.0	mA
t_{rr}	I_F = 75 A, dI_F/dt = 200 A/μs, V_R = 390 V	T_C = 25°C	–	40	75	ns
		T_C = 125°C	–	85	–	ns
t_a	I_F = 75 A, dI_F/dt = 200 A/μs, V_R = 390 V	T_C = 25°C	–	23	–	ns
t_b		T_C = 25°C	–	17	–	ns
Q_{rr}		T_C = 25°C	–	80	–	nC
W_{AVL}	Avalanche Energy (L = 40 mH)		20	–	–	mJ

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse: Test Pulse Width = 300 μs, Duty Cycle = 2%

TEST CIRCUITS AND WAVEFORMS

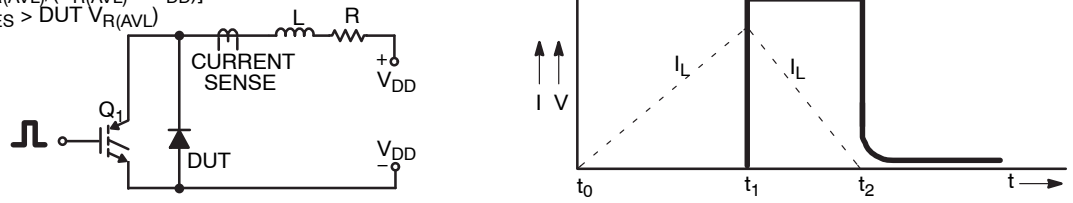


t_{rr} Test Circuit

t_{rr} Waveforms and Definitions

Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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



Avalanche Energy Test Circuit

Avalanche Current and Voltage Waveforms

Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

TYPICAL PERFORMANCE CHARACTERISTICS

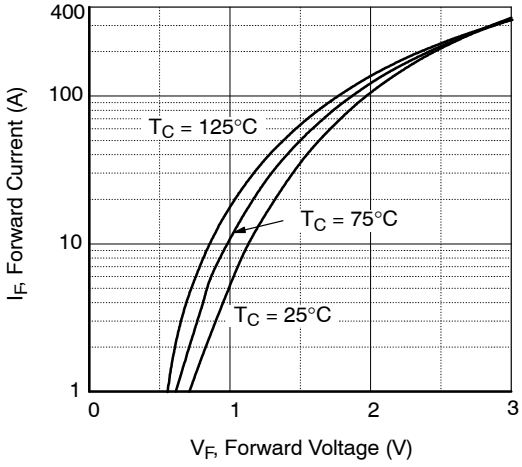


Figure 3. Typical Forward Voltage Drop vs. Forward Current

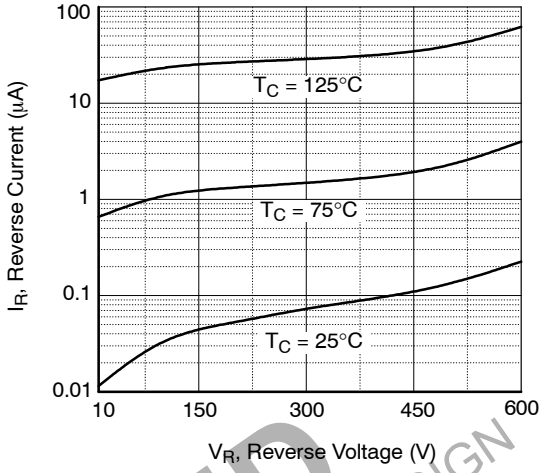


Figure 4. Typical Reverse Current vs. Reverse Voltage

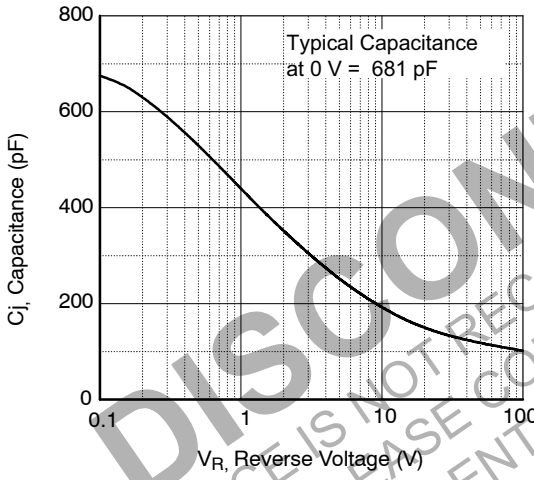


Figure 5. Typical Junction Capacitance

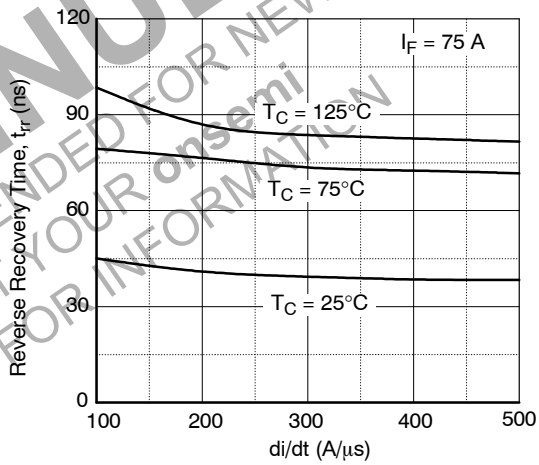


Figure 6. Typical Reverse Recovery Time vs. di/dt

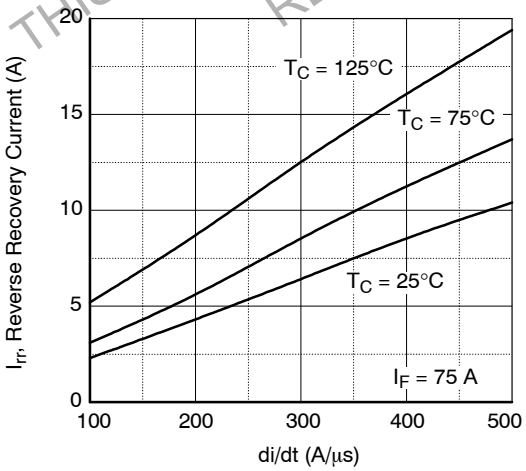


Figure 7. Typical Reverse Recovery Current vs. di/dt

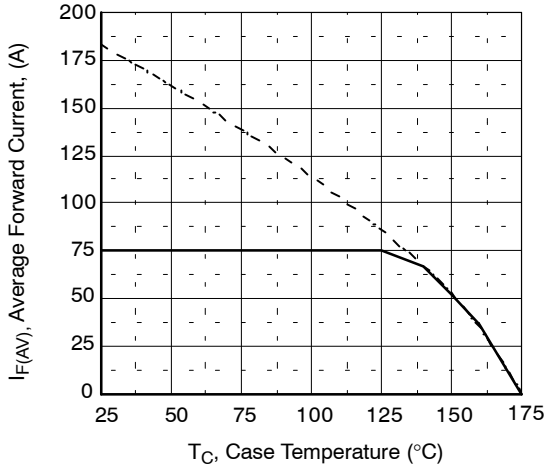


Figure 8. Forward Current Derating Curve

TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

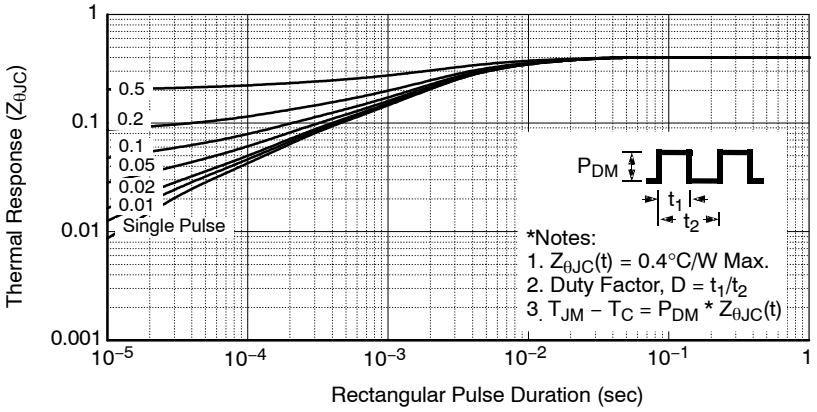


Figure 9. Transient Thermal Response Curve

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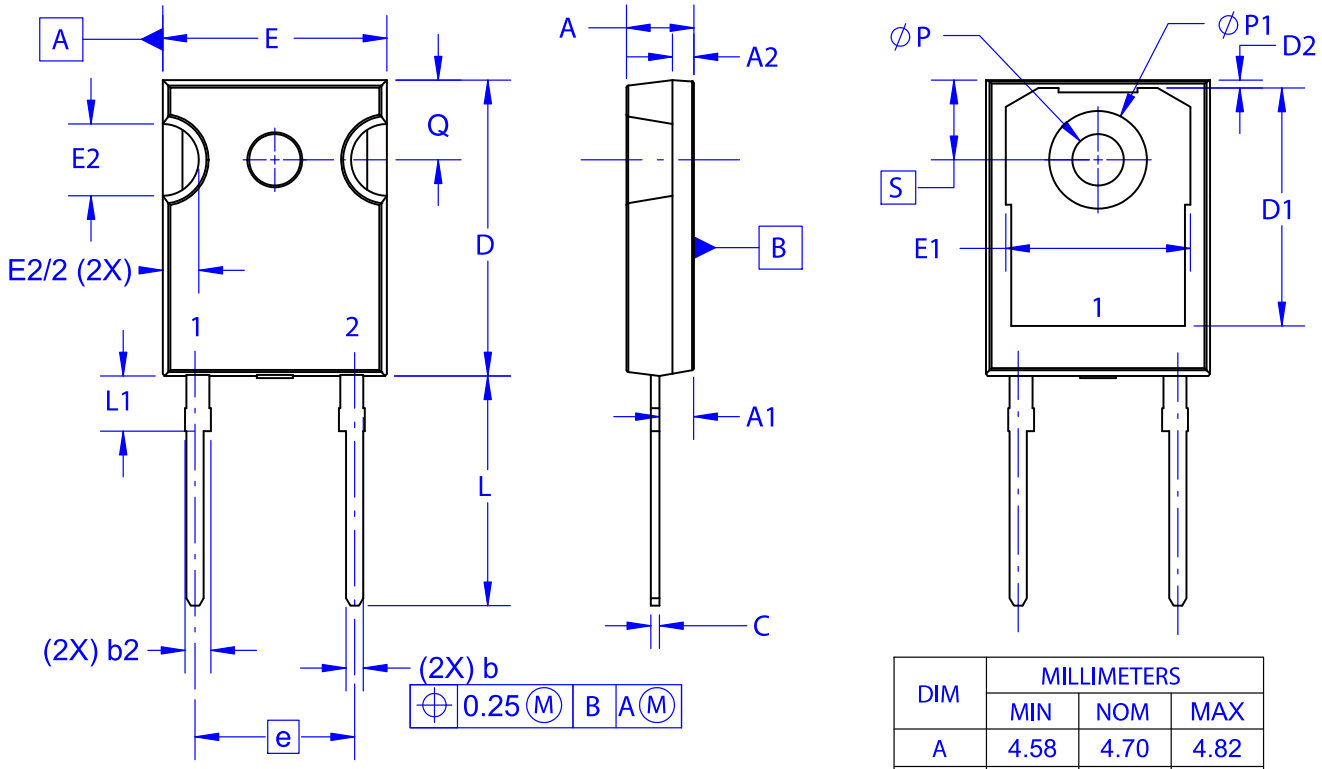
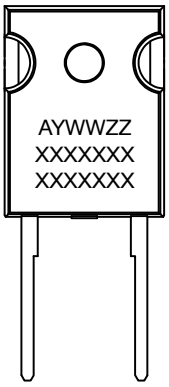


NOTES: UNLESS OTHERWISE SPECIFIED.

A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.29	2.40	2.66
A2	1.30	1.50	1.70
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	16.37	16.57	16.77
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	11.12	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51	3.58	3.65
ØP1	6.61	6.73	6.85
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	**TO−247−2LD**	**PAGE 1 OF 1**

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