

# Hyperfast Diode

**75 A, 600 V**

## FFH75H60S

**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 (@  $T_C = 25^\circ\text{C}$ )
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated
- This Device is Pb-Free and is RoHS Compliant

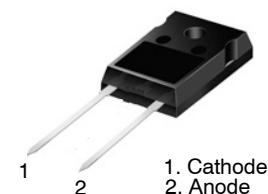
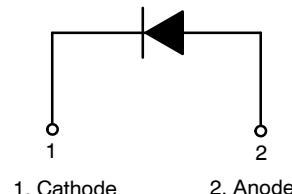
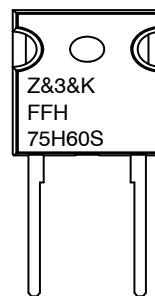
**Applications**

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

**ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  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 ( $T_C = 105^\circ\text{C}$ )	$I_{F(AV)}$	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.

TO-247-2LD  
CASE 340CL**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.

# FFH75H60S

## THERMAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

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

## 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 ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Conditions	Min	Typ	Max	Unit	
$V_F$ (Note 1)	$I_F = 75 \text{ A}$	$T_C = 25^\circ\text{C}$	–	1.8	2.2	V
	$I_F = 75 \text{ A}$	$T_C = 125^\circ\text{C}$	–	1.6	2.0	V
$I_R$ (Note 1)	$V_R = 600 \text{ V}$	$T_C = 25^\circ\text{C}$	–	–	100	$\mu\text{A}$
	$V_R = 600 \text{ V}$	$T_C = 125^\circ\text{C}$	–	–	1.0	mA
$t_{rr}$	$I_F = 75 \text{ A}$ , $dI_F/dt = 200 \text{ A}/\mu\text{s}$ , $V_R = 390 \text{ V}$	$T_C = 25^\circ\text{C}$	–	40	75	ns
		$T_C = 125^\circ\text{C}$	–	85	–	ns
$t_a$	$I_F = 75 \text{ A}$ , $dI_F/dt = 200 \text{ A}/\mu\text{s}$ , $V_R = 390 \text{ V}$	$T_C = 25^\circ\text{C}$	–	23	–	ns
$t_b$		$T_C = 25^\circ\text{C}$	–	17	–	ns
$Q_{rr}$		$T_C = 25^\circ\text{C}$	–	80	–	nC
$W_{AVL}$	Avalanche Energy ( $L = 40 \text{ mH}$ )	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  $\mu\text{s}$ , Duty Cycle = 2%

## TEST CIRCUITS AND WAVEFORMS

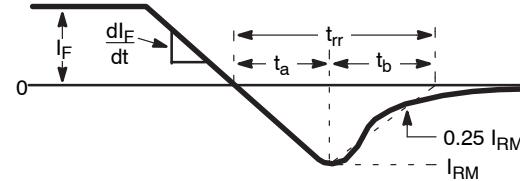
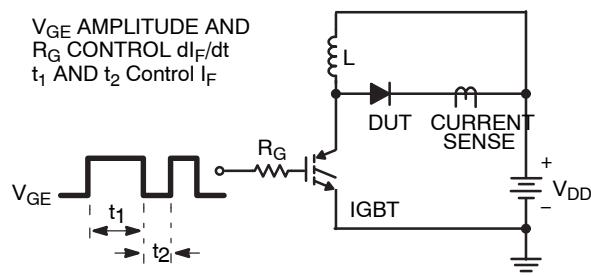


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$$\begin{aligned} I &= 1 \text{ A} \\ L &= 40 \text{ mH} \\ R &< 0.1 \Omega \\ E_{AVL} &= 1/2L^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})] \\ Q_1 &= \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)}) \end{aligned}$$

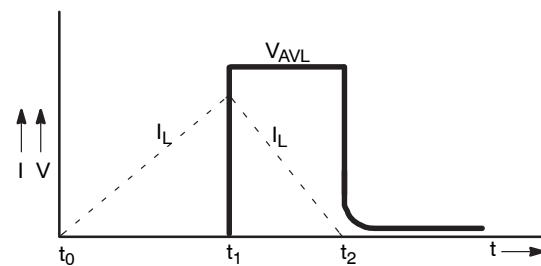
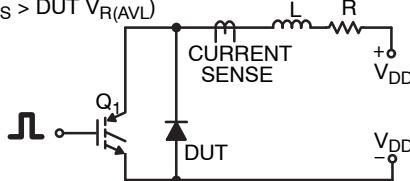
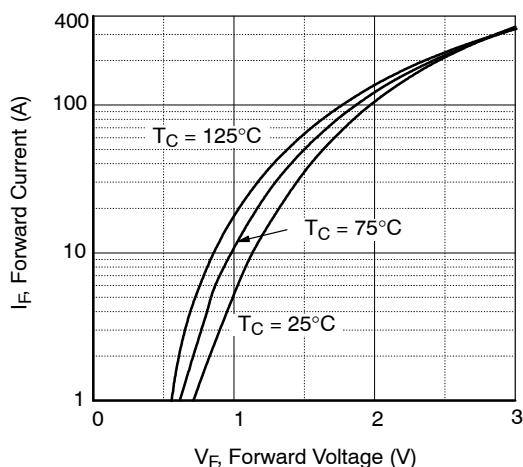
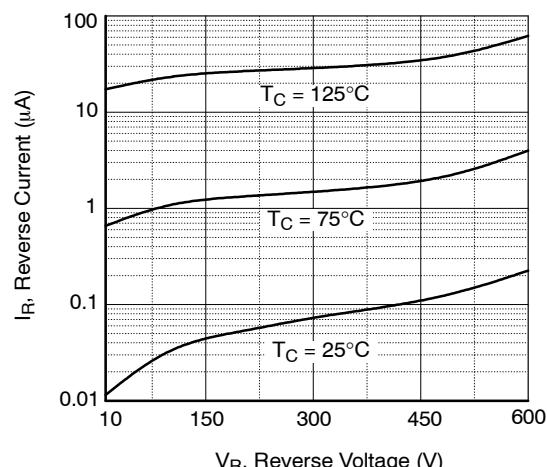


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

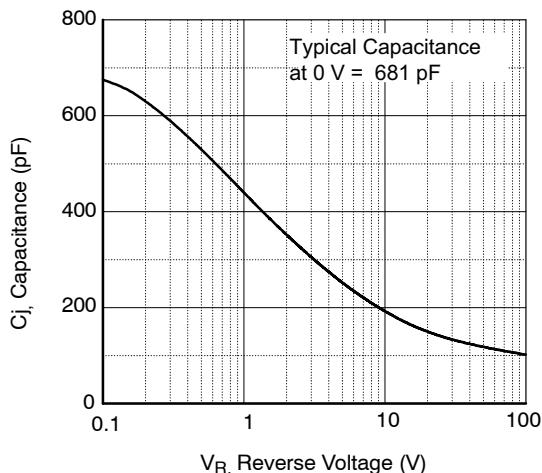
## TYPICAL PERFORMANCE CHARACTERISTICS



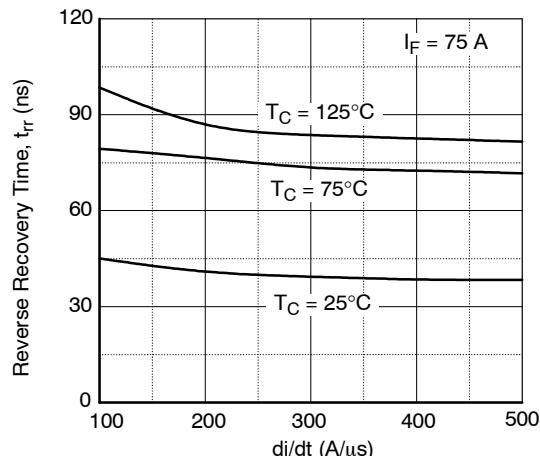
**Figure 3. Typical Forward Voltage Drop vs. Forward Current**



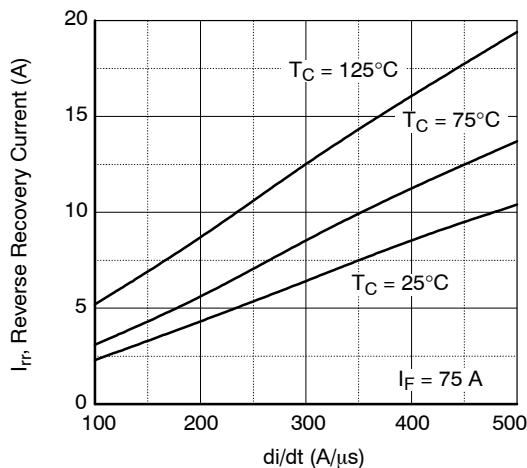
**Figure 4. Typical Reverse Current vs. Reverse Voltage**



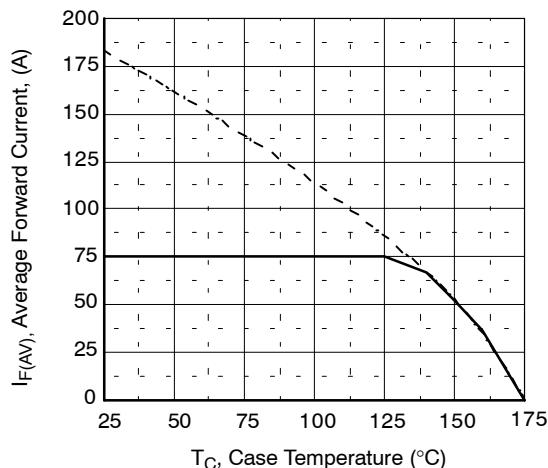
**Figure 5. Typical Junction Capacitance**



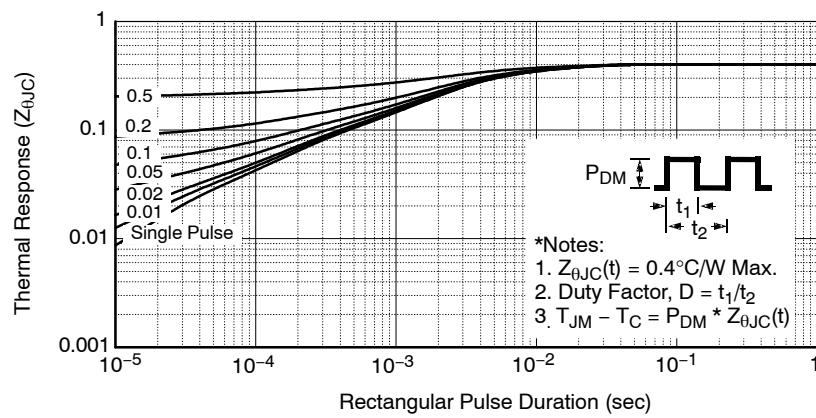
**Figure 6. Typical Reverse Recovery Time vs.  $di/dt$**



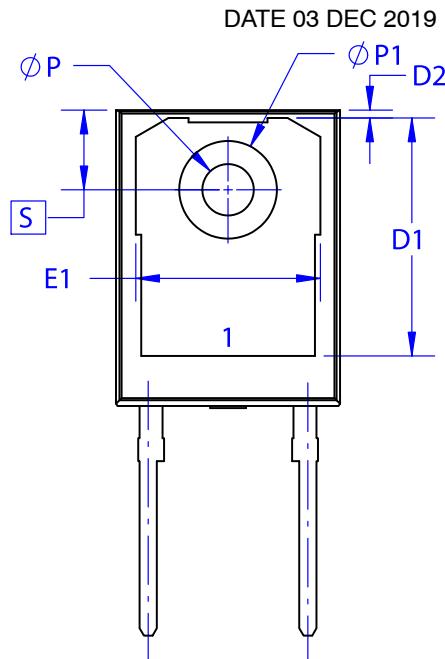
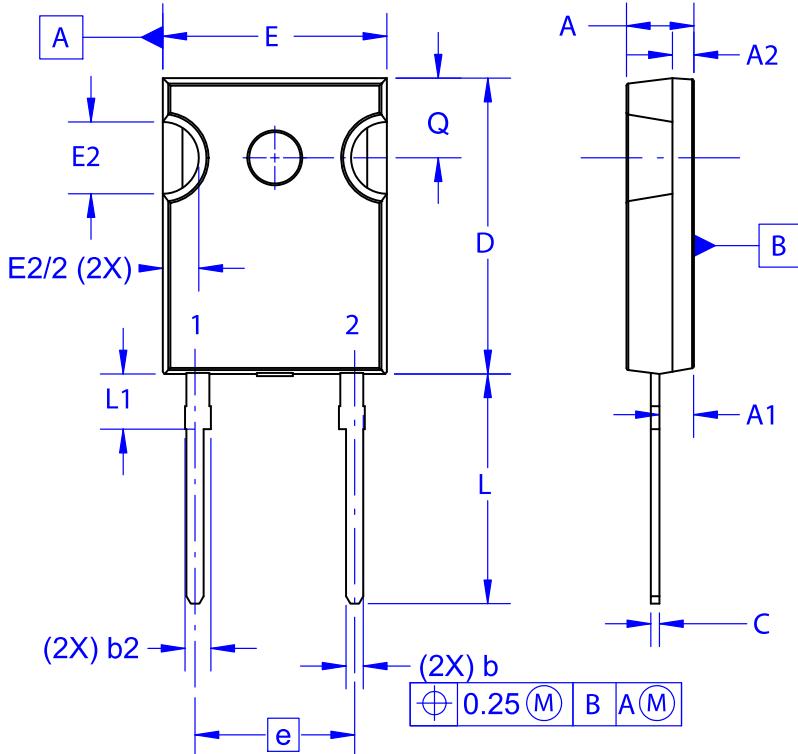
**Figure 7. Typical Reverse Recovery Current vs.  $di/dt$**



**Figure 8. Forward Current Derating Curve**

**TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)****Figure 9. Transient Thermal Response Curve**

**TO-247-2LD**  
CASE 340CL  
ISSUE A

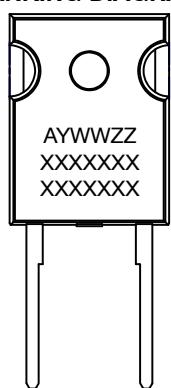


DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.29	2.40	2.66
A2	1.30	1.50	1.70
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	16.37	16.57	16.77
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	11.12	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51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

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.

**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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