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March 2016

# FFA40UP35S

## 40 A, 350 V Ultrafast Diode



FFA40UP35S – Ultrafast Diode

### Features

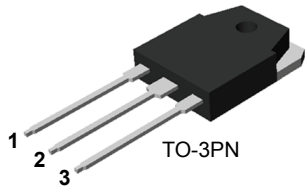
- Ultrafast Recovery,  $t_{rr} < 55 \text{ ns}$  (@  $I_F = 40 \text{ A}$ )
- Max. Forward Voltage,  $V_F = 1.6 \text{ V}$  ( $T_C = 25^\circ\text{C}$ )
- Reverse Voltage:  $V_{RRM} = 350 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

### Description

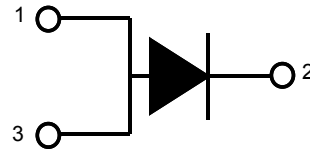
The FFA40UP35S is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial applications as welder and UPS application.

### Applications

- General Purpose
- SMPS, Free-Wheeling Diode for Motor Application
- Power Switching Circuits, Welder, UPS



1. Anode 2. Cathode 3. Anode



1. Anode 2. Cathode 3. Anode

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	350	V
$V_{RWM}$	Working Peak Reverse Voltage	350	V
$V_R$	DC Blocking Voltage	350	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 125^\circ\text{C}$	40	A
$I_{FSM}$	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	300	A
$T_J, T_{STG}$	Operating and Storage Temperature Range	-65 to +175	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	0.8	$^\circ\text{C/W}$

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFA40UP35STU	F40UP35S	TO-3P	Tube	N/A	N/A	30

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{F1}$	$I_F = 40\text{ A}$ $I_F = 40\text{ A}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	1.6 1.5	V
$I_{R1}$	$V_R = 350\text{ V}$ $V_R = 350\text{ V}$	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	- -	100 500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{ A}$ , $di_F/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ $I_F = 40\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 230\text{ V}$	$T_C = 25^\circ\text{C}$	- 26 28	53 55	ns
$t_a$ $t_b$ $Q_{rr}$	$I_F = 40\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 230\text{ V}$	$T_C = 25^\circ\text{C}$	- - 36	- - -	ns ns nC
$W_{AVL}$	Avalanche Energy ( $L = 40\text{ mH}$ )	20	-	-	mJ

**Notes:**

1: Pulse: Test Pulse width = 300 $\mu\text{s}$ , Duty Cycle = 2%

### Test Circuit and Waveforms

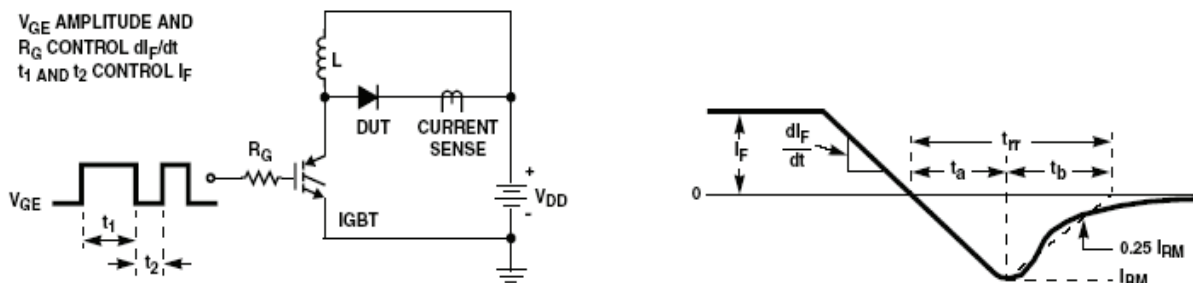


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$   
 $R < 0.1\Omega$   
 $V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$   
 $Q1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

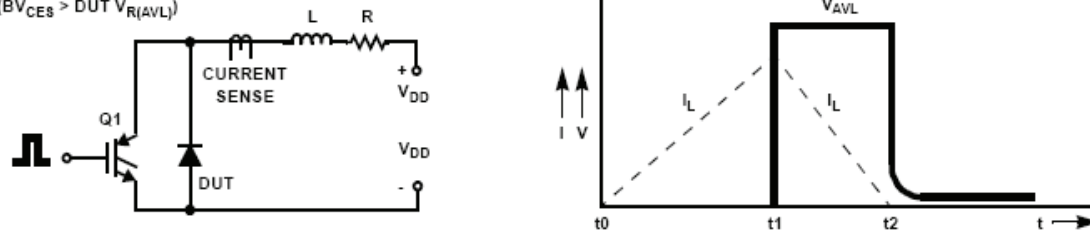


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

### Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

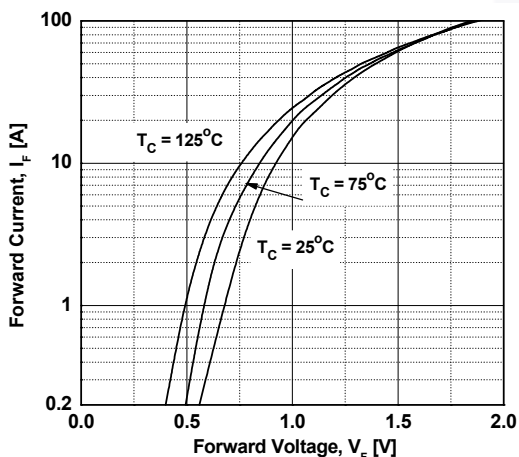


Figure 4. Typical Reverse Current vs. Reverse Voltage

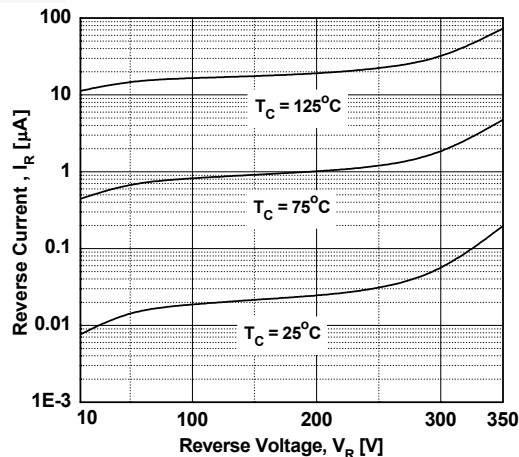


Figure 5. Typical Junction Capacitance

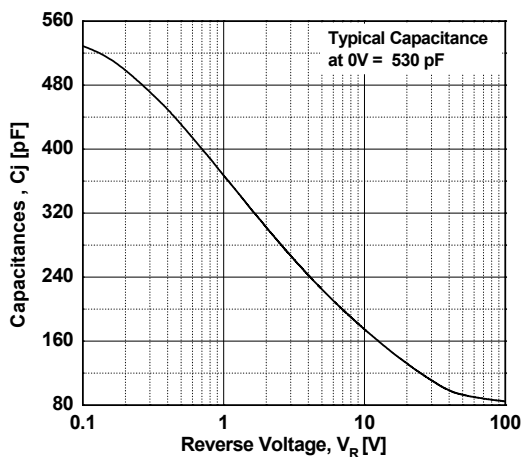


Figure 6. Typical Reverse Recovery Time vs.  $di_F/dt$

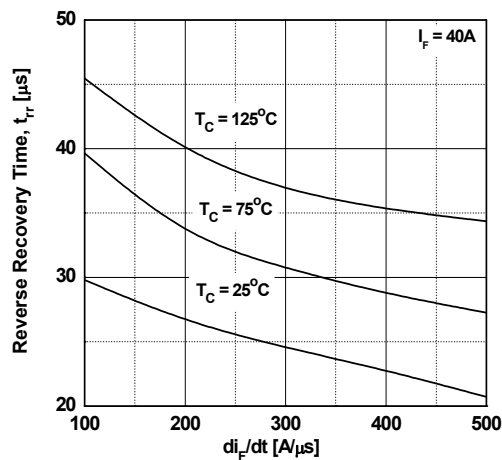


Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$

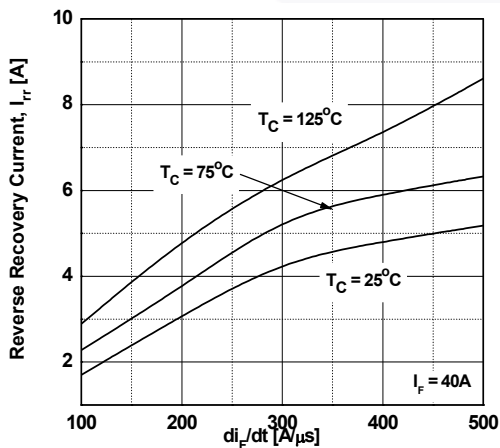
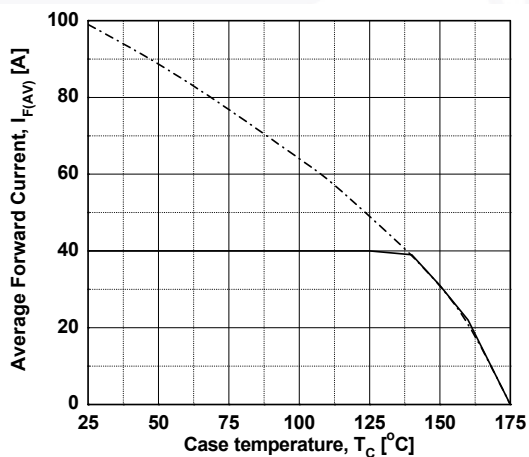
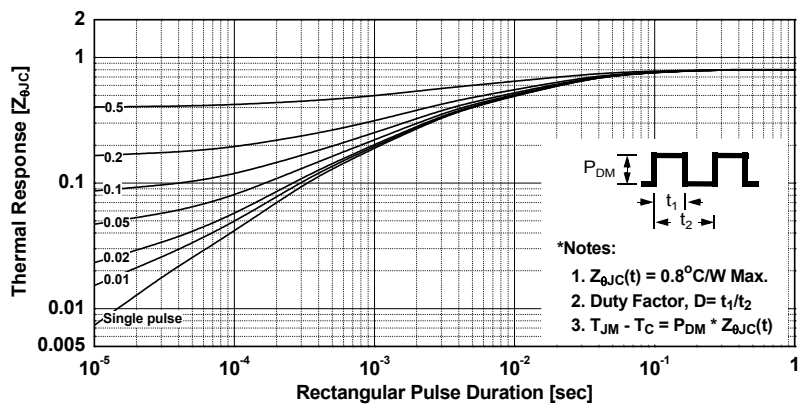


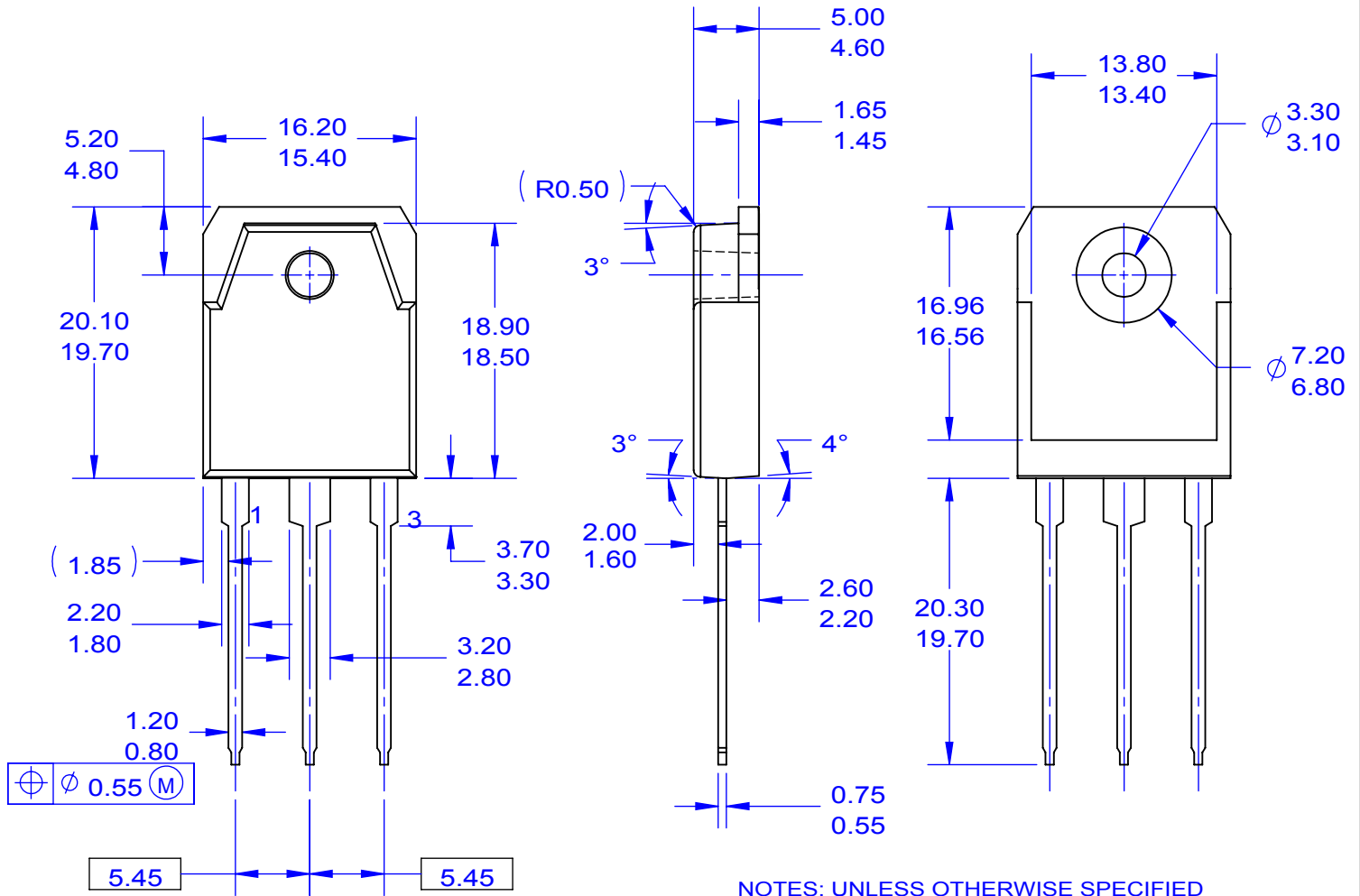
Figure 8. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

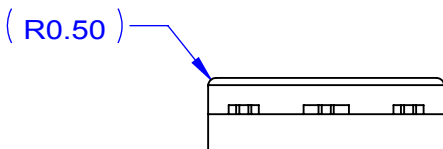
Figure 9. Transient Thermal Response Curve





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