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March 2016

FFA40UP35S

40 A, 350 V Ultrafast Diode



FFA40UP35S – Ultrafast Diode

Features

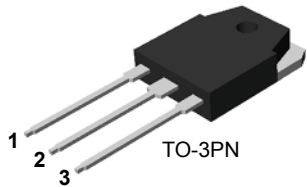
- Ultrafast Recovery, $t_{rr} < 55 \text{ ns}$ (@ $I_F = 40 \text{ A}$)
- Max. Forward Voltage, $V_F = 1.6 \text{ V}$ ($T_C = 25^\circ\text{C}$)
- Reverse Voltage: $V_{RRM} = 350 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

Description

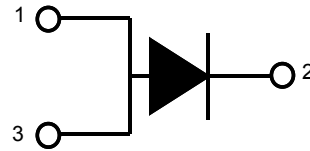
The FFA40UP35S is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies 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	μA
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 μs , Duty Cycle = 2%

Test Circuit and Waveforms

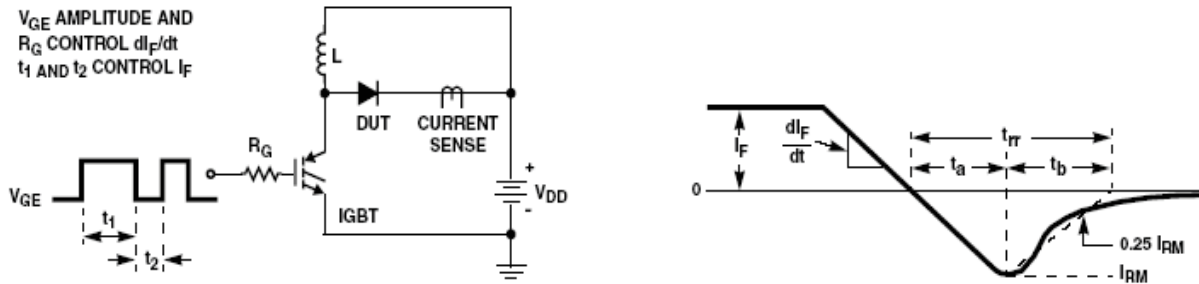


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$
 $R < 0.1\Omega$
 $V_{DD} = 50\text{V}$
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT } (BV_{CES} > \text{DUT } V_{R(AVL)})$

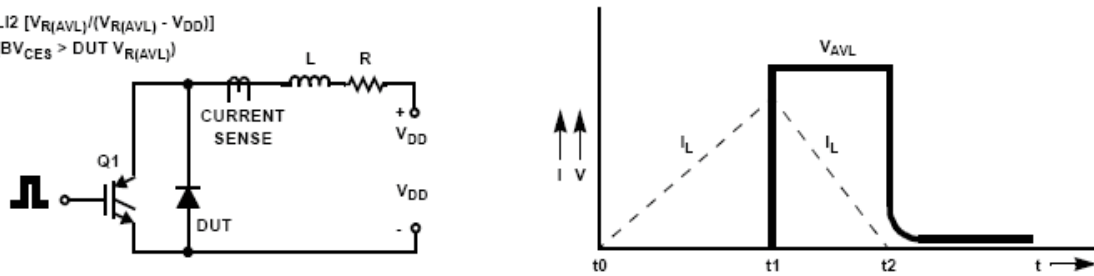


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

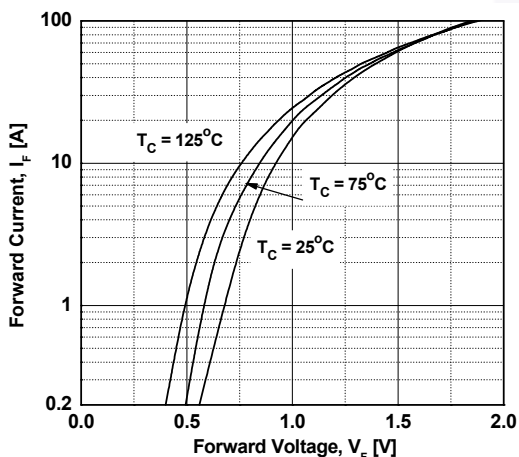


Figure 5. Typical Junction Capacitance

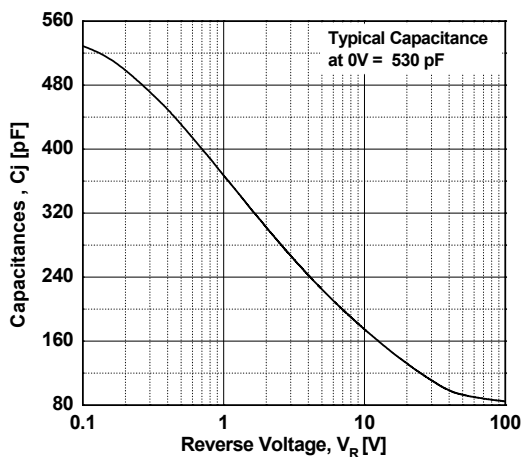


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

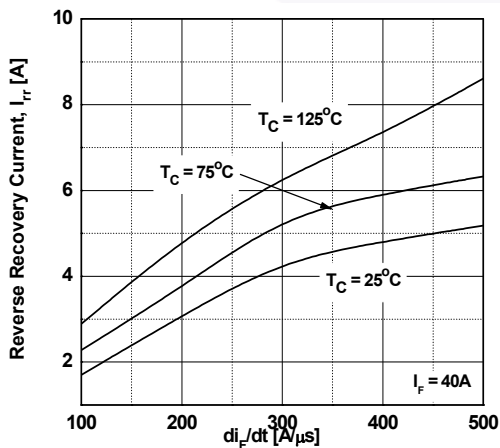


Figure 4. Typical Reverse Current vs. Reverse Voltage

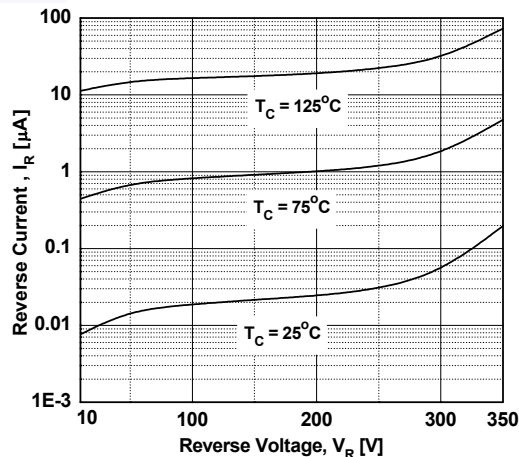


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

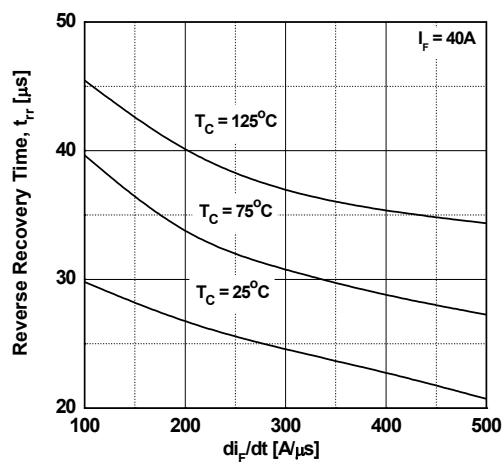
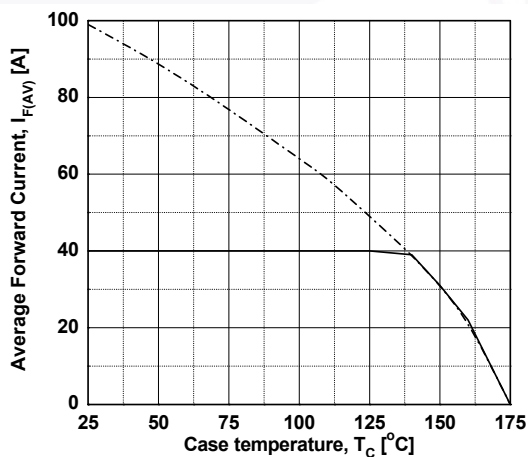
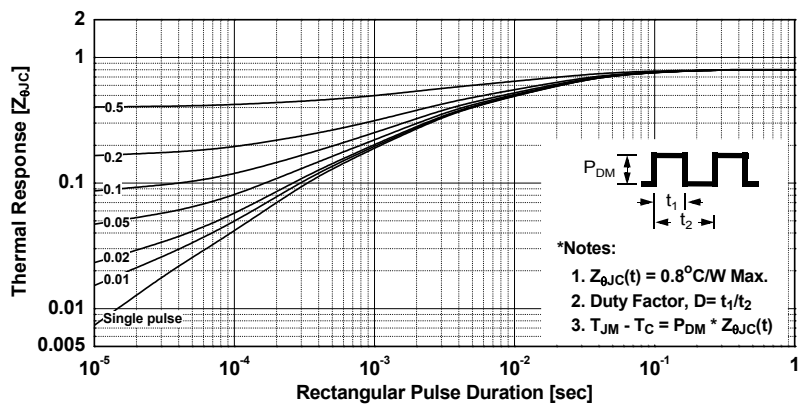


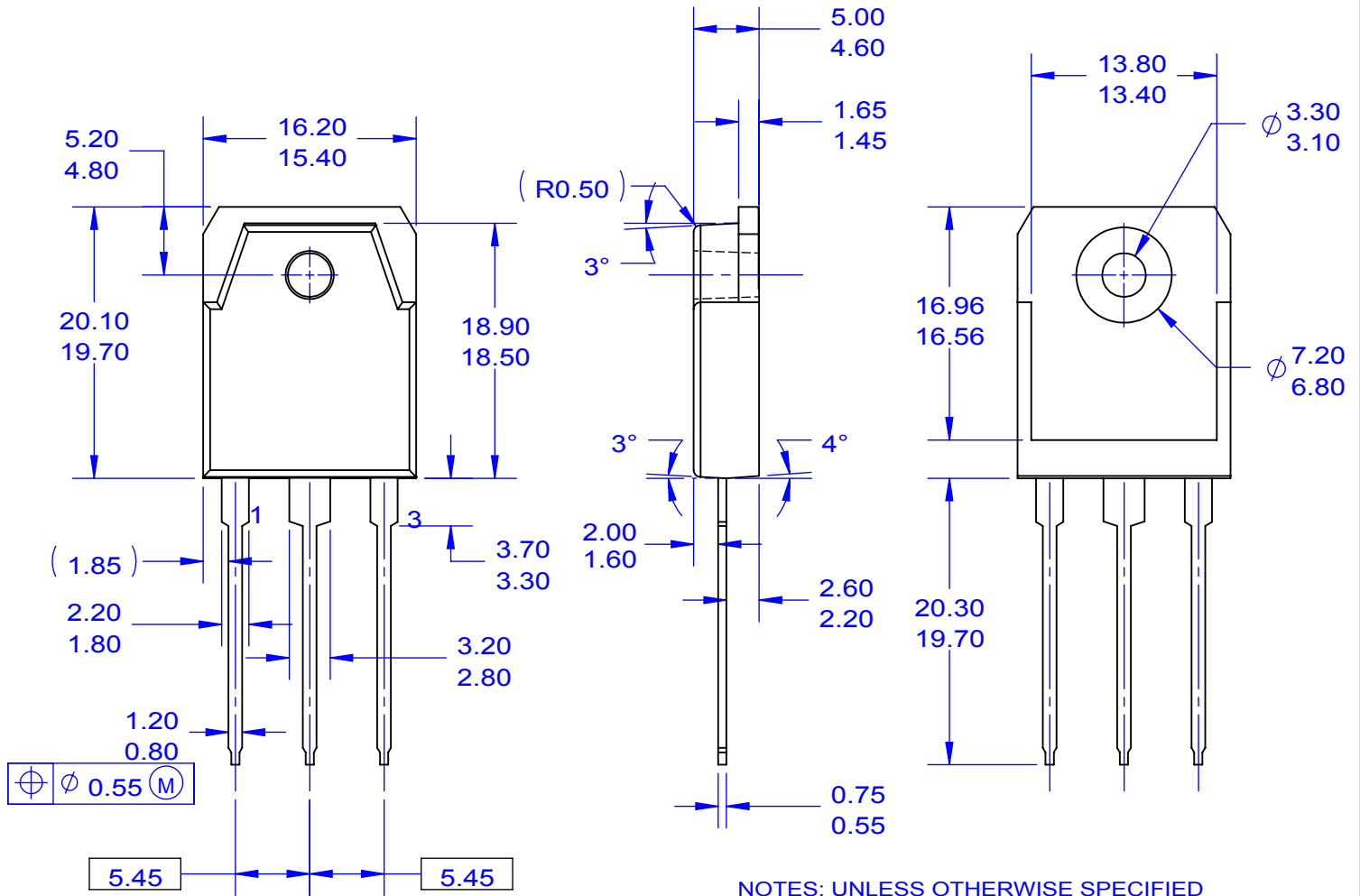
Figure 8. Forward Current Derating Curve



Typical Performance Characteristics (Continued)

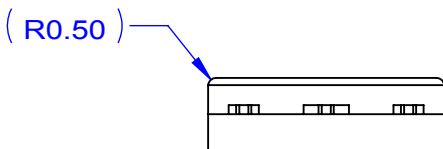
Figure 9. Transient Thermal Response Curve





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