

Pb Free Plating Product

F40UP35S



40Amperes,350Volts Planar Passivation Single Ultra Fast Recovery Rectifiers

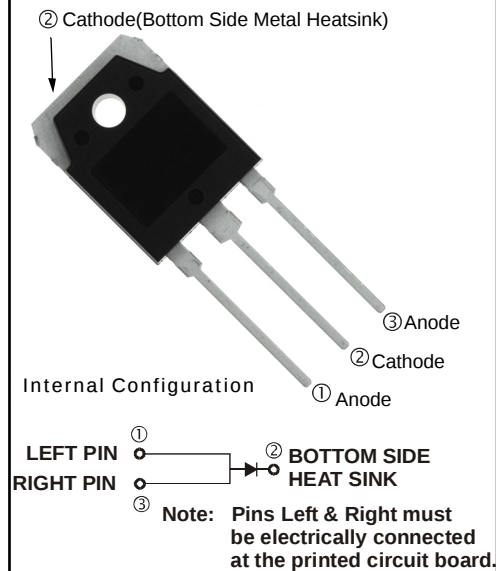
APPLICATION

- Freewheeling, Snubber, Clamp
- Inversion Welder
- PFC
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Converter & Chopper
- UPS

PRODUCT FEATURE

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Low Recovery Loss
- Low Forward Voltage
- High Surge Current Capability
- Low Leakage Current

TO-3PB



GENERAL DESCRIPTION

F40UP35S using latest FRED FAB process(planar passivation chip) with ultrafast and soft recovery characteristic.

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	$^\circ\text{C/W}$

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

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_F1	$I_F = 40\text{ A}$	-	-	1.6	V
	$T_C = 125^\circ\text{C}$	-	-	1.5	
I_{R1}	$V_R = 350\text{ V}$	-	-	100	μA
	$T_C = 125^\circ\text{C}$	-	-	500	
t_{rr}	$I_F = 1\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	26	53	ns
	$I_F = 40\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 230\text{ V}$	-	28	55	
t_a t_b Q_{rr}	$I_F = 40\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 230\text{ V}$	-	17	-	ns
		-	11	-	ns
		-	36	-	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

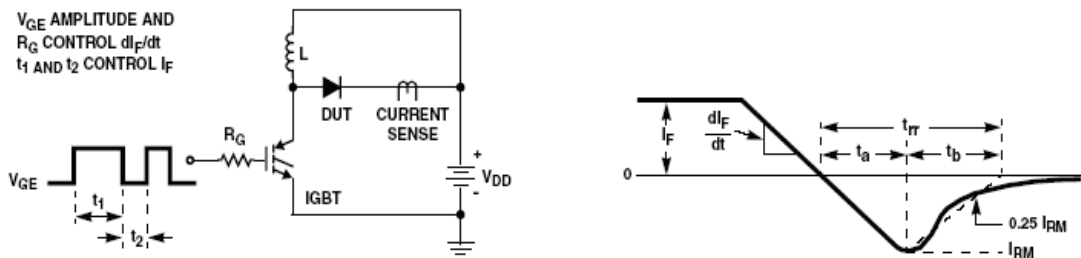


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$
 $R < 0.1\Omega$
 $V_{DD} = 50\text{V}$
 $E_{AVL} = 1/2 L I_2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT (} BV_{CES} > \text{DUT } V_{R(AVL)} \text{)}$

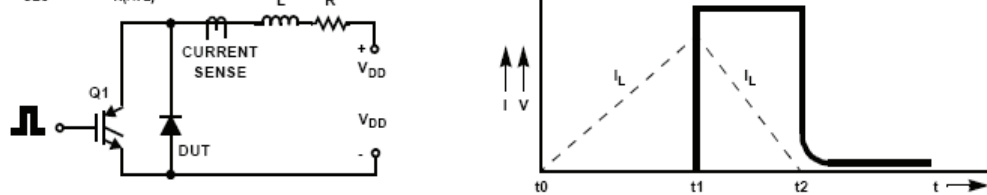


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

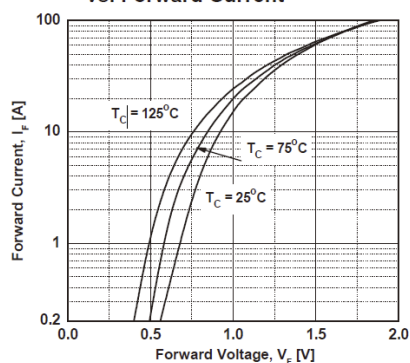


Figure 5. Typical Junction Capacitance

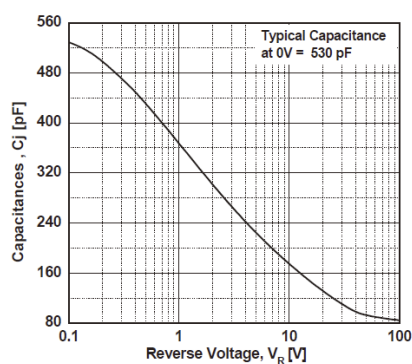


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

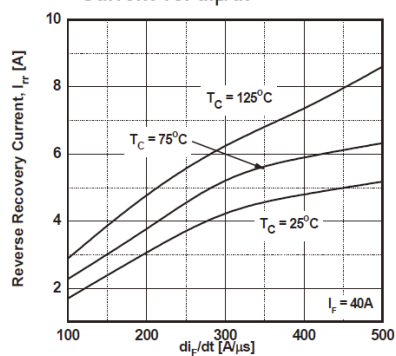


Figure 4. Typical Reverse Current vs. Reverse Voltage

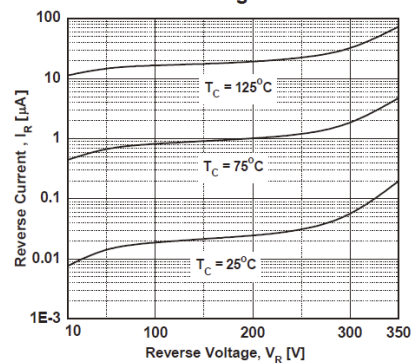


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

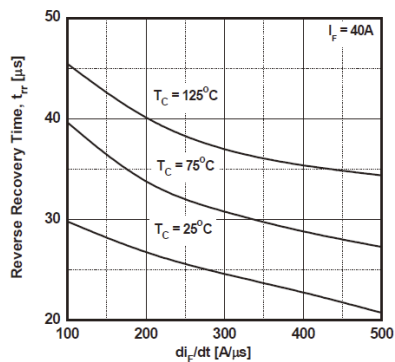
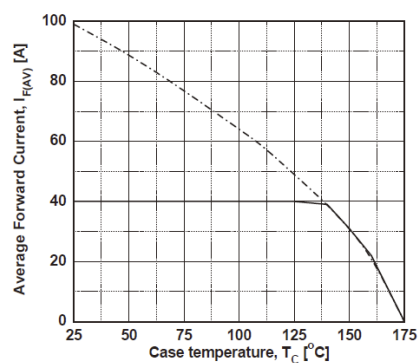
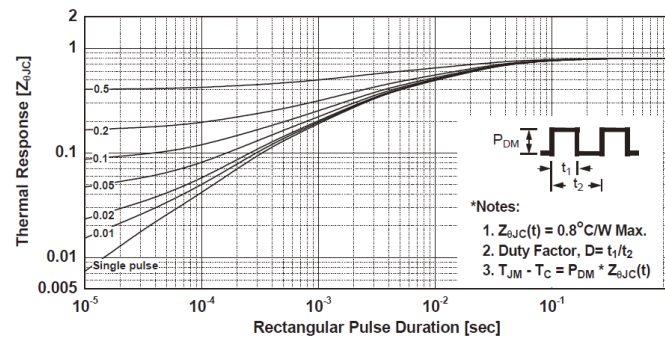


Figure 8. Forward Current Derating Curve



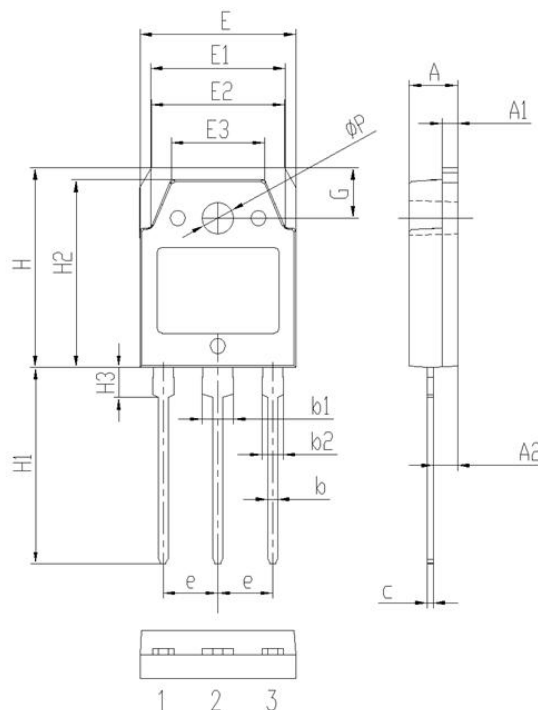
Typical Performance Characteristics (Continued)

Figure 9. Transient Thermal Response Curve



Package Information

TO-3PB PACKAGE



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.60	5.00
A1	1.30	1.70
A2	2.20	2.60
b	0.80	1.20
b1	2.90	3.30
b2	1.90	2.30
c	0.40	0.80
e	5.25	5.65
E	15.3	15.7
E1	13.2	13.6
E2	13.1	13.5
E3	9.10	9.50
H	19.7	20.1
H1	19.1	20.1
H2	18.3	18.7
H3	2.80	3.20
G	4.80	5.20
ΦP	3.00	3.40