

Pb Free Plating Product

F40UP35S



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

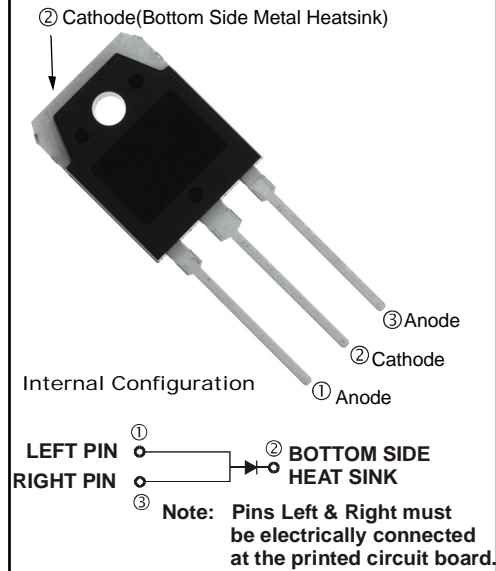
APPLICATION

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

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 | $I_F = 40\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 230\text{ V}$ | - | 17 | - | ns |
| | | $T_C = 25^\circ\text{C}$ | - | 11 | |
| Q_{rr} | $I_F = 40\text{ A}, di_F/dt = 200\text{ A}/\mu\text{s}, V_R = 230\text{ V}$ | - | 36 | - | nC |
| | | $T_C = 25^\circ\text{C}$ | - | 36 | |
| 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

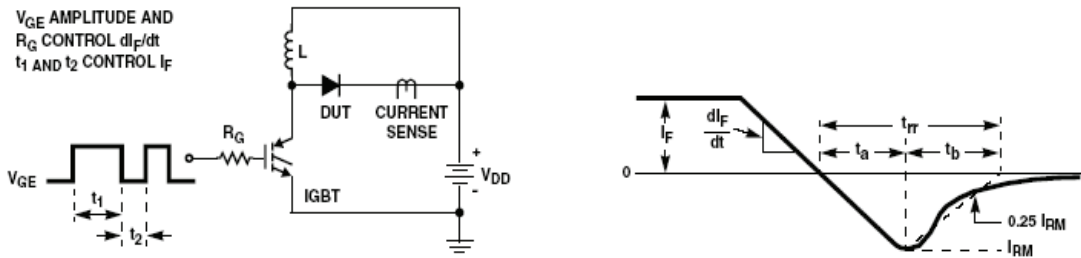


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

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

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

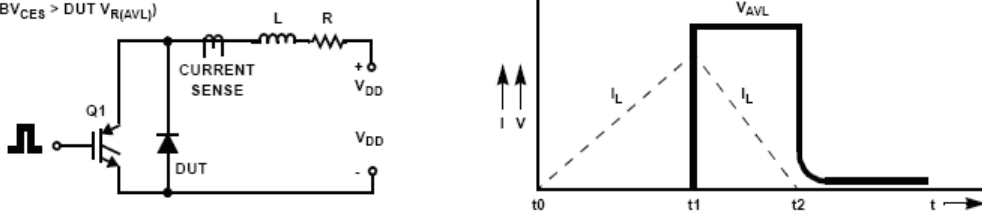


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

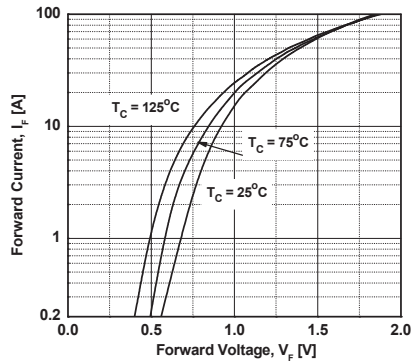


Figure 5. Typical Junction Capacitance

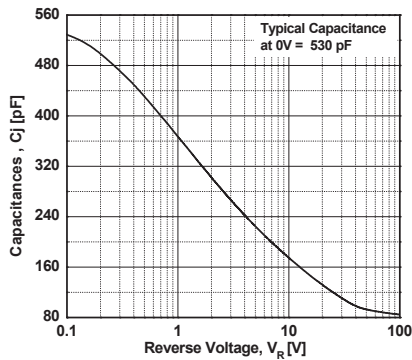


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

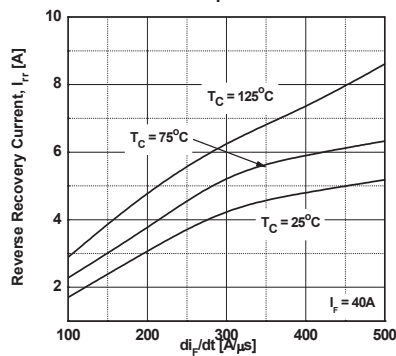


Figure 4. Typical Reverse Current vs. Reverse Voltage

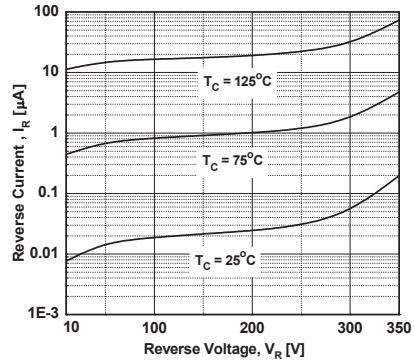


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

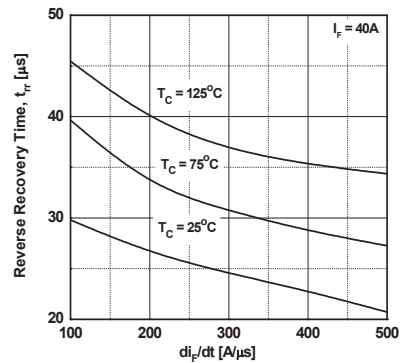
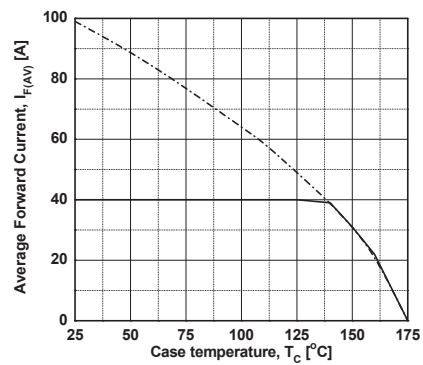
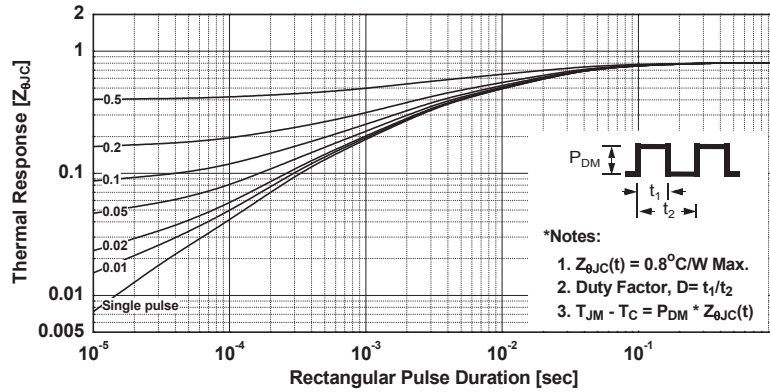


Figure 8. Forward Current Derating Curve



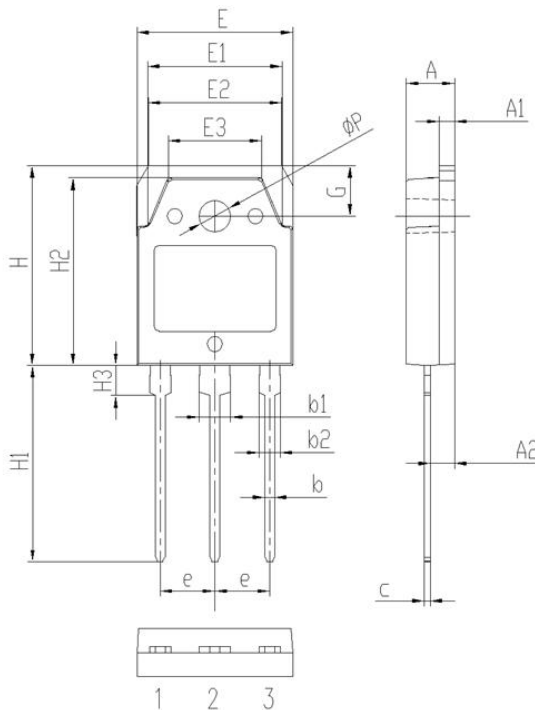
Typical Performance Characteristics (Continued)

Figure 9. Transient Thermal Response Curve



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 |