

ESB150NH40S

Ultra-Fast Soft Recovery Diode Module

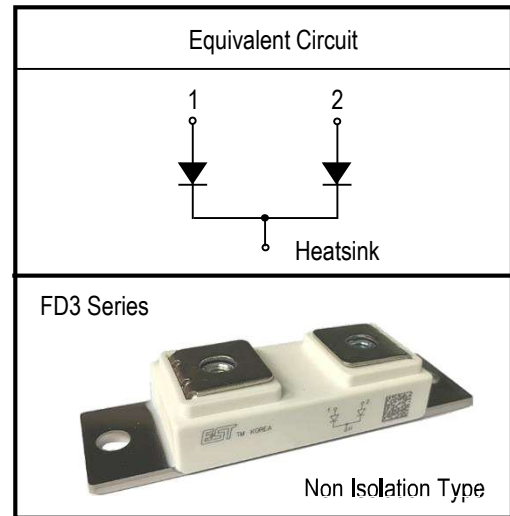
■ Features

- Repetitive Reverse Voltage : $V_{RRM} = 400V$
- Low Forward Voltage Drop : $V_F(\text{typ.}) = 1.05V$
- Average Forward Current : $I_F(\text{AV.}) = 150A @ T_c = 100^\circ C$
- Ultra-Fast Reverse Recovery Time : $t_{rr}(\text{typ.}) = 90 \text{ ns}$
- Extensive Characterization of Recovery Parameters
- Reduced EMI and RFI
- Non Isolation Type Package

■ Applications

- Welding Machine
- Induction Heating
- UPS

Equivalent Circuit and Package



Please see the package out line information

■ Absolute Maximum Ratings @ $T_c=25^\circ C$ (Per Leg)

| Symbol | Parameter | Conditions | Ratings | Unit | |
|-----------------|---------------------------------------|------------------------------------------------------------------------------|---------------------|------------|---|
| V_{RRM} | Repetitive Peak Reverse Voltage | | 400 | V | |
| $V_{R(DC)}$ | Reverse DC Voltage | | 320 | V | |
| $I_{F(AV)}$ | Average Forward Current | Resistive Load | $T_c = 25^\circ C$ | 270 | A |
| | | | $T_c = 100^\circ C$ | 150 | A |
| $I_{FSM}^{(1)}$ | Surge(non-repetitive) Forward Current | One Half Cycle at 60Hz, Peak Value | 2100 | A | |
| I_t^2 | I_t^2 for Fusing | Value for One Cycle Current, $t_w = 8.3\text{ms}$, $T_j = 25^\circ C$ Start | 1.84×10^4 | A^2s | |
| $T_j^{(2)}$ | Junction Temperature | - | -40 ~ 125 | $^\circ C$ | |
| T_{stg} | Storage Temperature | - | -40 ~ 125 | $^\circ C$ | |
| P_d | Maximum Power Dissipation | | 1250 | W | |
| - | Mounting screw torque | M6 | 4.0 | N.m | |
| - | Mounting terminals screw torque | M6 | 3.0 | N.m | |

(Note *1) Repetitive rating : Pulse width limited by max junction temperature

(Note *2) The maximum junction temperature of chip is $175^\circ C$

Electrical Characteristics of FRD @ $T_c=25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit | |
|-----------|---------------------------------|---------------------------------------------------------------------------------------|---------------------------|------|------|------|----|
| V_R | Cathode Anode Breakdown Voltage | $I_R = 100\mu\text{A}$ | 400 | - | - | V | |
| V_{FM} | Maximum Forward Voltage | $I_{FM} = 150\text{A}$ | $T_j = 25^\circ\text{C}$ | - | 1.05 | 1.4 | V |
| | | | $T_j = 125^\circ\text{C}$ | - | 0.95 | - | |
| I_{RRM} | Repetitive Peak Reverse Current | $T_C = 100^\circ\text{C}$, V_{RRM} applied | - | - | 1.0 | mA | |
| t_{rr} | Reverse Recovery Time | $I_{FM} = 150\text{A}$, $V_R = 200\text{V}$ $di/dt = -500\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ | - | 100 | 150 | ns |
| | | | $T_j = 125^\circ\text{C}$ | - | 150 | - | |

Thermal Characteristics and Weight

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|------------------|------------|------|------|------|---------------------------|
| $R_{\theta JC}$ | Junction-to-Case | per FRD | - | - | 0.12 | $^\circ\text{C}/\text{W}$ |
| Weight | Weight of Module | | - | - | 95 | g |

Performance Curves

Fig. 1 Typical Forward Voltage Drop vs. Instantaneous Current

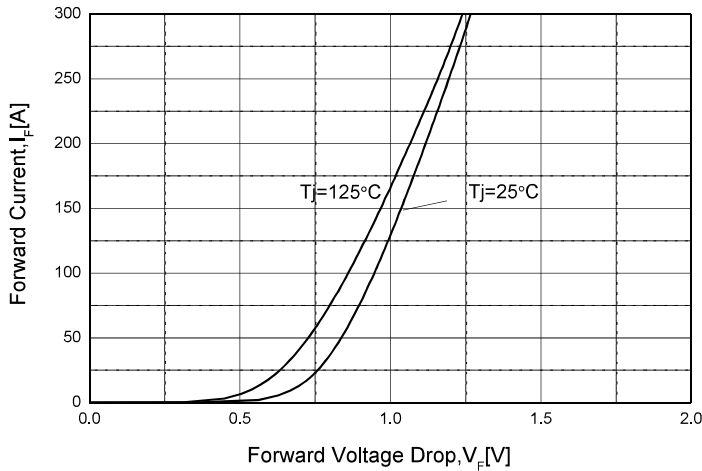


Fig. 2 Typical Reverse Recovery Time vs. $-di/dt$

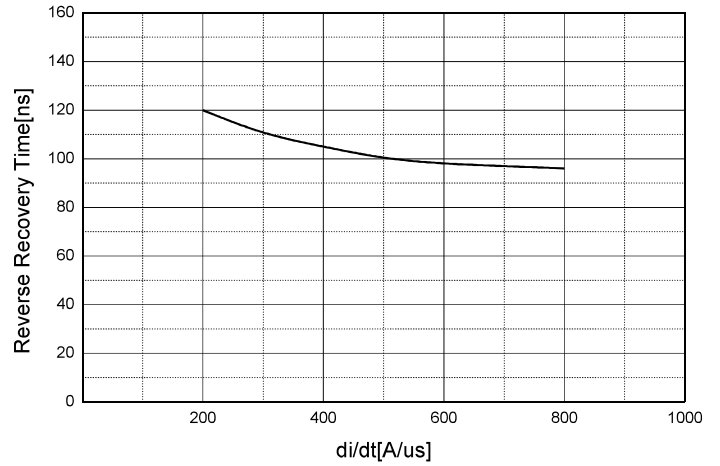


Fig. 3 Transient Thermal Impedance (Z_{thjc}) Characteristics

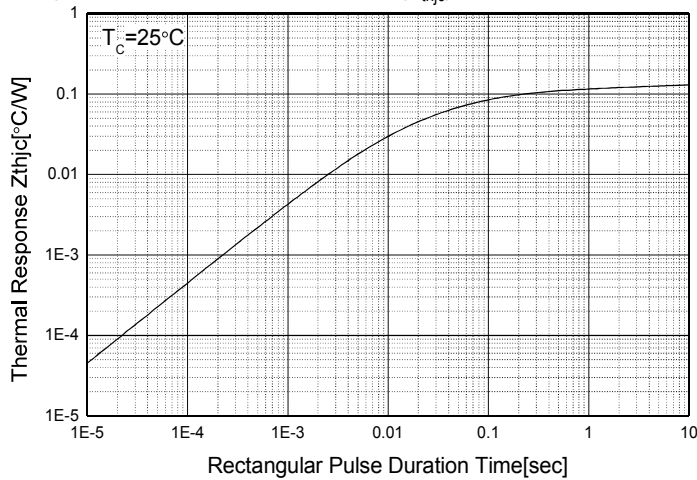
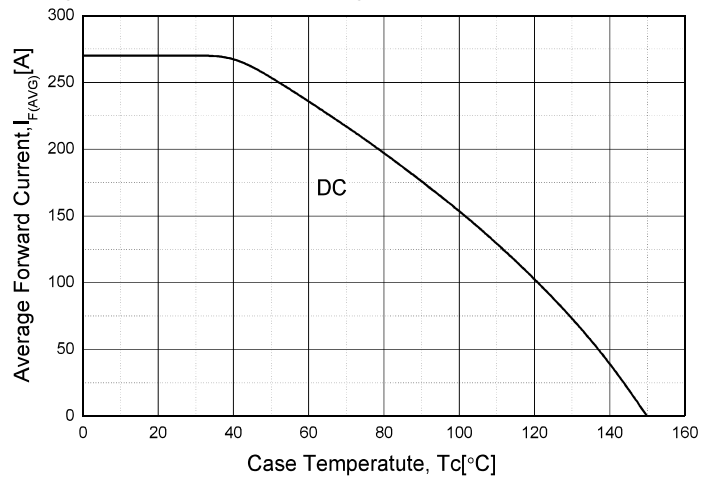


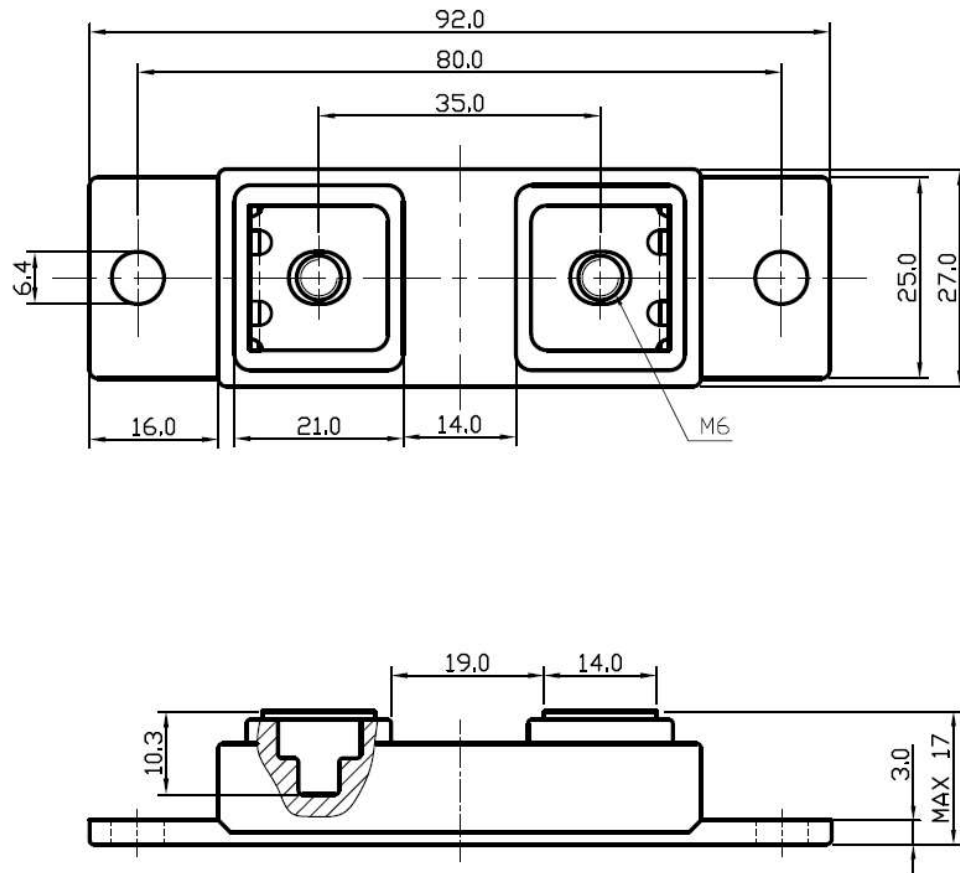
Fig. 4 Forward Current Derating Curve



■ Package Out Line Information

FD3 Package

Dimensions in mm



■ Internal Circuit

