

GT75SD120B5H

IGBT Module

Preliminary Data

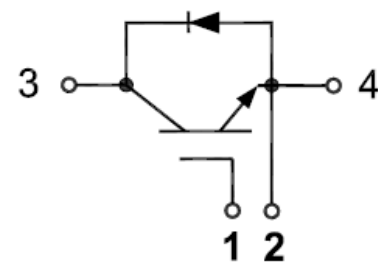
Features:

- Short Circuit Rated 10 μ s
- Low Saturation Voltage: $V_{CE(sat)} = 1.90V @ I_C = 75A, T_C = 25^\circ C$
- Low Switching Loss
- 100% RBSOA Tested ($2 \times I_C$)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Welding Machine/ Cutting Machine
- Induction Heating
- SMPS
- UPS



IGBT

Maximum Rated Values($T_C = 25^\circ C$ unless otherwise specified)

| | | | | |
|-----------|------------------------------------|--|----------|---------|
| V_{CES} | Collector-Emitter Blocking Voltage | | 1200 | V |
| V_{GES} | Gate-Emitter Voltage | | ± 20 | V |
| I_C | Continuous Collector Current | $T_C = 80^\circ C,$ | 75 | A |
| | | $T_C = 25^\circ C$ | 150 | A |
| I_{CM} | Repetitive Peak Collector Current | $T_J = 175^\circ C$ | 150 | A |
| t_{SC} | Short Circuit Withstand Time | | >10 | μ s |
| P_D | Maximum Power Dissipation per IGBT | $T_C = 25^\circ C$ $T_{Jmax} = 175^\circ C$ | 520 | W |

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Static characteristics

| Symbol | Description | Conditions | Min | Typ | Max | Unit |
|---------------|--------------------------------------|---|---------------------------|------|------|------|
| $V_{GE(th)}$ | Gate-Emitter Threshold Voltage | $I_C = 1 \text{ mA}, V_{CE} = V_{GE}$ | 5.0 | 5.5 | 6.0 | V |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 75\text{A}, V_{GE} = 15\text{V}$ | $T_J = 25^\circ\text{C}$ | 1.90 | 2.10 | V |
| | | | $T_J = 125^\circ\text{C}$ | 2.20 | | V |
| I_{CES} | Collector-Emitter Leakage Current | $V_{GE} = 0\text{V}, V_{CE} = V_{CES}, T_J = 25^\circ\text{C}$ | | | 1 | mA |
| I_{GES} | Gate-Emitter Leakage Current | $V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$ | | | 200 | nA |
| C_{ies} | Input Capacitance | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 10.4 | | nF |
| C_{oes} | Output capacitance | | | 0.56 | | nF |

Switching Characteristics

| | | | | | | | |
|-----------------|--|--|---------------------------|------|------|--------------------|----|
| $t_{d(on)}$ | Turn-on Delay Time | $V_{CC} = 600\text{V}, I_C = 75\text{A}, R_G = 15\Omega, V_{GE} = \pm 15\text{V}$ Inductive Load | $T_J = 25^\circ\text{C}$ | | 190 | | ns |
| | | | $T_J = 125^\circ\text{C}$ | | 170 | | |
| t_r | Rise Time | | $T_J = 25^\circ\text{C}$ | | 100 | | ns |
| | | | $T_J = 125^\circ\text{C}$ | | 110 | | |
| $t_{d(off)}$ | Turn-off Delay Time | | $T_J = 25^\circ\text{C}$ | | 270 | | ns |
| | | | $T_J = 125^\circ\text{C}$ | | 280 | | |
| t_f | Fall Time | | $T_J = 25^\circ\text{C}$ | | 160 | | ns |
| | | | $T_J = 125^\circ\text{C}$ | | 240 | | |
| E_{on} | Turn-on Switching Loss | | $T_J = 25^\circ\text{C}$ | | 5.77 | | mJ |
| | | | $T_J = 125^\circ\text{C}$ | | 6.90 | | |
| E_{off} | Turn-off Switching Loss | $T_J = 25^\circ\text{C}$ | | 3.54 | | mJ | |
| | | $T_J = 125^\circ\text{C}$ | | 5.60 | | | |
| Q_g | Total Gate Charge | $T_J = 25^\circ\text{C}$ | | 630 | | nC | |
| RBSOA | Reverse Bias Safe Operation Area | $I_C = 150\text{A}, V_{CC} = 960\text{V}, V_p = 1200\text{V}, R_g = 15\Omega, V_{GE} = +15\text{V to } 0\text{V}, T_J = 150^\circ\text{C}$ | Trapezoid | | | | |
| SCSOA | Short Circuit Safe Operation Area | $V_{CC} = 600\text{V}, V_{GE} = 15\text{V}, T_J = 150^\circ\text{C}$ | 10 | | | μs | |
| $R_{\theta JC}$ | IGBT Thermal Resistance : Junction-To-Case | | | 0.29 | | $^\circ\text{C/W}$ | |

Diode, Inverter

Maximum Rated Values ($T_C=25^{\circ}\text{C}$ Unless otherwise specified)

| | | | |
|-----------|----------------------------------|------|---|
| V_{RRM} | Repetitive Peak Reverse Voltage | 1200 | V |
| I_F | Diode Continuous Forward Current | 75 | A |
| I_{FM} | Diode Maximum Forward Current | 150 | A |

Electrical Characteristics of FWD ($T_C=25^{\circ}\text{C}$ Unless otherwise specified)

| Symbol | Description | Test conditions | | Min. | Typ. | Max. | Units | |
|-----------------|--|---|-----------------------------|------|------|------|-----------------------------|--|
| V_{FM} | Forward Voltage | $I_F=75\text{A}$, $V_{GE} = 0\text{V}$ | $T_J = 25^{\circ}\text{C}$ | | 2.00 | | V | |
| | | | $T_J = 125^{\circ}\text{C}$ | | 2.20 | | | |
| t_{rr} | Reverse Recovery Time | $I_F=75\text{A}$, $di/dt = 700\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$ | $T_J = 25^{\circ}\text{C}$ | | 230 | | ns | |
| | | | $T_J = 125^{\circ}\text{C}$ | | 300 | | | |
| I_{rr} | Peak Reverse Recovery Current | | $T_J = 25^{\circ}\text{C}$ | | 35 | | A | |
| | | | $T_J = 125^{\circ}\text{C}$ | | 40 | | | |
| Q_{rr} | Reverse Recovery Charge | | $T_J = 25^{\circ}\text{C}$ | | 5.7 | | μC | |
| | | | $T_J = 125^{\circ}\text{C}$ | | 9.52 | | | |
| E_{rec} | Reverse Recovery Energy | | $T_J = 25^{\circ}\text{C}$ | | 1.92 | | mJ | |
| | | | $T_J = 125^{\circ}\text{C}$ | | 3.80 | | | |
| $R_{\theta JC}$ | Diode Thermal Resistance: Junction-To-Case | | | | 0.45 | | $^{\circ}\text{C}/\text{W}$ | |

Module

| Symbol | Description | | Min | Typ | Max | Unit |
|------------------|--|-------------------|-----|-----|------|------|
| V _{iso} | Isolation Voltage(All Terminals Shorted) | f = 50Hz, 1minute | | | 2500 | V |
| T _J | Maximum Junction Temperature | | | | 175 | °C |
| T _{JOP} | Maximum Operating Junction Temperature Range | | -40 | | +150 | °C |
| T _{stg} | Storage Temperature | | -40 | | +125 | °C |
| R _{ecs} | Case-To-Sink (Conductive Grease Applied) | | | 0.1 | | °C/W |
| T | Power Terminals Screw(M4) | | 0.5 | | 1.5 | N·m |
| T | Mounting Screw(M5) | | 0.5 | | 1.5 | N·m |
| G | Weight | | | 32 | | g |

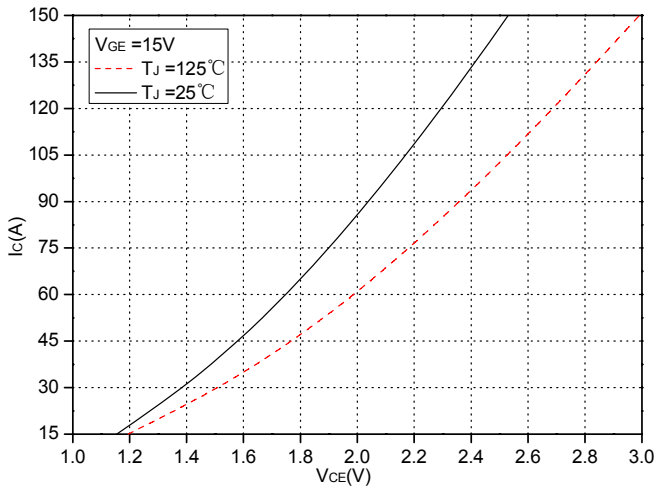


Fig.1 Typical Saturation Voltage Characteristics

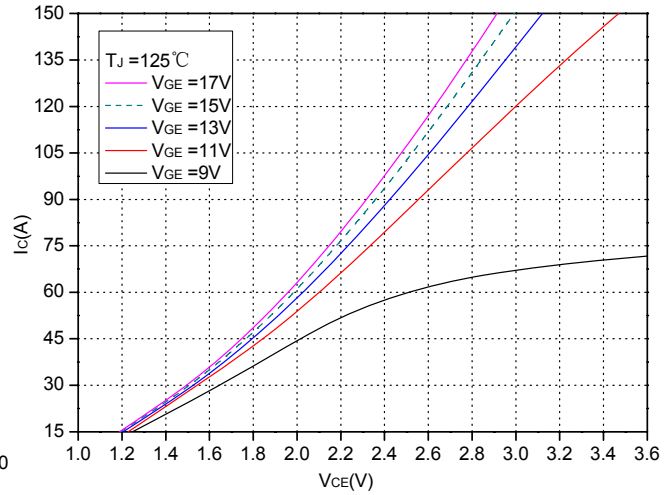


Fig.2 Typical Output Characteristics

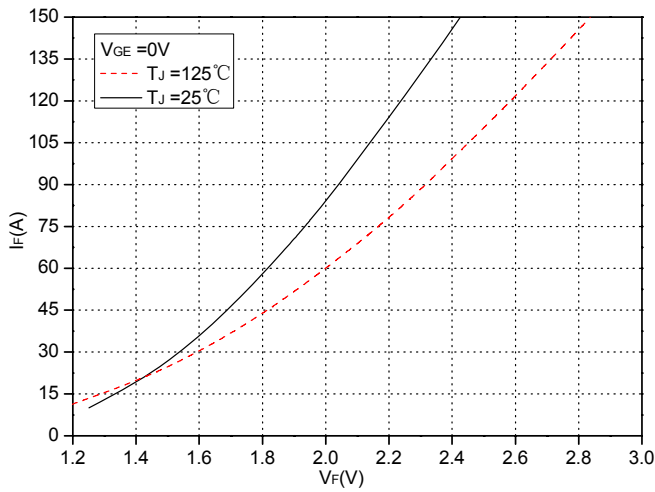


Fig.3 Forward Characteristics of FWD

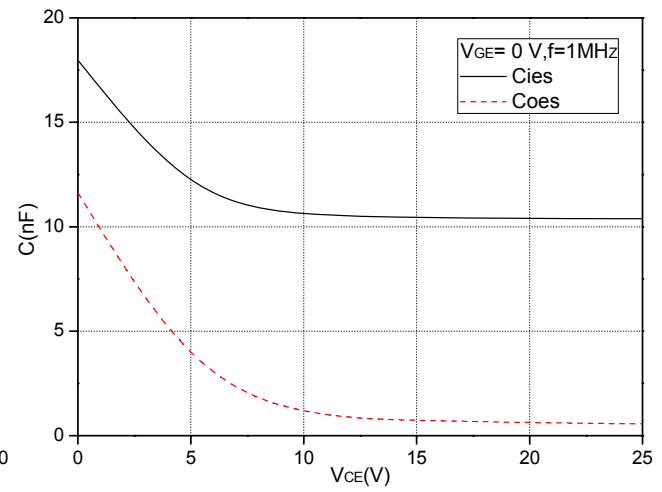


Fig.4 Capacitance Characteristics

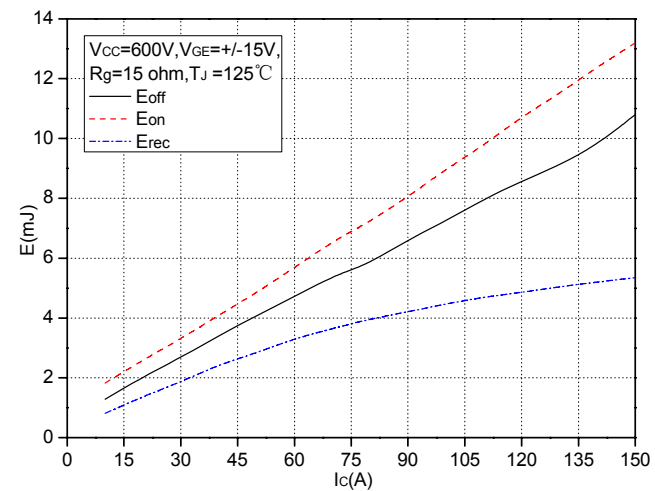


Fig.5 Typical Switching Loss vs. Collector Current

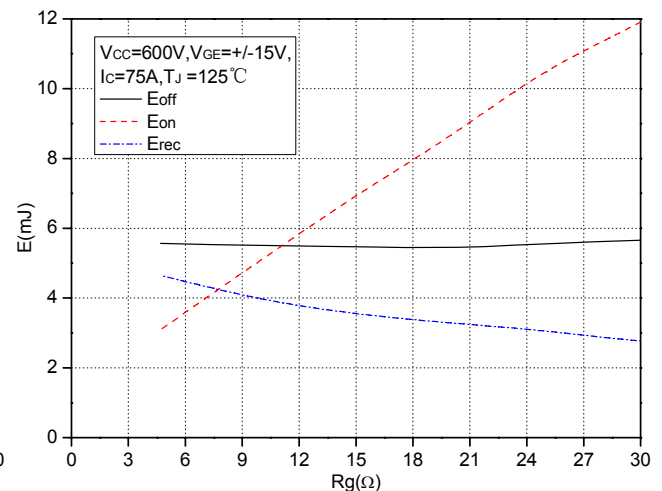


Fig.6 Typical Switching Loss vs. Gate Resistance

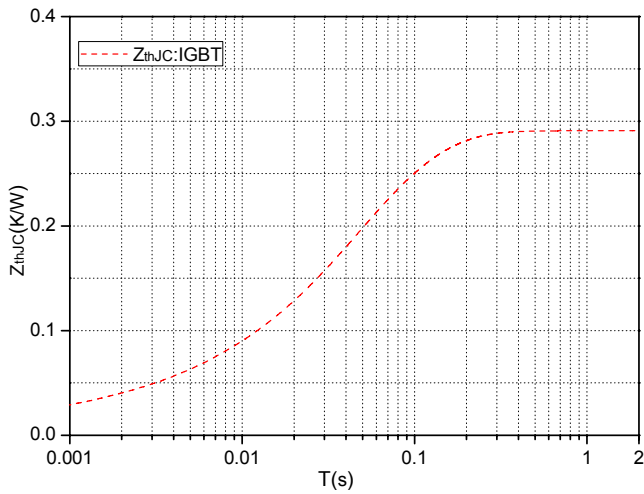


Fig.7 Transient thermal impedance (IGBT)

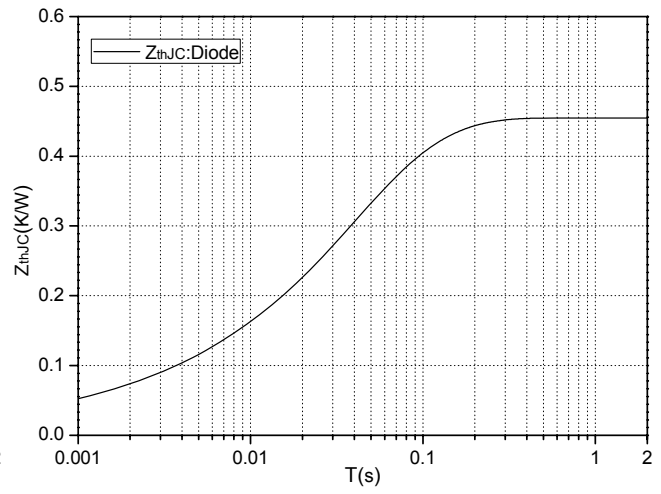


Fig.8 Transient thermal impedance (Diode)

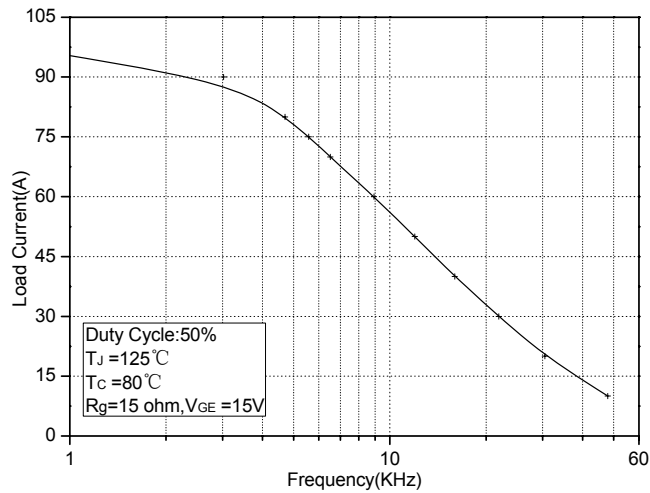


Fig.9 Typical Load Current vs. Frequency

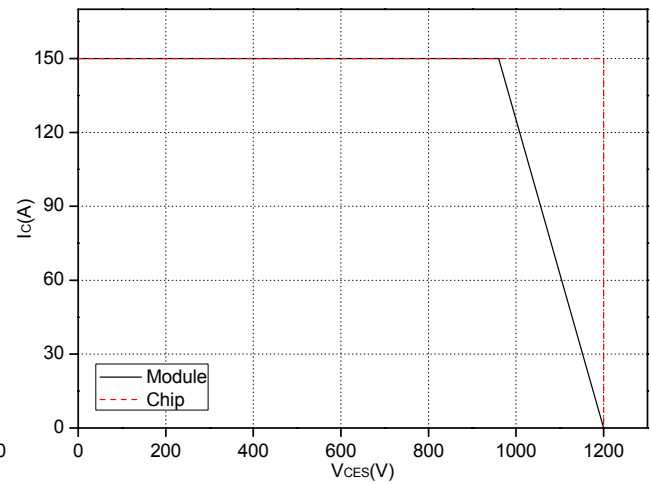
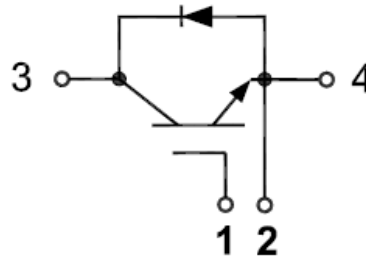
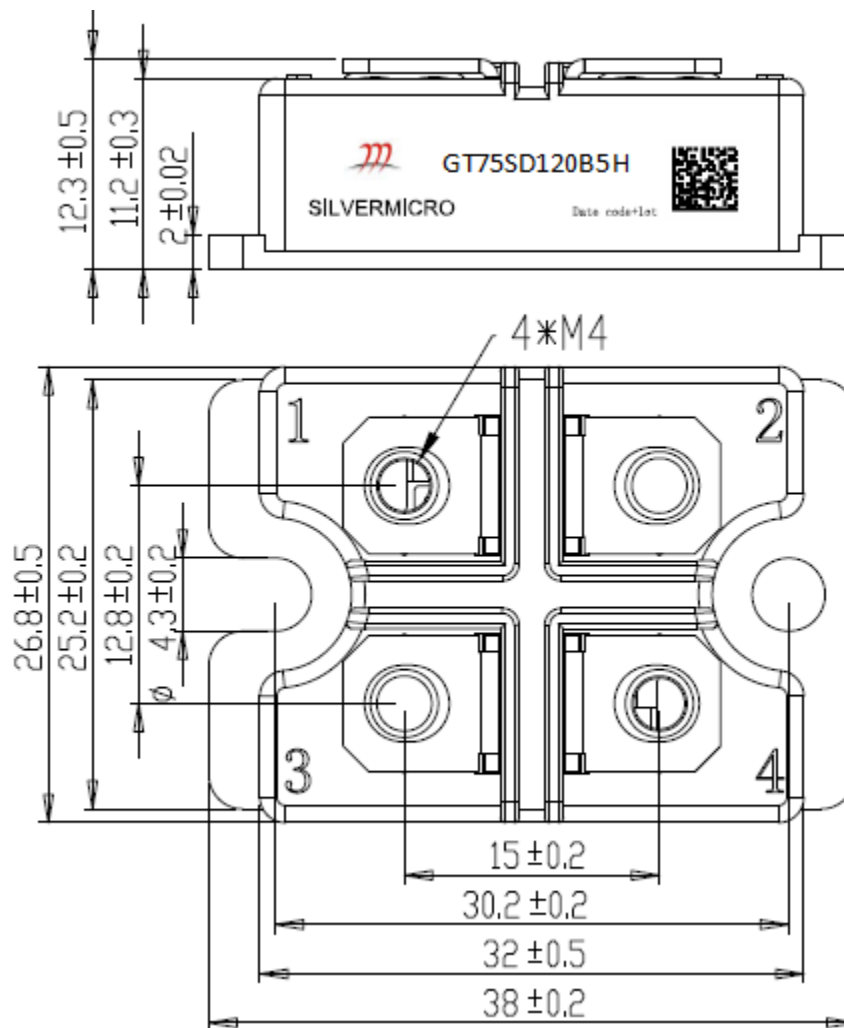


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):



Announcement

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