

# 6MBI35S-120

## IGBT Modules

### IGBT MODULE ( S series) 1200V / 35A 6 in one-package

#### ■ Features

- Compact package
- P.C.board mount
- Low  $V_{CE(sat)}$

#### ■ Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply
- Industrial machines, such as welding machines

#### ■ Maximum ratings and characteristics

##### ● Absolute maximum ratings ( $T_c=25^{\circ}\text{C}$ unless otherwise specified)

| Item                              |            |                      | Symbol                | Rating          | Unit |
|-----------------------------------|------------|----------------------|-----------------------|-----------------|------|
| Collector-Emitter voltage         |            |                      | V <sub>CES</sub>      | 1200            | V    |
| Gate-Emitter voltage              |            |                      | V <sub>GES</sub>      | ±20             | V    |
| Collector current                 | Continuous | T <sub>c</sub> =25°C | I <sub>c</sub>        | 50              | A    |
|                                   |            | T <sub>c</sub> =80°C |                       | 35              |      |
|                                   | 1ms        | T <sub>c</sub> =25°C | I <sub>c</sub> pulse  | 100             | A    |
|                                   |            | T <sub>c</sub> =80°C |                       | 70              |      |
|                                   |            |                      | -I <sub>c</sub>       | 35              | A    |
|                                   | 1ms        |                      | -I <sub>c</sub> pulse | 70              | A    |
| Max. power dissipation (1 device) |            |                      | P <sub>c</sub>        | 240             | W    |
| Operating temperature             |            |                      | T <sub>j</sub>        | +150            | °C   |
| Storage temperature               |            |                      | T <sub>stg</sub>      | -40 to +125     | °C   |
| Isolation voltage                 |            |                      | V <sub>is</sub>       | AC 2500 (1min.) | V    |
| Screw torque                      |            |                      | Mounting *1           | 3.5             | N·m  |

\*1 : Recommendable value : 2.5 to 3.5 N·m (M5)

##### ● Electrical characteristics ( $T_j=25^{\circ}\text{C}$ unless otherwise specified)

| Item                                 | Symbol        | Characteristics |      |      | Conditions                                                        | Unit          |
|--------------------------------------|---------------|-----------------|------|------|-------------------------------------------------------------------|---------------|
|                                      |               | Min.            | Typ. | Max. |                                                                   |               |
| Zero gate voltage collector current  | $I_{CES}$     | —               | —    | 1.0  | $V_{GE}=0\text{V}$ , $V_{CE}=1200\text{V}$                        | mA            |
| Gate-Emitter leakage current         | $I_{GES}$     | —               | —    | 0.2  | $V_{CE}=0\text{V}$ , $V_{GE}=\pm 20\text{V}$                      | $\mu\text{A}$ |
| Gate-Emitter threshold voltage       | $V_{GE(th)}$  | 5.5             | 7.2  | 8.5  | $V_{CE}=20\text{V}$ , $I_c=35\text{mA}$                           | V             |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | —               | 2.3  | 2.65 | $T_j=25^{\circ}\text{C}$ , $V_{GE}=15\text{V}$ , $I_c=35\text{A}$ | V             |
|                                      |               | —               | 2.8  | —    | $T_j=125^{\circ}\text{C}$                                         |               |
| Input capacitance                    | $C_{ies}$     | —               | 4200 | —    | $V_{GE}=0\text{V}$                                                | pF            |
| Output capacitance                   | $C_{oes}$     | —               | 875  | —    | $V_{CE}=10\text{V}$                                               |               |
| Reverse transfer capacitance         | $C_{res}$     | —               | 770  | —    | $f=1\text{MHz}$                                                   |               |
| Turn-on time                         | $t_{on}$      | —               | 0.35 | 1.2  | $V_{CC}=600\text{V}$                                              | $\mu\text{s}$ |
|                                      | $t_r$         | —               | 0.25 | 0.6  | $I_c=35\text{A}$                                                  |               |
|                                      | $t_{r(i)}$    | —               | 0.1  | —    | $V_{GE}=\pm 15\text{V}$                                           |               |
| Turn-off time                        | $t_{off}$     | —               | 0.45 | 1.0  | $R_G=33\Omega$                                                    |               |
|                                      | $t_f$         | —               | 0.08 | 0.3  |                                                                   |               |
| Diode forward on voltage             | $V_F$         | —               | 2.5  | 3.3  | $T_j=25^{\circ}\text{C}$ , $I_F=35\text{A}$ , $V_{GE}=0\text{V}$  | V             |
|                                      |               | —               | 2.0  | —    | $T_j=125^{\circ}\text{C}$                                         |               |
| Reverse recovery time                | $t_{rr}$      | —               | —    | 0.35 | $I_F=35\text{A}$                                                  | $\mu\text{s}$ |

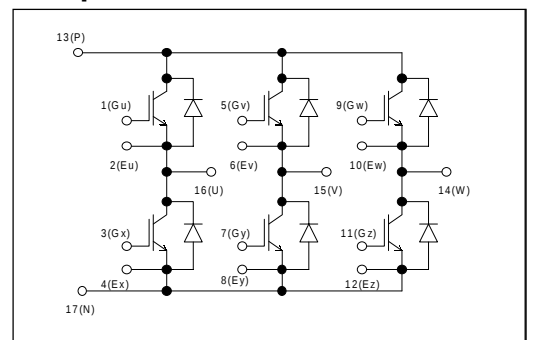
##### ● Thermal resistance characteristics

| Item               | Symbol          | Characteristics |      |      | Conditions              | Unit                 |
|--------------------|-----------------|-----------------|------|------|-------------------------|----------------------|
|                    |                 | Min.            | Typ. | Max. |                         |                      |
| Thermal resistance | $R_{th(j-c)}$   | —               | —    | 0.52 | IGBT                    | $^{\circ}\text{C/W}$ |
|                    | $R_{th(j-c)}$   | —               | —    | 0.90 | FWD                     | $^{\circ}\text{C/W}$ |
|                    | $R_{th(c-f)*2}$ | —               | 0.05 | —    | the base to cooling fin | $^{\circ}\text{C/W}$ |

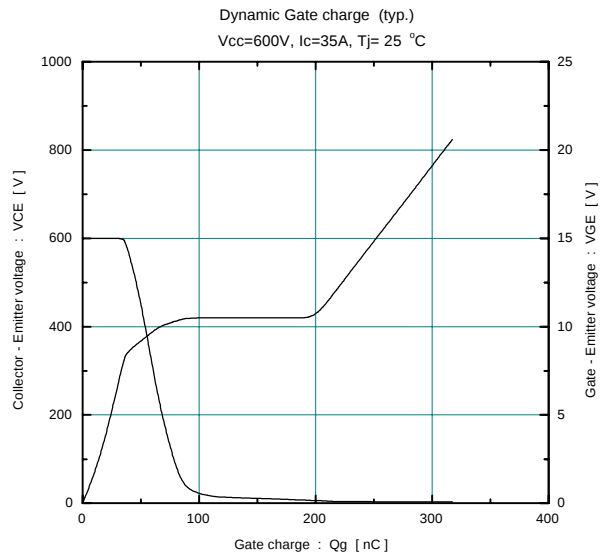
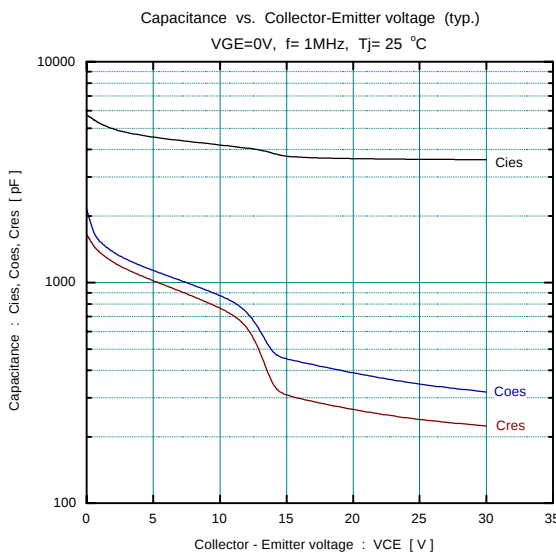
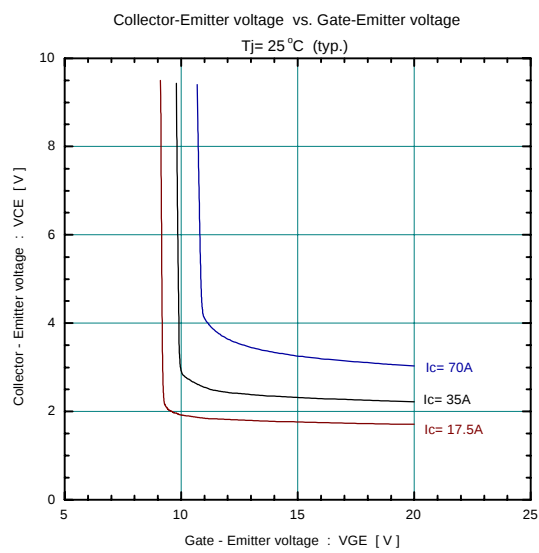
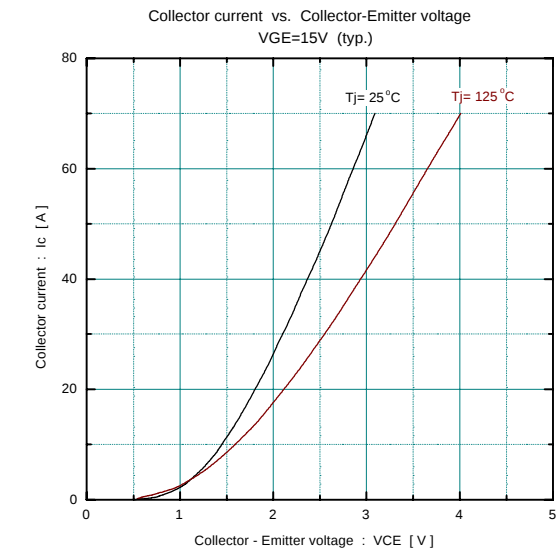
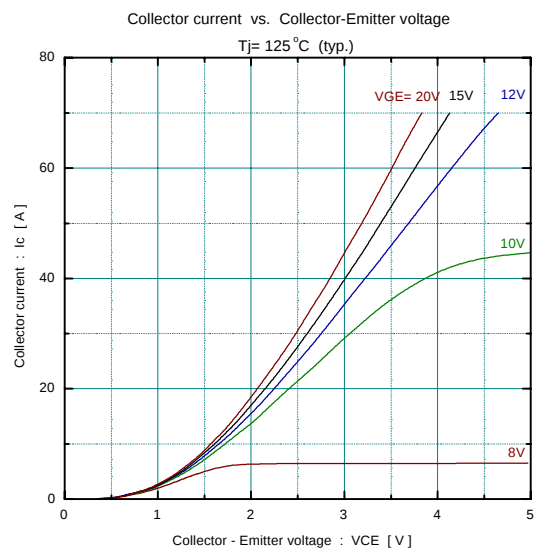
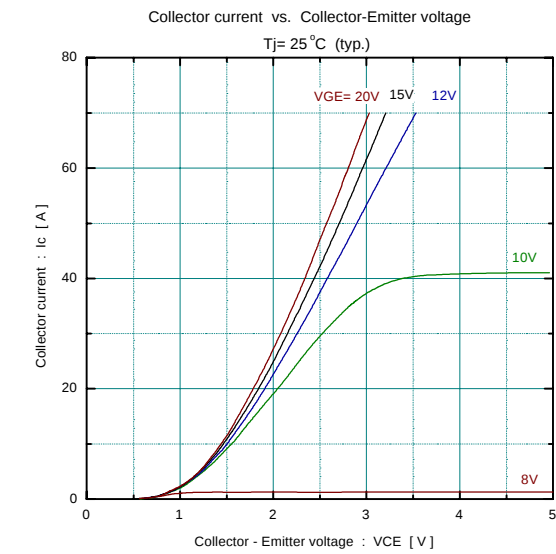
\*2 : This is the value which is defined mounting on the additional cooling fin with thermal compound

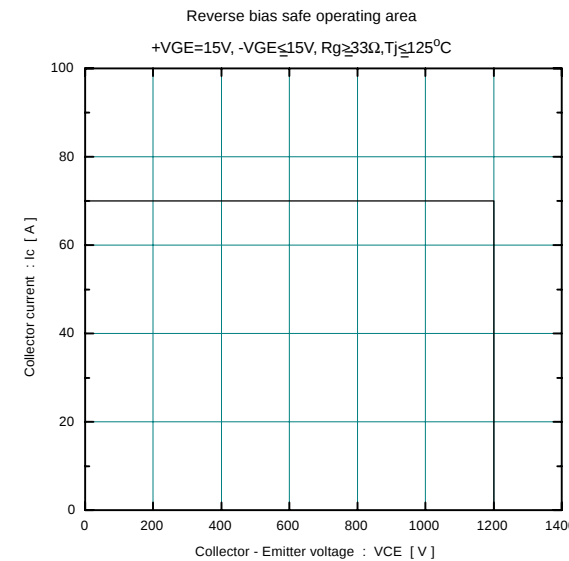
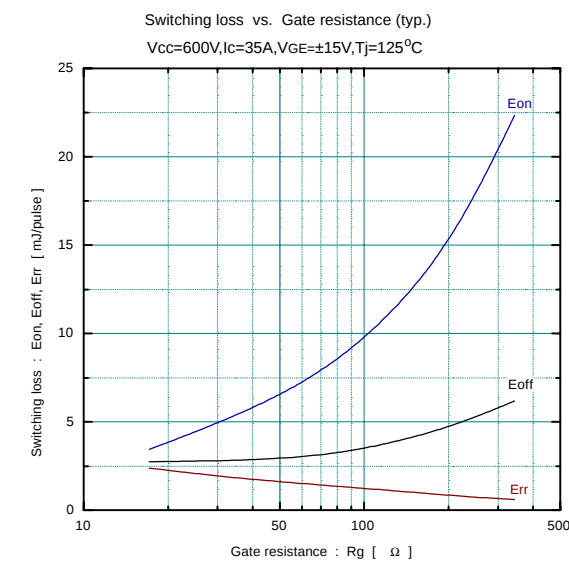
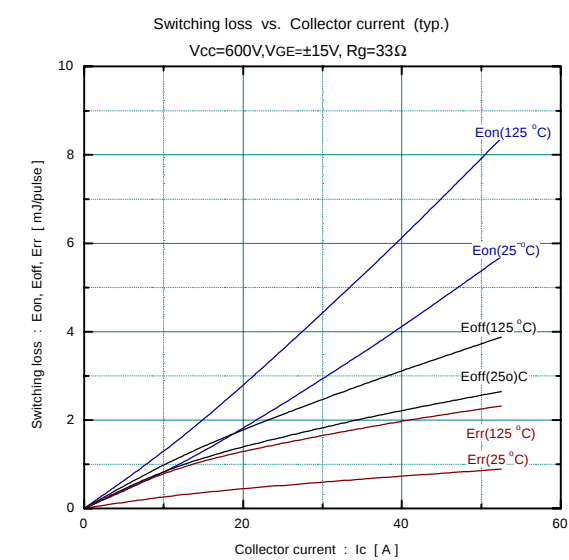
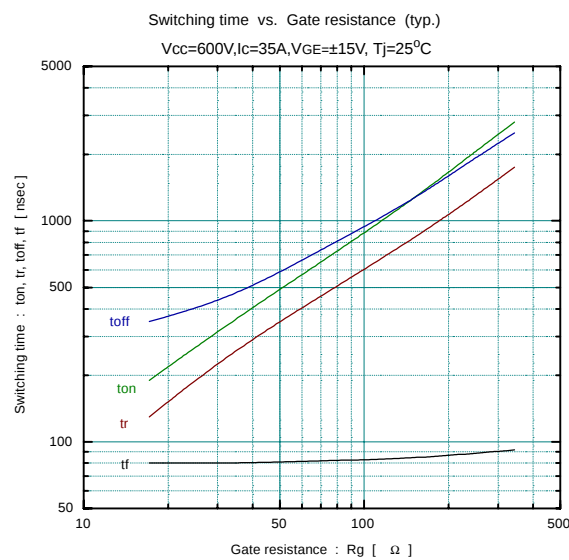
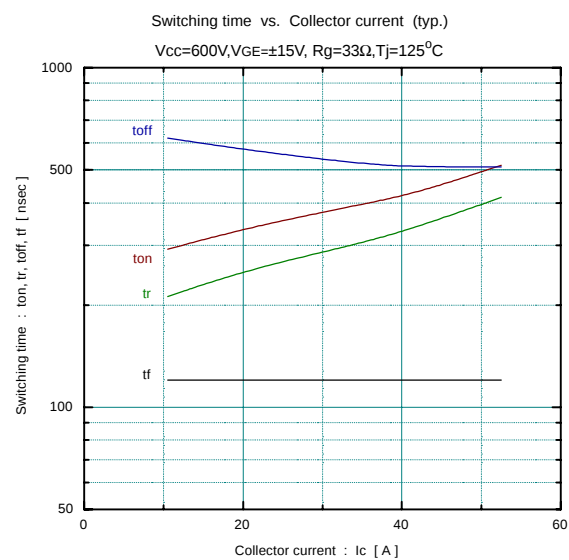
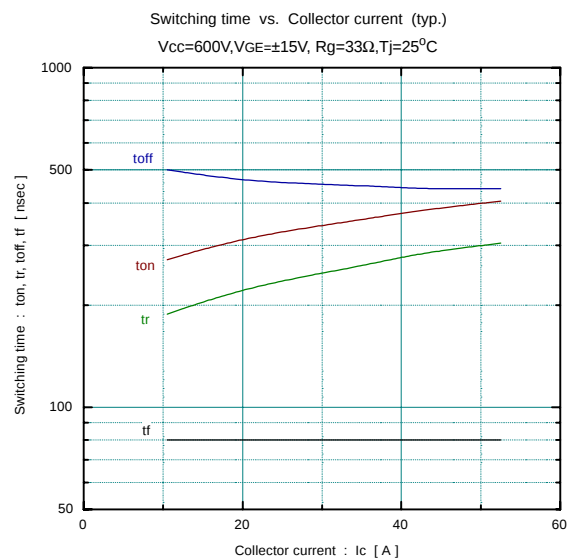


#### ■ Equivalent Circuit Schematic

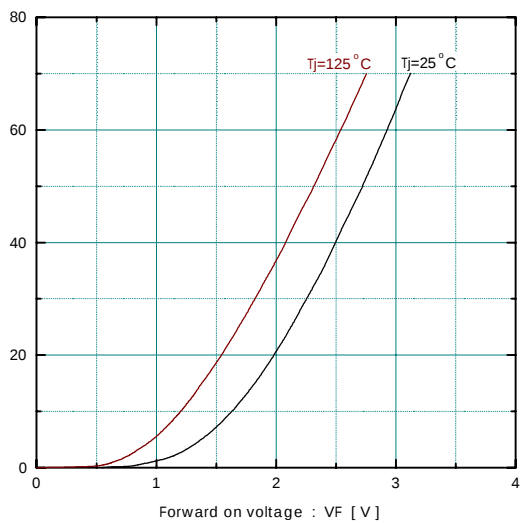


Characteristics



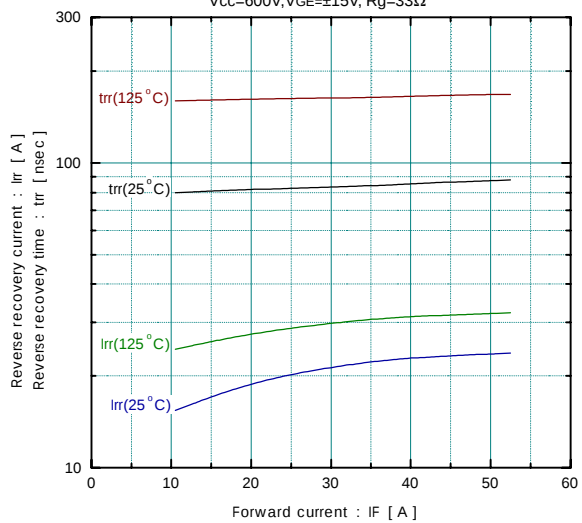


Forward current vs. Forward on voltage (typ.)

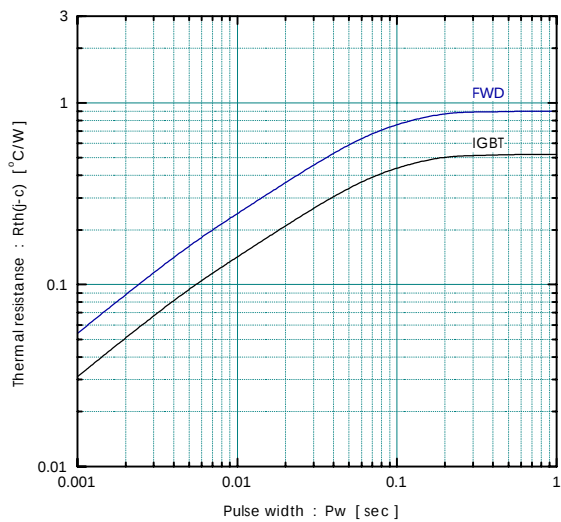


Reverse recovery characteristics (typ.)

$V_{CC}=600V, V_{GE}=\pm 15V, R_g=33\Omega$



### Transient thermal resistance



### ■ Outline Drawings, mm

