

# 1MBI600PX-140

IGBT Modules

## IGBT Modules P series

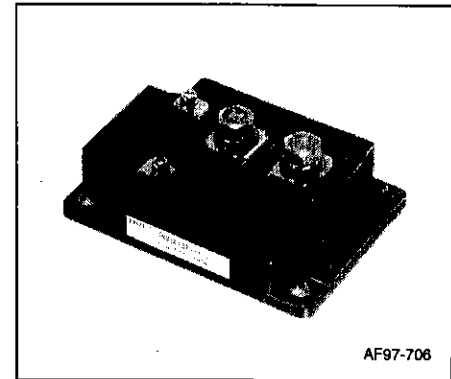
1400V / 600A

### ■ Features

- Small temperature dependence of the turn-off switching loss
- Easy to connect in parallel
- Wide RBSOA (square up to 2 times of rated current) and high short-circuit withstand capability
- Low loss and soft-switching (reduction of EMI noise)

### ■ Applications

- General purpose inverters
- AC servo systems (Drive unit)
- UPS (Uninterruptible Power Supply)

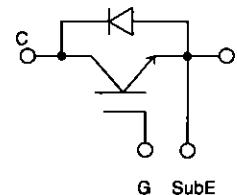


### ■ Maximum ratings and characteristics

#### ● Absolute maximum ratings (Tc=25°C unless otherwise specified)

| Item                      | Symbol                  | Rating                | Unit                      |
|---------------------------|-------------------------|-----------------------|---------------------------|
| Collector-Emitter voltage | V <sub>CES</sub>        | 1400                  | V                         |
| Gate-Emitter voltage      | V <sub>GES</sub>        | ±20                   | V                         |
| Collector current         | Continuous              | Tc=25°C               | I <sub>C</sub> 800        |
|                           |                         | Tc=80°C               | 600                       |
|                           | 1ms                     | Tc=25°C               | I <sub>C</sub> pulse 1600 |
|                           |                         | Tc=80°C               | 1200                      |
|                           | Continuous              | -I <sub>C</sub>       | 600                       |
|                           |                         | -I <sub>C</sub> pulse | 1200                      |
| Max power dissipation     | P <sub>C</sub>          | 4100                  | 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>         | 2500 AC (1min.)       | V                         |
| Screw torque              | Mounting <sup>*1</sup>  | 4.5                   | N·m                       |
|                           | Terminals <sup>*2</sup> | 11.0                  |                           |
|                           | <sup>*3</sup>           | 1.7                   |                           |

### ■ Equivalent circuit



Recommendable value

<sup>\*1</sup> 4.0 ± 0.5 N·m (M6) <sup>\*2</sup> 10.0 ± 1.0 N·m (M8)

<sup>\*3</sup> 1.50 ± 0.2 N·m (M4)

#### ● Electrical ratings and characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

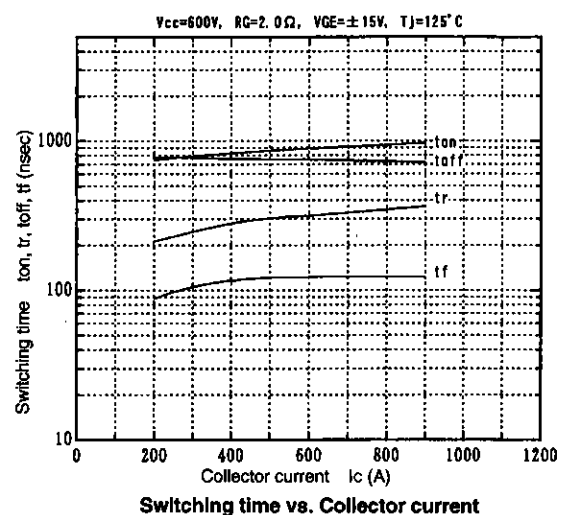
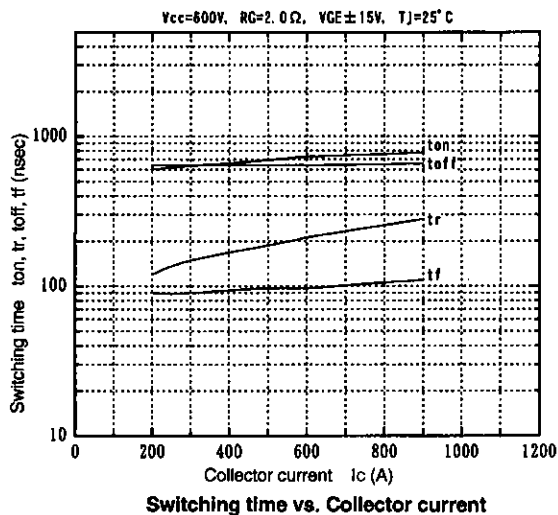
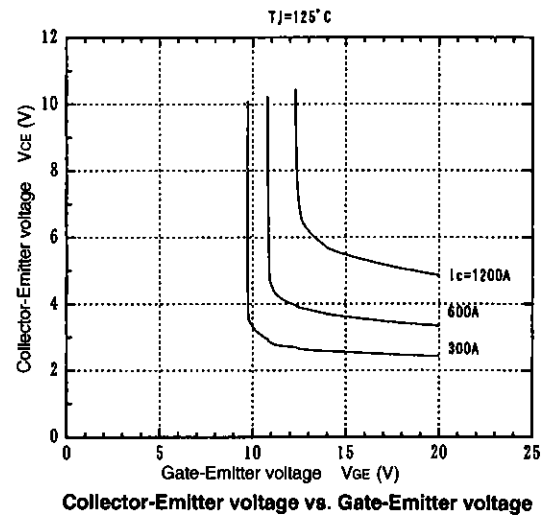
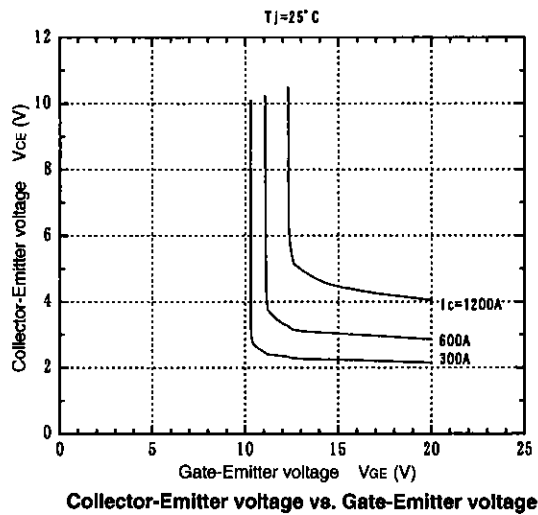
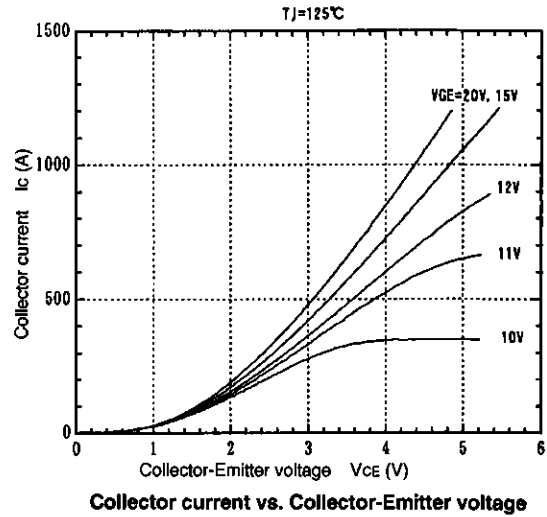
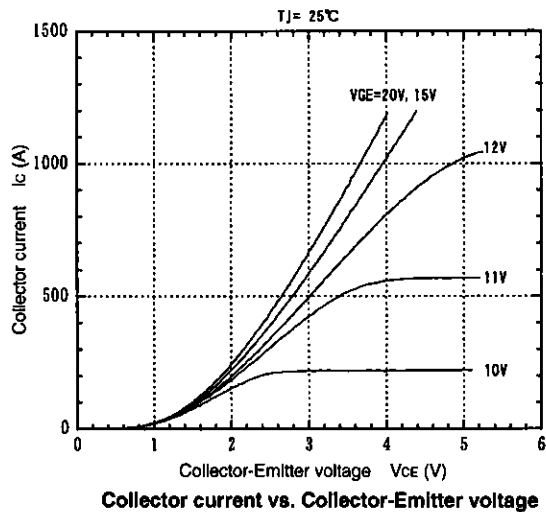
| Item                                 | Symbol                | Characteristics |      |      | Conditions                                    | Unit |
|--------------------------------------|-----------------------|-----------------|------|------|-----------------------------------------------|------|
|                                      |                       | Min.            | Typ. | Max. |                                               |      |
| Zero gate voltage collector current  | I <sub>CES</sub>      | —               | —    | 2.0  | V <sub>GE</sub> =0V, V <sub>CE</sub> =1400V   | mA   |
| Gate-Emitter leakage current         | I <sub>GES</sub>      | —               | —    | 0.5  | V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V    | μA   |
| Gate-Emitter threshold voltage       | V <sub>GE</sub> (th)  | 6.0             | 8.0  | 9.0  | V <sub>CE</sub> =20V, I <sub>C</sub> =600mA   | V    |
| Collector-Emitter saturation voltage | V <sub>CE</sub> (sat) | —               | 2.85 | 3.2  | V <sub>GE</sub> =15V, I <sub>C</sub> =600A    | V    |
| Input capacitance                    | C <sub>ies</sub>      | —               | 60   | —    | V <sub>GE</sub> =0V                           | nF   |
| Output capacitance                   | C <sub>oes</sub>      | —               | 9    | —    | V <sub>CE</sub> =10V                          |      |
| Reverse transfer capacitance         | C <sub>res</sub>      | —               | 4    | —    | f=1MHz                                        |      |
| Turn-on time                         | t <sub>on</sub>       | —               | 0.75 | 1.20 | V <sub>CC</sub> =600V<br>I <sub>C</sub> =600A | μs   |
|                                      | t <sub>r</sub>        | —               | 0.20 | 0.60 |                                               |      |
| Turn-off time                        | t <sub>off</sub>      | —               | 0.65 | 1.00 | V <sub>GE</sub> =±15V<br>R <sub>G</sub> =2.0Ω | μs   |
|                                      | t <sub>f</sub>        | —               | 0.10 | 0.30 |                                               |      |
| Diode forward on voltage             | V <sub>F</sub>        | —               | —    | 3.4  | I <sub>F</sub> =600A, V <sub>GE</sub> =0V     | V    |
| Reverse recovery time                | t <sub>rr</sub>       | —               | —    | 0.35 | I <sub>F</sub> =600A                          | μs   |

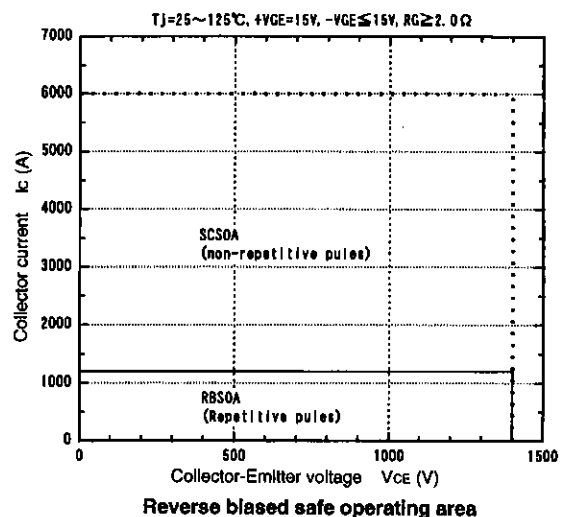
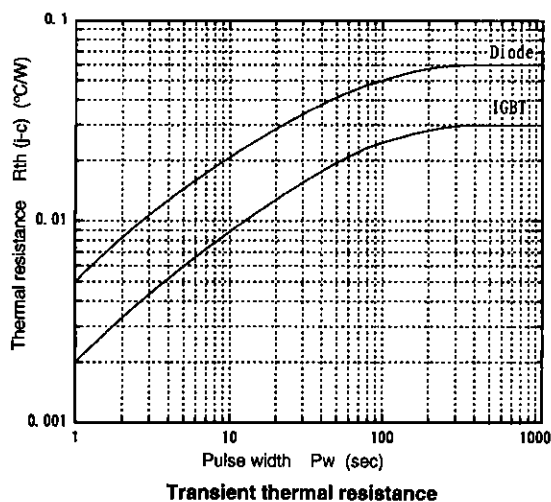
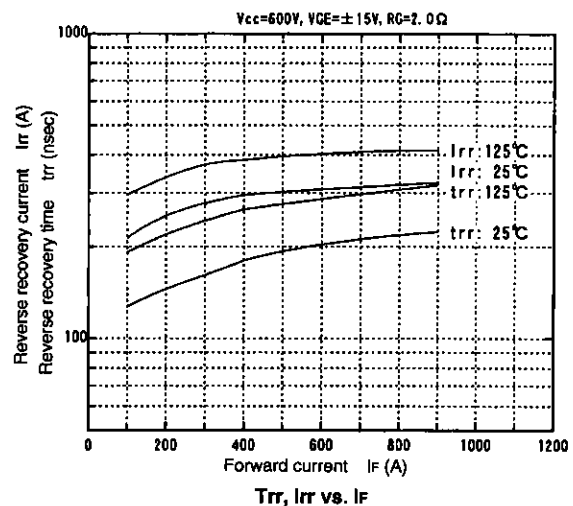
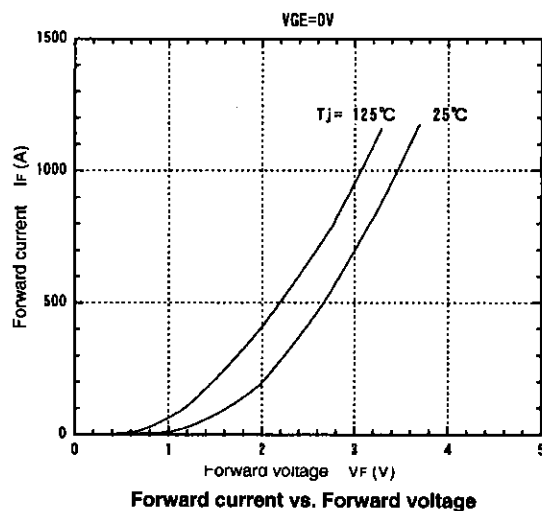
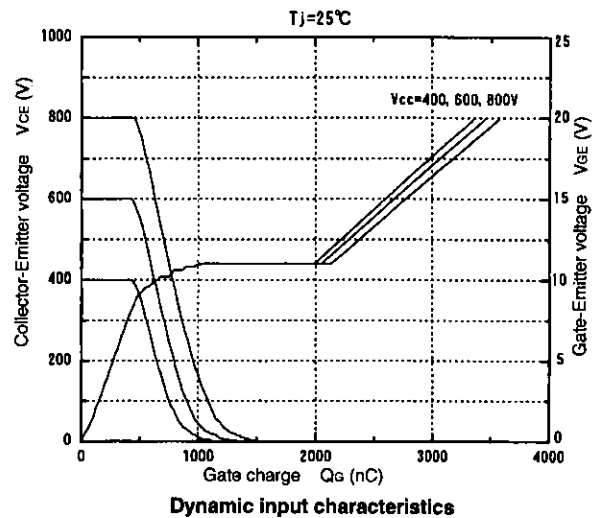
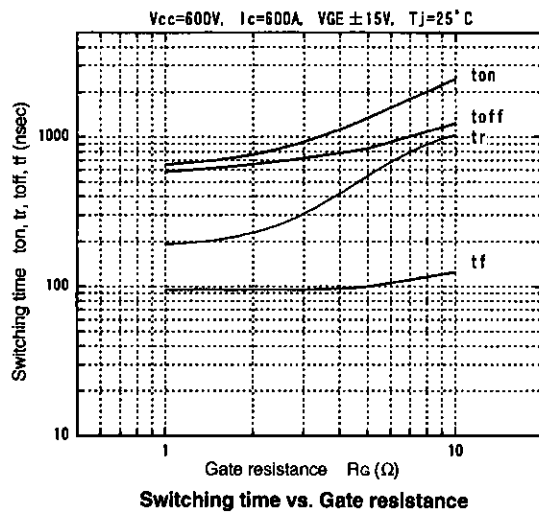
#### ● Thermal resistance characteristics

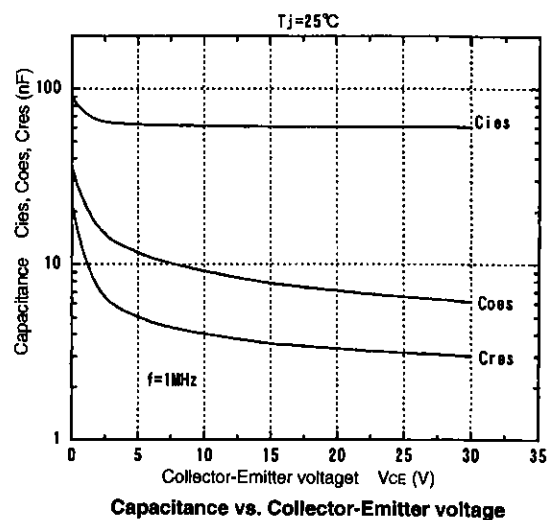
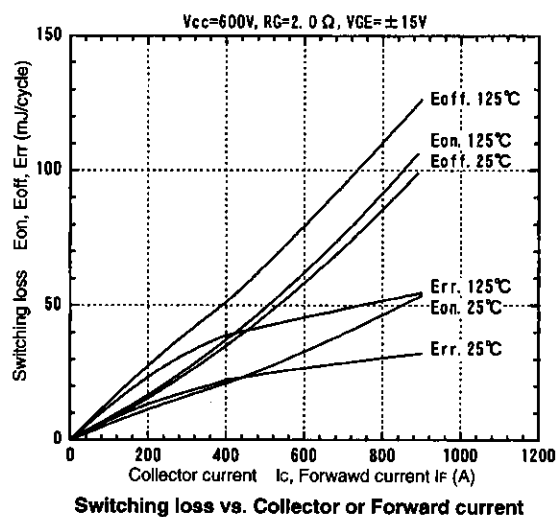
| Item               | Symbol                 | Characteristics |        |      | Conditions              | Unit |
|--------------------|------------------------|-----------------|--------|------|-------------------------|------|
|                    |                        | Min.            | Typ.   | Max. |                         |      |
| Thermal resistance | R <sub>th</sub> (j-c)  | —               | —      | 0.03 | IGBT                    | °C/W |
|                    | R <sub>th</sub> (j-c)  | —               | —      | 0.06 | Diode                   |      |
|                    | R <sub>th</sub> (c-f)* | —               | 0.0063 | —    | the base to cooling fin |      |

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

## Characteristics

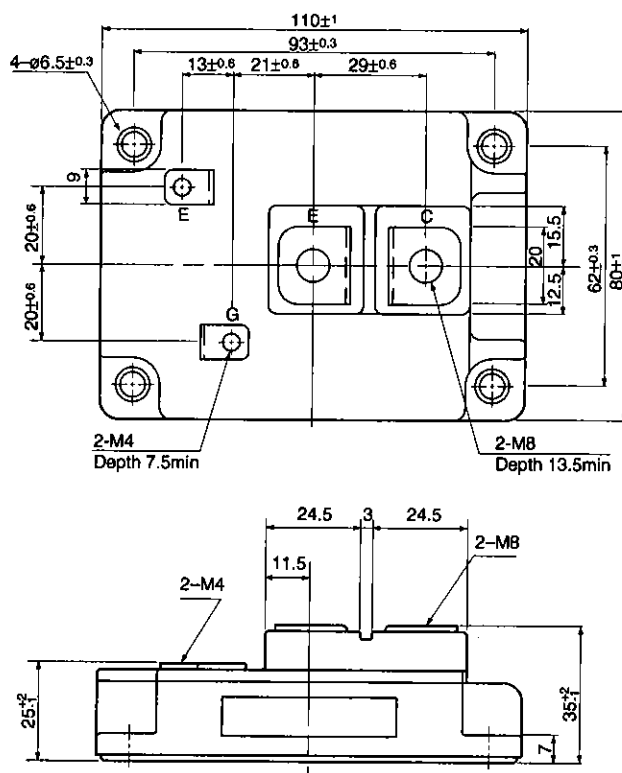






## Outline drawings, mm

M138



Mass : 530g