

# 2MBI150NC-060

IGBT Module

600V / 150A 2 in one-package

## ■ Features

- High speed switching
- Voltage drive
- Low inductance module structure

## ■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply
- Industrial machines, such as Welding machines



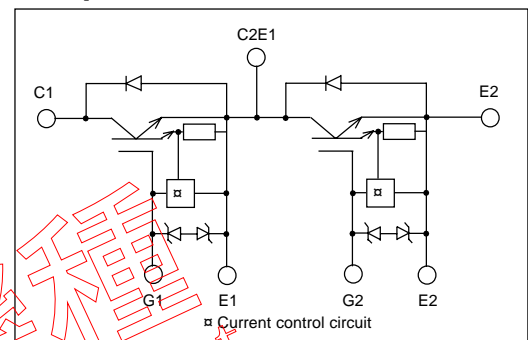
## ■ Maximum ratings and characteristics

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

| Item                      | Symbol       | Rating          | Unit             |
|---------------------------|--------------|-----------------|------------------|
| Collector-Emitter voltage | $V_{CES}$    | 600             | V                |
| Gate-Emitter voltage      | $V_{GES}$    | $\pm 20$        | V                |
| Collector current         | Continuous   | $I_c$           | 150 A            |
|                           | 1ms          | $I_c$ pulse     | 300 A            |
|                           | Continuous   | $-I_c$          | 150 A            |
|                           | 1ms          | $-I_c$ pulse    | 300 A            |
| Max. power dissipation    | $P_c$        | 600             | W                |
| Operating temperature     | $T_j$        | +150            | $^\circ\text{C}$ |
| Storage temperature       | $T_{stg}$    | -40 to +125     | $^\circ\text{C}$ |
| Isolation voltage         | $V_{is}$     | AC 2500 (1min.) | V                |
| Screw torque              | Mounting *1  | 3.5             | N·m              |
|                           | Terminals *1 | 3.5             | N·m              |

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

## ■ Equivalent Circuit Schematic



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

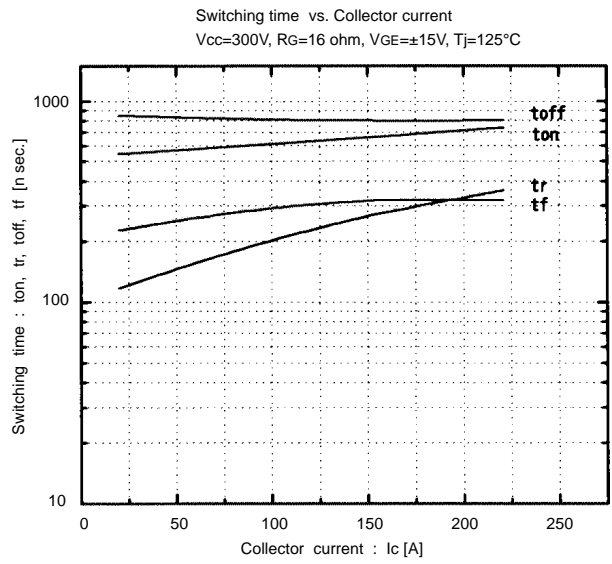
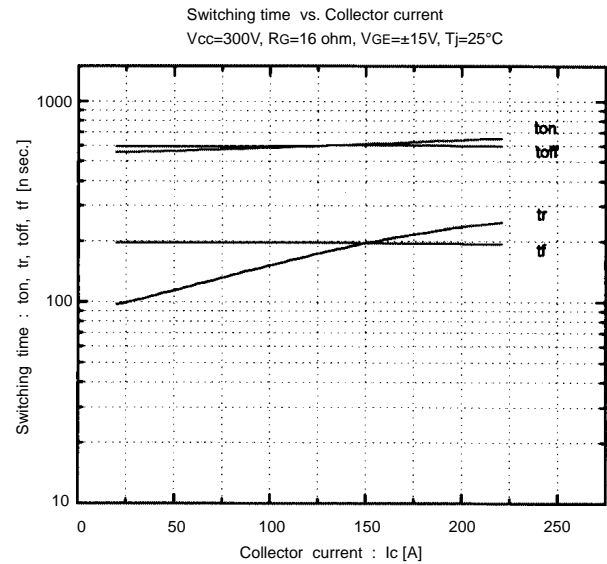
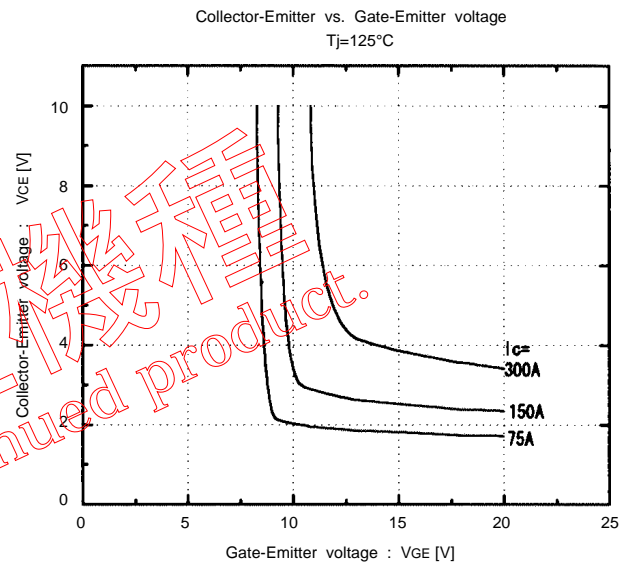
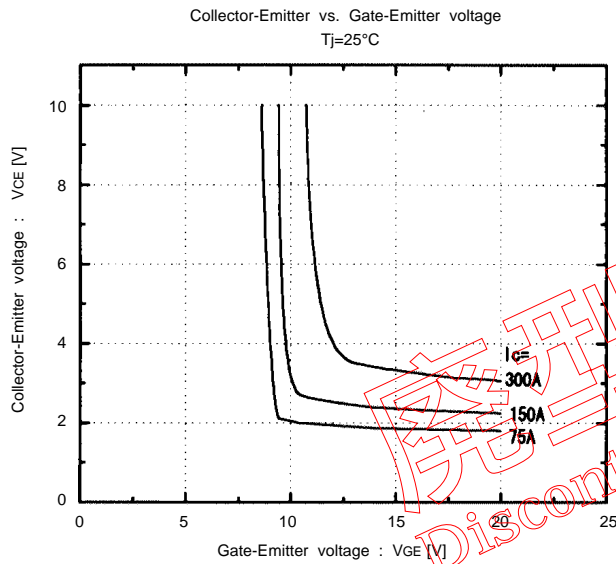
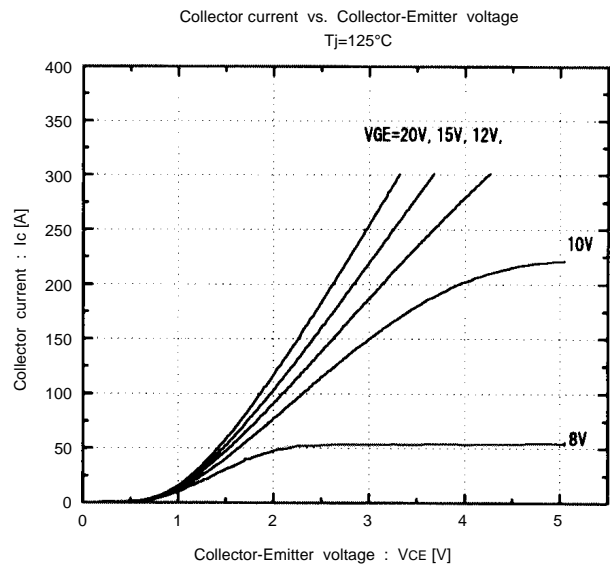
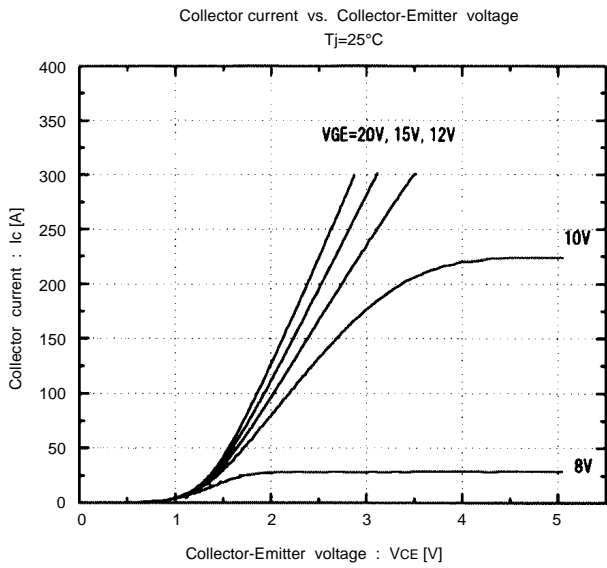
| Item                                 | Symbol        | Characteristics |      |      | Conditions                                   | Unit          |
|--------------------------------------|---------------|-----------------|------|------|--|---------------|
|                                      |               | Min.            | Typ. | Max. |  |               |
| Zero gate voltage collector current  | $I_{CES}$     | –               | –    | 1.0  | $V_{GE}=0\text{V}$ , $V_{CE}=600\text{V}$    | mA            |
| Gate-Emitter leakage current         | $I_{GES}$     | –               | –    | 15   | $V_{CE}=0\text{V}$ , $V_{GE}=\pm 20\text{V}$ | $\mu\text{A}$ |
| Gate-Emitter threshold voltage       | $V_{GE(th)}$  | 4.5             | –    | 7.5  | $V_{CE}=20\text{V}$ , $I_c=150\text{mA}$     | V             |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | –               | –    | 2.8  | $V_{GE}=15\text{V}$ , $I_c=150\text{A}$      | V             |
| Input capacitance                    | $C_{ies}$     | –               | 9900 | –    | $V_{GE}=0\text{V}$                           | pF            |
| Output capacitance                   | $C_{oes}$     | –               | 2200 | –    | $V_{CE}=10\text{V}$                          |               |
| Reverse transfer capacitance         | $C_{res}$     | –               | 1000 | –    | $f=1\text{MHz}$                              |               |
| Turn-on time                         | $t_{on}$      | –               | 0.6  | 1.2  | $V_{CC}=300\text{V}$                         | $\mu\text{s}$ |
|                                      | $t_r$         | –               | 0.2  | 0.6  | $I_c=150\text{A}$                            |               |
| Turn-off time                        | $t_{off}$     | –               | 0.6  | 1.0  | $V_{GE}=\pm 15\text{V}$                      | $\mu\text{s}$ |
|                                      | $t_f$         | –               | 0.2  | 0.35 | $R_G=16\text{ohm}$                           |               |
| Diode forward on voltage             | $V_F$         | –               | –    | 3.0  | $I_F=150\text{A}$ , $V_{GE}=0\text{V}$       | V             |
| Reverse recovery time                | $t_{rr}$      | –               | –    | 0.3  | $I_F=150\text{A}$                            | $\mu\text{s}$ |

● Thermal resistance characteristics

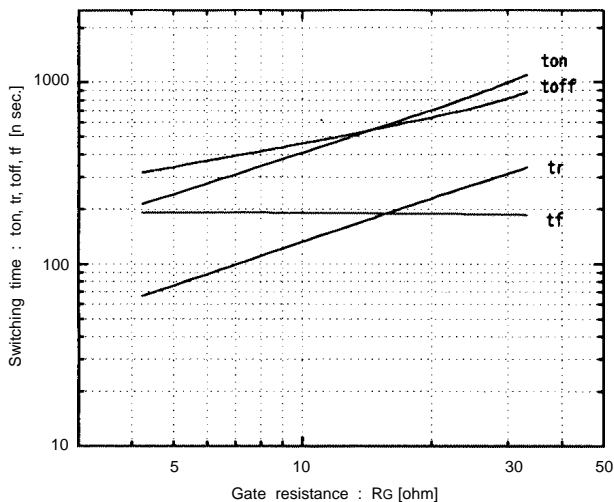
| Item               | Symbol          | Characteristics |      |      | Conditions              | Unit               |
|--------------------|-----------------|-----------------|------|------|-------------------------|--------------------|
|                    |                 | Min.            | Typ. | Max. |                         |                    |
| Thermal resistance | $R_{th(j-c)}$   | –               | –    | 0.21 | IGBT                    | $^\circ\text{C/W}$ |
|                    | $R_{th(j-c)}$   | –               | –    | 0.47 | Diode                   | $^\circ\text{C/W}$ |
|                    | $R_{th(c-f)*2}$ | –               | 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

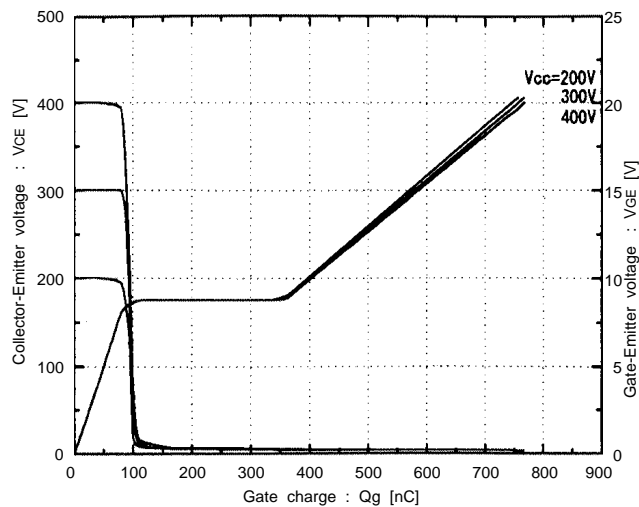
Characteristics (Representative)



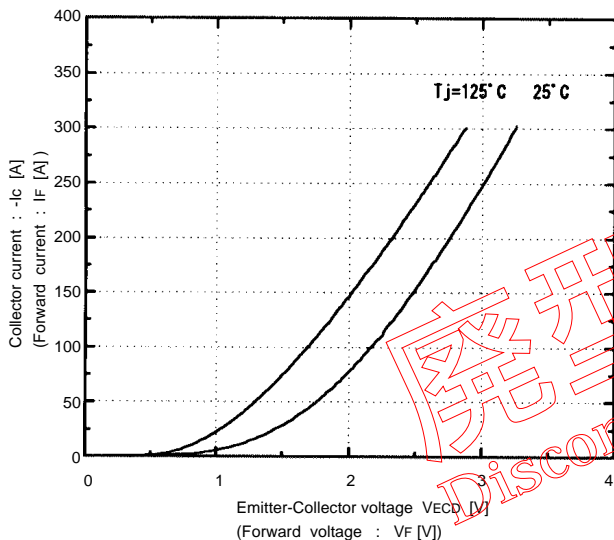
Switching time vs.  $R_G$   
 $V_{CC}=300V, I_c=150A, V_{GE}=\pm 15V, T_j=25^\circ C$



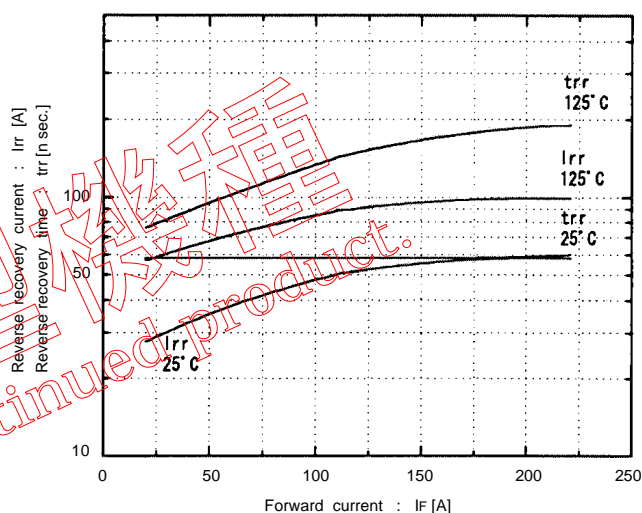
Dynamic input characteristics  
 $T_j=25^\circ C$



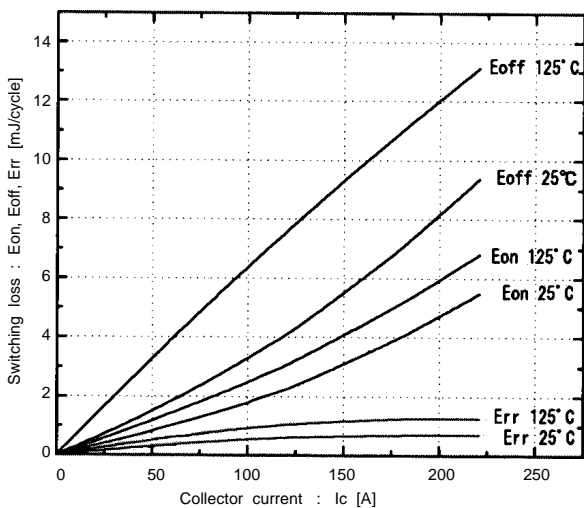
Forward current vs. Forward voltage  
 $V_{GE}=0V$



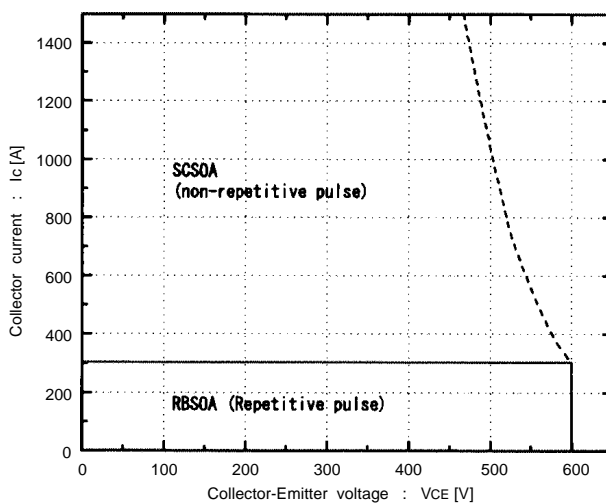
Reverse recovery characteristics  
 $t_{rr}, I_{rr}$ , vs.  $I_F$

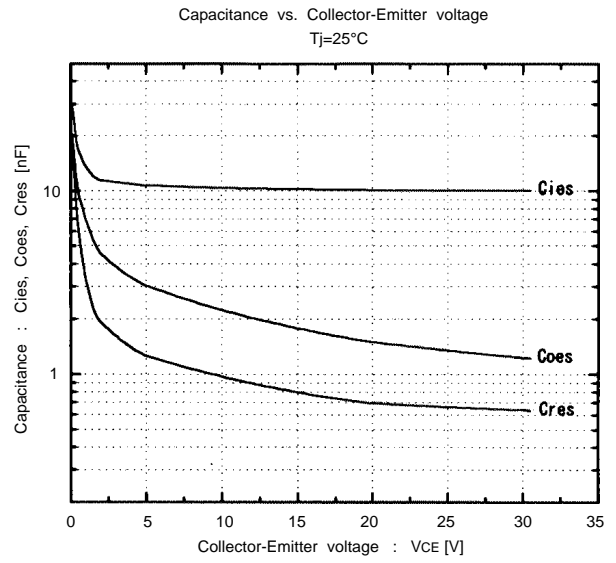
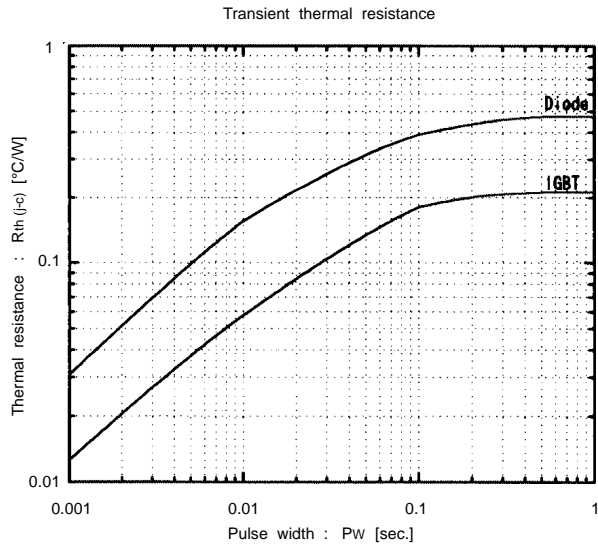


Switching loss vs. Collector current  
 $V_{CC}=300V, R_G=16\text{ ohm}, V_{GE}=\pm 15V$



Reversed biased safe operating area  
 $+V_{GE}=15V, -V_{GE} \leq 15V, T_j \leq 125^\circ C, R_G \geq 16\text{ ohm}$





■ Outline Drawings, mm

