

2MBI50N-120

IGBT Module

1200V / 50A 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



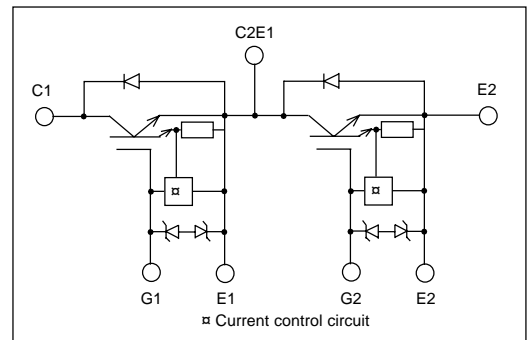
■ Maximum ratings and characteristics

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

| Item | Symbol | Rating | Unit |
|---------------------------|------------------|-----------------------|-------|
| Collector-Emitter voltage | V _{CEs} | 1200 | V |
| Gate-Emitter voltage | V _{GES} | ±20 | V |
| Collector current | Continuous | I _c | 50 A |
| | 1ms | I _c pulse | 100 A |
| | Continuous | -I _c | 50 A |
| | 1ms | -I _c pulse | 100 A |
| Max. power dissipation | P _c | 400 | W |
| Operating temperature | T _j | +150 | °C |
| Storage temperature | T _{stg} | -40 to +125 | °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 Tj=25°C unless otherwise specified)

| Item | Symbol | Characteristics | | | Conditions | Unit |
|--------------------------------------|----------------------|-----------------|------|------|---|------|
| | | Min. | Typ. | Max. | | |
| Zero gate voltage collector current | I _{CEs} | — | — | 1.0 | V _{GE} =0V, V _{CE} =1200V | mA |
| Gate-Emitter leakage current | I _{GES} | — | — | 15 | V _{CE} =0V, V _{GE} =±20V | μA |
| Gate-Emitter threshold voltage | V _{GE(th)} | 4.5 | — | 7.5 | V _{CE} =20V, I _c =50mA | V |
| Collector-Emitter saturation voltage | V _{CE(sat)} | — | — | 3.3 | V _{GE} =15V, I _c =50A | V |
| Input capacitance | C _{ies} | — | 8000 | — | V _{GE} =0V | pF |
| Output capacitance | C _{oes} | — | 2900 | — | V _{CE} =10V | |
| Reverse transfer capacitance | C _{res} | — | 2580 | — | f=1MHz | |
| Turn-on time | t _{on} | — | 0.65 | 1.2 | V _{CC} =600V | μs |
| | t _r | — | 0.25 | 0.6 | I _c =50A | |
| Turn-off time | t _{off} | — | 0.85 | 1.5 | V _{GE} =±15V | μs |
| | t _f | — | 0.35 | 0.5 | R _G =24 ohm | |
| Diode forward on voltage | V _F | — | — | 3.0 | I _F =50A, V _{GE} =0V | V |
| Reverse recovery time | t _{rr} | — | — | 0.35 | I _F =50A | μs |

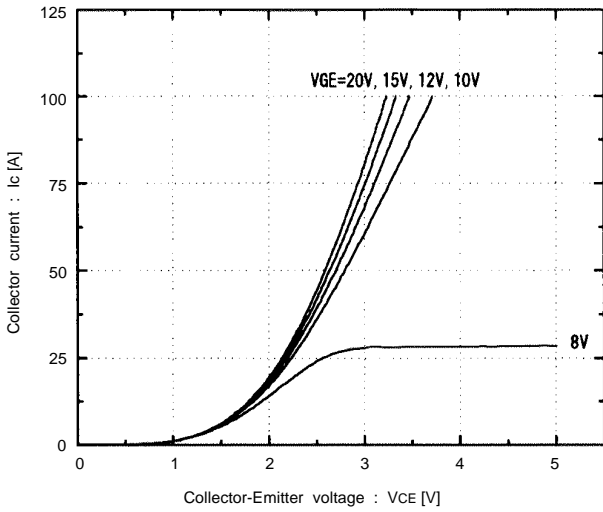
● Thermal resistance characteristics

| Item | Symbol | Characteristics | | | Conditions | Unit |
|--------------------|------------------------|-----------------|------|------|-------------------------|------|
| | | Min. | Typ. | Max. | | |
| Thermal resistance | R _{th(j-c)} | — | — | 0.31 | IGBT | °C/W |
| | R _{th(j-c)} | — | — | 0.85 | Diode | °C/W |
| | R _{th(c-f)*2} | — | 0.05 | — | the base to cooling fin | °C/W |

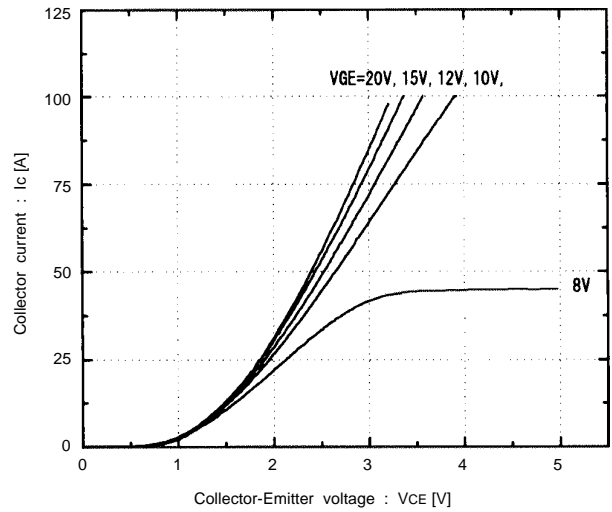
*2 : This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

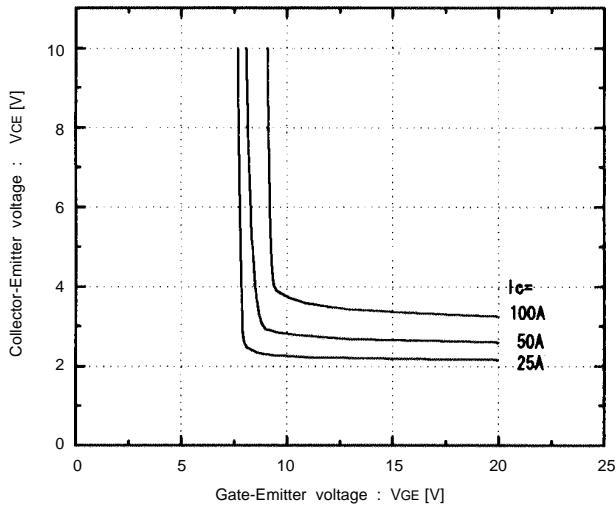
Collector current vs. Collector-Emitter voltage
T_J=25°C



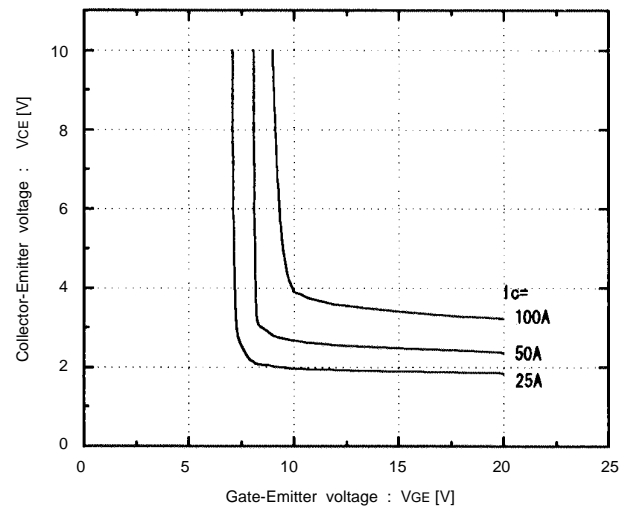
Collector current vs. Collector-Emitter voltage
T_J=125°C



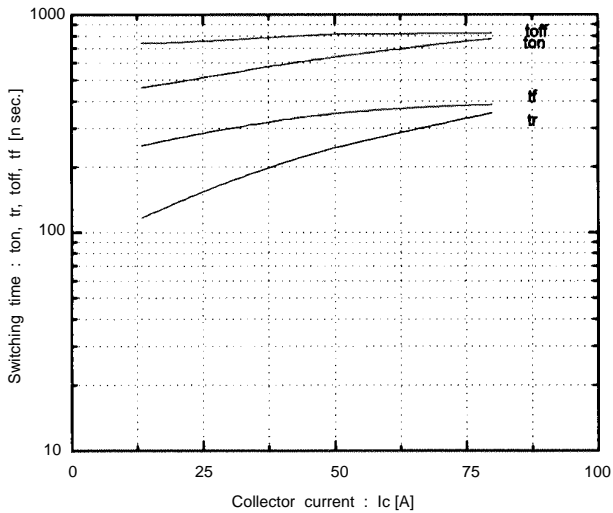
Collector-Emitter vs. Gate-Emitter voltage
T_J=25°C



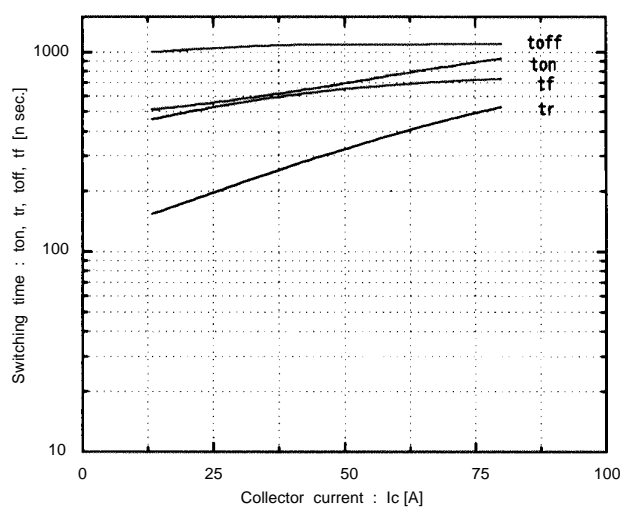
Collector-Emitter vs. Gate-Emitter voltage
T_J=125°C



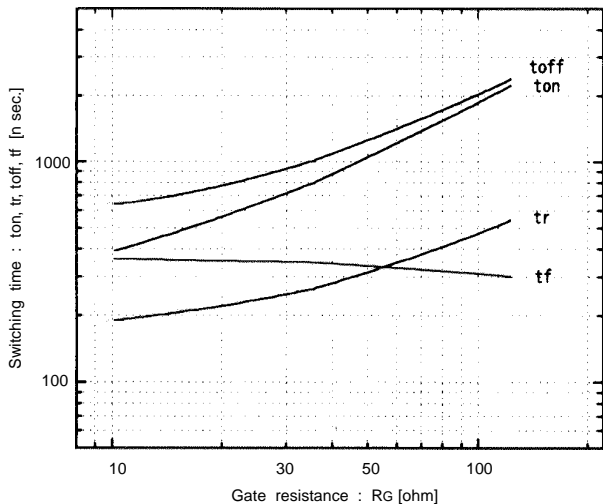
Switching time vs. Collector current
V_{CC}=600V, R_G=24 ohm, V_{GE}=±15V, T_J=25°C



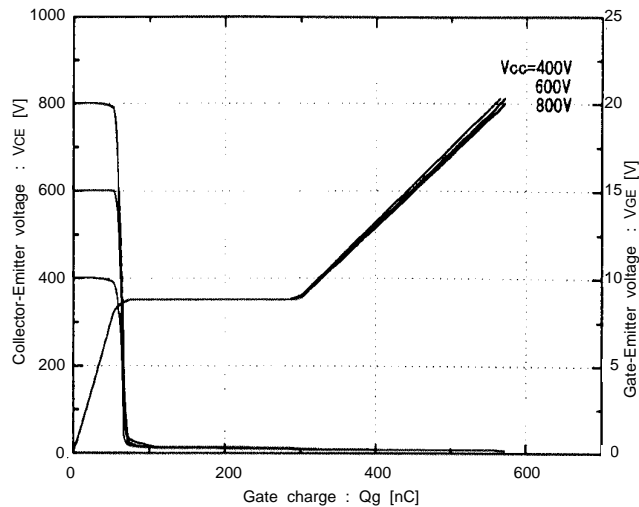
Switching time vs. Collector current
V_{CC}=600V, R_G=24 ohm, V_{GE}=±15V, T_J=125°C



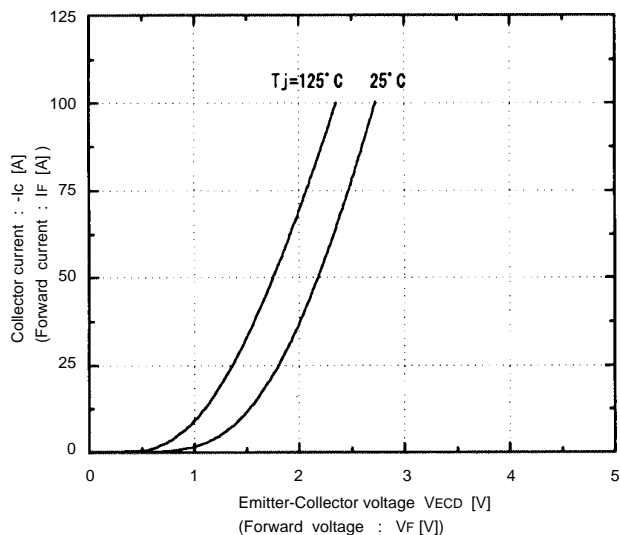
Switching time vs. RG
Vcc=600V, Ic=50A, VGE=±15V, Tj=25°C



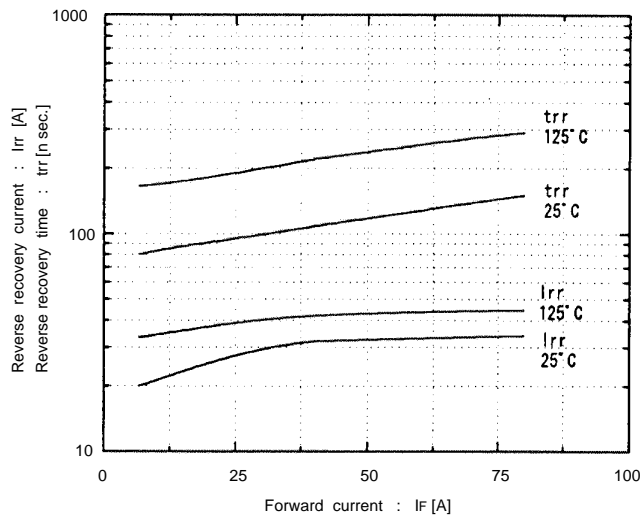
Dynamic input characteristics
Tj=25°C



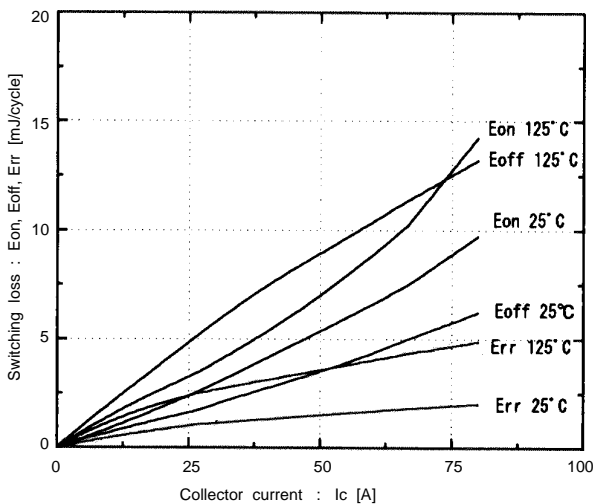
Forward current vs. Forward voltage
VGE=0V



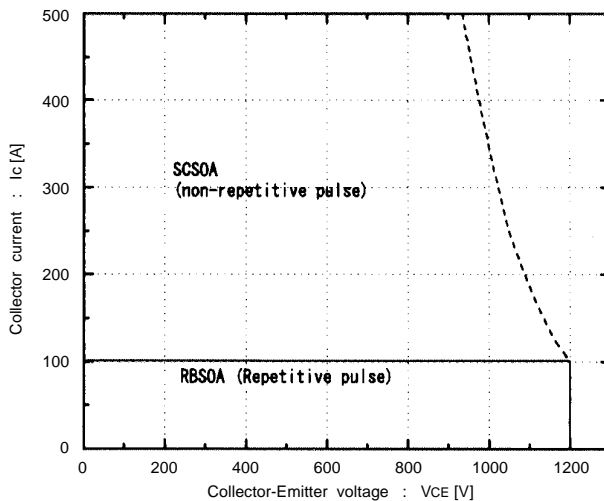
Reverse recovery characteristics
trr, Irr, vs. IF

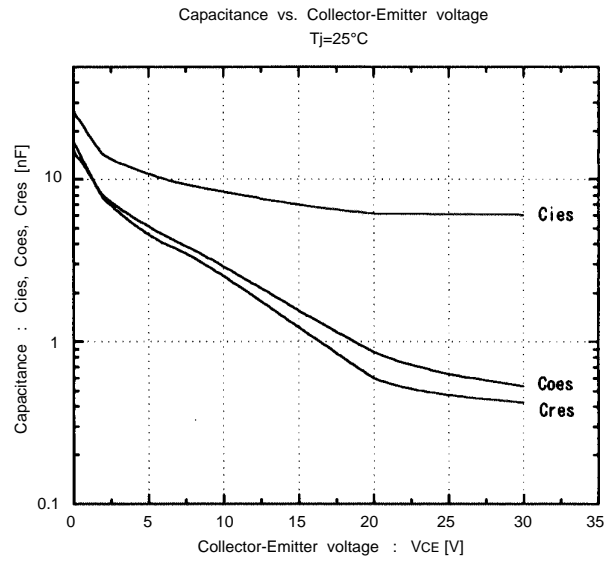
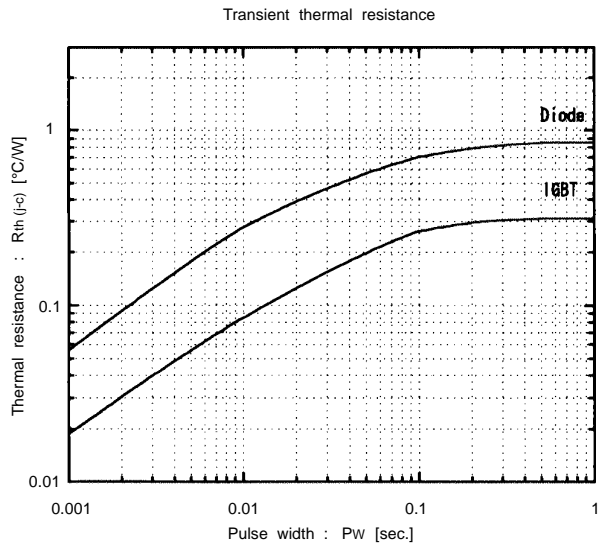


Switching loss vs. Collector current
Vcc=600V, RG=24 ohm, VGE=±15V



Reversed biased safe operating area
+VGE=15V, -VGE ≤ 15V, Tj ≤ 125°C, RG ≥ 24 ohm





■ Outline Drawings, mm

