FUJI ELECTRIC

# 2MBI 100NB-120

**2-Pack IGBT**
**1200 V**
**100 A**

## IGBT MODULE ( N series )

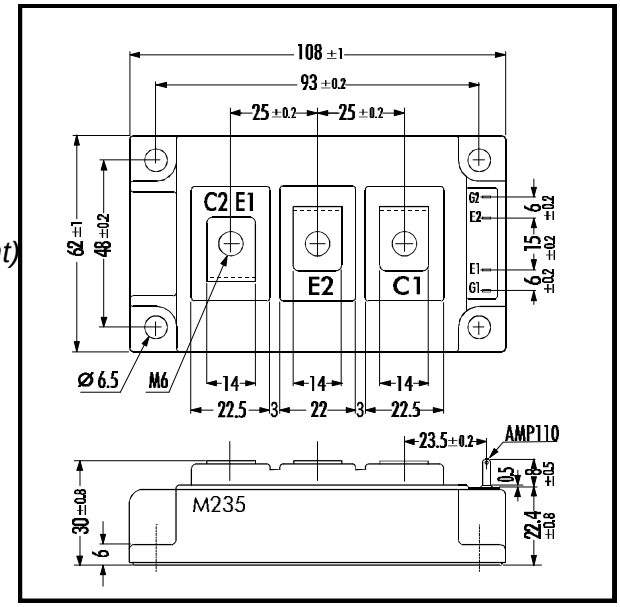
## ■ Features

- *Square RBSOA*
- *Low Saturation Voltage*
- *Less Total Power Dissipation*
- *Improved FWD Characteristic*
- *Minimized Internal Stray Inductance*
- *Overcurrent Limiting Function (4~5 Times Rated Current)*

## ■ Applications

- *High Power Switching*
- *A.C. Motor Controls*
- *D.C. Motor Controls*
- *Uninterruptible Power Supply*

## ■ Outline Drawing



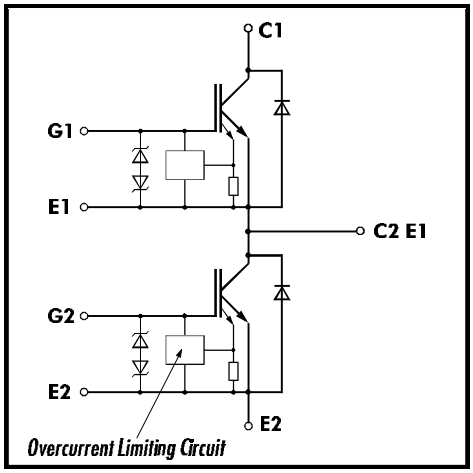

## ■ Maximum Ratings and Characteristics

**• Absolute Maximum Ratings** ( $T_c$=25°C)

| Items | | Symbols | Ratings | Units |
|---|---|---|---|---|
| Collector-Emitter Voltage | | $V_{CES}$ | 1200 | V |
| Gate -Emitter Voltage | | $V_{GES}$ | ± 20 | V |
| Collector Current | Continuous | $I_C$ | 100 | A |
| | 1ms | $I_{C\ PULSE}$ | 200 | |
| | Continuous | $-I_C$ | 100 | |
| | 1ms | $-I_{C\ PULSE}$ | 200 | |
| Max. Power Dissipation | | $P_C$ | 780 | W |
| Operating Temperature | | $T_j$ | +150 | °C |
| Storage Temperature | | $T_{stg}$ | -40 ~ +125 | °C |
| Isolation Voltage | A.C. 1min. | $V_{is}$ | 2500 | V |
| Screw Torque | | Mounting *1 | 3.5 | Nm |
| | | Terminals *2 | 4.5 | |

**Note:** *1:Recommendable Value; 2.5 ~ 3.5 Nm (M5) or (M6)
*2:Recommendable Value; 3.5 ~ 4.5 Nm (M6)

## ■ Equivalent Circuit




**• Electrical Characteristics** ( at $T_j$=25°C )

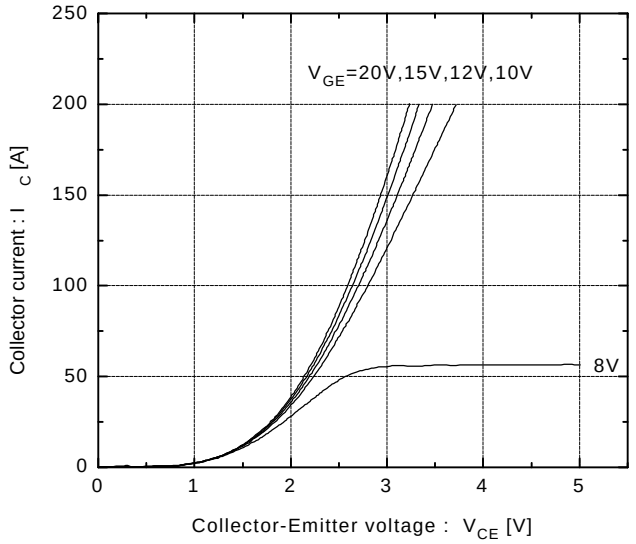
| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Zero Gate Voltage Collector Current | $I_{CES}$ | $V_{GE}$=0V $V_{CE}$=1200V | | | 2.0 | mA |
| Gate-Emitter Leackage Current | $I_{GES}$ | $V_{CE}$=0V $V_{GE}$=± 20V | | | 30 | µA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $V_{GE}$=20V $I_C$=100mA | 4.5 | | 7.5 | V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_{GE}$=15V $I_C$=100A | | | 3.3 | V |
| Input capacitance | $C_{ies}$ | $V_{GE}$=0V | | 16000 | | pF |
| Output capacitance | $C_{oes}$ | $V_{CE}$=10V | | 5800 | | |
| Reverse Transfer capacitance | $C_{res}$ | f=1MHz | | 5160 | | |
| Turn-on Time | $t_{ON}$ | $V_{CC}$=600V | | 0.65 | 1.2 | µs |
| | $t_r$ | $I_C$=100A | | 0.25 | 0.6 | |
| Turn-off Time | $t_{OFF}$ | $V_{GE}$=± 15V | | 0.85 | 1.5 | |
| | $t_f$ | $R_G$=9.1Ω | | 0.35 | 0.5 | |
| Diode Forward On-Voltage | $V_F$ | $I_F$=100A $V_{GE}$=0V | | | 3.0 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=100A | | | 350 | ns |

**• Thermal Characteristics**

| Items | Symbols | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Thermal Resistance | $R_{th(j-c)}$ | IGBT | | | 0.16 | °C/W |
| | $R_{th(j-c)}$ | Diode | | | 0.33 | |
| | $R_{th(c-f)}$ | With Thermal Compound | | 0.025 | | |

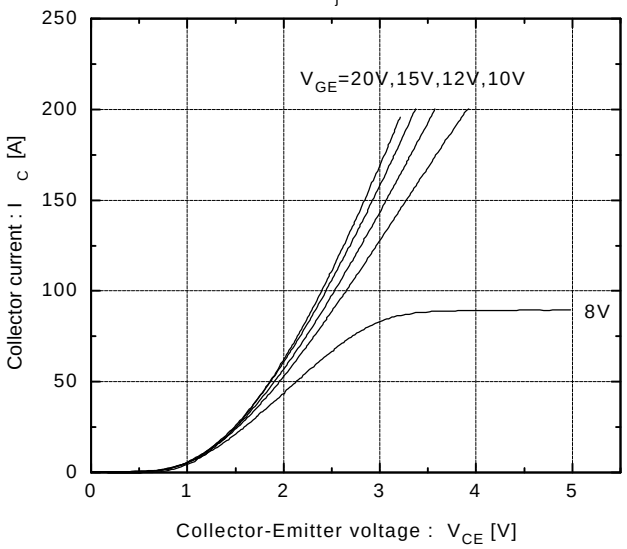
Collector current vs. Collector-Emitter voltage

$T_j$=25°C



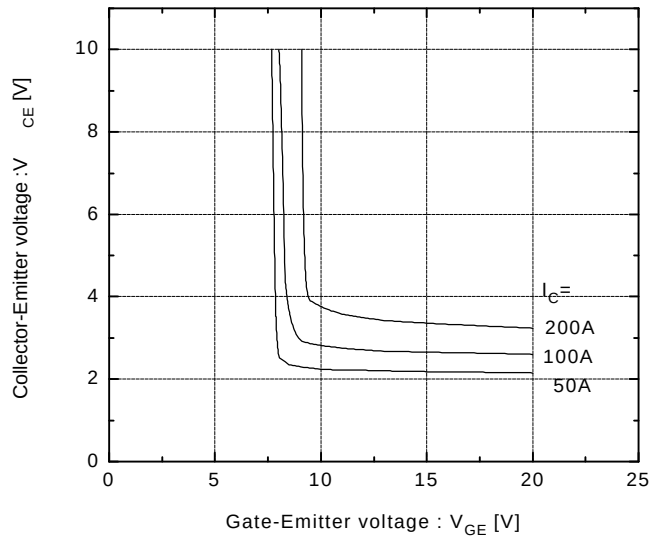

Collector current vs. Collector-Emitter voltage

$T_j$=125°C



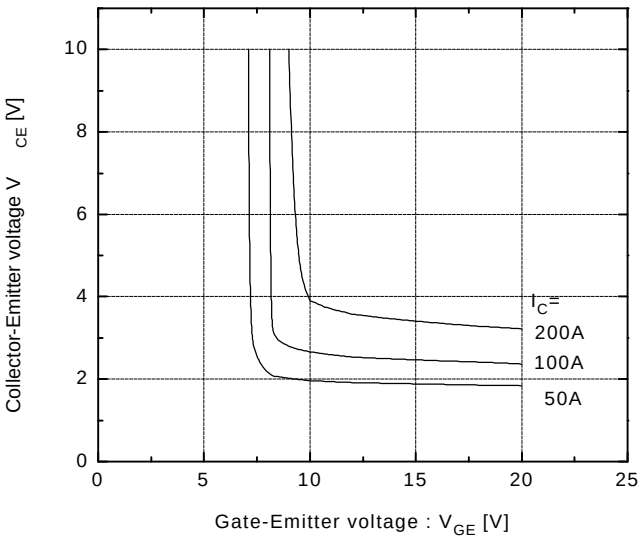

Collector-Emitter vs. Gate-Emitter voltage

$T_j$=25°C



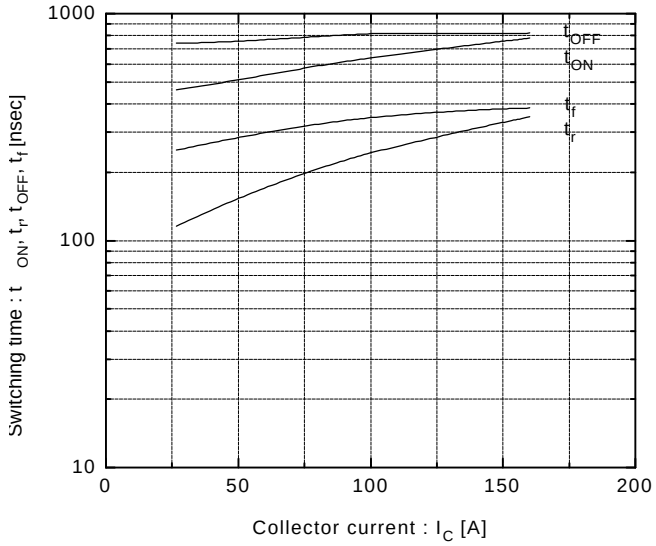

Collector-Emitter vs. Gate-Emitter voltage

$T_j$=125°C




Switching time vs. Collector current

$V_{CC}$=600V, $R_G$=9.1Ω, $V_{GE}$±15V, $T_j$=25°C

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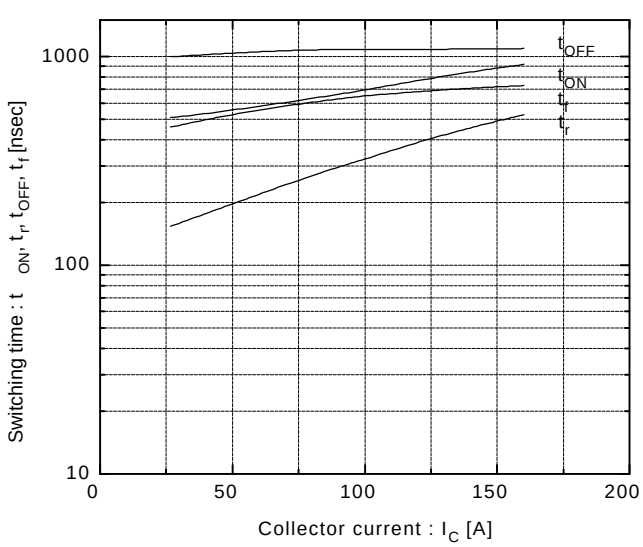

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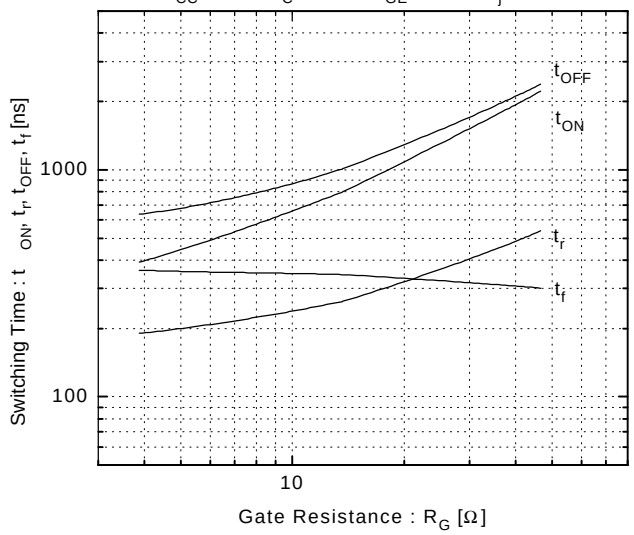
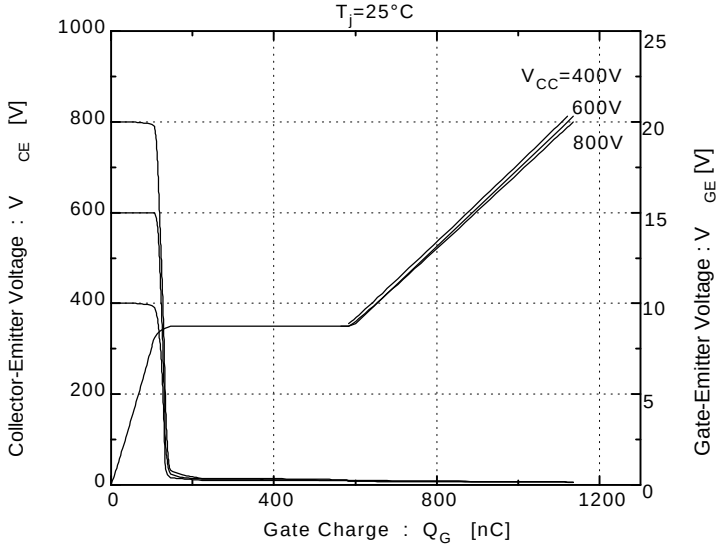
Switching Time vs. $R_G$

$V_{CC}$=600V, $I_C$=100A, $V_{GE}$=±15V, $T_j$=25°C



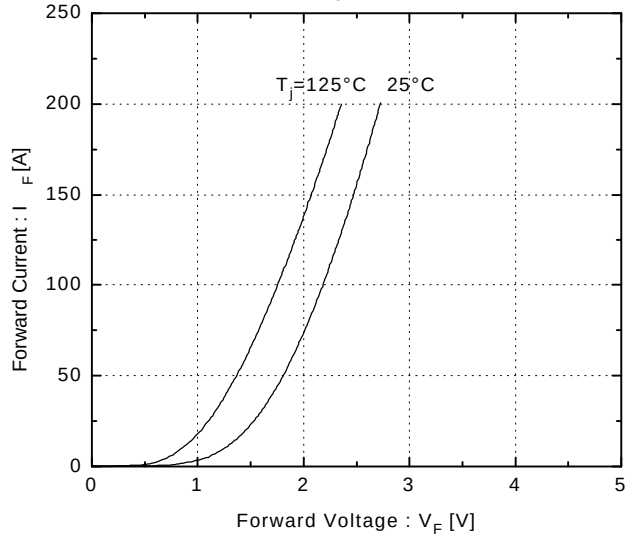

Dynamic Input Characteristics

$T_j$=25°C



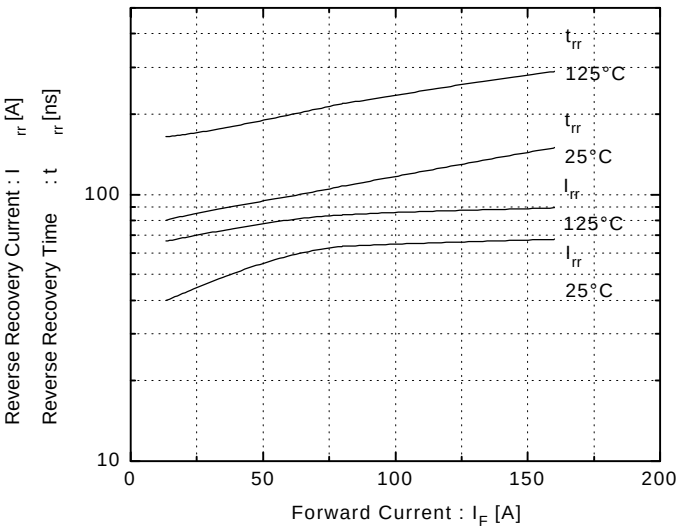

Forward Current vs. Forward Voltage

$V_{GE}$=0V

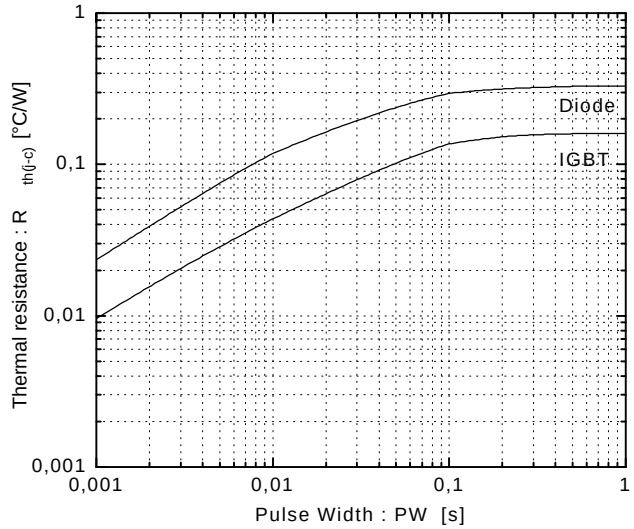



Reverse Recovery Characteristics

$t_{rr}$, $I_{rr}$ vs. $I_F$

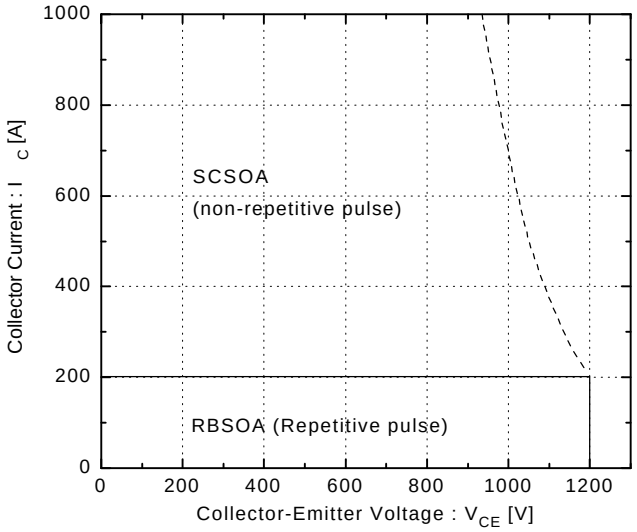



Transient Thermal Resistance



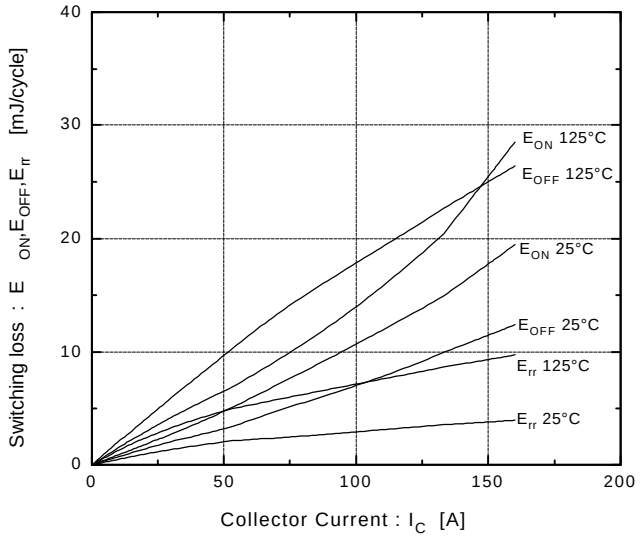

Reversed Biased Safe Operating Area

+$V_{GE}$=15V, -$V_{GE}$≤15V, $T_j$≤125°C, $R_G$≥9.1Ω



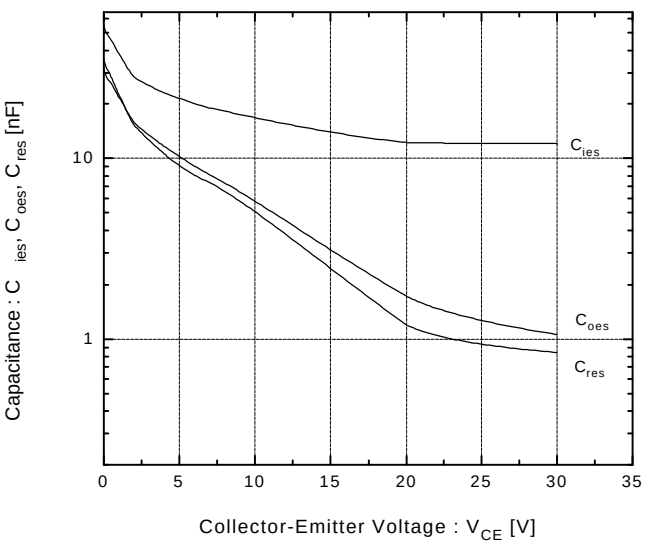
Switching loss vs. Collector current

$V_{CC}$=600V, $R_G$=9.1Ω , $V_{GE}$=±15V




Capacitance vs. Collector-Emitter voltage

$T_j$=25°C

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