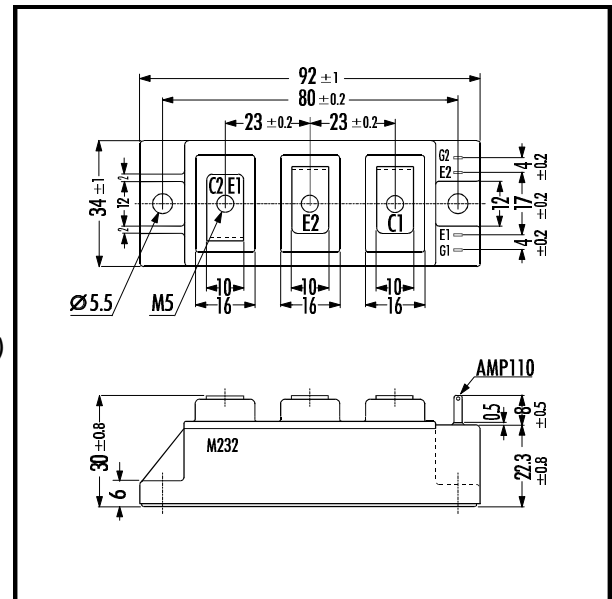


## IGBT MODULE ( N series )

## ■ Outline Drawing

### ■ Features

- Square RBSOA
- Low Saturation Voltage
- Overcurrent Limiting Function (~3 Times Rated Current)



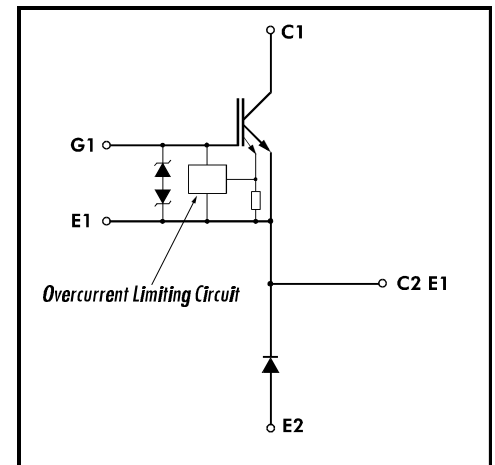
## ■ Maximum Ratings and Characteristics

### • Absolute Maximum Ratings ( T<sub>c</sub>=25°C )

| Items                      | Symbols                    | Ratings               | Units |
|----------------------------|----------------------------|-----------------------|-------|
| Collector-Emmitter Voltage | V <sub>CES</sub>           | 600                   | V     |
| Gate -Emmitter Voltage     | V <sub>GES</sub>           | ± 20                  | V     |
| Collector Current          | Continuous                 | I <sub>C</sub>        | 150   |
|                            | 1ms                        | I <sub>C PULSE</sub>  | 300   |
|                            | Continuous                 | -I <sub>C</sub>       | 150   |
|                            | 1ms                        | -I <sub>C PULSE</sub> | 300   |
| Max. Power Dissipation     | P <sub>C</sub>             | 600                   | W     |
| Operating Temperature      | T <sub>j</sub>             | +150                  | °C    |
| Storage Temperature        | T <sub>stg</sub>           | -40 ~ +125            | °C    |
| Isolation Voltage          | A.C. 1min. V <sub>is</sub> | 2500                  | V     |
| Screw Torque               | Mounting *1                | 3.5                   | Nm    |
|                            | Terminals *1               | 3.5                   |       |

Note: \*1:Recommendable Value: 2.5 ~ 3.5 Nm (M5)

## ■ Equivalent Circuit



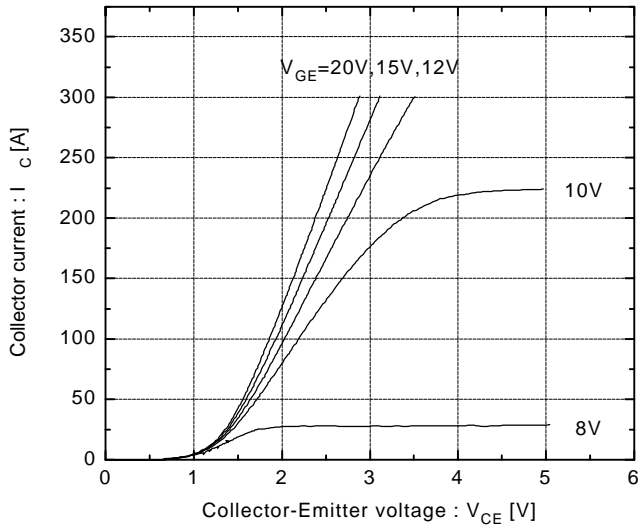
### • Electrical Characteristics ( at T<sub>j</sub>=25°C )

| Items                                 | Symbols              | Test Conditions                            | Min. | Typ. | Max. | Units |
|---------------------------------------|----------------------|--|------|------|------|-------|
| Zero Gate Voltage Collector Current   | I <sub>CES</sub>     | V <sub>GE</sub> =0V V <sub>CE</sub> =600V  |      |      | 1.0  | mA    |
| Gate-Emmitter Leakage Current         | I <sub>GES</sub>     | V <sub>CE</sub> =0V V <sub>GE</sub> =± 20V |      |      | 15   | μA    |
| Gate-Emmitter Threshold Voltage       | V <sub>GE(th)</sub>  | V <sub>GE</sub> =20V I <sub>C</sub> =150mA | 4.5  |      | 7.5  | V     |
| Collector-Emmitter Saturation Voltage | V <sub>CE(sat)</sub> | V <sub>GE</sub> =15V I <sub>C</sub> =150A  |      |      | 2.8  | V     |
| Input capacitance                     | C <sub>ies</sub>     | V <sub>GE</sub> =0V                        |      | 9900 |      | pF    |
| Output capacitance                    | C <sub>oes</sub>     | V <sub>CE</sub> =10V                       |      | 2200 |      |       |
| Reverse Transfer capacitance          | C <sub>res</sub>     | f=1MHz                                     |      | 1000 |      |       |
| Turn-on Time                          | t <sub>ON</sub>      | V <sub>CC</sub> =300V                      |      | 0.6  | 1.2  | μs    |
|                                       | t <sub>r</sub>       | I <sub>C</sub> =150A                       |      | 0.2  | 0.6  |       |
| Turn-off Time                         | t <sub>OFF</sub>     | V <sub>GE</sub> =± 15V                     |      | 0.6  | 1.0  |       |
|                                       | t <sub>f</sub>       | R <sub>G</sub> =16Ω                        |      | 0.2  | 0.35 |       |
| Diode Forward On-Voltage              | V <sub>F</sub>       | I <sub>F</sub> =150A V <sub>GE</sub> =0V   |      |      | 3.0  | V     |
| Reverse Recovery Time                 | t <sub>rr</sub>      | I <sub>F</sub> =150A                       |      |      | 300  | ns    |
| Reverse Current                       | I <sub>RRM</sub>     | V <sub>R</sub> =600V                       |      |      | 1.0  | mA    |

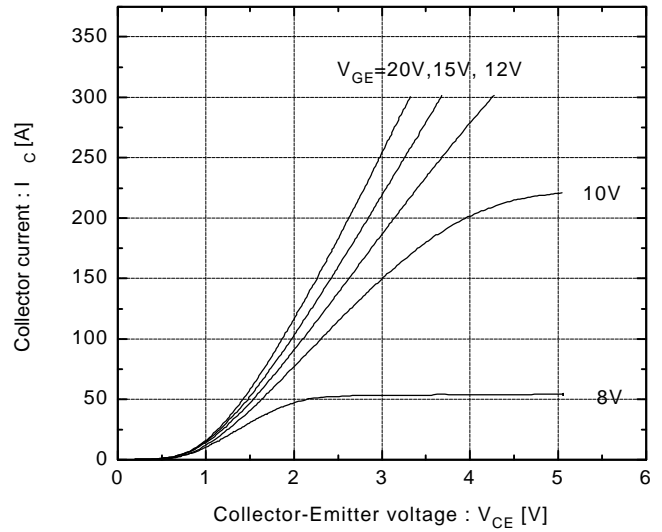
### • Thermal Characteristics

| Items              | Symbols              | Test Conditions       | Min. | Typ. | Max. | Units |
|--------------------|----------------------|-----------------------|------|------|------|-------|
| Thermal Resistance | R <sub>th(f-c)</sub> | IGBT                  |      |      | 0.21 | °C/W  |
|                    | R <sub>th(f-e)</sub> | Diode                 |      |      | 0.47 |       |
|                    | R <sub>th(c-f)</sub> | With Thermal Compound |      | 0.05 |      |       |

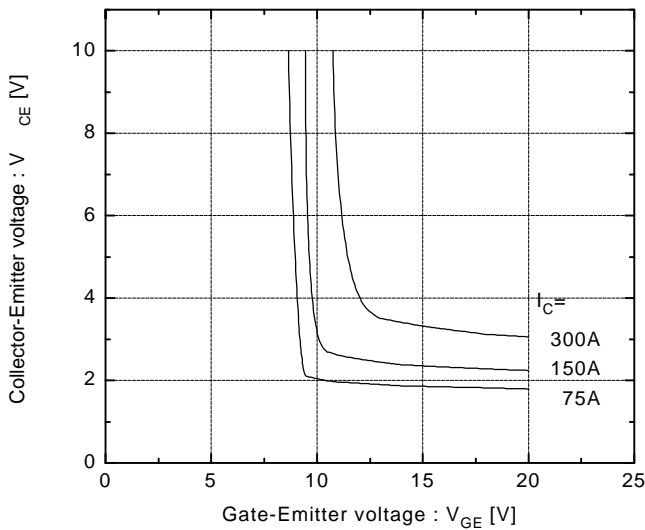
Collector current vs. Collector-Emittor voltage  
 $T_j=25^\circ\text{C}$



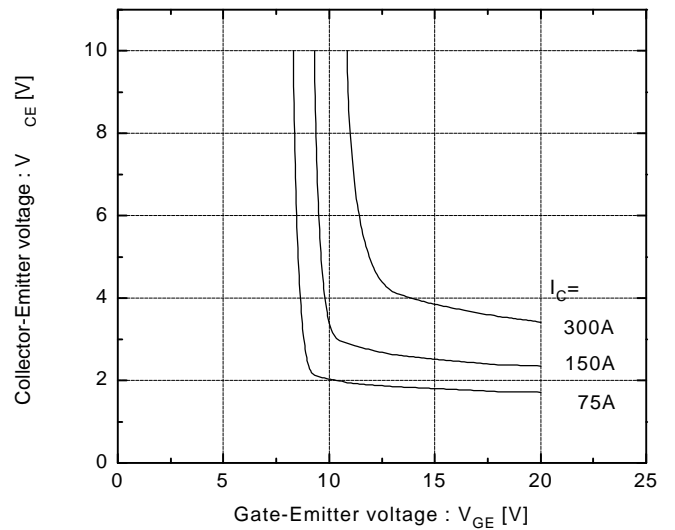
Collector current vs. Collector-Emittor voltage  
 $T_j=125^\circ\text{C}$



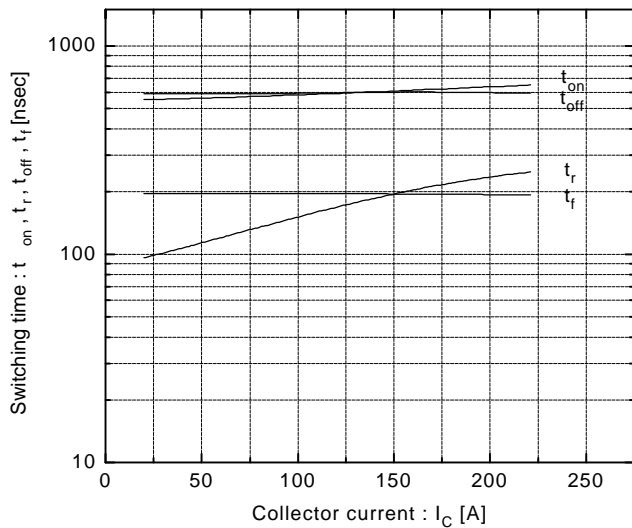
Collector-Emittor vs. Gate-Emittor voltage  
 $T_j=25^\circ\text{C}$



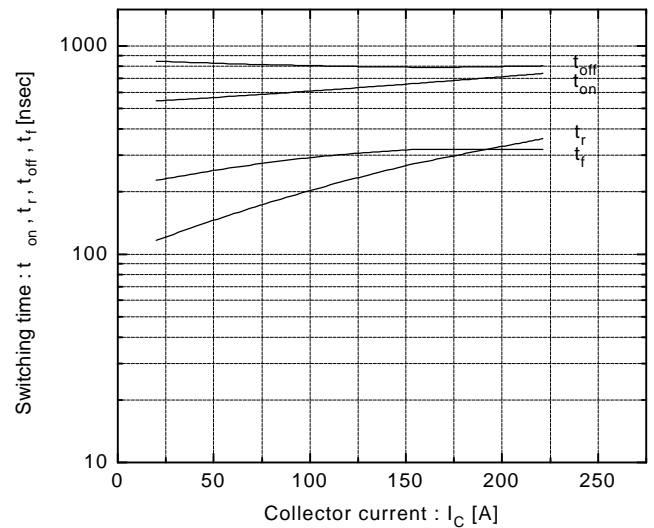
Collector-Emittor vs. Gate-Emittor voltage  
 $T_j=125^\circ\text{C}$

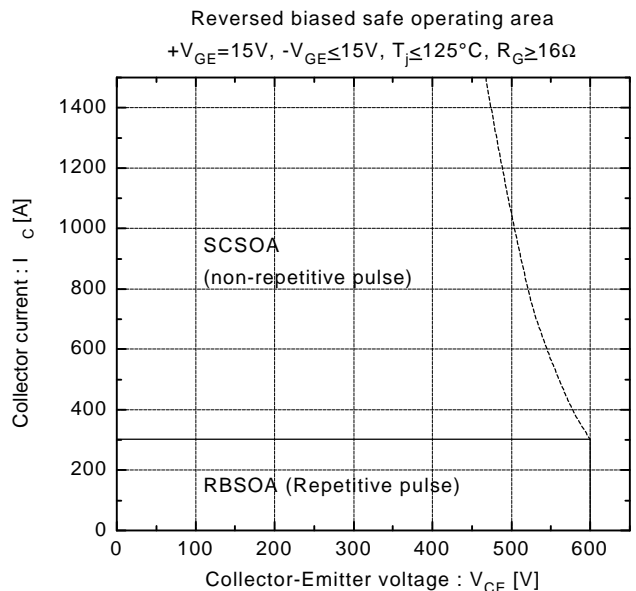
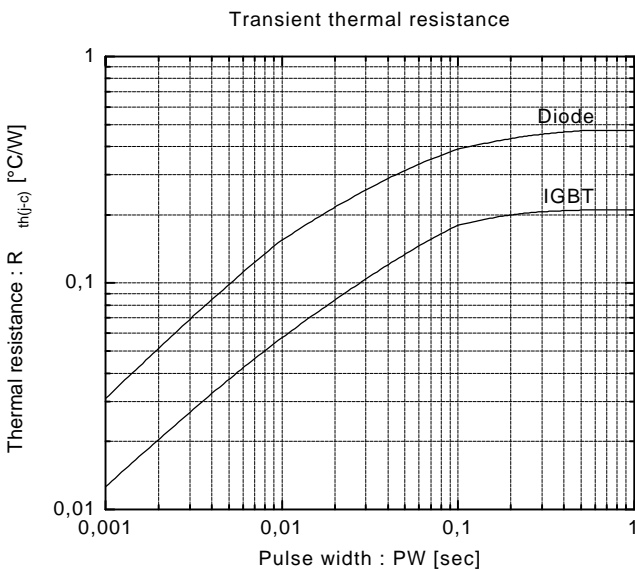
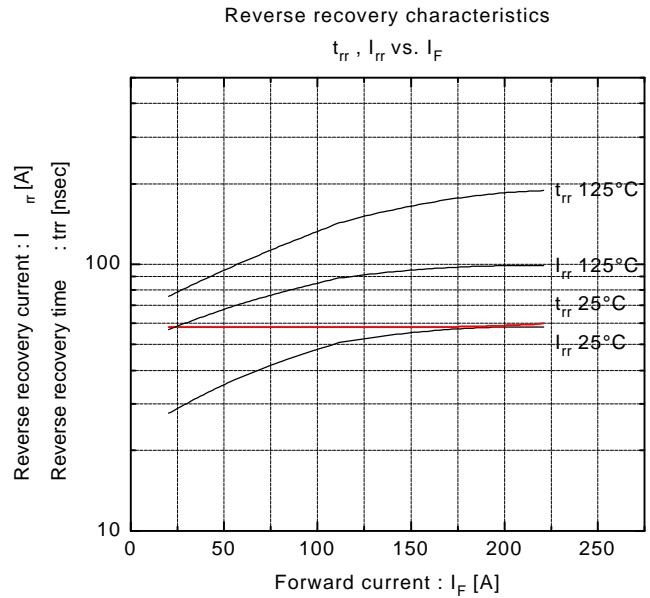
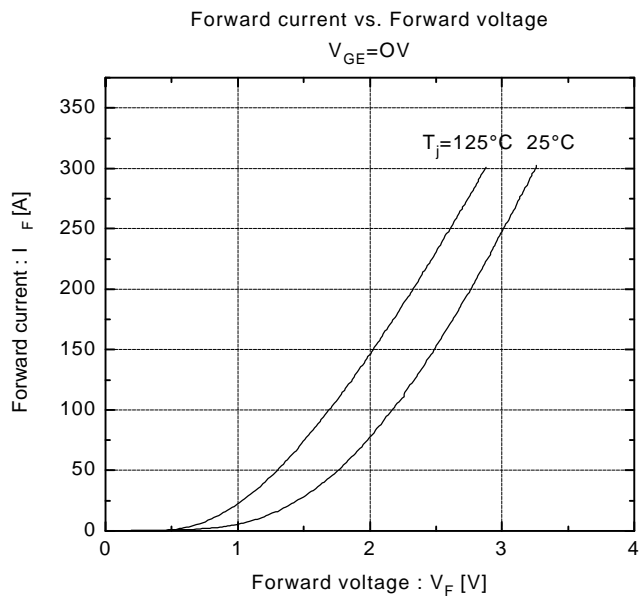
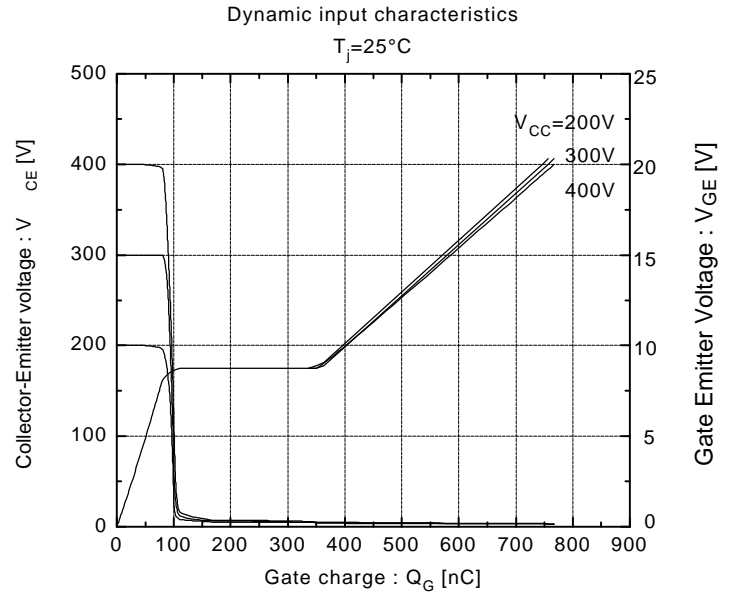
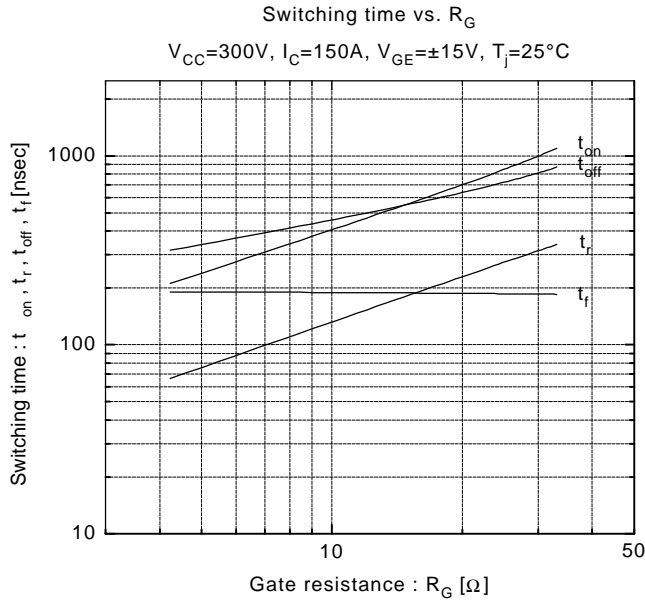


Switching time vs. Collector current  
 $V_{CC}=300\text{V}, R_G=16\Omega, V_{GE}=\pm 15\text{V}, T_j=25^\circ\text{C}$

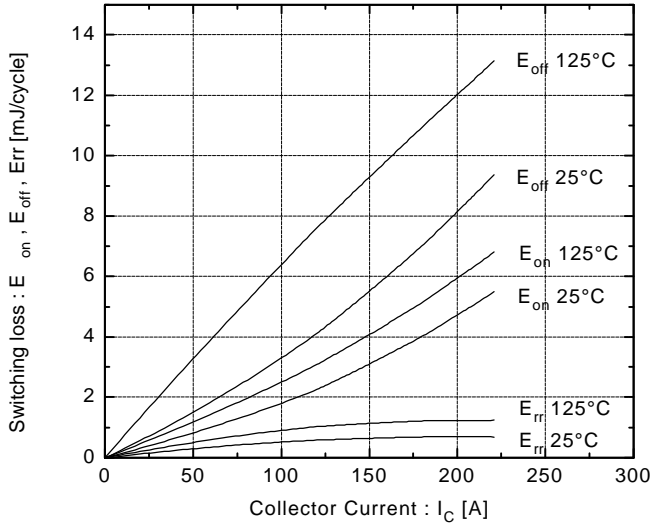


Switching time vs. Collector current  
 $V_{CC}=300\text{V}, R_G=16\Omega, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$

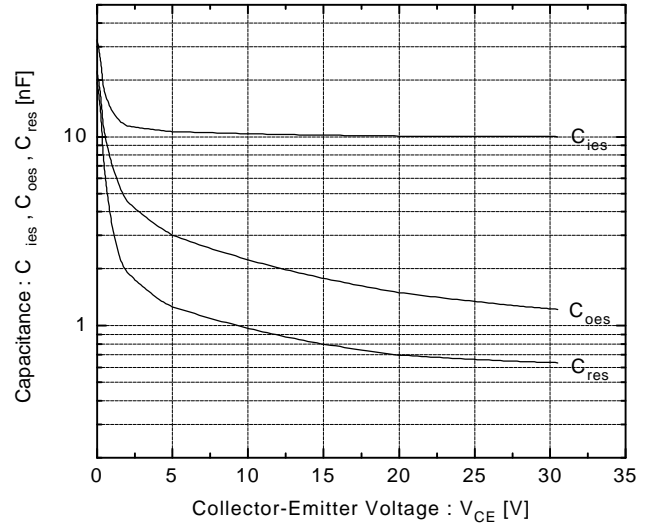




Switching loss vs. Collector current  
 $V_{CC}=300V, R_G=16\Omega, V_{GE}=\pm 15V$



Capacitance vs. Collector-Emitter voltage  
 $T_J=25^\circ C$



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