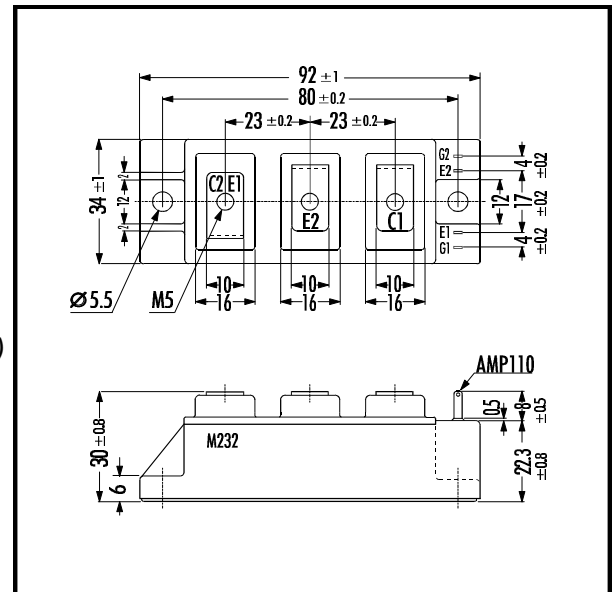


IGBT MODULE (N series)

■ Outline Drawing

■ Features

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



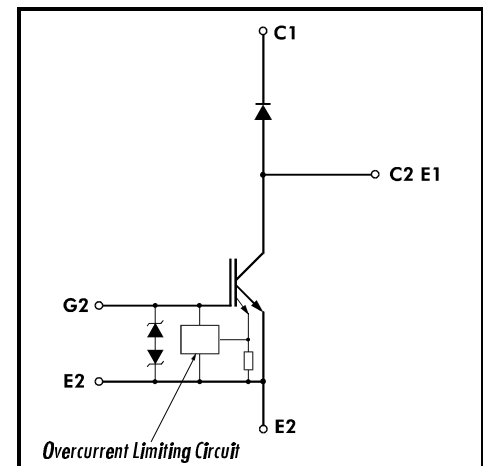
■ Maximum Ratings and Characteristics

• Absolute Maximum Ratings (T_c=25°C)

| Items | Symbols | Ratings | Units |
|----------------------------|----------------------------|-----------------------|-------|
| Collector-Emmitter Voltage | V _{CEs} | 600 | V |
| Gate -Emmitter Voltage | V _{GES} | ± 20 | V |
| Collector Current | Continuous | I _C | 150 |
| | 1ms | I _{C PULSE} | 300 |
| | Continuous | -I _C | 150 |
| | 1ms | -I _{C PULSE} | 300 |
| Max. Power Dissipation | P _C | 600 | W |
| Operating Temperature | T _i | +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 *1 | 3.5 | |

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

■ Equivalent Circuit



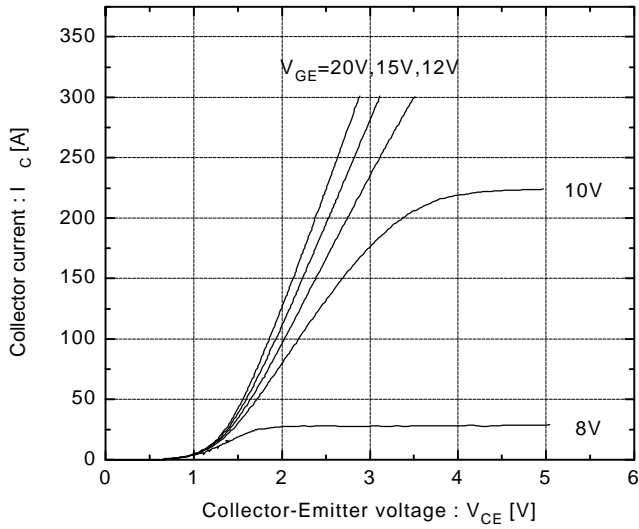
• Electrical Characteristics (at T_j=25°C)

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

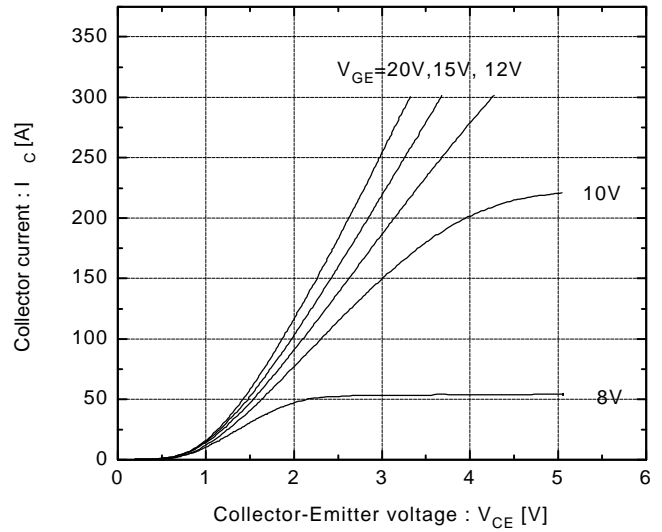
• Thermal Characteristics

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

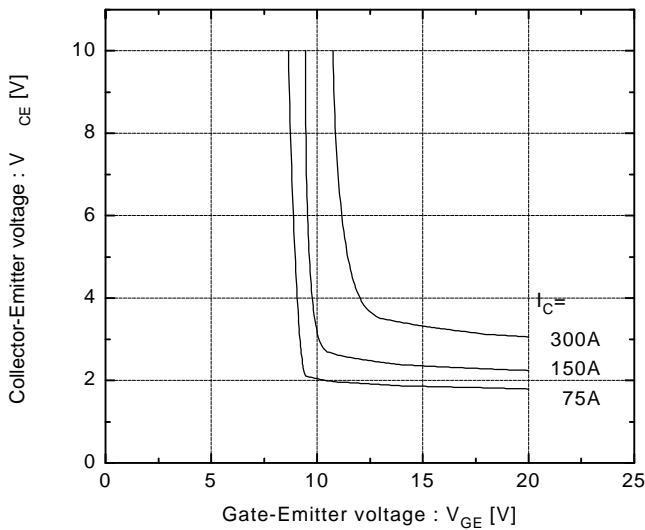
Collector current vs. Collector-Emittor voltage
 $T_j=25^\circ\text{C}$



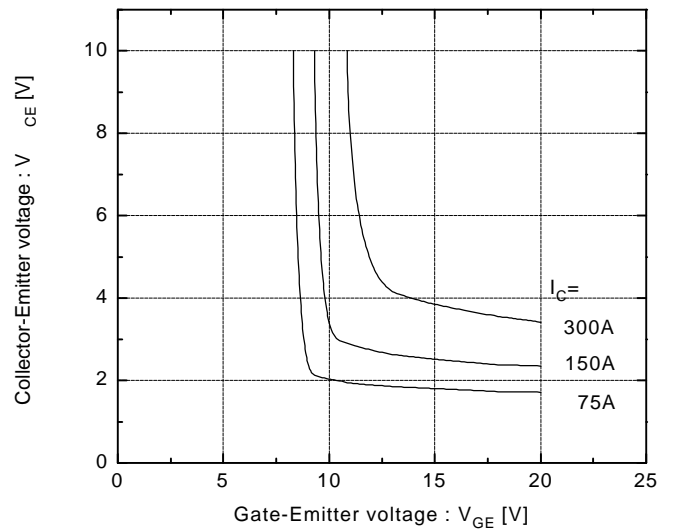
Collector current vs. Collector-Emittor voltage
 $T_j=125^\circ\text{C}$



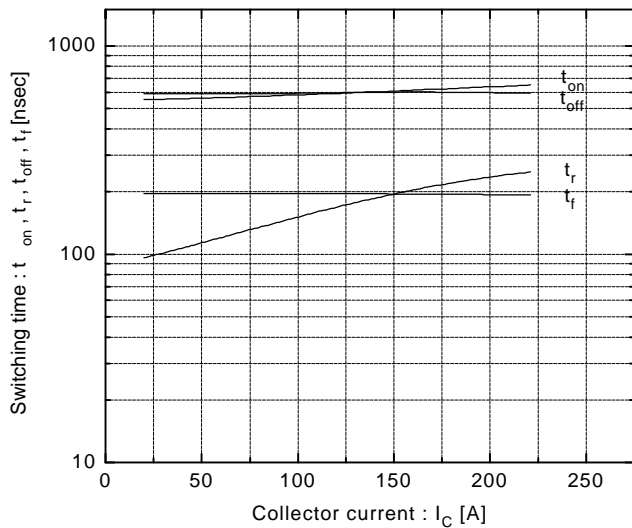
Collector-Emittor vs. Gate-Emittor voltage
 $T_j=25^\circ\text{C}$



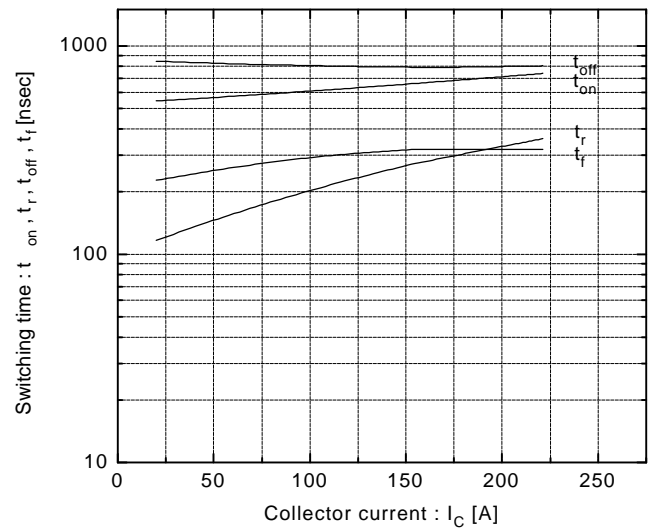
Collector-Emittor vs. Gate-Emittor voltage
 $T_j=125^\circ\text{C}$



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

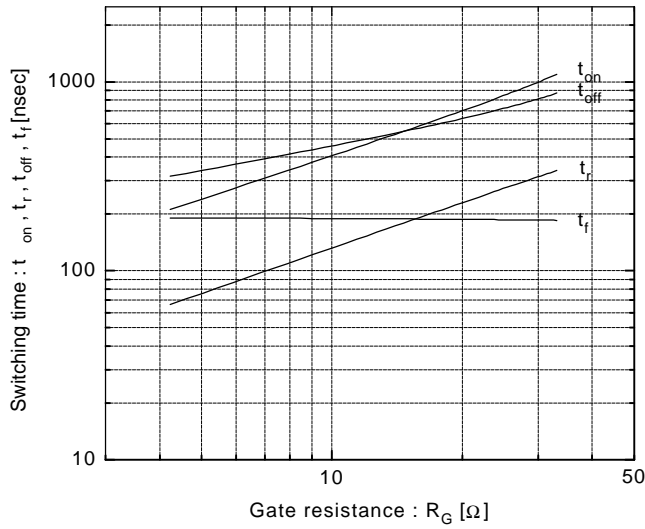


Switching time vs. Collector current
 $V_{CC}=300\text{V}, R_G=16\Omega, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$



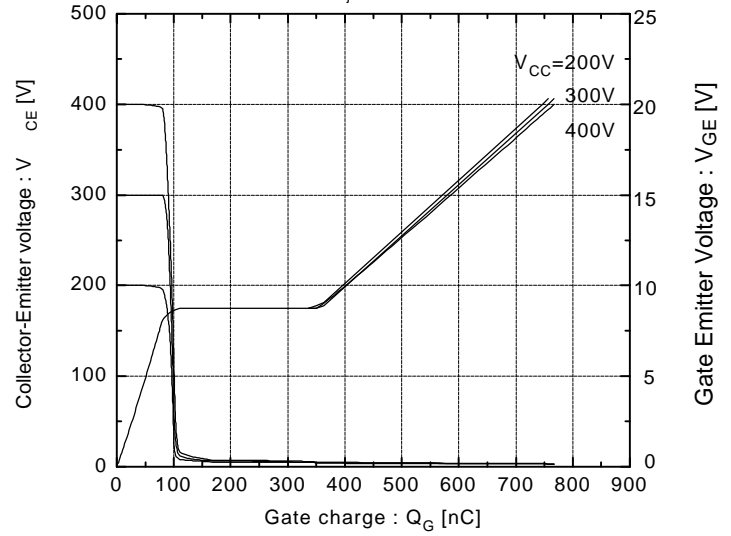
Switching time vs. R_G

$V_{CC}=300V, I_C=150A, V_{GE}=\pm 15V, T_J=25^\circ C$



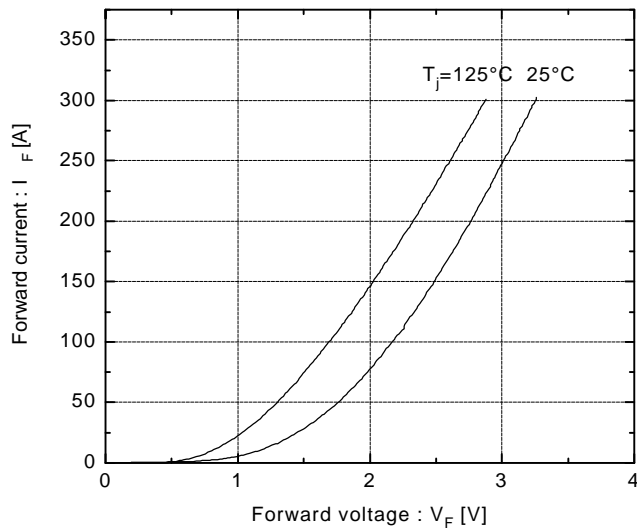
Dynamic input characteristics

$T_J=25^\circ C$



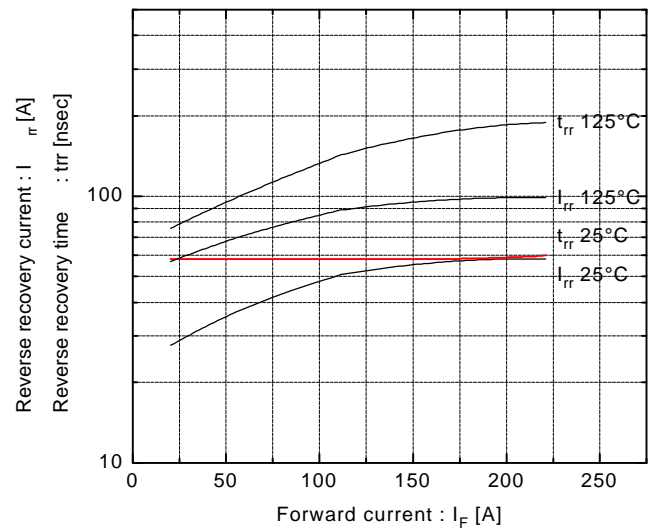
Forward current vs. Forward voltage

$V_{GE}=0V$

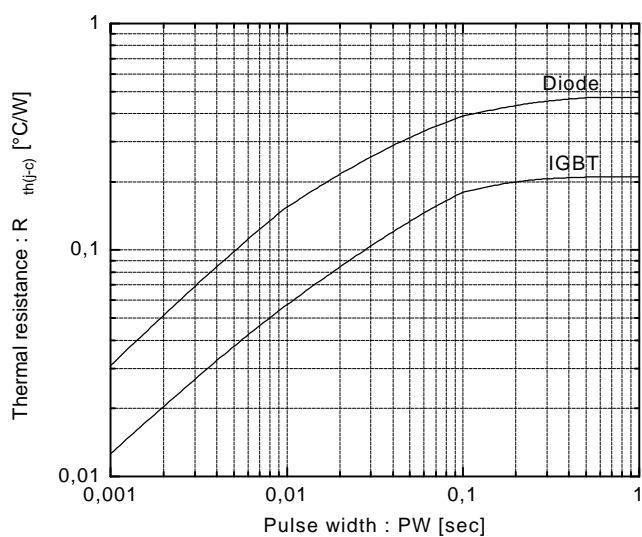


Reverse recovery characteristics

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

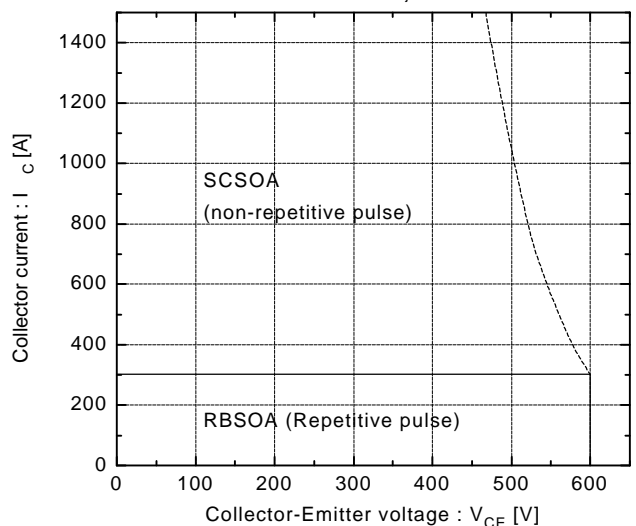


Transient thermal resistance

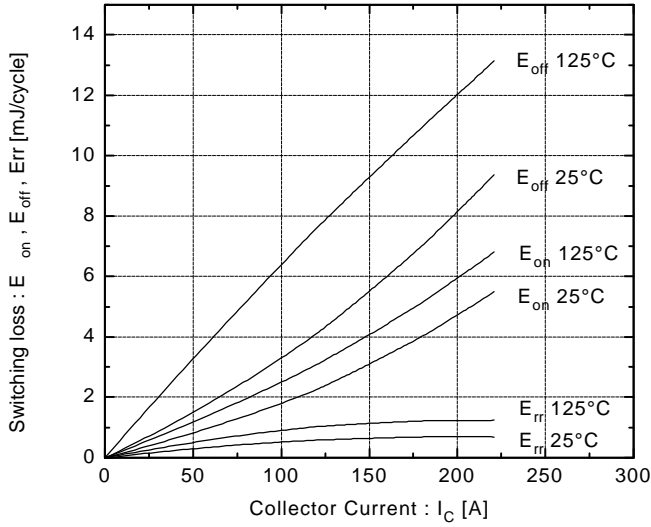


Reversed biased safe operating area

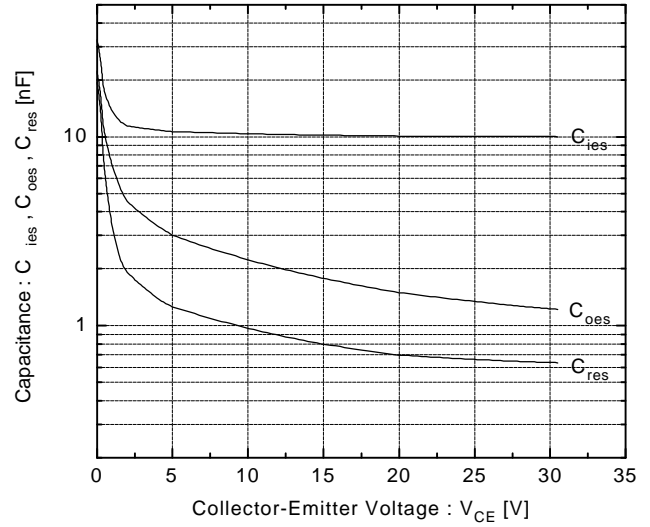
$+V_{GE}=15V, -V_{GE}\leq 15V, T_J\leq 125^\circ C, R_G\geq 16\Omega$



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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