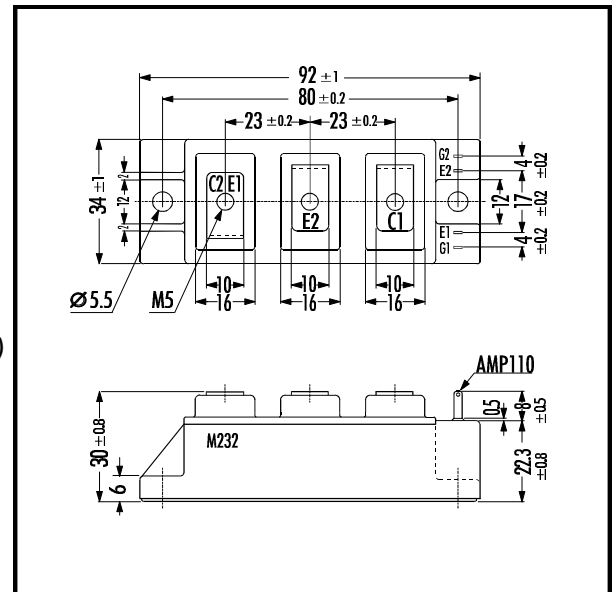


## IGBT MODULE ( N series )

## ■ Outline Drawing

### ■ Features

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



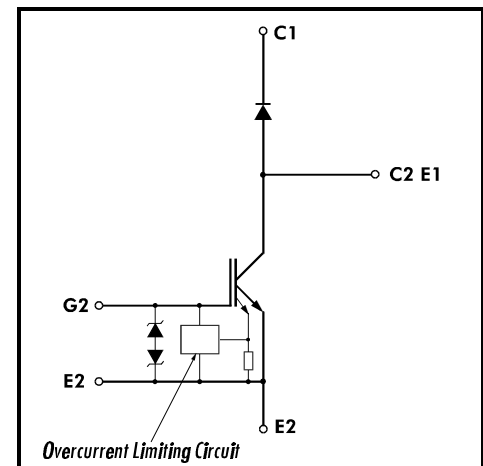
## ■ Maximum Ratings and Characteristics

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

Items	Symbols	Ratings	Units
Collector-Emitter Voltage	V <sub>CEs</sub>	600	V
Gate -Emitter 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>i</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



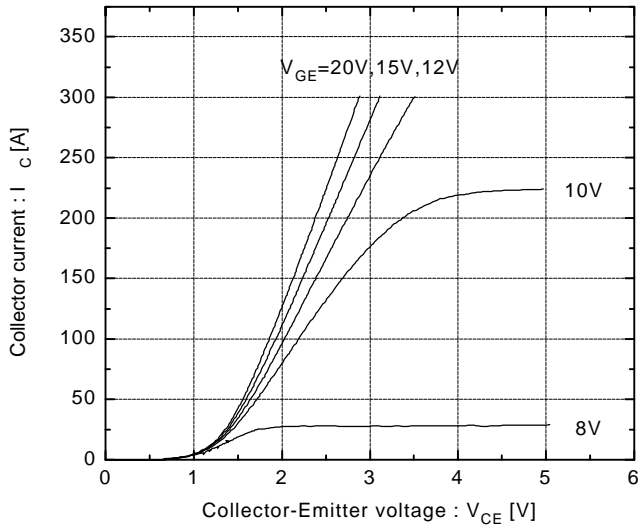
### • Electrical Characteristics ( at T<sub>j</sub>=25°C )

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

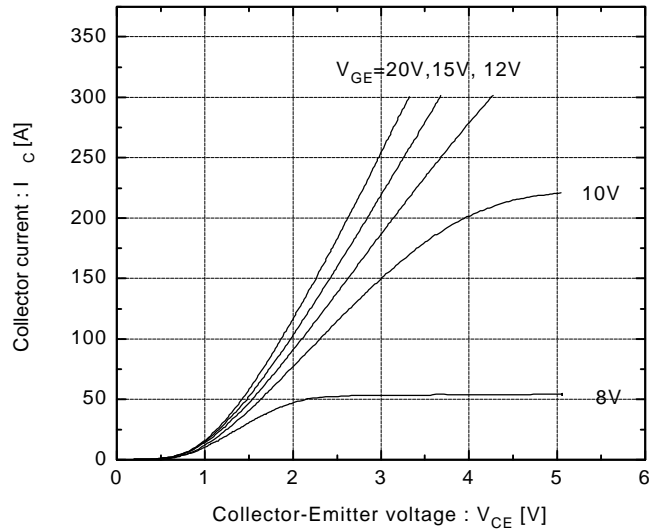
### • Thermal Characteristics

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-c)</sub>	Diode			0.47	
	R <sub>th(c-f)</sub>	With Thermal Compound		0.05		

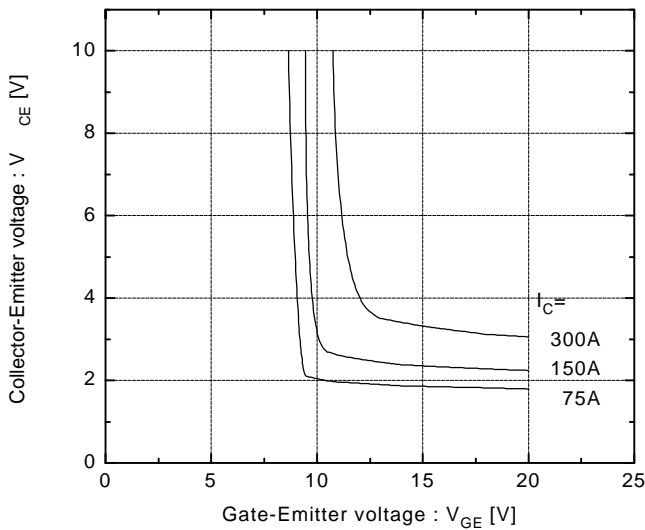
Collector current vs. Collector-Emittor voltage  
 $T_j=25^\circ\text{C}$



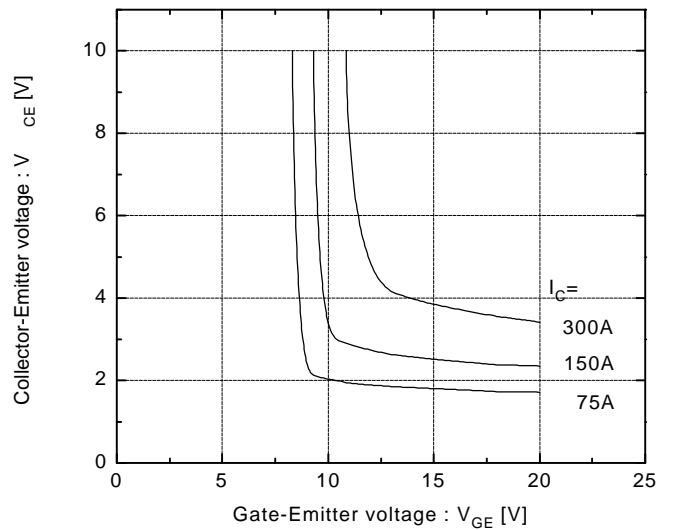
Collector current vs. Collector-Emittor voltage  
 $T_j=125^\circ\text{C}$



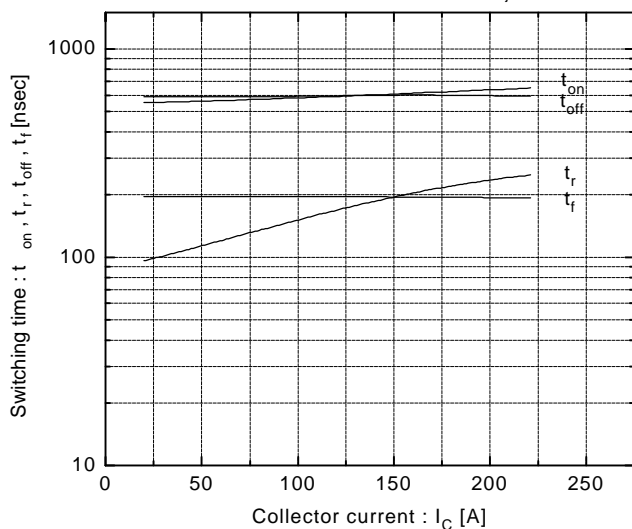
Collector-Emittor vs. Gate-Emittor voltage  
 $T_j=25^\circ\text{C}$



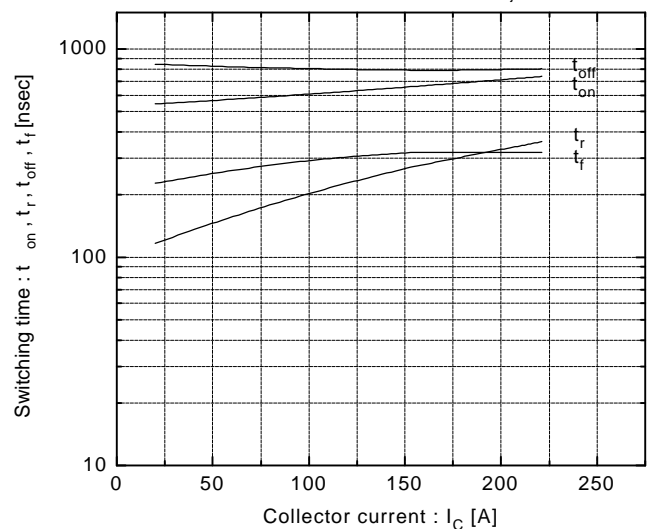
Collector-Emittor vs. Gate-Emittor voltage  
 $T_j=125^\circ\text{C}$



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

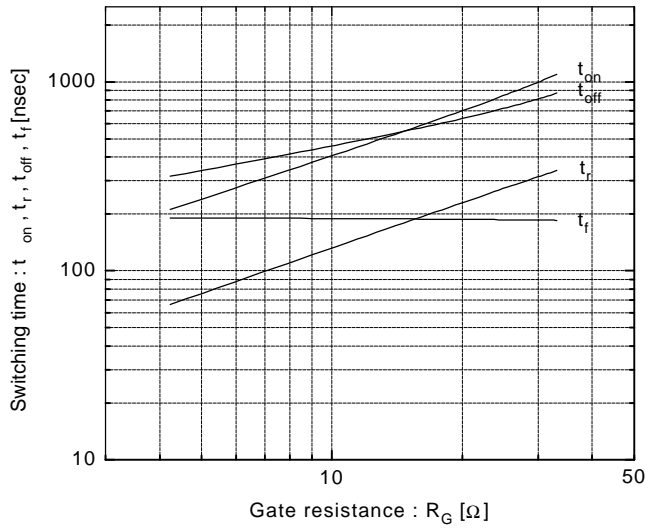


Switching time vs. Collector current  
 $V_{CC}=300\text{V}, R_G=16\Omega, V_{GE}=\pm 15\text{V}, T_j=125^\circ\text{C}$



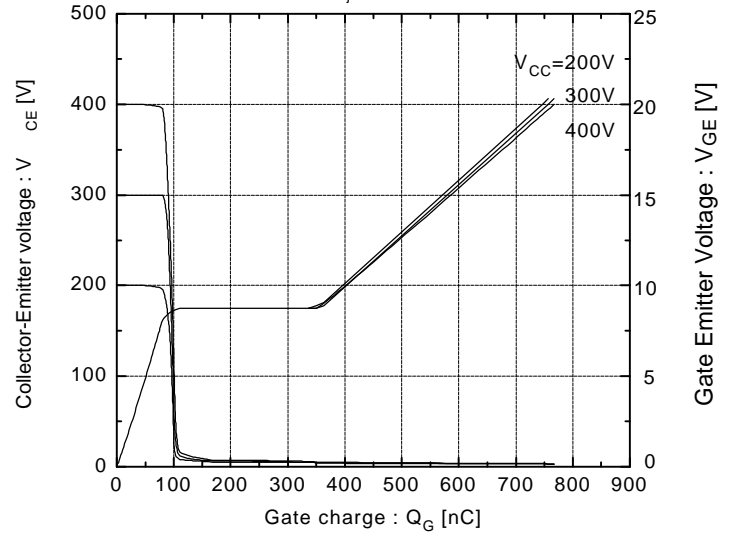
Switching time vs.  $R_G$

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



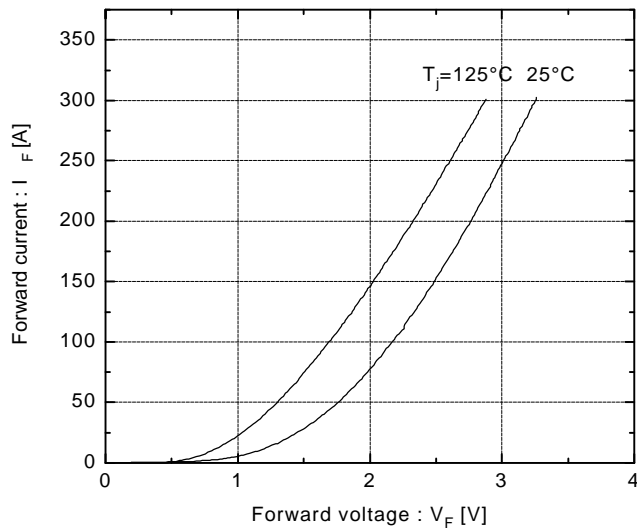
Dynamic input characteristics

$T_J=25^\circ C$



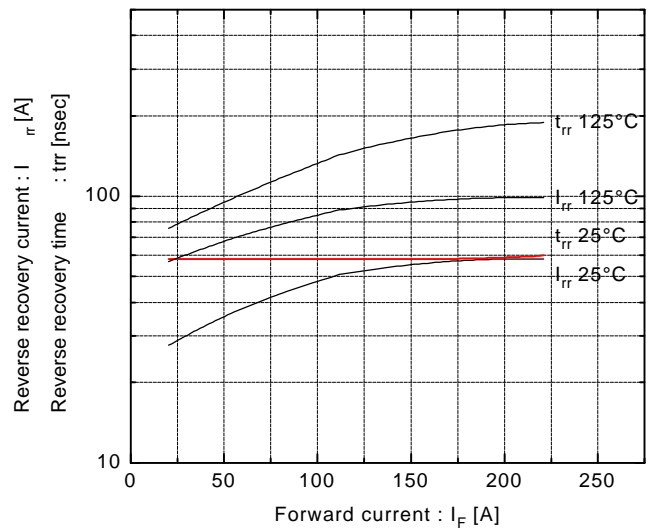
Forward current vs. Forward voltage

$V_{GE}=0V$

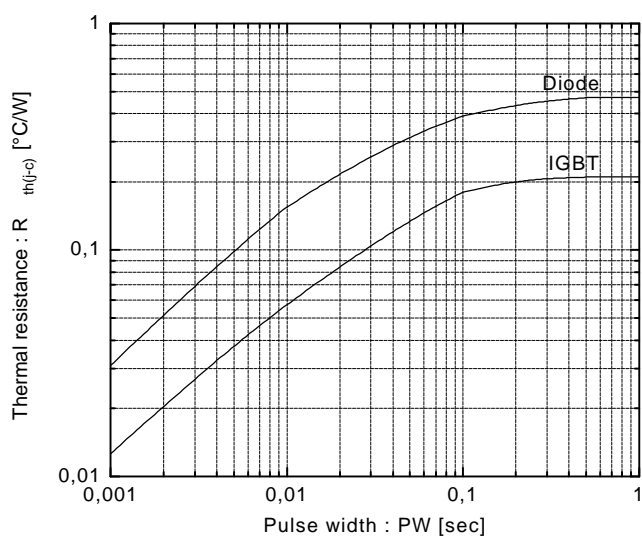


Reverse recovery characteristics

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

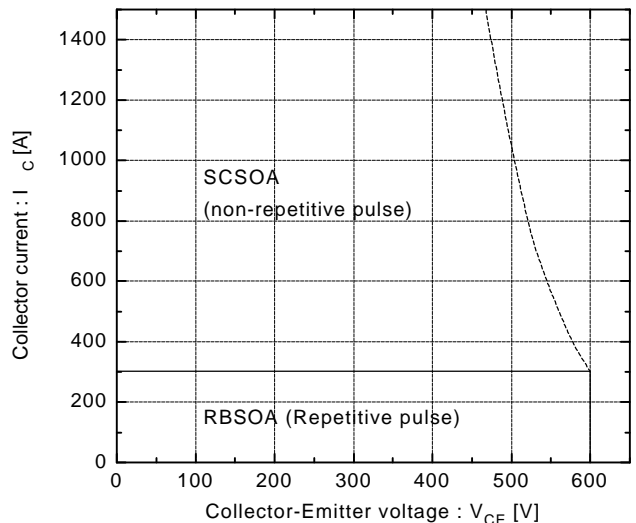


Transient thermal resistance

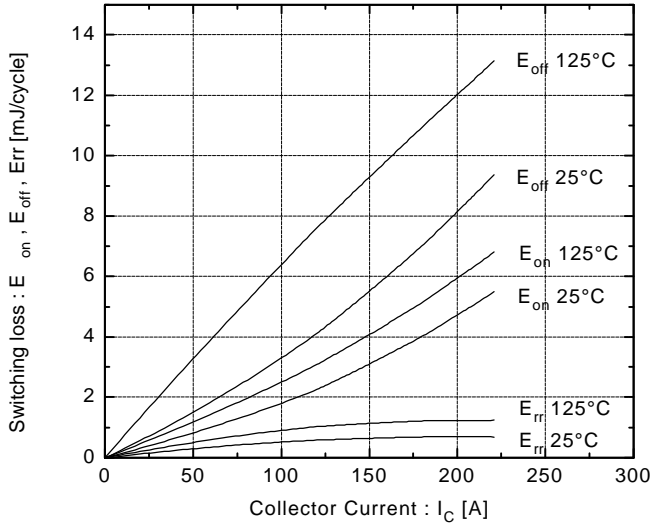


Reversed biased safe operating area

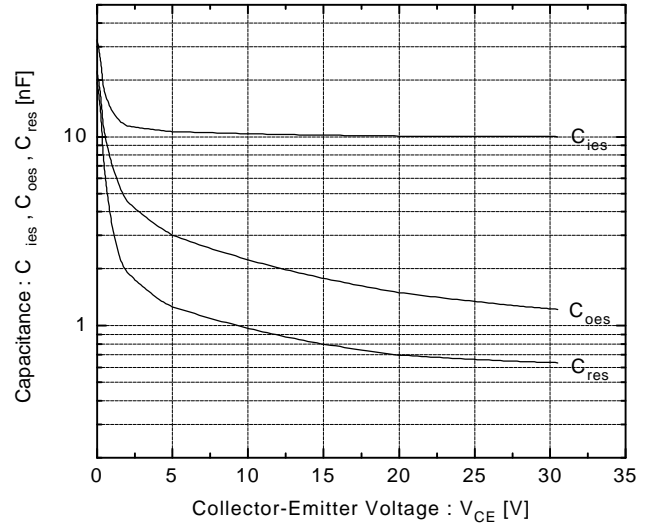
$+V_{GE}=15V, -V_{GE}\leq 15V, T_J\leq 125^\circ C, R_G\geq 16\Omega$



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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