

## IGBT MODULE ( S-Series )

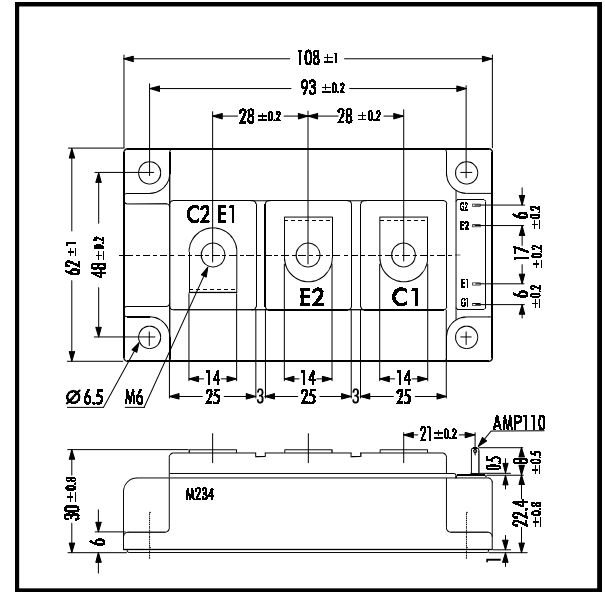
### ■ Features

- NPT-Technology
- Square SC SOA at  $10 \times I_C$
- High Short Circuit Withstand-Capability
- Small Temperature Dependence of the Turn-Off Switching Loss
- Low Losses And Soft Switching

### ■ Applications

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

## ■ Outline Drawing



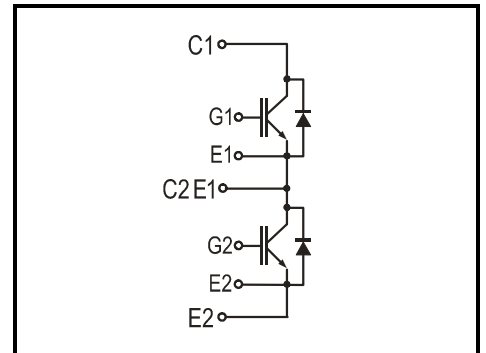
## ■ Maximum Ratings and Characteristics

### • Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ )

Items	Symbols	Ratings	Units	
Collector-Emitter Voltage	$V_{CES}$	1200	V	
Gate -Emitter Voltage	$V_{GES}$	± 20		
Collector Current	Continuous	25°C / 80°C	A	
	1ms	25°C / 80°C		
	Continuous			
	1ms			
Max. Power Dissipation	$P_C$	780	W	
Operating Temperature	$T_j$	+150	°C	
Storage Temperature	$T_{stg}$	-40 ~ +125		
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

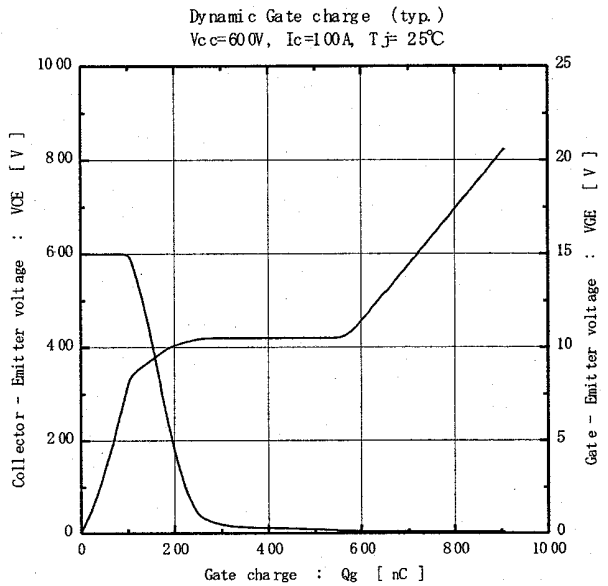
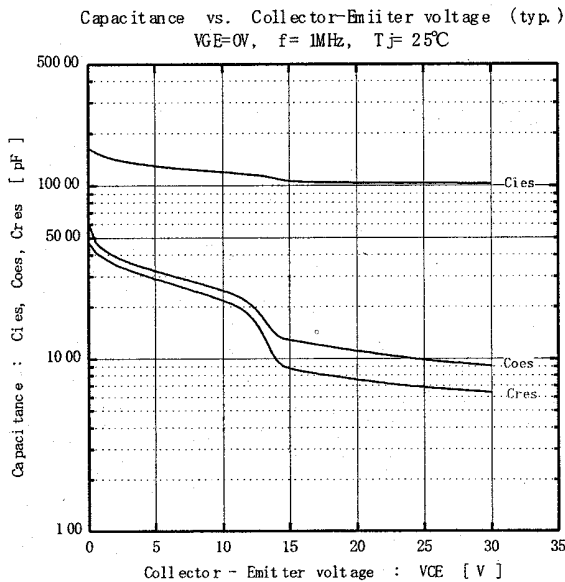
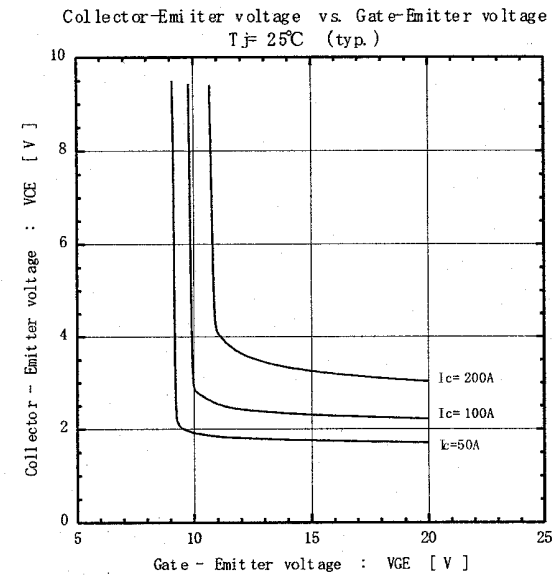
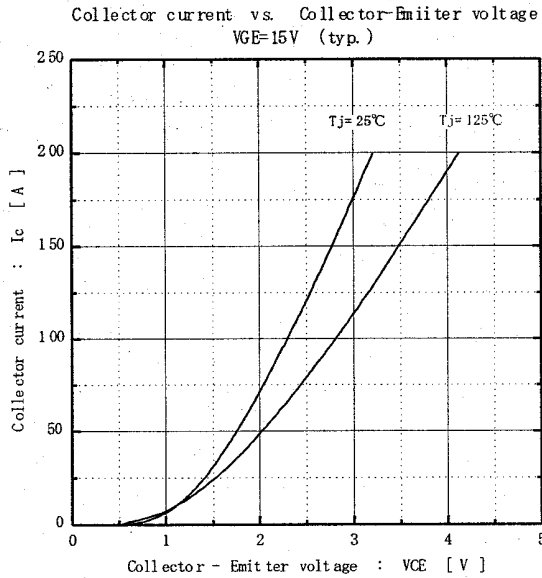
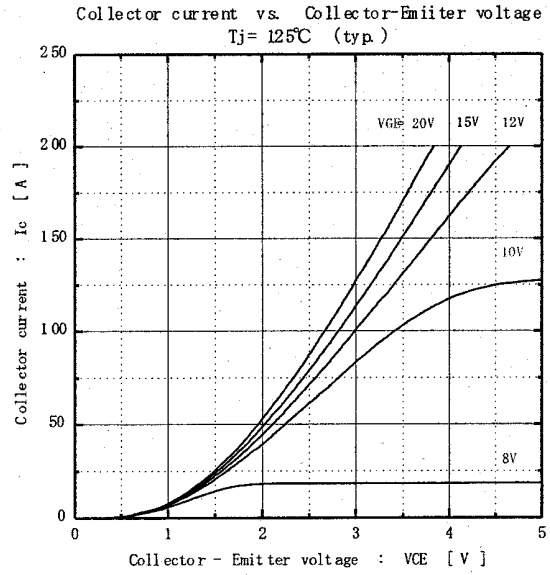
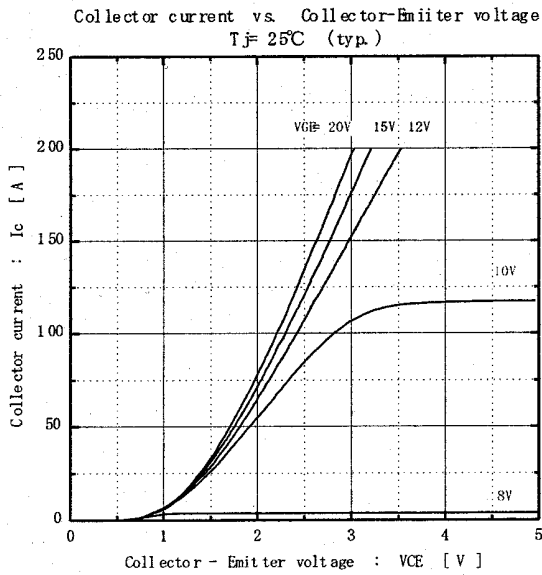


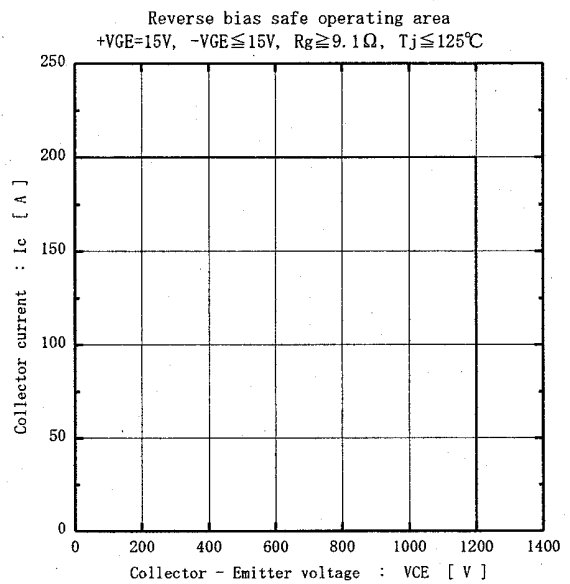
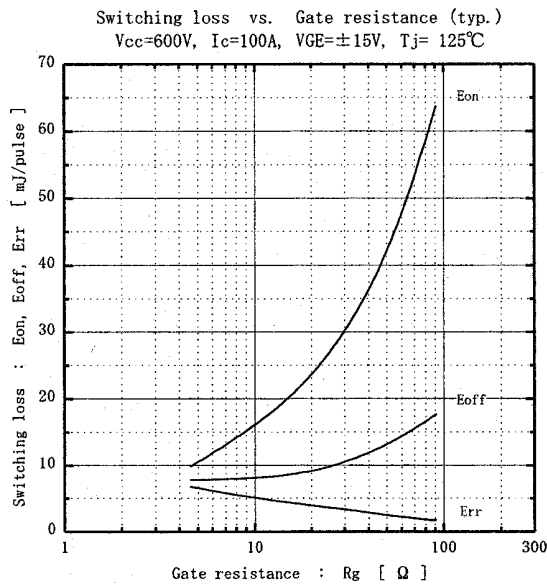
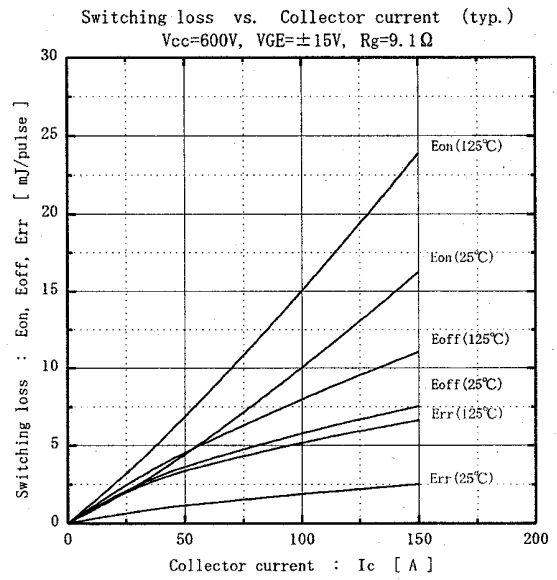
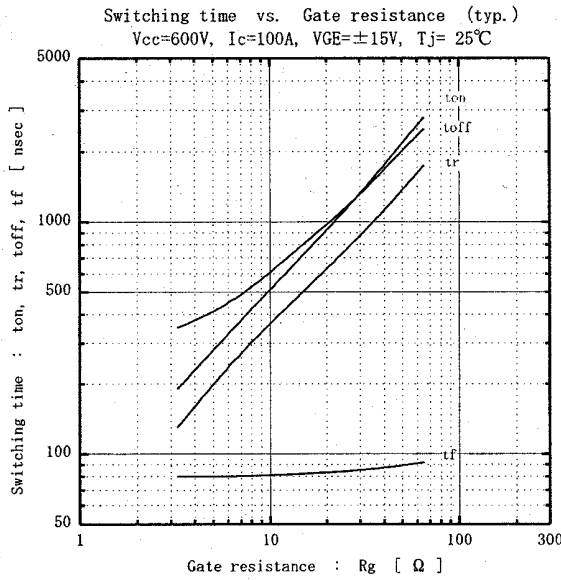
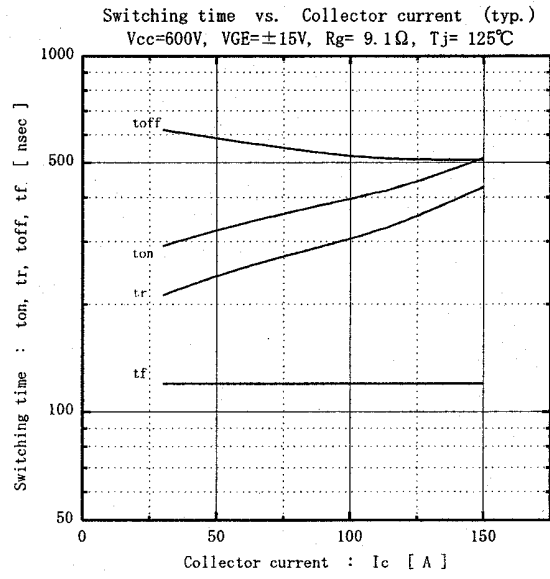
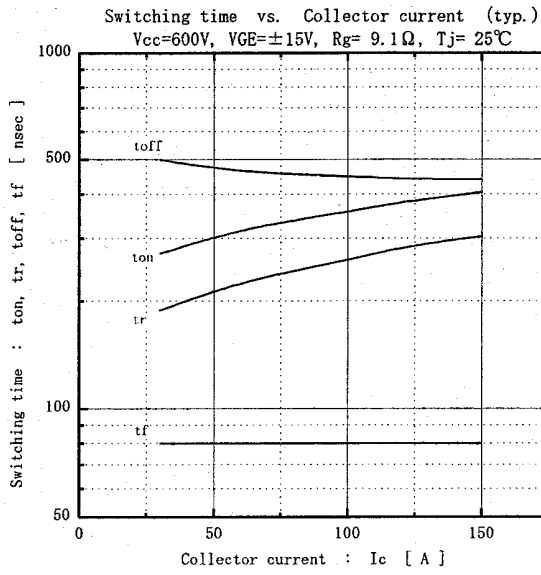
### • Electrical Characteristics ( at $T_j=25^\circ\text{C}$ )

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 Leakage Current	$I_{GES}$	$V_{CE}=0V$ $V_{GE}=\pm 20V$			400	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20V$ $I_C=100mA$	5.5	7.2	8.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=100A$		2.3	2.6	
Input Capacitance	$C_{ies}$	$V_{GE}=0V$		12000		pF
Output Capacitance	$C_{oes}$	$V_{CE}=10V$		2500		
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz$		2200		
Turn-on Time	$t_{ON}$	$V_{CC}=600V$		0.35	1.2	$\mu\text{s}$
	$t_{r,x}$	$I_C = 100A$		0.25	0.6	
	$t_{r,i}$	$V_{GE} = \pm 15V$		0.10		
	$t_{OFF}$	$R_G = 9.1\Omega$		0.45	1.0	
Turn-off Time	$t_f$	Inductive Load		0.08	0.3	
Diode Forward On-Voltage	$V_F$	$I_F=100A$	$T_j = 25^\circ\text{C}$	2.3	3.0	V
			$T_j = 125^\circ\text{C}$	2.0		
Reverse Recovery Time	$t_{rr}$	$I_F=100A$			350	ns

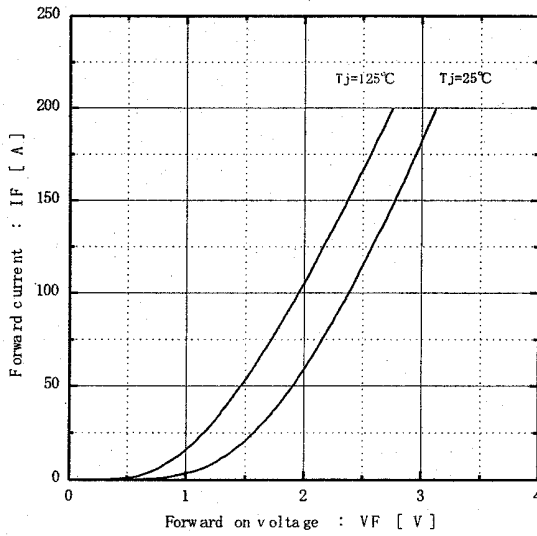
### • Thermal Characteristics

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	

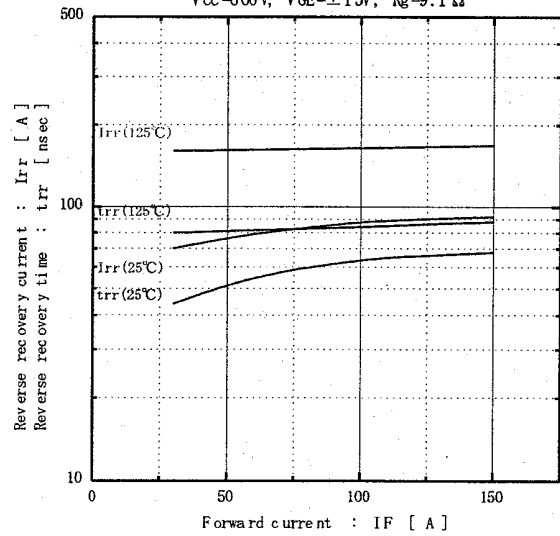




Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)  
Vcc=600V, VGE=±15V, Rg=9.1Ω



Transient thermal resistance

