

IGBT MODULE (S-Series)

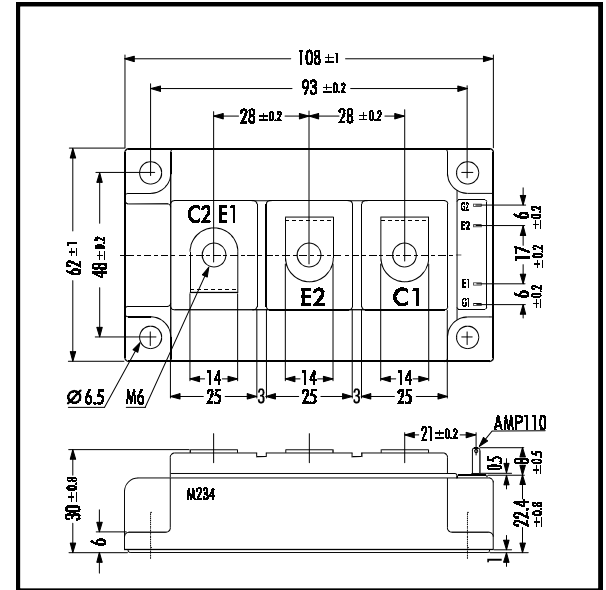
■ Outline Drawing

■ 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



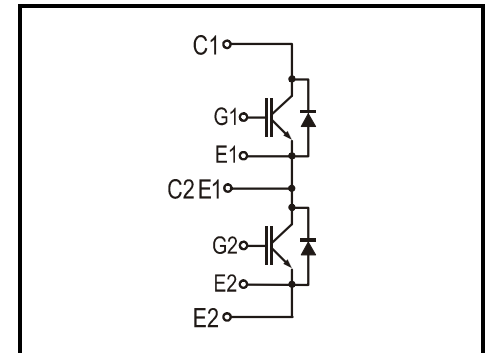
■ Maximum Ratings and Characteristics

■ Equivalent Circuit

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

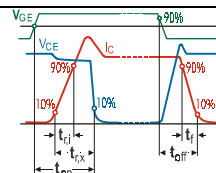
Items	Symbols	Ratings	Units
Collector-Emitter Voltage	V_{CES}	1200	V
Gate -Emitter Voltage	V_{GES}	± 20	V
Collector Current	Continuous $25^\circ\text{C} / 80^\circ\text{C}$	I_C	150 / 100
	1ms $25^\circ\text{C} / 80^\circ\text{C}$	$I_{C \text{ PULSE}}$	300 / 200
	Continuous	$-I_C$	100
	1ms	$-I_{C \text{ PULSE}}$	200
Max. Power Dissipation	P_C	780	W
Operating Temperature	T_j	+150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +125	$^\circ\text{C}$
Isolation Voltage	A.C. 1min.	V_{is}	2500
Screw Torque	Mounting 1*	3.5	Nm
	Terminals 2*	4.5	Nm

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



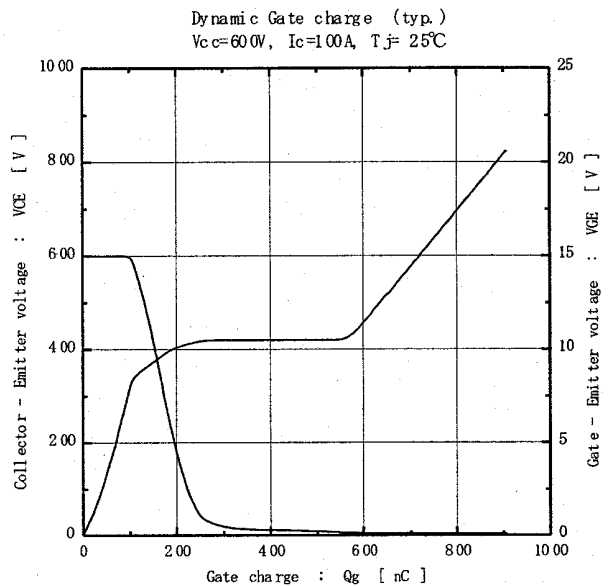
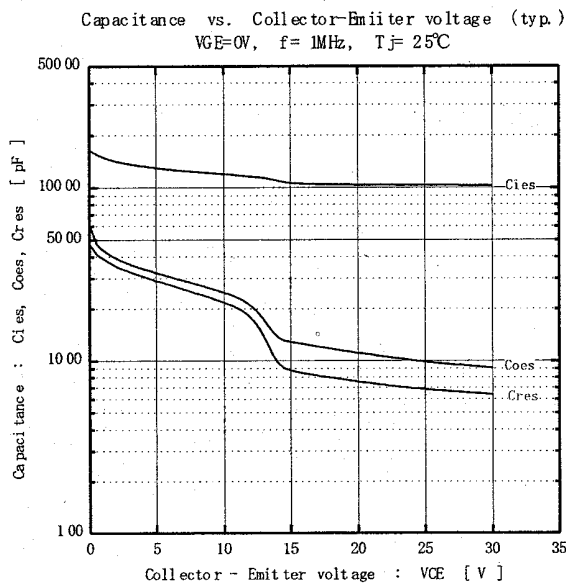
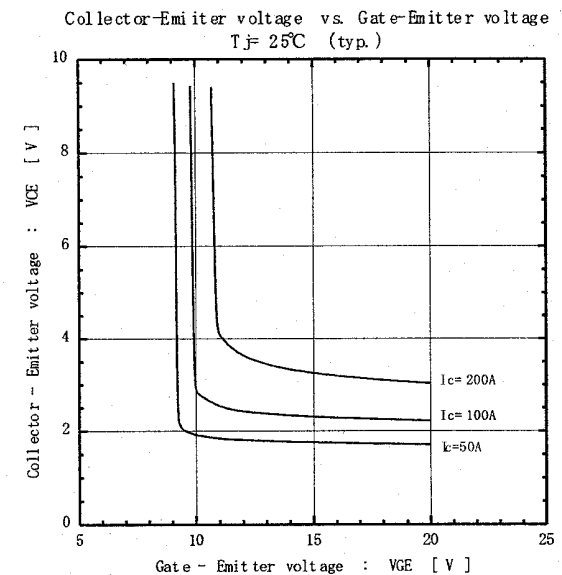
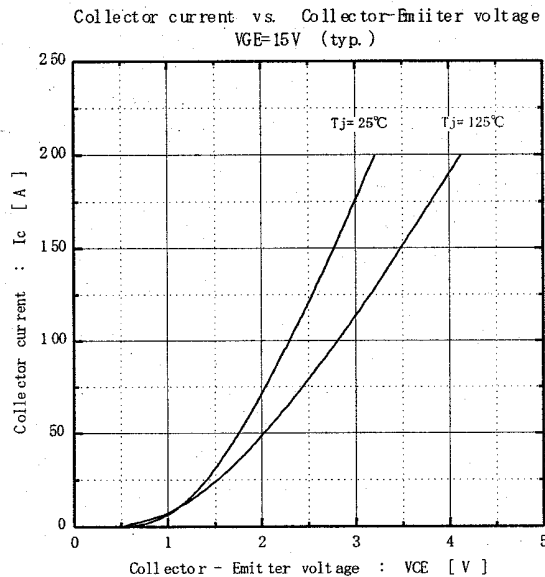
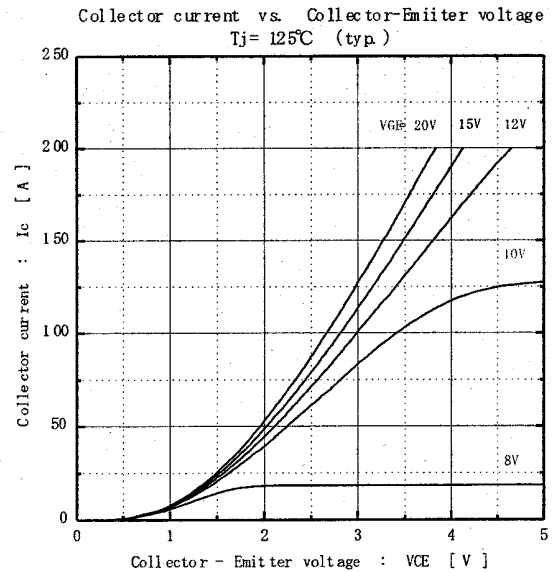
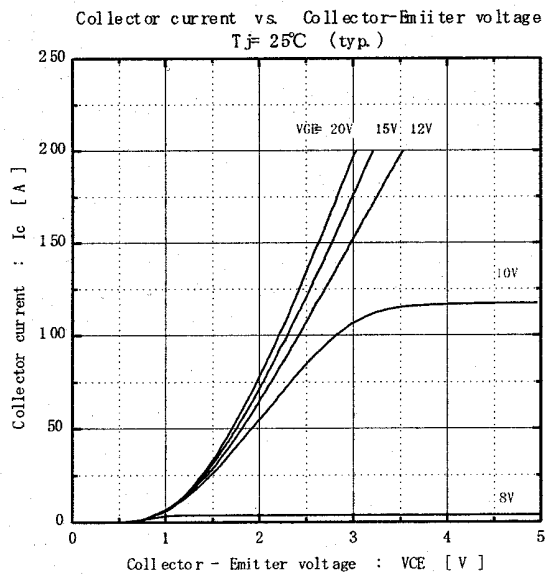
• Electrical Characteristics (at $T_j=25^\circ\text{C}$)

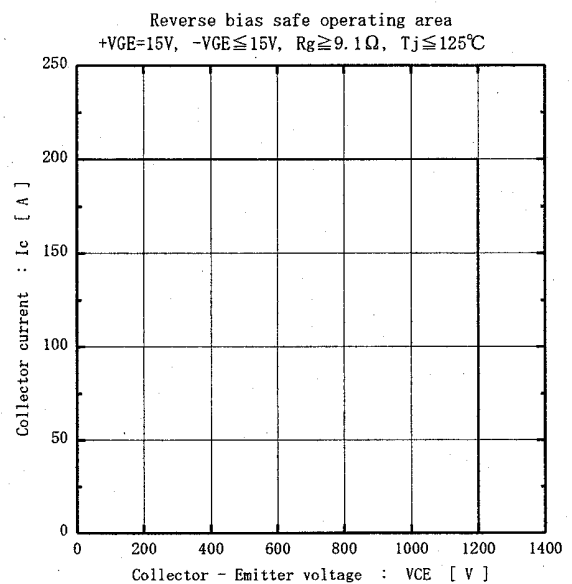
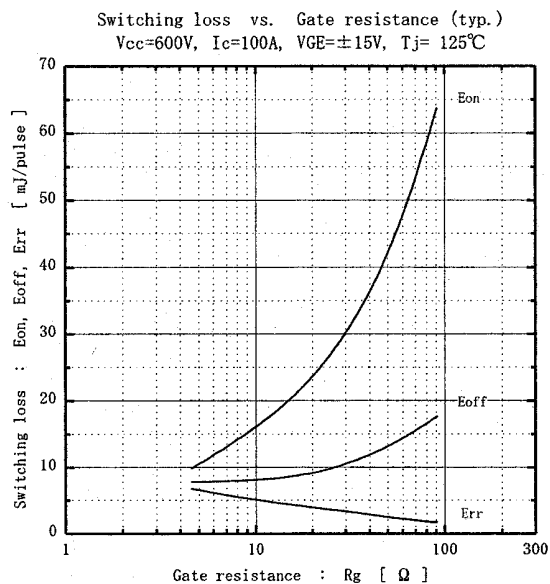
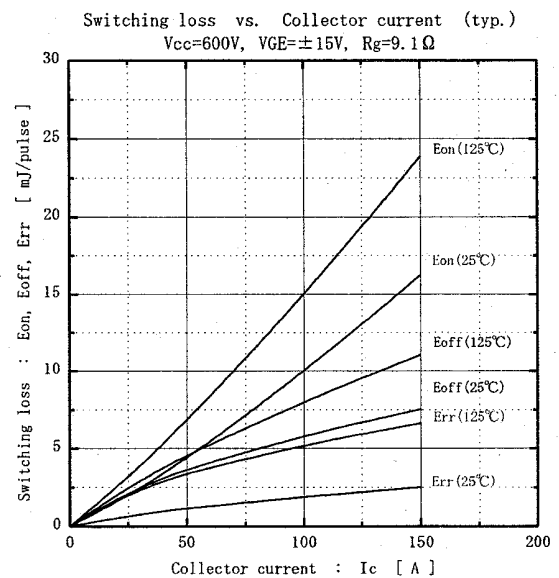
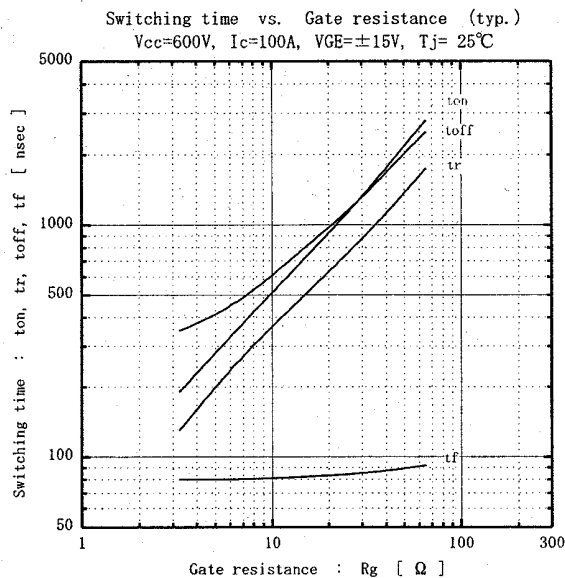
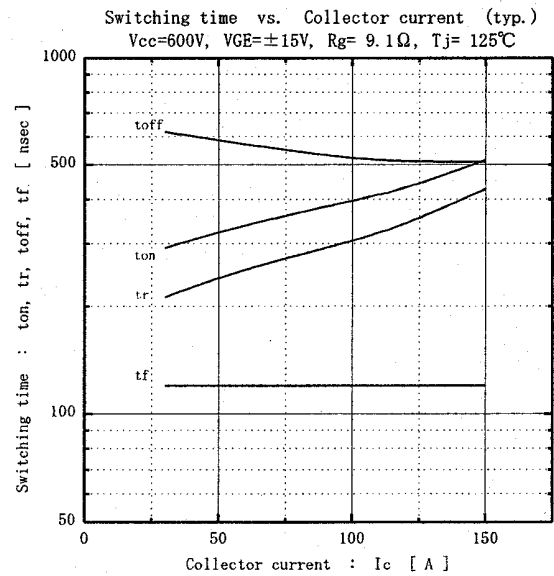
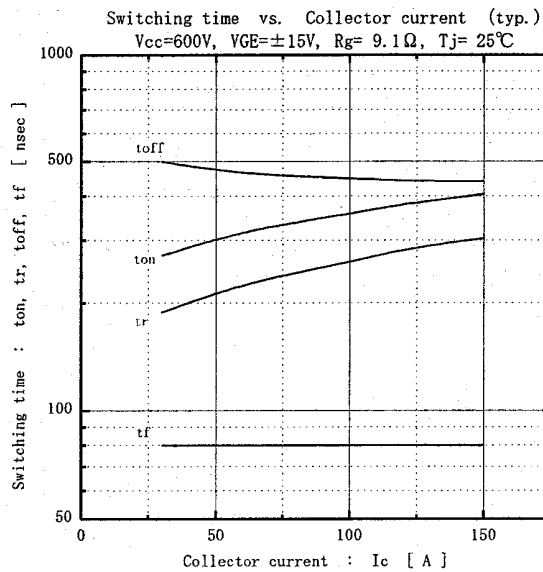
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0V$ $V_{CE}=1200V$			2.0	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V$ $V_{GE}=\pm 20V$			400	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20V$ $I_C=100mA$	5.5	7.2	8.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=100A$	$T_j = 25^\circ\text{C}$	2.3	2.6	V
			$T_j = 125^\circ\text{C}$	2.8		V
Input Capacitance	C_{ies}	$V_{GE}=0V$		12000		pF
Output Capacitance	C_{oes}	$V_{CE}=10V$		2500		pF
Reverse Transfer Capacitance	C_{res}	$f=1MHz$		2200		pF
Turn-on Time	t_{ON}	$V_{CC}= 600V$		0.35	1.2	μs
	$t_{r,x}$	$I_C = 100A$		0.25	0.6	μs
	$t_{r,i}$	$V_{GE}= \pm 15V$		0.10		μs
Turn-off Time	t_{OFF}	$R_G = 9.1\Omega$		0.45	1.0	μs
	t_f	Inductive Load		0.08	0.3	μs
						μs
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		V
Reverse Recovery Time	t_{rr}	$I_F=100A$			350	ns



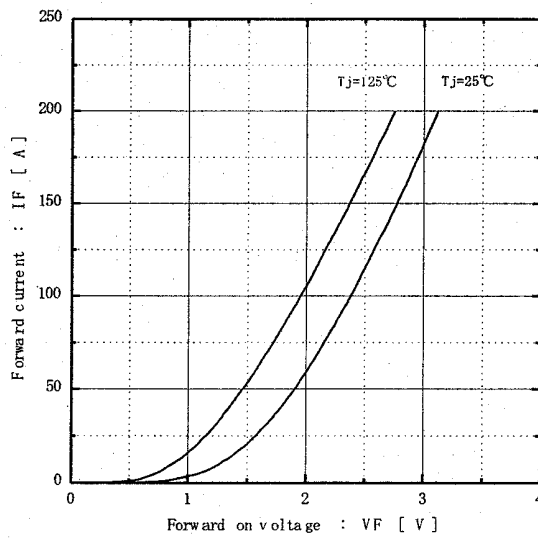
• Thermal Characteristics

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

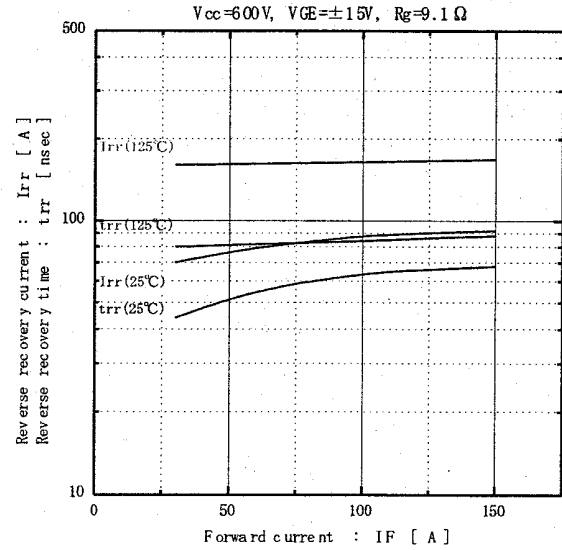




Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)



Transient thermal resistance

