

IGBT MODULE (S-Series)

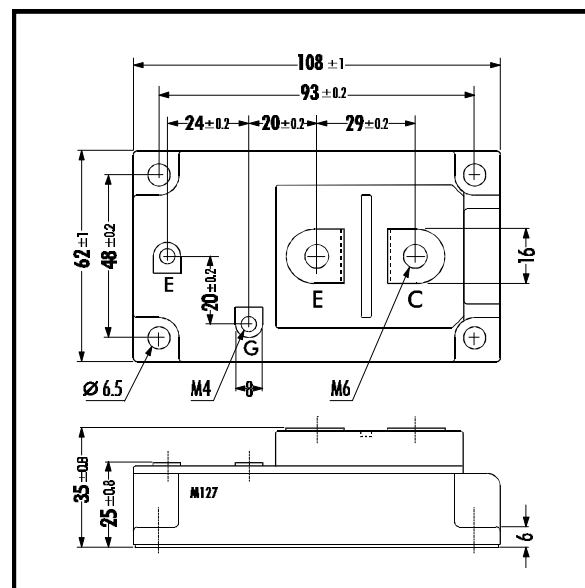
■ Features

- 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

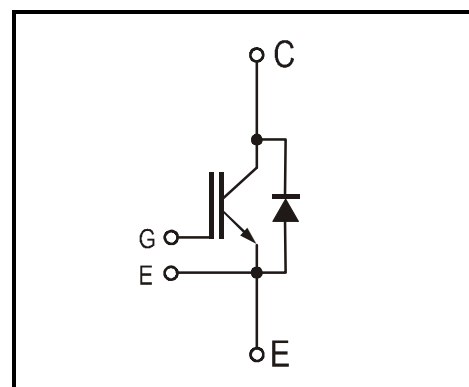
• Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

Items			Symbols	Ratings	Units
Collector-Emitter Voltage			V_{CES}	1200	V
Gate -Emitter Voltage			V_{GES}	± 20	
Collector Current	Continuous	25°C / 80°C	I_C	300 / 200	A
	1ms	25°C / 80°C	$I_{C\text{ PULSE}}$	600 / 400	
	Continuous		$-I_C$	200	
	1ms		$-I_{C\text{ PULSE}}$	400	
Max. Power Dissipation			P_C	1500	W
Operating Temperature			T_J	+150	°C
Storage Temperature			T_{stg}	-40 ~ +125	
Isolation Voltage *1			V_{is}	2500	V
Screw Torque			Mounting *2	3.5	Nm
			Terminals *2	4.5	
			Terminals *2	1.7	

Note: 1*: All Terminals should be connected together when isolation test will be done.

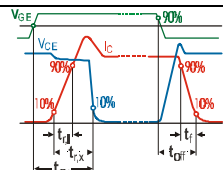
2*: Recommendable Value: Mounting 2.5 ~ 3.5 Nm (M5) or (M6) ; Terminal 3.5 ~ 4.5 Nm (M6), 1.3 ~ 1.7 Nm (M4)

■ Equivalent Circuit



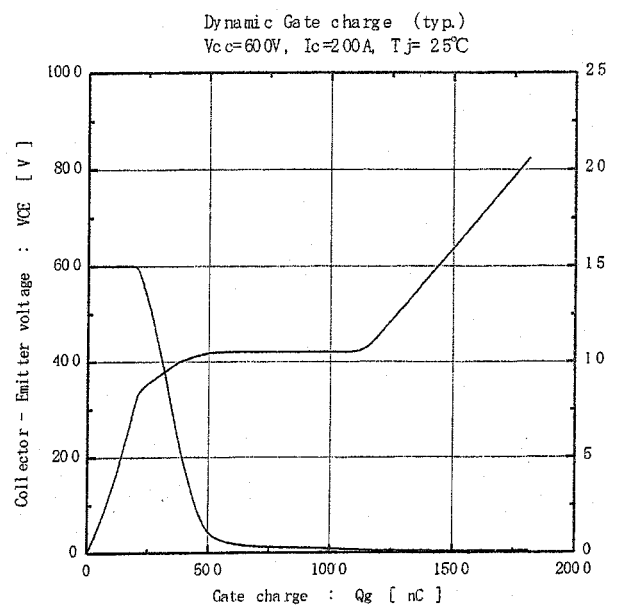
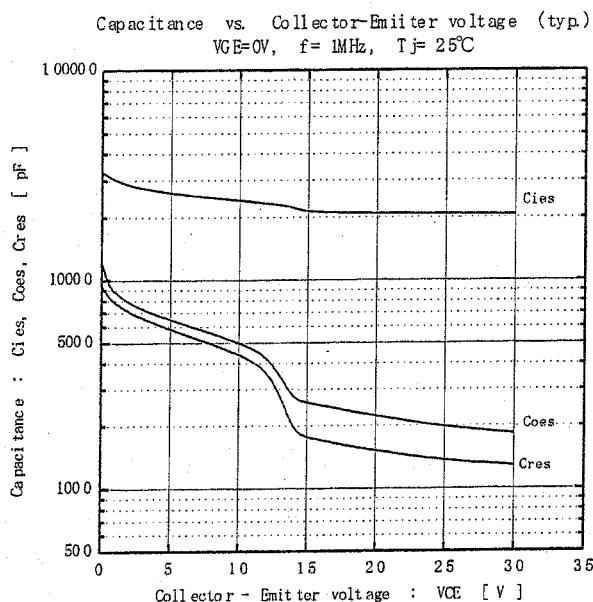
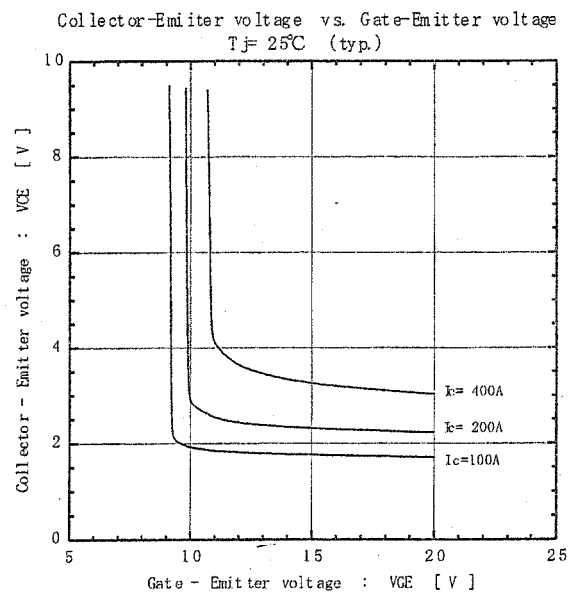
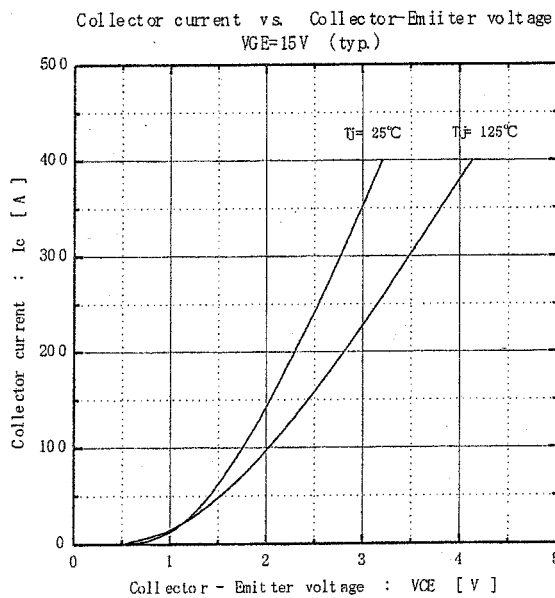
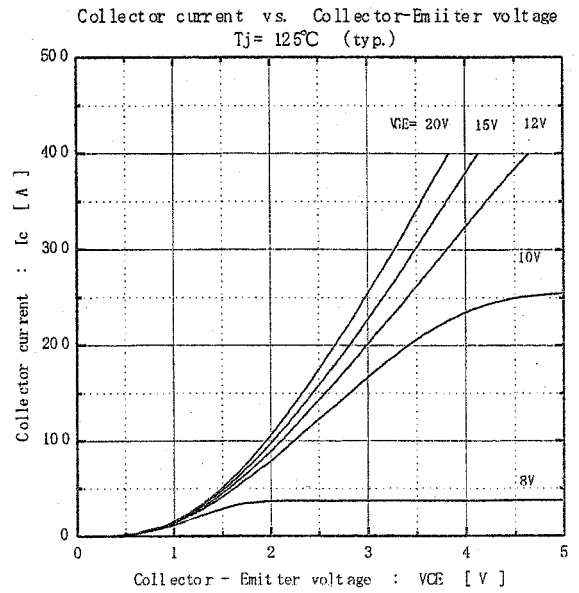
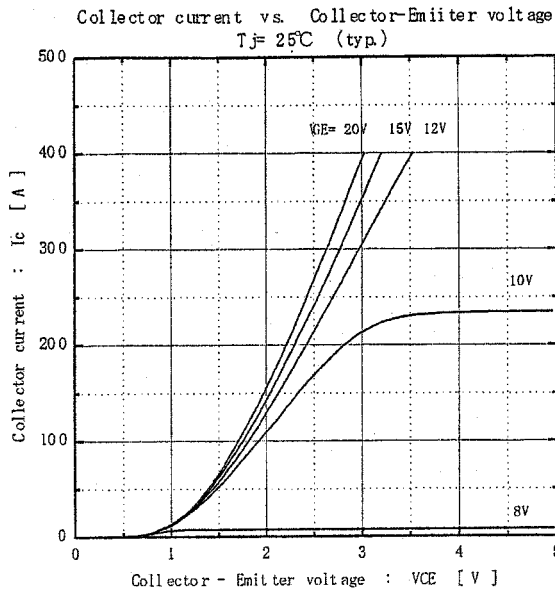
• Electrical Characteristics (at $T_J=25^\circ\text{C}$)

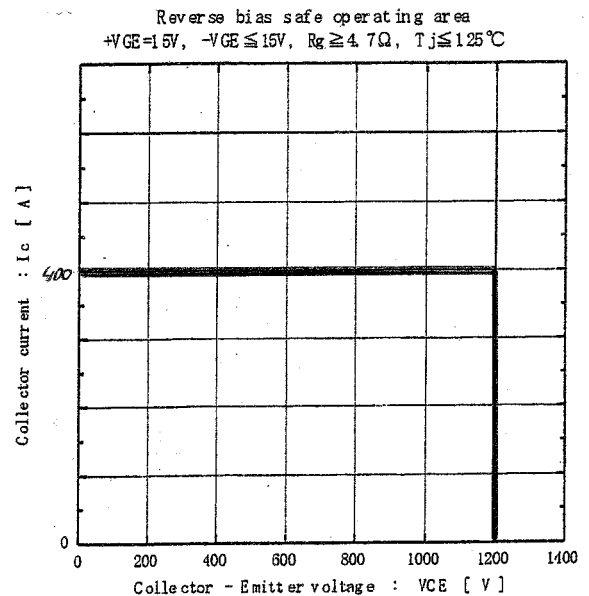
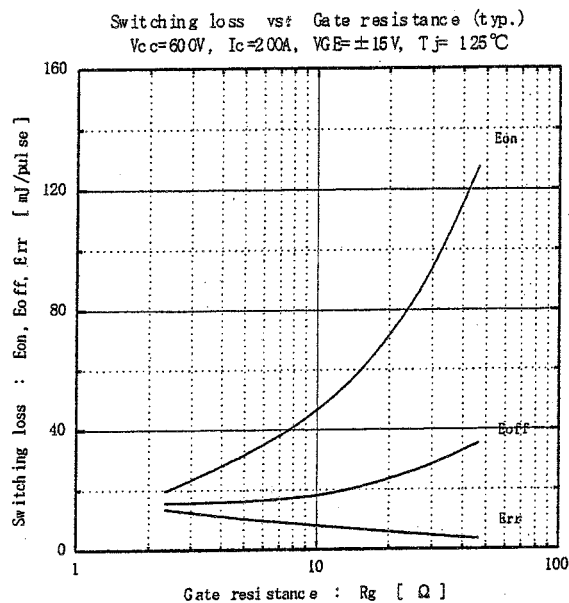
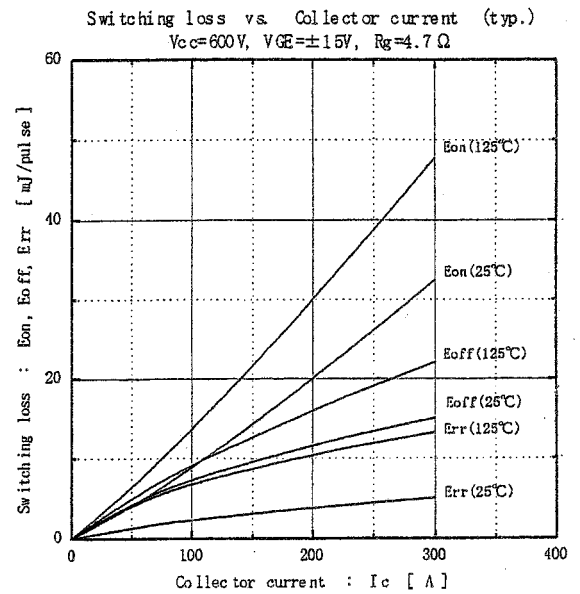
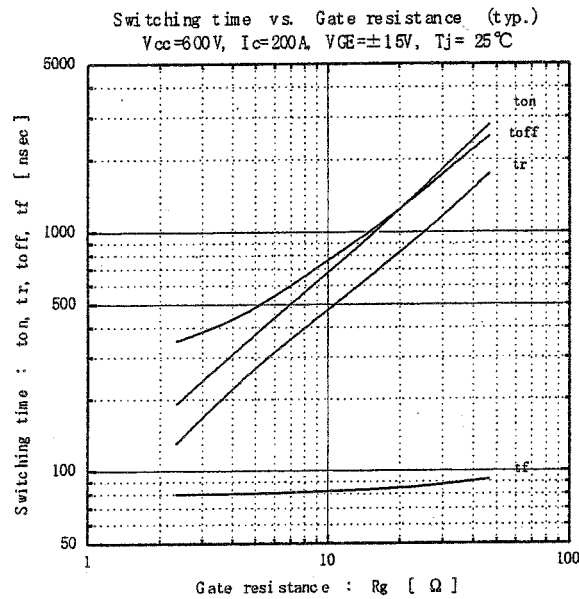
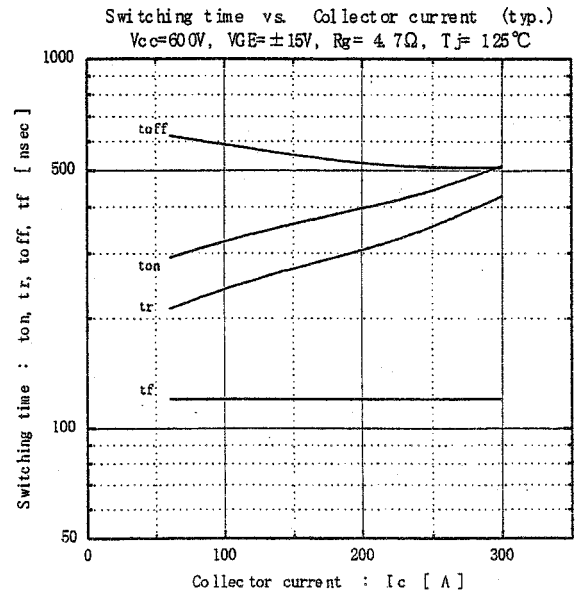
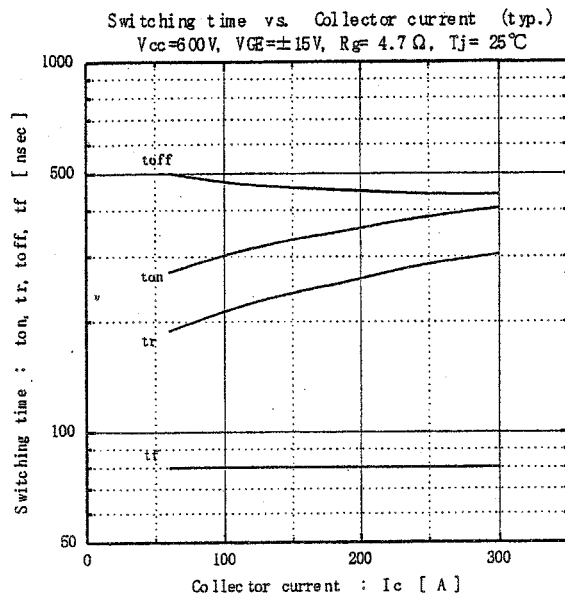
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0V$ $V_{CE}=1200V$			4.0	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V$ $V_{GE}=\pm 20V$			800	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20V$ $I_C=200mA$	5.5	7.2	8.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=200A$		2.3	2.6	
Input Capacitance	C_{ies}	$V_{GE}=0V$		24'000		pF
Output Capacitance	C_{oes}	$V_{CE}=10V$		5'000		
Reverse Transfer Capacitance	C_{res}	$f=1MHz$		4'400		
Turn-on Time	t_{ON}	$V_{CC} = 600V$		0.35	1.2	μs
	$t_{r,x}$	$I_C = 200A$		0.25	0.6	
	$t_{r,i}$	$V_{GE} = \pm 15V$		0.10		
Turn-off Time	t_{OFF}	$R_G = 4.7\Omega$		0.45	1.0	
	t_f	Inductive Load		0.08	0.3	
Diode Forward On-Voltage	V_F	$I_F=200A$; $V_{GE}=0V$	$T_J = 25^\circ\text{C}$	2.3	3.0	V
Reverse Recovery Time	t_{rr}	$I_F=200A$	$T_J = 125^\circ\text{C}$	2.0		



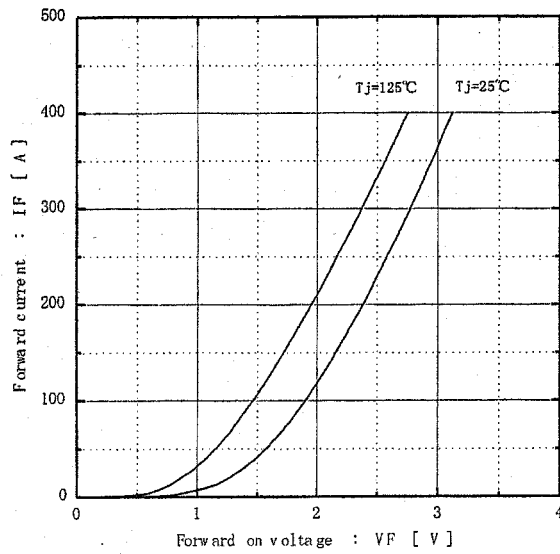
• Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.085	°C/W
	$R_{th(j-c)}$	Diode			0.220	
	$R_{th(c-f)}$	With Thermal Compound		0.0125		



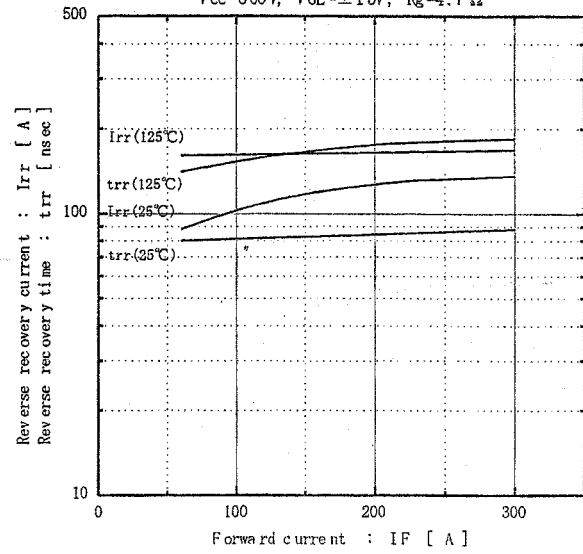


Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)

$V_{CC} = 600\text{V}$, $V_{GE} = \pm 15\text{V}$, $R_g = 4.7\ \Omega$



Transient thermal resistance

