

## IGBT MODULE ( S-Series )

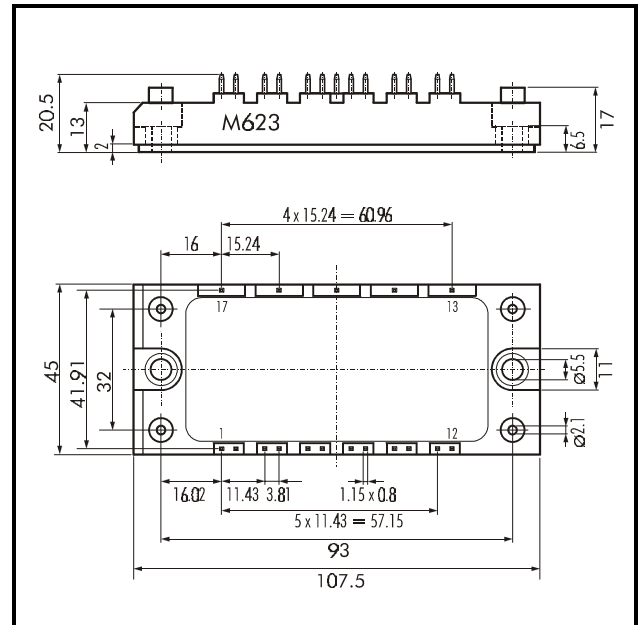
## ■ Outline Drawing

### ■ Features

- NPT-Technology
- Solderable Package
- 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



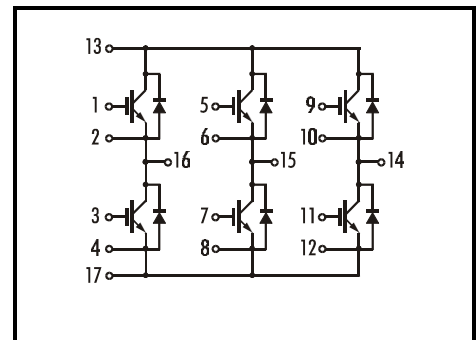
## ■ Maximum Ratings and Characteristics

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

Items	Symbols	Ratings	Units
Collector-Emitter Voltage	$V_{CES}$	1200	V
Gate -Emitter Voltage	$V_{GES}$	$\pm 20$	
Collector Current	Continuous	$I_C$	75 / 50
	1ms	$I_{C\ PULSE}$	150 / 100
	Continuous	$-I_C$	50
	1ms	$-I_{C\ PULSE}$	100
Max. Power Dissipation	$P_C$	360	W
Operating Temperature	$T_j$	+150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +125	
Isolation Voltage	$V_{is}$	2500	V
Screw Torque	Mounting*	3.5	Nm

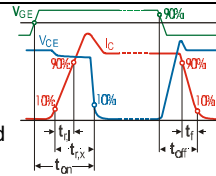
Note: \*Recommendable Value; 2.5 - 3.5 Nm (M5)

## ■ Equivalent Circuit



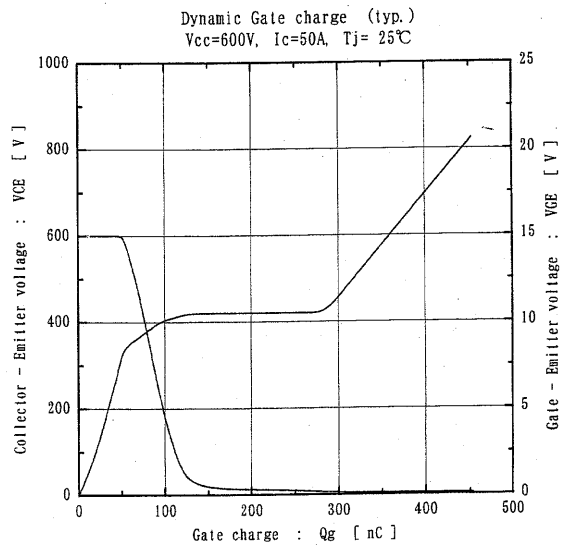
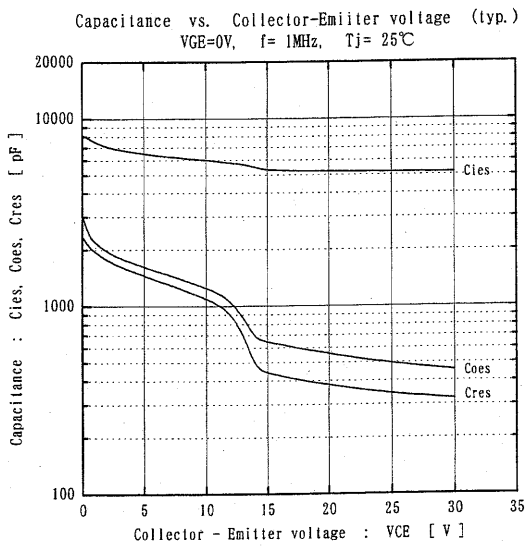
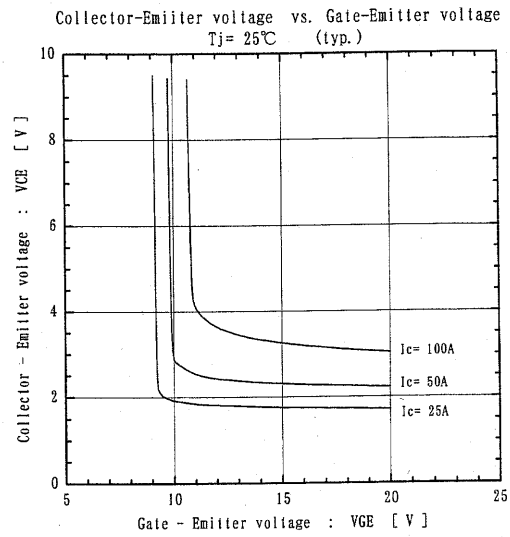
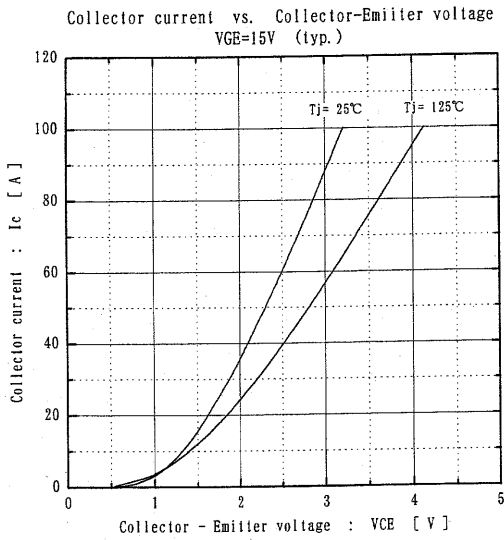
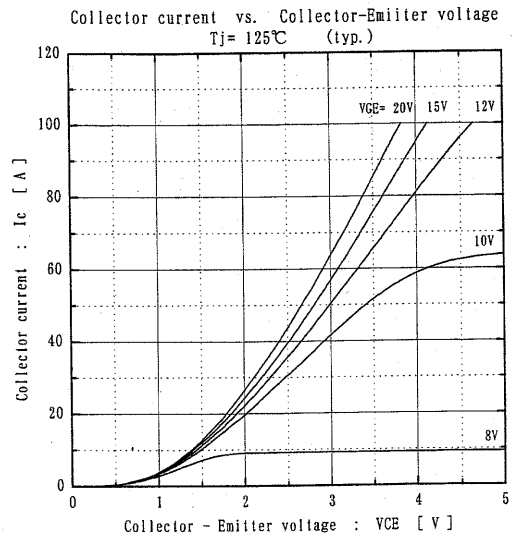
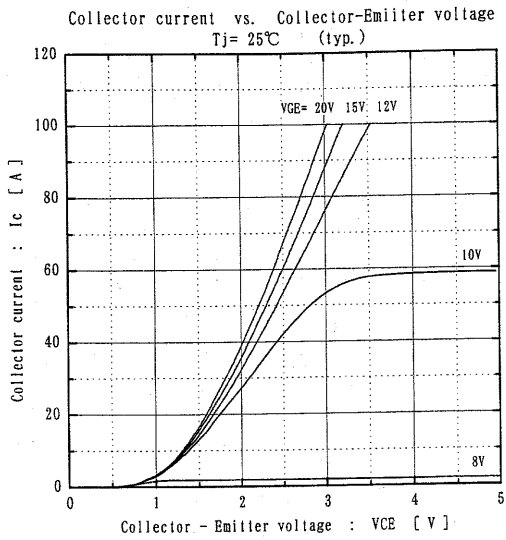
### • Electrical Characteristics ( at $T_j=25^\circ\text{C}$ )

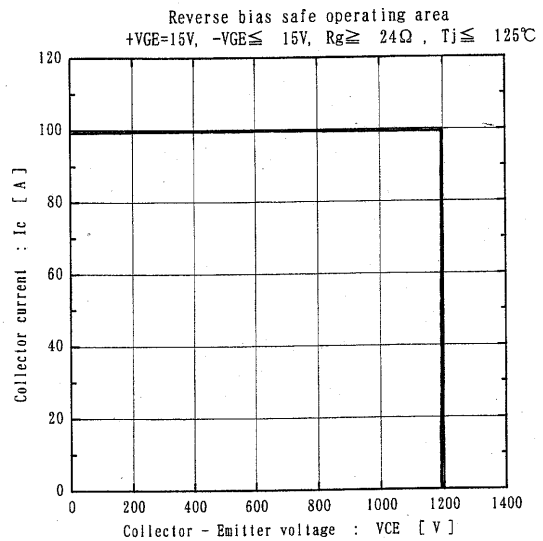
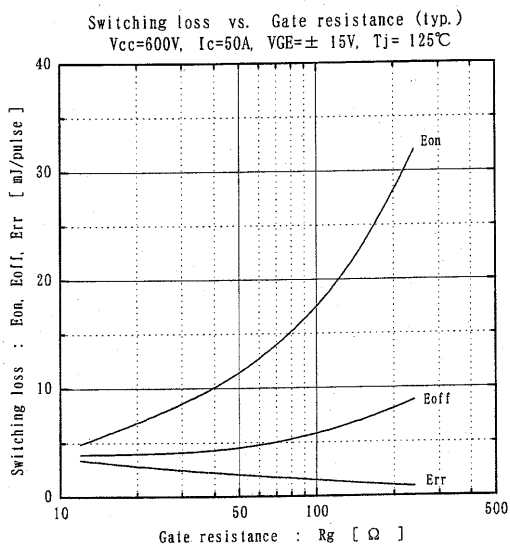
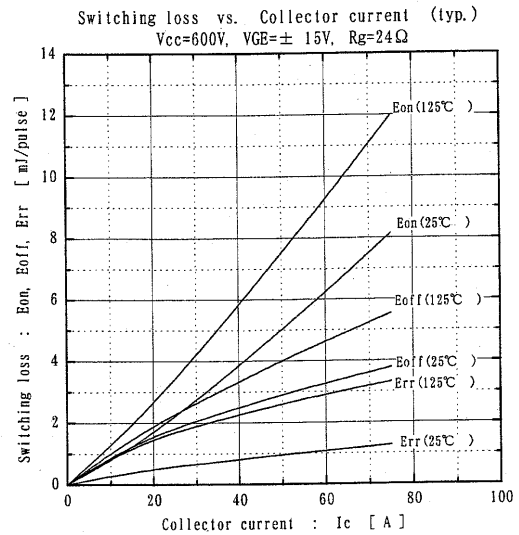
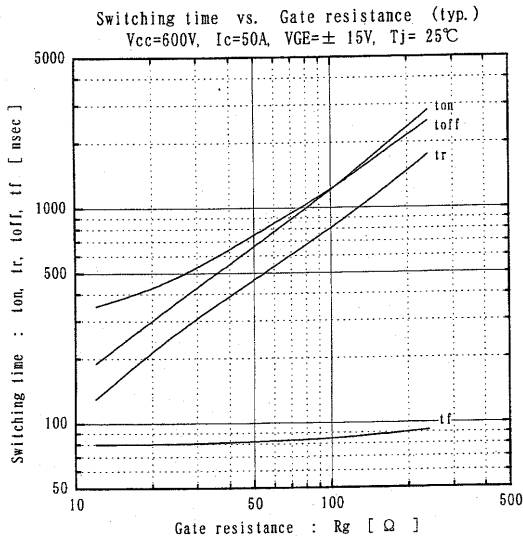
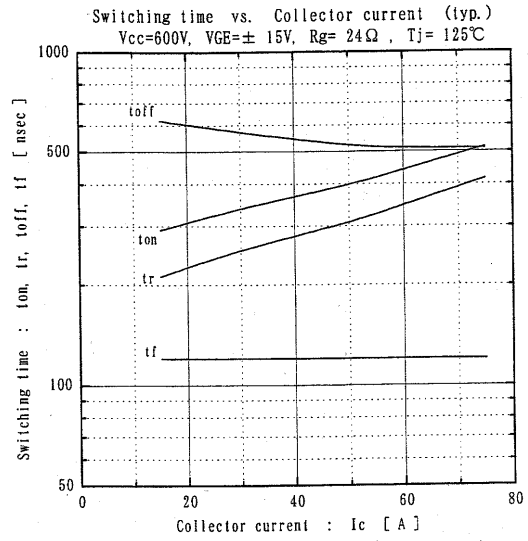
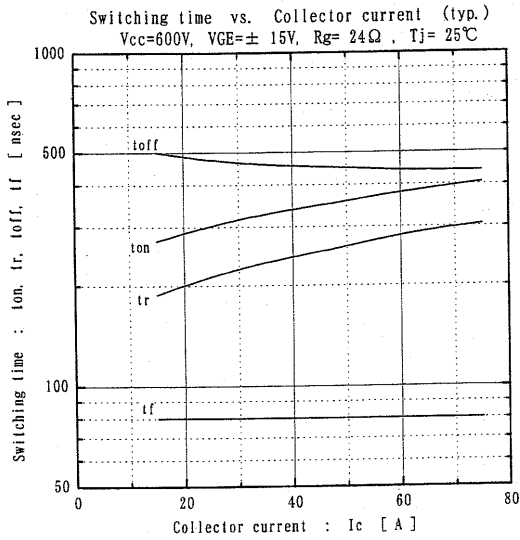
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{GE}=0V$ $V_{CE}=1200V$			1.0	mA
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V$ $V_{GE}=\pm 20V$			200	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20V$ $I_C=50mA$	5.5	7.2	8.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=50A$ ; $T_j = 25^\circ\text{C}$		2.3	2.65	
		$V_{GE}=15V$ $I_C=50A$ ; $T_j = 125^\circ\text{C}$		2.8		
Input Capacitance	$C_{ies}$	$V_{GE}=0V$		6000		pF
Output Capacitance	$C_{oes}$	$V_{CE}=10V$		1250		
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz$		1100		
Turn-on Time	$t_{ON}$	$V_{CC}=600V$		0.35	1.2	$\mu\text{s}$
	$t_{r,x}$	$I_C=50A$		0.25	0.6	
	$t_{r,i}$	$V_{GE}=\pm 15V$		0.10		
	$t_{OFF}$	$R_G=24\Omega$		0.45	1.0	
Turn-off Time	$t_f$	Inductive Load		0.08	0.3	
Diode Forward On-Voltage	$V_F$	$I_F=50A$ ; $V_{GE}=0V$ ; $T_j = 25^\circ\text{C}$		2.5	3.3	V
		$I_F=50A$ ; $V_{GE}=0V$ ; $T_j = 125^\circ\text{C}$		2.0		
Reverse Recovery Time	$t_{rr}$	$I_F=50A$			350	ns



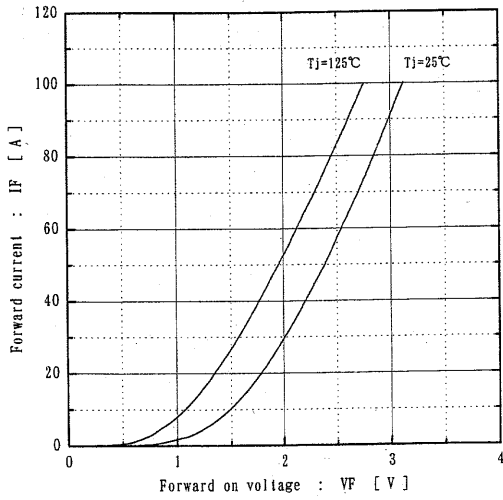
### • Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.35	$^\circ\text{C/W}$
	$R_{th(j-e)}$	Diode			0.75	
	$R_{th(c-f)}$	With Thermal Compound		0.05		

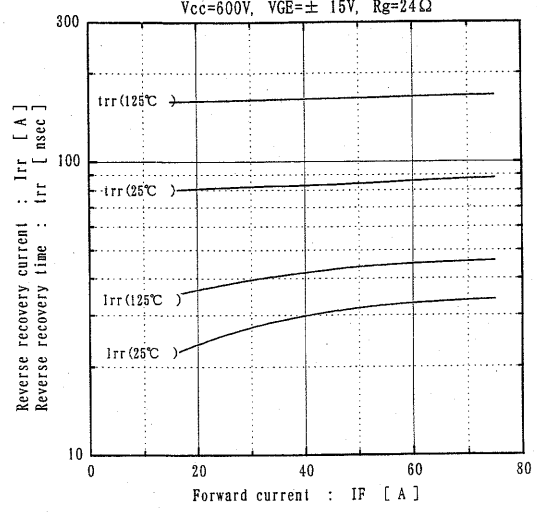




Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)



Transient thermal resistance

