

IGBT MODULE (S-Series)

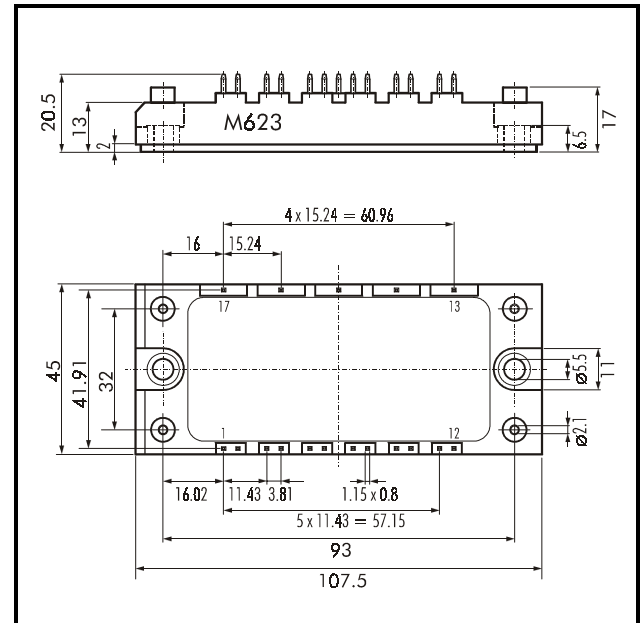
■ Features

- 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

■ Outline Drawing



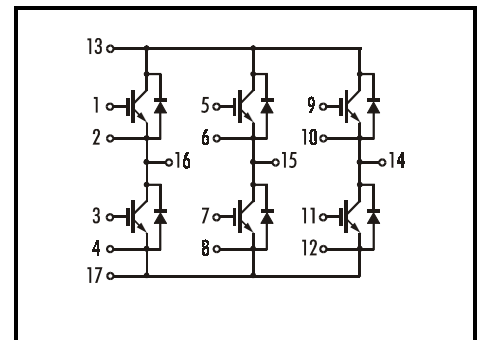
■ Maximum Ratings and Characteristics

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

Items	Symbols	Ratings	Units
Collector-Emitter Voltage	V_{CES}	1400	V
Gate -Emitter Voltage	V_{GES}	± 20	
Collector Current	Continuous $25^\circ\text{C} / 75^\circ\text{C}$	I_C	50 / 35
	1ms $25^\circ\text{C} / 75^\circ\text{C}$	$I_{C \text{ PULSE}}$	100 / 70
	Continuous	$-I_C$	35
	1ms	$-I_{C \text{ PULSE}}$	70
Max. Power Dissipation	P_C	240	W
Operating Temperature	T_j	+150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +125	
Isolation Voltage	A.C. 1min. V_{is}	2500	V
Screw Torque	Mounting*	3.5	Nm

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

■ Equivalent Circuit

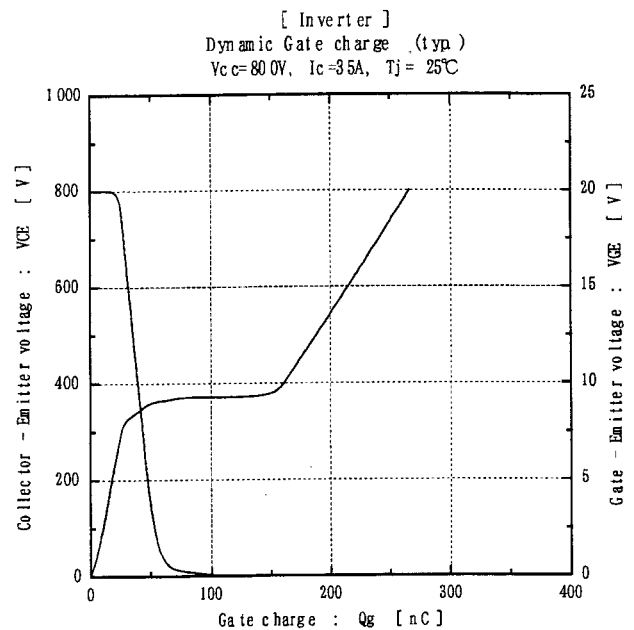
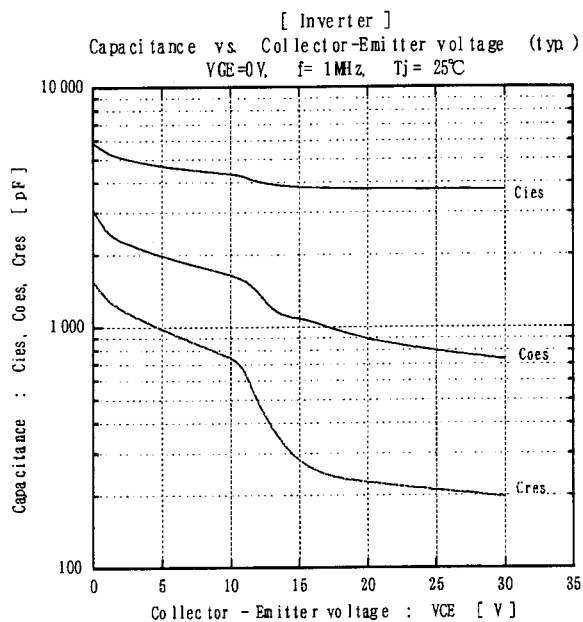
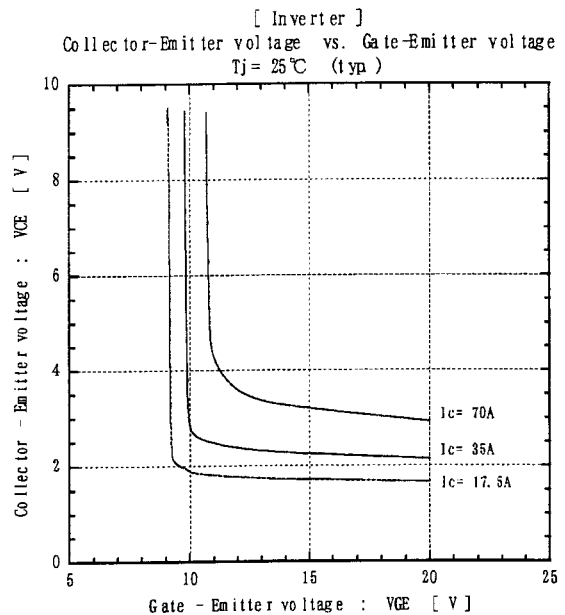
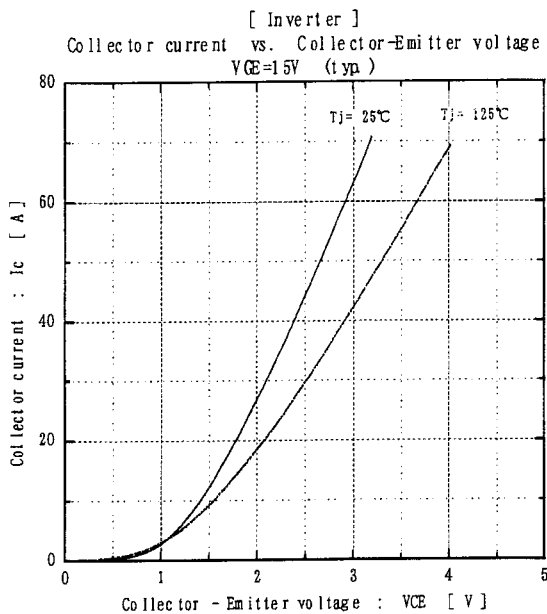
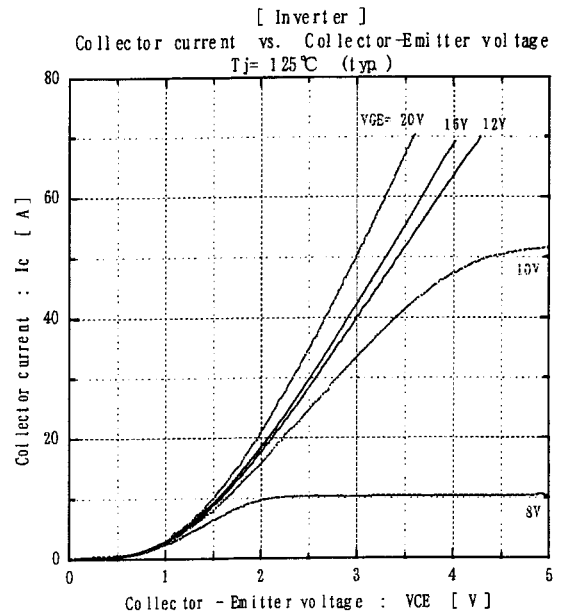
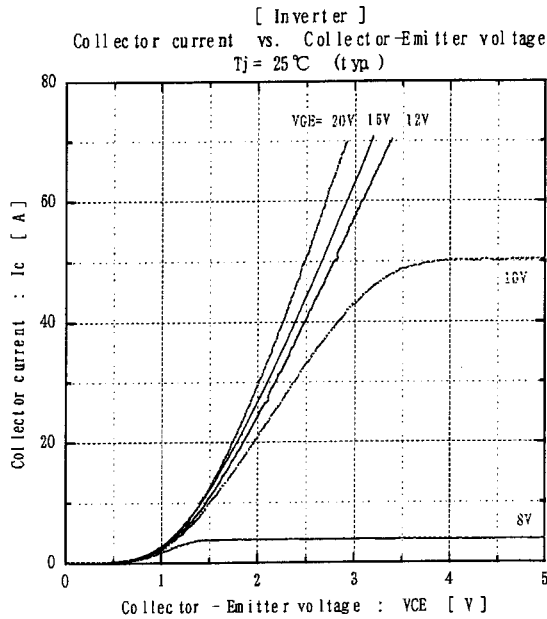


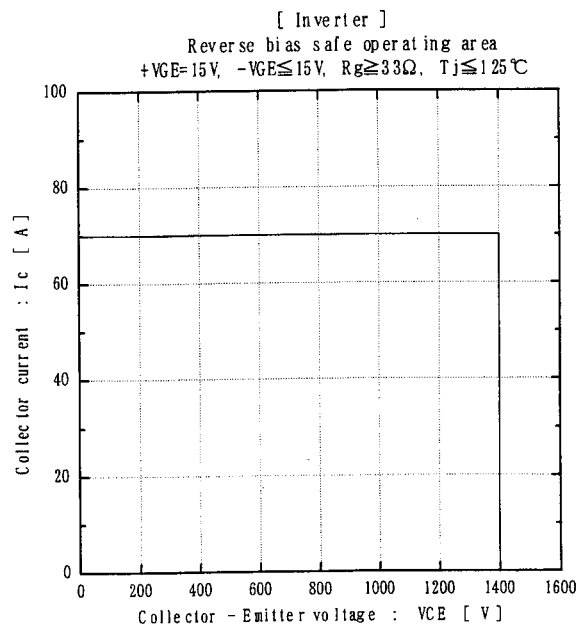
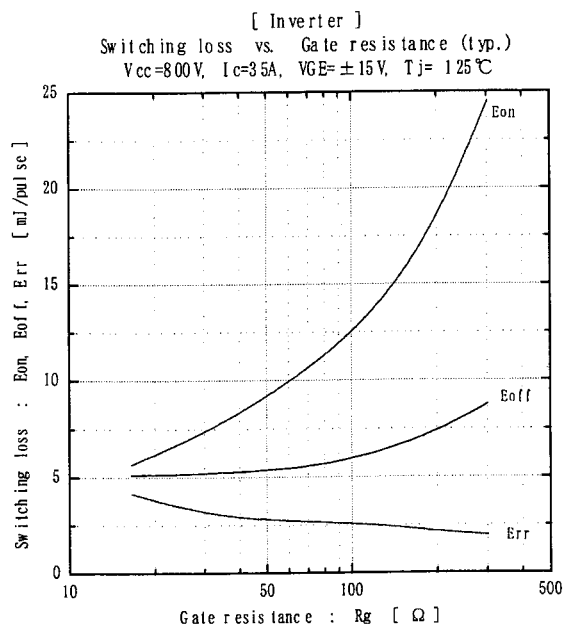
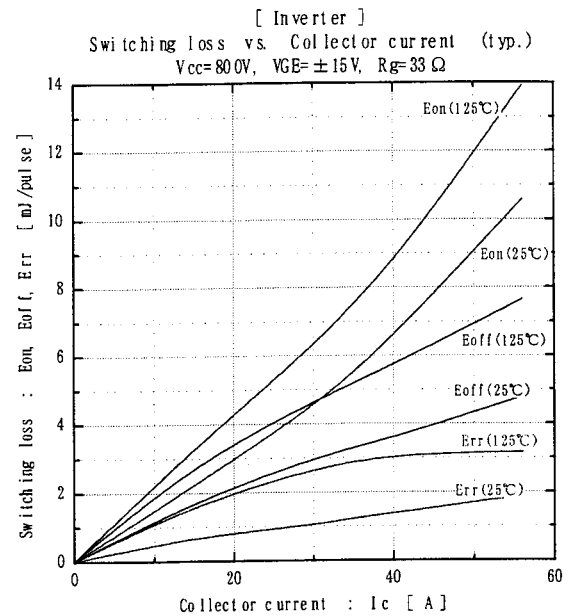
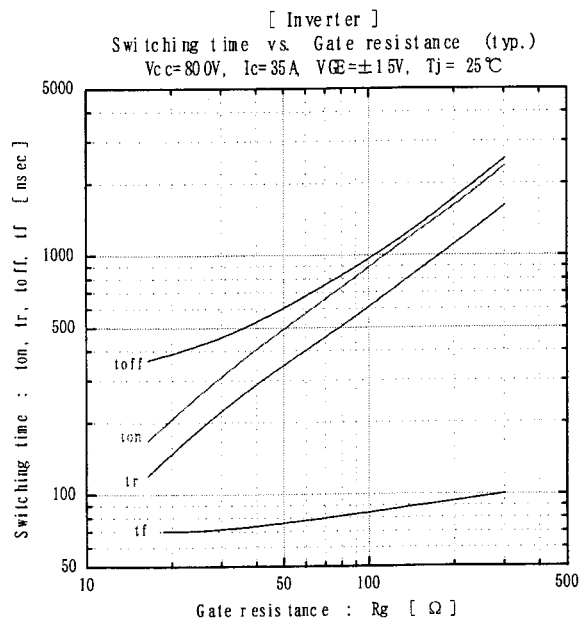
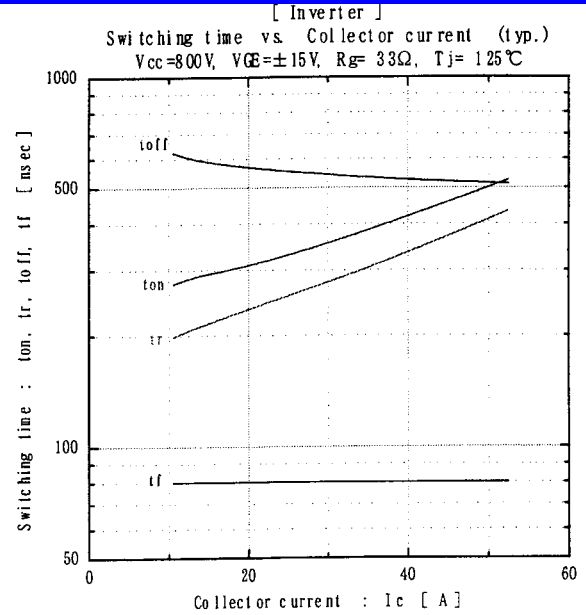
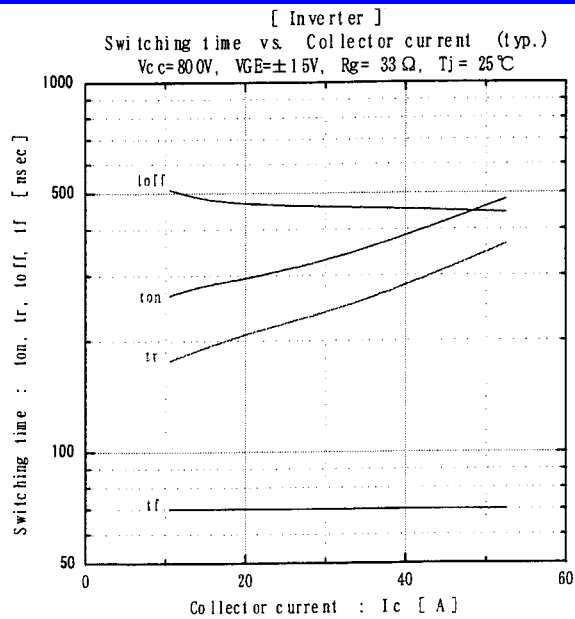
• Electrical Characteristics (at $T_j=25^\circ\text{C}$)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0V$ $V_{CE}=1400V$			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	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=35A$; $T_j = 25^\circ\text{C}$ $V_{GE}=15V$ $I_C=35A$; $T_j = 125^\circ\text{C}$		2.4 3.0	2.75	
Input Capacitance	C_{ies}	$V_{GE}=0V$		4200		pF
Output Capacitance	C_{oes}	$V_{CE}=10V$		875		
Reverse Transfer Capacitance	C_{res}	$f=1MHz$		770		
Turn-on Time	t_{ON}	$V_{CC}=800V$		0.35	1.2	μs
	$t_{r,x}$	$I_C=35A$		0.25	0.6	
	$t_{r,i}$	$V_{GE}=\pm 15V$		0.10		
Turn-off Time	t_{OFF}	$R_G=33\Omega$		0.45	1.0	
	t_f	Inductive Load		0.08	0.3	
Diode Forward On-Voltage	V_F	$I_F=35A$; $V_{GE}=0V$; $T_j = 25^\circ\text{C}$ $I_F=35A$; $V_{GE}=0V$; $T_j = 125^\circ\text{C}$		2.6 2.2	3.4	V
Reverse Recovery Time	t_{rr}	$I_F=35A$			350	ns

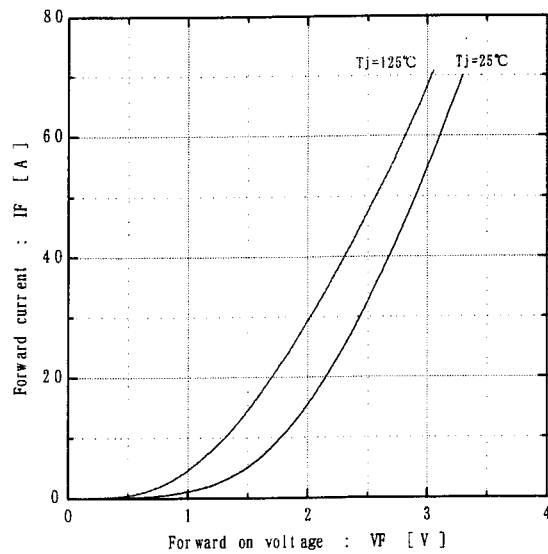
• Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.52	$^\circ\text{C/W}$
	$R_{th(j-e)}$	Diode			0.90	
	$R_{th(c-f)}$	With Thermal Compound		0.05		



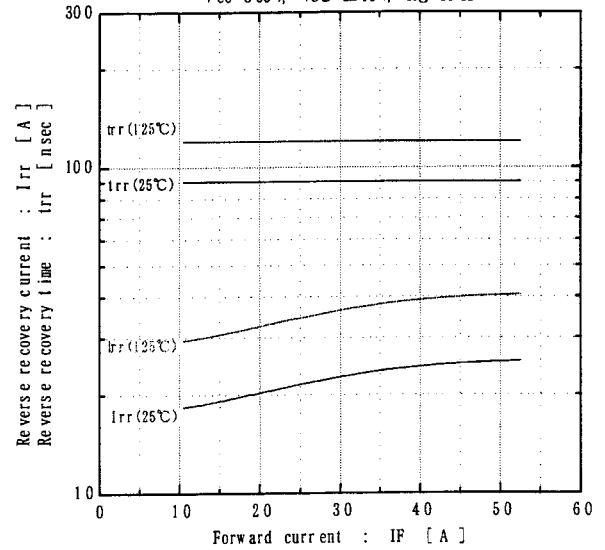


Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)

$V_{CC} = 800\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_g = 33\ \Omega$



Transient thermal resistance

