

1MBI400NP-120

1MBI400NN-120

IGBT Module

1200V / 400A 1 in one-package

■ Features

- High speed switching
- Voltage drive
- Low inductance module structure

■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply
- Industrial machines, such as Welding machines

■ Maximum ratings and characteristics

● Absolute maximum ratings (at Tc=25°C unless otherwise specified)

Item		Symbol	Rating	Unit
Collector-Emitter voltage		V _{CES}	1200	V
Gate-Emitter voltage		V _{GES}	±20	V
Collector current	Continuous	I _C	400	A
	1ms	I _C pulse	800	A
	Continuous	-I _C	400	A
	1ms	-I _C pulse	800	A
Max. power dissipation		P _C	3100	W
Operating temperature		T _J	+150	°C
Storage temperature		T _{stg}	-40 to +125	°C
Isolation voltage		V _{is}	AC 2500 (1min.)	V
Screw torque		Mounting *1	3.5	N·m
		Terminals *2	4.5	N·m
		Terminals *3	1.7	N·m

*1 : Recommendable value : 2.5 to 3.5 N·m(M5) or (M6)

*2 : Recommendable value : 3.5 to 4.5 N·m(M6)

*3 : Recommendable value : 1.3 to 1.7 N·m(M4)

● Electrical characteristics (at Tj=25°C unless otherwise specified)

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	I _{CES}	—	—	4.0	V _{GE} =0V, V _{CE} =1200V	mA
Gate-Emitter leakage current	I _{GES}	—	—	60	V _{CE} =0V, V _{GE} =±20V	μA
Gate-Emitter threshold voltage	V _{GE(th)}	4.5	—	7.5	V _{CE} =20V, I _C =400mA	V
Collector-Emitter saturation voltage	V _{CE(sat)}	—	—	3.3	V _{GE} =15V, I _C =400A	V
Input capacitance	C _{ies}	—	64000	—	V _{GE} =0V	pF
Output capacitance	C _{oes}	—	23200	—	V _{CE} =10V	
Reverse transfer capacitance	C _{res}	—	20640	—	f=1MHz	
Turn-on time	t _{on}	—	0.75	1.2	V _{CC} =600V	μs
	t _r	—	0.25	0.6	I _C =400A	
Turn-off time	t _{off}	—	1.05	1.5	V _{GE} =±15V	
	t _f	—	0.35	0.5	R _G =1.8 ohm	
Diode forward on voltage	V _F	—	—	3.0	I _F =400A, V _{GE} =0V	V
Reverse recovery time	t _{rr}	—	—	0.35	I _F =400A	μs

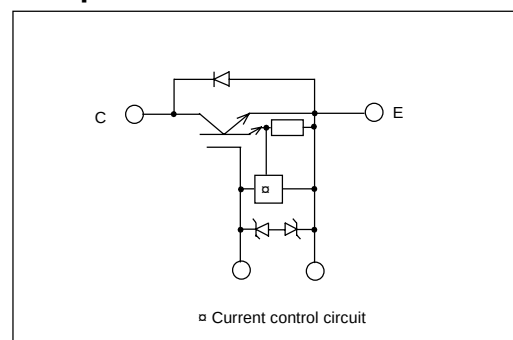
● Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	R _{th(j-c)}	—	—	0.04	IGBT	°C/W
	R _{th(j-c)}	—	—	0.12	Diode	°C/W
	R _{th(c-f)*4}	—	0.0125	—	the base to cooling fin	°C/W

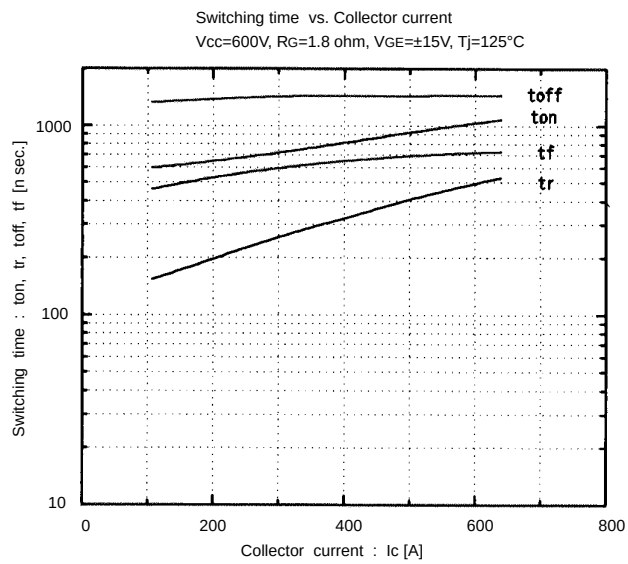
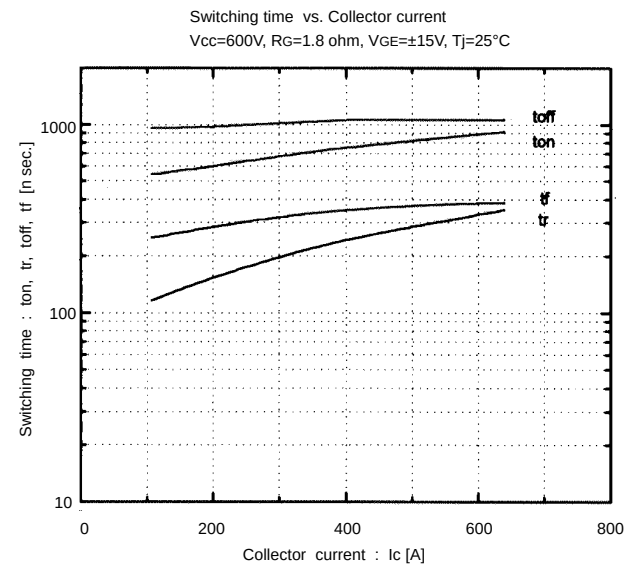
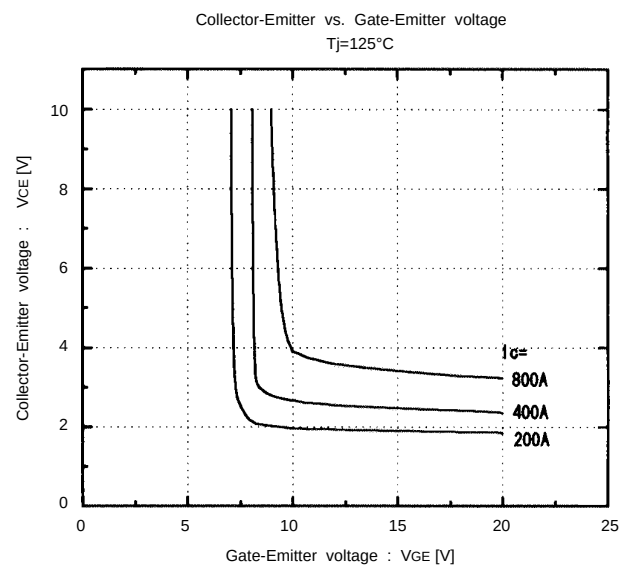
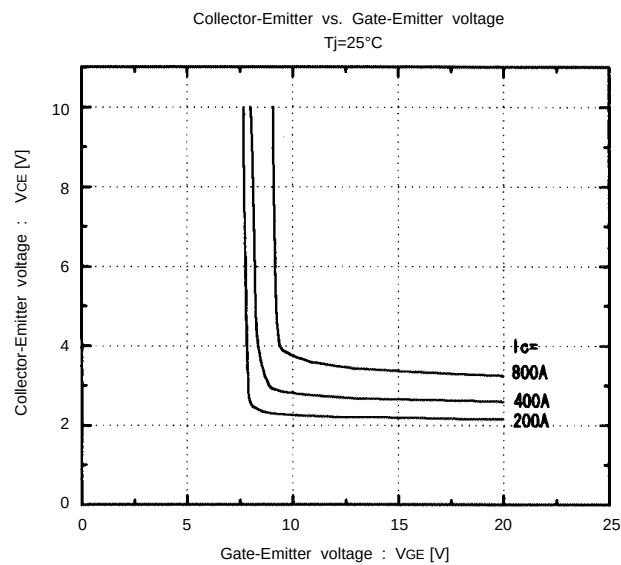
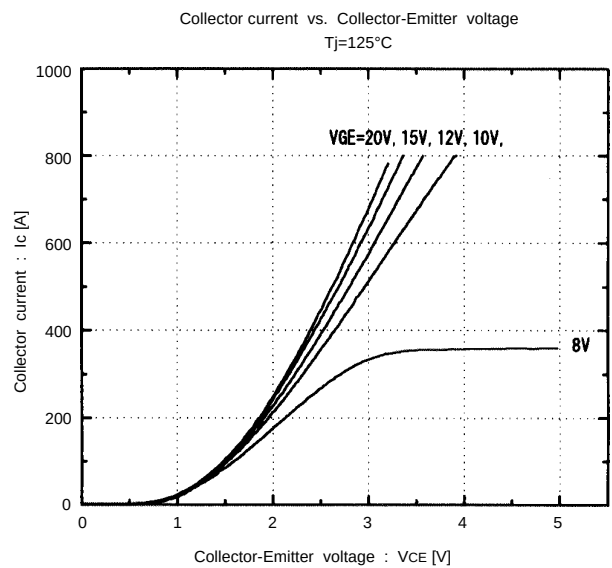
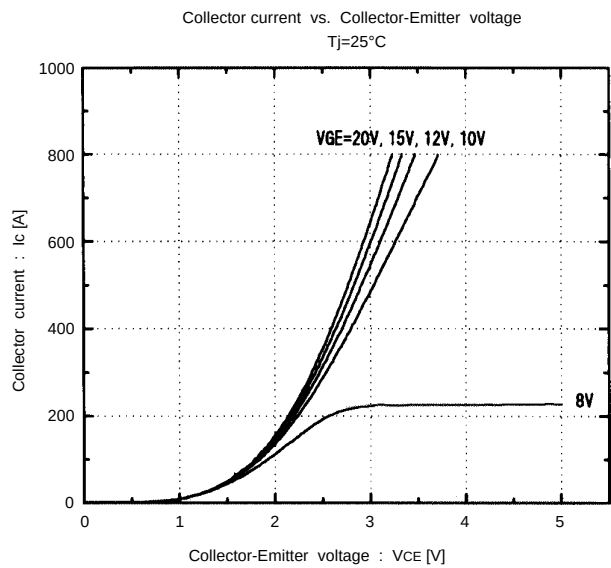
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound



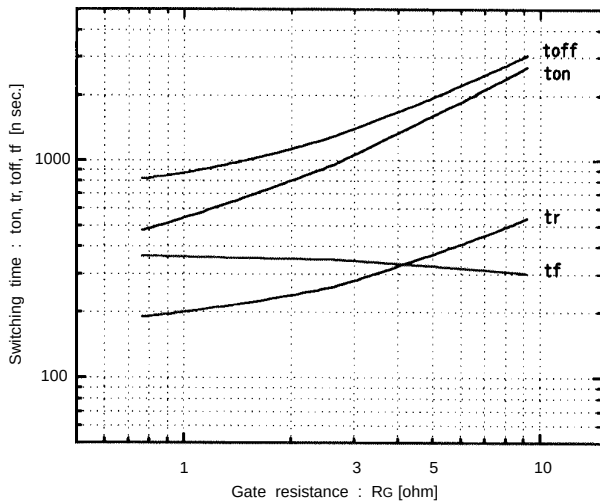
■ Equivalent Circuit Schematic



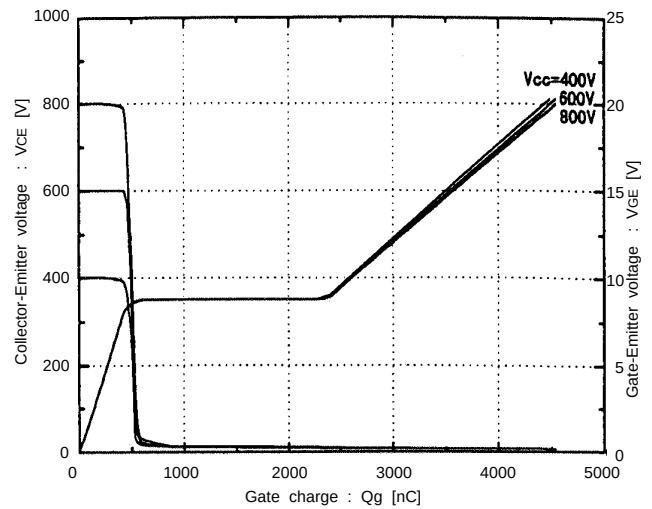
Characteristics (Representative)



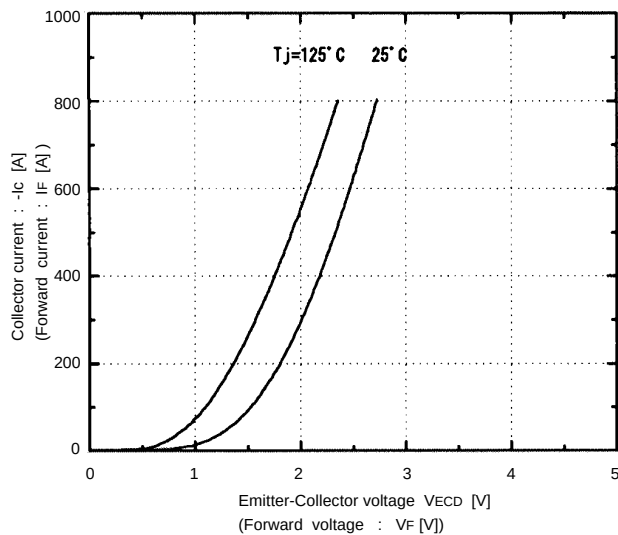
Switching time vs. R_G
 $V_{CC}=600V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=25^\circ C$



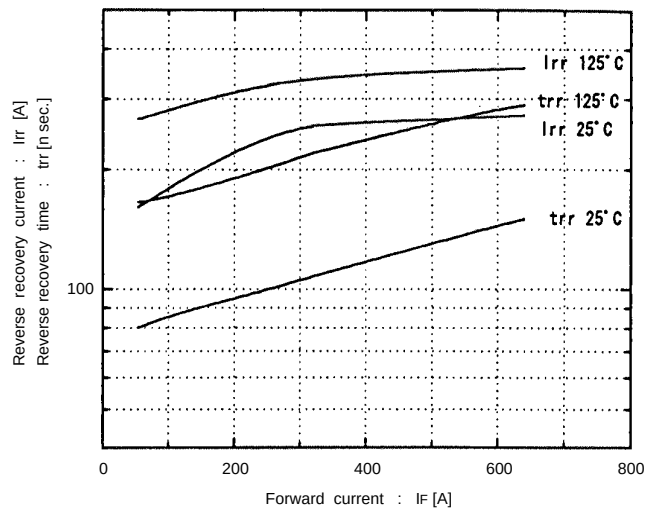
Dynamic input characteristics
 $T_J=25^\circ C$



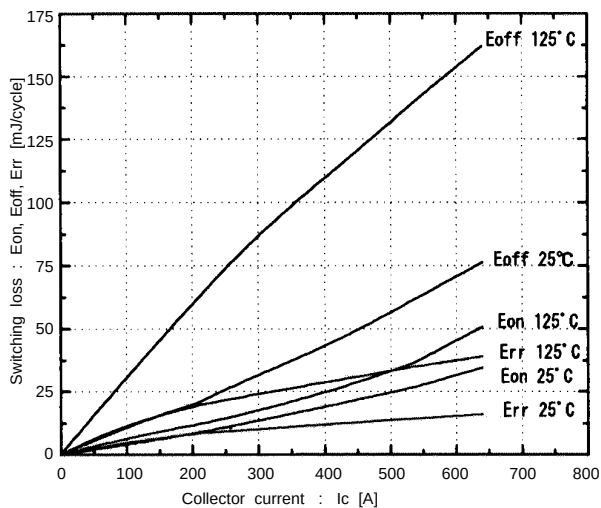
Forward current vs. Forward voltage
 $V_{GE}=0V$



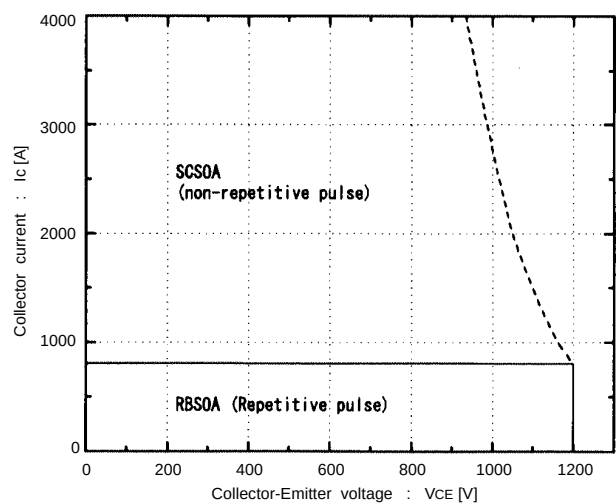
Reverse recovery characteristics
 t_{rr} , I_{rr} , vs. I_F

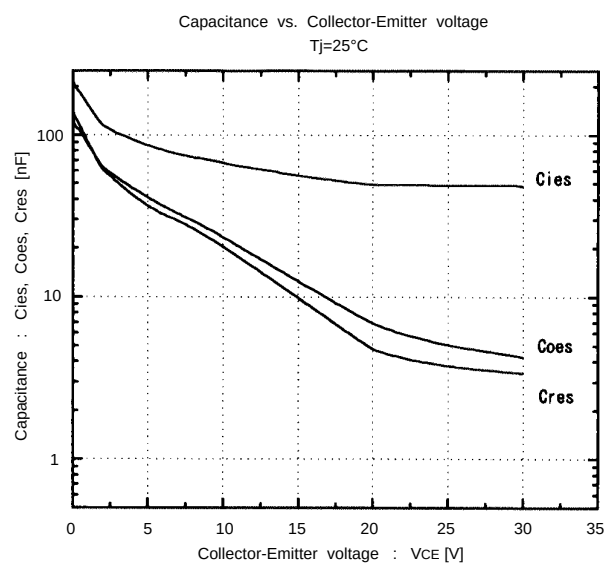
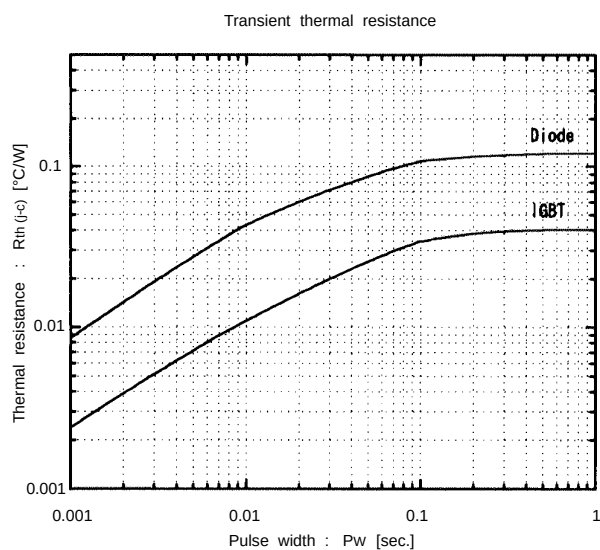


Switching loss vs. Collector current
 $V_{CC}=600V$, $R_G=1.8\text{ ohm}$, $V_{GE}=\pm 15V$

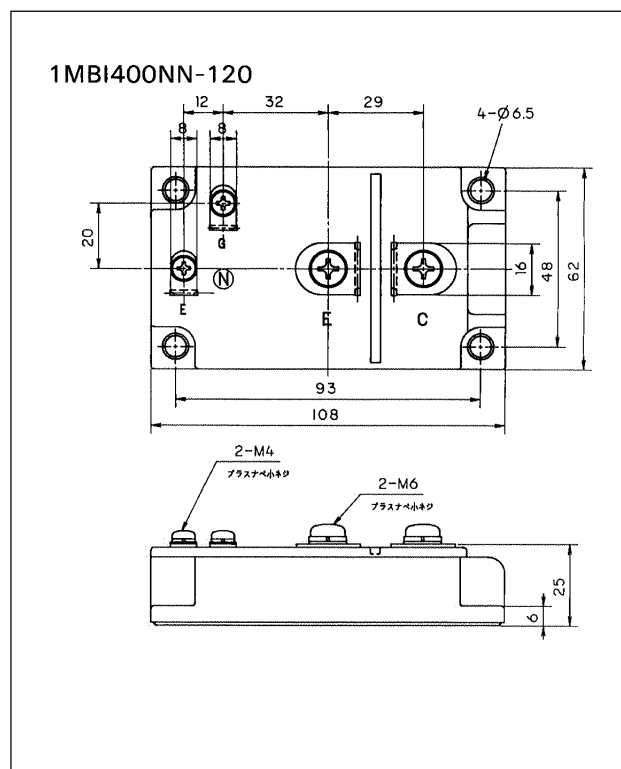
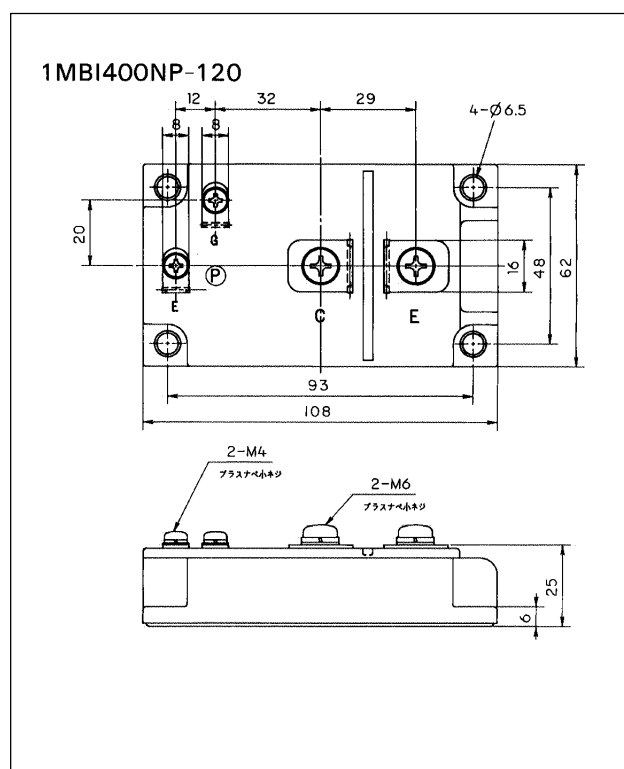


Reversed biased safe operating area
 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $T_J \leq 125^\circ C$, $R_G \geq 1.8\text{ ohm}$





■ Outline Drawings, mm



mass : 370g