

1MBI400S-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 $T_c=25^\circ\text{C}$ unless otherwise specified)

Item			Symbol	Rating	Unit
Collector-Emitter voltage			V _{CES}	1200	V
Gate-Emitter voltage			V _{GES}	±20	V
Collector current	Continuous	T _C =25°C	I _C	600	A
		T _C =80°C		400	A
	1ms	T _C =25°C	I _C pulse	1200	A
		T _C =80°C		800	A
			-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 *1			V _{is}	AC 2500 (1min.)	V
Screw torque			Mounting *2	3.5	N·m
			Terminals *2	4.5	N·m
			Terminals *2	1.7	N·m

*1 : All terminals should be connected together when isolation test will be done

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

Terminal 3.5 to 4.5 N·m(M6), 1.3 to 1.7 N·m(M4)

● Electrical characteristics (at $T_j=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	I_{CES}	—	—	4.0	$V_{GE}=0\text{V}$, $V_{CE}=1200\text{V}$	mA
Gate-Emitter leakage current	I_{GES}	—	—	0.8	$V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	5.5	7.2	8.5	$V_{CE}=20\text{V}$, $I_c=400\text{mA}$	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	—	2.3	2.6	$T_c=25^\circ\text{C}$, $V_{GE}=15\text{V}$, $I_c=400\text{A}$	V
		—	2.8	—	$T_c=125^\circ\text{C}$	
Input capacitance	C_{ies}	—	48000	—	$V_{GE}=0\text{V}$	pF
Output capacitance	C_{oes}	—	10000	—	$V_{CE}=10\text{V}$	
Reverse transfer capacitance	C_{res}	—	8800	—	$f=1\text{MHz}$	
Turn-on time	t_{on}	—	0.35	1.2	$V_{CC}=600\text{V}$	μs
	t_r	—	0.25	0.6	$I_c=400\text{A}$	
	$t_{r(i)}$	—	0.1	—	$V_{GE}=\pm 15\text{V}$	
Turn-off time	t_{off}	—	0.45	1.0	$R_G=1.8\text{ ohm}$	
	t_f	—	0.08	0.3		
Forward on voltage	V_F	—	2.7	3.5	$T_j=25^\circ\text{C}$	V
		—	2.4	—	$T_j=125^\circ\text{C}$	
Reverse recovery time	t_{rr}	—	—	0.35	$I_F=400\text{A}$	μs

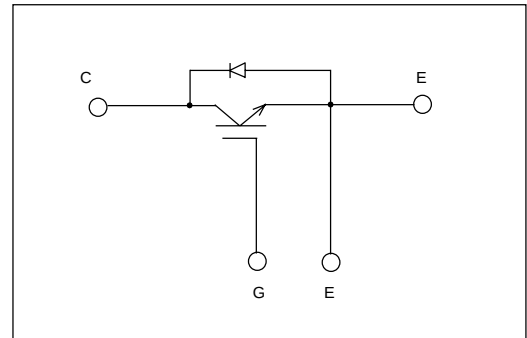
● Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	$R_{th(j-c)}$	—	—	0.04	IGBT	$^\circ\text{C/W}$
	$R_{th(j-c)}$	—	—	0.12	FWD	$^\circ\text{C/W}$
	$R_{th(c-f)*4}$	—	0.0125	—	the base to cooling fin	$^\circ\text{C/W}$

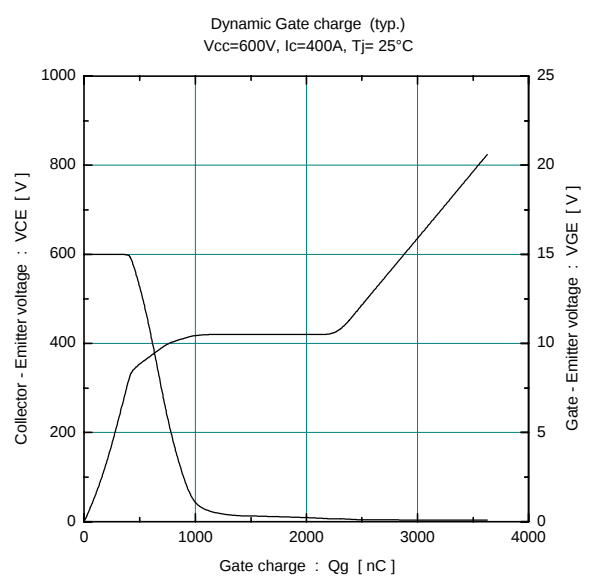
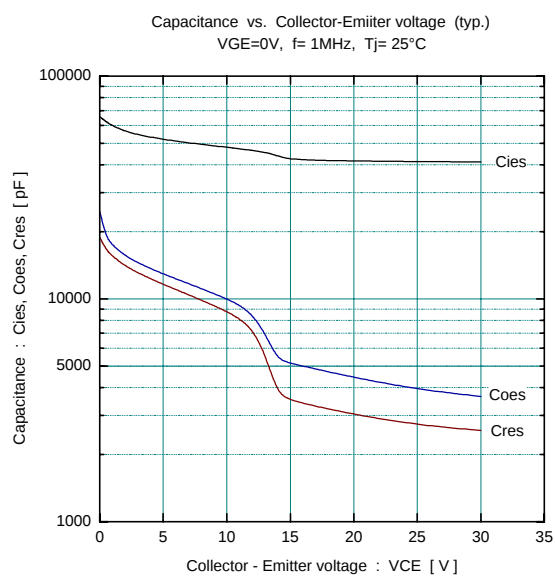
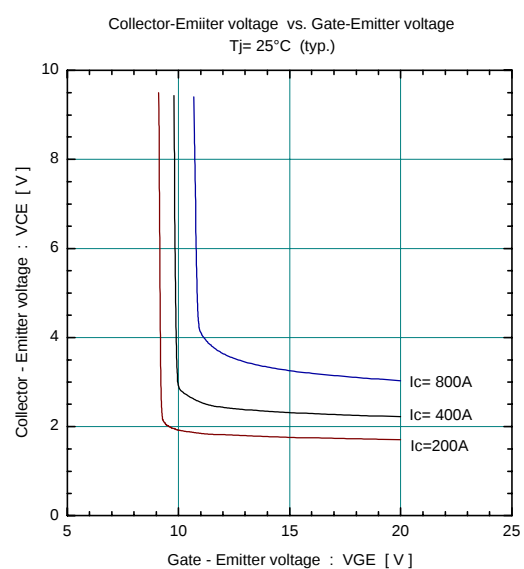
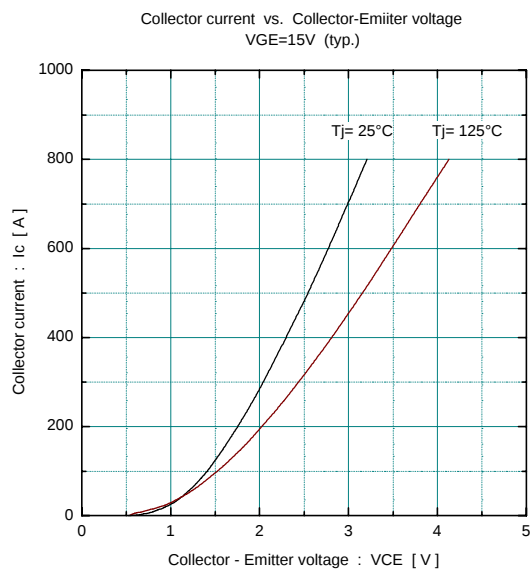
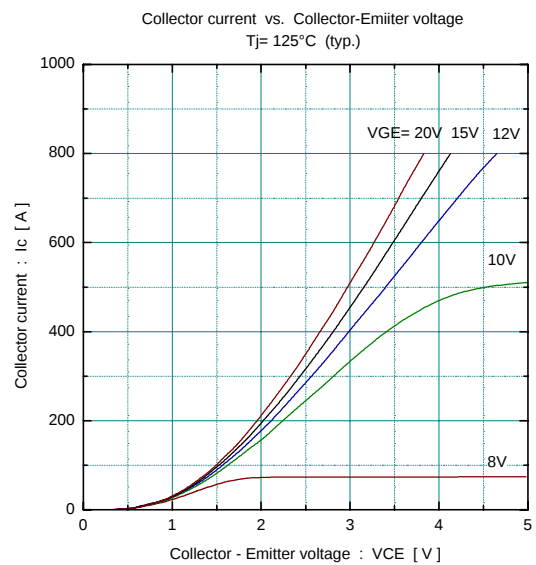
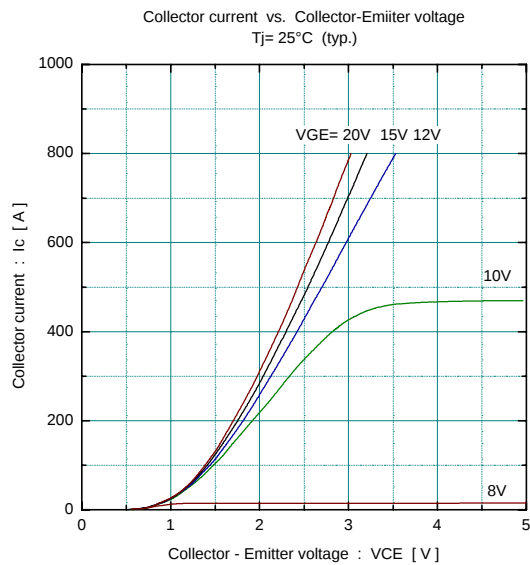
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound

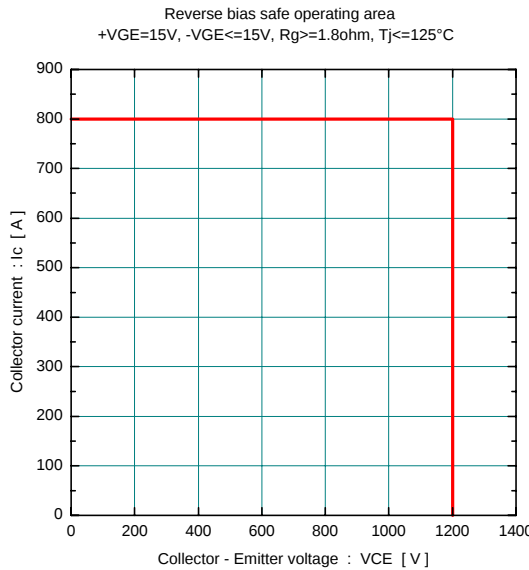
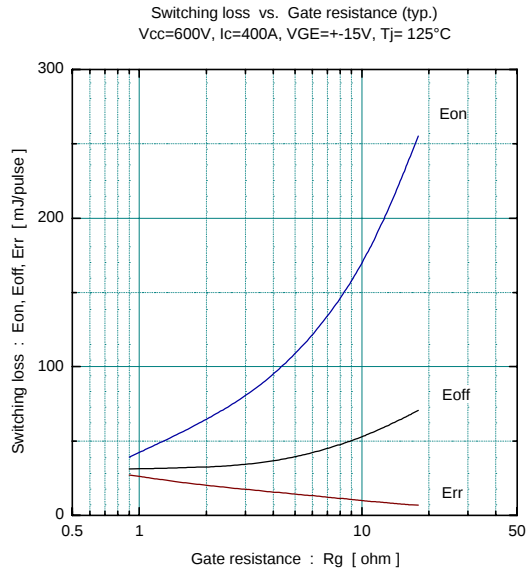
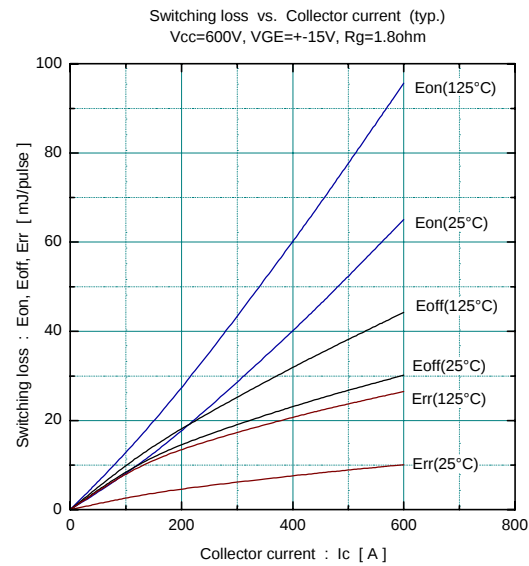
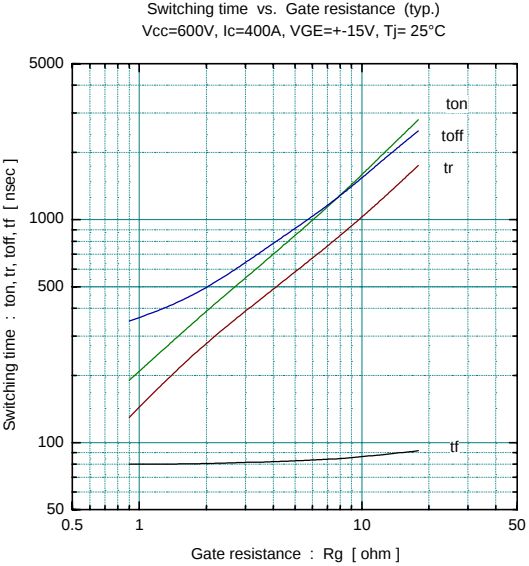
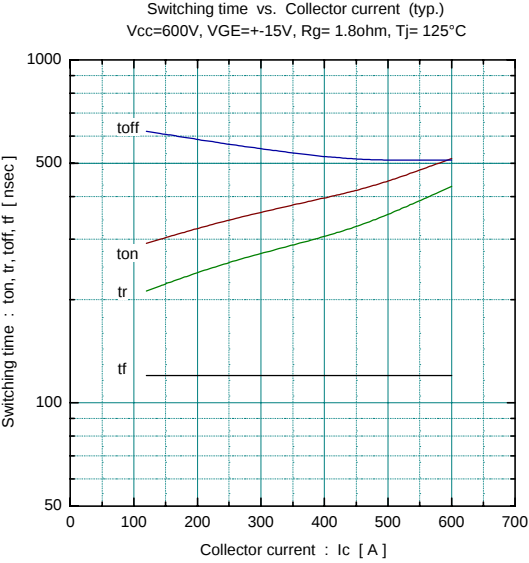
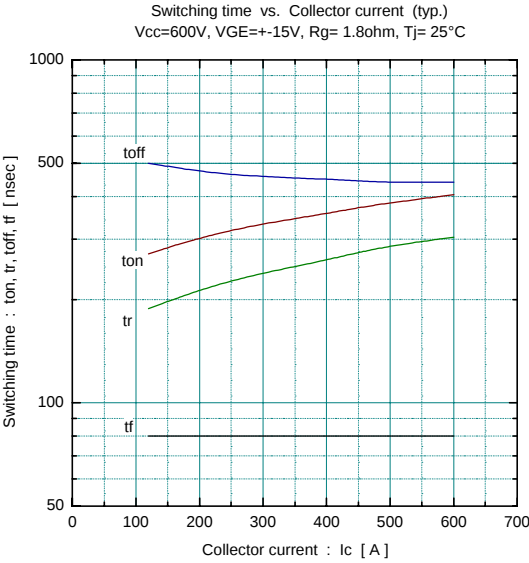


■ Equivalent Circuit Schematic

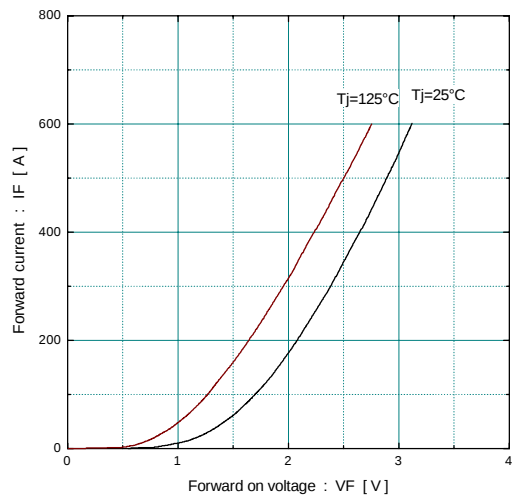


Characteristics

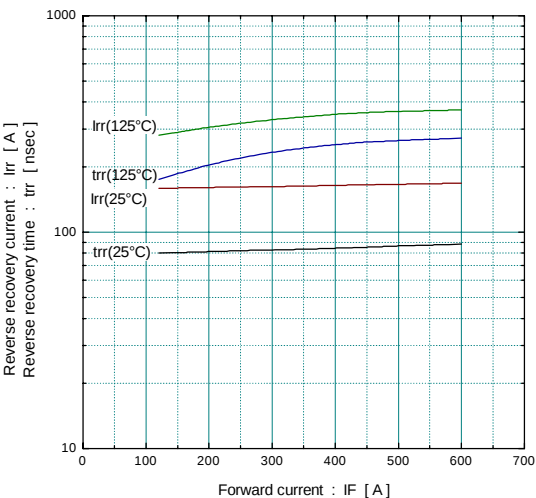




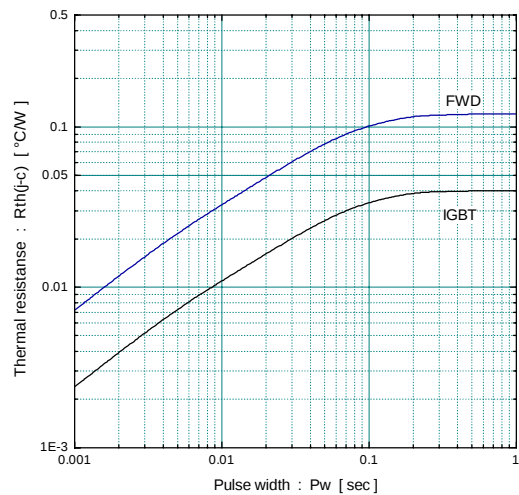
Forward current vs. Forward on voltage (typ.)



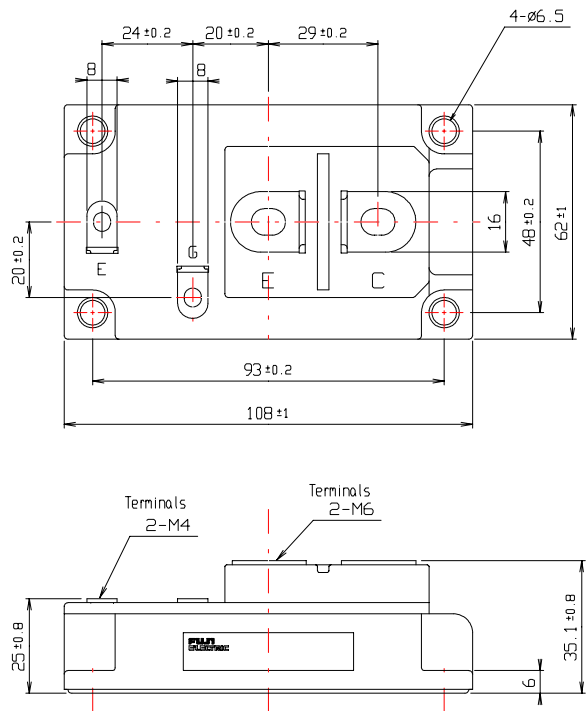
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=+15V, Rg=1.8ohm



Transient thermal resistance



Outline Drawings, mm



mass : 380g