

# 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 Tc=25°C unless otherwise specified)

Item	Symbol	Rating	Unit		
Collector-Emitter voltage	V <sub>CEs</sub>	1200	V		
Gate-Emitter voltage	V <sub>GES</sub>	±20	V		
Collector current	Continuous	T <sub>c</sub> =25°C	I <sub>C</sub>	600	A
		T <sub>c</sub> =80°C		400	A
	1ms	T <sub>c</sub> =25°C	I <sub>C</sub> pulse	1200	A
		T <sub>c</sub> =80°C		800	A
	1ms		-I <sub>c</sub>	400	A
		-I <sub>c</sub> pulse	800	A	
Max. power dissipation	P <sub>c</sub>	3100	W		
Operating temperature	T <sub>j</sub>	+150	°C		
Storage temperature	T <sub>stg</sub>	-40 to +125	°C		
Isolation voltage *1	V <sub>is</sub>	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 1.7N·m(M4)

#### ● Electrical characteristics (at T<sub>j</sub>=25°C unless otherwise specified)

Item	Symbol	Characteristics			Conditions	Unit	
		Min.	Typ.	Max.			
Zero gate voltage collector current	I <sub>CEs</sub>	–	–	4.0	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	–	–	0.8	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V	μA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	5.5	7.2	8.5	V <sub>CE</sub> =20V, I <sub>c</sub> =400mA	V	
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	–	2.3	2.6	T <sub>c</sub> =25°C, V <sub>GE</sub> =15V, I <sub>c</sub> =400A	V	
		–	2.8	–	T <sub>c</sub> =125°C		
Input capacitance	C <sub>ies</sub>	–	48000	–	V <sub>GE</sub> =0V	pF	
Output capacitance	C <sub>oes</sub>	–	10000	–	V <sub>CE</sub> =10V		
Reverse transfer capacitance	C <sub>res</sub>	–	8800	–	f=1MHz		
Turn-on time	t <sub>on</sub>	–	0.35	1.2	V <sub>CC</sub> =600V I <sub>c</sub> =400A V <sub>GE</sub> =±15V R <sub>G</sub> =1.8 ohm	μs	
	t <sub>r</sub>	–	0.25	0.6			
	t <sub>r(i)</sub>	–	0.1	–			
Turn-off time	t <sub>off</sub>	–	0.45	1.0			
	t <sub>f</sub>	–	0.08	0.3			
Forward on voltage	V <sub>F</sub>	–	2.7	3.5	T <sub>j</sub> =25°C	I <sub>F</sub> =400A, V <sub>GE</sub> =0V	V
		–	2.4	–	T <sub>j</sub> =125°C		
Reverse recovery time	t <sub>rr</sub>	–	–	0.35	I <sub>F</sub> =400A	μs	

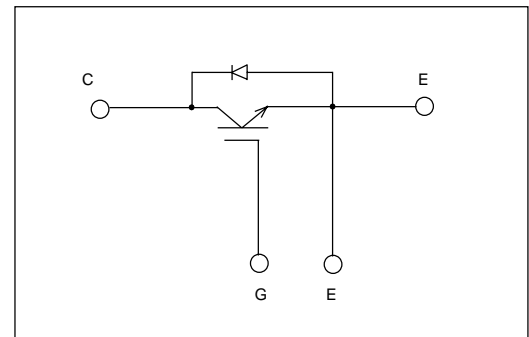
#### ● Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	R <sub>th(j-c)</sub>	–	–	0.04	IGBT	°C/W
	R <sub>th(j-c)</sub>	–	–	0.12	FWD	°C/W
	R <sub>th(c-f)*4</sub>	–	0.0125	–	the base to cooling fin	°C/W

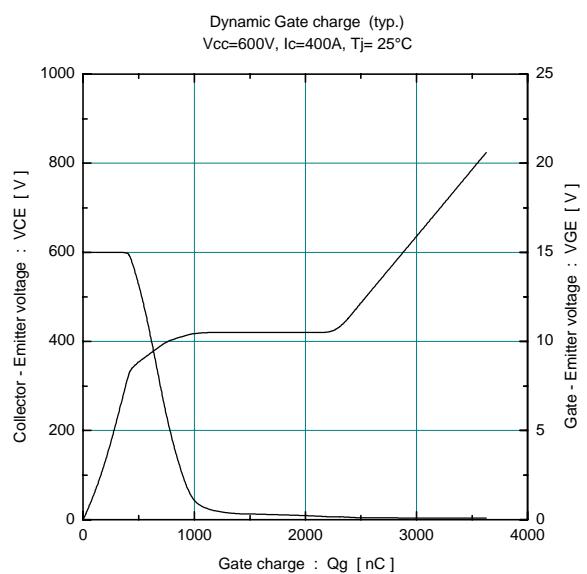
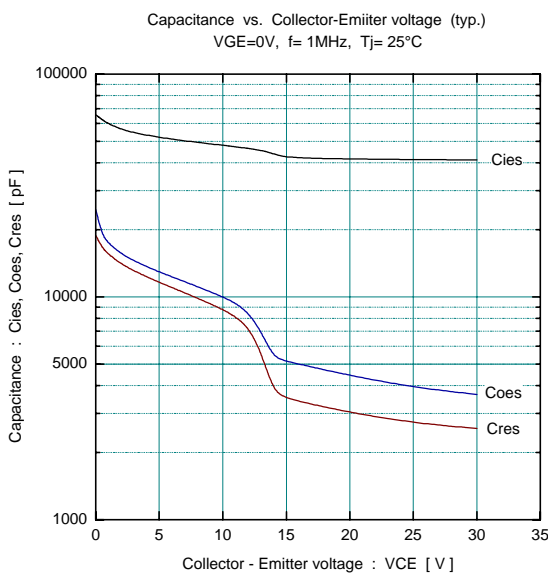
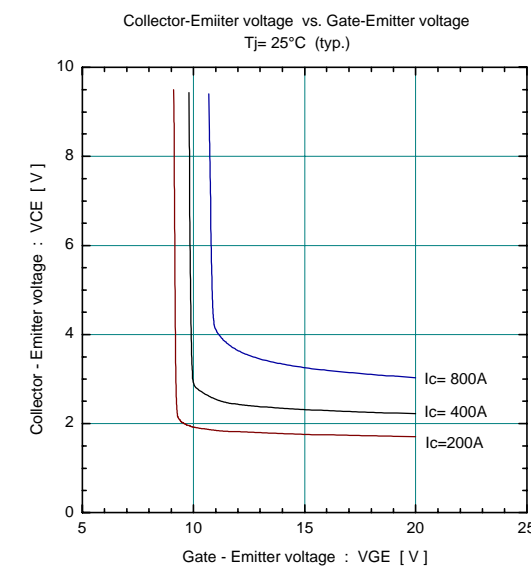
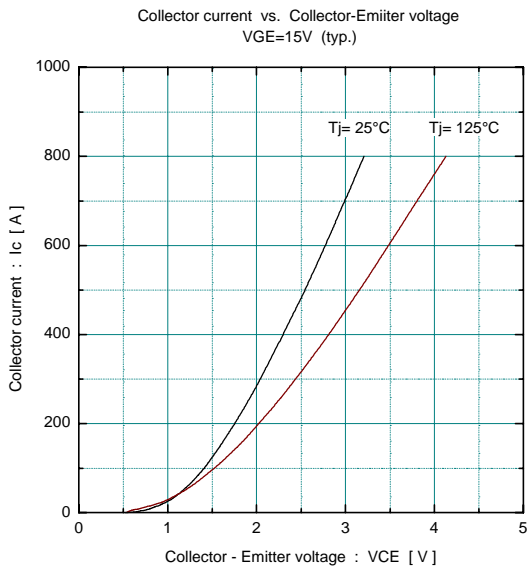
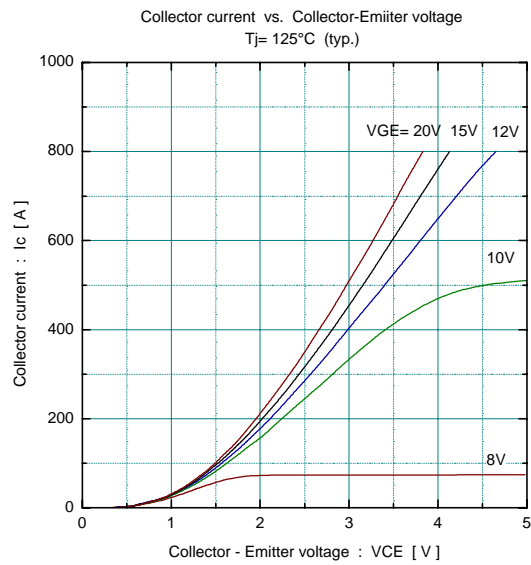
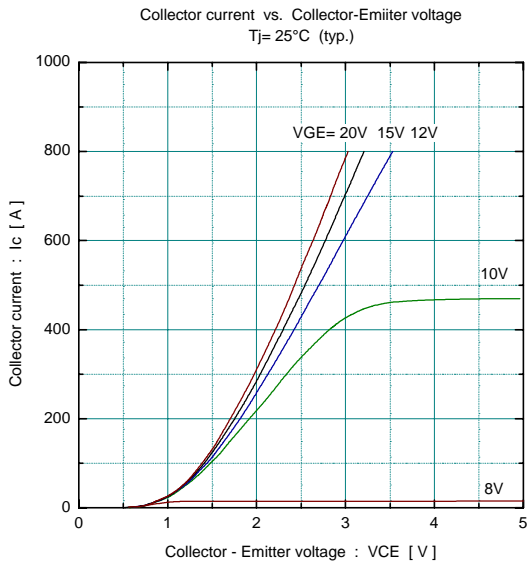
\*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound

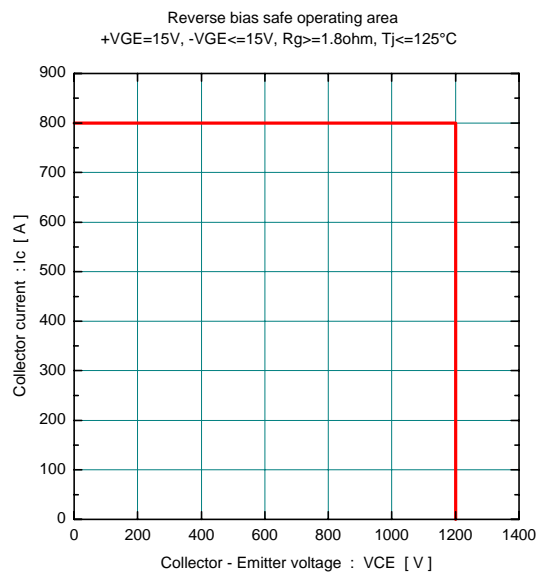
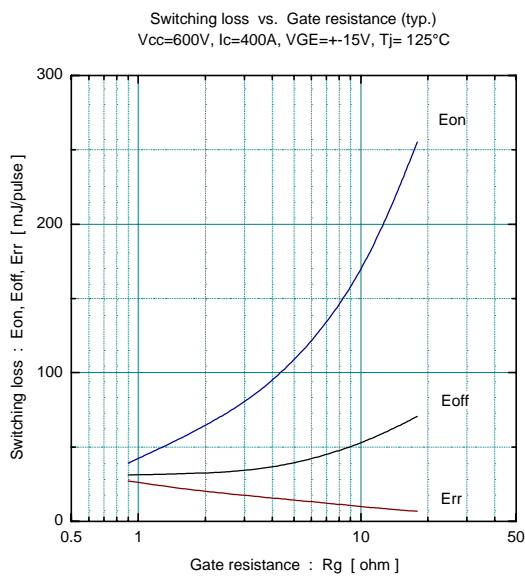
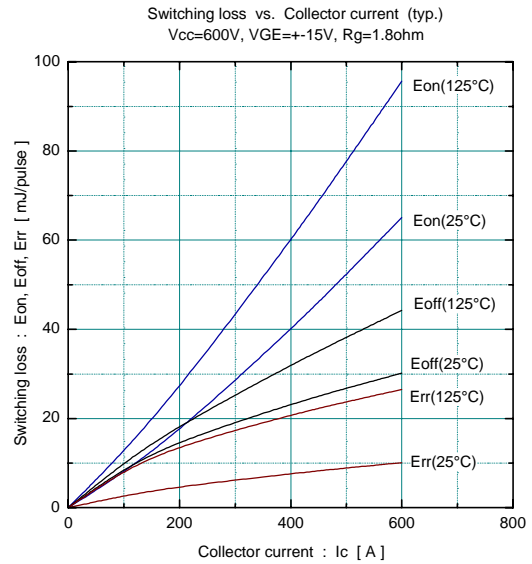
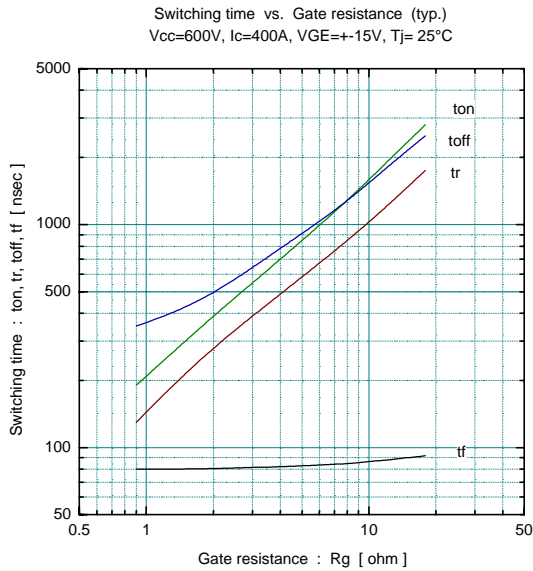
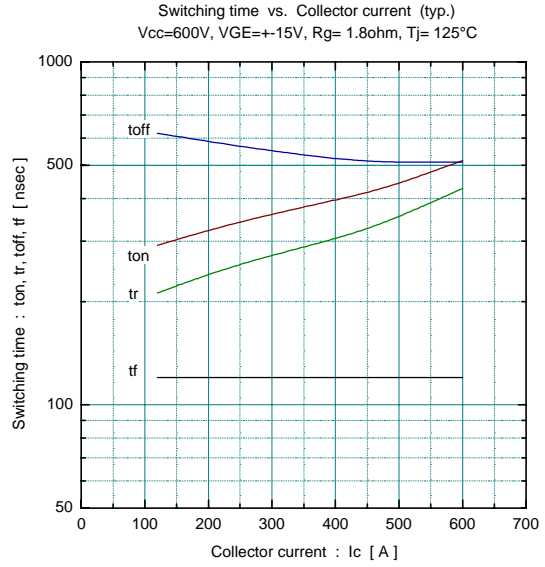
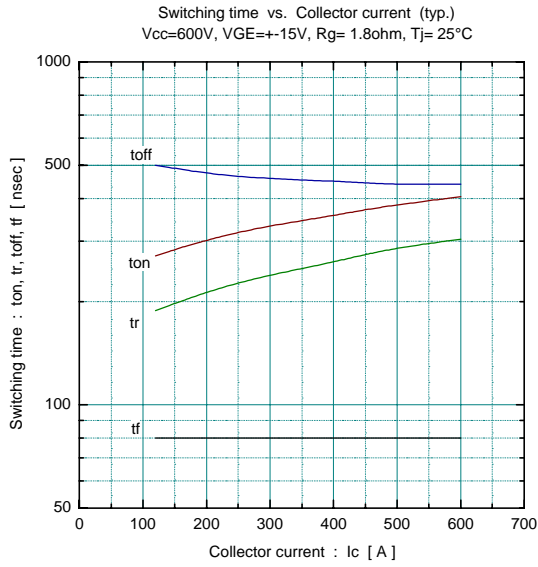


### ■ Equivalent Circuit Schematic

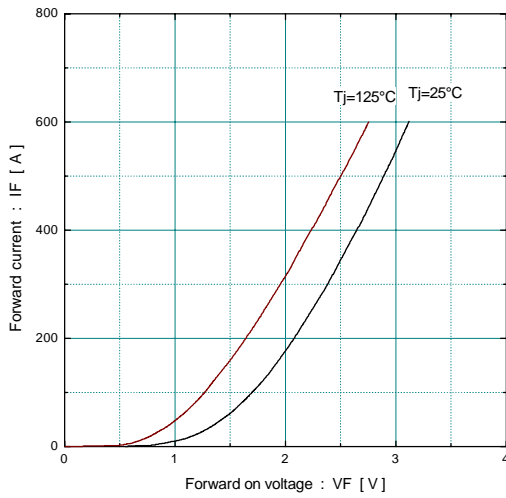


Characteristics

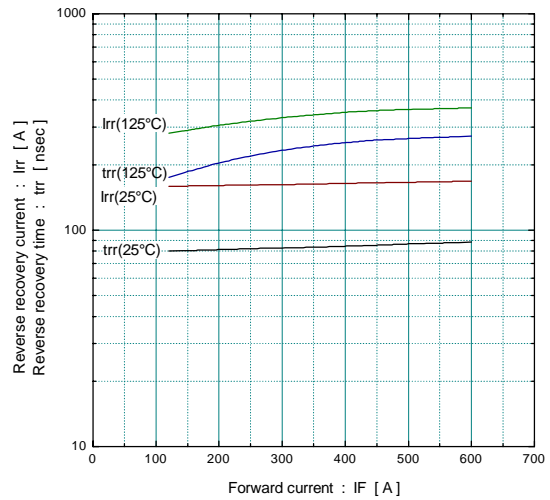




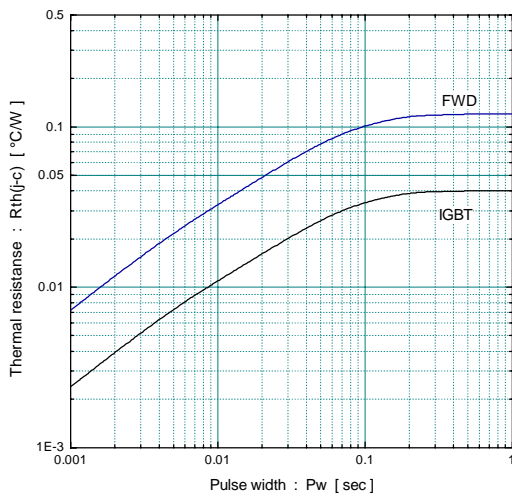
Forward current vs. Forward on voltage (typ.)



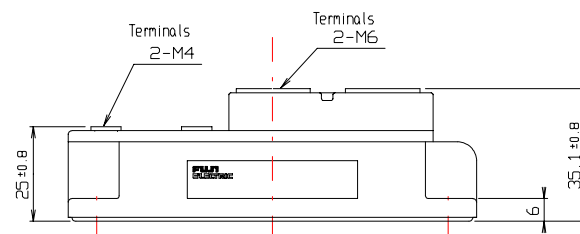
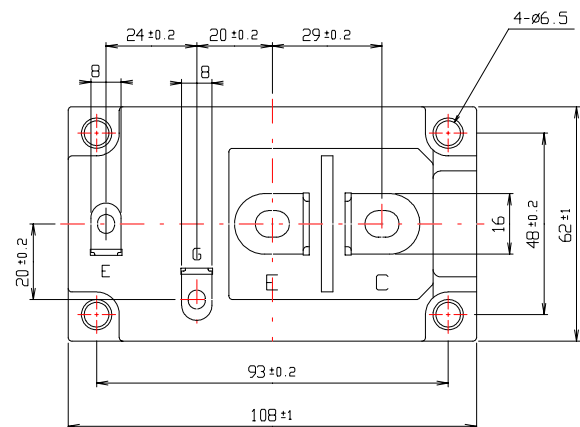
Reverse recovery characteristics (typ.)  
Vcc=600V, VGE=+15V, Rg=1.8ohm



Transient thermal resistance



■ Outline Drawings, mm



mass : 380g