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

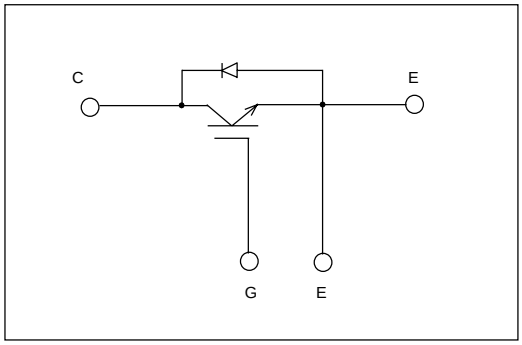
■ Maximum ratings and characteristics

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

Item			Symbol	Rating	Unit
Collector-Emitter voltage			V_{CES}	1200	V
Gate-Emitter voltaga			V_{GES}	±20	V
Collector current	Continuous	Tc=25°C	I_C	600	A
		Tc=80°C		400	A
	1ms	Tc=25°C	IC pulse	1200	A
		Tc=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	℃
Storage temperature			T_{stg}	-40 to +125	℃
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 : Aii 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)

■ Equivalent Circuit Schematic



● 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}	–	–	0.8	V_{CE}=0V, V_{GE}=±20V		μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	5.5	7.2	8.5	V_{CE}=20V, I_C=400mA		V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	–	2.3	2.6	Tc=25° C	V_{GE}=15V, I_C=400A	V
		–	2.8	–	Tc=125°C		
Input capacitance	C_{ies}	–	48000	–	V_{GE}=0V		pF
Output capacitance	C_{oes}	–	10000	–	V_{CE}=10V		
Reverse transfer capacitance	C_{res}	–	8800	–	f=1MHz		
Turn-on time	t_{on}	–	0.35	1.2	V_{CC}=600V		μs
	t_r	–	0.25	0.6	I_C=400A		
	$t_{r(i)}$	–	0.1	–	V_{GE}=±15V		
Turn-off time	t_{off}	–	0.45	1.0	R_G=1.8 ohm		
	t_f	–	0.08	0.3			
Forward on voltage	V_F	–	2.7	3.5	Tj=25°C	I_F=400A, V_{GE}=0V	V
		–	2.4	–	Tj=125°C		
Reverse recovery time	t_{rr}	–	–	0.35	I_F=400A		μs

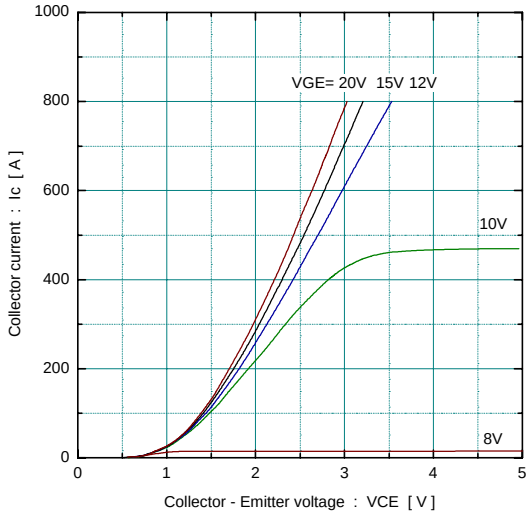
● Thermal resistance characteristics

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

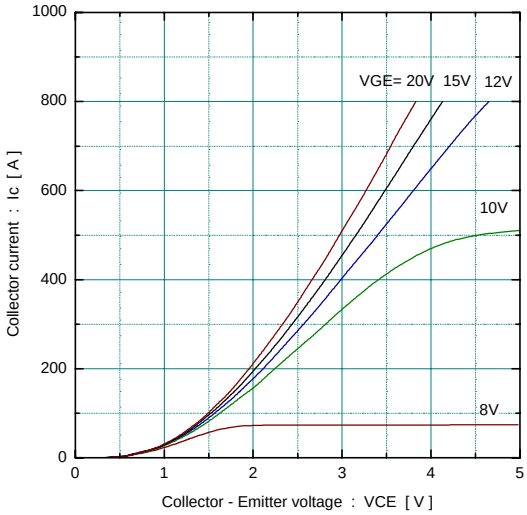
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound

Characteristics

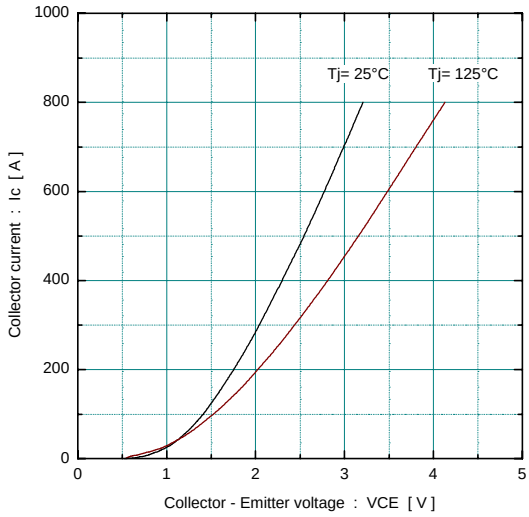
Collector current vs. Collector-Emiiter voltage
Tj= 25°C (typ.)



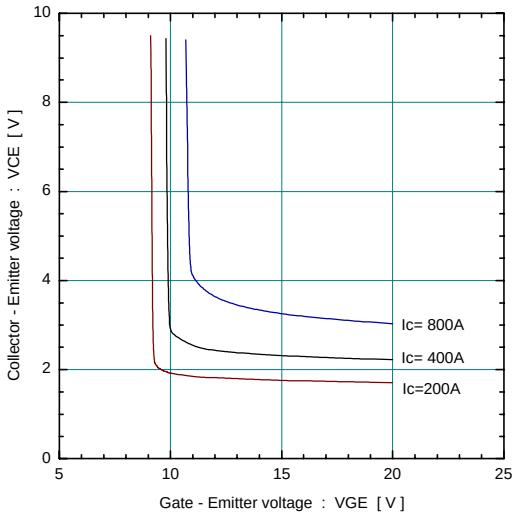
Collector current vs. Collector-Emiiter voltage
Tj= 125°C (typ.)



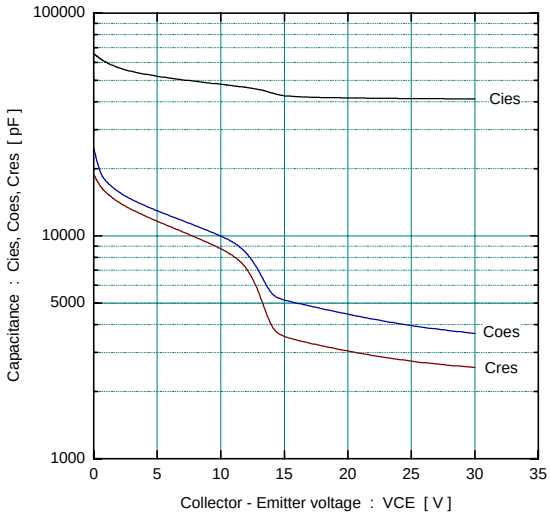
Collector current vs. Collector-Emiiter voltage
VGE=15V (typ.)



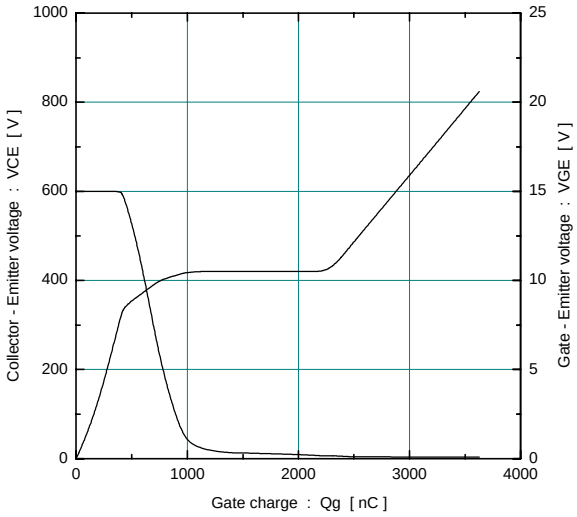
Collector-Emiiter voltage vs. Gate-Emitter voltage
Tj= 25°C (typ.)



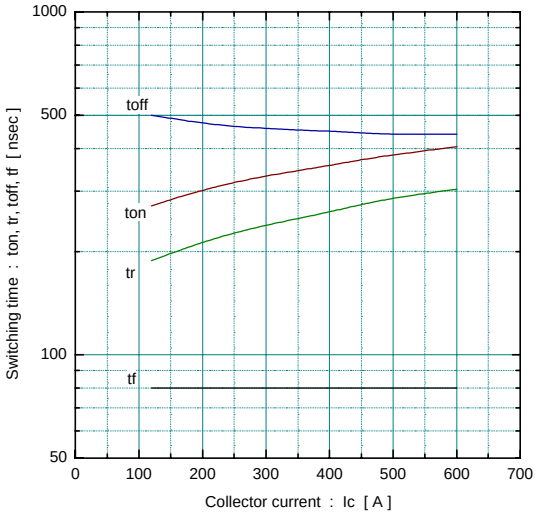
Capacitance vs. Collector-Emiiter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



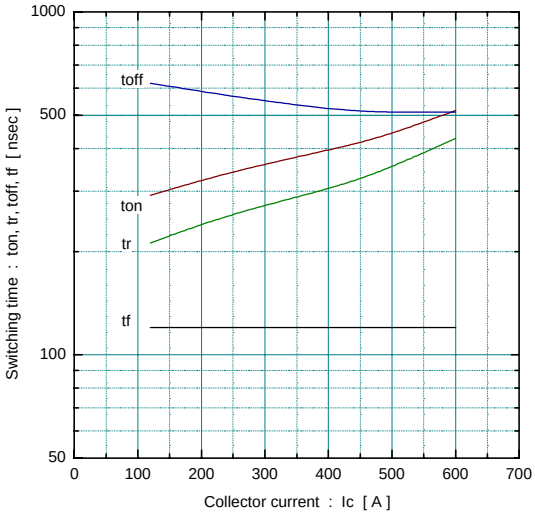
Dynamic Gate charge (typ.)
Vcc=600V, Ic=400A, Tj= 25°C



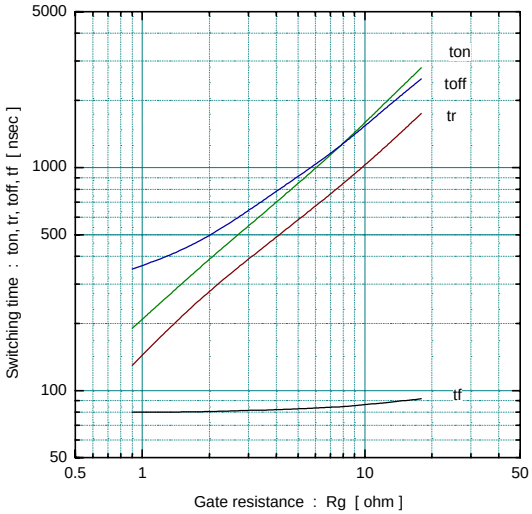
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=+-15V, Rg= 1.8ohm, Tj= 25°C



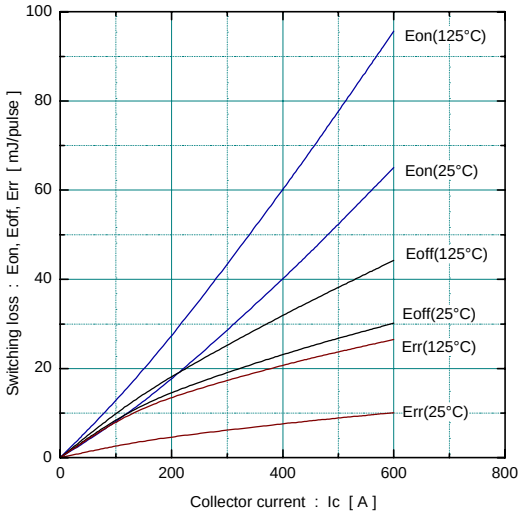
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=+-15V, Rg= 1.8ohm, Tj= 125°C



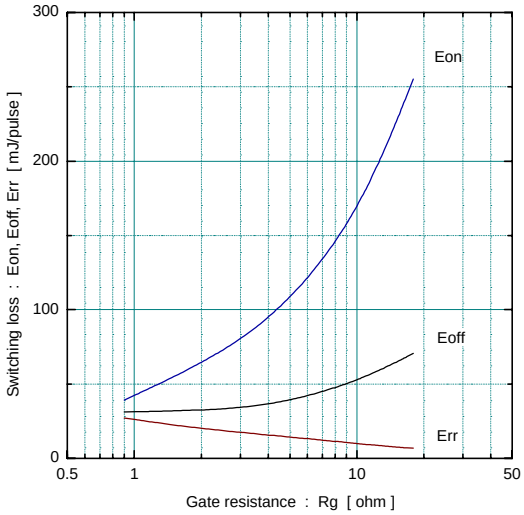
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=400A, VGE=+-15V, Tj= 25°C



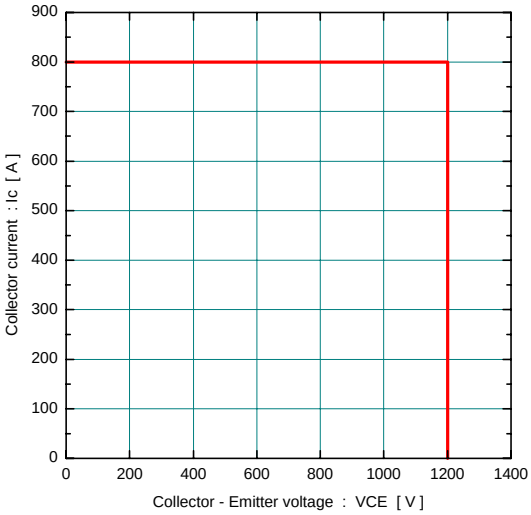
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=+-15V, Rg=1.8ohm



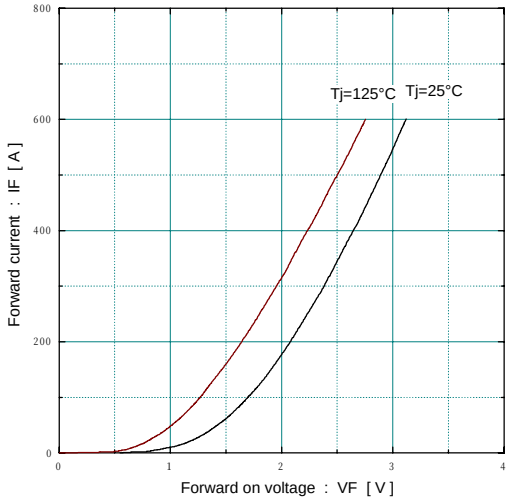
Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=400A, VGE=+-15V, Tj= 125°C



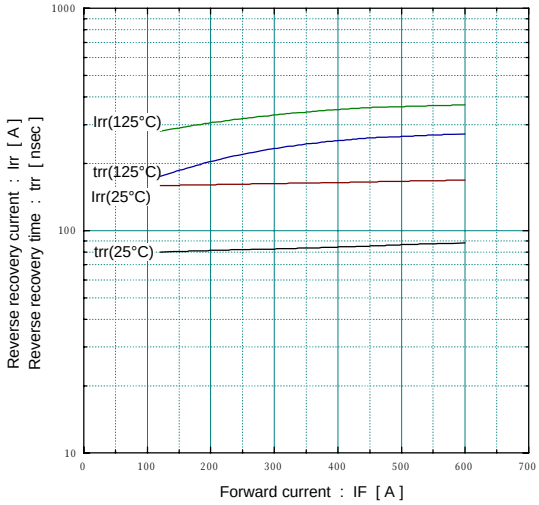
Reverse bias safe operating area
+VGE=15V, -VGE<=15V, Rg>=1.8ohm, Tj<=125°C



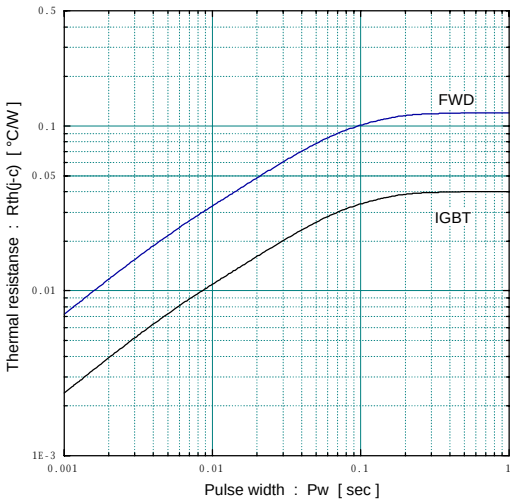
Forward current vs. Forward on voltage (typ.)



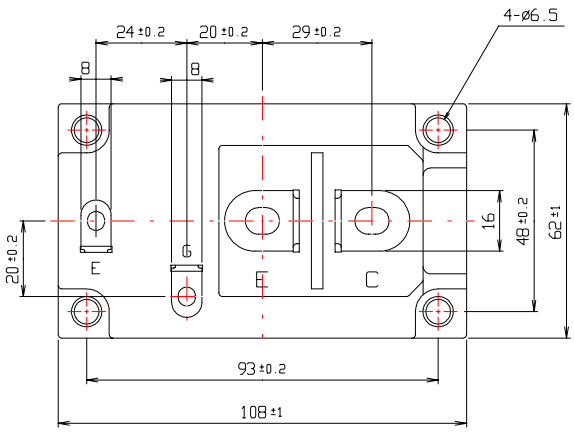
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=+-15V, Rg=1.8ohm

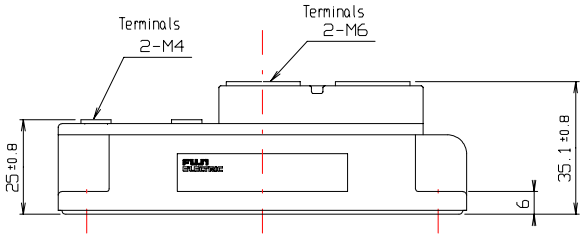


Transient thermal resistance



■ Outline Drawings, mm





mass : 380g