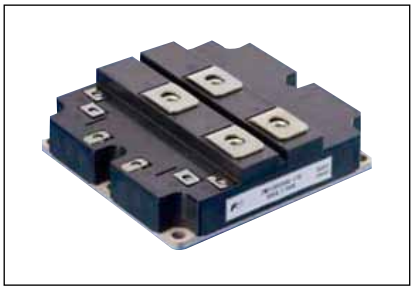
2MBI1200U4G-120

IGBT Modules

IGBT MODULE (U series)
1200V / 1200A / 2 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)**

Items		Symbols	Conditions		Maximum ratings	Units
Collector-Emitter voltage		V_{CES}			1200	V
Gate-Emitter voltage		V_{GES}			±20	V
Collector current		Ic	Continuous	Tc=25°C	1600	A
				Tc=80°C	1200	
		Ic pulse	1ms	Tc=25°C	3200	
				Tc=80°C	2400	
		-Ic			1200	
		-Ic pulse	1ms		2400	
Collector power dissipation		Pc	1 device		6250	W
Junction temperature		Tj			150	°C
Storage temperature		Tstg			-40 ~ +125	
Isolation voltage	Between terminal and copper base (*1)	V_{iso}	AC : 1min.		4000	VAC
Screw torque	Mounting (*2)	M6			5.75	N m
	Terminals (*3)	M8			10	
		M4			2.5	

Note *1: All terminals should be connected together when isolation test will be done.
Note *2: Recommendable Value : Mounting 4.25~5.75 Nm (M6)
Note *3: Recommendable Value : Main Terminals 8~10 Nm (M8)
Sense Terminals 1.7~2.5 Nm (M4)

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

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE} = 1200V		-	-	1.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V		-	-	1600	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE} = 20V, I_C = 1200mA		5.5	6.5	7.5	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (main terminal)	V_{GE} = 15V, I_C = 1200A	Tj=25°C	-	2.22	2.41	V
			Tj=125°C	-	2.42	-	
	$V_{CE(sat)}$ (chip)		Tj=25°C	-	1.90	2.05	
			Tj=125°C	-	2.10	-	
Input capacitance	Cies	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		-	135	-	nF
Turn-on	ton	V_{CC} = 600V, I_C = 1200A, V_{GE} = ±15V, Tj = 125ºC	R_{Gon} = 3.3Ω	-	1.35	-	µs
	tr		R_{Goff} = 0.82Ω	-	0.65	-	
Turn-off	toff			-	0.80	-	
	tf			-	0.20	-	
Forward on voltage	V_F (main terminal)	V_{GE} = 0V, I_F = 1200A	Tj=25°C	-	1.97	2.16	V
			Tj=125°C	-	2.07	-	
	V_F (chip)		Tj=25°C	-	1.65	1.80	
			Tj=125°C	-	1.75	-	
Reverse recovery	trr	I_F = 1200A		-	0.45	-	µs
Lead resistance, terminal-chip	R lead			-	0.27	3450	mΩ

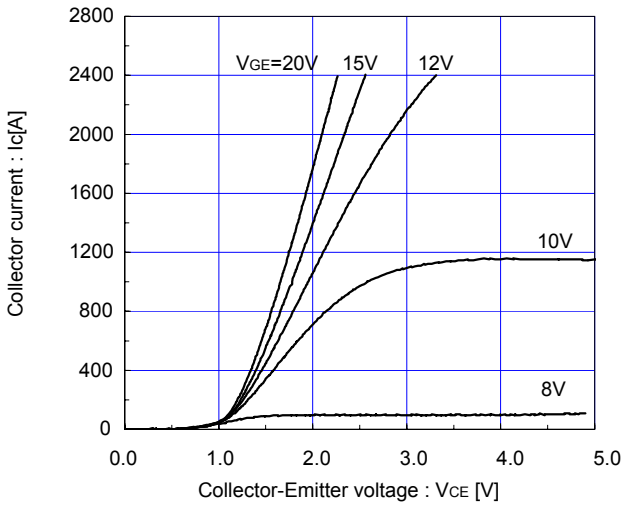
● **Thermal resistance characteristics**

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	Rth(j-c)	IGBT	-	-	0.020	°C/W
		FWD	-	-	0.033	
Contact thermal resistance (1device)	Rth(c-f)	with Thermal Compound (*4)	-	0.006	-	

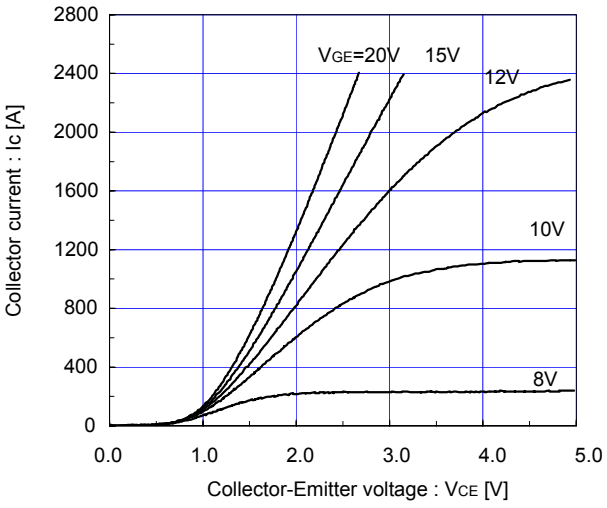
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

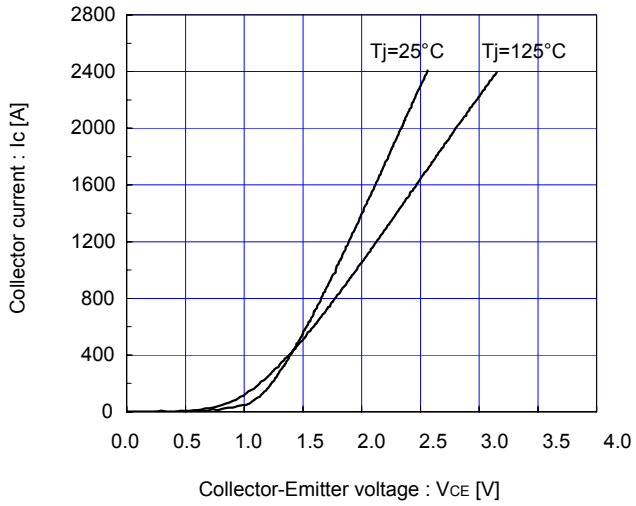
Collector current vs. Collector-Emitter voltage (typ.)
Tj=25ºC,chip



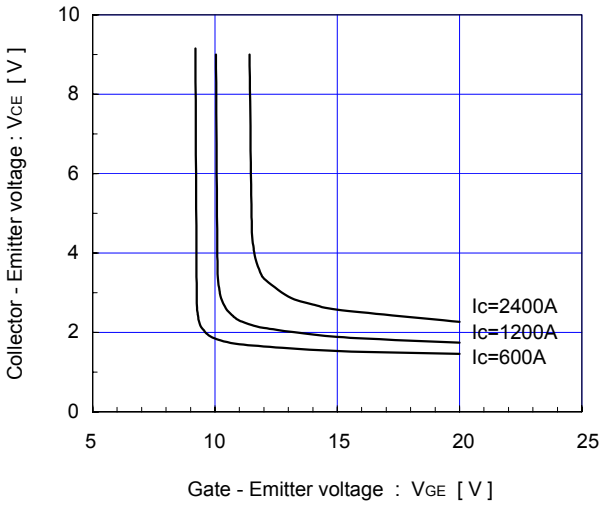
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C, chip



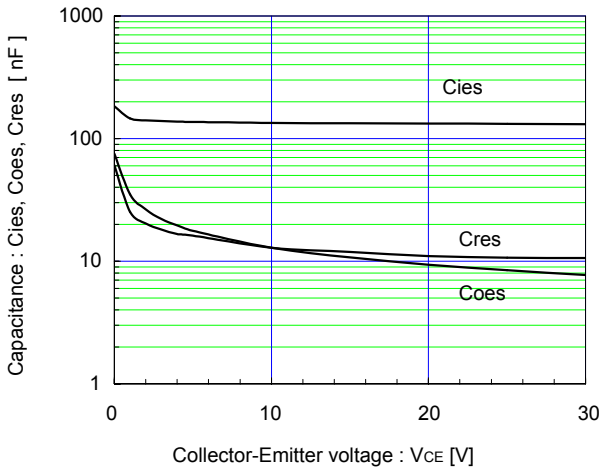
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
VGE=+15V,chip



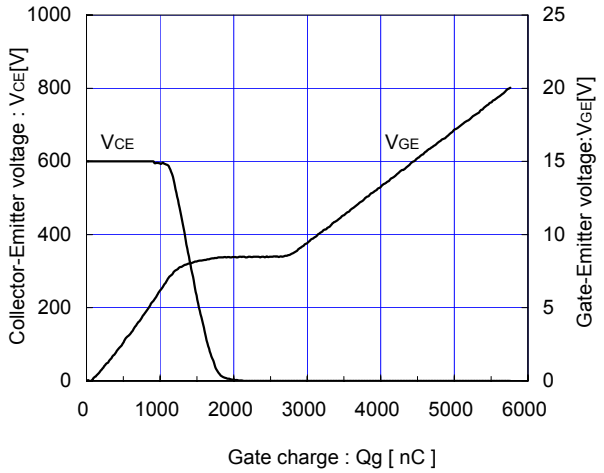
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25ºC,chip



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

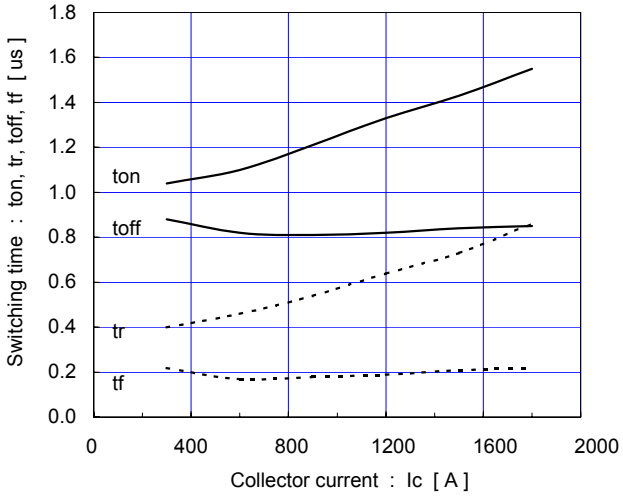


Dynamic Gate charge (typ.)
VCC=600V, IC=1200A, Tj= 25°C



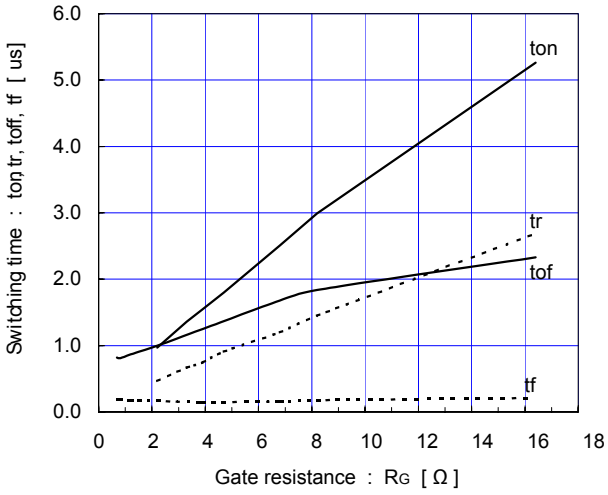
Switching time vs. Collector current (typ.)

Vcc=600V, VGE=±15V, RGon=3.3Ω, RGoff=0.82Ω, Tj= 125°C



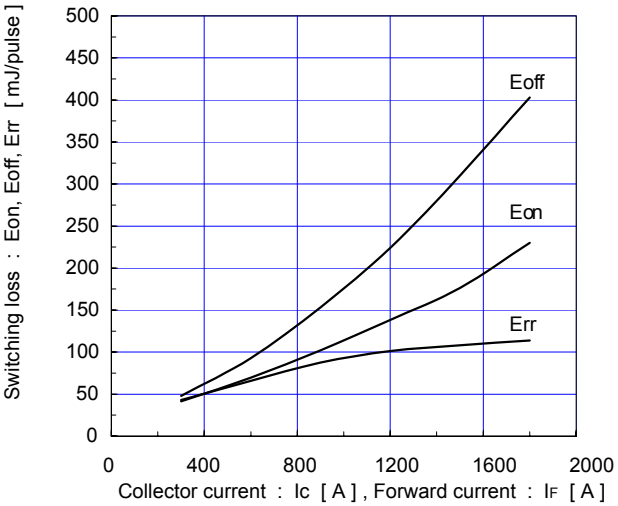
Switching time vs. Gate resistance (typ.)

Vcc=600V, Ic=1200A,VGE=±15V, Tj= 125°C



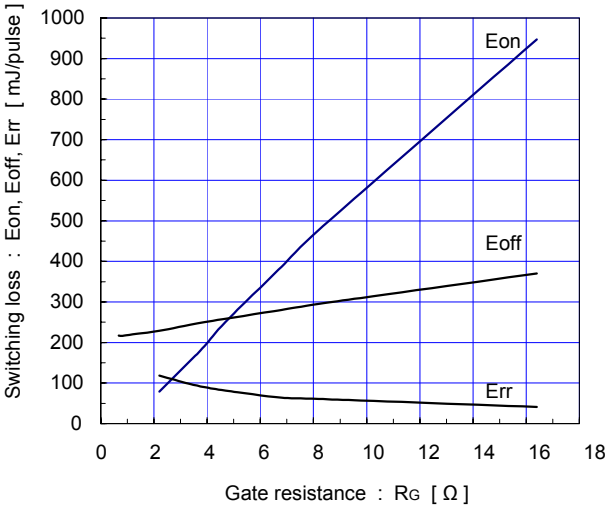
Switching loss vs. Collector current (typ.)

Vcc=600V, VGE=±15V, RGon=3.3Ω, RGoff=0.82Ω, Tj= 125°C



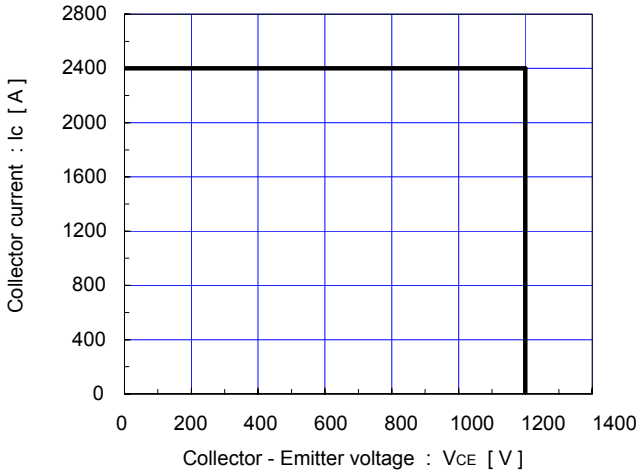
Switching loss vs. Gate resistance (typ.)

Vcc=600V, Ic=1200A,VGE=±15V, Tj= 125°C

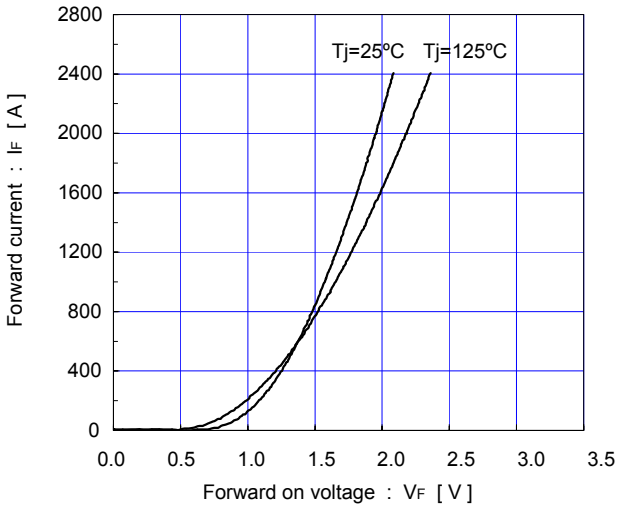


Reverse bias safe operating area (max.)

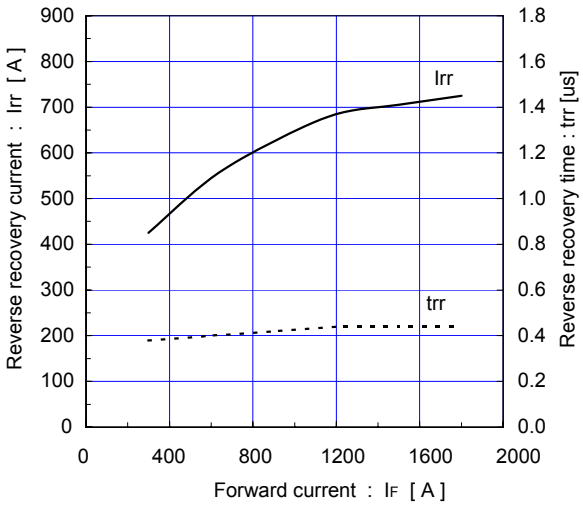
± VGE=15V ,Tj = 125°C / chip



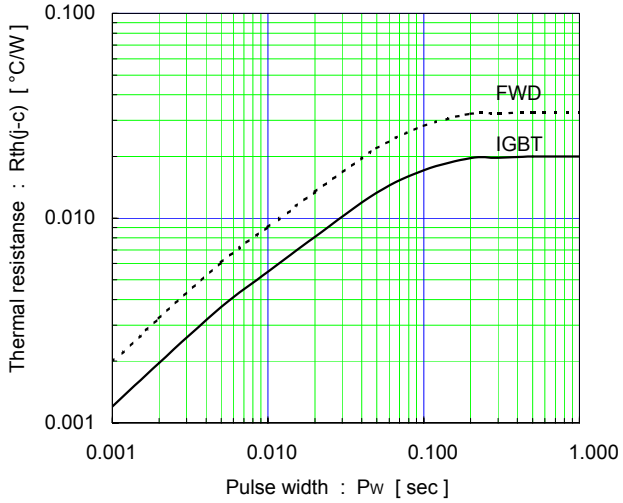
Forward current vs. Forward on voltage (typ.)
chip



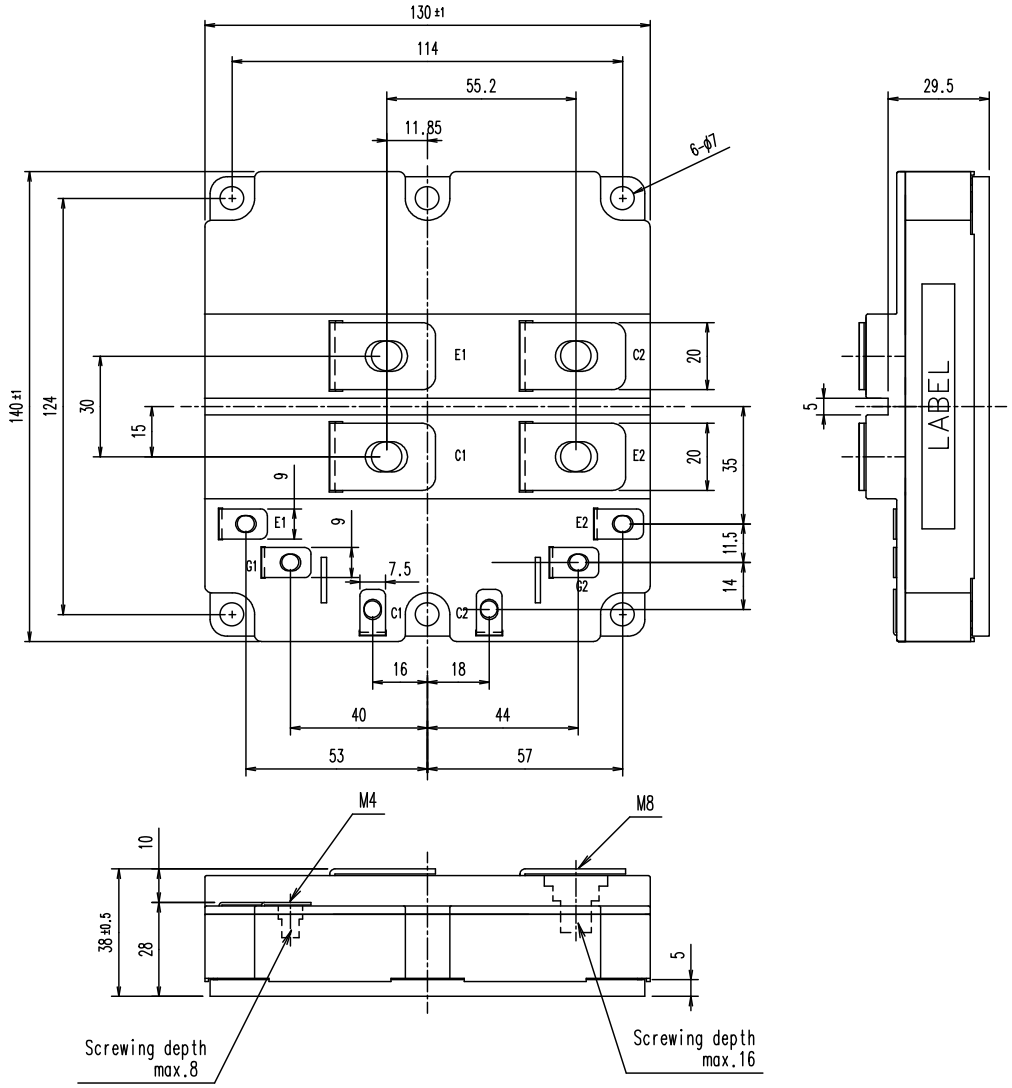
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, RGon=3.3Ω, Tj=125ºC



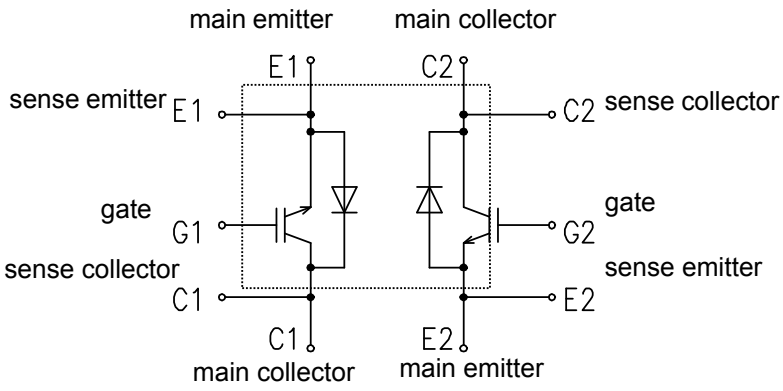
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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- Safety devices
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