

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	I _C	Continuous	Tc=25°C 1600 Tc=80°C 1200	A
	I _C pulse	1ms	Tc=25°C 3200 Tc=80°C 2400	
	-I _C		1200	
	-I _C pulse	1ms	2400	
	P _C	1 device	6250	
Collector power dissipation	P _C		6250	W
Junction temperature	T _J		150	°C
Storage temperature	T _{stg}		-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			Units
			min.	typ.	max.	
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
	V _{CE(sat)} (chip)		Tj=125°C	2.42	-	
			Tj=25°C	1.90	2.05	
			Tj=125°C	2.10	-	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	135	-	nF
Turn-on	ton	V _{CC} = 600V I _C = 1200A R _{gon} = 3.3Ω R _{goff} = 0.82Ω	-	1.35	-	μs
	tr		-	0.65	-	
Turn-off	toff	V _{GE} = ±15V Tj = 125°C	-	0.80	-	μs
	tf		-	0.20	-	
Forward on voltage	V _F (main terminal)	V _{GE} = 0V I _F = 1200A	Tj=25°C	1.97	2.16	V
	V _F (chip)		Tj=125°C	2.07	-	
			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

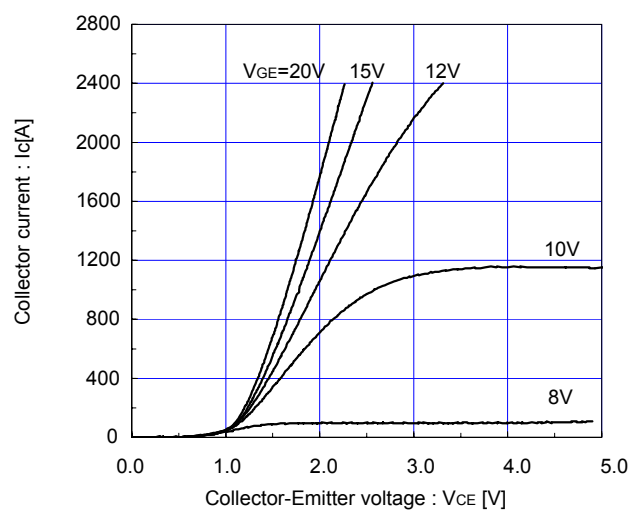
● Thermal resistance characteristics

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

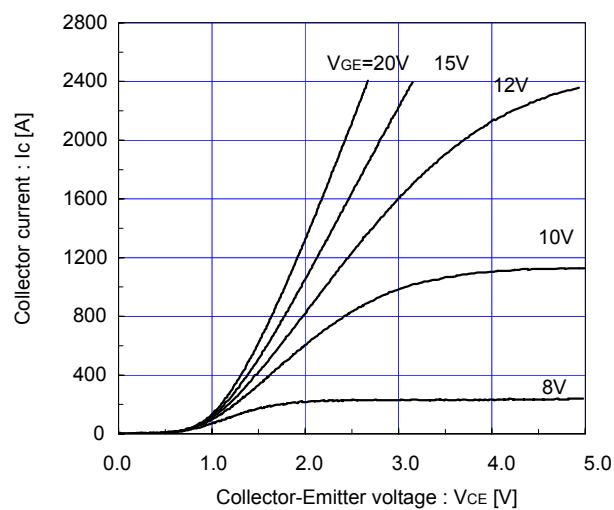
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

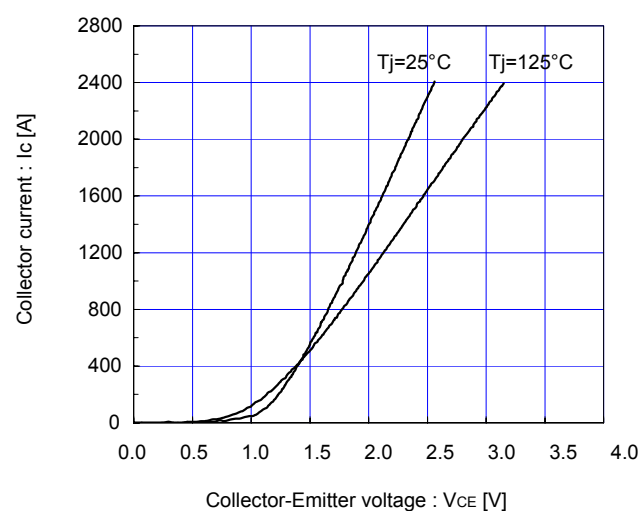
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$, chip



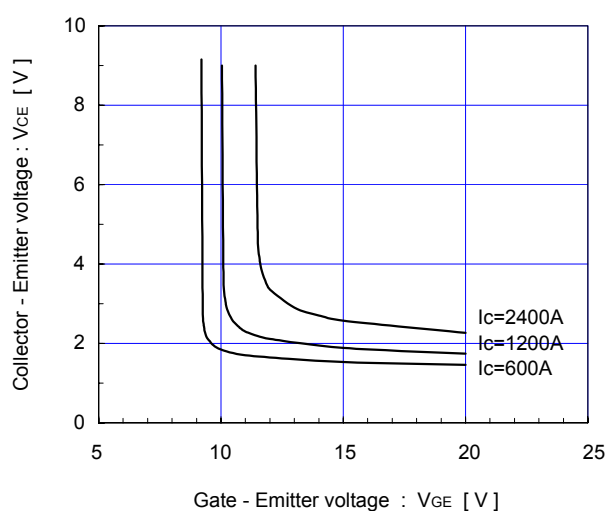
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 125^\circ\text{C}$, chip



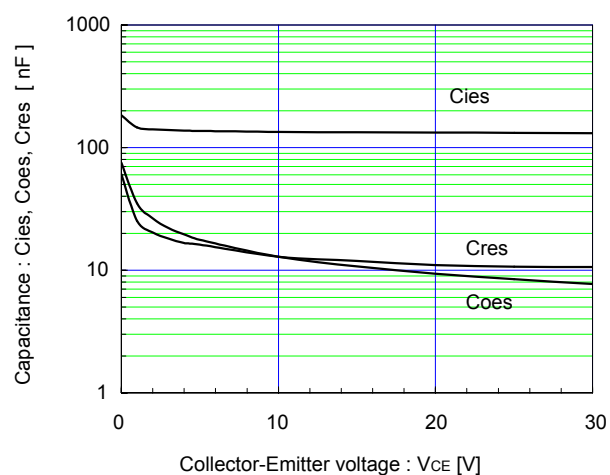
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $V_{GE} = +15\text{V}$, chip



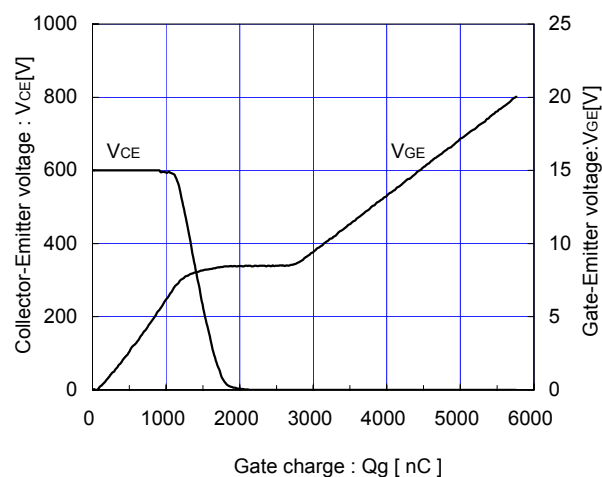
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$, chip



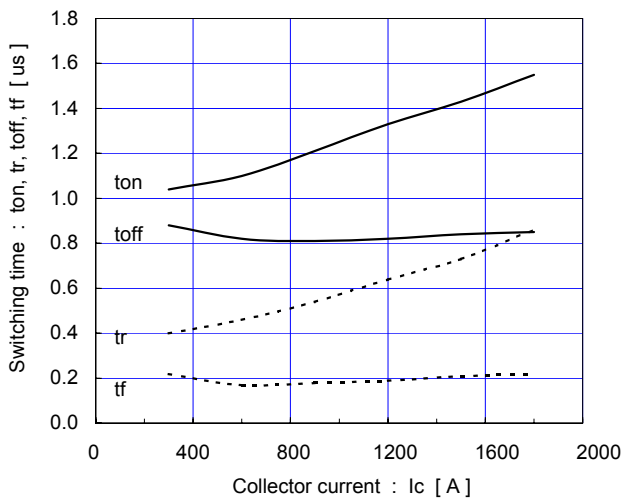
Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



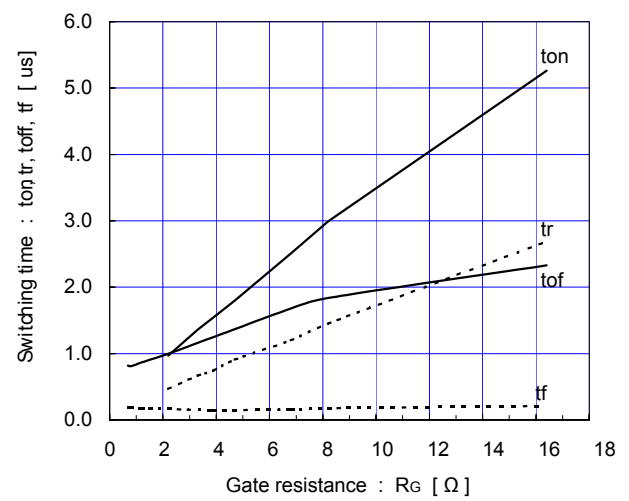
Dynamic Gate charge (typ.)
 $V_{CC} = 600\text{V}$, $I_C = 1200\text{A}$, $T_j = 25^\circ\text{C}$



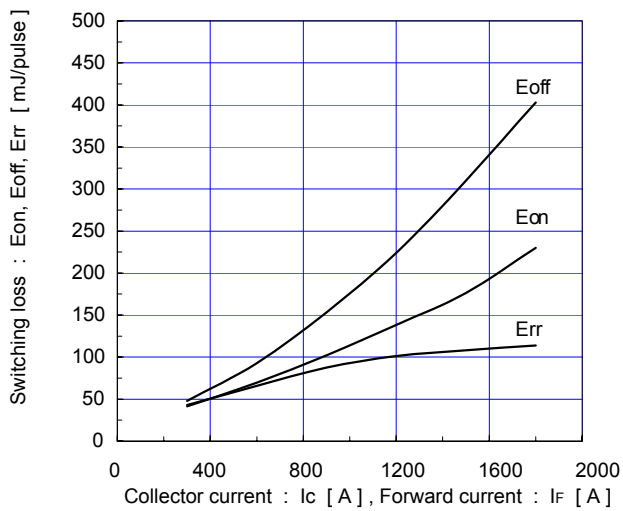
Switching time vs. Collector current (typ.)

 $V_{CC}=600V, V_{GE}=\pm 15V, R_{Gon}=3.3\Omega, R_{Goff}=0.82\Omega, T_J=125^\circ C$ 

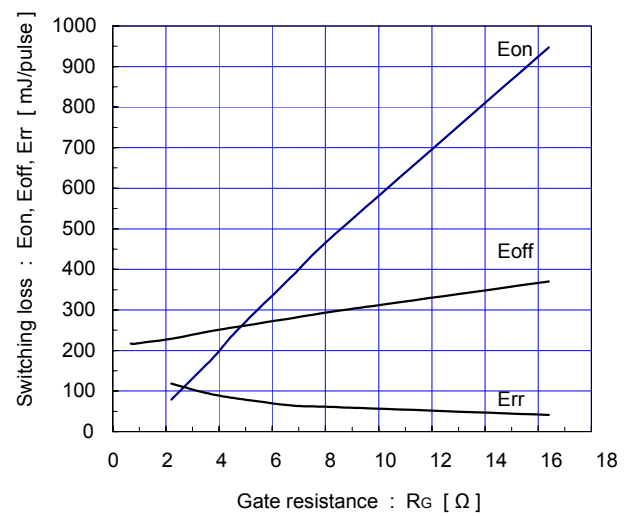
Switching time vs. Gate resistance (typ.)

 $V_{CC}=600V, I_C=1200A, V_{GE}=\pm 15V, T_J=125^\circ C$ 

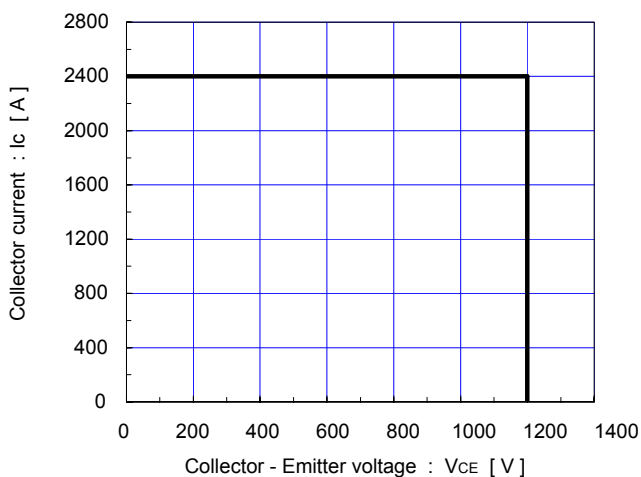
Switching loss vs. Collector current (typ.)

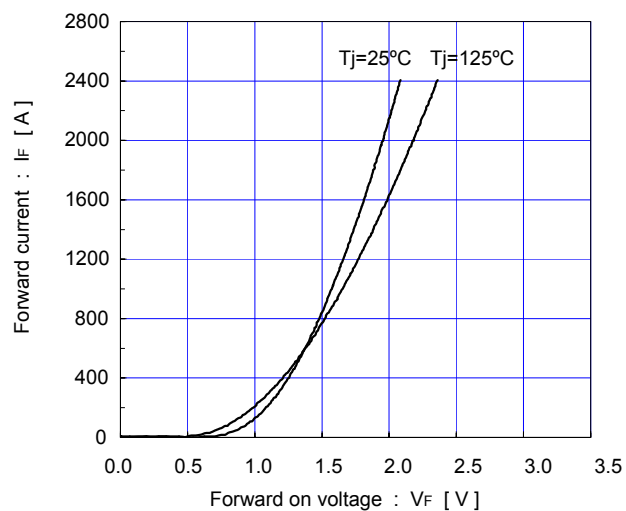
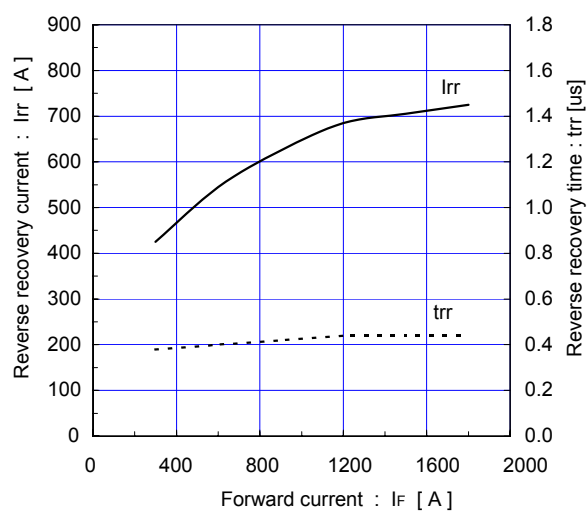
 $V_{CC}=600V, V_{GE}=\pm 15V, R_{Gon}=3.3\Omega, R_{Goff}=0.82\Omega, T_J=125^\circ C$ 

Switching loss vs. Gate resistance (typ.)

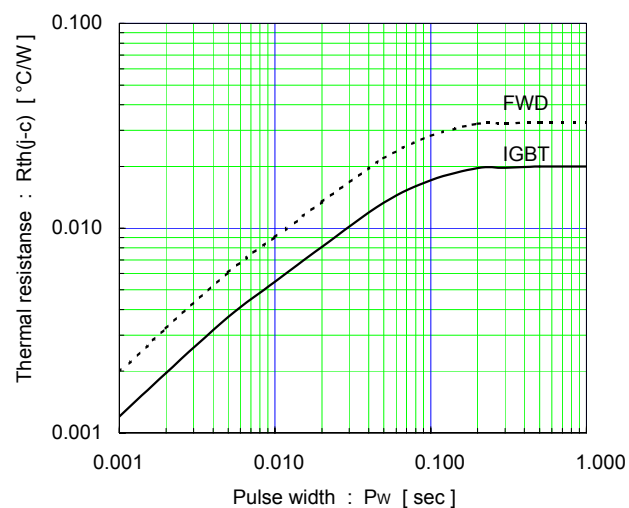
 $V_{CC}=600V, I_C=1200A, V_{GE}=\pm 15V, T_J=125^\circ C$ 

Reverse bias safe operating area (max.)

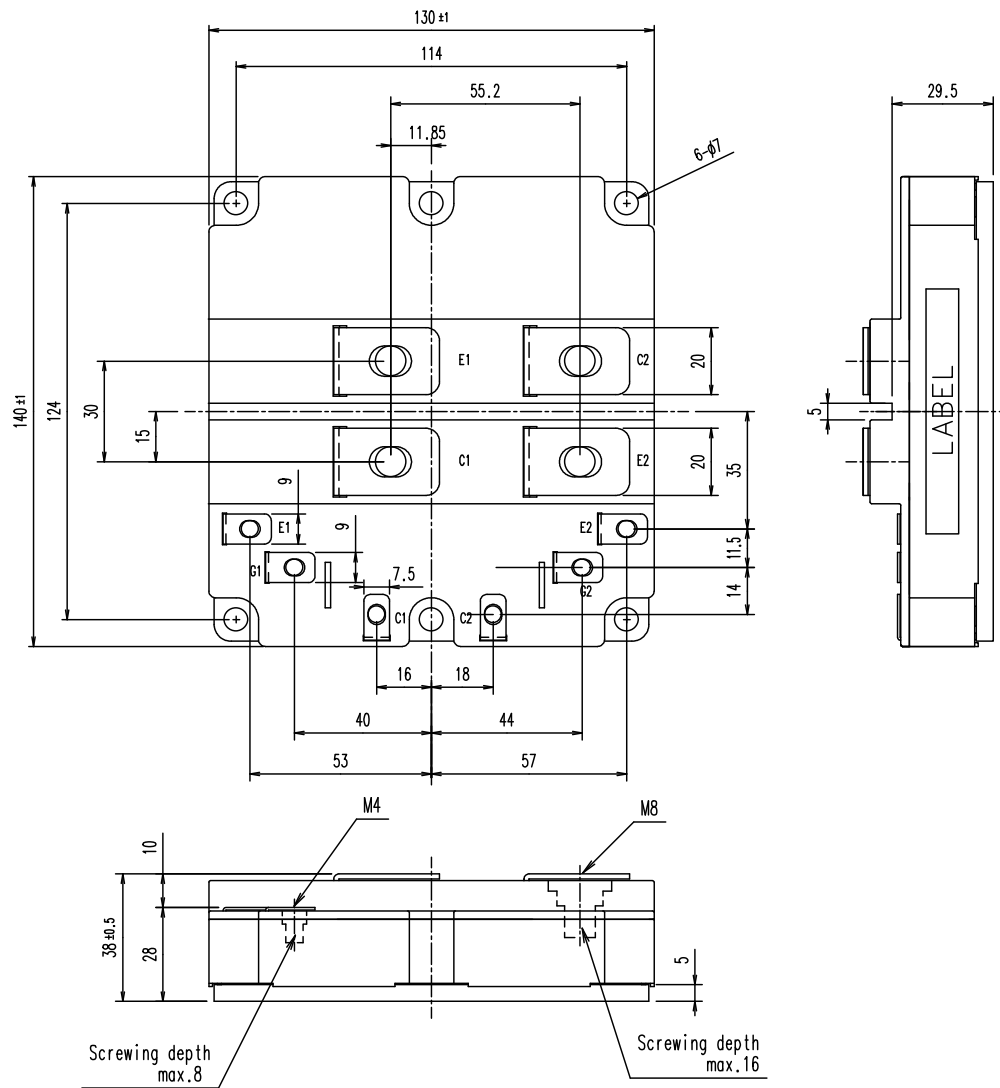
 $\pm V_{GE}=15V, T_J=125^\circ C / \text{chip}$ 

Forward current vs. Forward on voltage (typ.)
chipReverse recovery characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_{Gon}=3.3\Omega$, $T_J=125^\circ\text{C}$ 

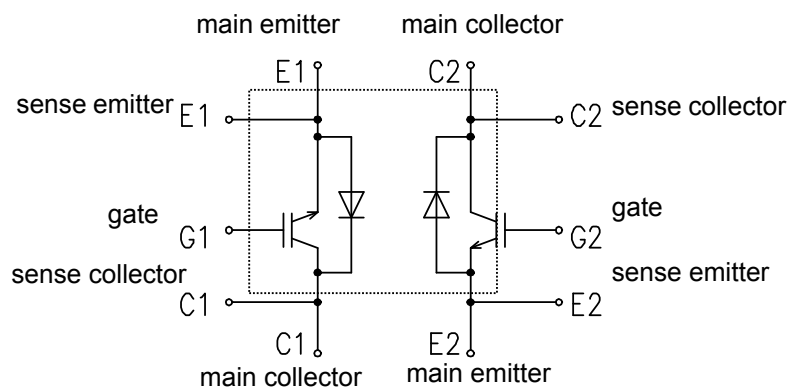
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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