

2MBI1200U4G-170

IGBT MODULE (U series) 1700V / 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}		1700	V	
Gate-Emitter voltage	V _{GES}		±20	V	
Collector current	I _c	Continuous	Tc=25°C Tc=80°C	1600 1200	A
	I _{cp}	1ms	Tc=25°C Tc=80°C	3200 2400	
	-I _c			1200	
	-I _c pulse	1ms		2400	
	Collector power dissipation	P _c	1 device	6250	
Junction temperature	T _j		150	°C	
Storage temperature	T _{stg}		-40 to +125		
Isolation voltage between terminal and copper base (*1)	V _{iso}	AC : 1min.	3400	VAC	
Screw torque (*2)	Mounting		5.75	N m	
	Main Terminals		10		
	Sense Terminals		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), 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} = 1700V	-	-	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	-	2.57	2.76	V
			Tj=125°C	-	2.97	-	
	V _{CE(sat)} (chip)		Tj=25°C	-	2.25	2.40	
			Tj=125°C	-	2.65	-	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	112	-	nF	
Turn-on time	ton	V _{CC} = 900V, I _c = 1200A, V _{GE} = ±15V, Tj = 125°C, R _{gon} = 4.7Ω, R _{goff} = 1.2Ω	-	3.10	-	μs	
	tr		-	1.25	-		
Turn-off time	toff		-	1.45	-		
	tf		-	0.25	-		
Forward on voltage	V _F (main terminal)	V _{GE} = 0V I _F = 1200A	Tj=25°C	-	2.12	2.51	V
			Tj=125°C	-	2.32	-	
	V _F (chip)		Tj=25°C	-	1.80	2.15	
			Tj=125°C	-	2.00	-	
Reverse recovery time	trr	I _F = 1200A	-	0.45	-	μs	
Lead resistance, terminal-chip (*3)	R lead		-	0.27	-	mΩ	

Note *3: Biggest internal terminal resistance among arm.

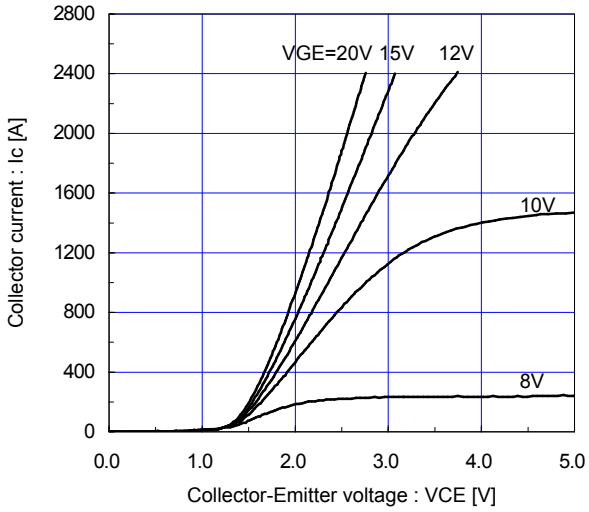
● Thermal resistance characteristics

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

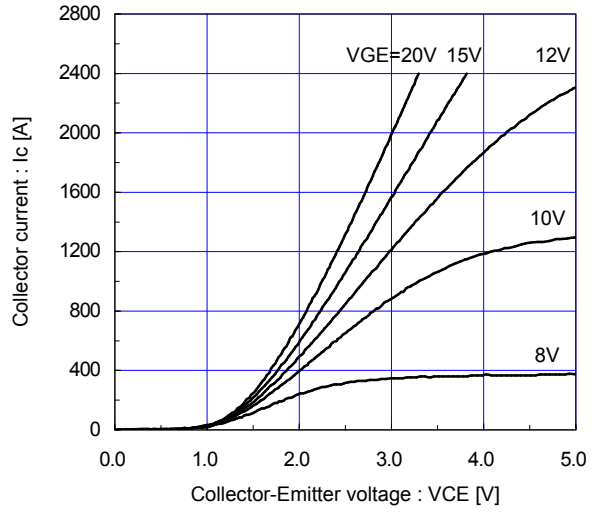
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

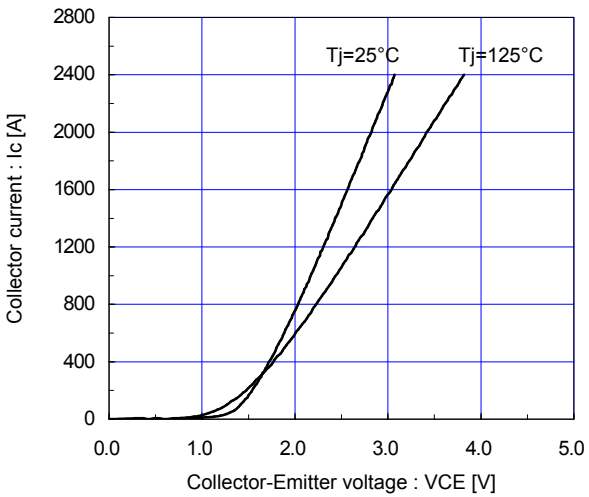
Collector current vs. Collector-Emitter voltage (typ.)
Tj=25°C, chip



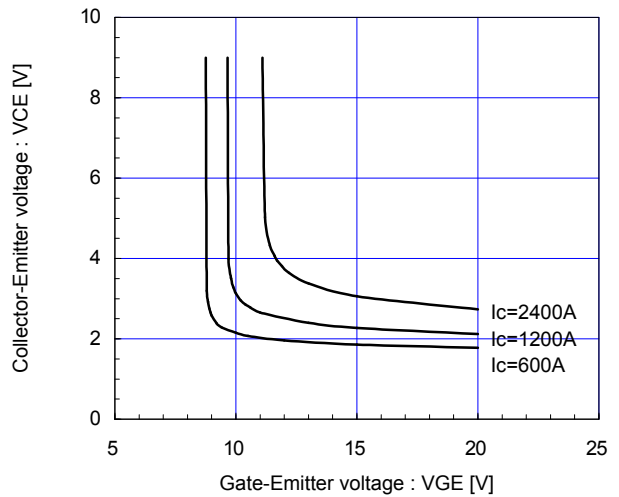
Collector current vs. Collector-Emitter voltage (typ.)
Tj=125°C, chip



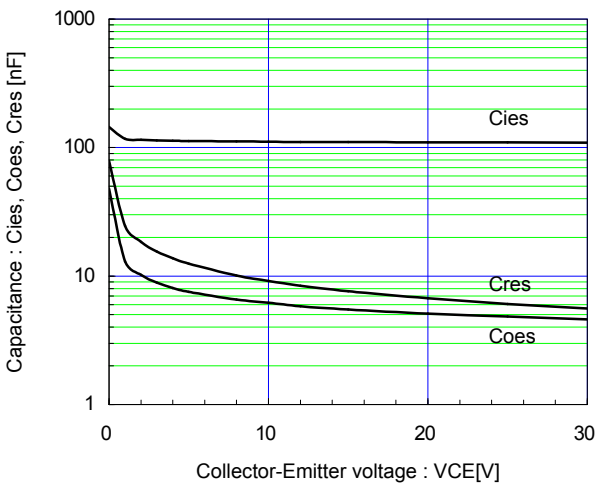
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
VGE=+15V, chip



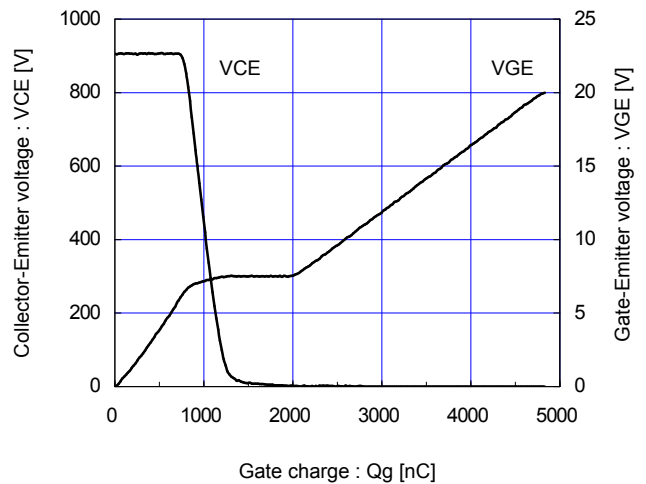
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C, chip



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

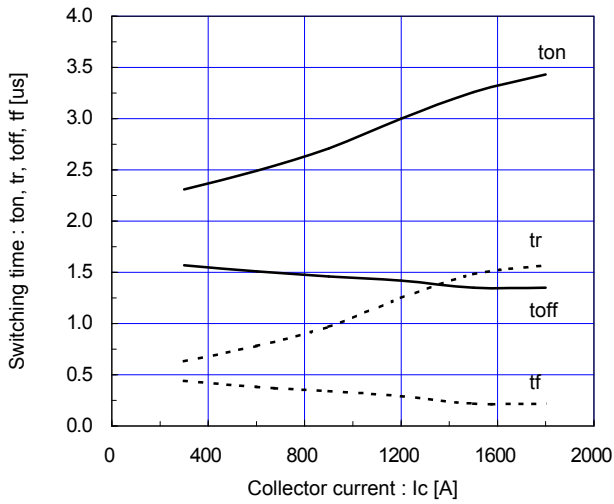


Dynamic Gate charge (typ.)
Tj=25°C



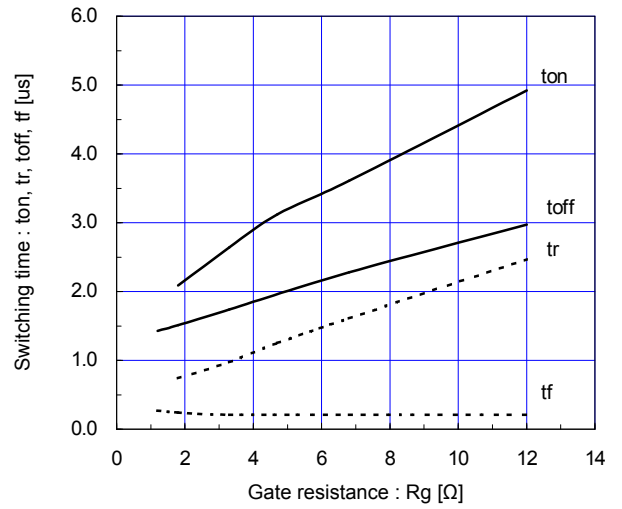
Switching time vs. Collector current (typ.)

V_{cc}=900V, V_{GE}=±15V, R_{gon}=4.7Ω, R_{goff}=1.2Ω, T_j=125°C



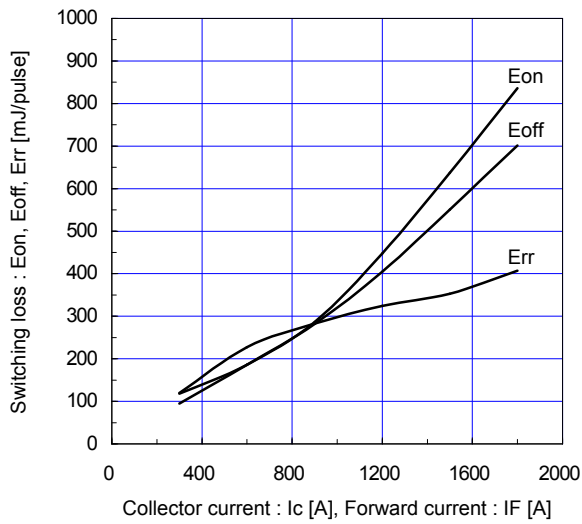
Switching time vs. Gate resistance (typ.)

V_{cc}=900V, I_c=1200A, V_{GE}=±15V, T_j=125°C



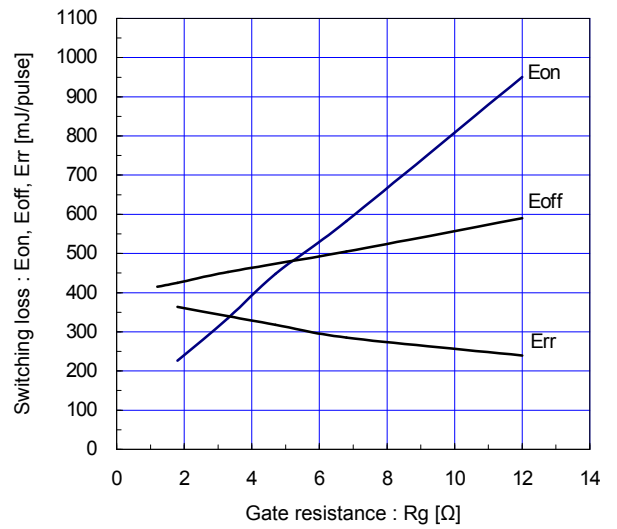
Switching loss vs. Collector current (typ.)

V_{cc}=900V, V_{GE}=±15V, R_{gon}=4.7Ω, R_{goff}=1.2Ω, T_j=125°C



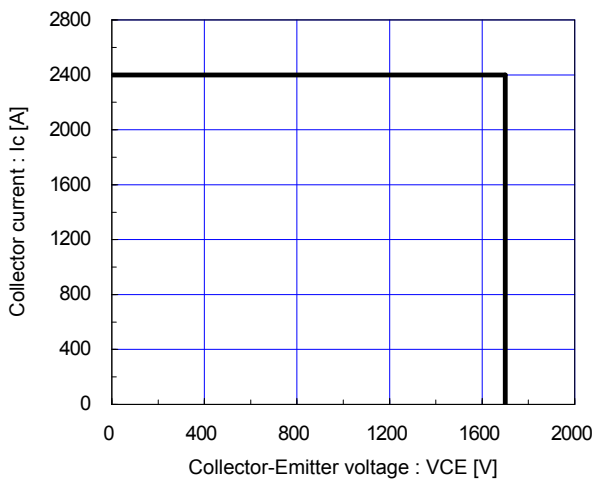
Switching loss vs. Gate resistance (typ.)

V_{cc}=900V, I_c=1200A, V_{GE}=±15V, T_j=125°C

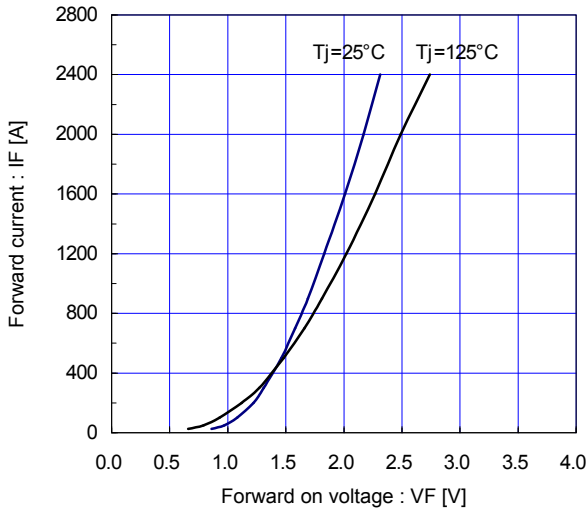


Reverse bias safe operating area (max.)

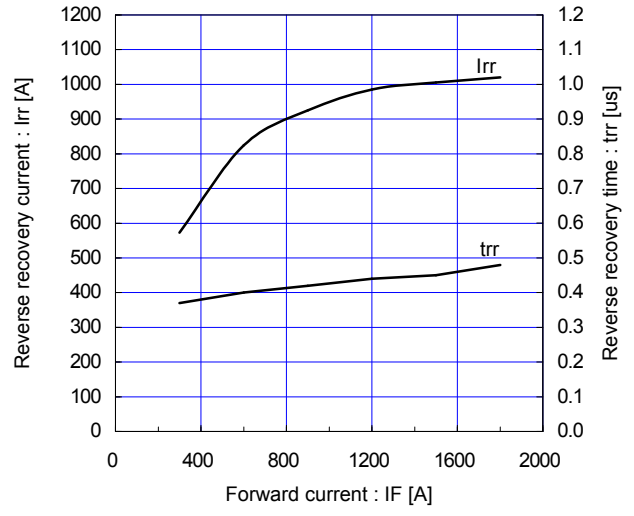
±V_{GE}=15V, T_j=125°C/chip



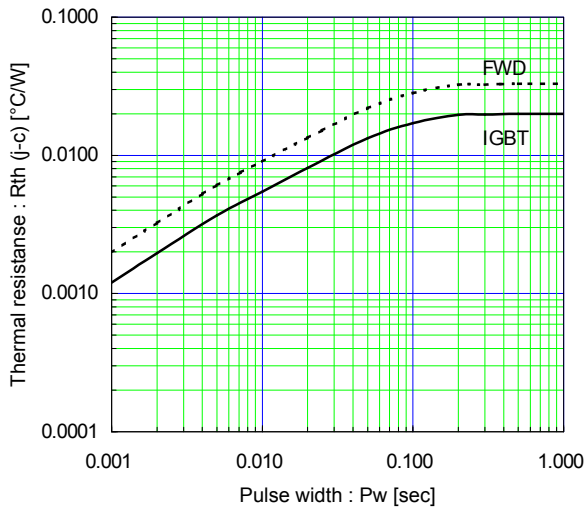
Forward current vs. Forward on voltage (typ.)
chip



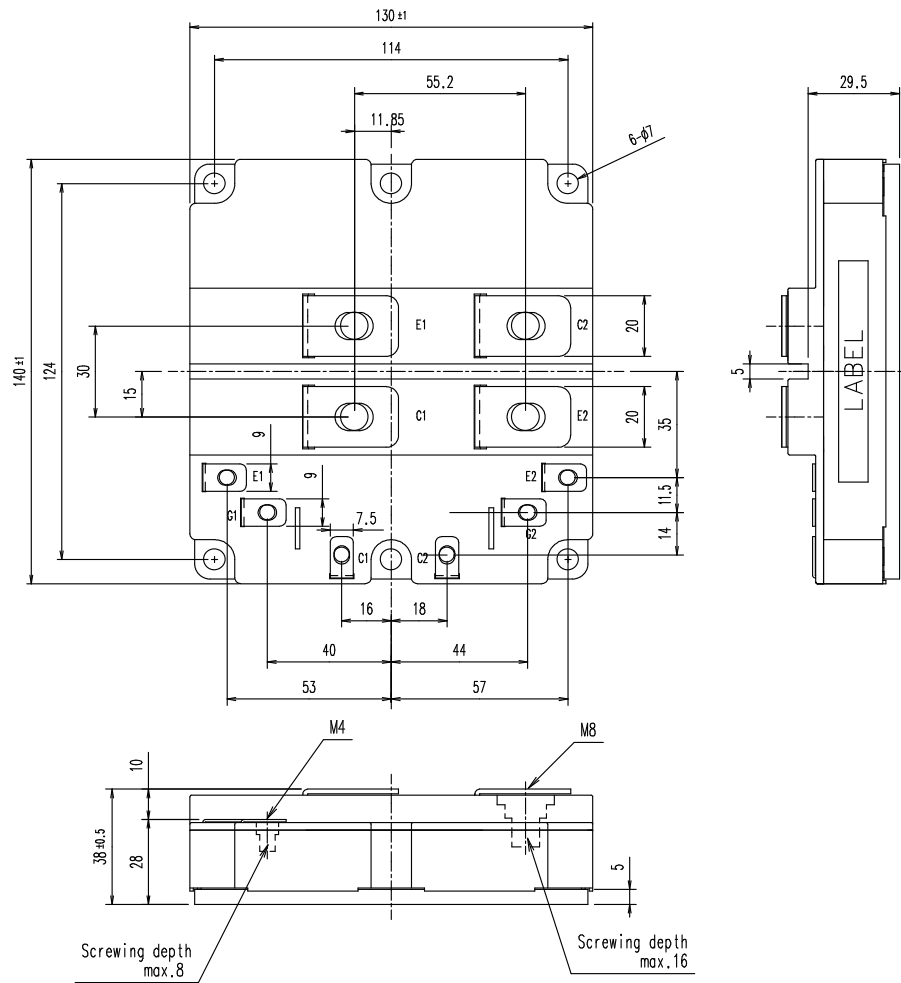
Reverse recovery characteristics (typ.)
Vcc=900V, VGE=±15V, Rgon=4.7Ω, Tj=125°C



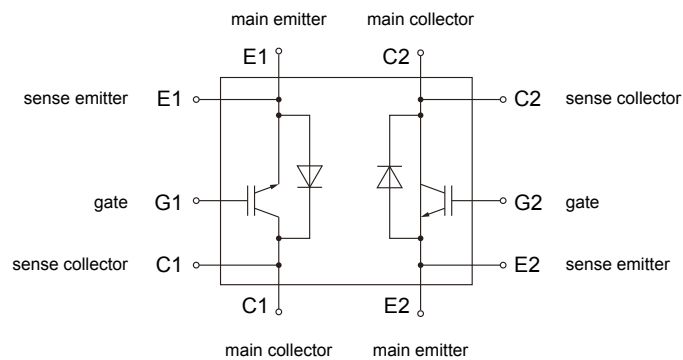
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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