

2MBI600U4G-170

IGBT Modules

IGBT MODULE (U series) 1700V / 600A / 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	A
	I _{cp}	1ms	Tc=25°C Tc=80°C	
	-I _c		600	
	-I _c pulse	1ms	1200	
			600	
Collector power dissipation	P _c	1 device	3670	W
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	-	-	1200	nA
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 600mA	5.5	6.5	7.5	V
Collector-Emitter saturation voltage	V _{CE(sat)} (main terminal)	V _{GE} = 15V I _c = 600A	Tj=25°C	2.43	2.61	V
			Tj=125°C	2.83	-	
	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	-	56	-	nF
Turn-on time	t _{on}	V _{CC} = 900V, I _c = 600A, V _{GE} = ±15V, Tj = 125°C, R _{gon} = 12Ω, R _{goff} = 4.7Ω	-	3.10	-	μs
	t _r		-	1.25	-	
Turn-off time	t _{off}		-	1.45	-	
	t _f		-	0.25	-	
Forward on voltage	V _F (main terminal)	V _{GE} = 0V I _F = 600A	Tj=25°C	1.98	2.36	V
			Tj=125°C	2.18	-	
	V _F (chip)		Tj=25°C	1.80	2.15	
			Tj=125°C	2.00	-	
Reverse recovery time	t _{rr}	I _F = 600A	-	0.45	-	μs
Lead resistance, terminal-chip (*3)	R _{lead}		-	0.29	-	mΩ

Note *3: Biggest internal terminal resistance among arm.

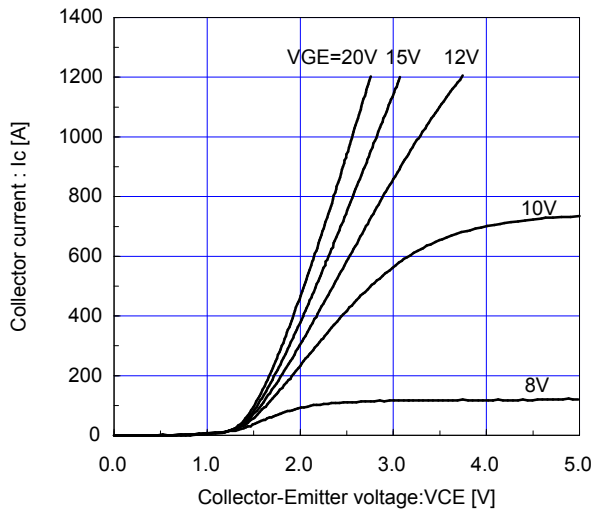
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT	-	-	0.034	°C/W
		FWD	-	-	0.060	
Contact thermal resistance (1device)	R _{th(c-f)}	with Thermal Compound (*4)	-	0.006	-	

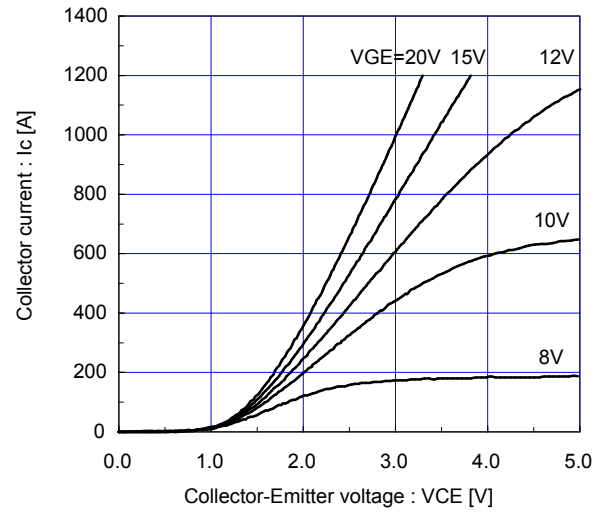
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

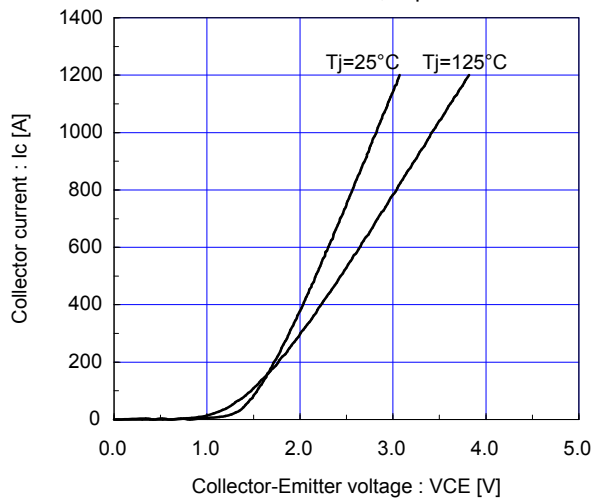
Collector current vs. Collector-Emittervoltage (typ.)
T_j=25°C,chip



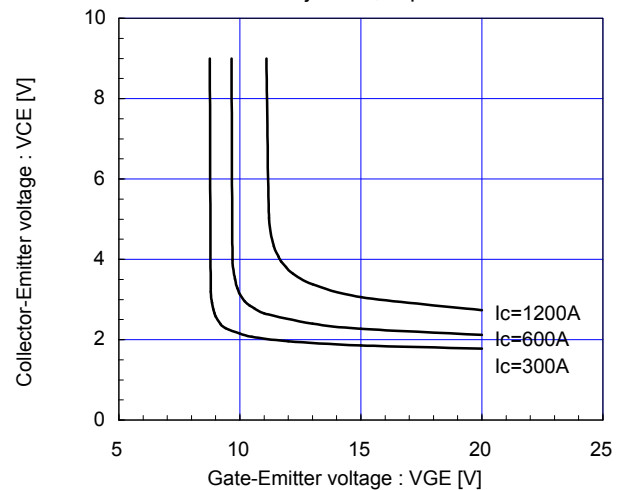
Collector current vs. Collector-Emitter voltage (typ.)
T_j=125°C,chip



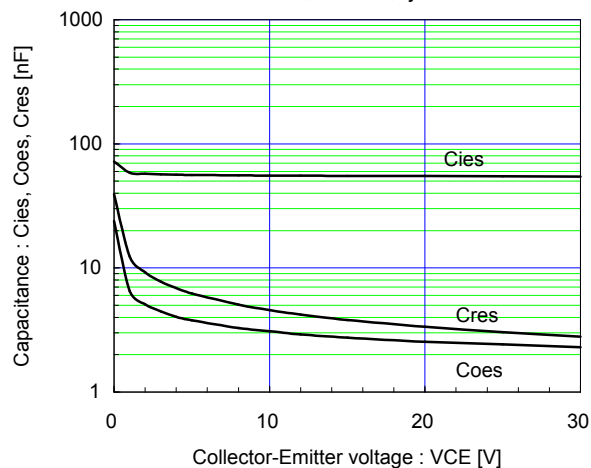
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
V_{GE}=+15V,chip



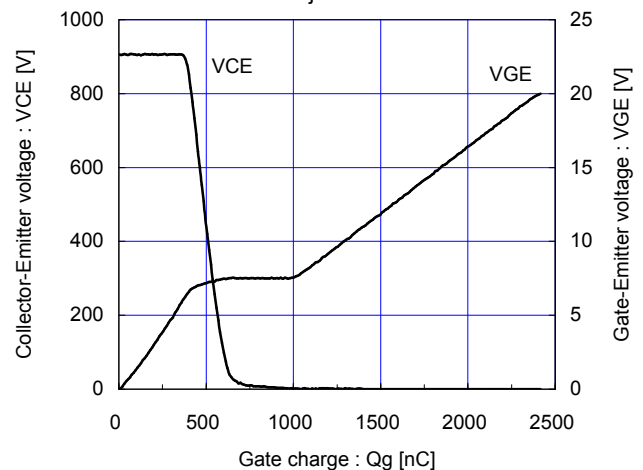
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j=25°C,chip



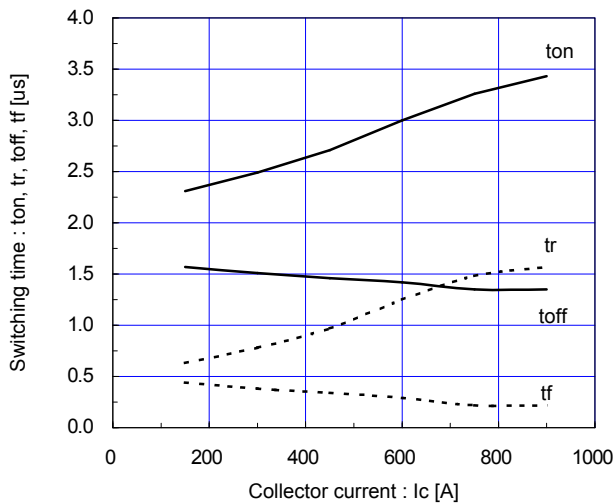
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}=0V, f=1MHz, T_j=25°C



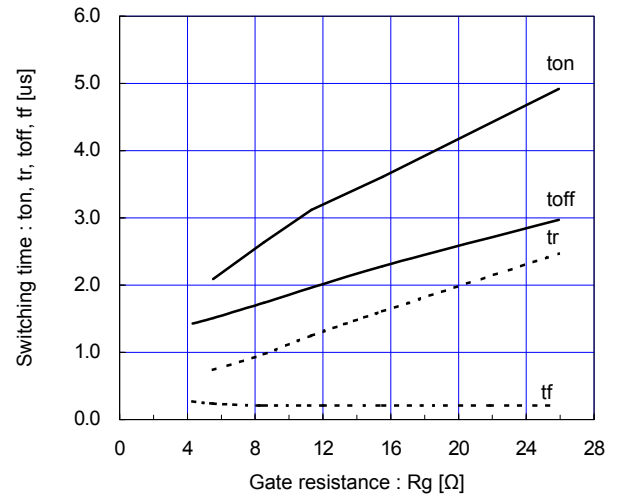
Dynamic Gate charge (typ.)
T_j=25°C



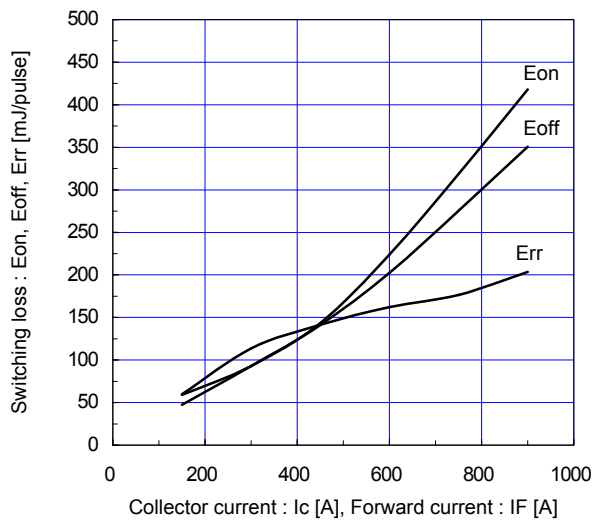
Switching time vs. Collector current (typ.)

 $V_{cc}=900V$, $V_{GE}=\pm 15V$, $R_{gon}=12\Omega$, $R_{goff}=4.7\Omega$, $T_j=125^\circ C$ 

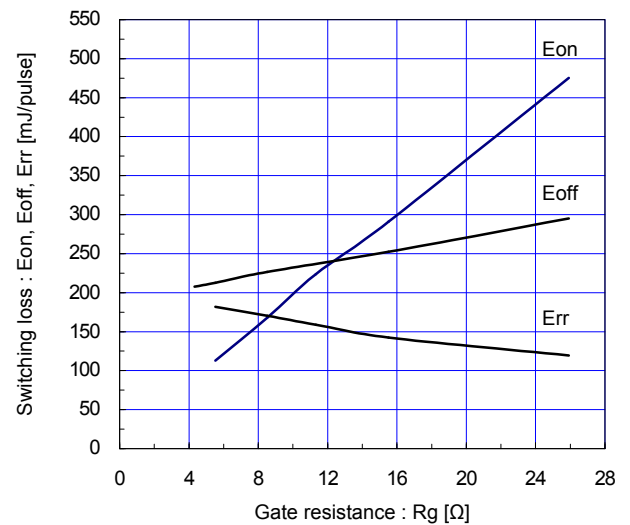
Switching time vs. Gate resistance (typ.)

 $V_{cc}=900V$, $I_c=600A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$ 

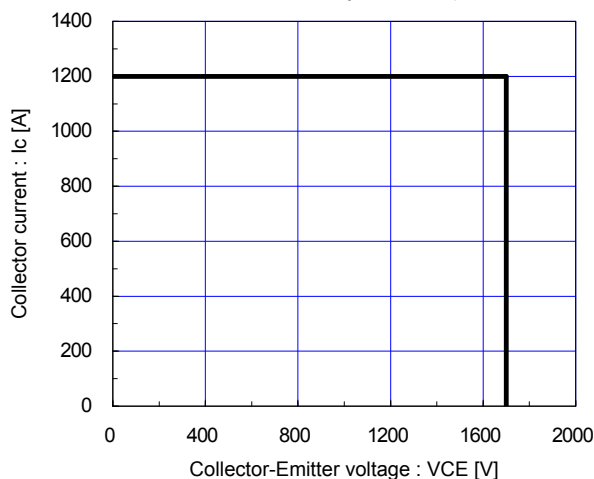
Switching loss vs. Collector current (typ.)

 $V_{cc}=900V$, $V_{GE}=\pm 15V$, $R_{gon}=12\Omega$, $R_{goff}=4.7\Omega$, $T_j=125^\circ C$ 

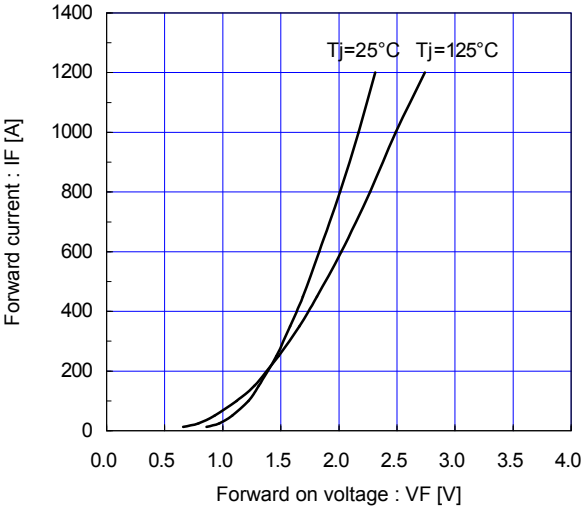
Switching loss vs. Gate resistance (typ.)

 $V_{cc}=900V$, $I_c=600A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$ 

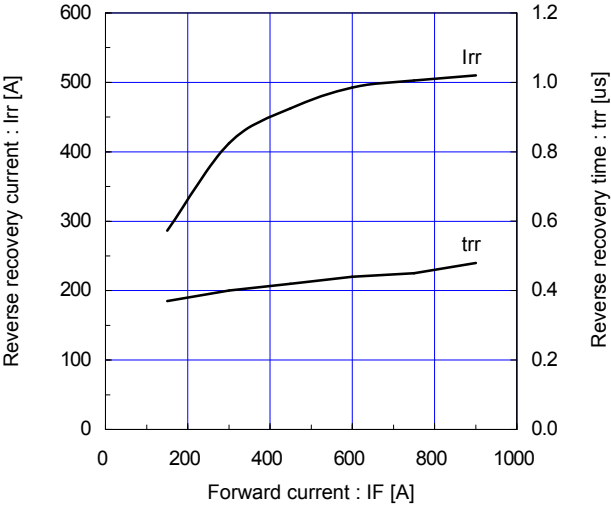
Reverse bias safe operating area (max.)

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

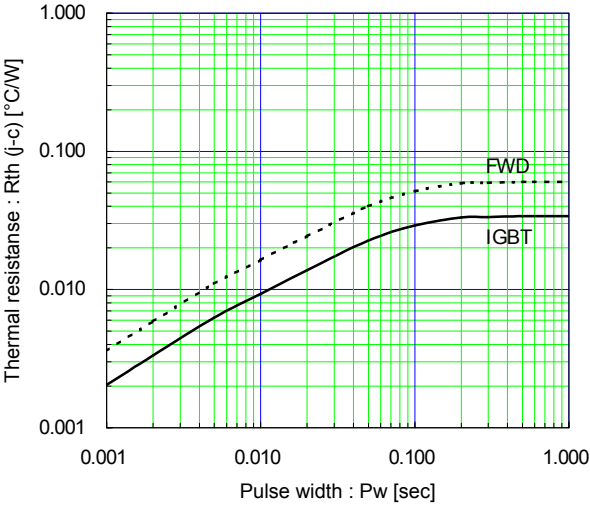
Forward current vs. Forward on voltage (typ.)
chip



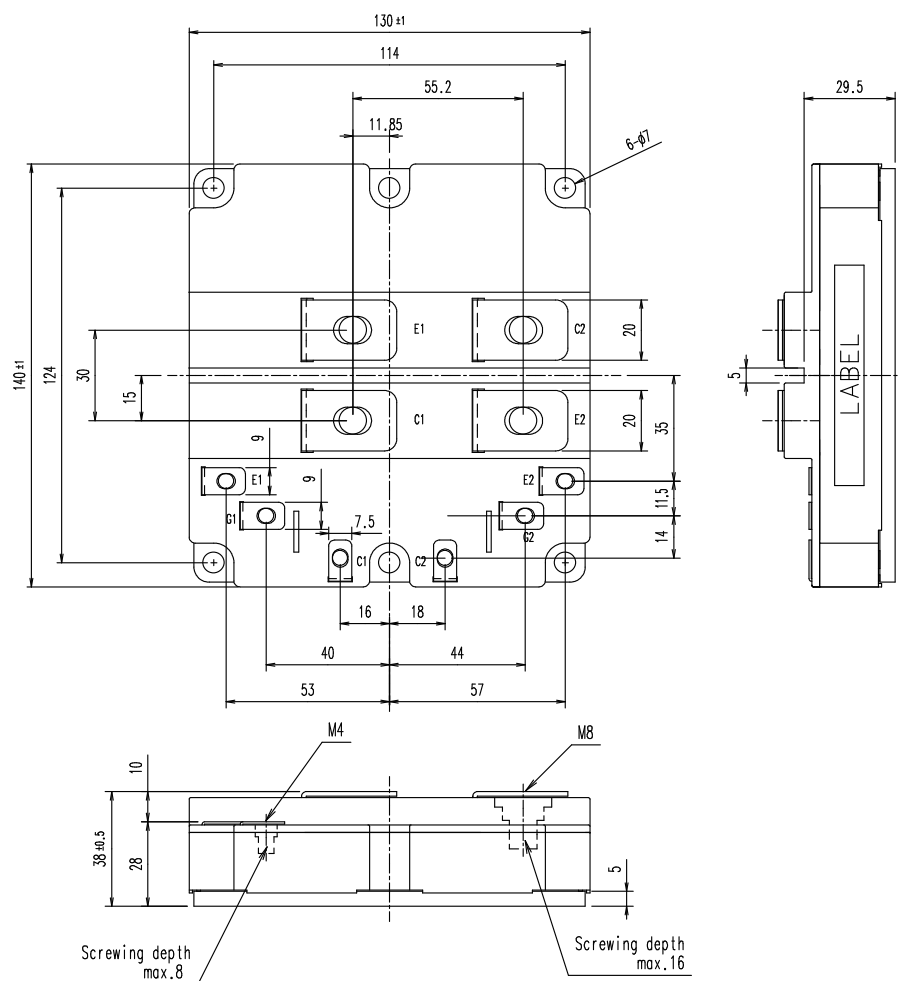
Reverse recovery characteristics (typ.)
 $V_{CC}=900\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=12\Omega$, $T_J=125^{\circ}\text{C}$



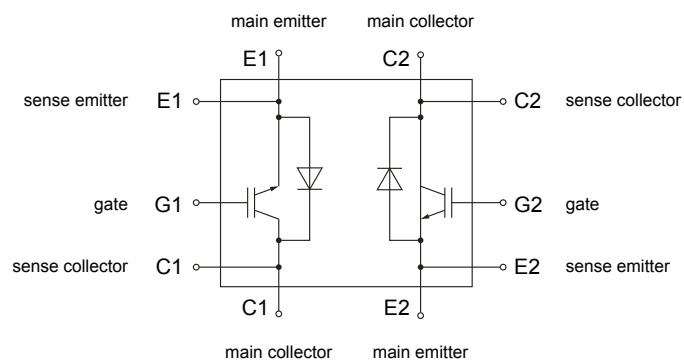
Transient thermal resistance (max.)



Outline Drawings, mm



Equivalent Circuit Schematic



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