

# 2MBI600U4G-170

## 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 <sub>CEs</sub>		1700	V	
Gate-Emitter voltage	V <sub>GES</sub>		±20	V	
Collector current	I <sub>c</sub>	Continuous	Tc=25°C Tc=80°C	800 600	A
	I <sub>cp</sub>	1ms	Tc=25°C Tc=80°C	1600 1200	
	-I <sub>c</sub>			600	
	-I <sub>c</sub> pulse	1ms		1200	
	Collector power dissipation	P <sub>c</sub>	1 device	3670	
Junction temperature	T <sub>j</sub>		150	°C	
Storage temperature	T <sub>stg</sub>		-40 to +125		
Isolation voltage   between terminal and copper base (*1)	V <sub>iso</sub>	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 <sub>CEs</sub>	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 1700V	-	-	1.0	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CE</sub> = 0V, V <sub>GE</sub> = ±20V	-	-	1200	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = 20V, I <sub>c</sub> = 600mA	5.5	6.5	7.5	V	
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub> (main terminal)	V <sub>GE</sub> = 15V I <sub>c</sub> = 600A	Tj=25°C	-	2.43	2.61	V
			Tj=125°C	-	2.83	-	
	V <sub>CE(sat)</sub> (chip)		Tj=25°C	-	2.25	2.40	
			Tj=125°C	-	2.65	-	
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V, f = 1MHz	-	56	-	nF	
Turn-on time	ton	V <sub>CC</sub> = 900V, I <sub>c</sub> = 600A, V <sub>GE</sub> = ±15V, Tj = 125°C, R <sub>gon</sub> = 12Ω, R <sub>goff</sub> = 4.7Ω	-	3.10	-	μs	
	tr		-	1.25	-		
Turn-off time	toff		-	1.45	-		
	tf		-	0.25	-		
Forward on voltage	V <sub>F</sub> (main terminal)	V <sub>GE</sub> = 0V I <sub>F</sub> = 600A	Tj=25°C	-	1.98	2.36	V
			Tj=125°C	-	2.18	-	
	V <sub>F</sub> (chip)		Tj=25°C	-	1.80	2.15	
			Tj=125°C	-	2.00	-	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 600A	-	0.45	-	μs	
Lead resistance, terminal-chip (*3)	R lead		-	0.29	-	mΩ	

Note \*3: Biggest internal terminal resistance among arm.

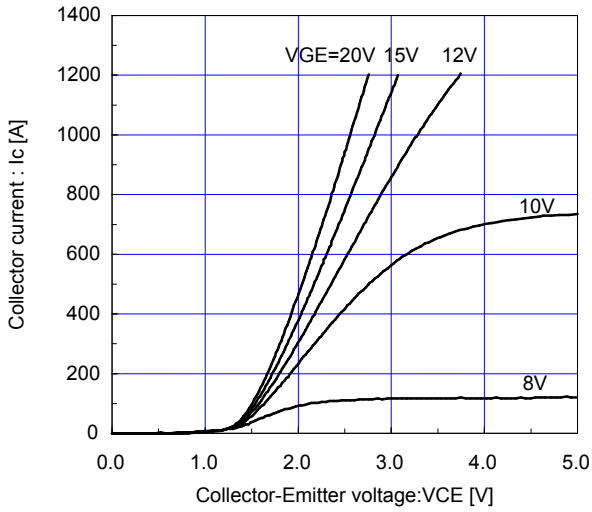
#### ● Thermal resistance characteristics

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

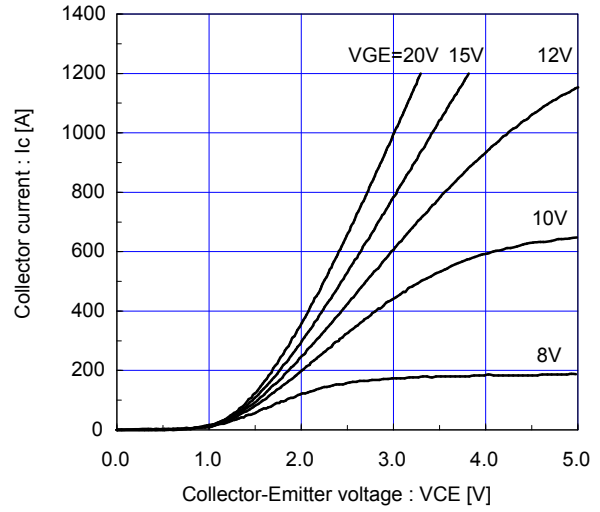
Note \*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

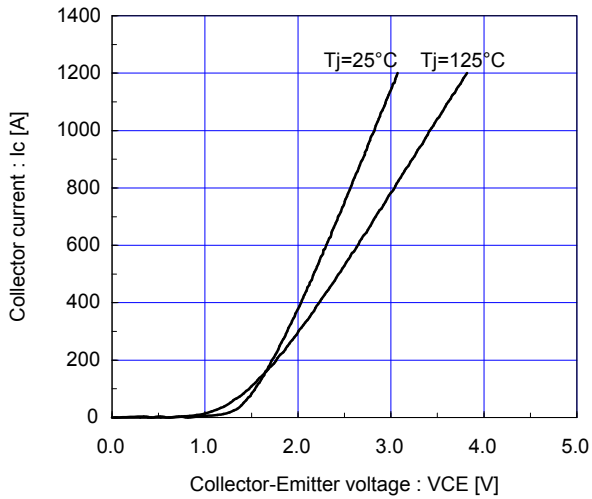
Collector current vs. Collector-Emittervoltage (typ.)  
Tj=25°C,chip



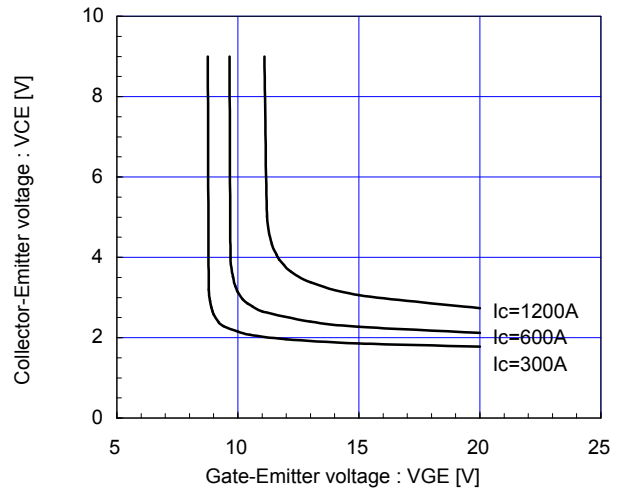
Collector current vs. Collector-Emitter voltage (typ.)  
Tj=125°C,chip



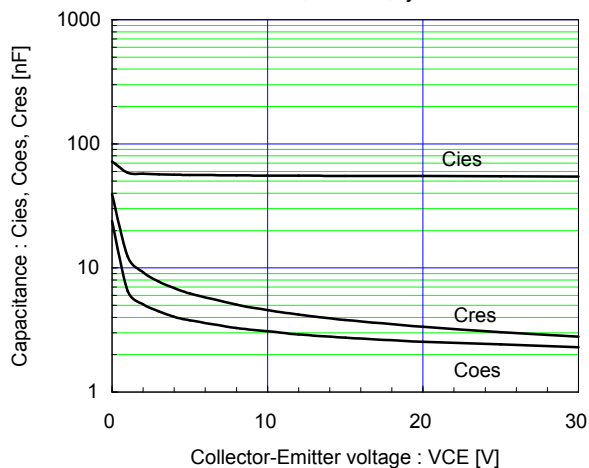
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)  
VGE=+15V,chip



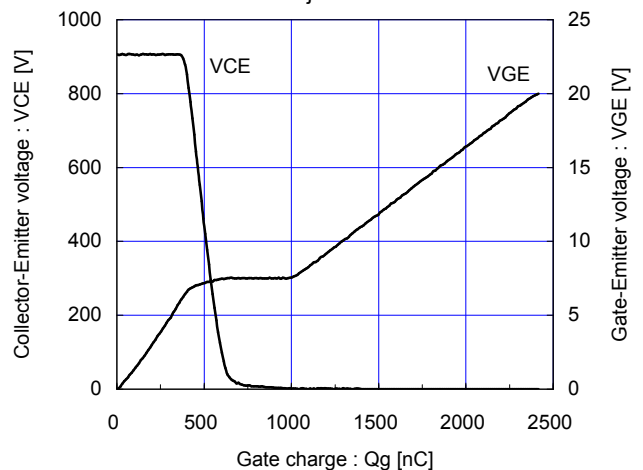
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)  
Tj=25°C,chip

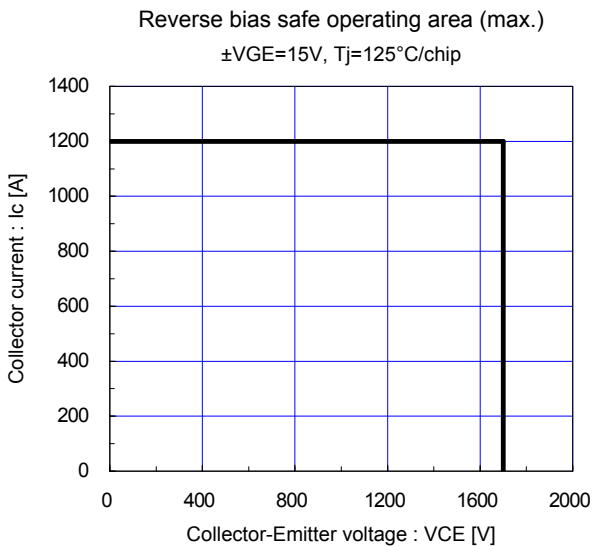
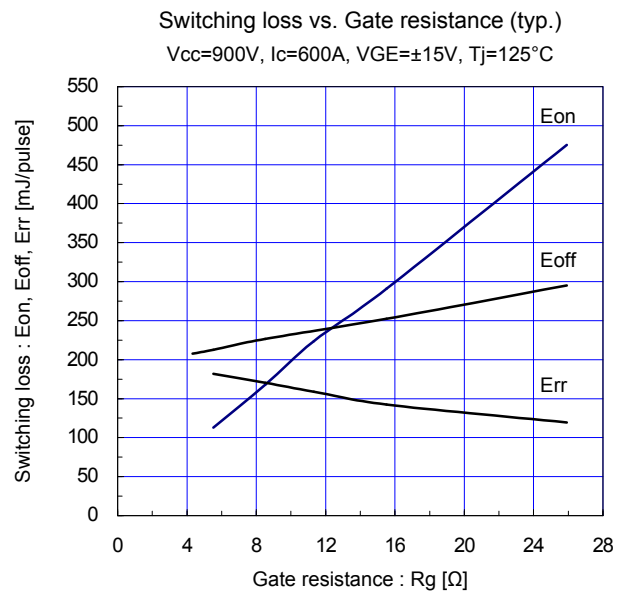
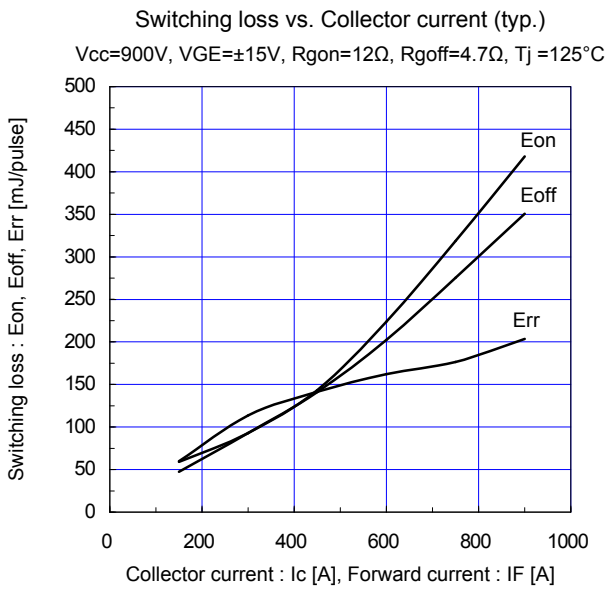
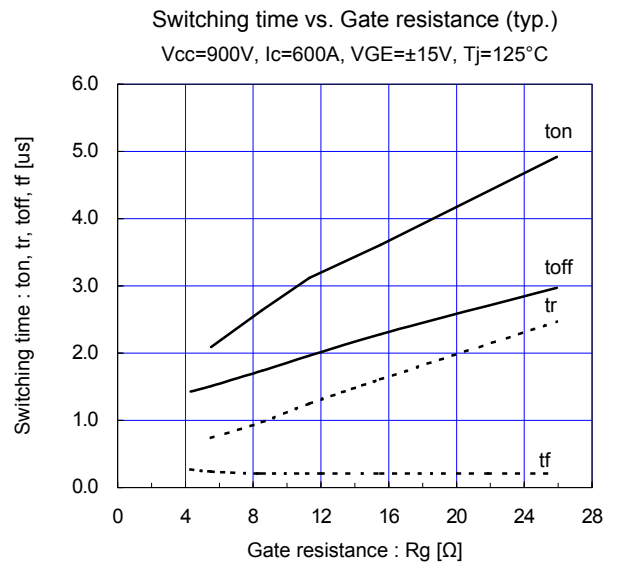
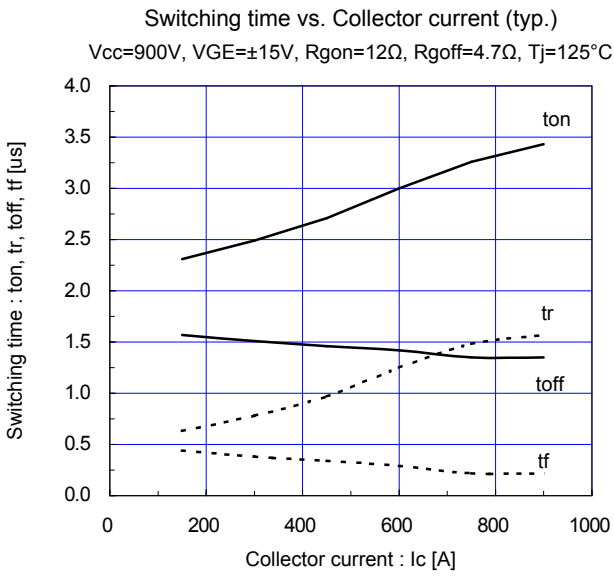


Capacitance vs. Collector-Emitter voltage (typ.)  
VGE=0V, f=1MHz, Tj=25°C

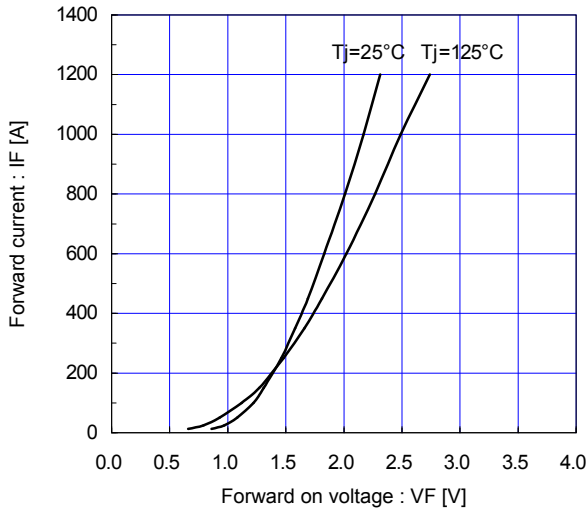


Dynamic Gate charge (typ.)  
Tj=25°C

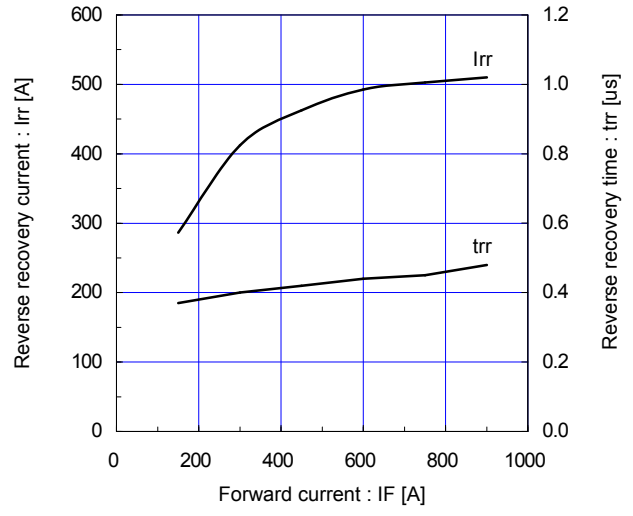




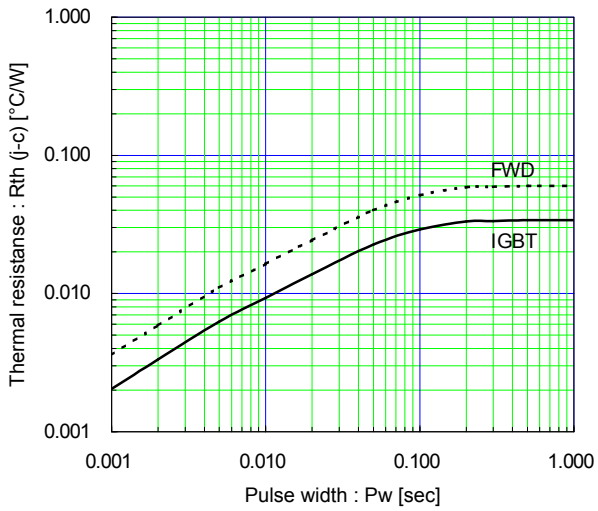
Forward current vs. Forward on voltage (typ.)  
chip



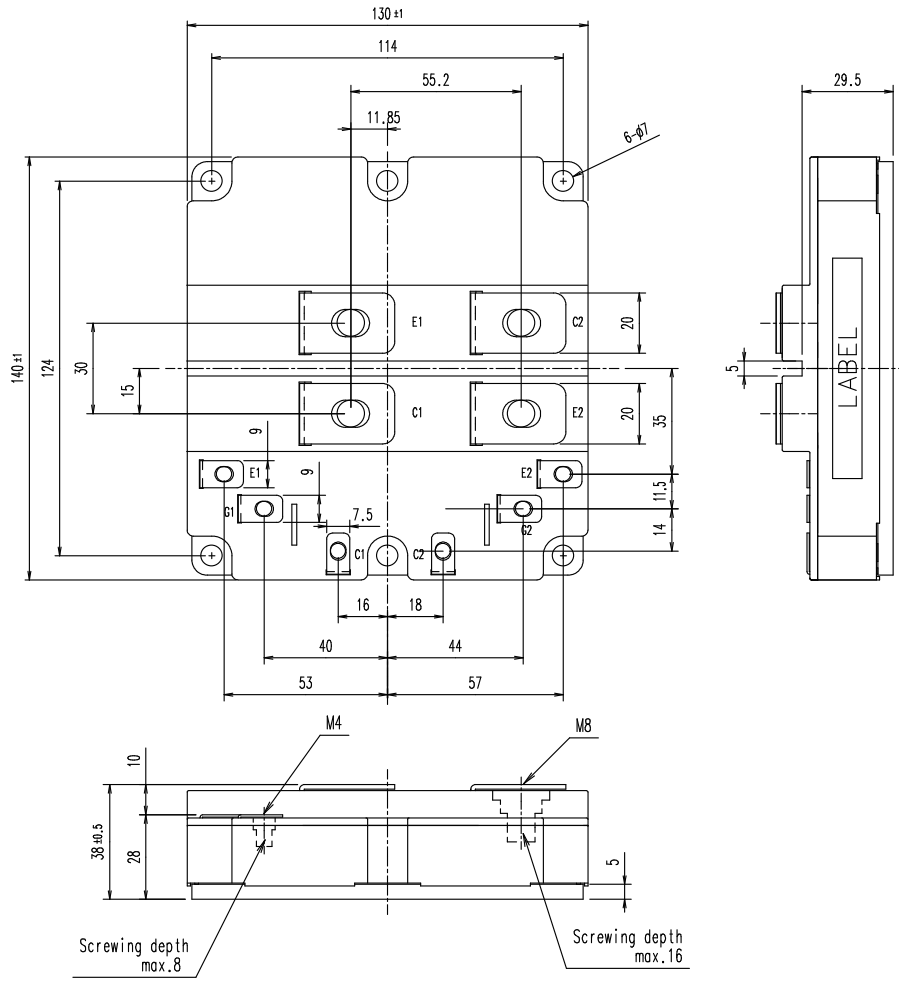
Reverse recovery characteristics (typ.)  
Vcc=900V, VGE=±15V, Rg=12Ω, Tj=125°C



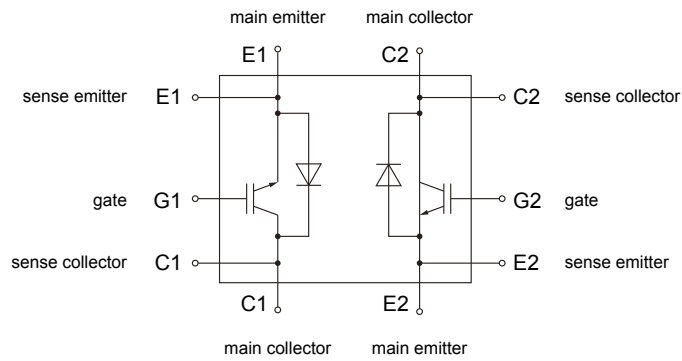
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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