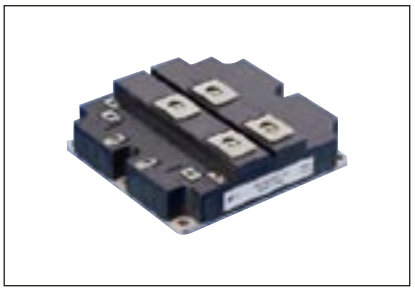
2MBI600U4G-170

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	Ic	Continuous	Tc=25°C	800	A
			Tc=80°C	600	
	Icp	1ms	Tc=25°C	1600	
			Tc=80°C	1200	
	-Ic			600	
	-Ic pulse	1ms		1200	
Collector power dissipation	Pc	1 device		3670	W
Junction temperature	Tj			150	°C
Storage temperature	Tstg			-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 min.	Characteristics typ.	Characteristics max.	Units
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	Cies	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		-	56	-	nF
Turn-on time	ton	V_{CC} = 900V, I_C = 600A, V_{GE} = ±15V, Tj = 125°C, R_{gon} = 12Ω, R_{goff} = 4.7Ω		-	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 = 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	trr	I_F = 600A		-	0.45	-	μs
Lead resistance, terminal-chip (*3)	R lead			-	0.29	-	mΩ

Note *3: Biggest internal terminal resistance among arm.

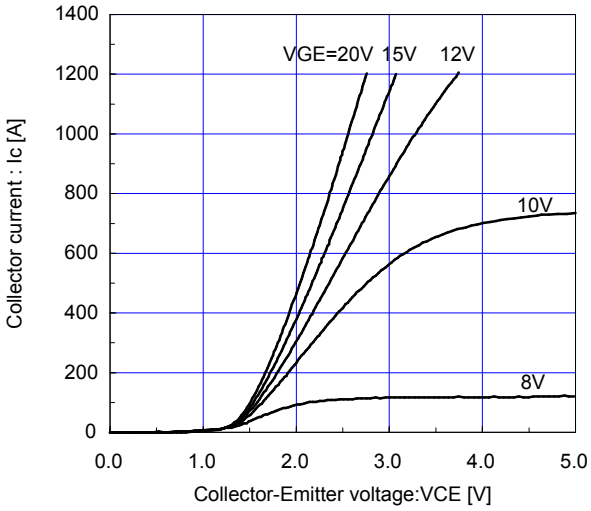
● **Thermal resistance characteristics**

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

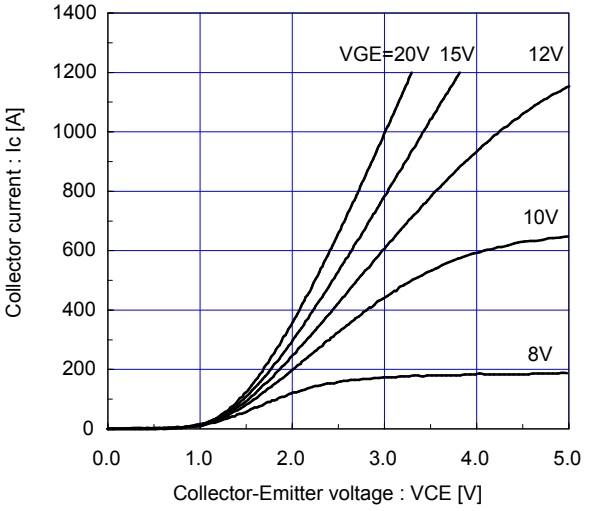
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

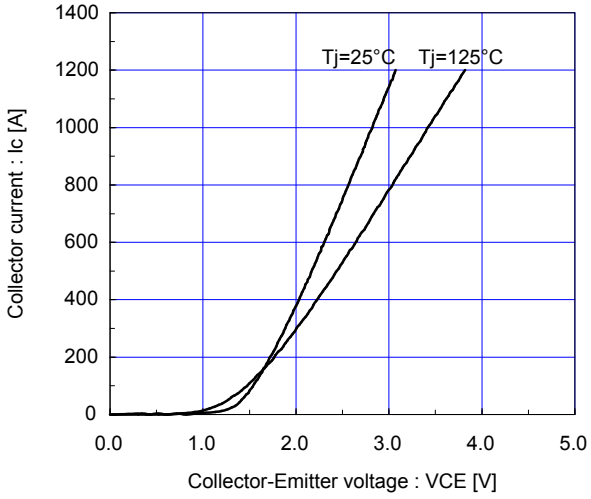
Collector current vs. Collector-Emittervoltage (typ.)
Tj=25°C,chip



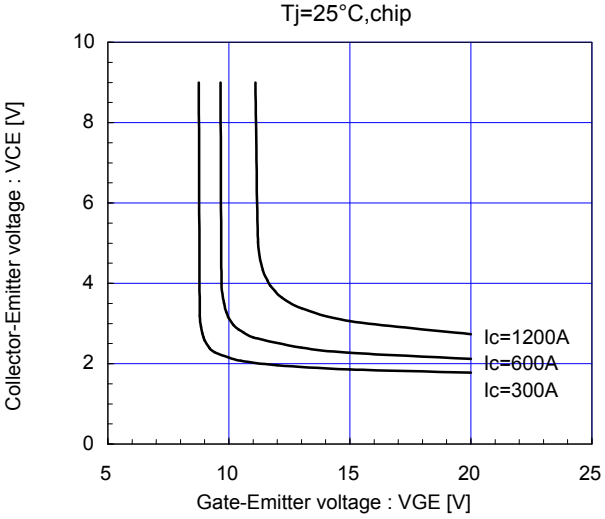
Collector current vs. Collector-Emitter voltage (typ.)
Tj=125°C,chip



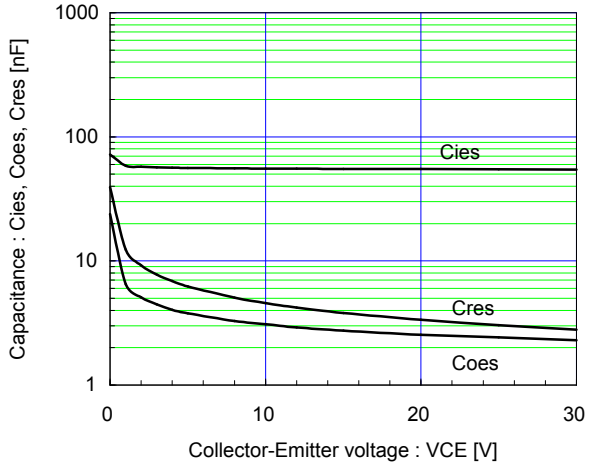
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
VGE=+15V,chip



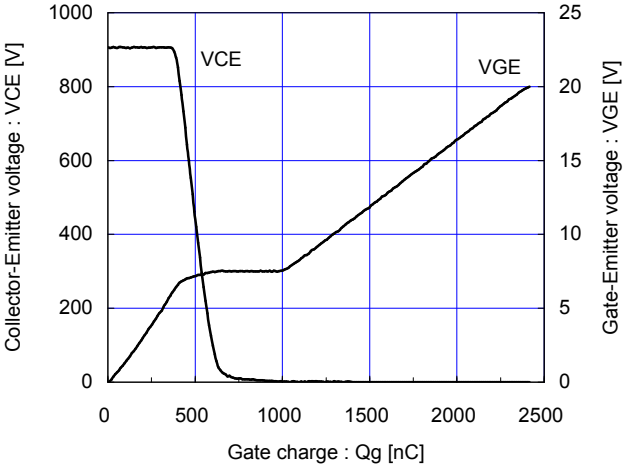
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C,chip



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

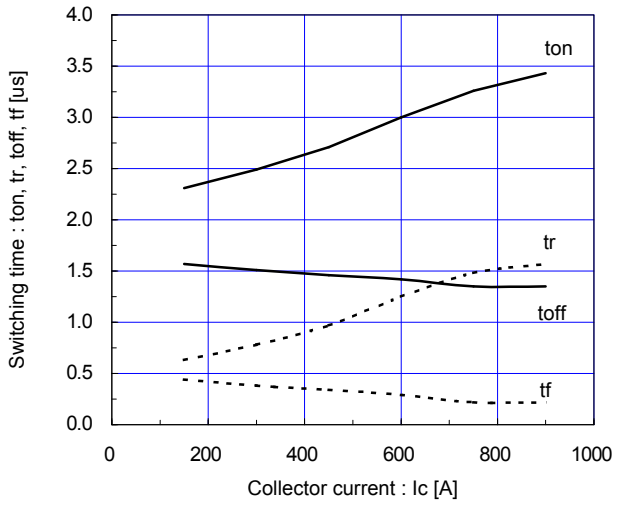


Dynamic Gate charge (typ.)
Tj=25°C



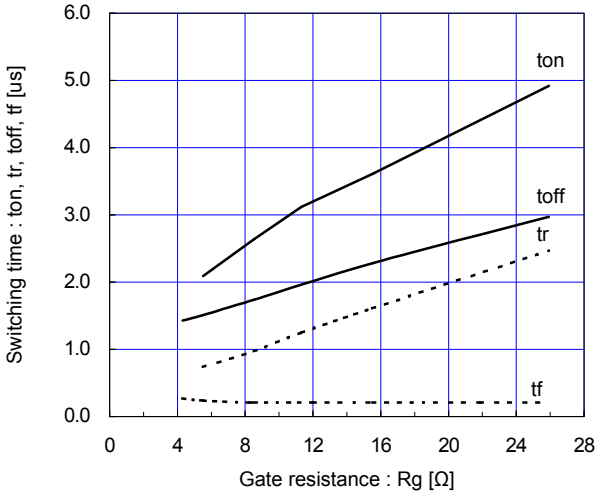
Switching time vs. Collector current (typ.)

Vcc=900V, VGE=±15V, Rgon=12Ω, Rgoff=4.7Ω, Tj=125°C



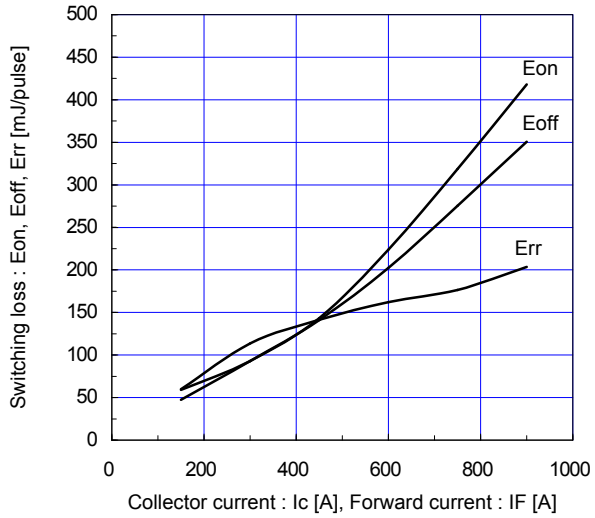
Switching time vs. Gate resistance (typ.)

Vcc=900V, Ic=600A, VGE=±15V, Tj=125°C



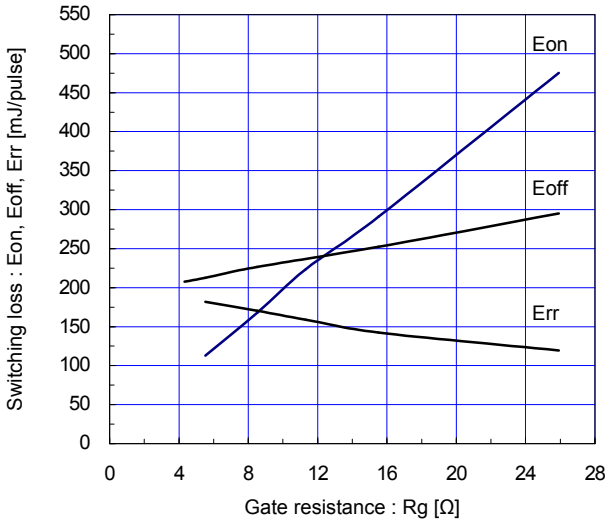
Switching loss vs. Collector current (typ.)

Vcc=900V, VGE=±15V, Rgon=12Ω, Rgoff=4.7Ω, Tj =125°C



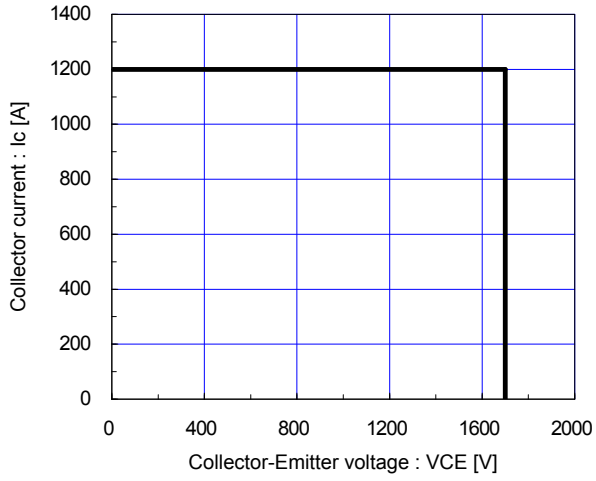
Switching loss vs. Gate resistance (typ.)

Vcc=900V, Ic=600A, VGE=±15V, Tj=125°C

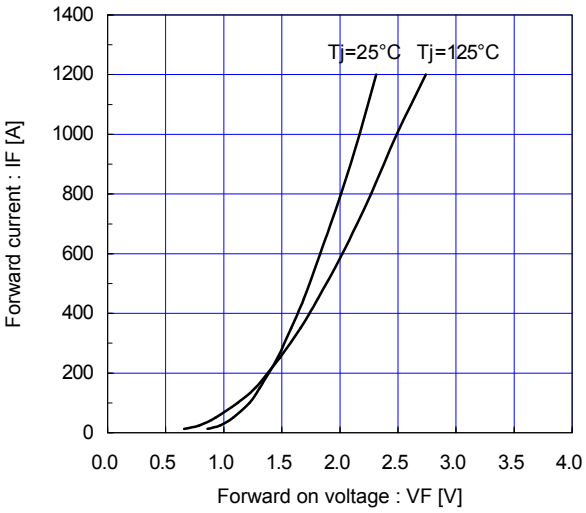


Reverse bias safe operating area (max.)

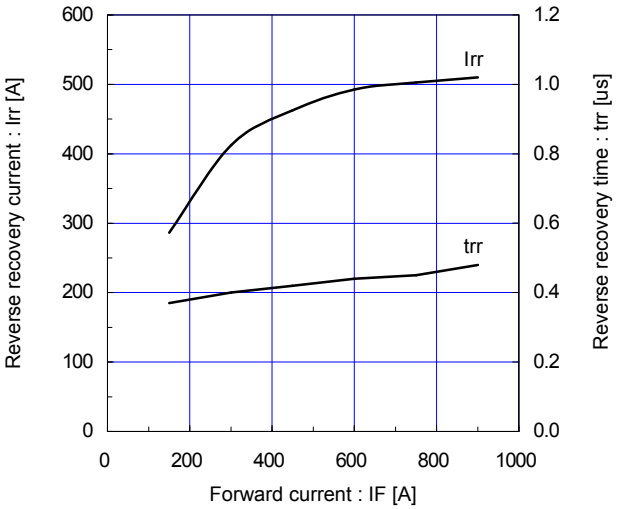
±VGE=15V, Tj=125°C/chip



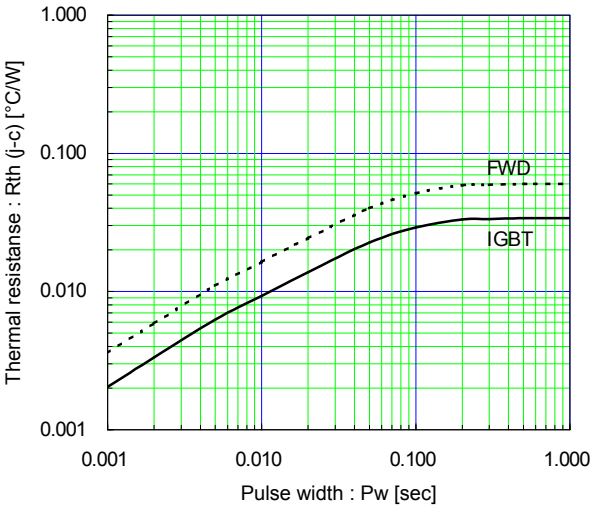
Forward current vs. Forward on voltage (typ.)
chip



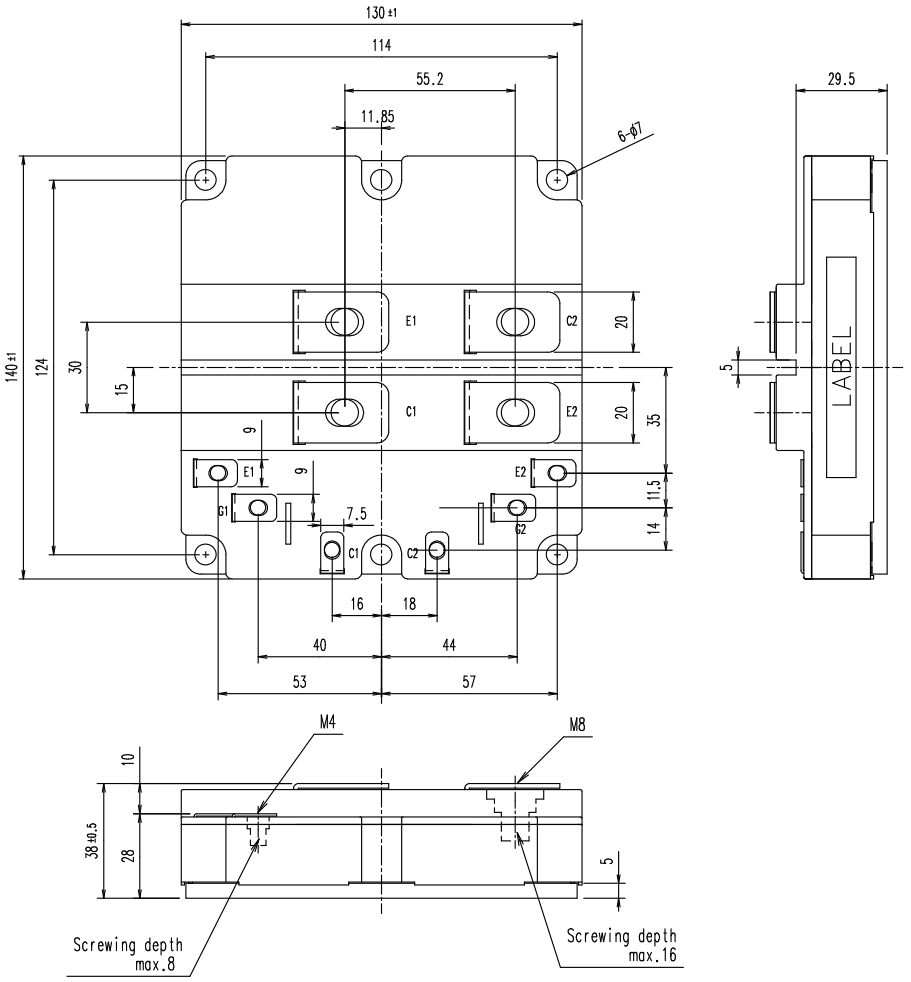
Reverse recovery characteristics (typ.)
Vcc=900V, VGE=±15V, Rg=12Ω, Tj=125°C



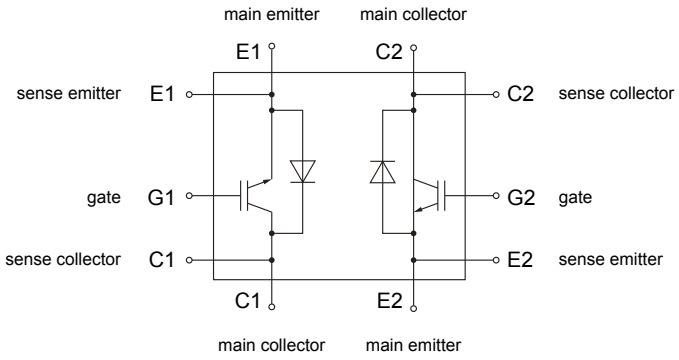
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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   • Medical equipment

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