

# 1MBI1600U4C-120

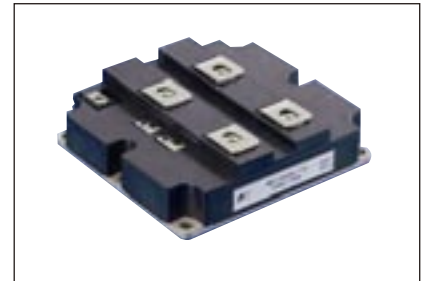
## IGBT MODULE (U series) 1200V / 1600A / 1 in one package

### ■ 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>		1200	V	
Gate-Emitter voltage	V <sub>GES</sub>		±20	V	
Collector current	I <sub>c</sub>		Tc=25°C	1600	A
			Tc=80°C	1600	
	I <sub>c</sub> pulse	1ms	Tc=25°C	3200	
			Tc=80°C	3200	
	-I <sub>c</sub>			1600	
-I <sub>c</sub> pulse	1ms		3200		
Collector power dissipation	P <sub>c</sub>	1 device	9610	W	
Junction temperature	T <sub>j</sub>		150	°C	
Storage temperature	T <sub>stg</sub>		-40 to +125	°C	
Isolation voltage	Between terminal and copper base (*1) V <sub>iso</sub>	AC : 1min.	2500	VAC	
Screw torque	Mounting (*2)		5.75	N·m	
	Main Terminals (*2)		10		
	Sense Terminals (*2)		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 N·m (M6), Main Terminal : 8-10 N·m (M8), Sense Terminal : 1.7-2.5 N·m (M4)

#### ● Electrical characteristics (at Tj= 25°C unless otherwise specified)

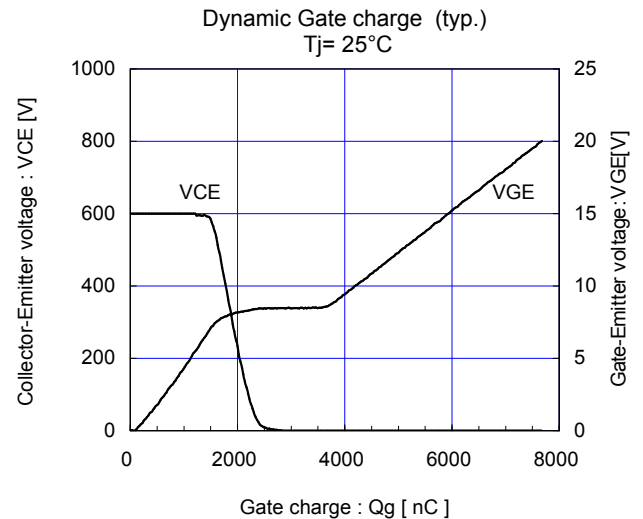
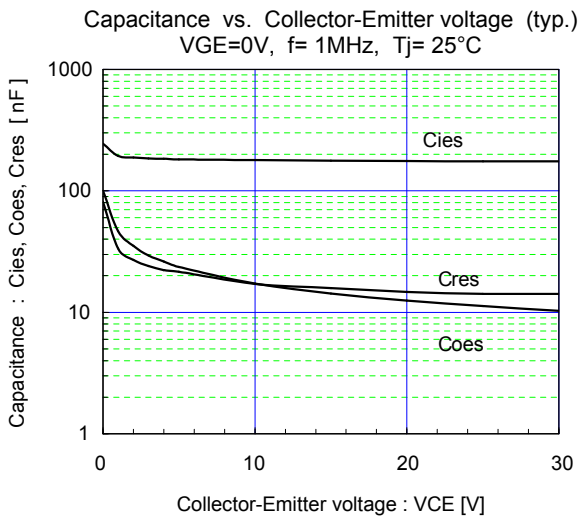
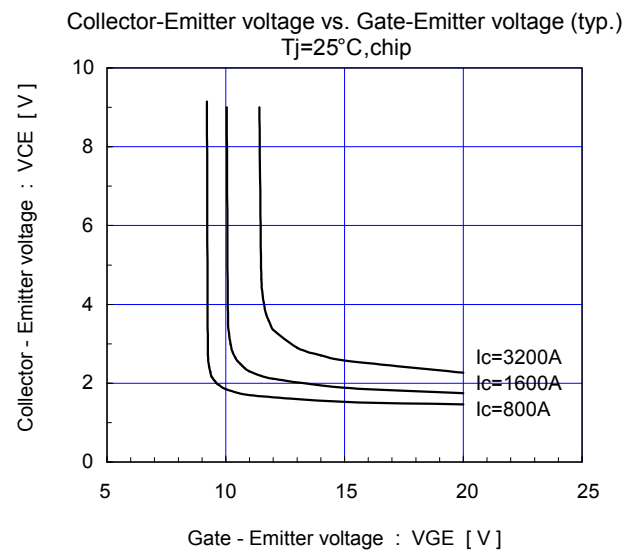
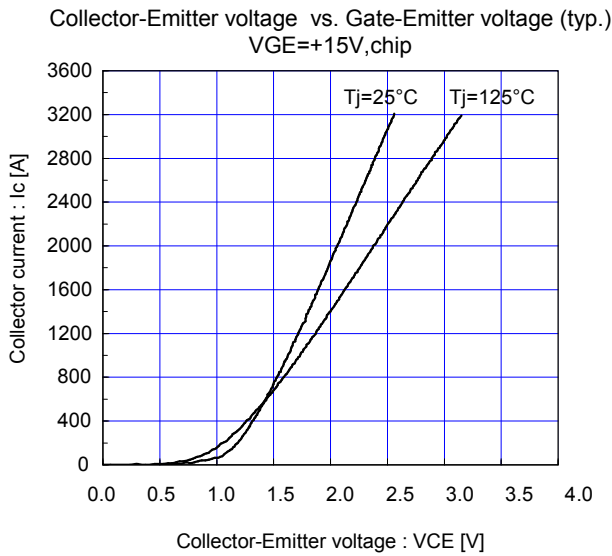
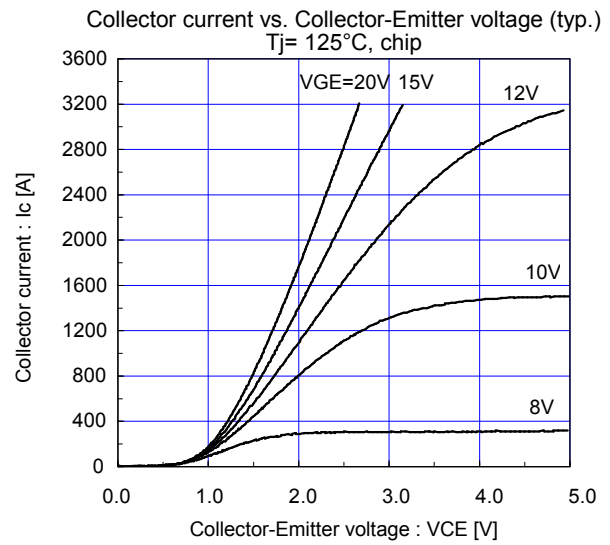
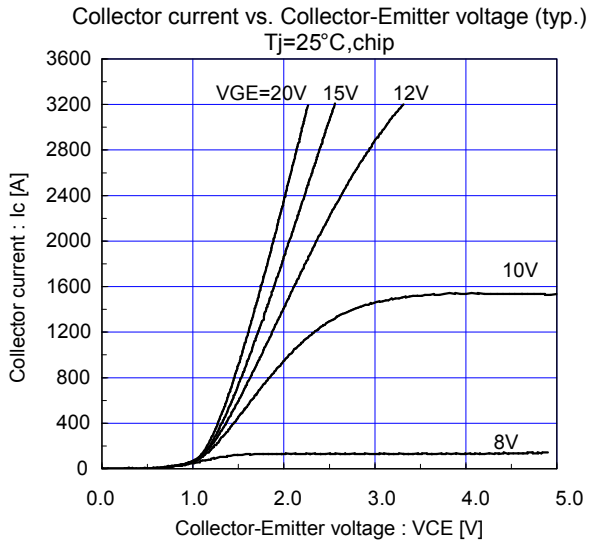
Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage collector current	I <sub>CEs</sub>	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 1200V	-	-	1.0	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CE</sub> = 0V, V <sub>GE</sub> = ±20V	-	-	3200	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = 20V, I <sub>c</sub> = 1600mA	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> = 1600A	Tj=25°C	-	2.11	2.29	V
			Tj=125°C	-	2.31	-	
	V <sub>CE(sat)</sub> (chip)		Tj=25°C	-	1.90	2.05	
			Tj=125°C	-	2.10	-	
Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> = 0V, V <sub>CE</sub> = 10V, f = 1MHz	-	180	-	nF	
Turn-on time	ton	V <sub>CC</sub> = 600V, I <sub>c</sub> = 1600A V <sub>GE</sub> = ±15V, Tj = 125°C R <sub>gon</sub> = 1.5Ω, R <sub>goff</sub> = 0.75Ω	-	0.90	-	μs	
	tr		-	0.50	-		
Turn-off time	toff		-	0.80	-		
	tf		-	0.20	-		
Forward on voltage	V <sub>F</sub> (main terminal)	V <sub>GE</sub> = 0V I <sub>F</sub> = 1600A	Tj=25°C	-	1.86	2.04	V
			Tj=125°C	-	1.96	-	
	V <sub>F</sub> (chip)		Tj=25°C	-	1.65	1.80	
			Tj=125°C	-	1.75	-	
Reverse recovery time	trr	I <sub>F</sub> = 1600A	-	0.35	-	μs	
Lead resistance, terminal-chip	R <sub>lead</sub>		-	0.13	-	mΩ	

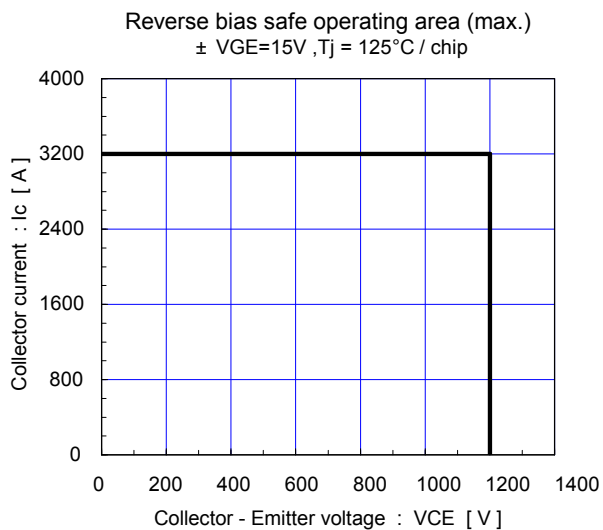
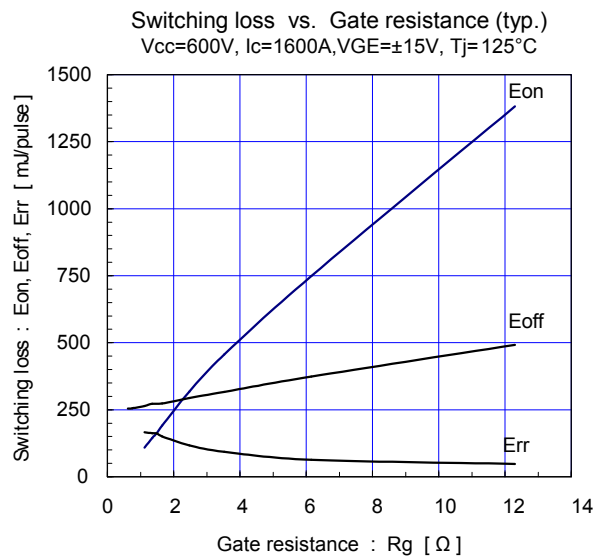
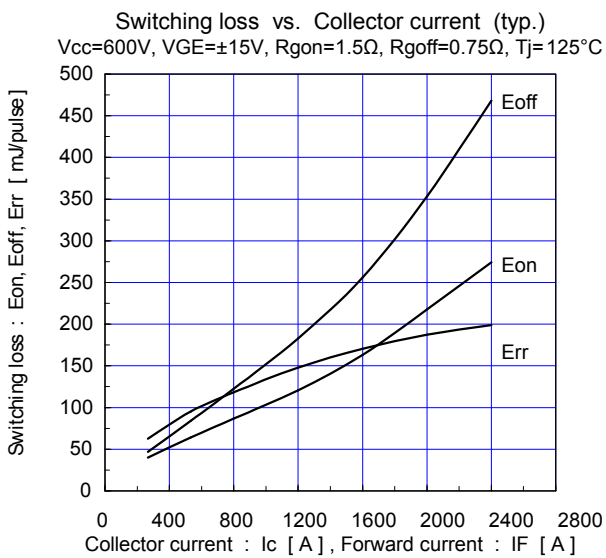
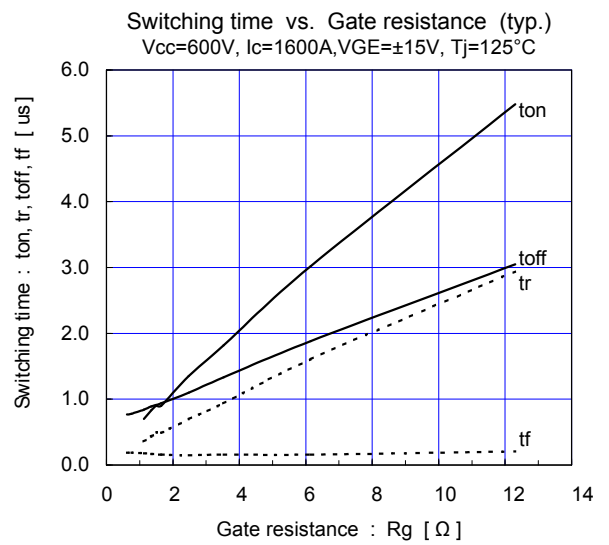
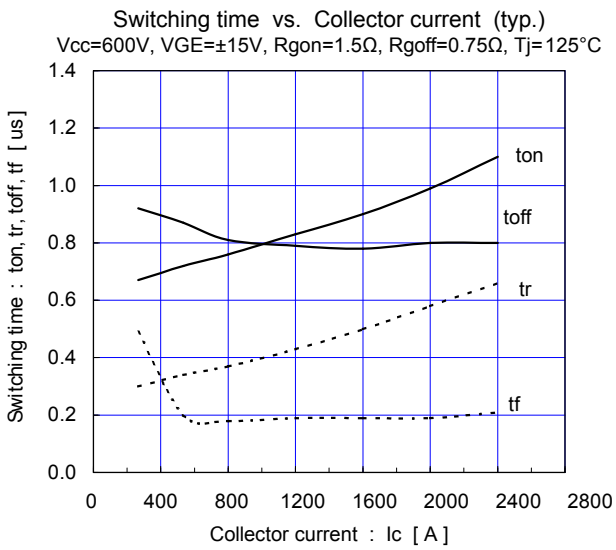
#### ● Thermal resistance characteristics

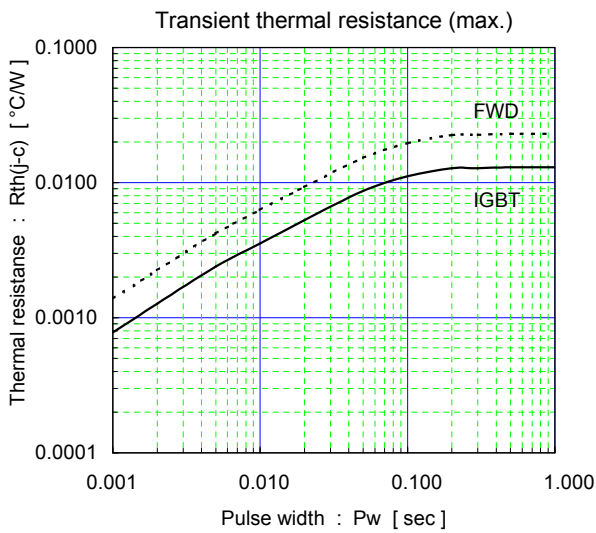
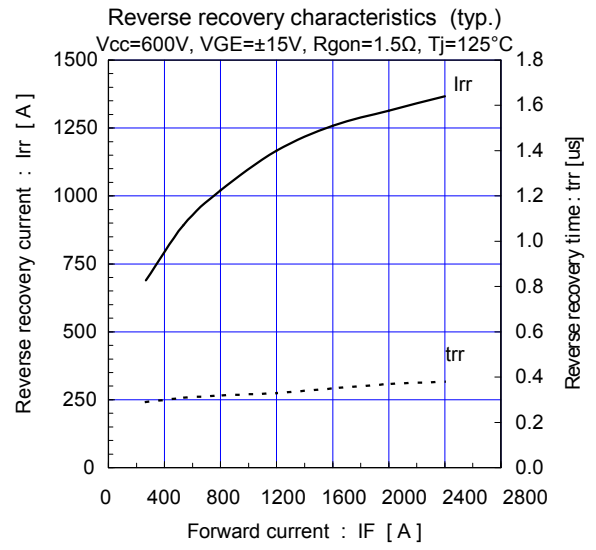
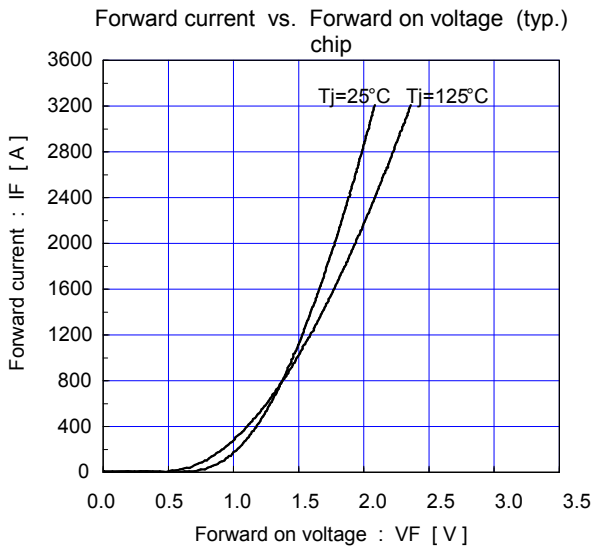
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R <sub>th(j-c)</sub>	IGBT	-	-	0.013	°C/W
		FWD	-	-	0.023	
Contact thermal resistance (1device)	R <sub>th(c-f)</sub>	with Thermal Compound (*3)	-	0.006	-	

Note \*3: This is the value which is defined mounting on the additional cooling fin with thermal compound.

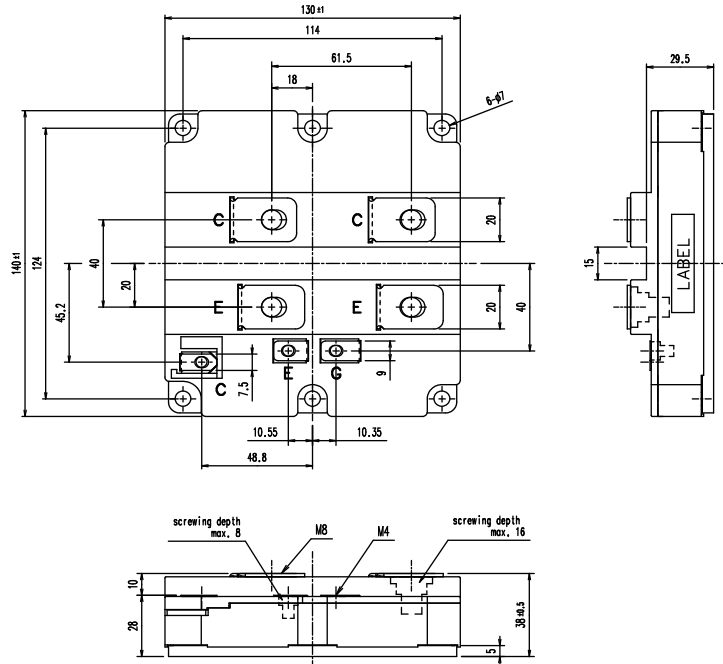
■ Characteristics (Representative)



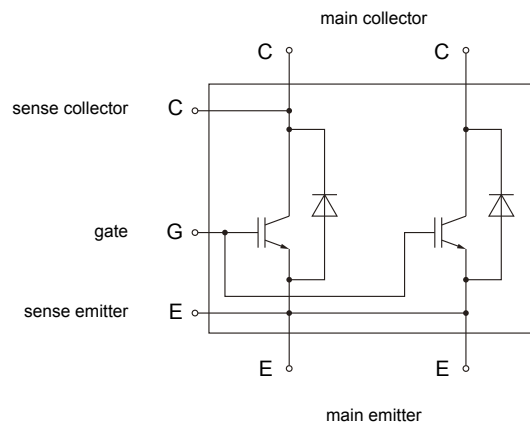




■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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