SPECIFICATION

Device Name : IGBT module

Type Name : 1MBI400NB-060

Spec. No. : MS5F3233

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED
DRAWN	Oct. - 3 - '95	S. Miyashita	S. Kobayashi
CHECKED	Oct. - 3 - '95	T. HOSEN	

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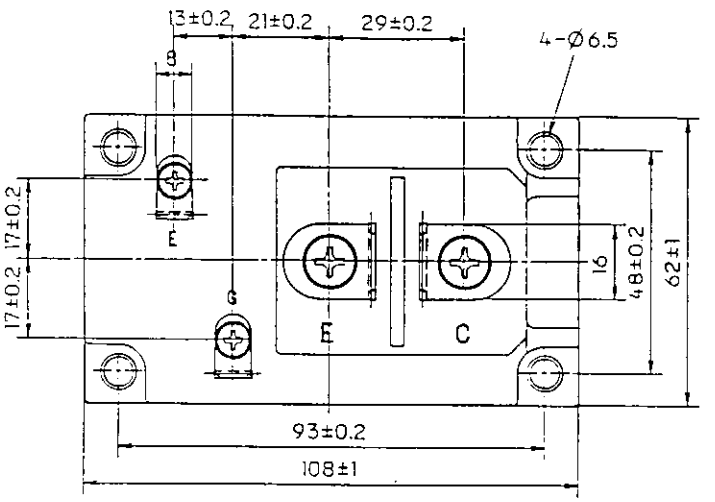
Revised Records

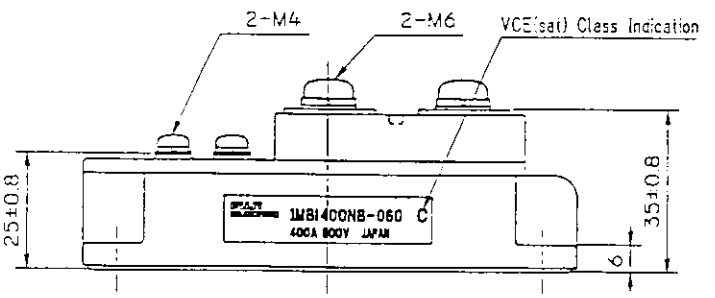
Date	Classi-fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Oct.-3-'95	enactment	—	————	Issued date	—	T.HOSEN	S.Kobayashi

Ratings and characteristics of Fuji IGBT Module

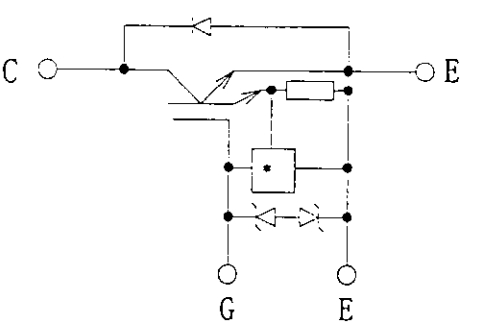
1MBI400NB-060

1. Outline Drawing
   Unit : mm





2. Equivalent circuit



*NLU (Over Current Limiting Circuit)

3. Absolute Maximum Ratings (at Tc=25℃ unless otherwise specified)

Items		Symbols	Ratings	Units
Collector-Emitter voltage		V_{CES}	600	V
Gate-Emitter voltage		V_{GES}	±20	V
Collector current	Continuous	I_C	400	A
	1ms	I_C pulse	800	
		-I_C	400	
	1ms	-I_C pulse	800	
Max. power dissipation		PC	1500	W
Operating temperature		Tj	+150	℃
Storage temperature		Tstg	-40～+125	℃
Isolation voltage		Vis	AC 2500 (1min.)	V
Screw torque		Mounting *1	3.5	N・m
		Terminals *2	4.5	
		Terminals *3	1.7	

Note : *1 Recommendable value : 2.5～3.5 N・m (M5) or (M6)
*2 Recommendable value : 3.5～4.5 N・m (M6)
*3 Recommendable value : 1.3～1.7 N・m (M4)

4. Electrical characteristics (at Tj=25℃ unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector current	I_{CES}			4.0	V_{GE}=0V, V_{CE}=600V	mA
Gate-Emitter leakage current	I_{GES}			60	V_{CE}=0V, V_{GE}=±20V	μA
Gate-Emitter threshold voltage	V_{GE}(th)	4.5		7.5	V_{CE}=20V, I_C=400mA	V
Collector-Emitter saturation voltage	V_{CE}(sat)			2.8	V_{GE}=15V, I_C=400A	V
Input capacitance	Cies		26400		V_{GE}=0V	pF
Output capacitance	Coes		5870		V_{CE}=10V	
Reverse transfer capacitance	Cres		2670		f=1MHz	
Turn-on time	ton		0.6	1.2	Vcc=300V	μs
	tr		0.2	0.6	I_C=400A	
Turn-off time	toff		0.6	1.0	V_{GE}=±15V	
	tf		0.2	0.35	R_G=4.7Ω	
Diode forward on voltage	V_F			3.0	I_F=400A, V_{GE}=0V	V
Reverse recovery time	trr			300	I_F=400A	ns

5. Thermal resistance characteristics

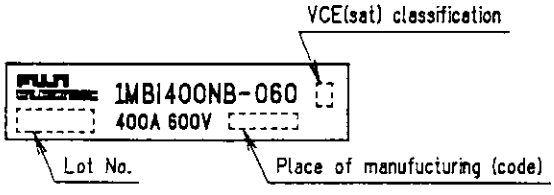
Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	Rth(j-c)			0.085	IGBT	℃/W
	Rth(j-c)			0.18	Diode	
	※ Rth(c-f)		0.0125		the base to cooling fin	

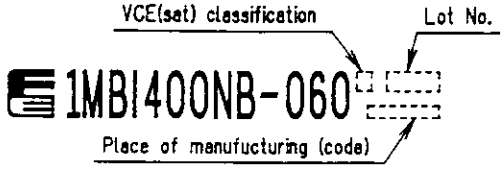
※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

6. VCE(sat) class

Class	VCE(sat) range [V]
F	1.85 ～ 2.1
A	2.0 ～ 2.25
B	2.15 ～ 2.4
C	2.3 ～ 2.6
D	2.5 ～ 2.8

7. Indication on module (モジュール表示)





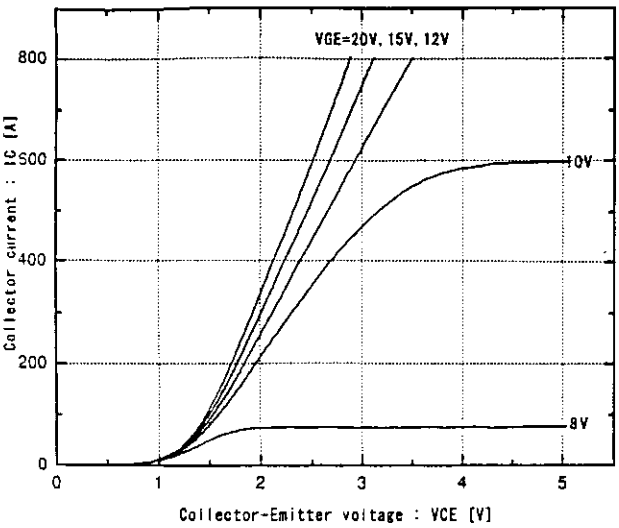
8. Applicable category (適用範囲)

This specification is applied to IGBT module named 1MBI400NB-060.
本納入仕様書は、IGBTモジュール1ＭＢＩ４００ＮＢ－０６０に適用する。

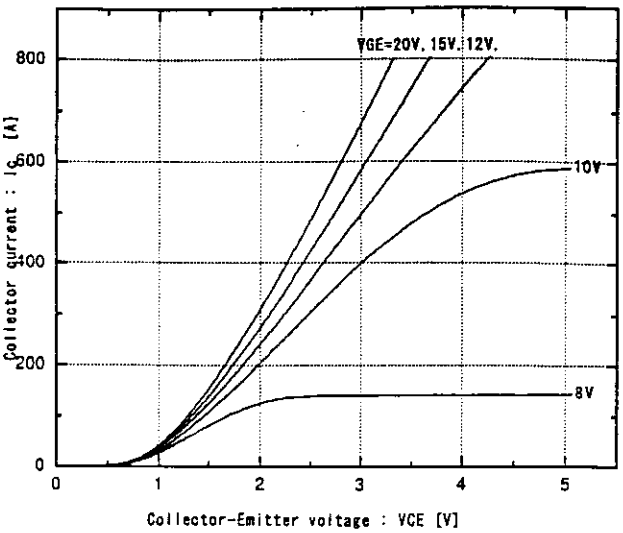
9. Storage and transportation notes (保管、運搬上の注意事項)

- The IGBT module should be stored at a standard temperature of 5 to 35℃ and humidity of 45 to 75%.
  常温保存が望ましい。 (5～35℃、45～75%)
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
  急激な温度変化の無きこと。 (モジュール表面が結露しないこと)
- Avoid exposure to corrosive gases and dust.
  腐蝕性ガスの発生場所、塵埃の多い場所は避けること。
- Avoid excessive external force on the module.
  製品に荷重がかからないように十分注意すること。
- Store modules with unprocessed terminals.
  モジュールの端子は未加工の状態で保管すること。
- Do not drop or otherwise shock the modules when transporting.
  製品の運搬時に衝撃を与えたり、落下させたりしないこと。

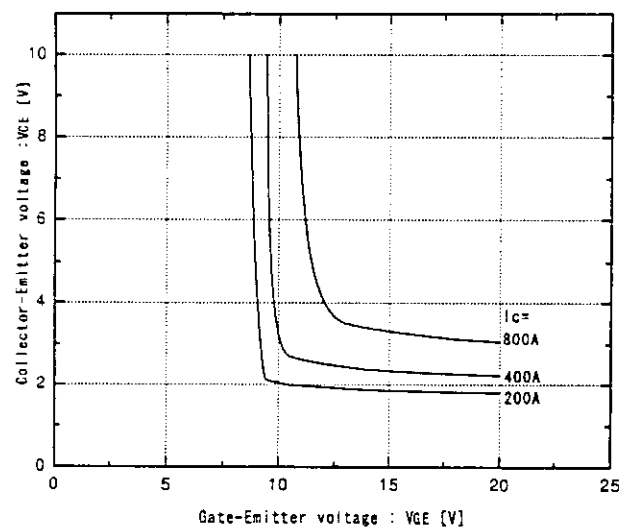
Collector current vs. Collector-Emitter voltage
Tj=25°C



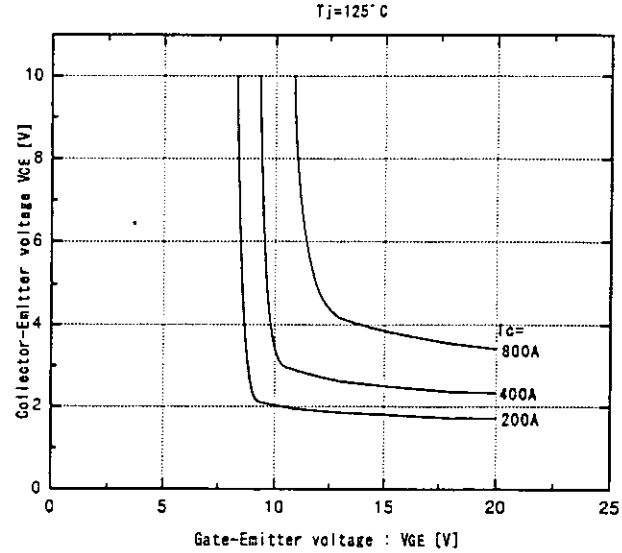
Collector current vs. Collector-Emitter voltage
Tj=125°C



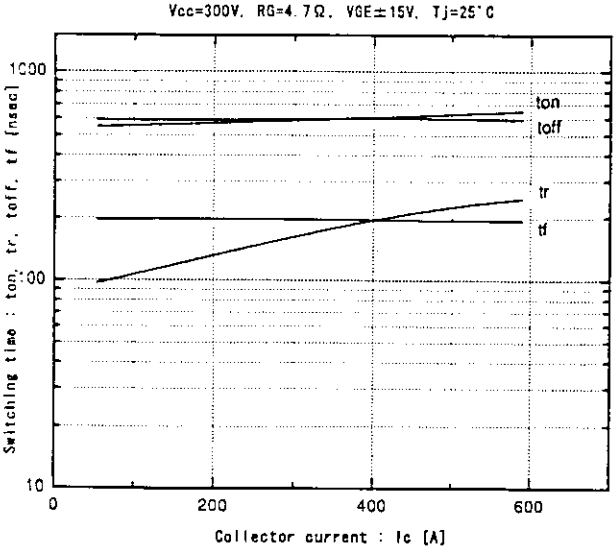
Collector-Emitter vs. Gate-Emitter voltage
Tj=25°C



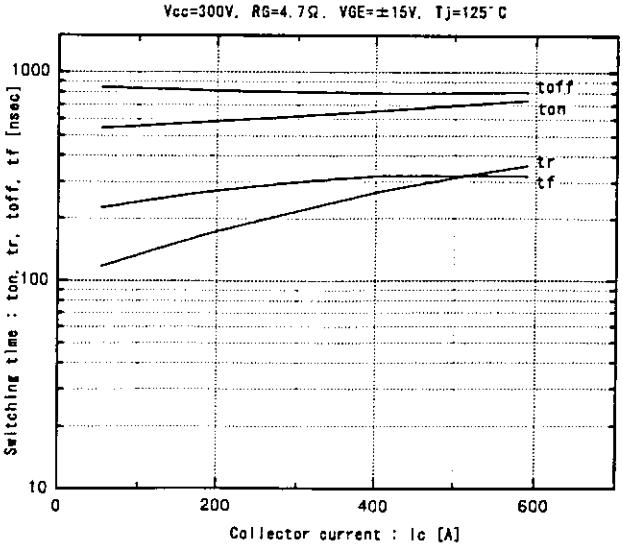
Collector-Emitter vs. Gate-Emitter voltage
Tj=125°C



Switching time vs. Collector current
Vcc=300V, RG=4.7Ω, VGE=±15V, Tj=25°C



Switching time vs. Collector current
Vcc=300V, RG=4.7Ω, VGE=±15V, Tj=125°C



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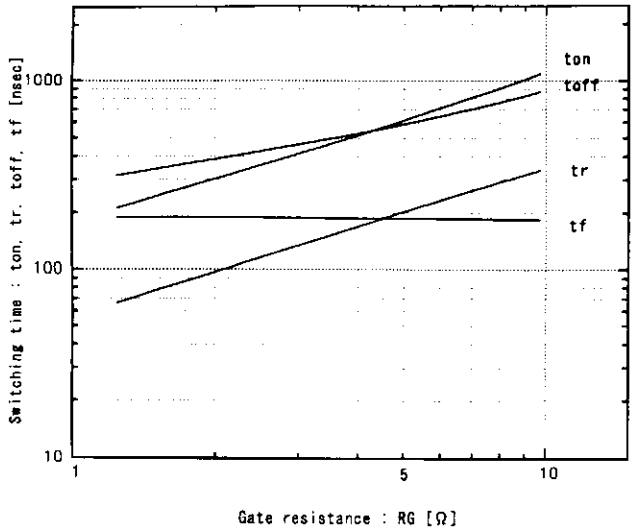
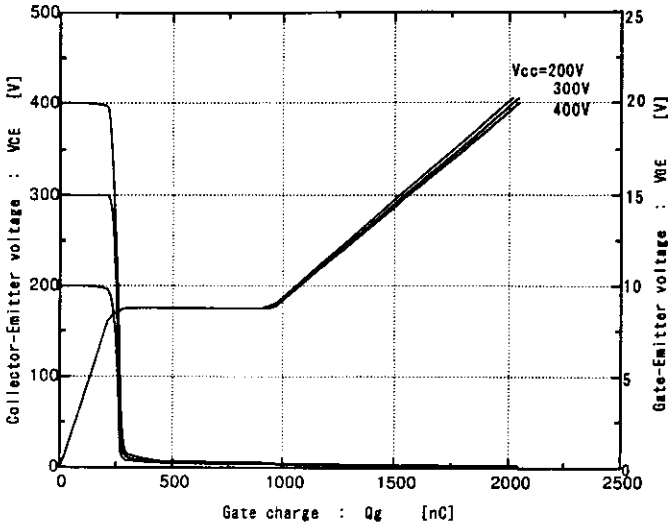
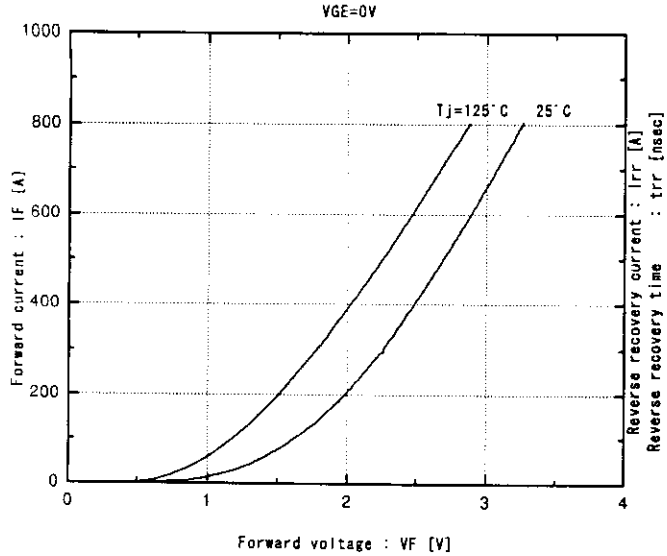
Switching time vs. RG
Vcc=300V, Ic=400A, VGE=±15V, Tj=25°C



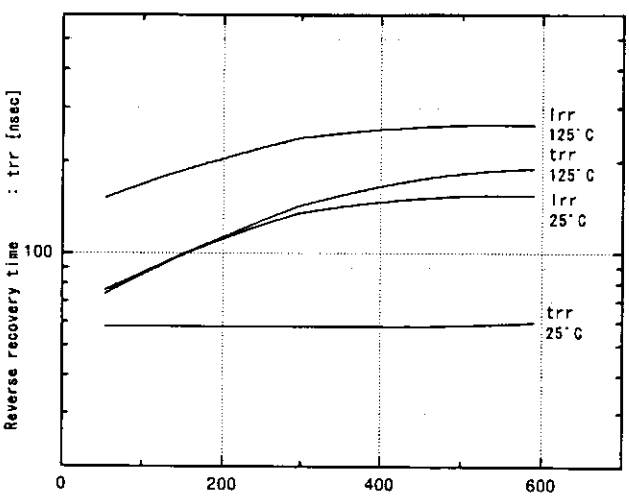
Dynamic input characteristics
Tj=25°C



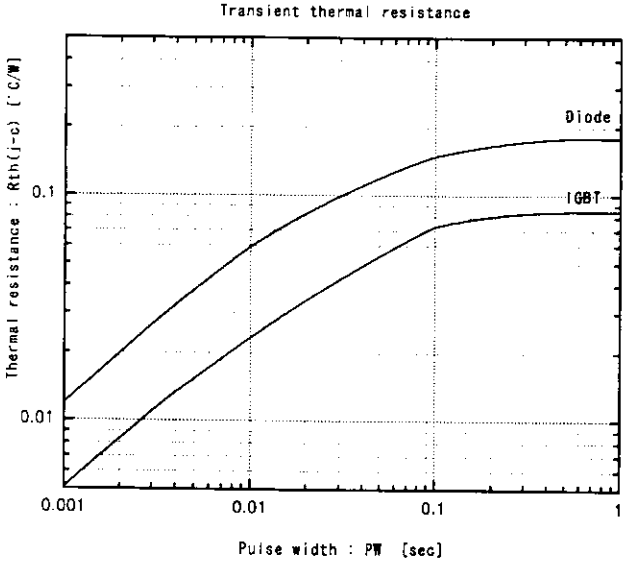
Forward current vs. Forward voltage
VGE=0V



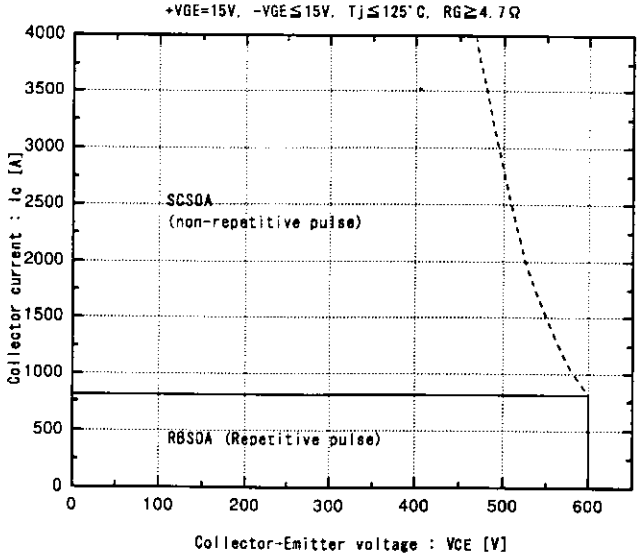
Reverse recovery characteristics
trr, Irr vs. IF



Transient thermal resistance



Reversed biased safe operating area
+VGE=15V, -VGE≦15V, Tj≦125°C, RG≧4.7Ω



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