

SPECIFICATION

Device Name : IGBT module

Type Name : 2MBI200NT-120-02

Spec. No. : **MS5F3938**

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	Feb. -21-'97	<i>Z. Kobayashi</i>	<i>S.K</i>	MS5F3938	1/7
CHECKED	Feb. -21-'97	<i>S. Hiyasaka</i>			a

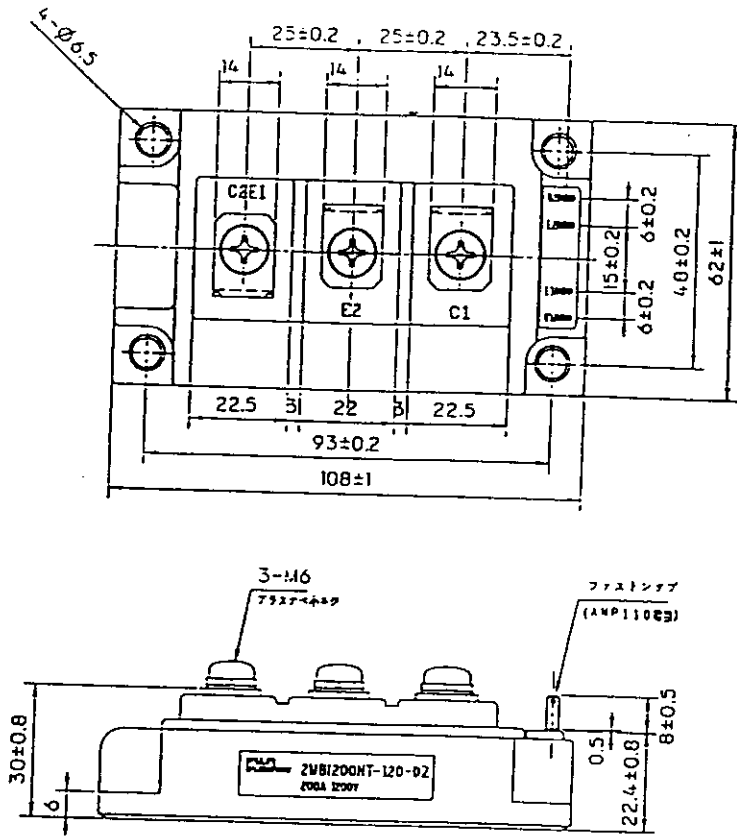
Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Feb. 21. '47	enactment	—	—	Issued date	—	S. Koyama	S. K.
Apr. 18. '47	Revision	a	P5/T Revers gate bias voltage		J. Koyama	S. Koyama	S. K.

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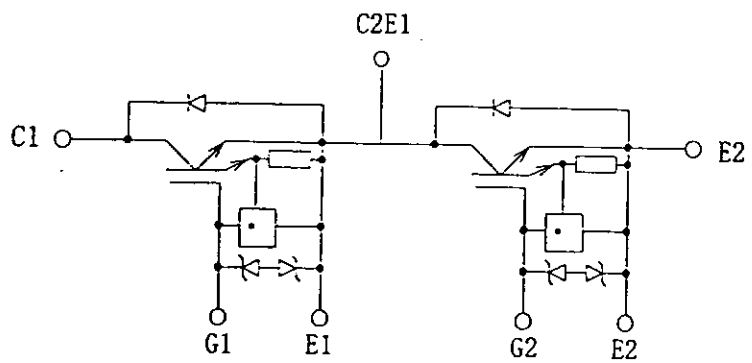
2MBI200NT-120-02

1. Outline Drawing
Unit : mm



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2. Equivalent circuit



* NLU (Over Current Limiting Circuit)

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DWG. NO.

MS5F3938

3/7

1	
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H04-004-03

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

Items		Symbols	Ratings	Units
Collector-Emitter voltage		V _{CEs}	1200	V
Gate-Emitter voltage		V _{GES}	±20	V
Collector current	Continuous	I _c	200	A
	1ms	I _c pulse	400	
		-I _c	200	
	1ms	-I _c pulse	400	
Max. power dissipation		PC	1650	W
Operating temperature		T _j	+150	°C
Storage temperature		T _{stg}	-40~+125	°C
Isolation voltage		V _{is}	AC 2500 (1min.)	V
Screw torque		Mounting *1	3.5	N·m
		Terminals *2	4.5	

Note : *1 Recommendable value : 2.5~3.5 N·m (M5) or (M6)

*2 Recommendable value : 3.5~4.5 N·m (M6)

4. Electrical characteristics (at T_j=25°C unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector current	I _{CEs}			2.0	V _{GE} =0V, V _{CE} =1200V	mA
Gate-Emitter leakage current	I _{GES}			30	V _{CE} =0V, V _{GE} =±20V	μA
Gate-Emitter threshold voltage	V _{GE(th)}	4.5		7.5	V _{CE} =20V, I _c =200mA	V
Collector-Emitter saturation voltage	V _{CE(sat)}			3.5	V _{GE} =15V, I _c =200A	V
Input capacitance	C _{ies}		32000		V _{GE} =0V	pF
Output capacitance	C _{oes}		15000		V _{CE} =10V	
Reverse transfer capacitance	C _{res}		12500		f=1MHz	
Turn-on time	t _{on}		0.65	1.2	V _{cc} =600V	μs
	t _r		0.25	0.6	I _c =200A	
Turn-off time	t _{off}		0.85	1.5	V _{GE} =±15V	μs
	t _f		0.35	0.5	R _G =4.7Ω	
Diode forward on voltage	V _F			3.4	I _F =200A, V _{GE} =0V	V
Reverse recovery time	t _{rr}			350	I _F =200A	ns
Short-circuit withstand capability	P _w	10			V _{cc} =800V, V _{GE} =-15V R _G =1.8Ω	μs

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	R _{th(j-c)}			0.077	IGBT	°C/W
	R _{th(j-c)}			0.20	Diode	
	※		0.025		the base to cooling	
	R _{th(c-f)}				fin	

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

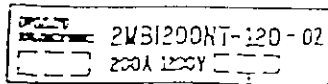
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MS5F3938

4/7

104-C04-03



Lot No.

Place of manufacturing (code)

7. Applicable category (適用範囲)

This specification is applied to IGBT module named 2MBI200NT-120-02.
 本納入仕様書は、IGBTモジュール 2MBI200NT-120-02 に適用する。

8. 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°C and humidity of 45 to 75%.
 常温保管が望ましい。(5~35°C、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。

9. Heat sink mounting notes (ヒートシンク取り付け上の注意事項)

- The mounting surface of the heat sink should be finished to a roughness of 10 μ m or less and a warp between screw holes of 100 μ m or less.
 本モジュールを取り付ける冷却体の取付面の仕上げは、粗さ10 μ m以下、取付ネジ間で平坦度100 μ m以下とする。
- Each mounting screw should be fastened using a specified torque after pre-fastening using a 1/3 specified torque.
 取付けネジは、規定の1/3のトルクで仮締を行った後、規定のトルクで本締を行って下さい。
- If the above notes are not met, it has a possibility to break the insulation between the IGBT module's chips and metal base.
 上記注意事項の範囲外で御適用した場合、IGBTモジュールのチップと金属ベース間の絶縁破壊を生ずる可能性があります。

⑩ Revers gate bias voltage (ゲート逆バイアス電圧)

- ① Recommendable value of the revers gate bias voltage : -7V(typ.), -5V(min.) $R_G=4.7\Omega$
 ゲート逆バイアス電圧の推奨値 : -7V(typ.), -5V(min.) $R_G=4.7\Omega$
- ② The revers gate bias voltage means the voltage between the gate terminal and the auxiliary emitter terminal of the modules.
 ゲート逆バイアス電圧は、モジュールのゲート端子と補助エミッタ端子間の電圧である。

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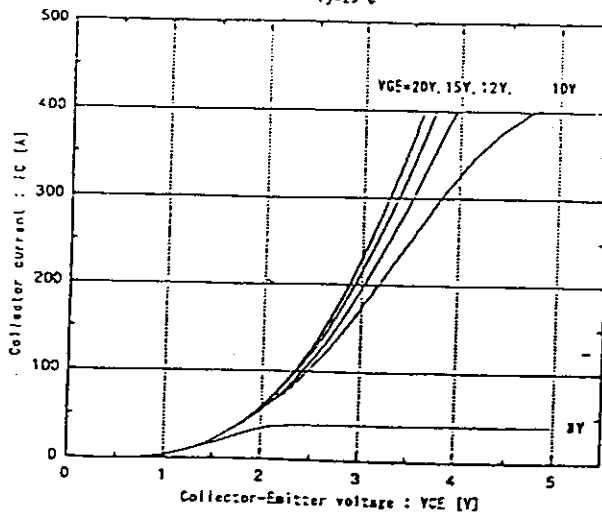
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5/7

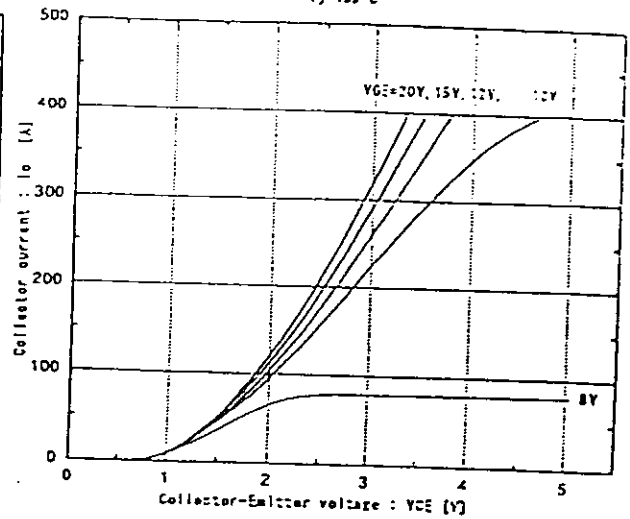
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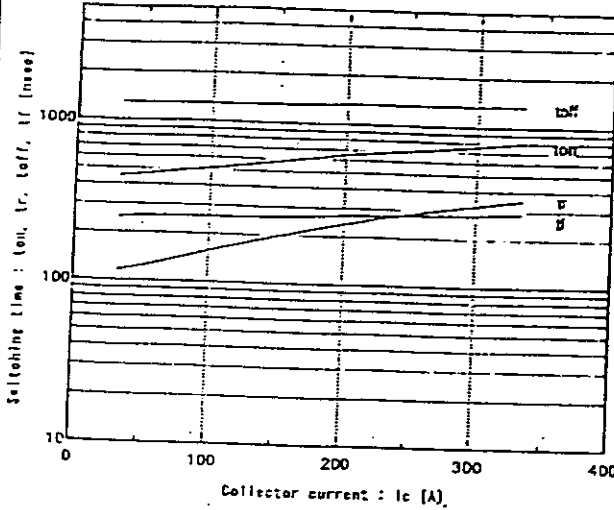
Collector current vs. Collector-Emitter voltage
Tj=25°C



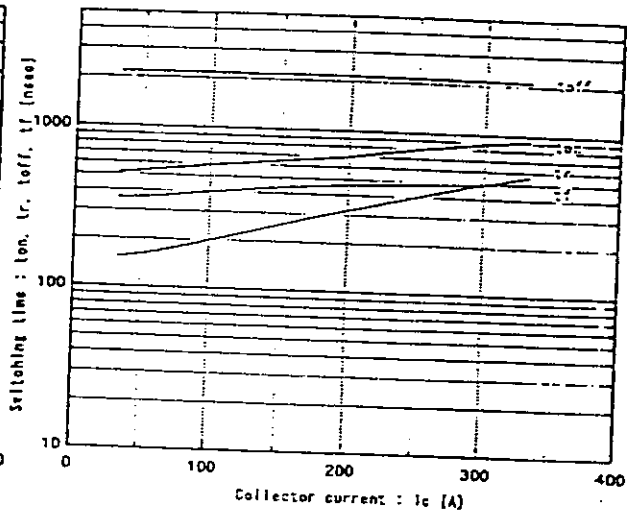
Collector current vs. Collector-Emitter voltage
Tj=135°C



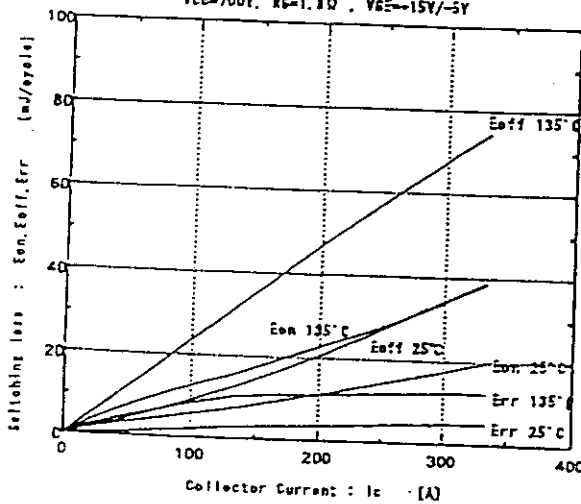
Switching time vs. Collector current
Vcc=700V, Rθ=1.8Ω, VGE=15V/-5V, Tj=25°C



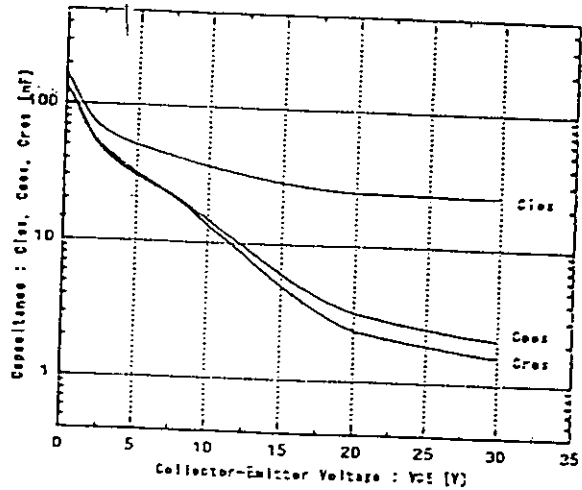
Switching time vs. Collector current
Vcc=700V, Rθ=1.8Ω, VGE=15V/-5V, Tj=135°C



Switching loss vs. Collector current
Vcc=700V, Rθ=1.8Ω, VGE=15V/-5V



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



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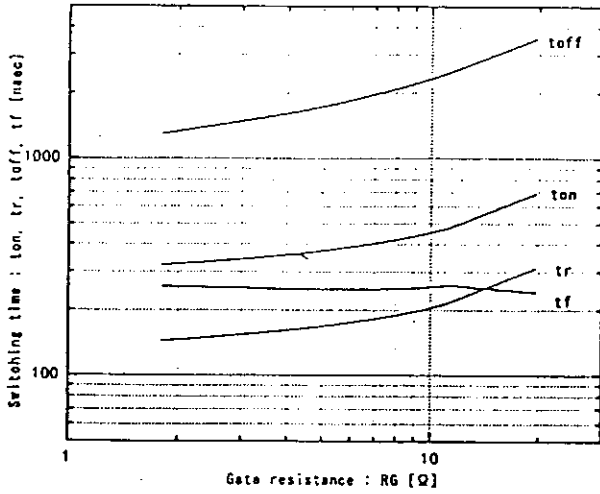
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6/7

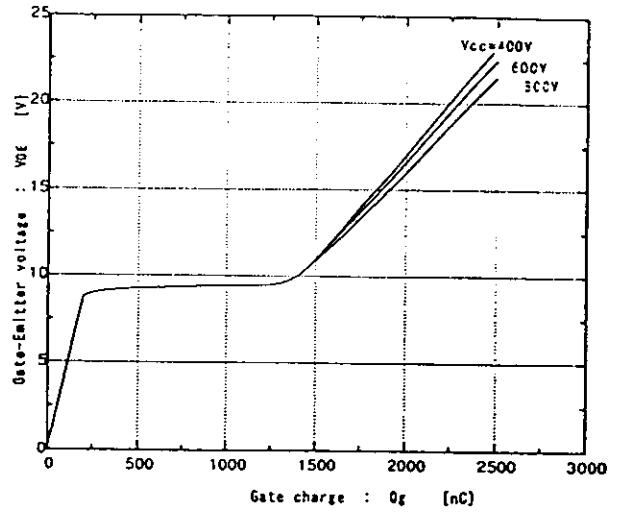
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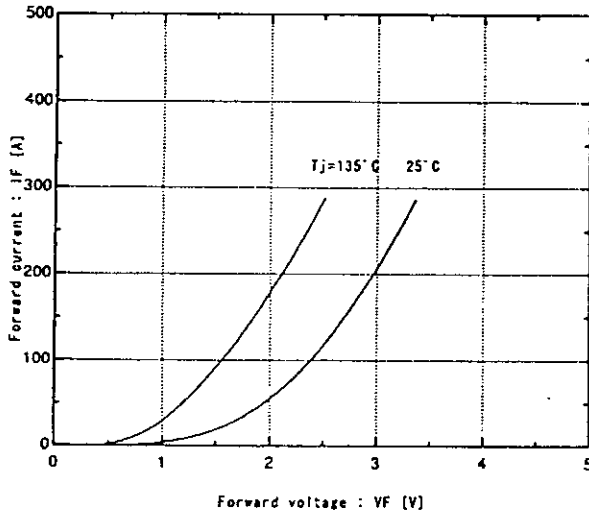
Switching time vs. R_G
 $V_{CC}=700V, I_c=200A, V_{GE}=-15V/-5V, T_j=25^\circ C$



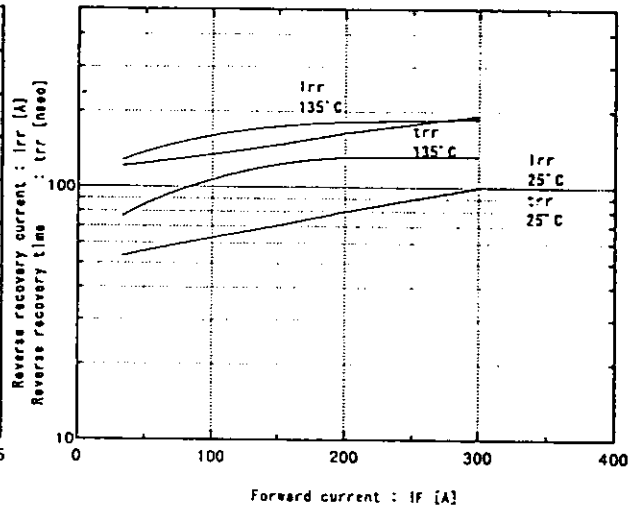
Dynamic input characteristics
 $T_j=25^\circ C$



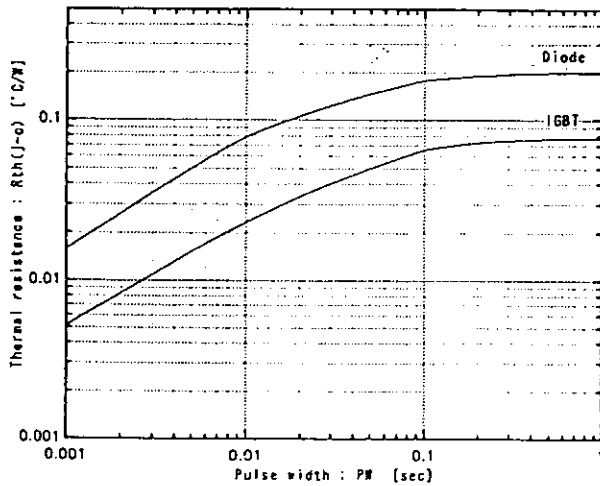
Forward current vs. Forward voltage
 $V_{GE}=0V$



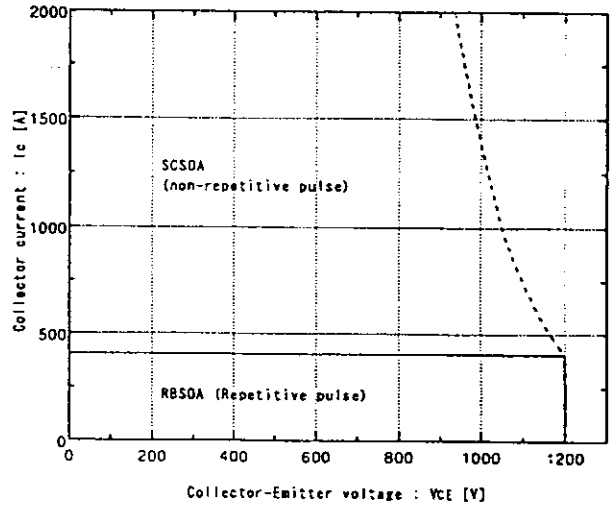
Reverse recovery characteristics
 t_{rr}, I_{rr} vs. I_F



Transient thermal resistance



Reversed biased safe operating area
 $-V_{GE}=15V, -V_{GE} \leq 15V, T_j \leq 135^\circ C, R_G \geq 1.8\Omega$



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7/7