

# SPECIFICATION

Device Name : IGBT module

Type Name : 1MBI400NB-120

Spec. No. : **MS5F3241**

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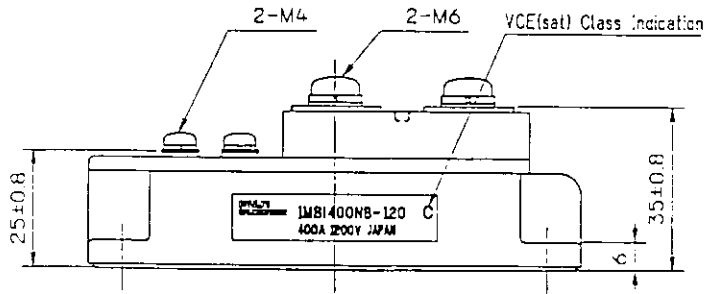
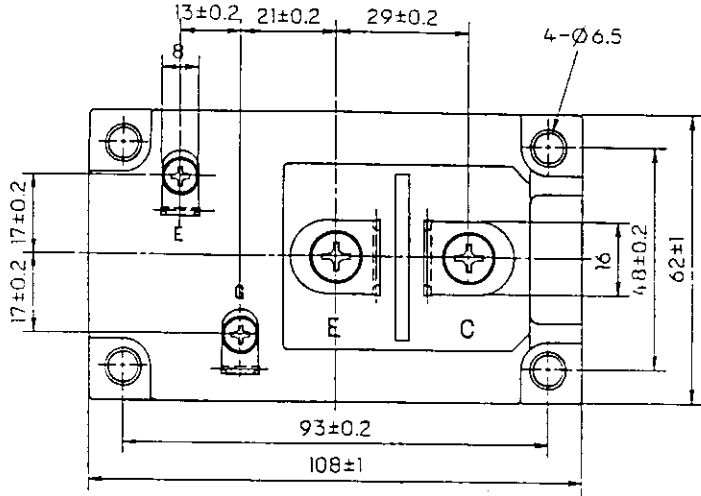
	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.
DRAWN	Oct. - 3 - 95	S. Miyashita		<b>MS5F3241</b> <span style="float: right;">1/8</span>
CHECKED	Oct. - 3 - 95	T. HOSEN		
			<i>S. Kobayashi</i>	



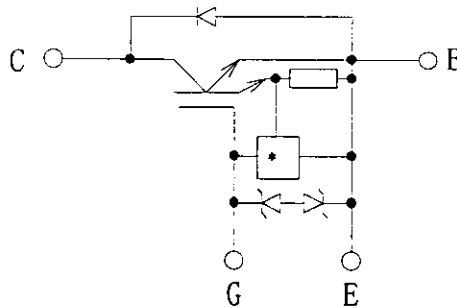
1MBI400NB-120

1. Outline Drawing

Unit : mm



2. Equivalent circuit



\*NLU (Over Current Limiting Circuit)

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

Items		Symbols	Ratings	Units
Collector-Emitter voltage		V <sub>CE</sub>	1200	V
Gate-Emitter voltage		V <sub>GE</sub>	±20	V
Collector current	Continuous	I <sub>c</sub>	400	A
	1ms	I <sub>c</sub> pulse	800	
		-I <sub>c</sub>	400	
	1ms	-I <sub>c</sub> pulse	800	
Max. power dissipation		P <sub>C</sub>	3100	W
Operating temperature		T <sub>j</sub>	+150	°C
Storage temperature		T <sub>stg</sub>	-40~+125	°C
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°C unless otherwise specified)

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Zero gate voltage Collector current	IC <sub>ES</sub>			4.0	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V	mA
Gate-Emitter leakage current	IG <sub>ES</sub>			60	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V	μA
Gate-Emitter threshold voltage	V <sub>GE</sub> (th)	4.5		7.5	V <sub>CE</sub> =20V, I <sub>c</sub> =400mA	V
Collector-Emitter saturation voltage	V <sub>CE</sub> (sat)			3.3	V <sub>GE</sub> =15V, I <sub>c</sub> =400A	V
Input capacitance	C <sub>ies</sub>		64000		V <sub>GE</sub> =0V	pF
Output capacitance	C <sub>oes</sub>		23200		V <sub>CE</sub> =10V	
Reverse transfer capacitance	C <sub>res</sub>		20640		f=1MHz	
Turn-on time	t <sub>on</sub>		0.75	1.2	V <sub>cc</sub> =600V	μs
	t <sub>r</sub>		0.25	0.6	I <sub>c</sub> =400A	
Turn-off time	t <sub>off</sub>		1.05	1.5	V <sub>GE</sub> =±15V	μs
	t <sub>f</sub>		0.35	0.5	R <sub>G</sub> =1.8Ω	
Diode forward on voltage	V <sub>F</sub>			3.0	I <sub>F</sub> =400A, V <sub>GE</sub> =0V	V
Reverse recovery time	t <sub>rr</sub>			350	I <sub>F</sub> =400A	ns

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Units
		min.	typ.	max.		
Thermal resistance	R <sub>th</sub> (j-c)			0.04	IGBT	°C/W
	R <sub>th</sub> (j-c)			0.12	Diode	
	※ R <sub>th</sub> (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.

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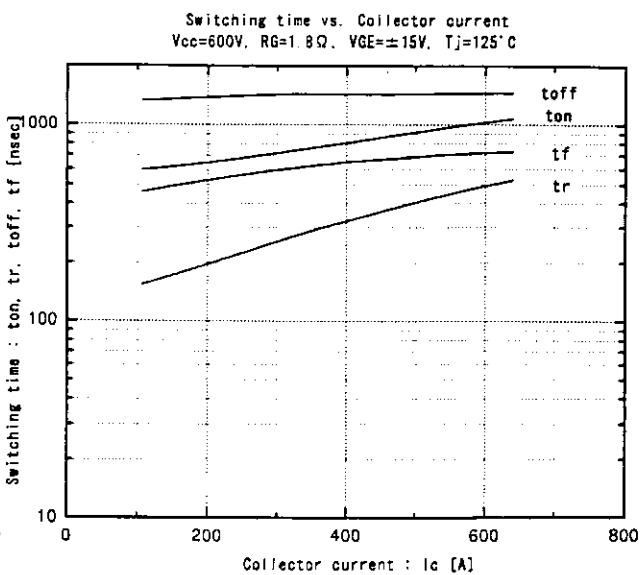
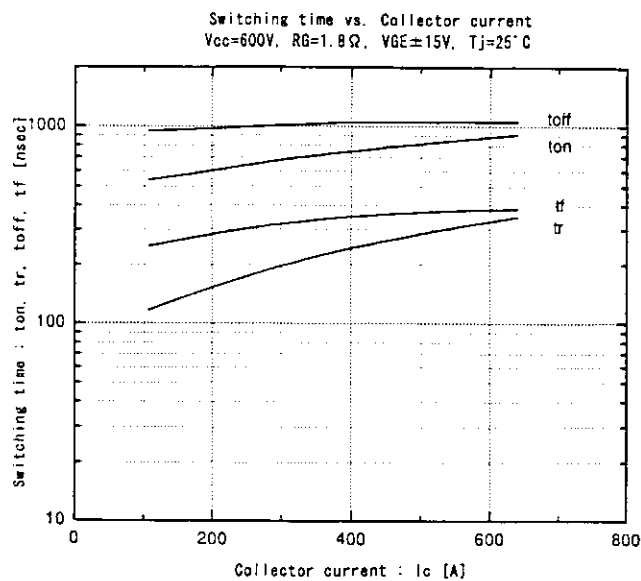
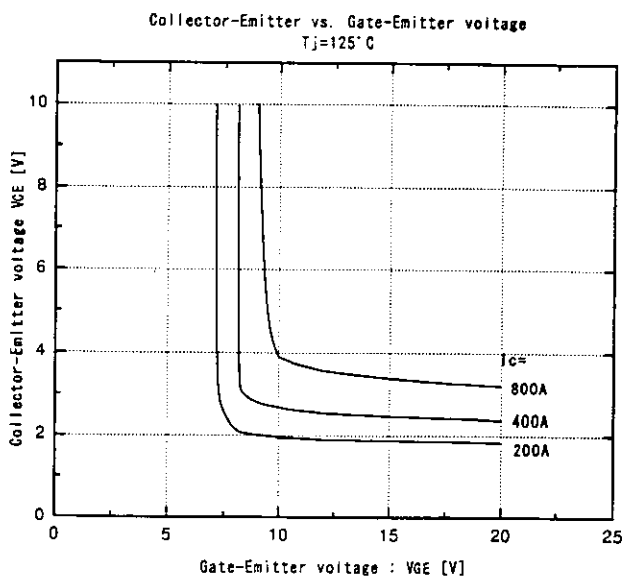
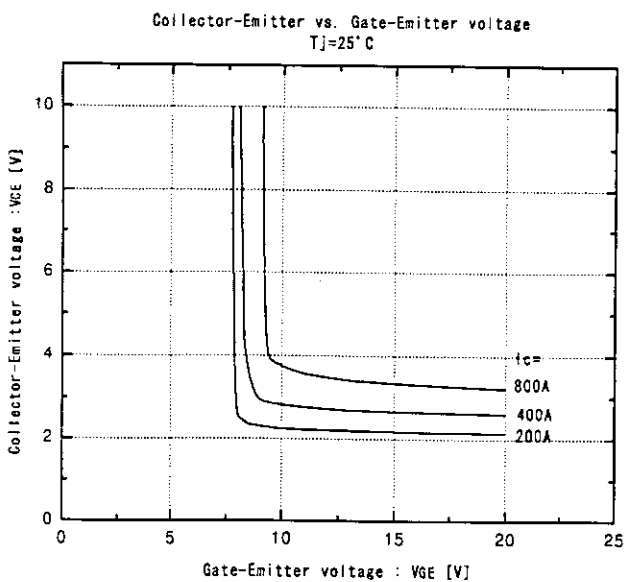
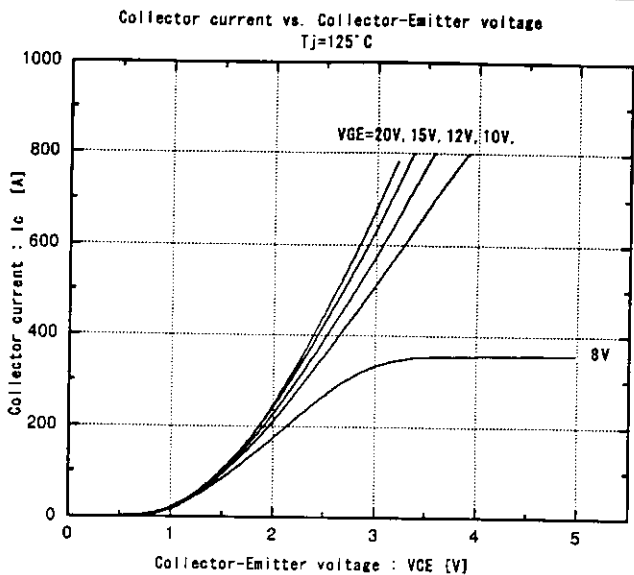
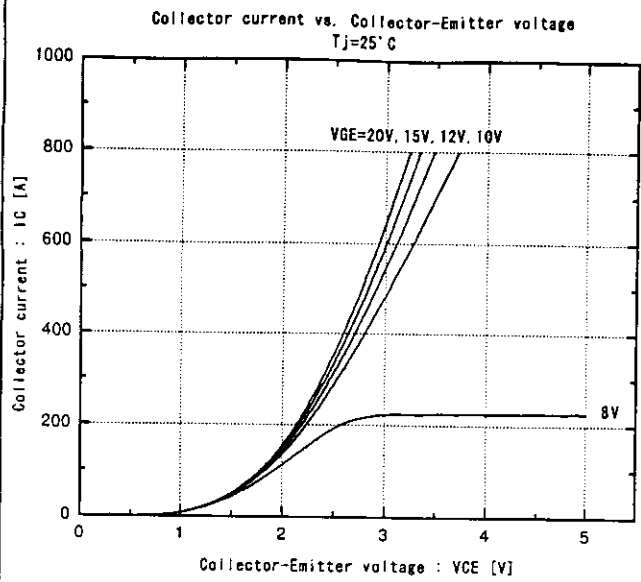
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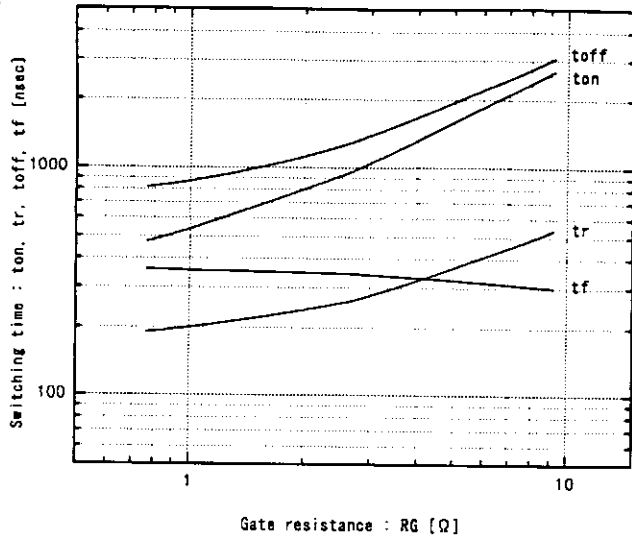
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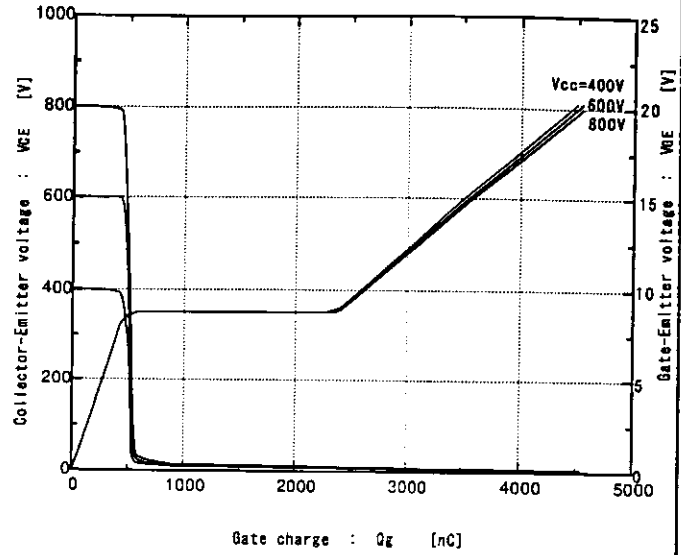
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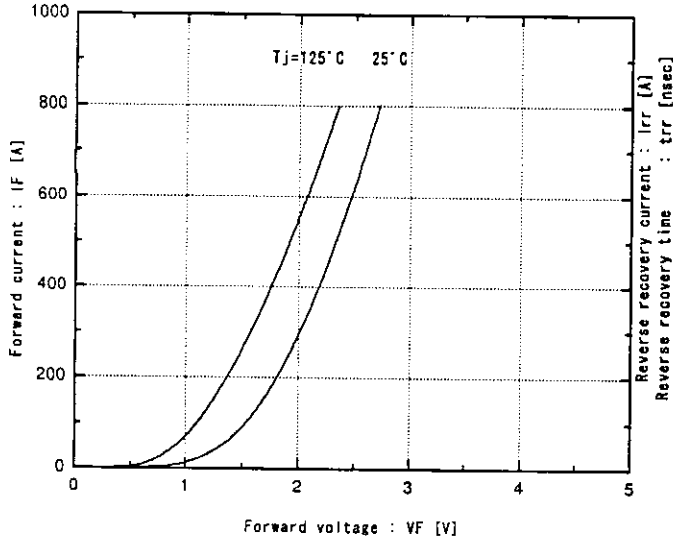
Switching time vs.  $R_G$   
 $V_{CC}=600V, I_C=400A, V_{GE}=\pm 15V, T_j=25^\circ C$



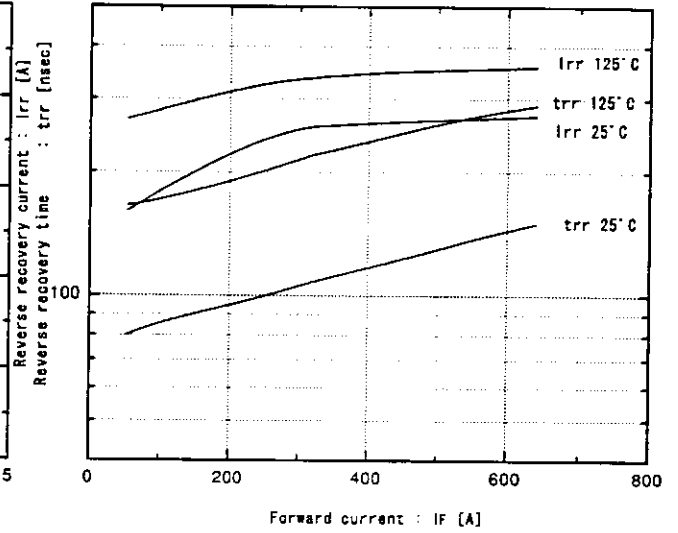
Dynamic input characteristics  
 $T_j=25^\circ C$



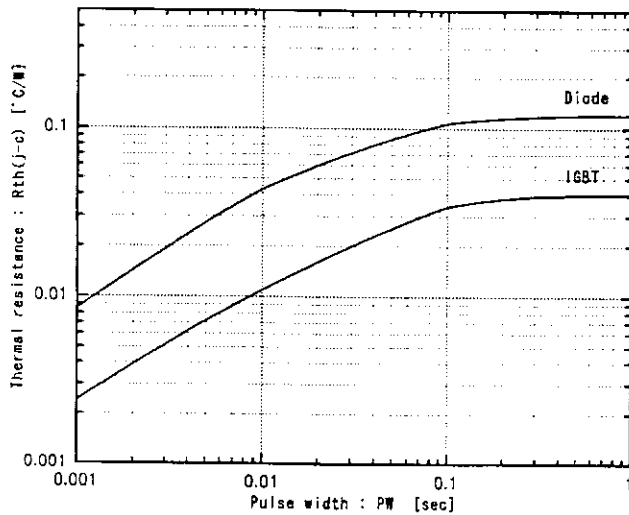
Forward current vs. Forward voltage  
 $V_{GE}=0V$



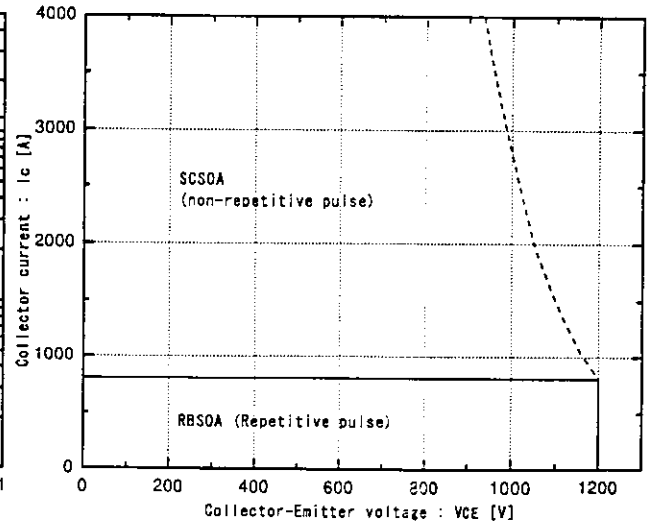
Reverse recovery characteristics  
 $t_{rr}, I_{rr}$  vs.  $I_F$



Transient thermal resistance



Reversed biased safe operating area  
 $+V_{GE}=15V, -V_{GE}\le 15V, T_j\le 125^\circ C, R_G\ge 1.8\Omega$



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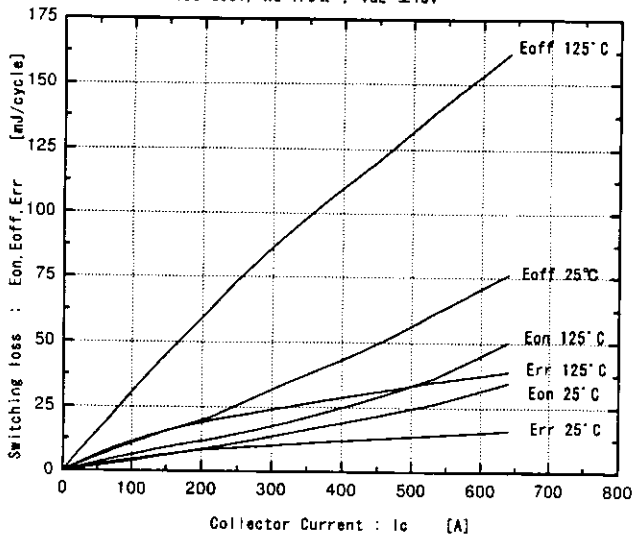
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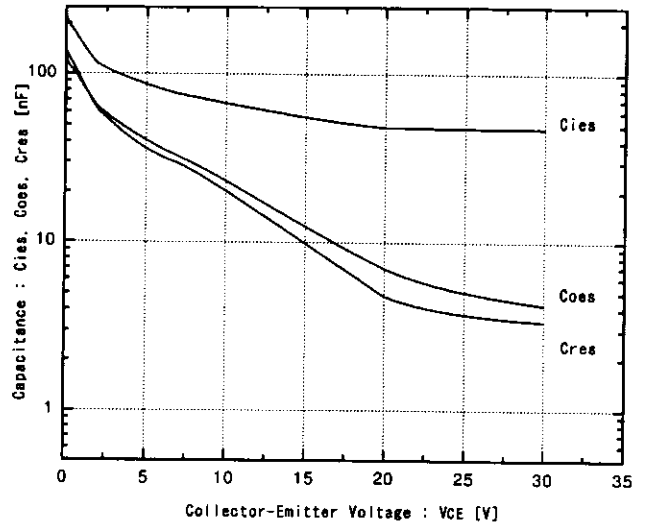
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Switching loss vs. Collector current  
 $V_{cc}=600V$ ,  $R_G=1.8\Omega$ ,  $V_{GE}=\pm 15V$



Capacitance vs. Collector-Emitter voltage  
 $T_j=25^\circ C$



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