

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR15SA060D-01

Spec. No. : MS6M 0541

Date : Jun. - 02 - 2000

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	Jun. - 2 - '00	<i>T. Nakagishi</i>		DWG. NO.	MS6M 0541
CHECKED	June - 2 - 00	<i>S. Matsumoto</i>	<i>T. Miyatake</i>		

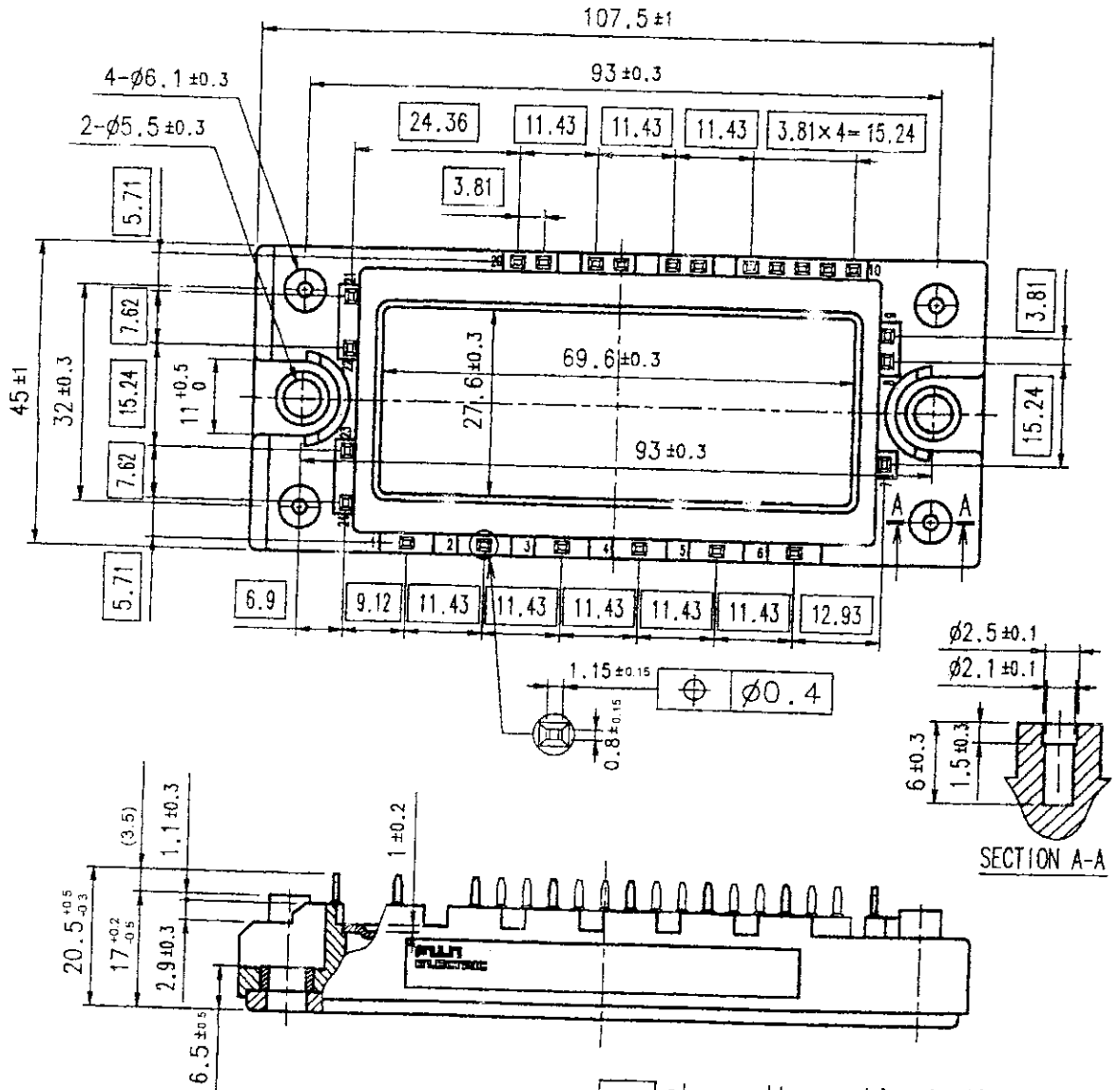
Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Jun.-2-'00	enactment	—	—————	Issued date	—	S. M. A. a	T. Miyasaka

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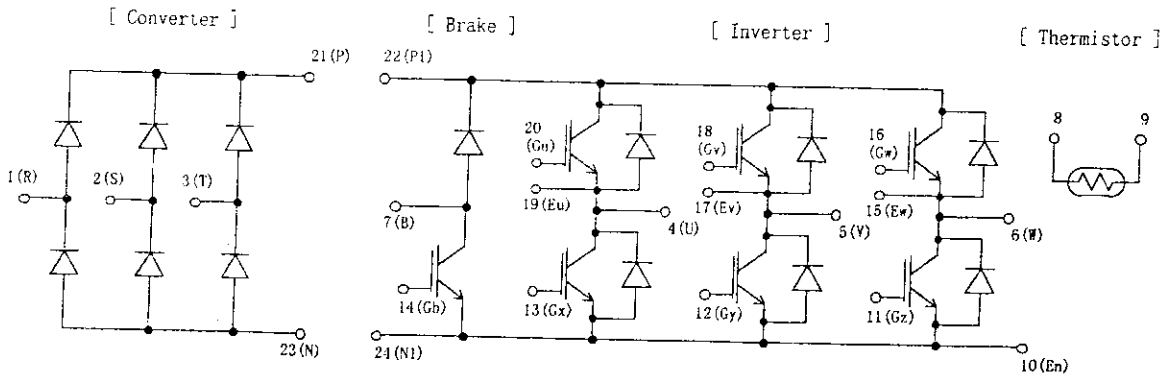
1. Outline Drawing (Unit : mm)



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□ shows theoretical dimension.

2. Equivalent circuit



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DWG. NO.

MS6M 0541

3 / 10

H04-004-03

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

Items		Symbols	Conditions	Maximum Ratings	Units
Inverter	Collector-Emitter voltage	VCES		600	V
	Gate-Emitter voltage	VGES		+20	V
	Collector current	Ic	Continuous	20	A
		Icp	1ms	40	A
		-Ic		20	A
Collector Power Dissipation	Pc	1 device	80	W	
Brake	Collector-Emitter voltage	VCES		600	V
	Gate-Emitter voltage	VGES		+20	V
	Collector current	Ic	Continuous	20	A
		Icp	1ms	40	A
		Pc	1 device	50	W
	Repetitive peak reverse Voltage(Diode)	VRRM		600	V
Converter	Repetitive peak reverse Voltage	VRRM		800	V
	Average Output Current	Io	50Hz/60Hz sine wave	25	A
	Surge Current (Non-Repetitive)	IFSM	Tj=150C, 10ms	260	A
	I ² t (Non-Repetitive)	I ² t	half sine wave	338	A ² s
Junction temperature		Tj		150	C
Storage temperature		Tstg		-40~ +125	C
Isolation voltage	between terminal and copper base ^{(*)1}	Viso	AC : 1min.	2500	V
	between thermistor and others ^{(*)2}			2500	V
Mounting Screw Torque ^{(*)3}				3.5	Nm

(*)1 All terminals should be connected together when isolation test will be done.

(*)2 Terminal 8 and 9 should be connected together. Terminal 1 to 7 and 10 to 24 should be connected together and shorted to copper base.

(*)3 Recommendable Value : 2.5~3.5 Nm (M5)

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MS6M 0541

4 / 10

H04-004-03

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

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	Max.		
Inverter	Zero gate voltage	ICES	VGE 0 V, VCE 600 V				
	Collector current	ICES	VGE 0 V, VCE 600 V			1.0 mA	
	Gate-Emitter leakage current	IGES	VCE 0 V, VGE +-20 V			200 nA	
	Gate-Emitter threshold voltage	VGE(th)	VCE 20 V, Ic = 20 mA	5.5	7.8	8.5 V	
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, Ic = 20 A	chip	1.8		V
				terminal	1.95	2.4	
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz	3000			pF
	Turn-on time	ton	Vcc= 300 V		0.45	1.2	us
		tr	Ic = 20 A		0.25	0.6	
		tr(0)	VGE +-15 V		0.08		
	Turn-off time	toff	RG = 120 ohm		0.40	1.0	us
		tf			0.05	0.35	
Forward on voltage	VF	IF = 20 A	chip	1.8		V	
			terminal	1.95	2.6		
Reverse recovery time	trr	IF = 20 A			300	ns	
Brake	Zero gate voltage	ICES	VGE 0 V, VCE 600 V				
	Collector current	ICES	VGE 0 V, VCE 600 V			1.0 mA	
	Gate-Emitter leakage current	IGES	VCE 0 V, VGE +-20 V			200 nA	
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, Ic = 20 A	chip	1.8		V
				terminal	1.95	2.4	
	Turn-on time	ton	Vcc= 300 V		0.45	1.2	us
		tr	Ic = 20 A		0.25	0.6	
	Turn-off time	toff	VGE +-15 V		0.40	1.0	us
		tf	RG = 120 ohm		0.05	0.35	
	Reverse current	IRRM	VR = 600 V			1.0	mA
	Forward on voltage	VFM	IF = 20 A	chip	1.0		V
				terminal	1.1	1.5	
Reverse current	IRRM	VR = 800 V			1.0	mA	
Thermistor	Resistance	R	T = 25C	5000		ohm	
			T = 100C	465	495		520
	B value	B	T = 25/50C	3305	3375	3450	K

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			1.56	C/W
		Inverter FWD			3.00	
		Brake IGBT			2.50	
		Converter Diode			1.30	
Contact Thermal resistance	Rth(c-f)	with Thermal Compound (*)		0.05		C/W

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

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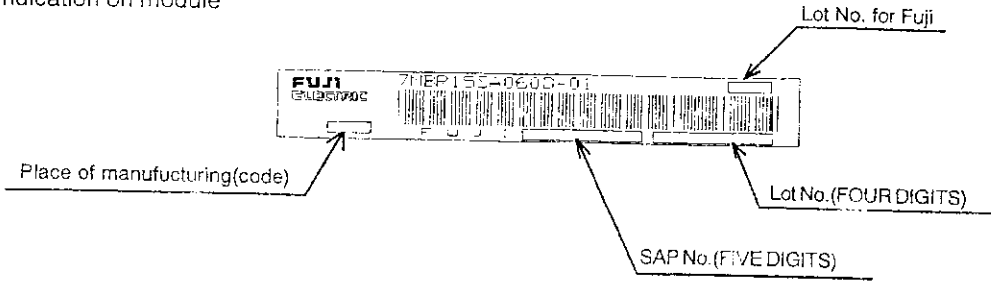
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MS6M 0541

5 / 10

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6. Indication on module



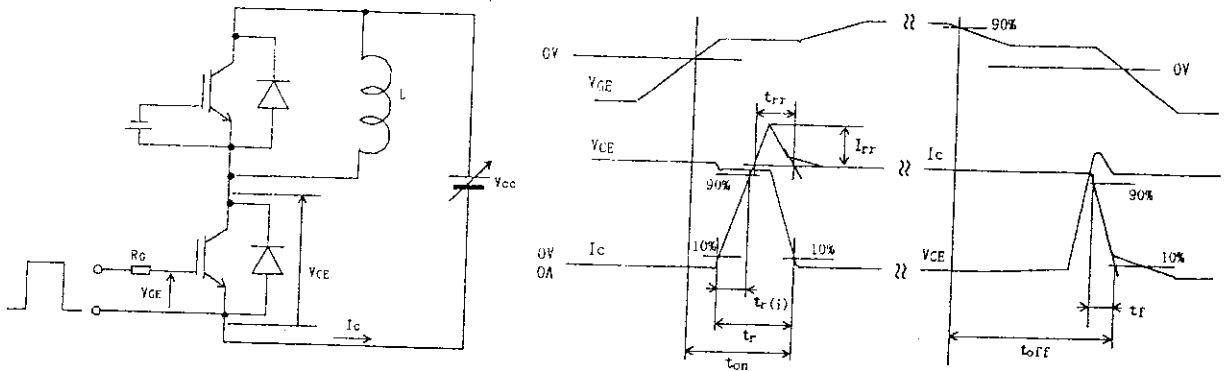
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR15SA060D-01.

8. Storage and transportation notes

- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
- Avoid exposure to corrosive gases and dust.
- Avoid excessive external force on the module.
- Store modules with unprocessed terminals.
- Do not drop or otherwise shock the modules when transporting.
- Please connect adequate fuse or protector of circuit between three-phase line and this product to prevent the equipment from causing secondary destruction.

9. Definitions of switching time



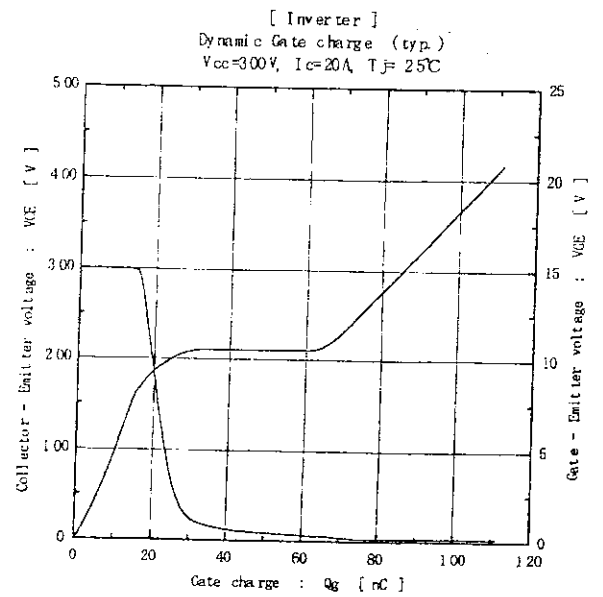
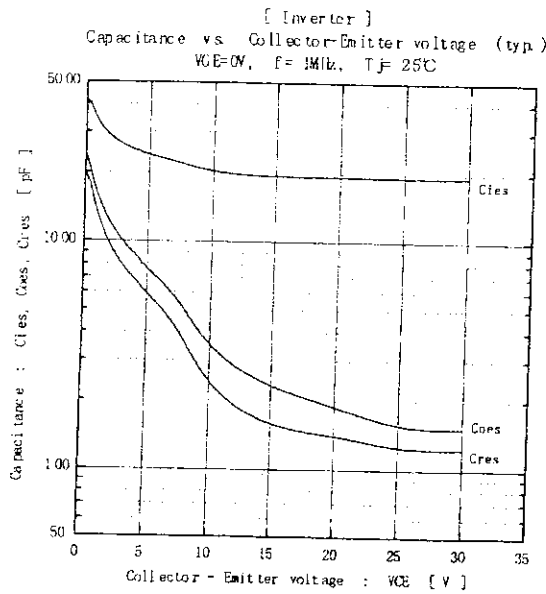
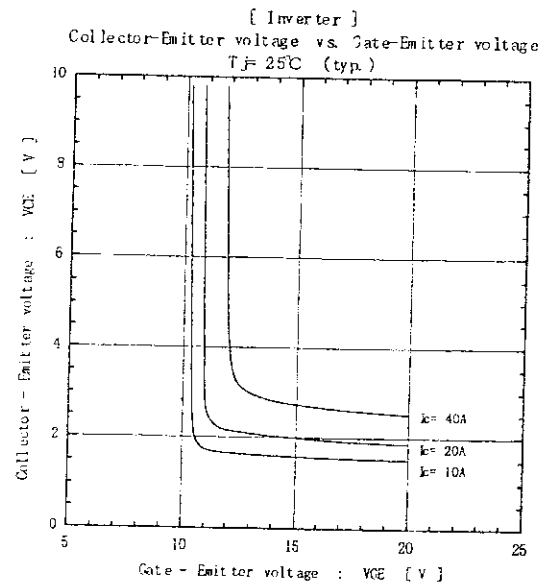
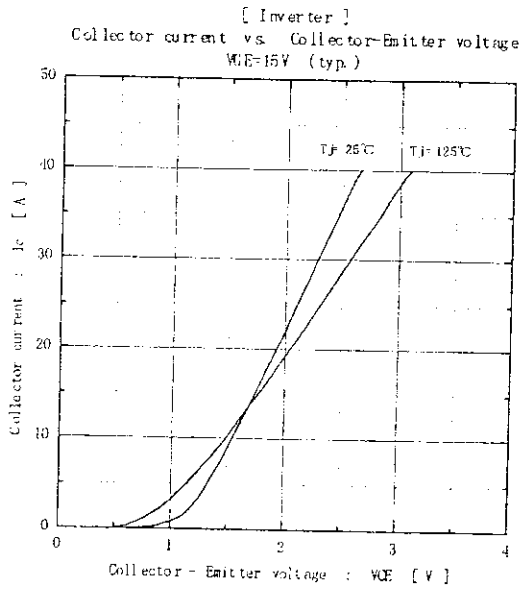
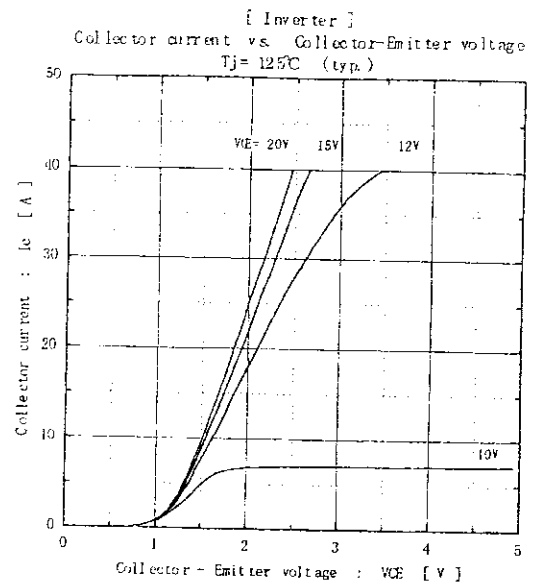
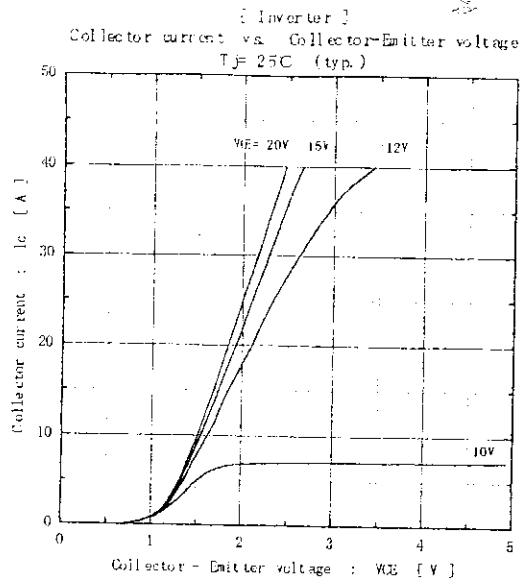
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6 / 10

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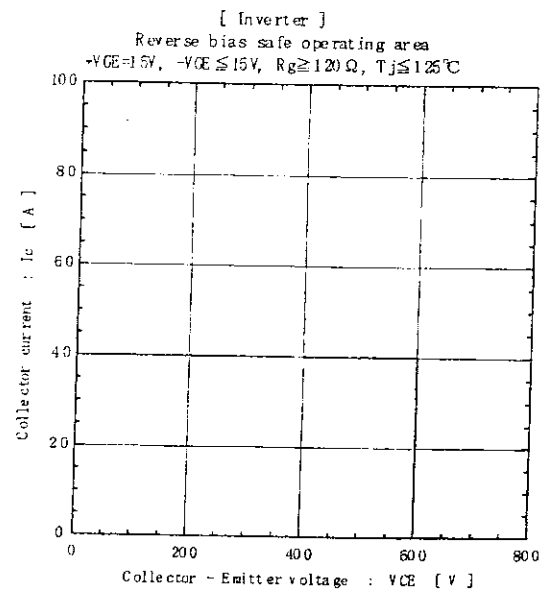
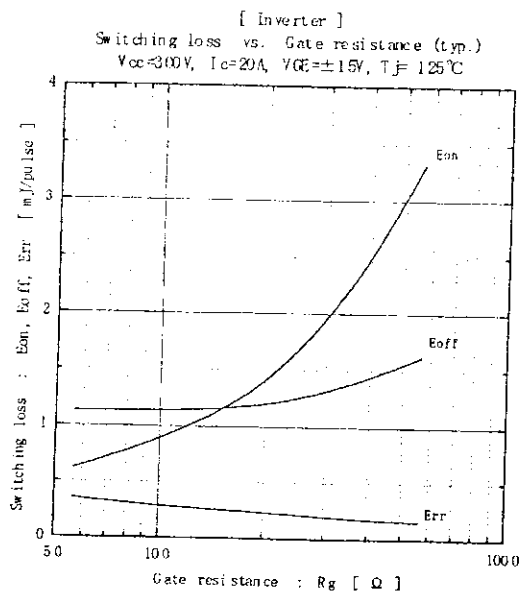
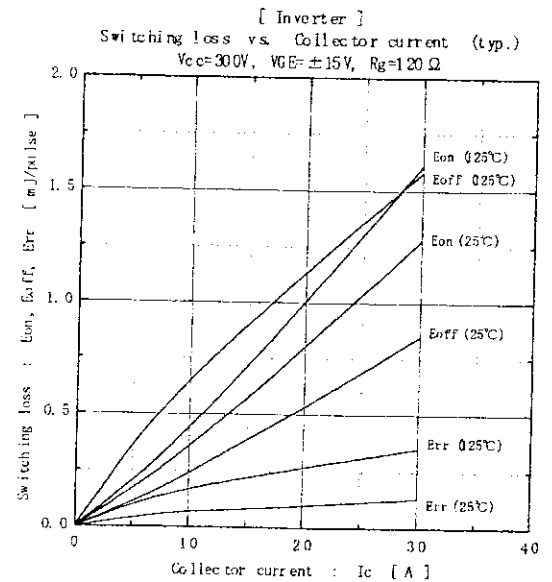
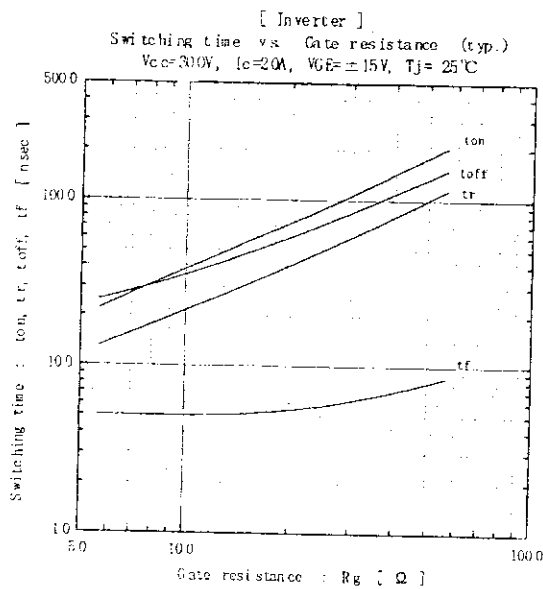
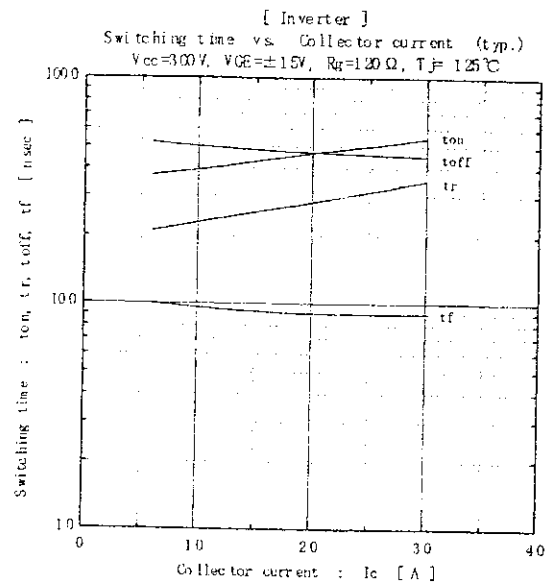
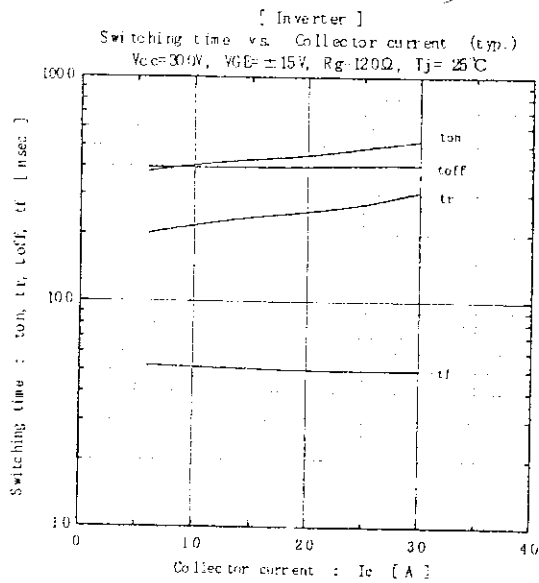
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7 / 10

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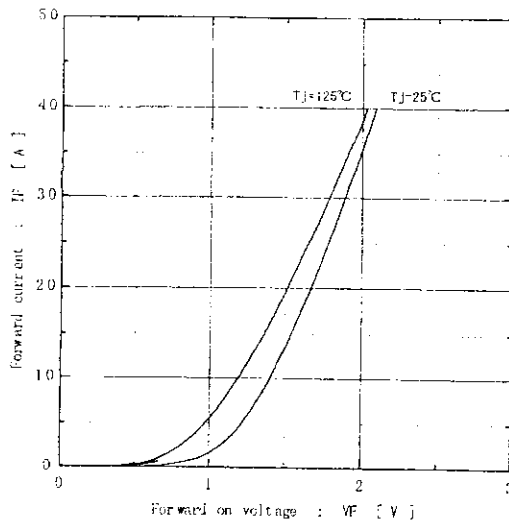
MS6M 0541

8/10

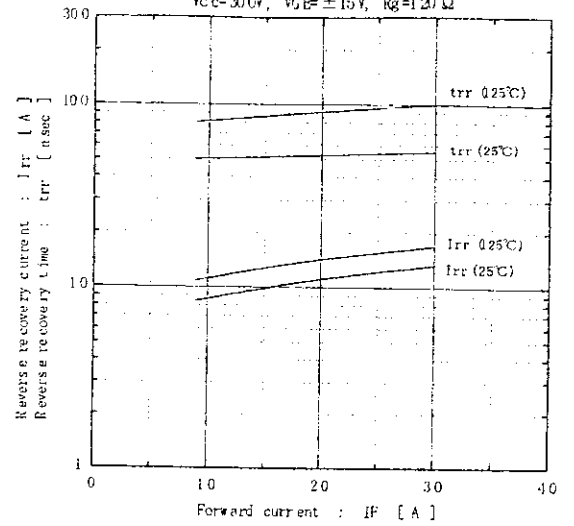
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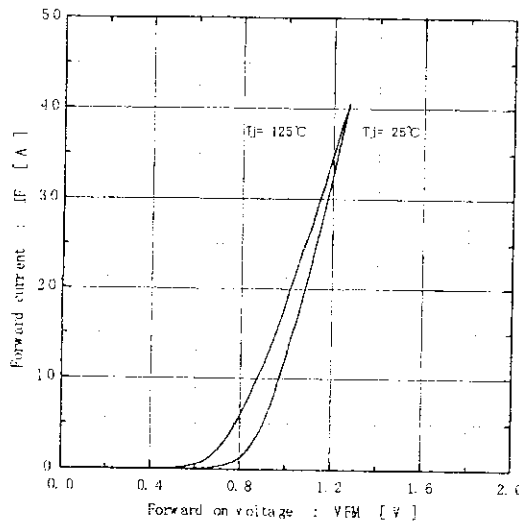
[Inverter]
Forward current vs. Forward on voltage (typ.)



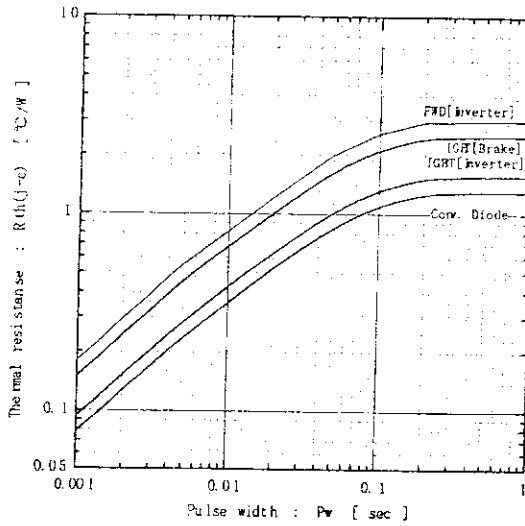
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=120\Omega$



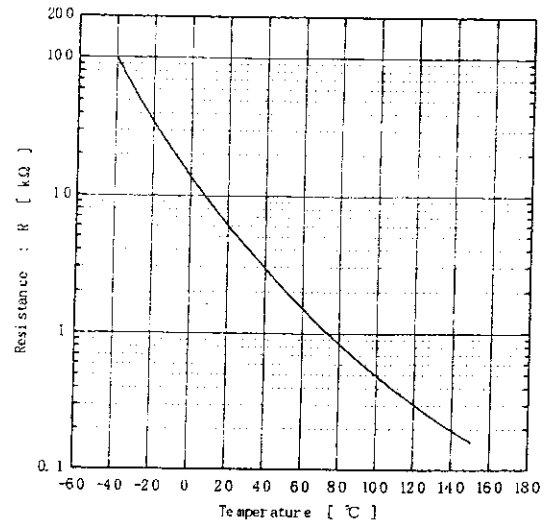
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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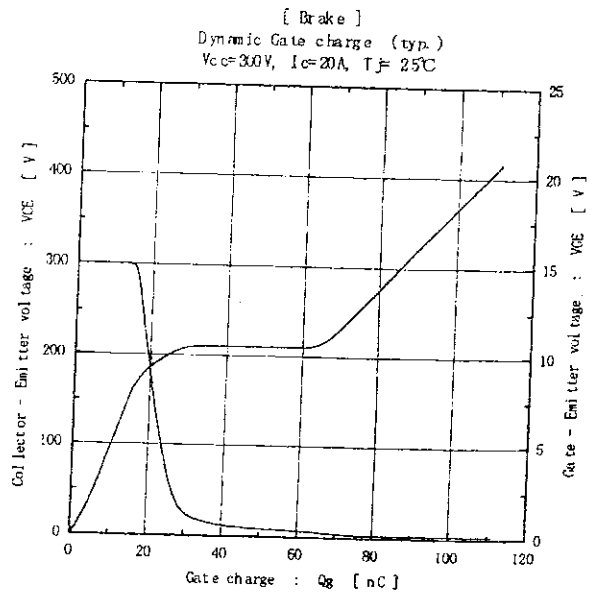
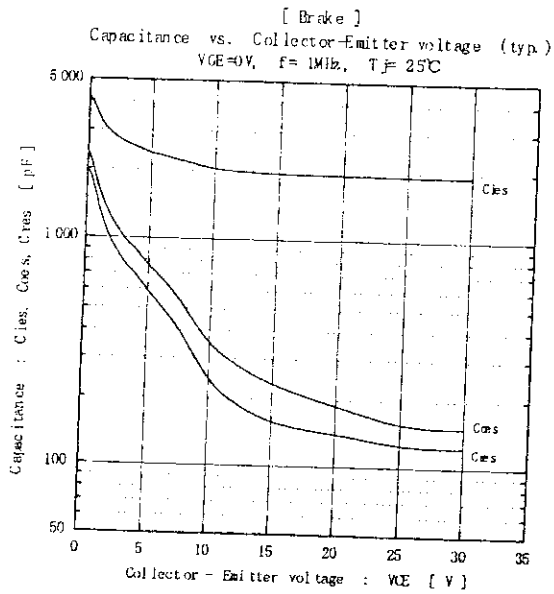
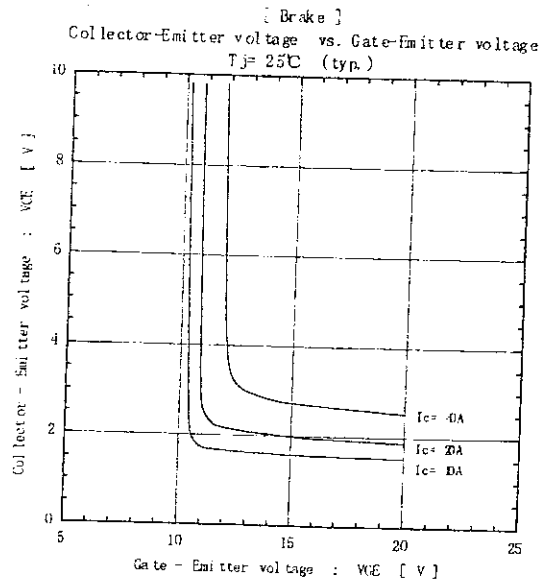
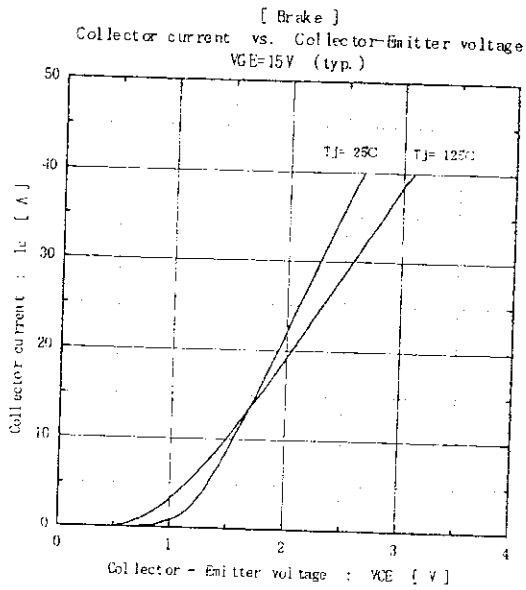
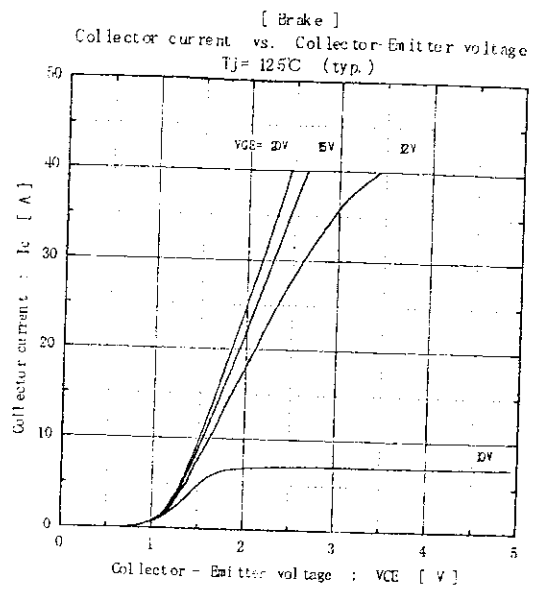
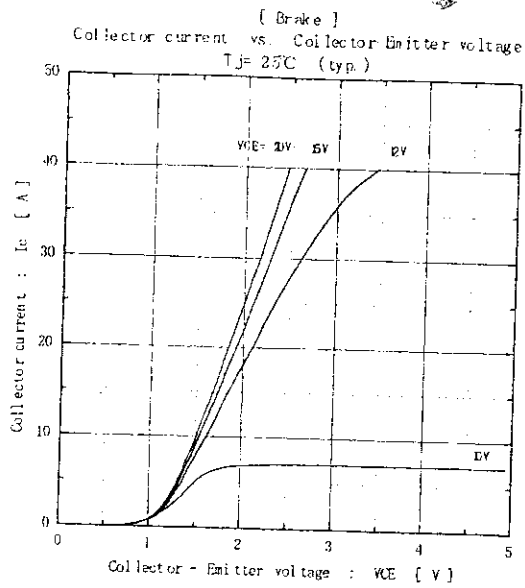
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9/10

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