

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR100SB060-01

Spec. No. : MS6M 0553

Date : Jun. - 02 - 2000

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN	Jun. - 2 - '00	T. Kobayashi	<i>T. Kobayashi</i>	DWG. NO.	MS6M 0553
CHECKED	June - 2 - 00	S. Nishida			

Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Jan. -2- '60	enactment	—	—	Issued date	—	S. N. H. A.	T. Miyazaki

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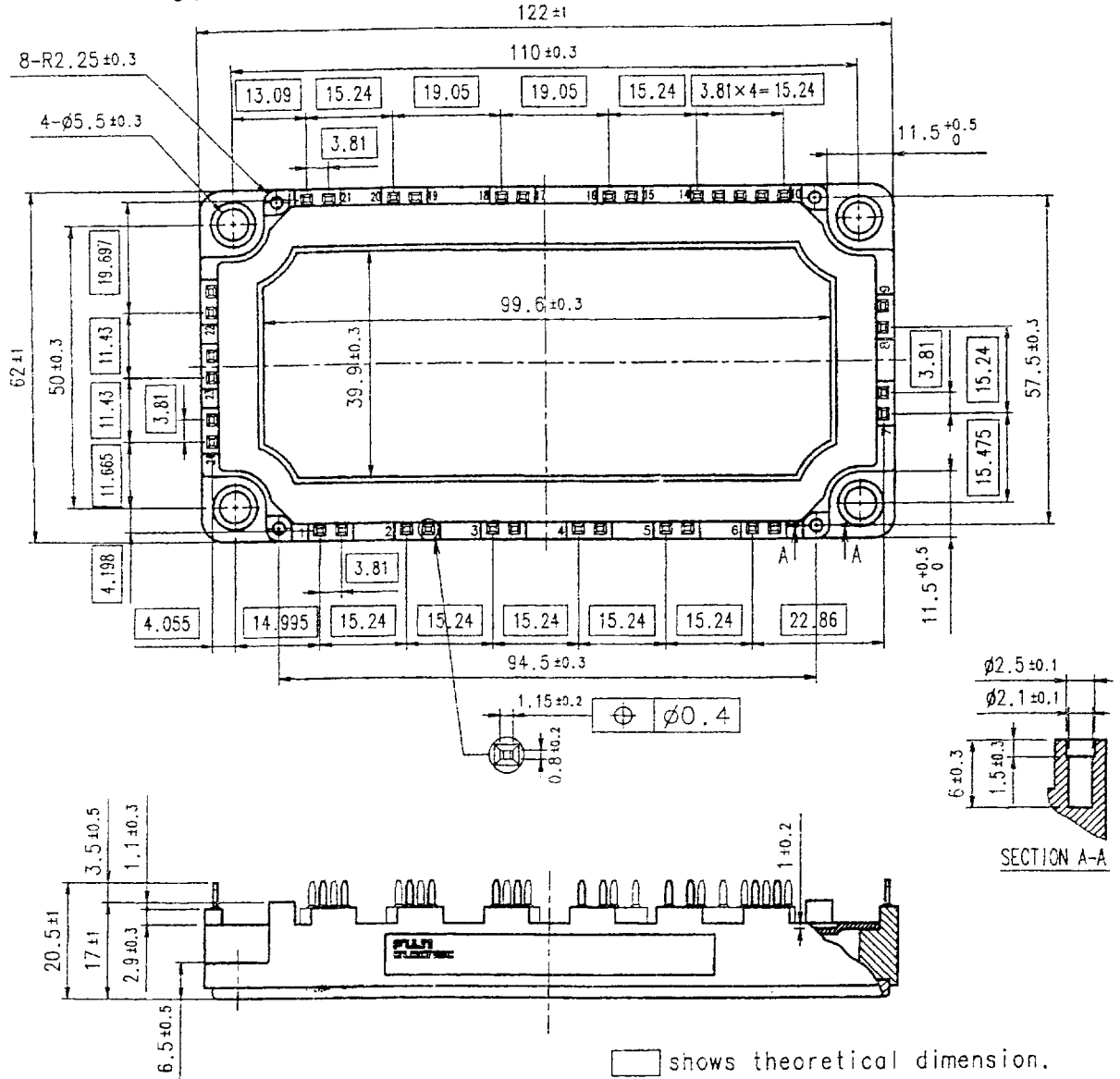
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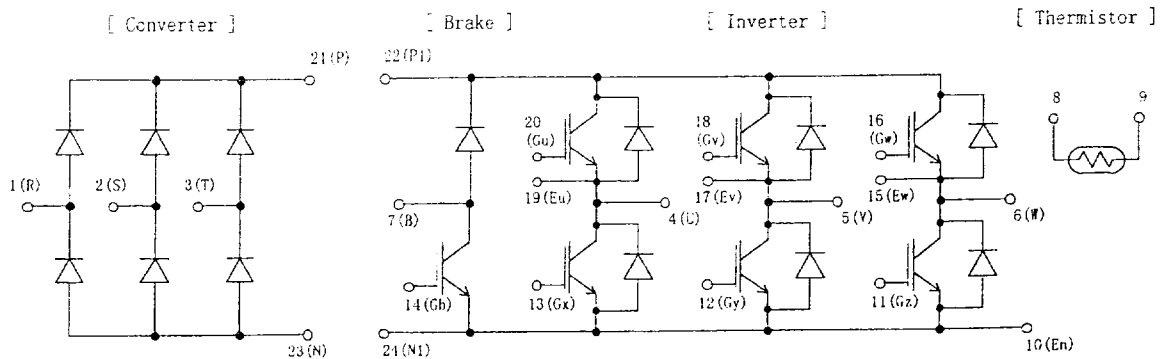
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1. Outline Drawing (Unit : mm)



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2. Equivalent circuit



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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	100	A
		Icp	1ms	200	A
		-Ic		100	A
Collector Power Dissipation	Pc	1 device	400	W	
Brake	Collector-Emitter voltage	VCES		600	V
	Gate-Emitter voltage	VGES		+20	V
	Collector current	Ic	Continuous	50	A
		Icp	1ms	100	A
	Collector Power Dissipation	Pc	1 device	200	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	100	A
	Surge Current (Non-Repetitive)	IFSM	Tj=150C,10ms	700	A
	I ² t (Non-Repetitive)	I ² t	half sine wave	2450	A ² s
Junction temperature	Tj		150	C	
Storage temperature	Tstg		-40~ +125	C	
Isolation voltage	between terminal and copper base ^(*)	Viso	AC : 1min.	2500	V
	between thermistor and others ^(*)			2500	V
Mounting Screw Torque ^(*)				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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4. Electrical characteristics (at Tj= 25C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	Max.		
Inverter	Zero gate voltage 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 = 100 m	5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, chip Ic = 100 A terminal		1.8	2.6	V
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz		10000		pF
	Turn-on time	ton	Vcc= 300 V		0.45	1.2	us
		tr	Ic = 100 A		0.25	0.6	
		tr(0)	VGE +-15 V		0.08		
	Turn-off time	toff	RG = 24 ohm		0.40	1.0	us
		tf			0.05	0.35	
Forward on voltage	VF	IF = 100 A	chip		1.6	V	
			terminal		1.95		2.7
Reverse recovery time	trr	IF = 100 A			300	ns	
Brake	Zero gate voltage 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, chip Ic = 50 A terminal		1.8	2.5	V
	Turn-on time	ton	Vcc= 300 V		0.45	1.2	us
		tr	Ic = 50 A		0.25	0.6	
	Turn-off time	toff	VGE +-15 V		0.40	1.0	us
		tf	RG = 51 ohm		0.05	0.35	
Reverse current	IRRM	VR = 600 V			1.0	mA	
Converter	Forward on voltage	VFM	IF = 100 A	chip		1.1	V
				terminal		1.2	
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			0.31	C/W
		Inverter FWD			0.70	
		Brake IGBT			0.63	
		Converter Diode			0.47	
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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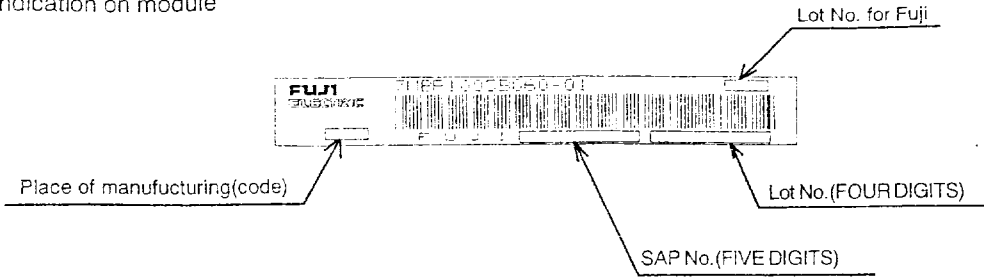
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6. Indication on module



7. Applicable category

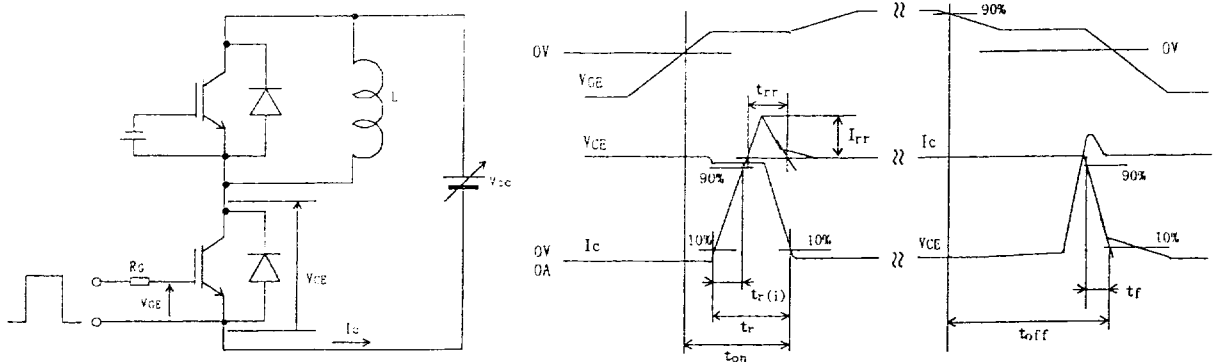
This specification is applied to Power Integrated Module named 7MBR100SB060-01.

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.

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9. Definitions of switching time



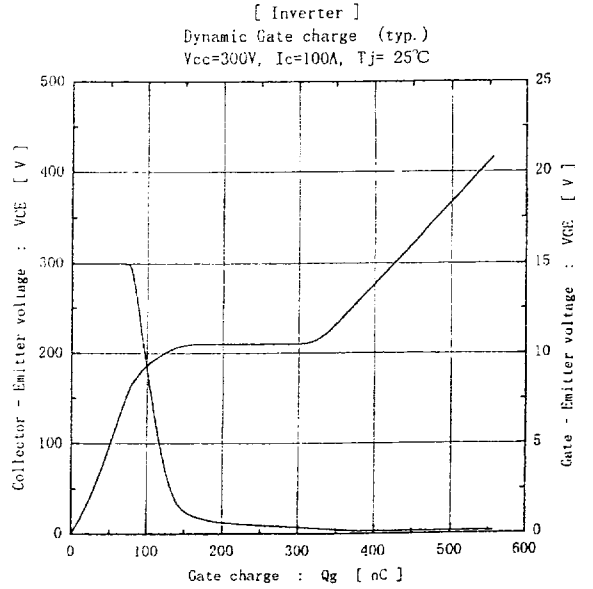
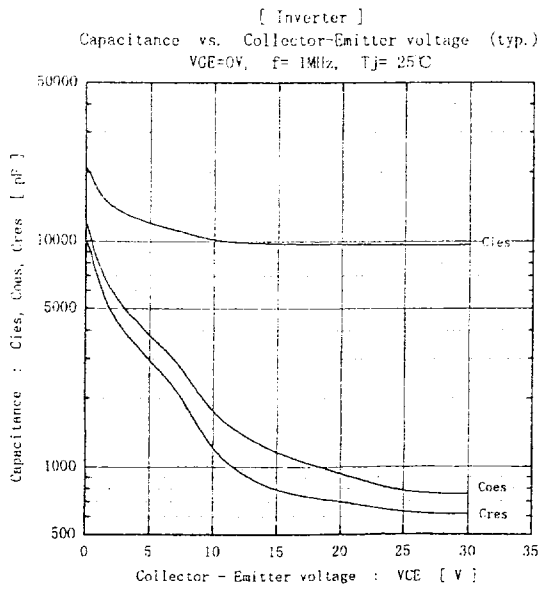
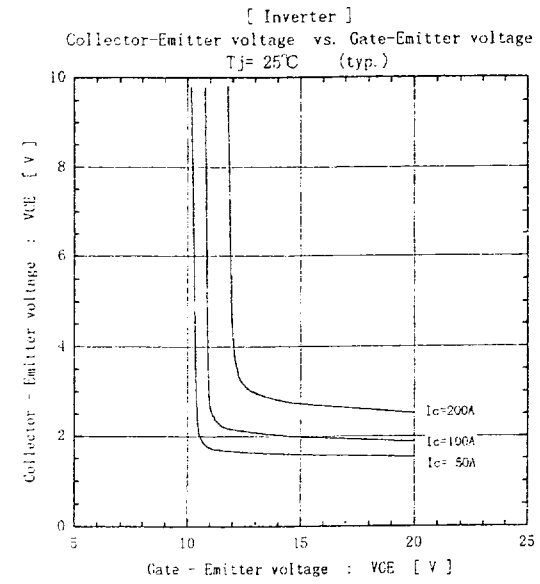
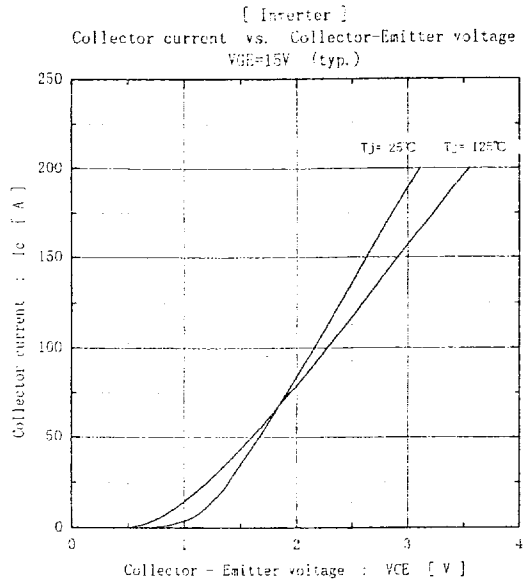
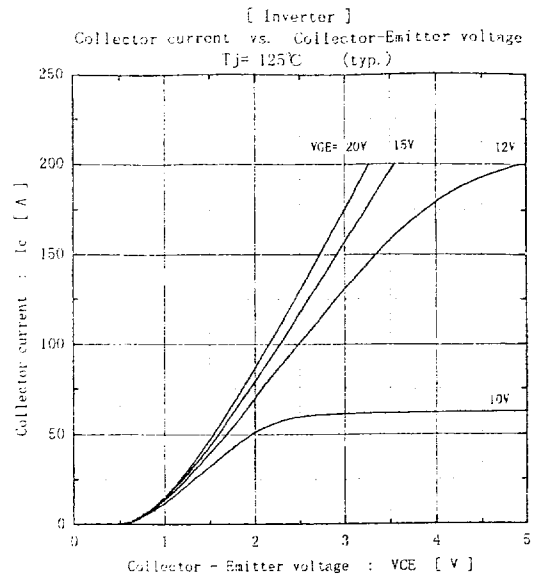
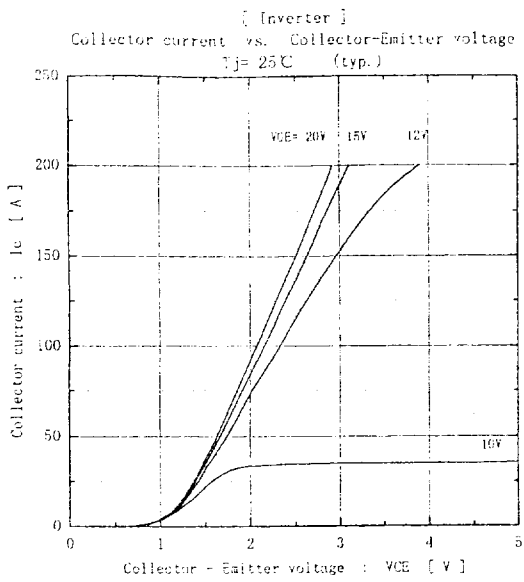
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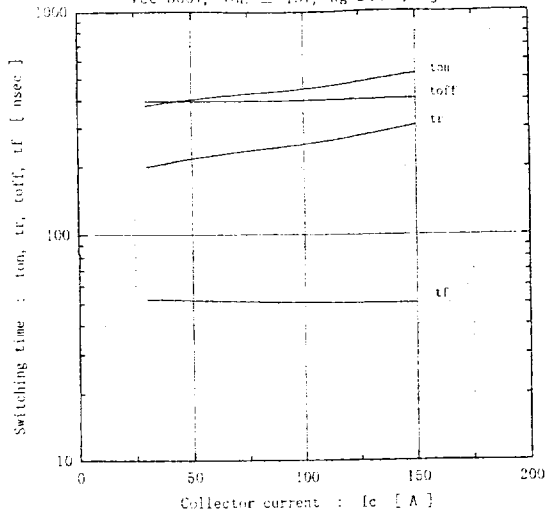
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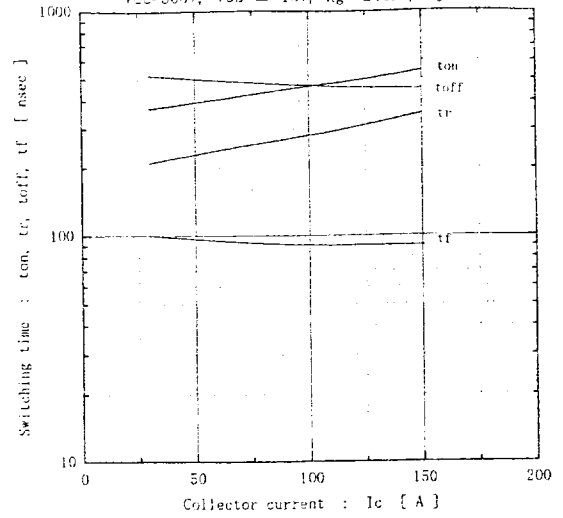
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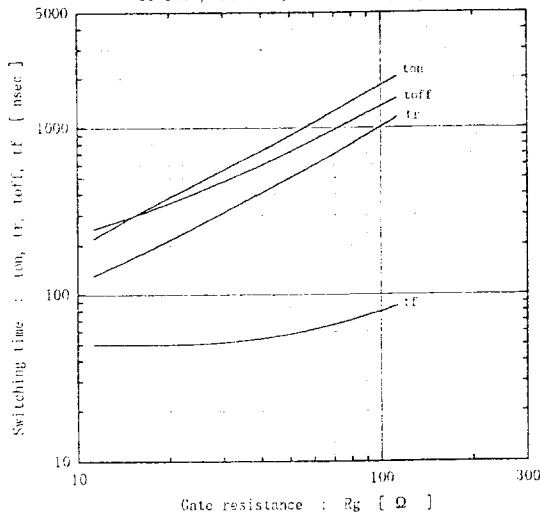
[Inverter]
Switching time vs. Collector current (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=24\Omega, T_j=25^\circ C$



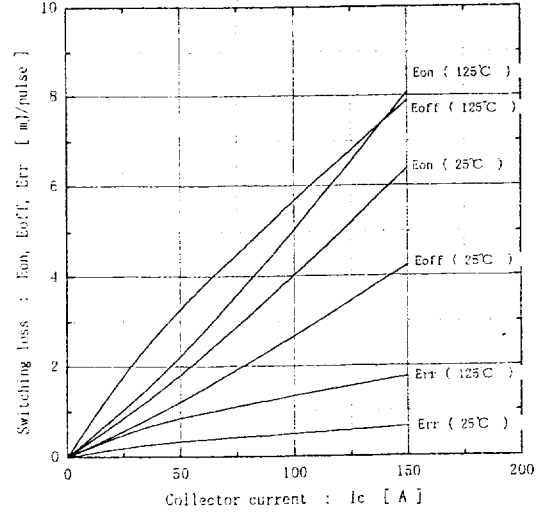
[Inverter]
Switching time vs. Collector current (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=24\Omega, T_j=125^\circ C$



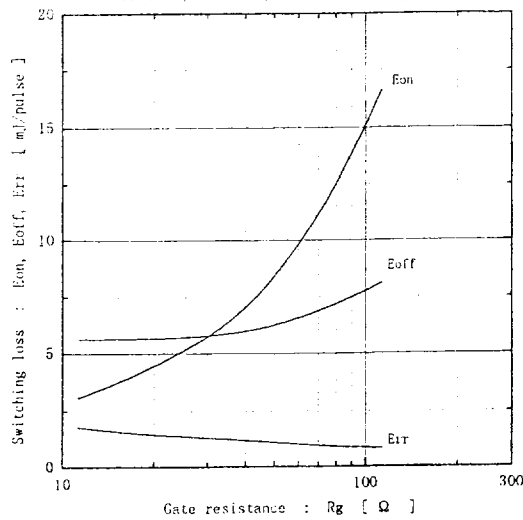
[Inverter]
Switching time vs. Gate resistance (typ.)
 $V_{CC}=300V, I_c=100A, V_{GE}=\pm 15V, T_j=25^\circ C$



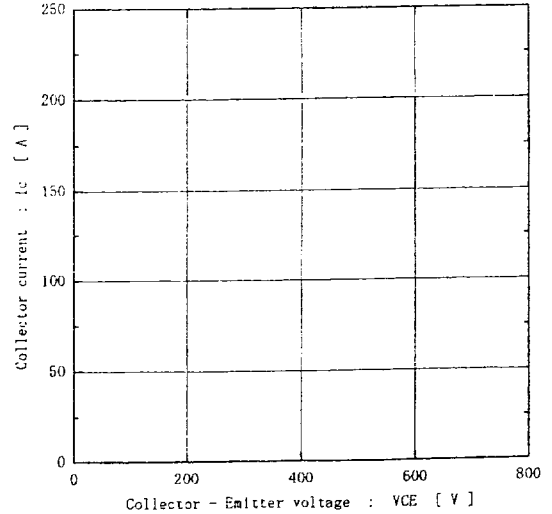
[Inverter]
Switching loss vs. Collector current (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=24\Omega$



[Inverter]
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=300V, I_c=100A, V_{GE}=\pm 15V, T_j=125^\circ C$



[Inverter]
Reverse bias safe operating area
 $-V_{CE}=15V, -V_{GE}\leq 15V, R_g\geq 24\Omega, T_j\leq 125^\circ C$



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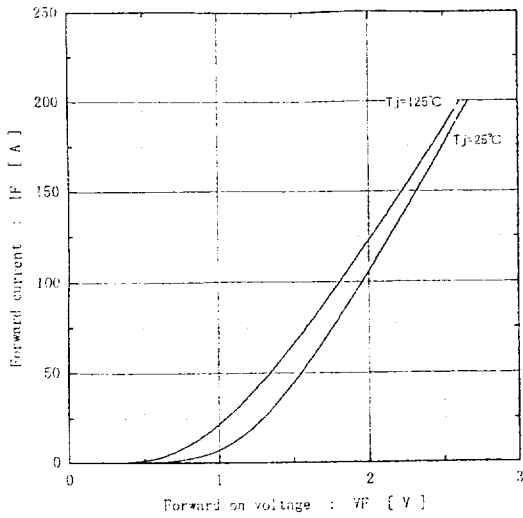
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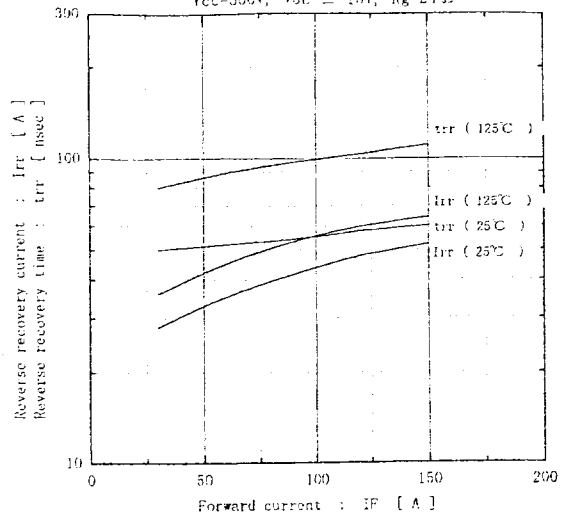
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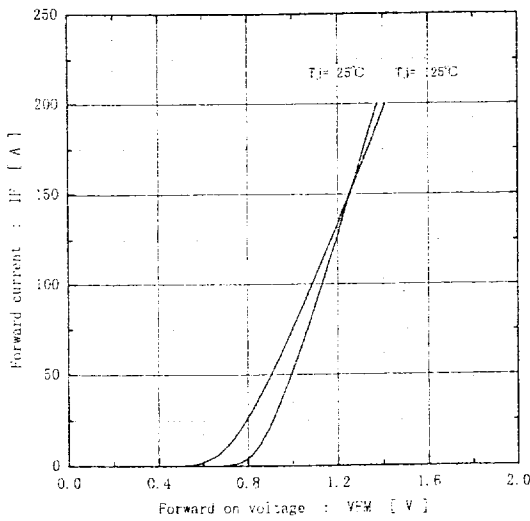
[Inverter]
Forward current vs. Forward on voltage (typ.)



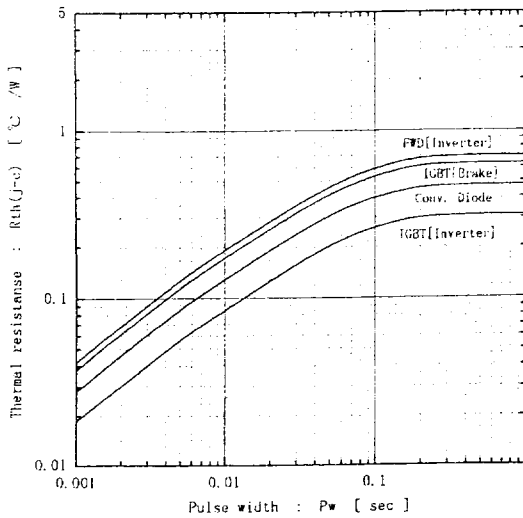
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=21\Omega$



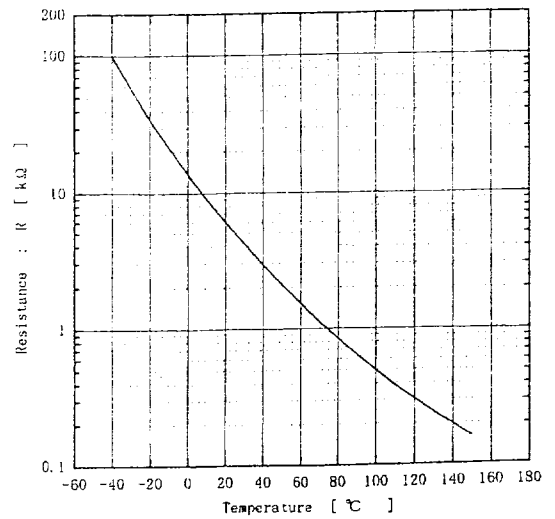
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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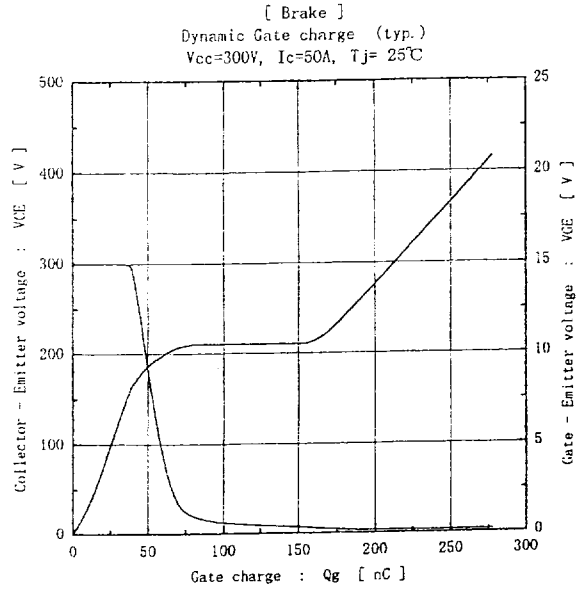
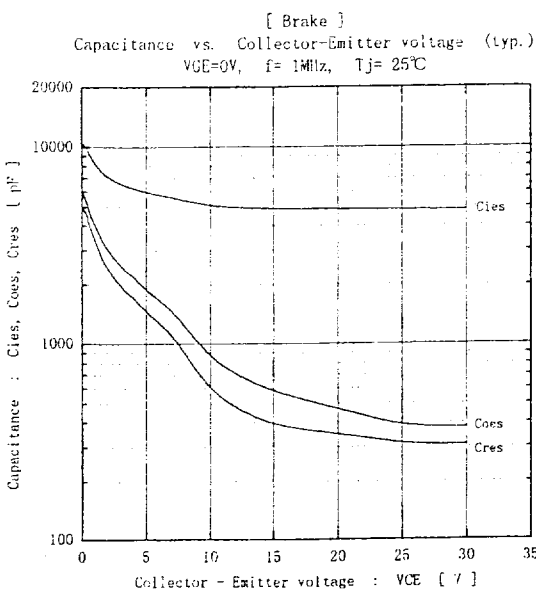
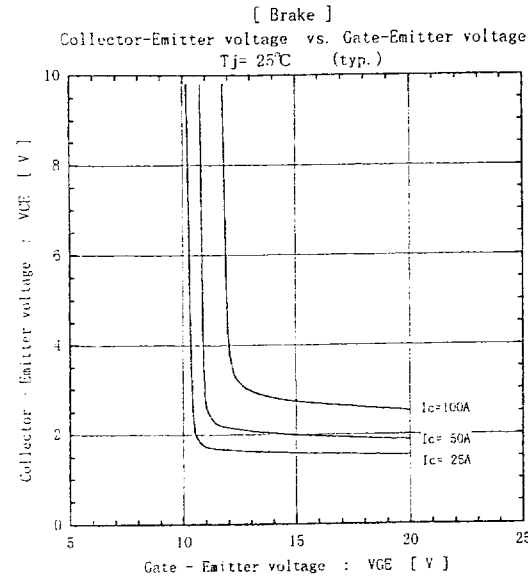
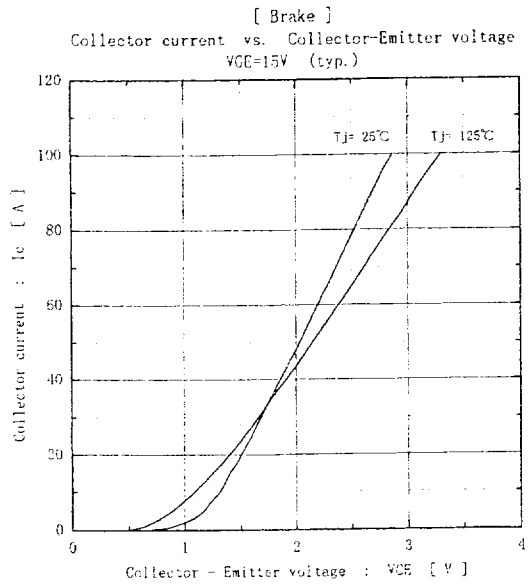
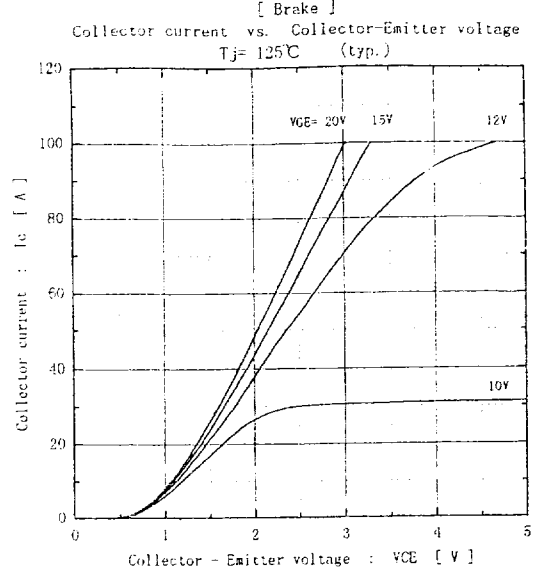
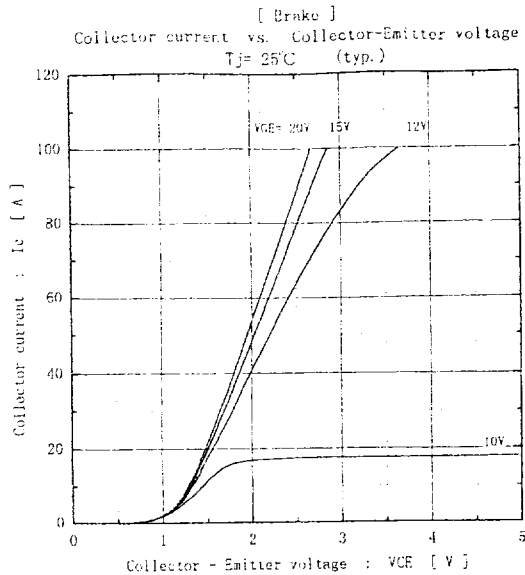
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