SPECIFICATION

Device Name	:	IGBT Module
Type Name	:	7MBR50SB060-01
Spec. No.	:	MS6M 0551
Date	:	Jun. - 02 - 2000

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Fuji Electric Co.,Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED
DRAWN	Jun. - 2 - '00	J. Kobayashi	
CHECKED	June - 2 - 00	S. Motta	T. Miyata

Fuji Electric Co.,Ltd.

DWG.NO. MS6M 0551 1/10

Revised Records

Date	Classi-fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Jun.-2-'00	enactment	—	—	Issued date	—	S. Mytta	T. Miyaoka

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Revised Records

Date	Classi-fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Jun.-2-'00	enactment	—	————	Issued date	—	S. Myata	T. Miyaoka

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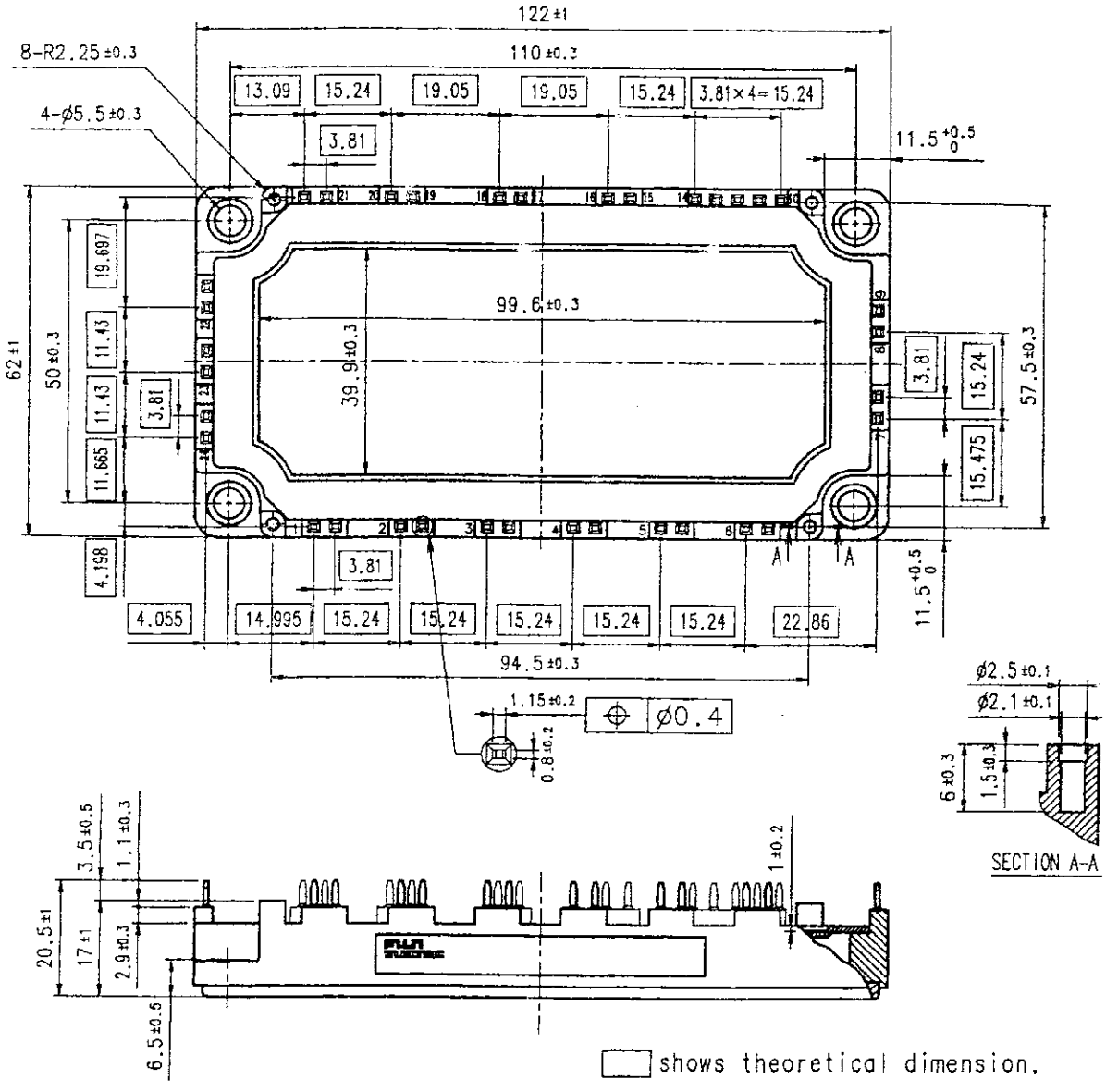
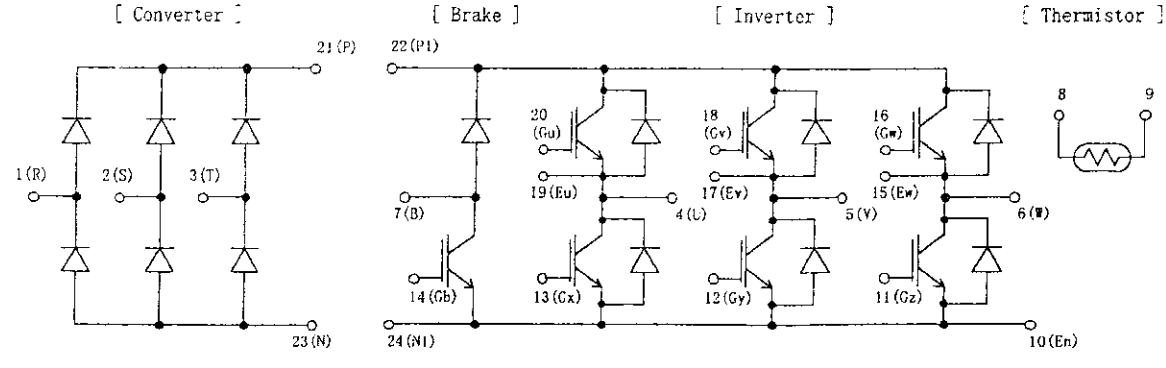
1. Outline Drawing (Unit : mm)



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	50	A
			Icp	1ms	100	A
			-Ic		50	A
	Collector Power Dissipation		Pc	1 device	200	W
Brake	Collector-Emitter voltage		VCES		600	V
	Gate-Emitter voltage		VGES		+-20	V
	Collector current		Ic	Continuous	30	A
			Icp	1ms	60	A
	Collector Power Dissipation		Pc	1 device	120	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	50	A
	Surge Current (Non-Repetitive)		IFSM	Tj=150C,10ms half sine wave	350	A
	I^2t (Non-Repetitive)		I^2t		613	A^2s
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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4. Electrical characteristics (at Tj= 25C unless otherwise specified)

	Items	Symbols	Conditions		Characteristics min.	typ.	Max.	Units
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 = 50 m		5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, Ic = 50 A	chip		1.8		V
				terminal		1.95	2.4	
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz			5000		pF
	Turn-on time	ton	Vcc= 300 V			0.45	1.2	us
		tr	Ic = 50 A			0.25	0.6	
		$tr_{(i)}$	VGE +-15 V			0.08		
	Turn-off time	toff	RG = 51 ohm			0.40	1.0	
		tf				0.05	0.35	
	Forward on voltage	VF	IF = 50 A	chip		1.75		V
				terminal		1.9	2.6	
	Reverse recovery time	trr	IF = 50 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, Ic = 30 A	chip		1.8		V
				terminal		1.95	2.4	
	Turn-on time	ton	Vcc= 300 V			0.45	1.2	us
		tr	Ic = 30 A			0.25	0.6	
	Turn-off time	toff	VGE +-15 V			0.40	1.0	
		tf	RG = 82 ohm			0.05	0.35	
	Reverse current	IRRM	VR = 600 V				1.0	mA
Converter	Forward on voltage	VFM	IF = 50 A	chip		1.1		V
				terminal		1.2	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 min.	typ.	Max.	Units
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.63	C/W
		Inverter FWD			1.33	
		Brake IGBT			1.04	
		Converter Diode			0.90	
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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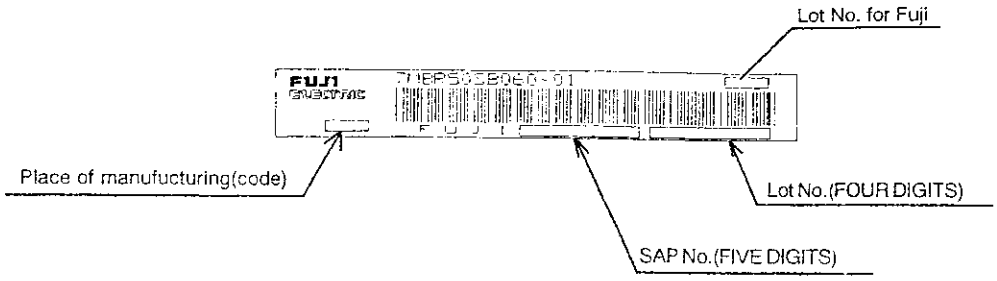
6. Indication on module



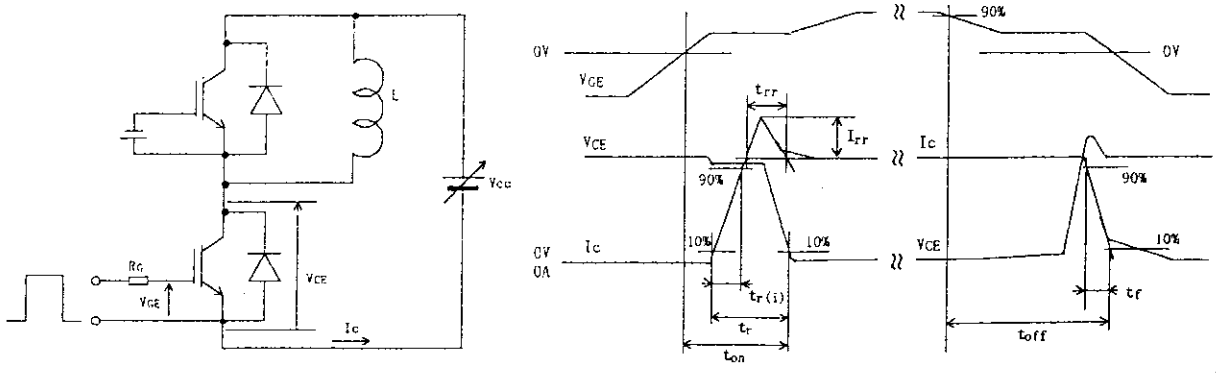
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR50SB060-01.

8. Storage and transportation notes

- The module should be stored at a standard temperature of 5 to 35℃ 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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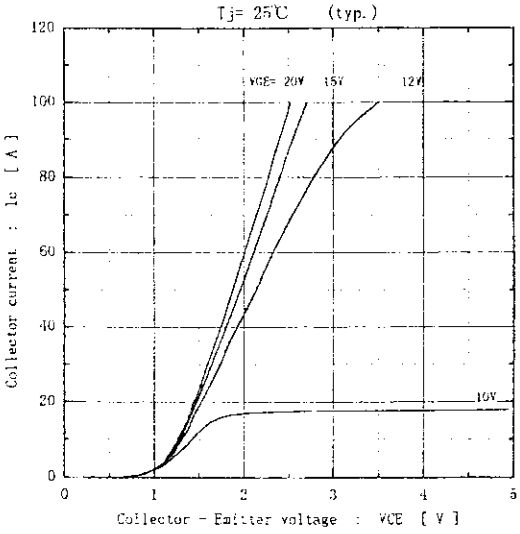
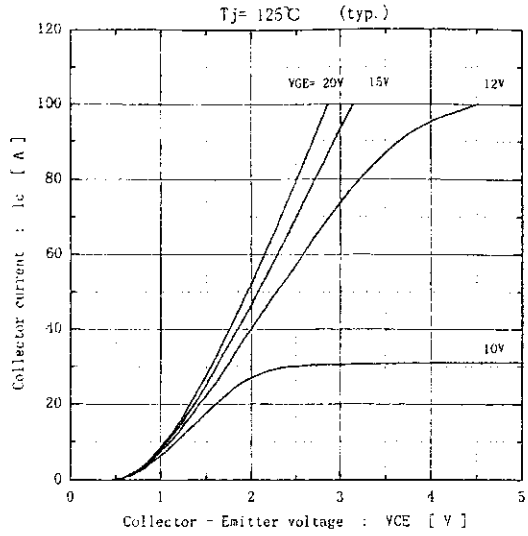
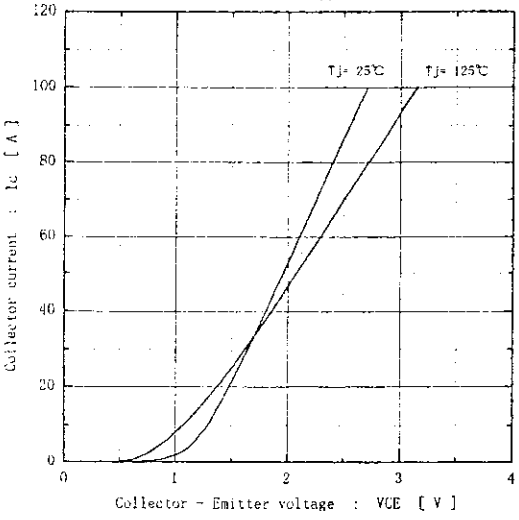
[Inverter]
Collector current vs. Collector-Emitter voltage
Tj= 25℃ (typ.)



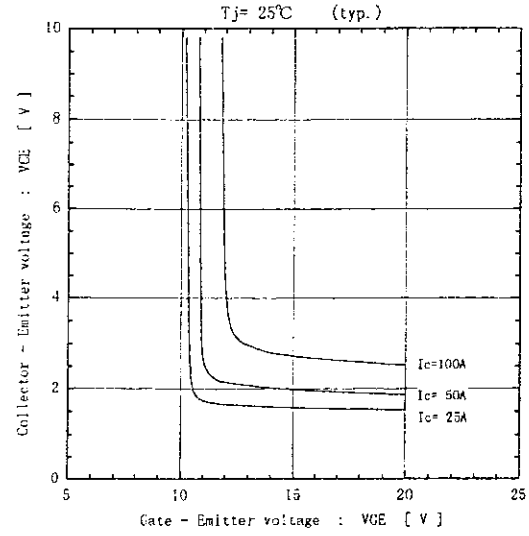
[Inverter]
Collector current vs. Collector-Emitter voltage
Tj= 125℃ (typ.)



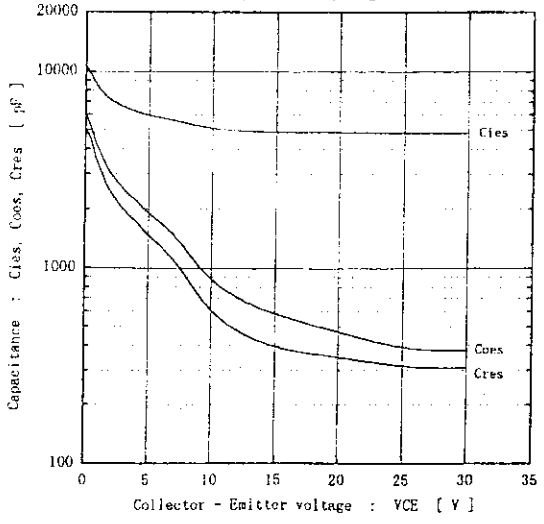
[Inverter]
Collector current vs. Collector-Emitter voltage
VGE=15V (typ.)



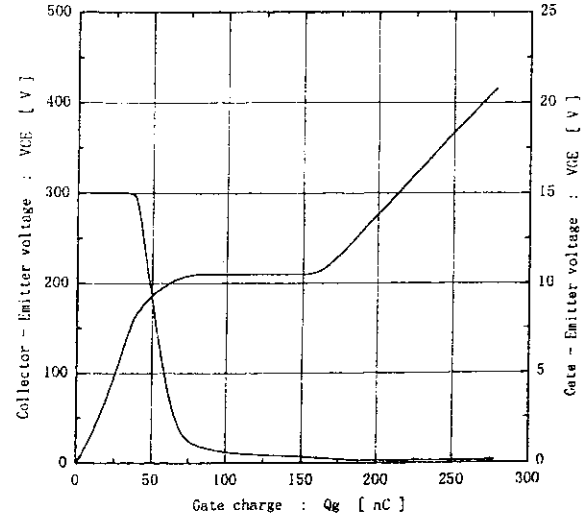
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj= 25℃ (typ.)



[Inverter]
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25℃



[Inverter]
Dynamic Gate charge (typ.)
Vcc=300V, Ic=50A, Tj= 25℃



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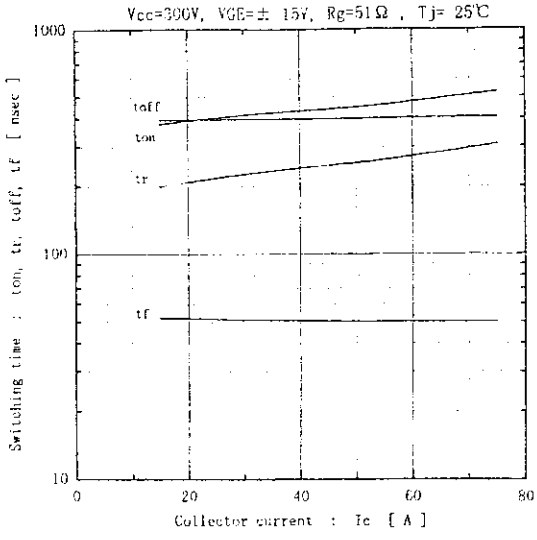
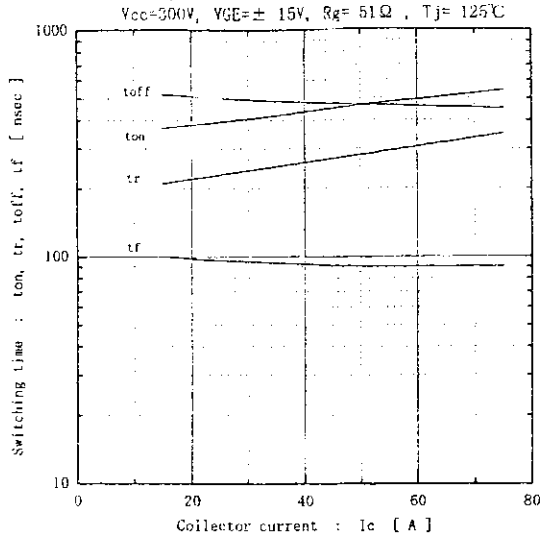
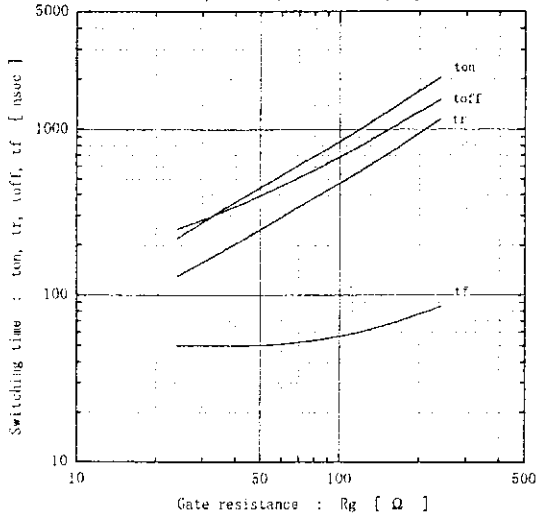
[Inverter]
Switching time vs. Collector current (typ.)
Vcc=300V, VGE=± 15V, Rg=51Ω , Tj= 25℃



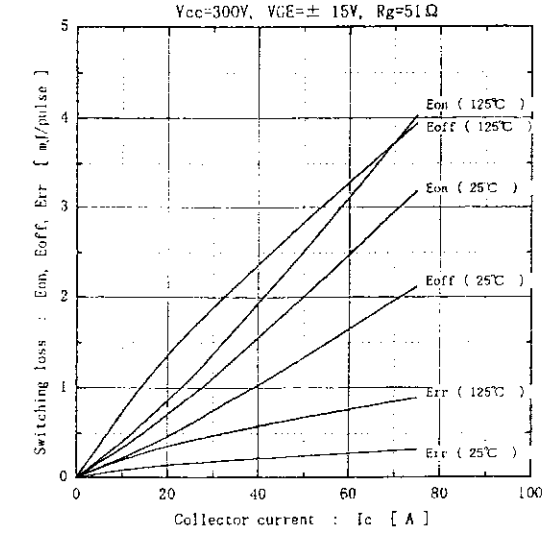
[Inverter]
Switching time vs. Collector current (typ.)
Vcc=300V, VGE=± 15V, Rg= 51Ω , Tj= 125℃



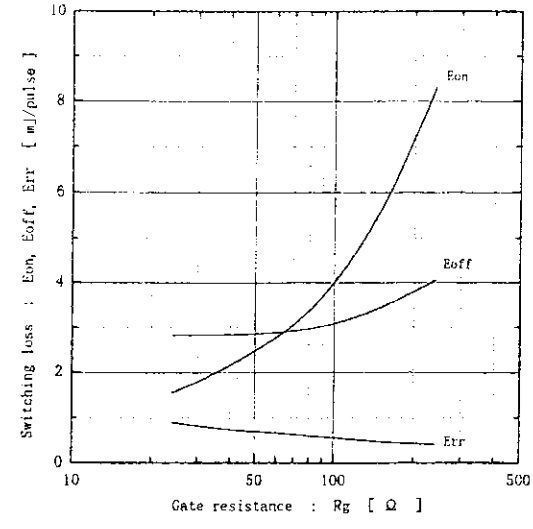
[Inverter]
Switching time vs. Gate resistance (typ.)
Vcc=300V, Ic=50A, VGE=± 15V, Tj= 25℃



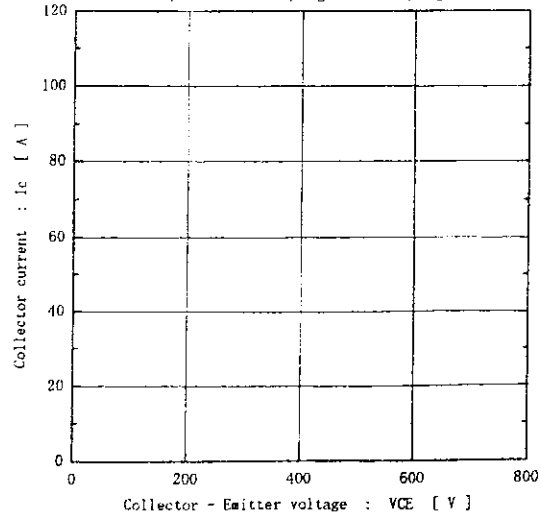
[Inverter]
Switching loss vs. Collector current (typ.)
Vcc=300V, VGE=± 15V, Rg=51Ω



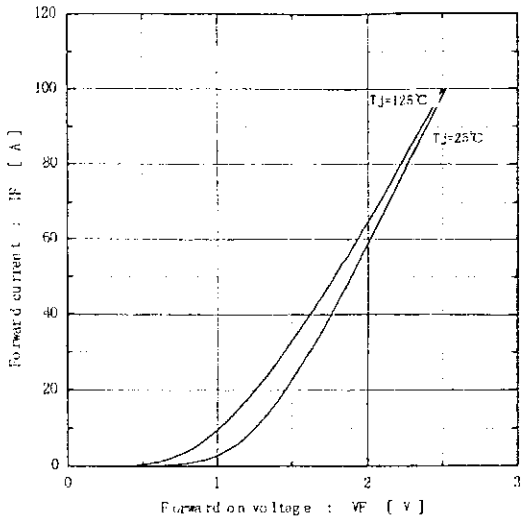
[Inverter]
Switching loss vs. Gate resistance (typ.)
Vcc=300V, Ic=50A, VGE=± 15V, Tj= 125℃



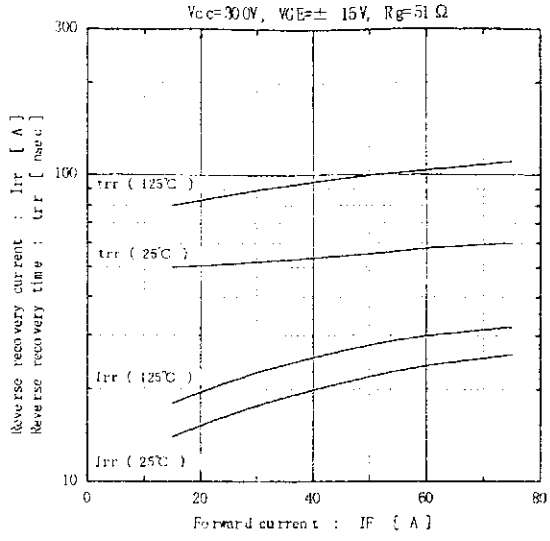
[Inverter]
Reverse bias safe operating area
+VGE=15V, -VGE≦ 15V, Rg≧ 51Ω , Tj≦ 125℃



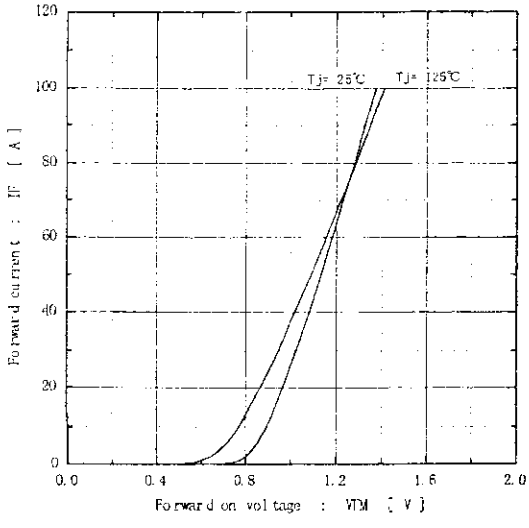
[Inverter]
Forward current vs. Forward on voltage (typ.)



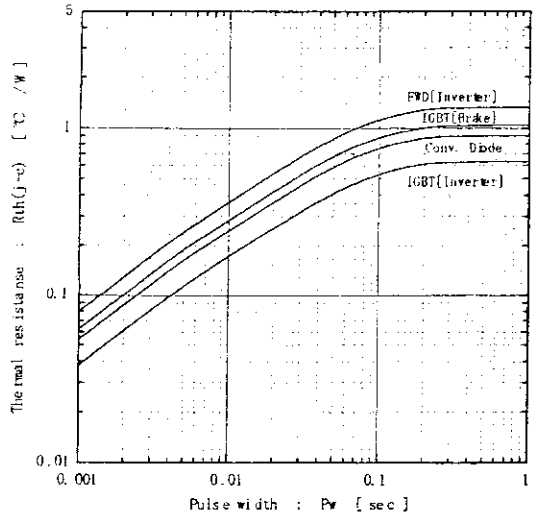
[Inverter]
Reverse recovery characteristics (typ.)
Vcc=300V, VGE=± 15V, Rg=51Ω



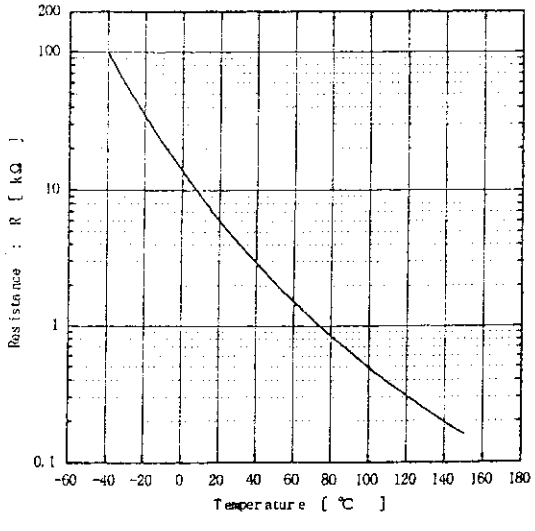
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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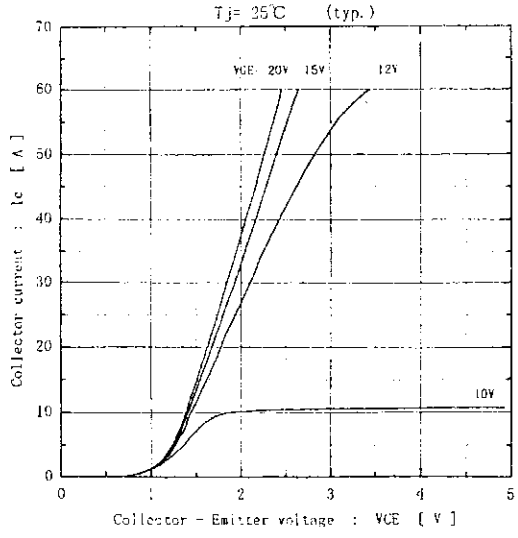
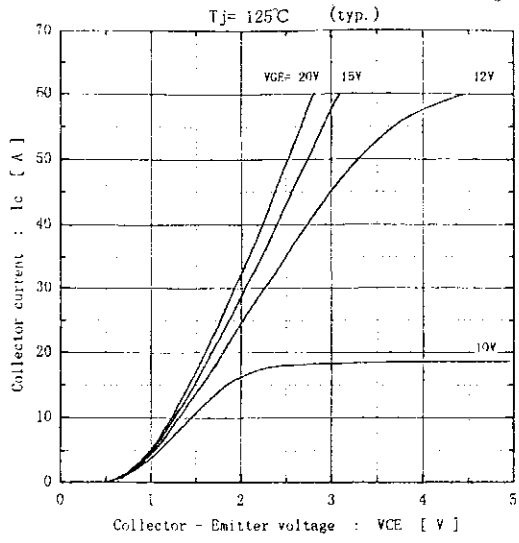
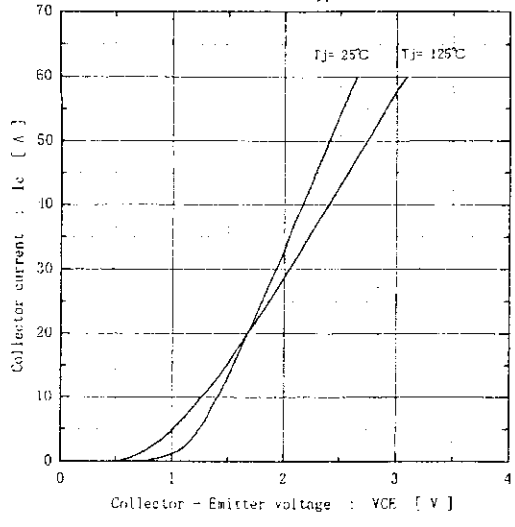
[Brake]
Collector current vs. Collector-Emitter voltage
Tj= 25℃ (typ.)



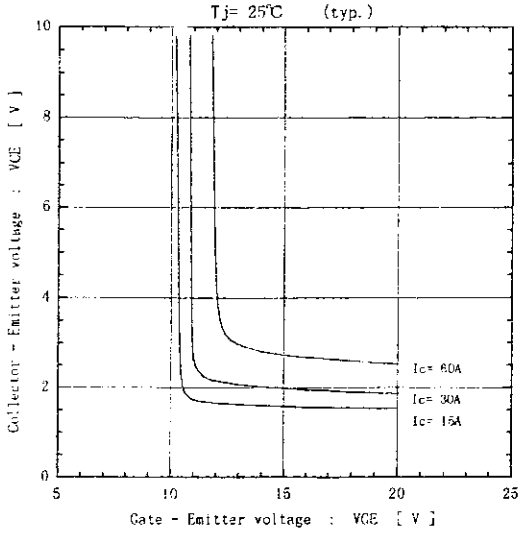
[Brake]
Collector current vs. Collector-Emitter voltage
Tj= 125℃ (typ.)



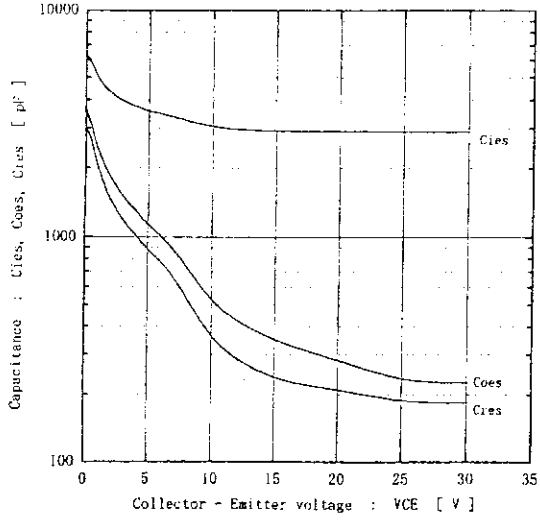
[Brake]
Collector current vs. Collector-Emitter voltage
VGE=15V (typ.)



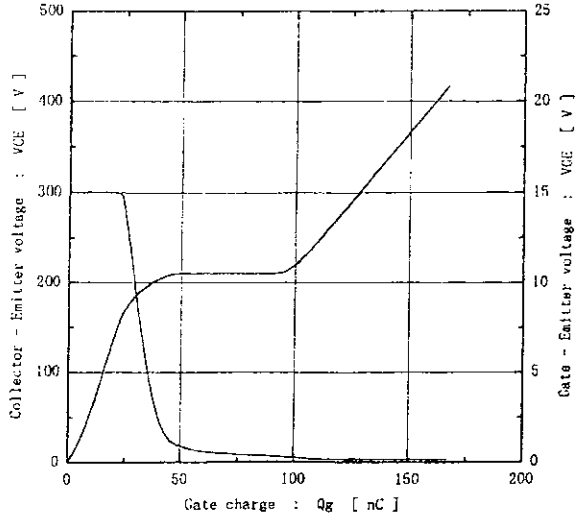
[Brake]
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj= 25℃ (typ.)



[Brake]
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25℃



[Brake]
Dynamic Gate charge (typ.)
Vcc=300V, Ic=30A, Tj= 25℃



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