

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR75SB060-01

Spec. No. : MS6M 0552

Date : Jun. - 02 - 2000

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Matsumoto Factory

		DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Jan. - 2 - '00		<i>G. Kikuguchi</i>		DWG. NO.	MS6M 0552	1 / 10
CHECKED	June - 2 - 00		<i>S. Kikuchi</i>	<i>T. Kikuchi</i>			

H04-004-05

Revised Records[illegible]

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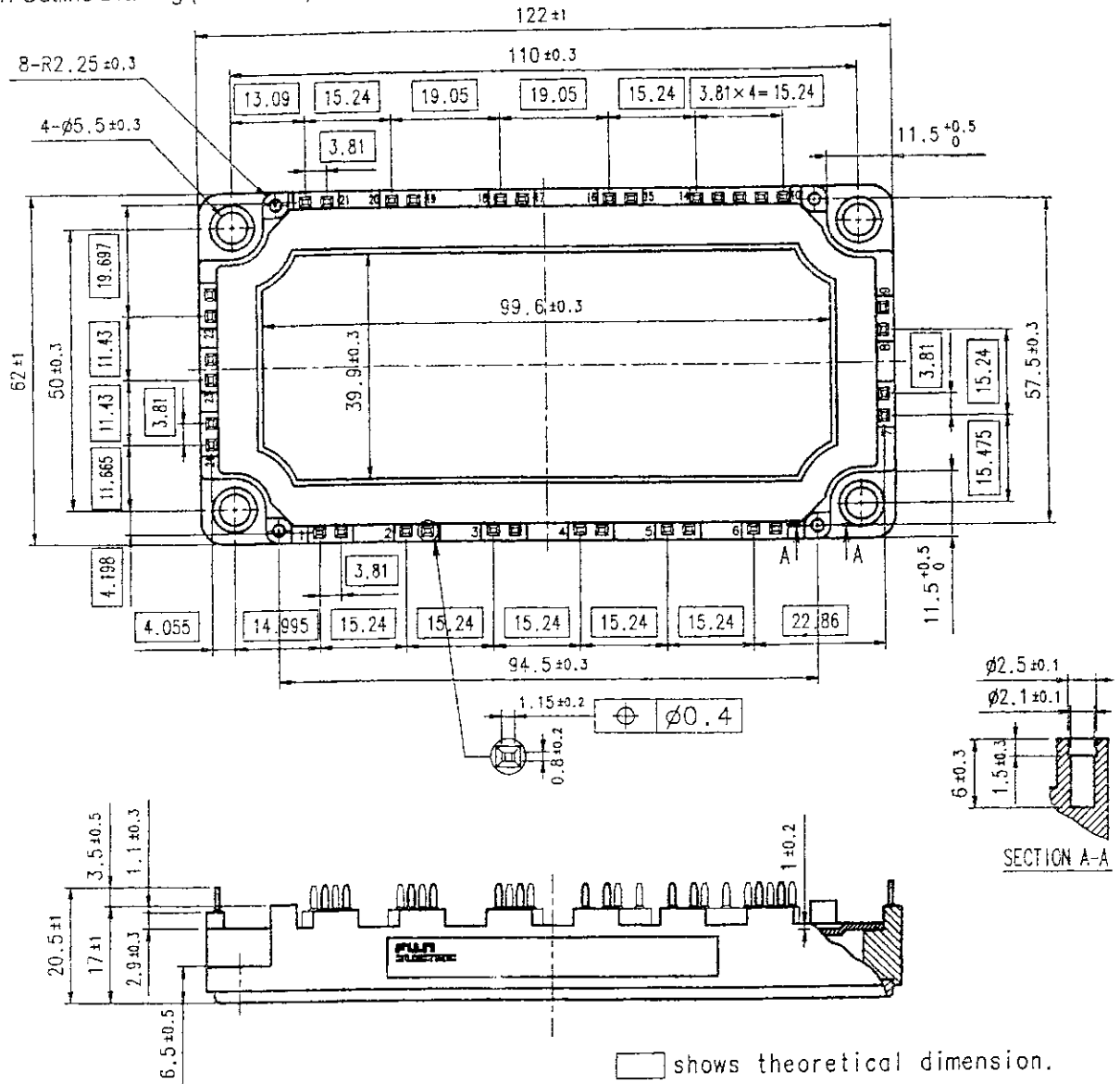
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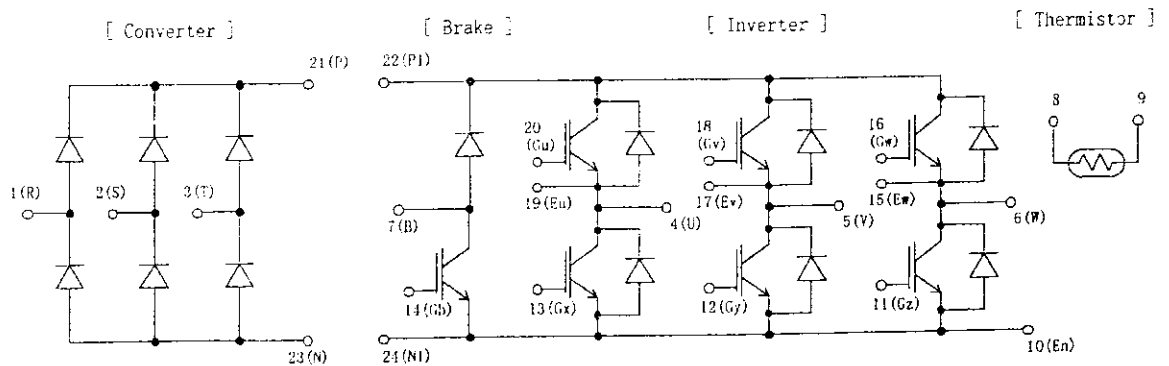
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7MBR75SB060-01

1. Outline Drawing (Unit : mm)



2. Equivalent circuit



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3. Absolute Maximum Ratings (at $T_c = 25^{\circ}\text{C}$ unless otherwise specified)

Items		Symbols	Conditions	Maximum Ratings	Units
Inverter	Collector-Emitter voltage	V _{CES}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _c	Continuous	75	A
		I _{cp}	1ms	150	A
		-I _c		75	A
	Collector Power Dissipation	P _c	1 device	300	W
Brake	Collector-Emitter voltage	V _{CES}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _c	Continuous	50	A
		I _{cp}	1ms	100	A
	Collector Power Dissipation	P _c	1 device	200	W
	Repetitive peak reverse Voltage(Diode)	V _{RRM}		600	V
Converter	Repetitive peak reverse Voltage	V _{RRM}		800	V
	Average Output Current	I _o	50Hz/60Hz sine wave	75	A
	Surge Current (Non-Repetitive)	I _{FSM}	T _j =150℃, 10ms	525	A
	I ² t (Non-Repetitive)	I ² t	half sine wave	1378	A ² s
Junction temperature		T _j		150	℃
Storage temperature		T _{stg}		-40~ +125	℃
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	N·m

(*)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 N · m (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 = 75 m	5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, chip		1.8		V
			Ic = 75 A terminal		2.1	2.55	
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz		7500		pF
	Turn-on time	ton	Vcc= 300 V		0.45	1.2	us
		tr	Ic = 75 A		0.25	0.6	
		tr(0)	VGE +-15 V		0.08		
	Turn-off time	toff	RG = 33 ohm		0.40	1.0	
		tf			0.05	0.35	
Brake	Forward on voltage	VF	IF = 75 A chip		1.7		V
			terminal		2.0	2.7	
	Reverse recovery time	trr	IF = 75 A			300	ns
	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		1.8		V
			Ic = 50 A terminal		2.05	2.5	
	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	
		tf	RG = 51 ohm		0.05	0.35	
Converter	Reverse current	IRRM	VR = 600 V			1.0	mA
	Forward on voltage	VFM	IF = 75 A chip		1.1		V
			terminal		1.2	1.5	
Thermistor	Reverse current	IRRM	VR = 800 V			1.0	mA
	Resistance	R	T = 25C		5000		ohm
			T = 100C	465	495	520	
	B value	B	T = 25/50C	3305	3375	3450	K

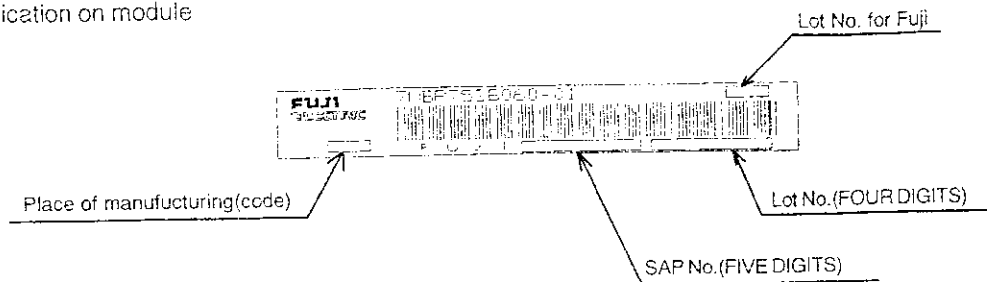
5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.42	C/W
		Inverter FWD			0.90	
		Brake IGBT			0.63	
		Converter Diode			0.70	
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



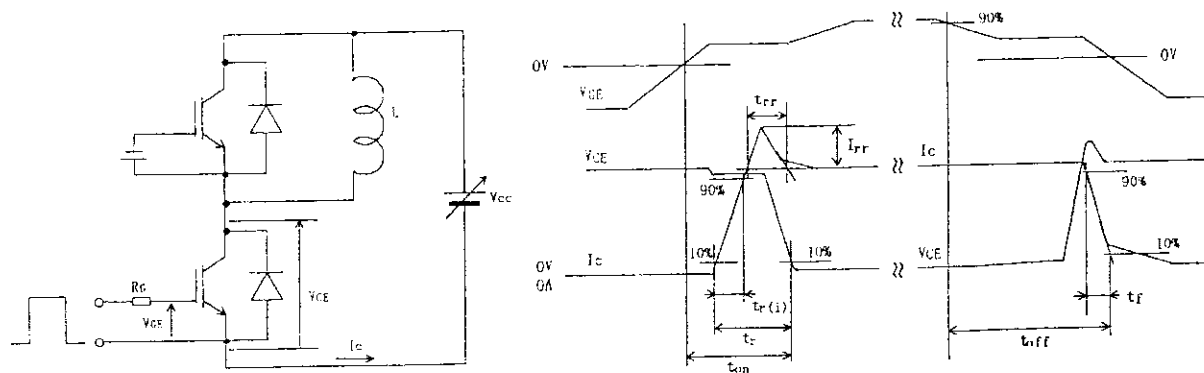
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR75SB060-01.

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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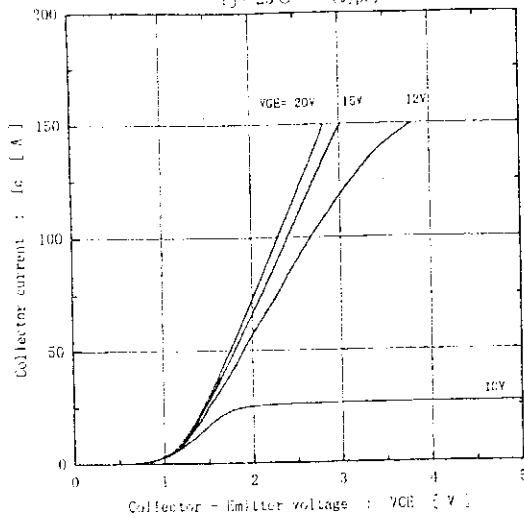
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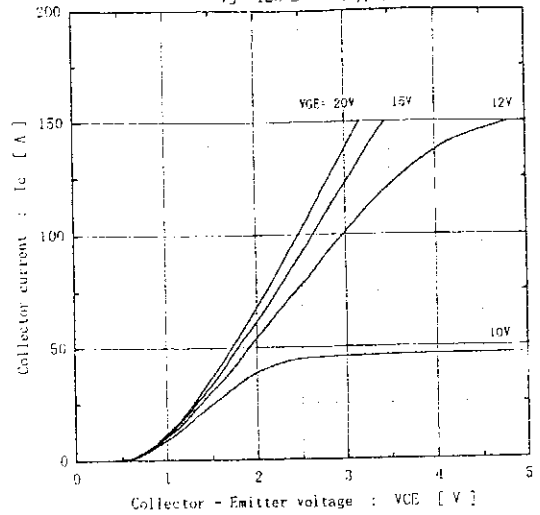
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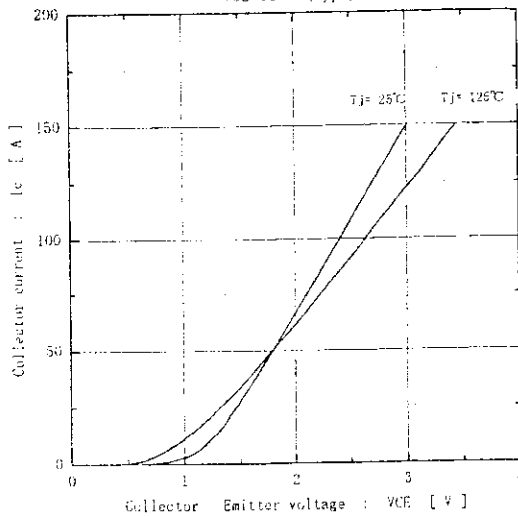
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



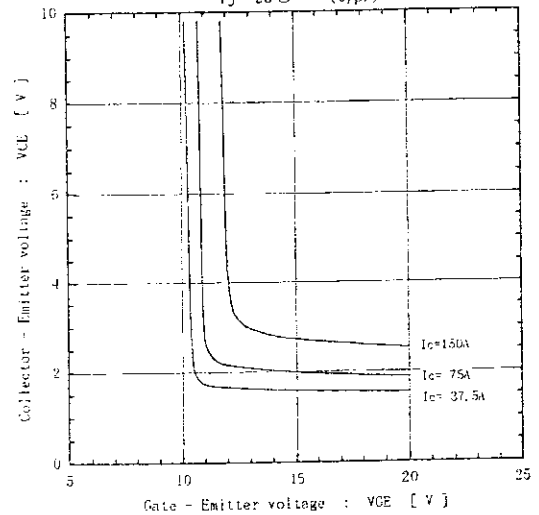
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



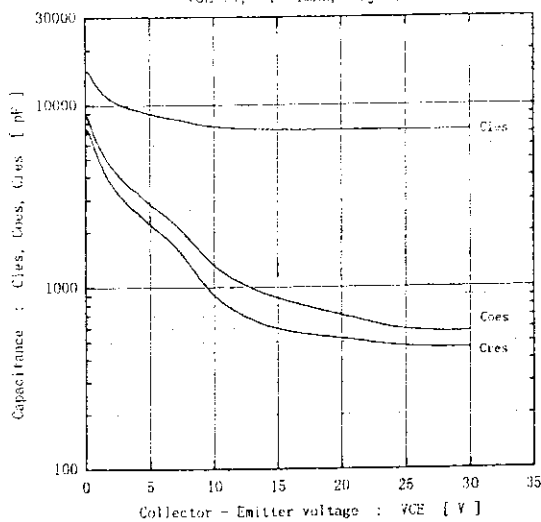
[Inverter]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



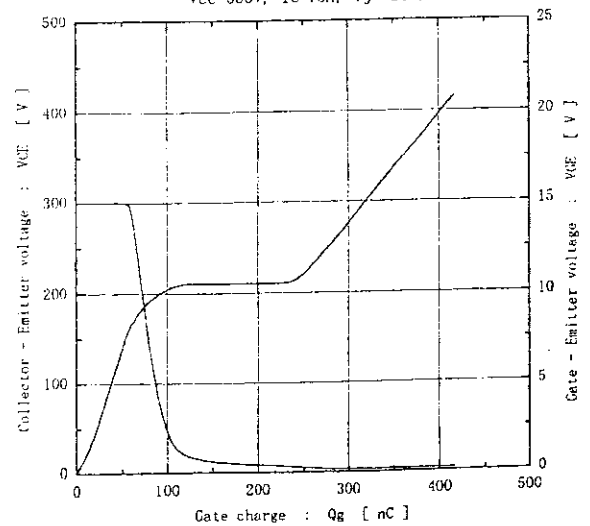
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



[Inverter]
Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



[Inverter]
Dynamic Gate charge (typ.)
 $V_{CC} = 300\text{V}$, $I_C = 75\text{A}$, $T_j = 25^\circ\text{C}$



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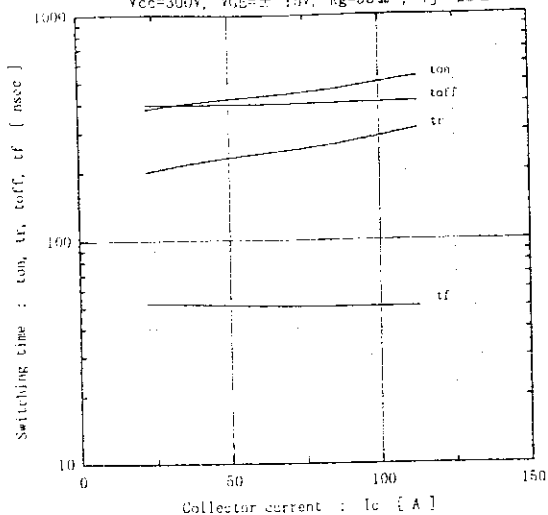
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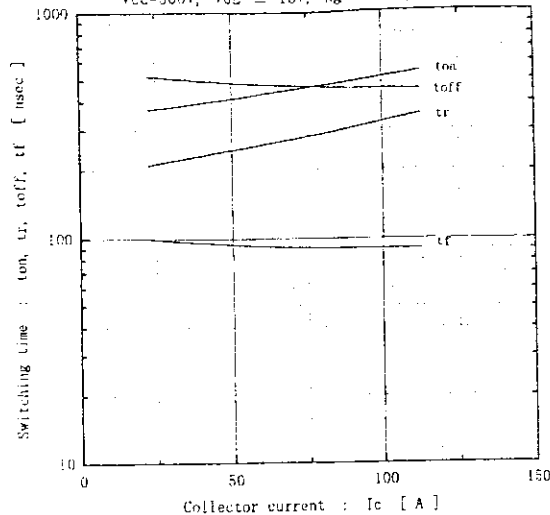
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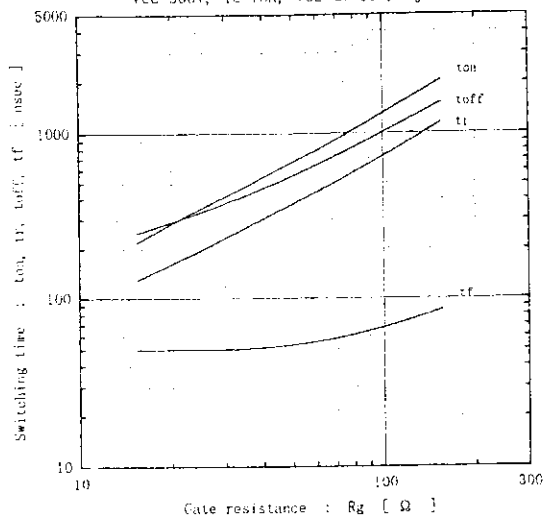
[Inverter]
Switching time vs. Collector current (typ.)
 $V_{CC}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$, $T_j=25^\circ C$



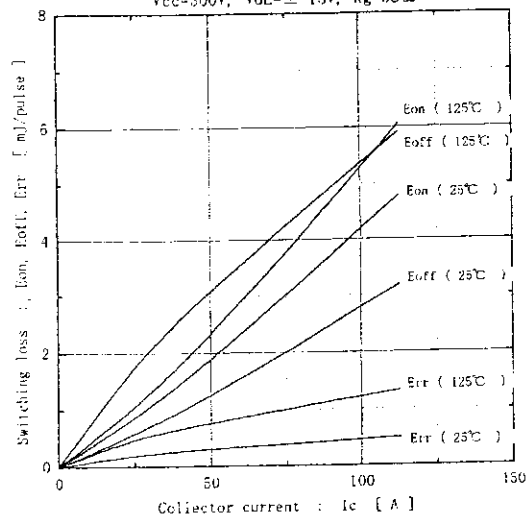
[Inverter]
Switching time vs. Collector current (typ.)
 $V_{CC}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$, $T_j=125^\circ C$



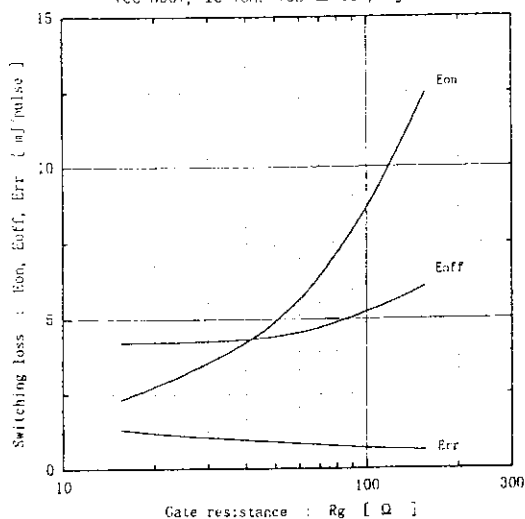
[Inverter]
Switching time vs. Gate resistance (typ.)
 $V_{CC}=300V$, $I_c=75A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



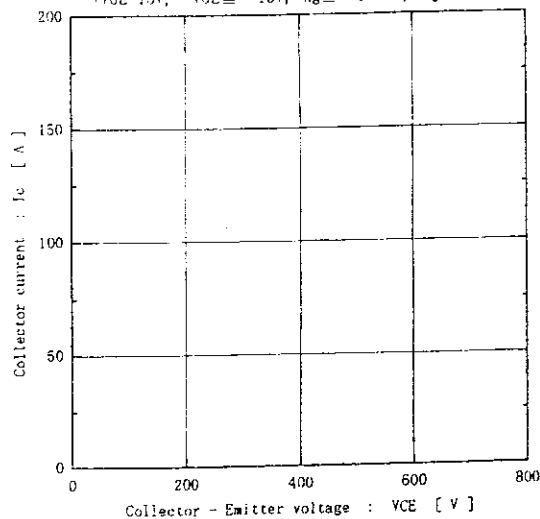
[Inverter]
Switching loss vs. Collector current (typ.)
 $V_{CC}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$



[Inverter]
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=300V$, $I_c=75A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$

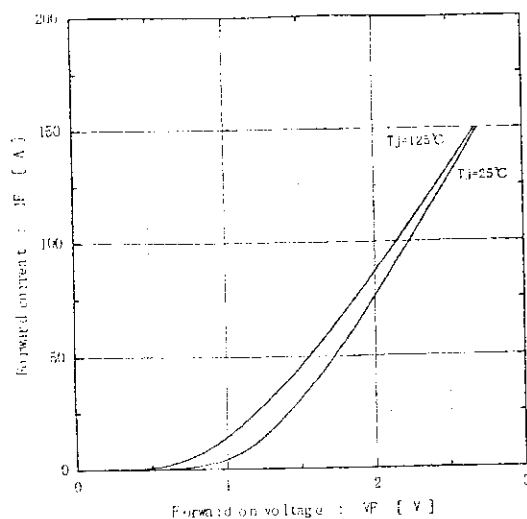


[Inverter]
Reverse bias safe operating area
 $+V_{GE}=15V$, $-V_{GE}\leq 15V$, $R_g\geq 33\Omega$, $T_j\leq 125^\circ C$

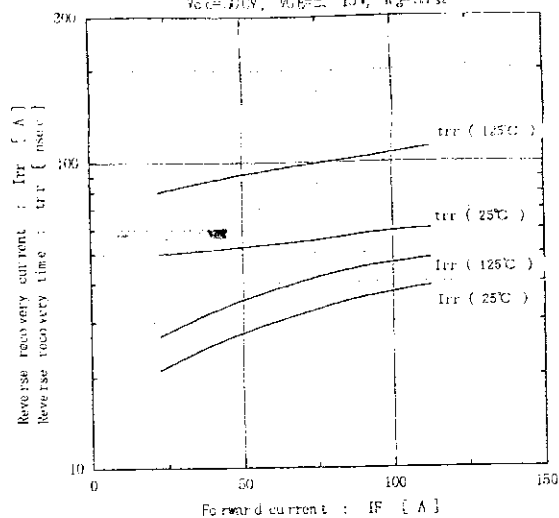


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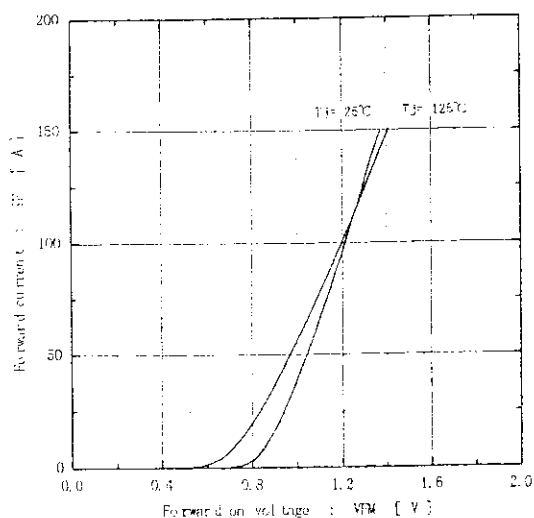
[Inverter]
Forward current vs. Forward on voltage (typ.)



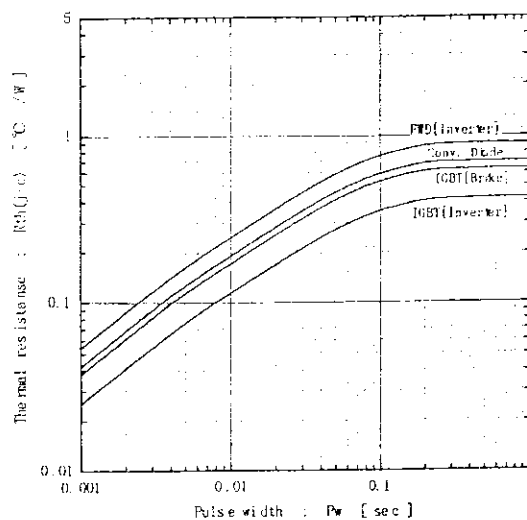
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{GE}=20V$, $V_{GE}=\pm 15V$, $R_{\theta}=33\Omega$



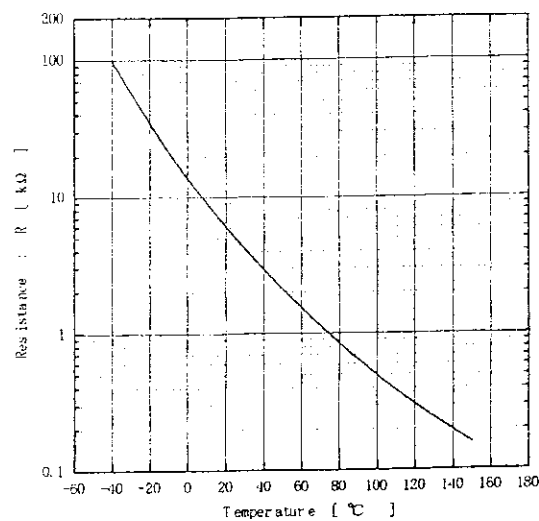
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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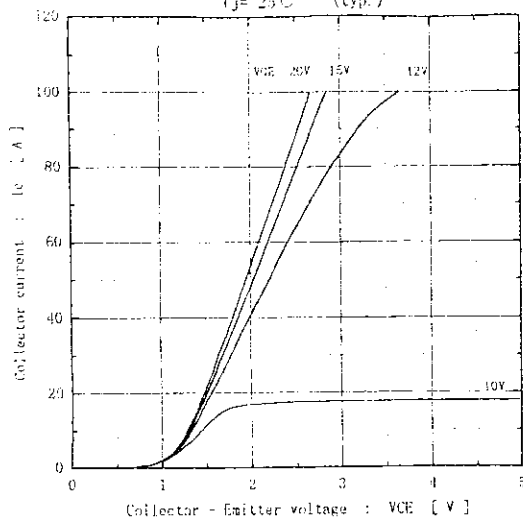
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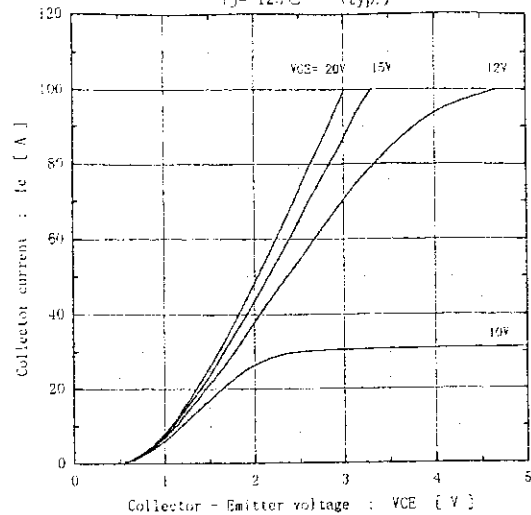
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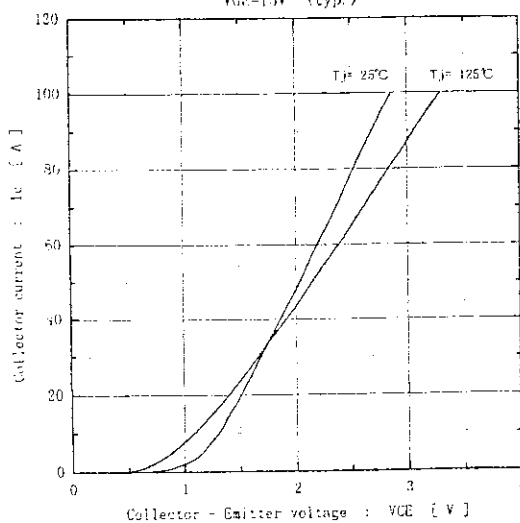
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



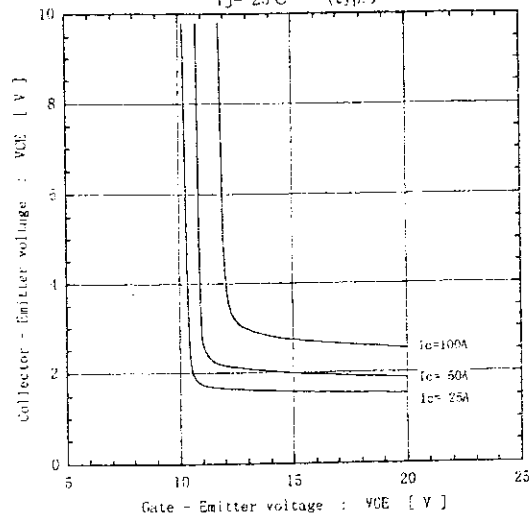
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



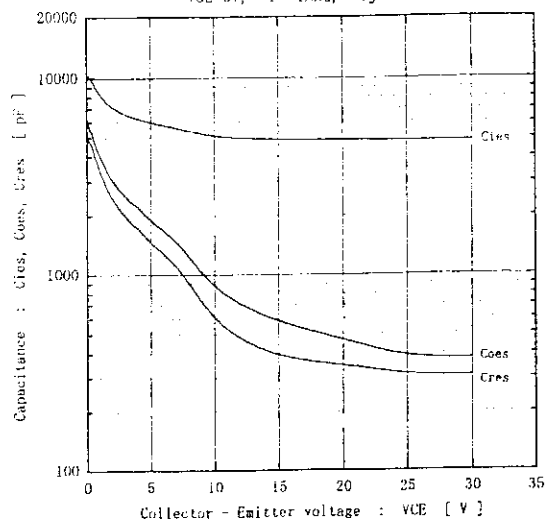
[Brake]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



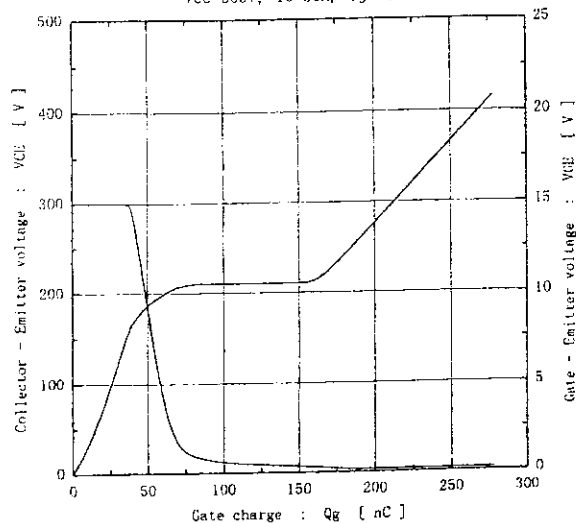
[Brake]
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



[Brake]
Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



[Brake]
Dynamic Gate charge (typ.)
 $V_{CC} = 300\text{V}$, $I_c = 50\text{A}$, $T_j = 25^\circ\text{C}$



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