

# SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR75SB060-01

Spec. No. : MS6M 0552

Date : Jun. - 02 - 2000

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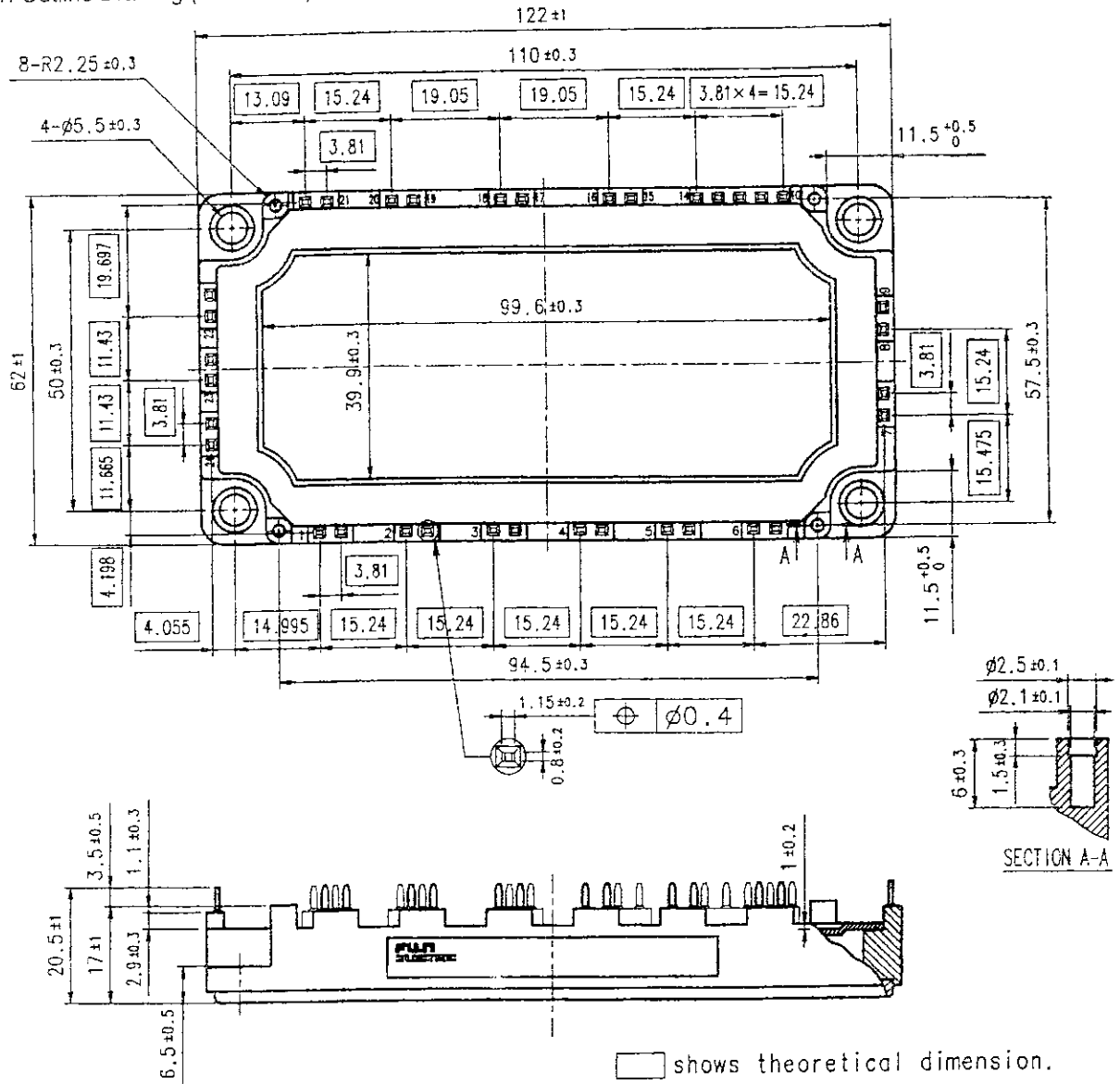
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Matsumoto Factory

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



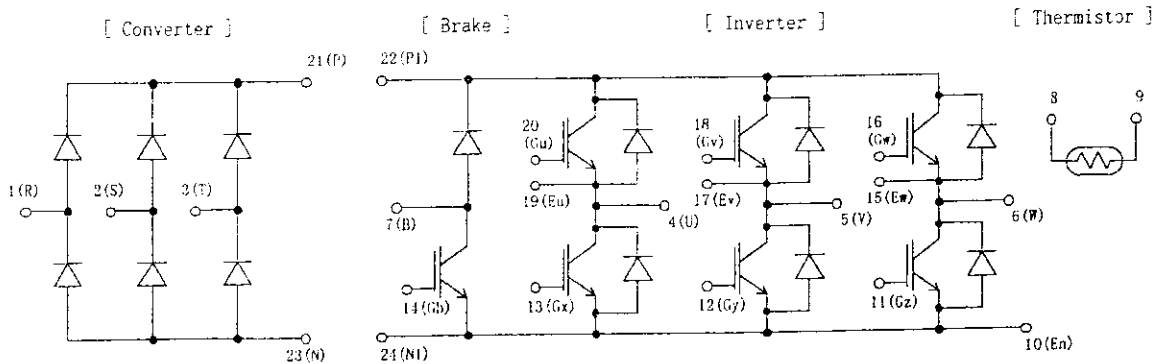
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1. Outline Drawing ( Unit : mm )



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2. Equivalent circuit



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

Items		Symbols	Conditions	Maximum Ratings	Units
Inverter	Collector-Emitter voltage	V <sub>CEs</sub>		600	V
	Gate-Emitter voltage	V <sub>GES</sub>		±20	V
	Collector current	I <sub>c</sub>	Continuous	75	A
		I <sub>cp</sub>	1ms	50	A
		-I <sub>c</sub>		75	A
Collector Power Dissipation	P <sub>c</sub>	1 device	300	W	
Brake	Collector-Emitter voltage	V <sub>CEs</sub>		600	V
	Gate-Emitter voltage	V <sub>GES</sub>		±20	V
	Collector current	I <sub>c</sub>	Continuous	50	A
		I <sub>cp</sub>	1ms	100	A
	Collector Power Dissipation	P <sub>c</sub>	1 device	200	W
Repetitive peak reverse Voltage (Diode)	V <sub>RRM</sub>		600	V	
Converter	Repetitive peak reverse Voltage	V <sub>RRM</sub>		800	V
	Average Output Current	I <sub>o</sub>	50Hz/60Hz sine wave	75	A
	Surge Current (Non-Repetitive)	I <sub>FSM</sub>	T <sub>j</sub> =150°C, 10ms	525	A
	I <sup>2</sup> t (Non-Repetitive)	I <sup>2</sup> t	half sine wave	1378	A <sup>2</sup> s
Junction temperature	T <sub>j</sub>		150	°C	
Storage temperature	T <sub>stg</sub>		-40~ +125	°C	
Isolation voltage	between terminal and copper base <sup>(*1)</sup>	Viso	AC : 1min.	2500	V
	between thermistor and others <sup>(*2)</sup>			2500	V
Mounting Screw Torque <sup>(*3)</sup>				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 Ic = 75 A terminal		1.8		V
				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	us
tf			0.05	0.35		
Forward on voltage	VF IF = 75 A chip terminal		1.7		V	
			2.0	2.7		
Reverse recovery time	trr IF = 75 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		V
				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	us
		tf RG = 51 ohm		0.05	0.35	
	Reverse current	IRRM VR = 600 V			1.0	mA
	Converter	VFM IF = 75 A chip terminal		1.1		V
			1.2	1.5		
Reverse current	IRRM VR = 800 V			1.0	mA	
Thermistor	R	T = 25C		5000		ohm
		T = 100C	465	495	520	
B value	B	T = 25/50C	3305	3375	3450	K

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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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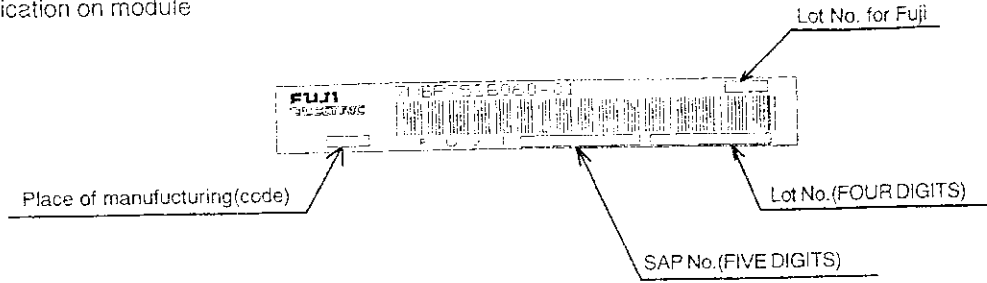
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6. Indication on module



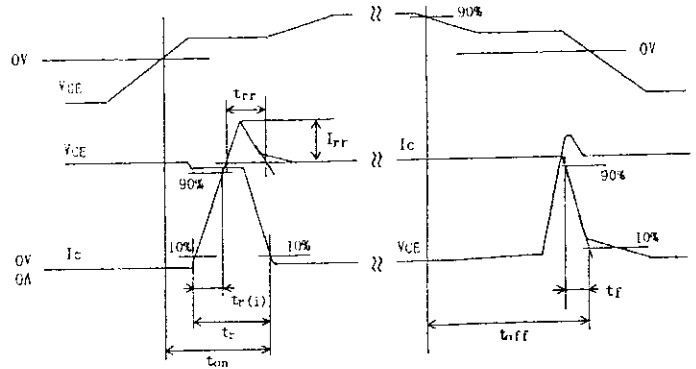
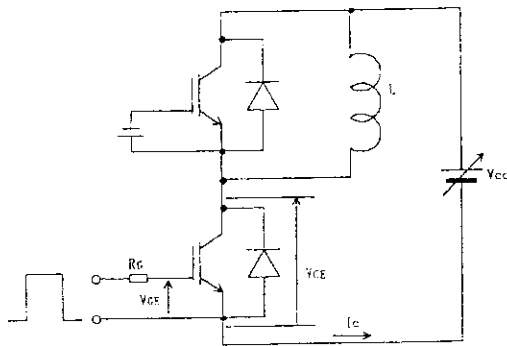
7. Applicable category

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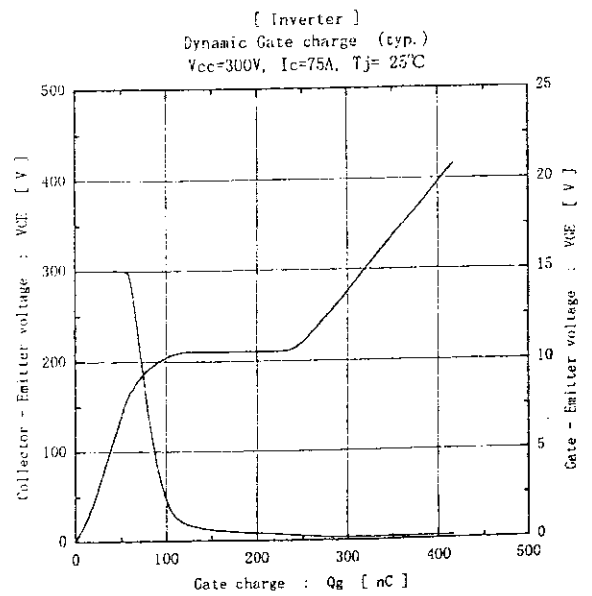
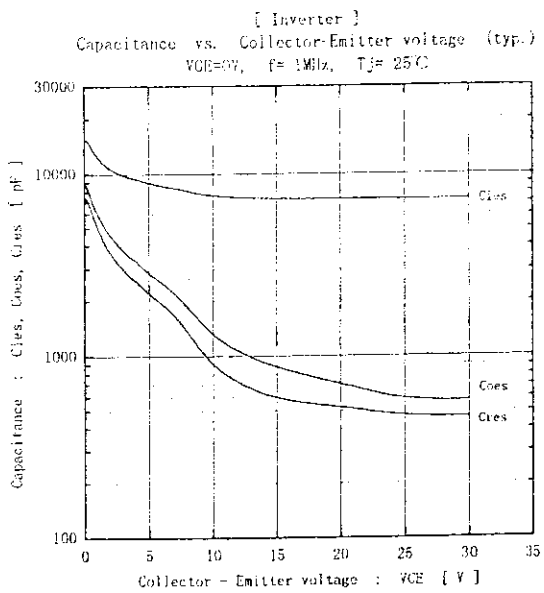
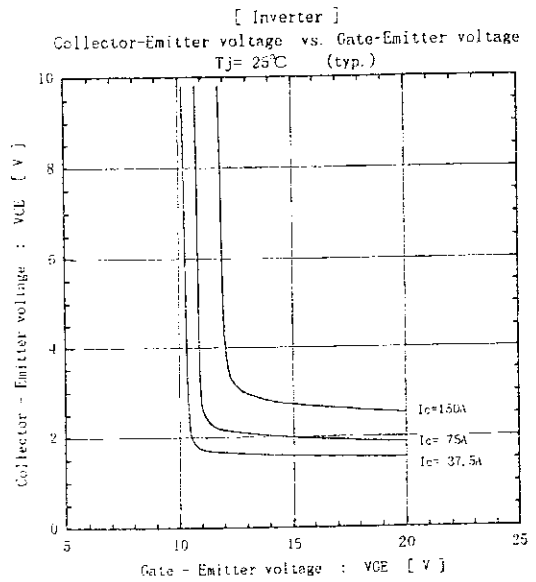
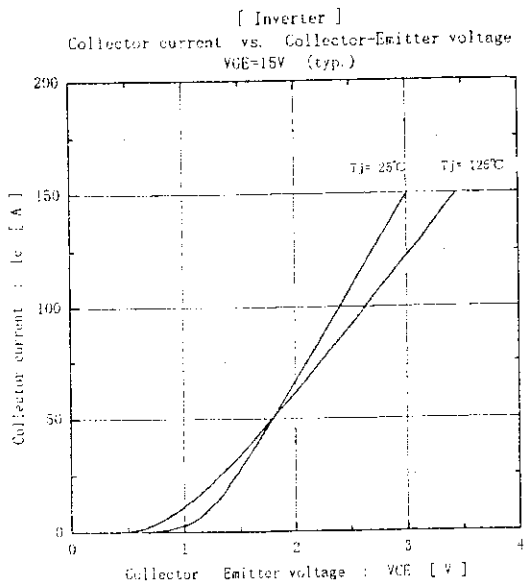
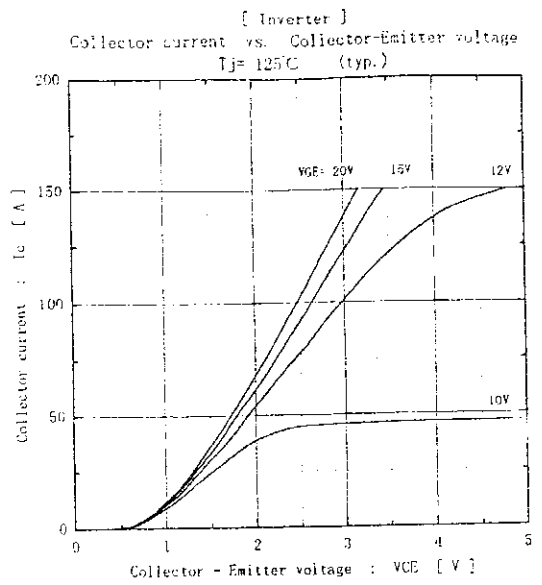
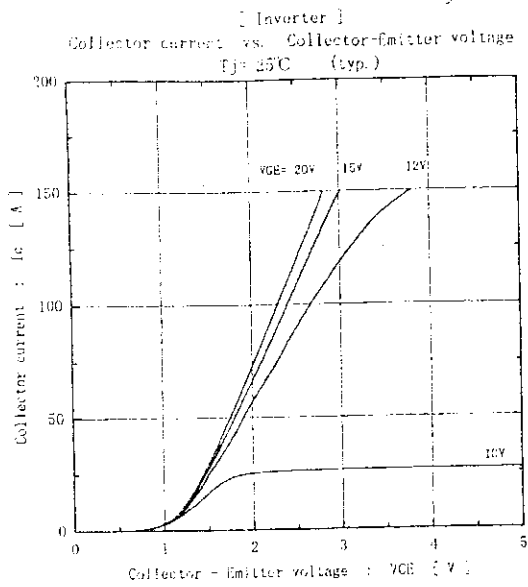
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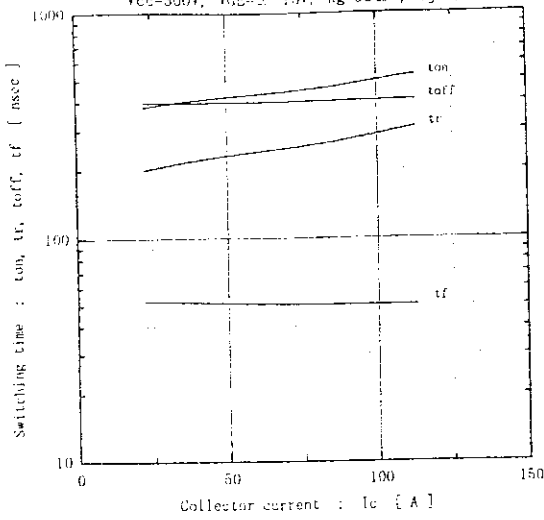
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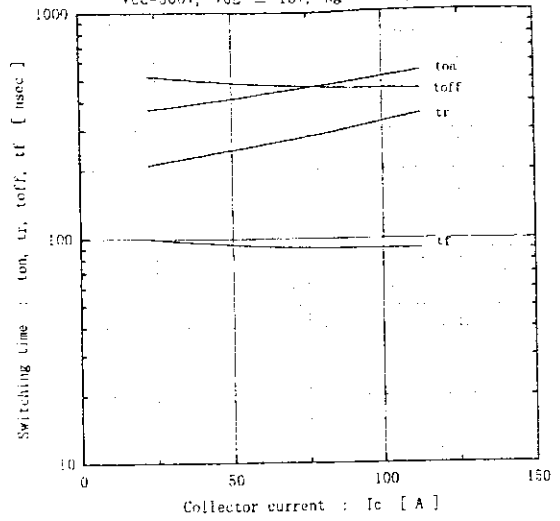
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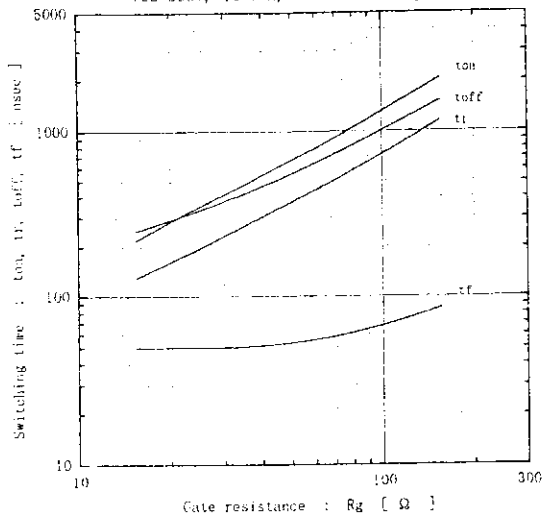
[ Inverter ]  
Switching time vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega, T_j=25^\circ C$



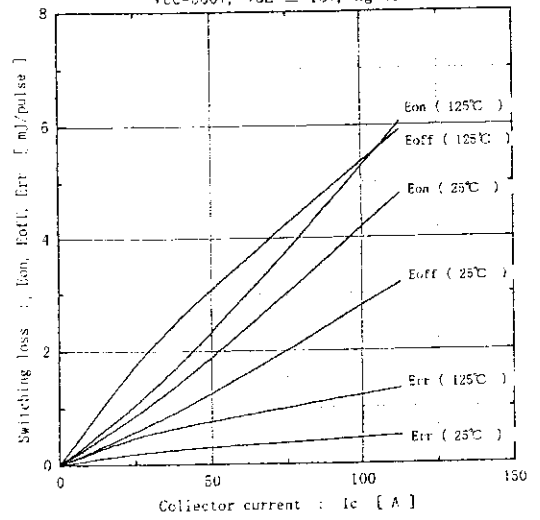
[ Inverter ]  
Switching time vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega, T_j=125^\circ C$



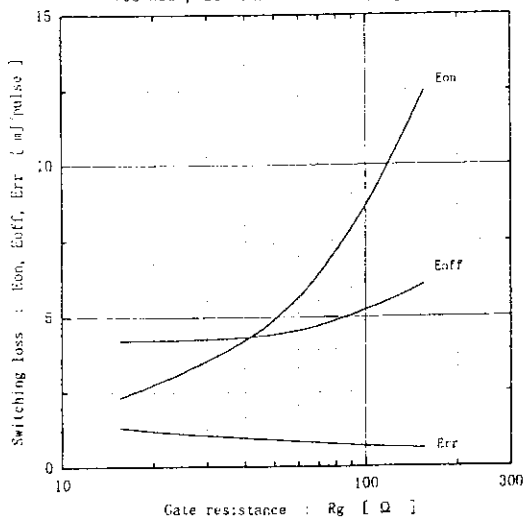
[ Inverter ]  
Switching time vs. Gate resistance (typ.)  
 $V_{cc}=300V, I_c=75A, V_{GE}=\pm 15V, T_j=25^\circ C$



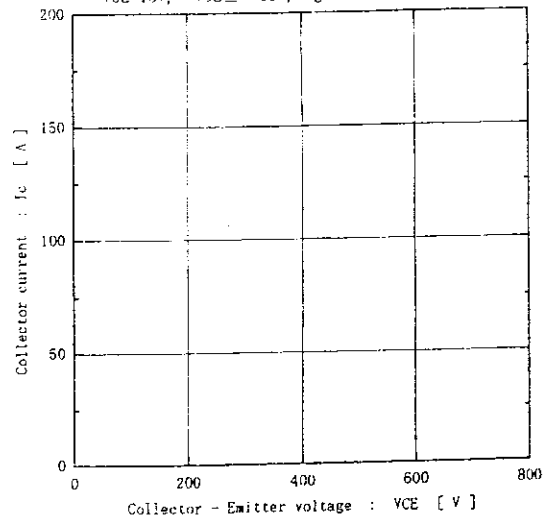
[ Inverter ]  
Switching loss vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega$



[ 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  
 $+V_{GE}=15V, -V_{GE}\le 15V, R_g\ge 33\Omega, T_j\le 125^\circ C$



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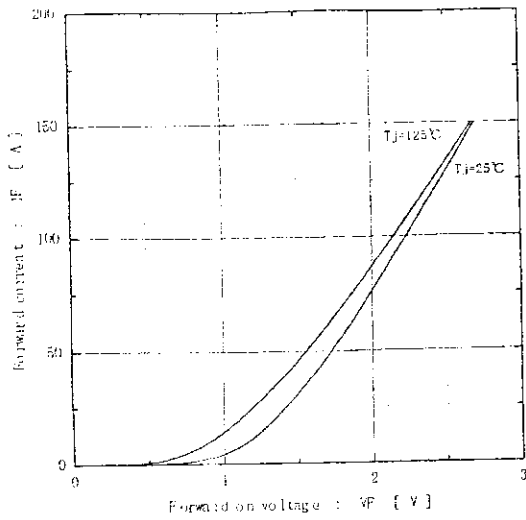
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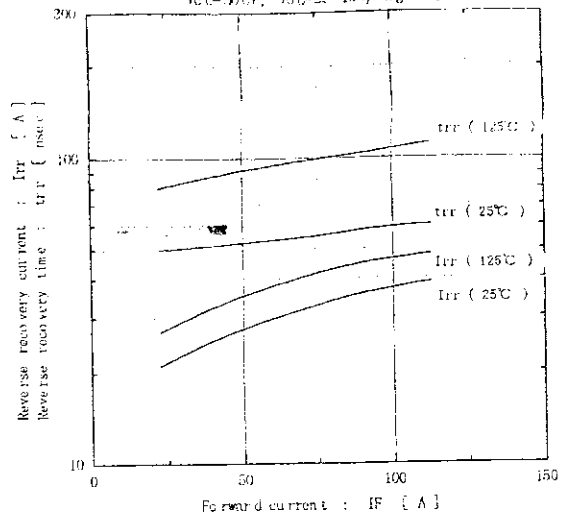


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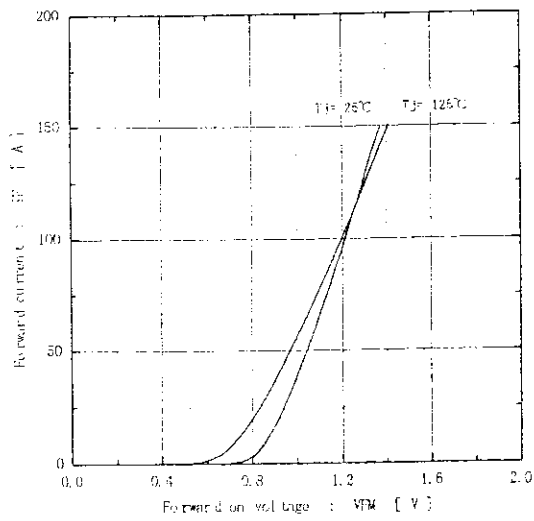
[ Inverter ]  
Forward current vs. Forward on voltage (typ.)



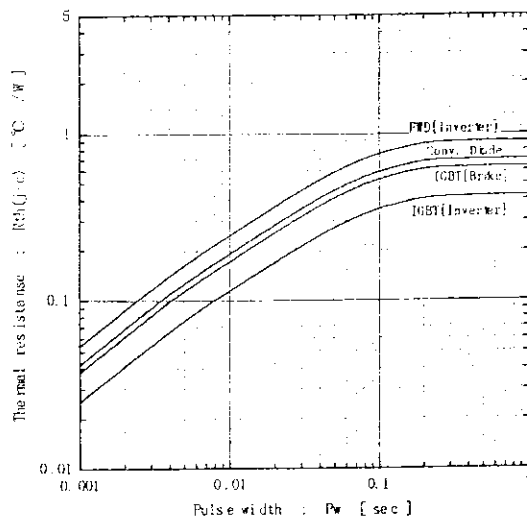
[ Inverter ]  
Reverse recovery characteristics (typ.)  
V<sub>ce</sub>=120V, V<sub>GE</sub>±15V, R<sub>θ</sub>=33°C/W



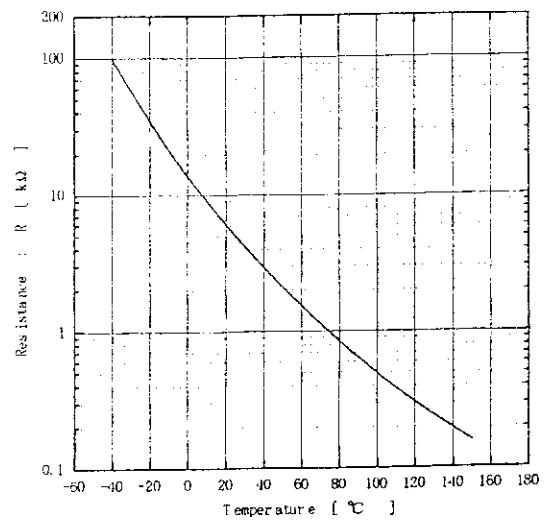
[ Converter ]  
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[ Thermistor ]  
Temperature characteristic (typ.)



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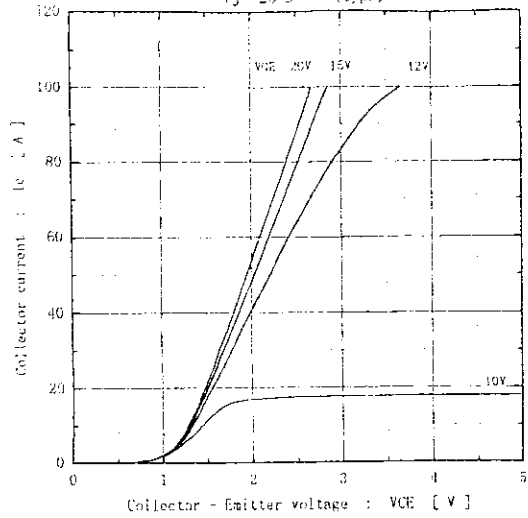
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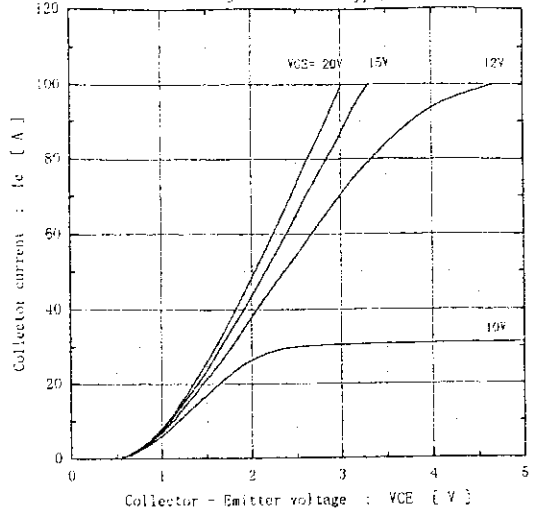
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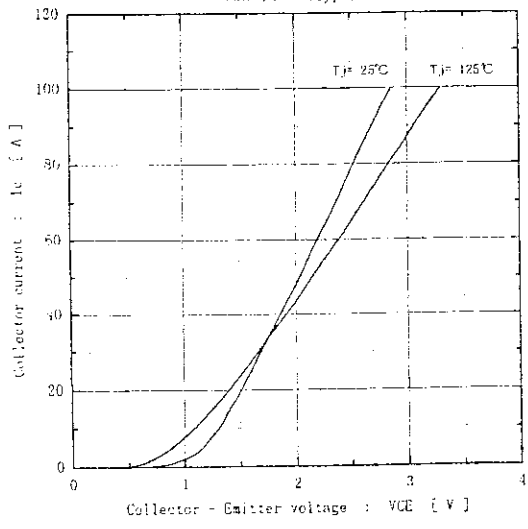
[ Brake ]  
 Collector current vs. Collector-Emitter voltage  
 $T_j = 25^\circ\text{C}$  (typ.)



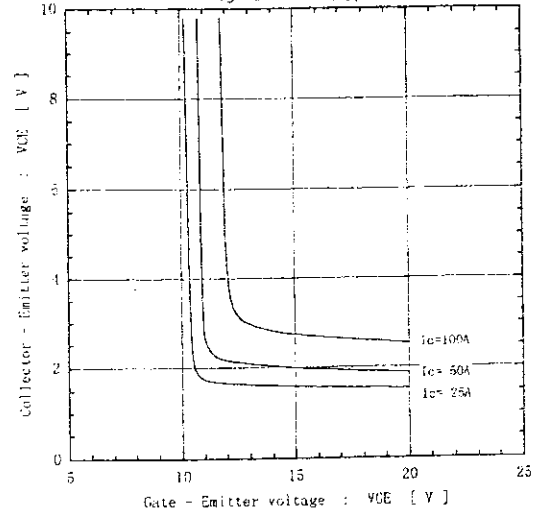
[ Brake ]  
 Collector current vs. Collector-Emitter voltage  
 $T_j = 125^\circ\text{C}$  (typ.)



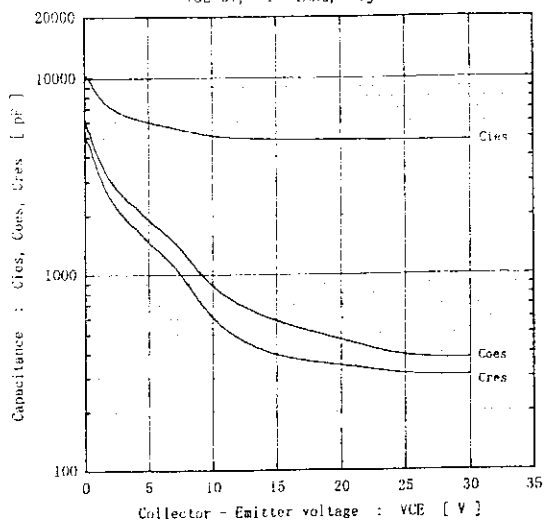
[ Brake ]  
 Collector current vs. Collector-Emitter voltage  
 $V_{GE} = 15\text{V}$  (typ.)



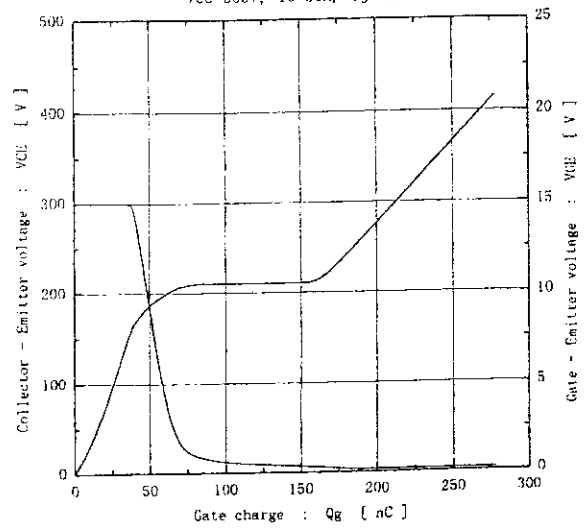
[ Brake ]  
 Collector-Emitter voltage vs. Gate-Emitter voltage  
 $T_j = 25^\circ\text{C}$  (typ.)



[ 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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