

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR15SA120D-01

Spec. No. : MS6M 0546

Date : Jun. - 02 - 2000

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Jun. - 2 - '00	T. Kikuyasu	T. Miyata	DWG. NO.	MS6M 0546	1 / 10
CHECKED	June - 2 - 00	S. Miyata				

Revised Records

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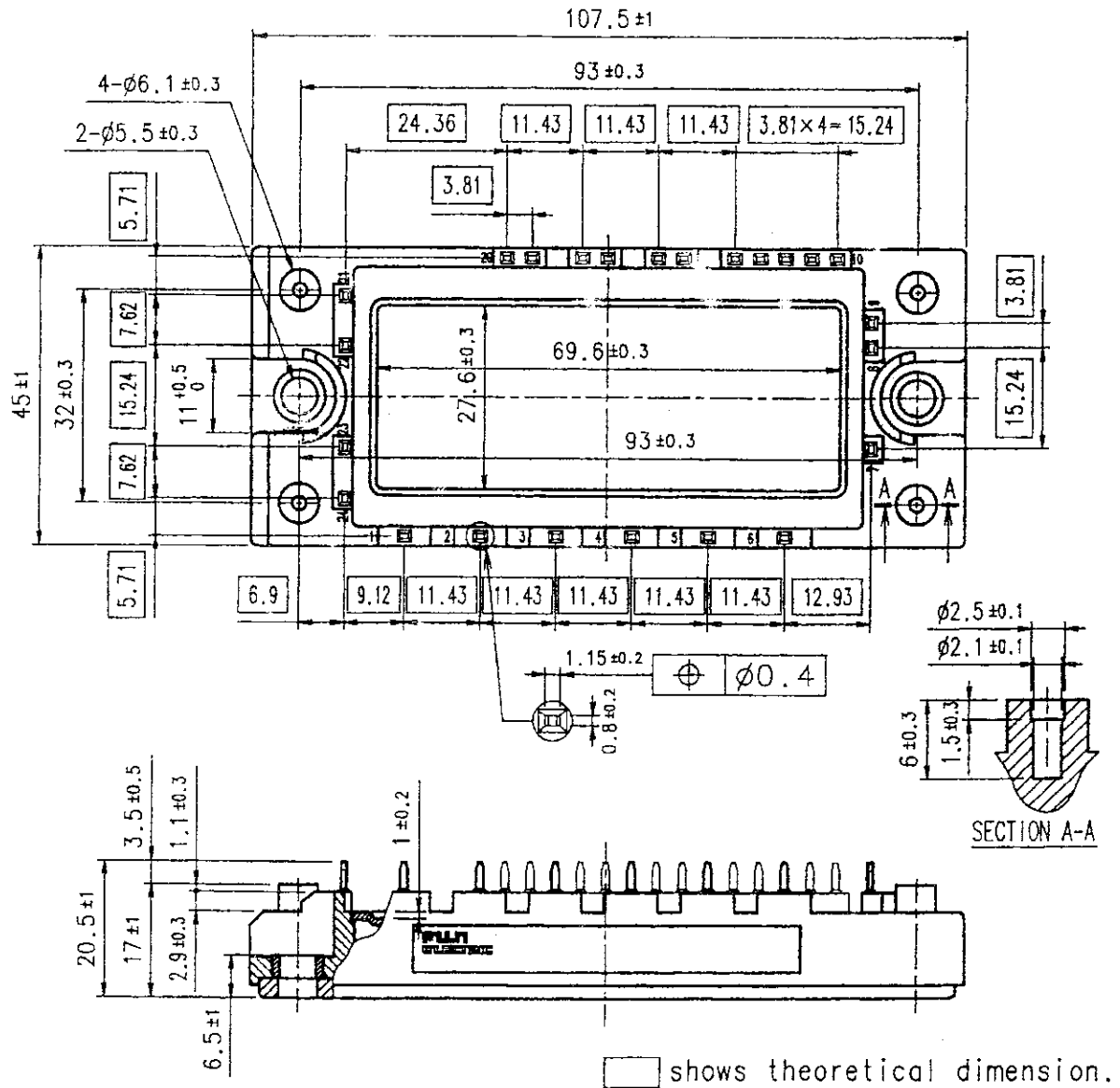
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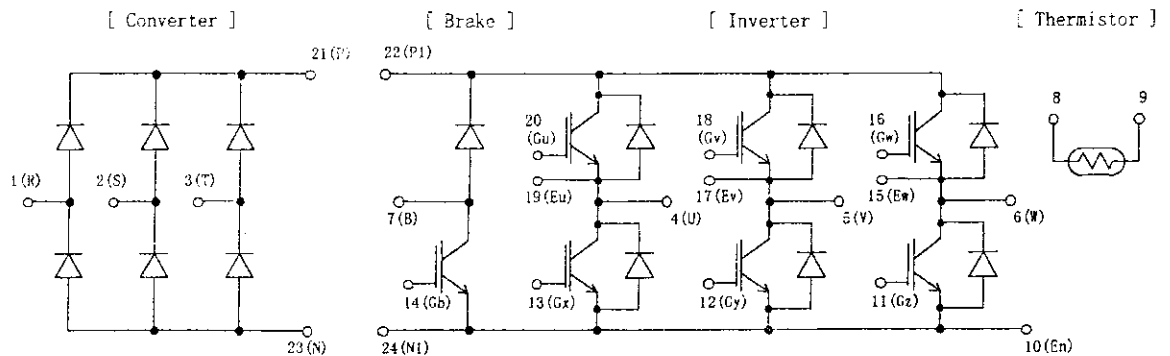
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7MBR15SA120D-01

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			1200	V
	Gate-Emitter voltage	VGES			+20	V
	Collector current	Ic	Continuous	Tc=25C	25	A
				Tc=80C	15	
		Icp	1ms	Tc=25C	50	A
				Tc=80C	30	
		-Ic			15	A
Collector Power Dissipation		Pc	1 device		110	W
Brake	Collector-Emitter voltage	VCES			1200	V
	Gate-Emitter voltage	VGES			+20	V
	Collector current	Ic	Continuous	Tc=25C	25	A
				Tc=80C	15	
		Icp	1ms	Tc=25C	50	A
				Tc=80C	30	
	Collector Power Dissipation	Pc	1 device		110	W
Converter	Repetitive peak reverse Voltage(Diode)	VRRM			1200	V
	Repetitive peak reverse Voltage	VRRM			1600	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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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 1200 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 = 15 mA	5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, chip		2.1		V
			Ic = 15 A terminal		2.15	2.6	
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz		1800		pF
	Turn-on time	ton	Vcc= 600 V		0.35	1.2	us
		tr	Ic = 15 A		0.25	0.6	
		tr(f)	VGE +-15 V		0.1		
	Turn-off time	toff	RG = 82 ohm		0.45	1.0	
		tf			0.08	0.3	
	Forward on voltage	VF	IF = 15 A chip		2.3		V
			terminal		2.35	3.2	
	Reverse recovery time	trr	IF = 15 A			350	ns
Brake	Zero gate voltage Collector current	ICES	VGE 0 V, VCE 1200 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		2.1		V
			Ic = 15 A terminal		2.2	2.6	
	Turn-on time	ton	Vcc= 600 V		0.35	1.2	us
		tr	Ic = 15 A		0.25	0.6	
	Turn-off time	toff	VGE +-15 V		0.45	1.0	
		tf	RG = 82 ohm		0.08	0.3	
	Reverse current	IRRM	VR = 1200 V			1.0	mA
Converter	Forward on voltage	VFM	IF = 15 A chip		0.9		V
			terminal		1.0	1.5	
	Reverse current	IRRM	VR = 1600 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			1.14	C/W
		Inverter FWD			1.85	
		Brake IGBT			1.14	
		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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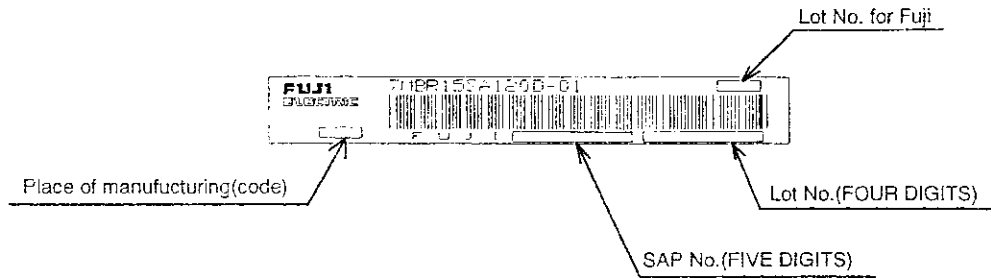
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6. Indication on module



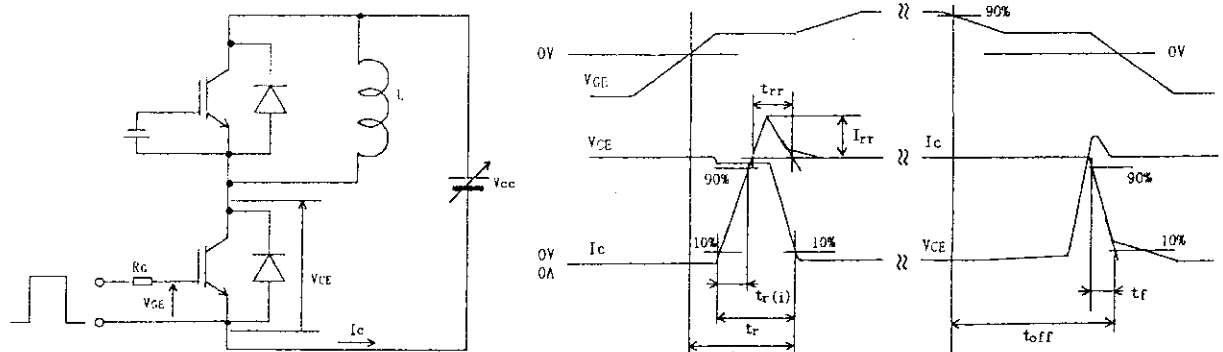
7. Applicable category (適用範囲)

This specification is applied to Power Integrated Module named 7MBR15SA120D-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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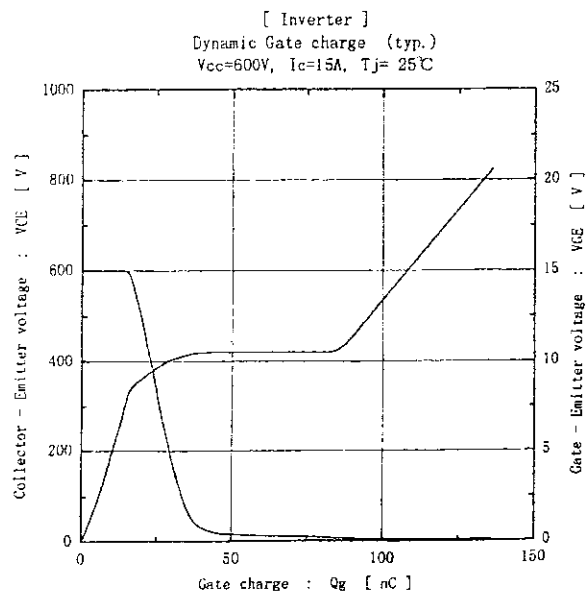
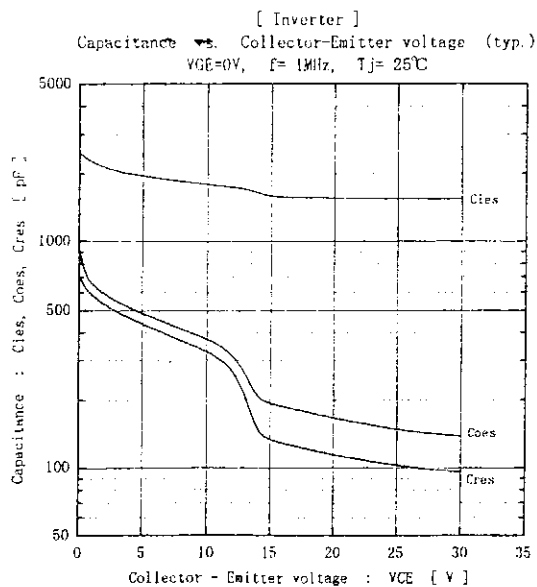
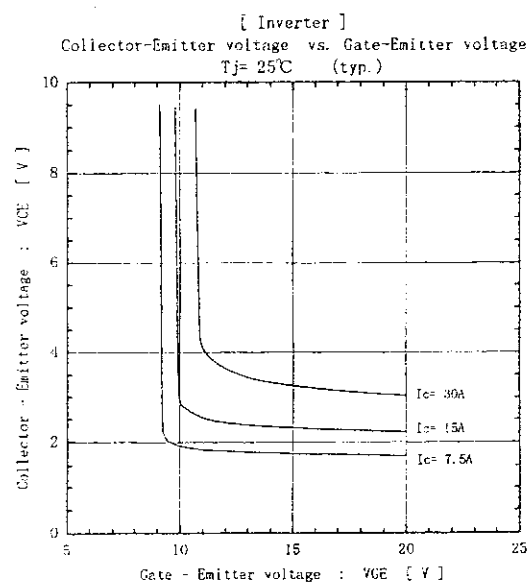
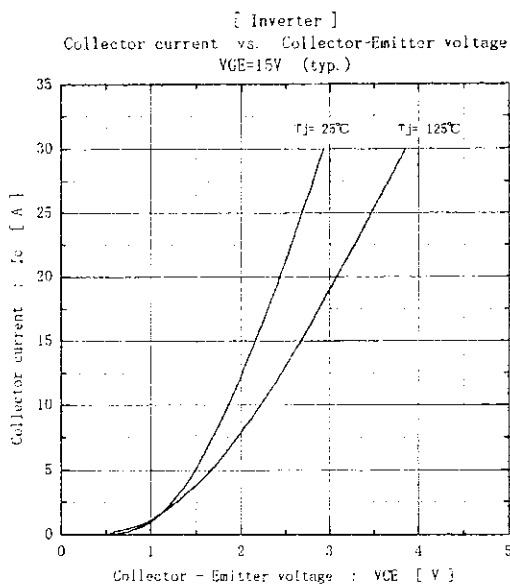
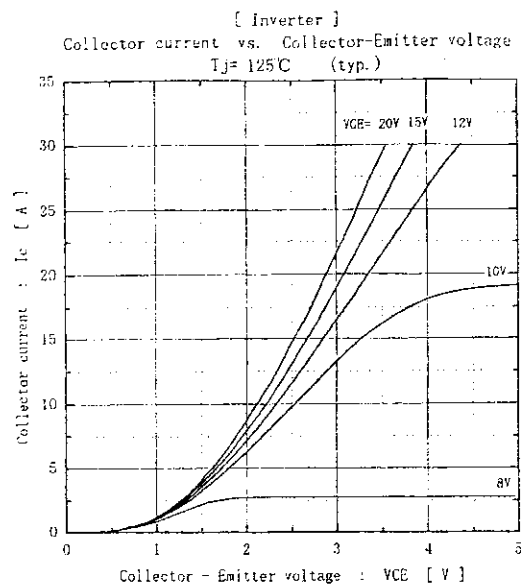
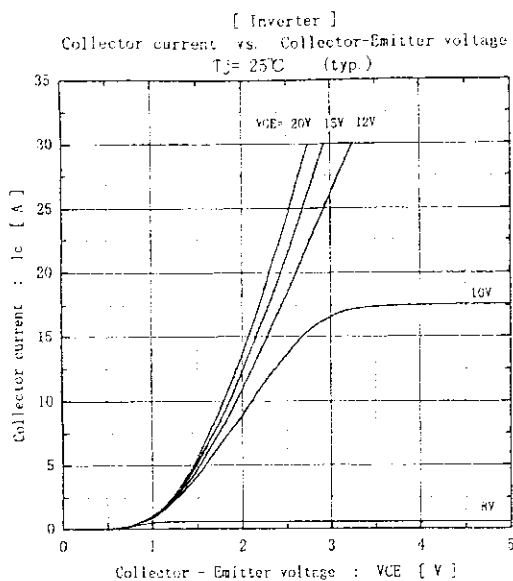
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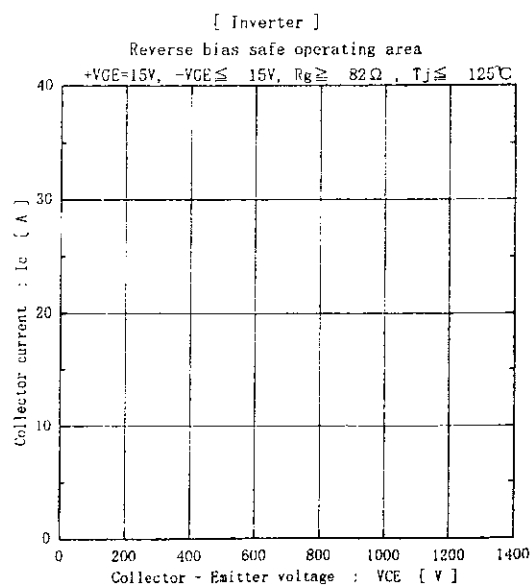
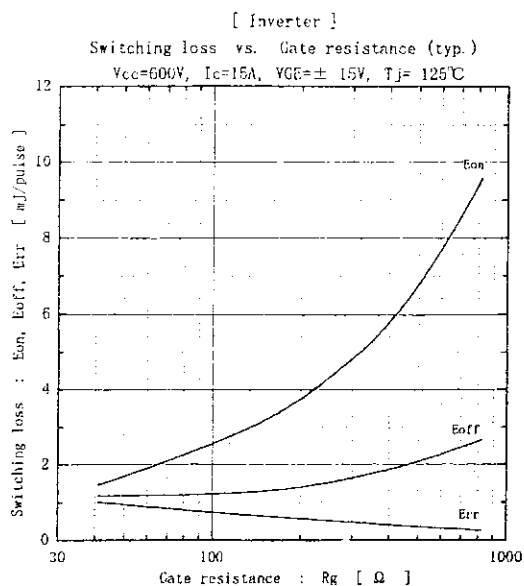
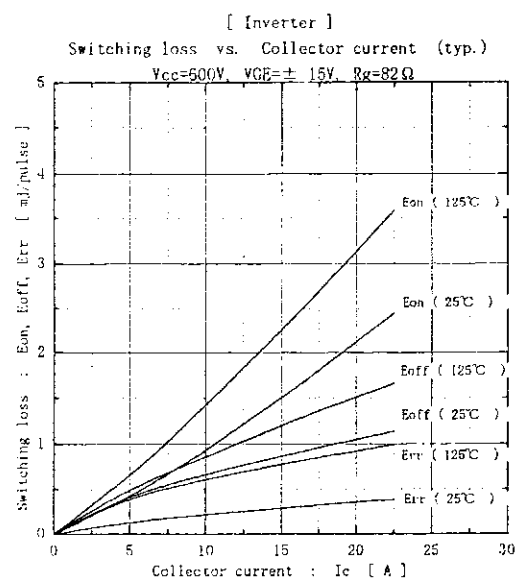
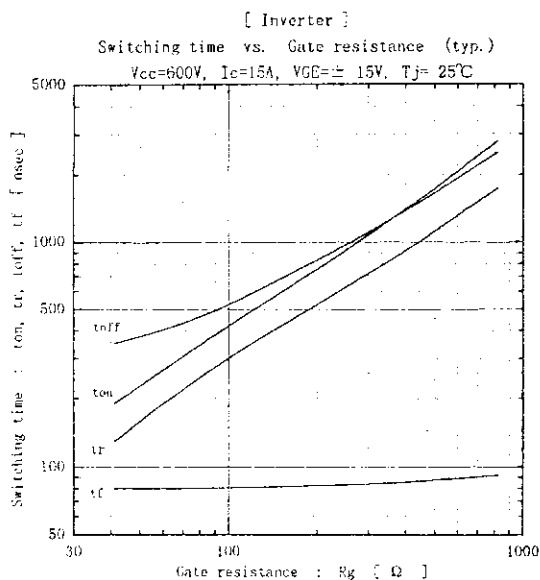
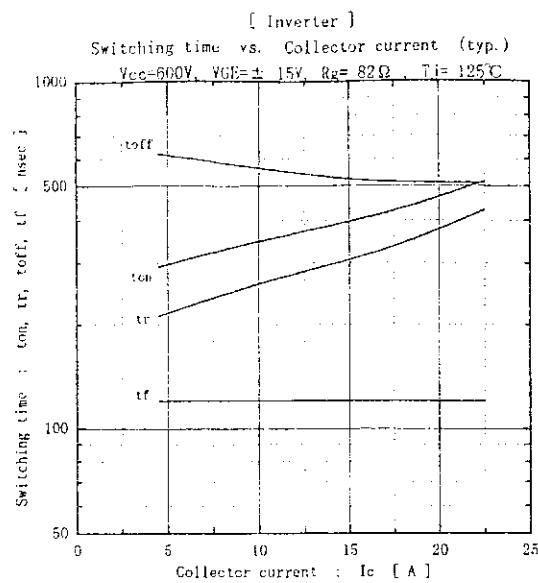
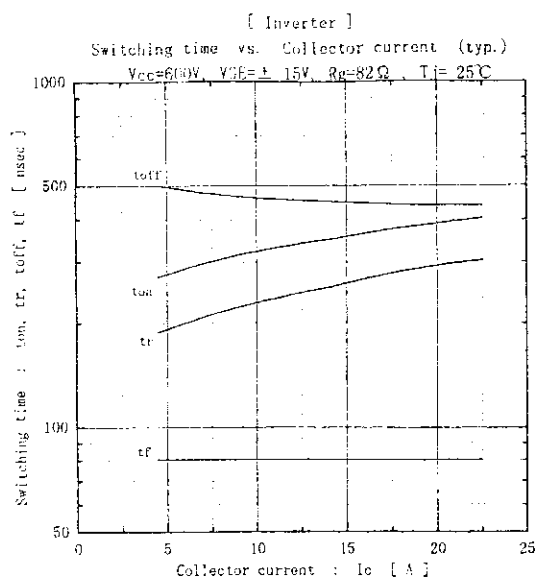
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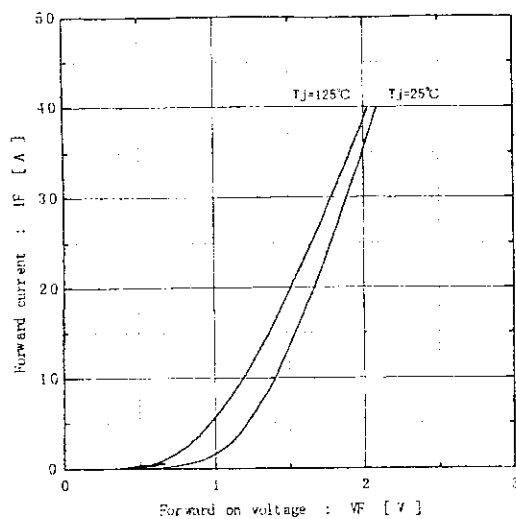
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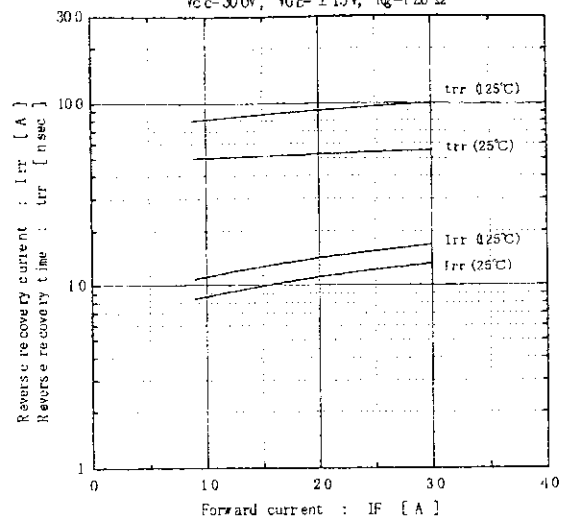


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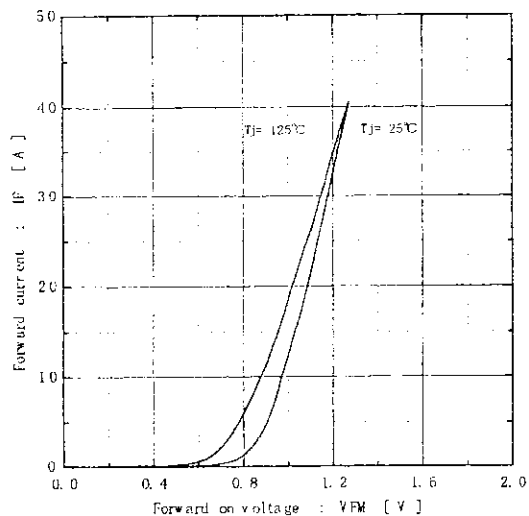
[Inverter]
Forward current vs. Forward on voltage (typ.)



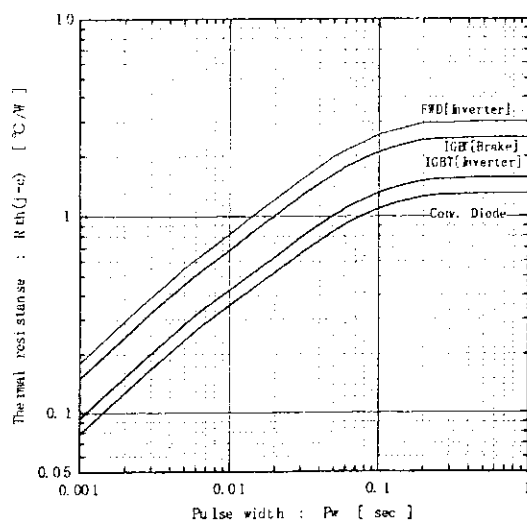
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CE}=300V$, $V_{GE}=\pm 15V$, $R_g=120\Omega$



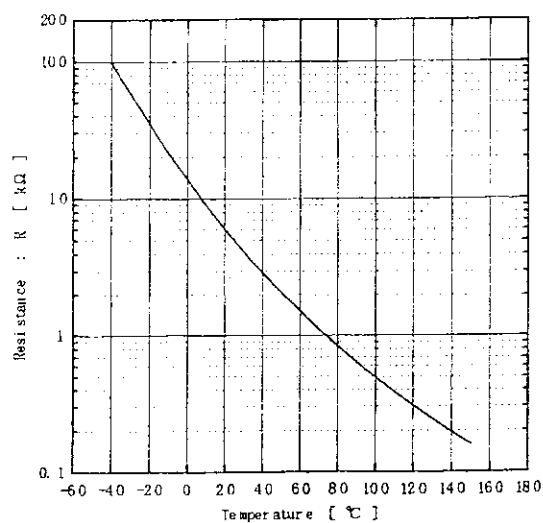
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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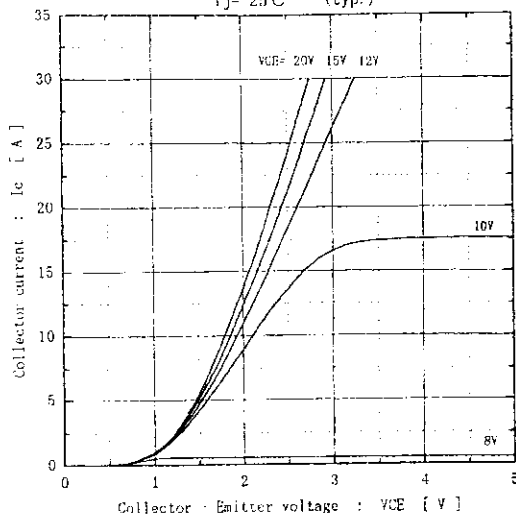
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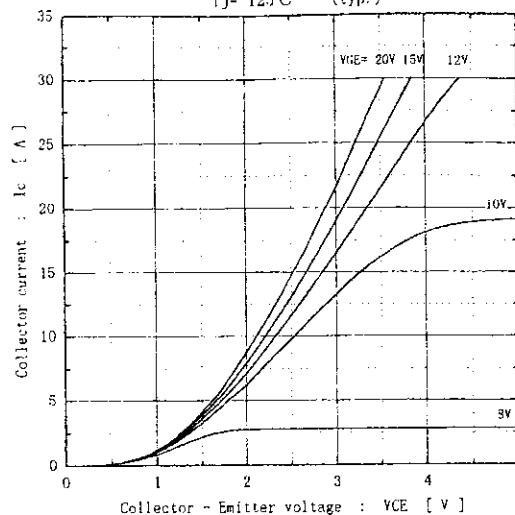
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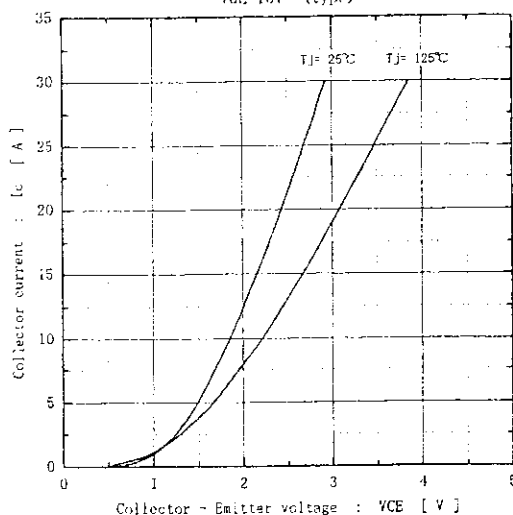
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



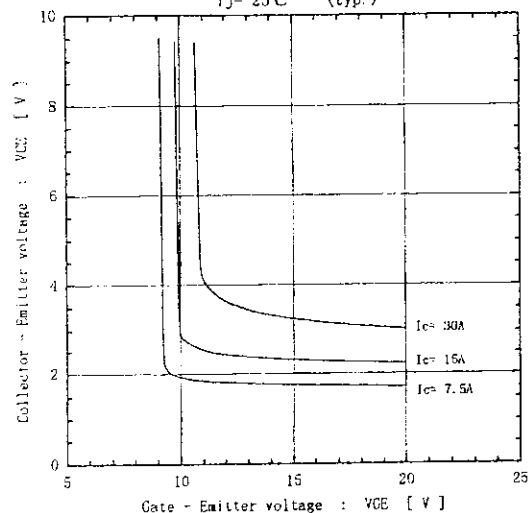
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



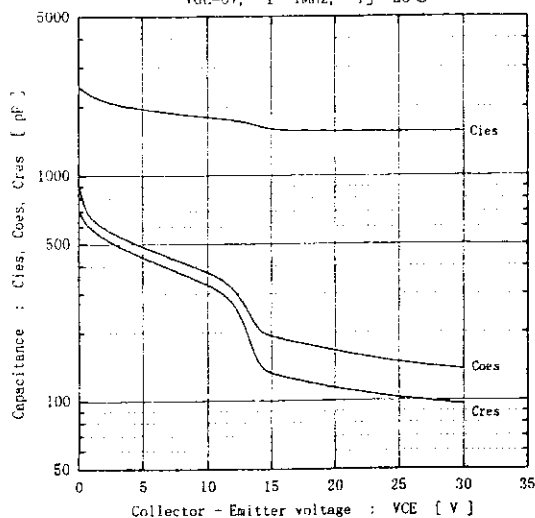
[Brake]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



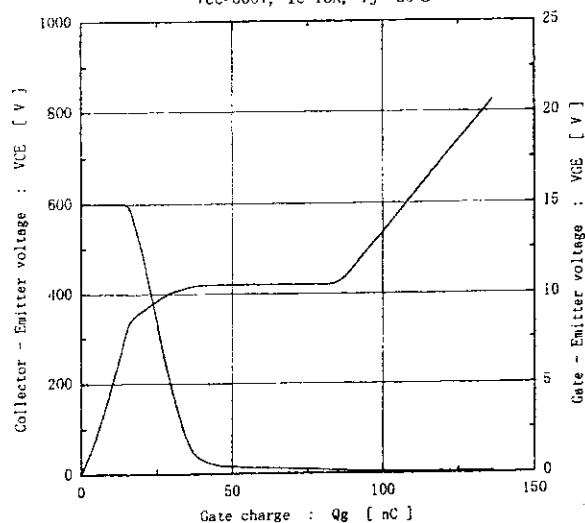
[Brake]
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



[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.)
 $V_{CC} = 600\text{V}$, $I_C = 15\text{A}$, $T_j = 25^\circ\text{C}$



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