

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR50SB120-01

Spec. No. : MS6M 0555

Date : Jun. - 02 - 2000

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Matsumoto Factory

	DATE	NAME	APPROVED		Fuji Electric Co., Ltd.	
DRAWN	Jun. - 2 - '00	T. Kikayashi			DWG. NO.	MS6M 0555
CHECKED	June - 2 - 00	S. Kikayashi	T. Kikayashi			
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Revised Records

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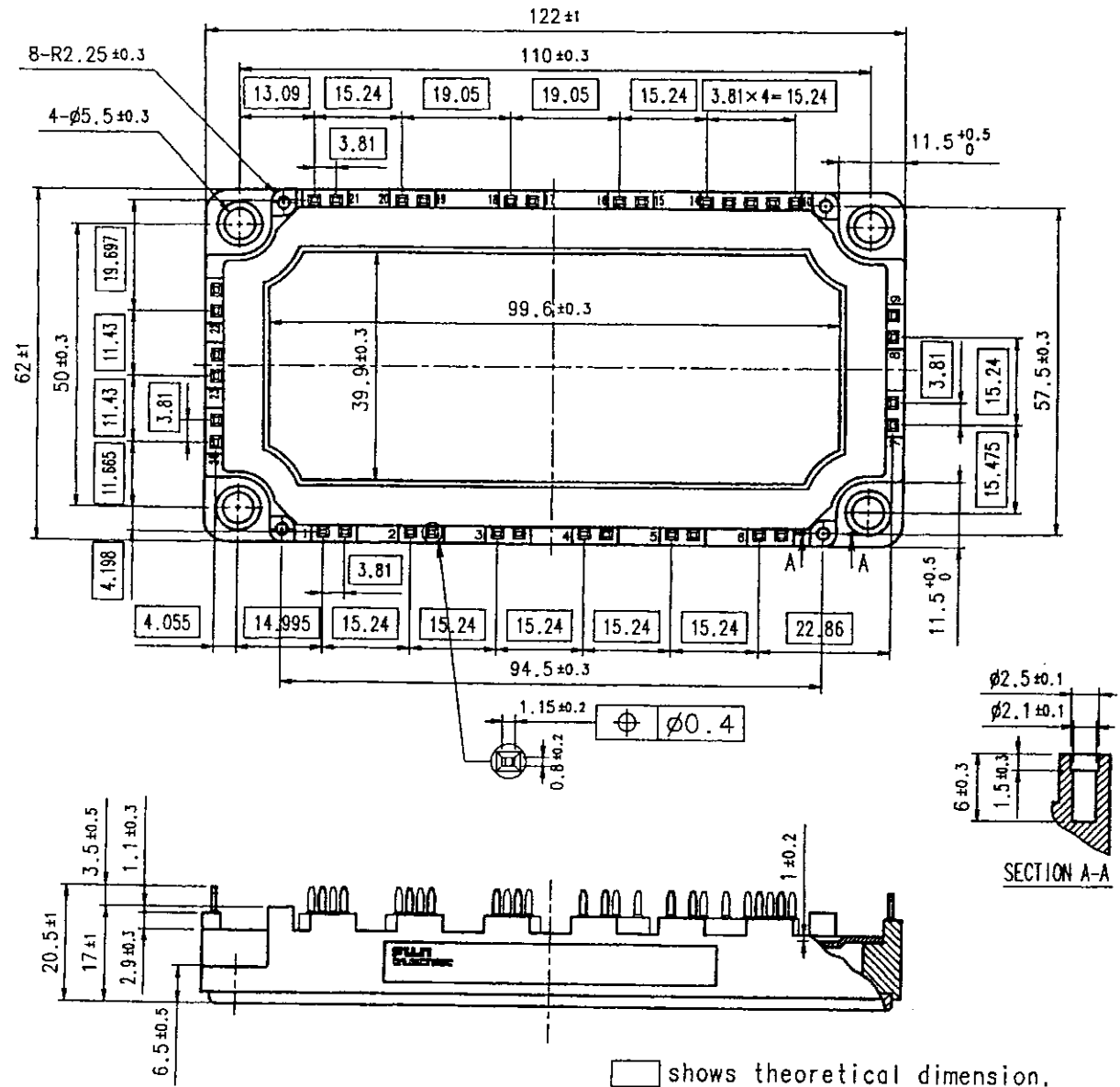
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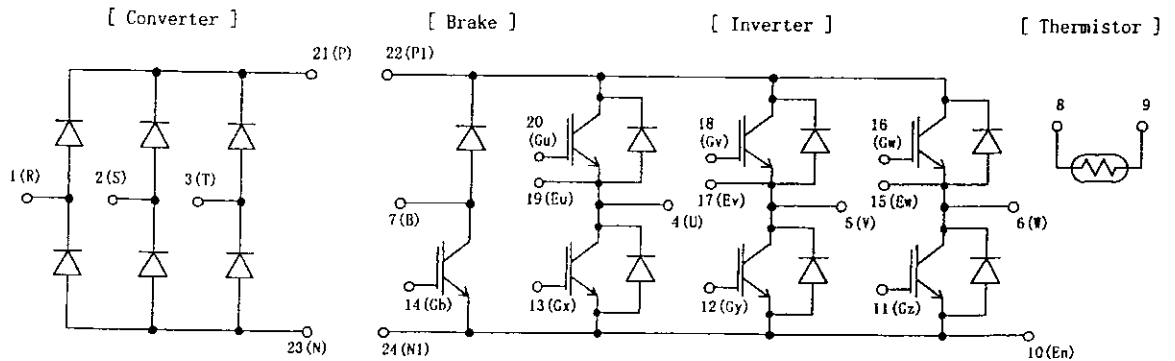
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7MBR50SB120-01

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	75	A
				Tc=80C	50	
		Icp	1ms	Tc=25C	150	A
				Tc=80C	100	
		-Ic			50	A
	Collector Power Dissipation	Pc	1 device		360	W
Brake	Collector-Emitter voltage	VCES			1200	V
	Gate-Emitter voltage	VGES			+20	V
	Collector current	Ic	Continuous	Tc=25C	35	A
				Tc=80C	25	
		Icp	1ms	Tc=25C	70	A
				Tc=80C	50	
	Collector Power Dissipation	Pc	1 device		180	W
	Repetitive peak reverse Voltage(Diode)	VRRM			1200	V
Converter	Repetitive peak reverse Voltage	VRRM			1600	V
	Average Output Current	Io	50Hz/60Hz sine wave		50	A
	Surge Current (Non-Repetitive)	IFSM	Tj=150C,10ms		520	A
	I ² t (Non-Repetitive)	I ² t	half sine wave		1352	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 $T_J = 25^\circ\text{C}$ unless otherwise specified)

	Items	Symbols	Conditions	Characteristics			Units
				min.	typ.	Max.	
Inverter	Zero gate voltage Collector current	ICES	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}$			1.0	mA
	Gate-Emitter leakage current	IGES	$V_{CE} = 0\text{ V}, V_{GE} = +20\text{ V}$			200	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20\text{ V}, I_c = 50\text{ mA}$	5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{ V}, I_c = 50\text{ A}$		2.1		V
			chip terminal		2.3	2.7	
	Input capacitance	Cies	$V_{GE} = 0\text{ V}, V_{CE} = 10\text{ V}$ $f = 1\text{ MHz}$		6000		pF
	Turn-on time	ton	$V_{cc} = 600\text{ V}$		0.35	1.2	us
		tr	$I_c = 50\text{ A}$		0.25	0.6	
		$tr_{(0)}$	$V_{GE} = +15\text{ V}$		0.1		
	Turn-off time	toff	$R_G = 24\text{ ohm}$		0.45	1.0	
		tf			0.08	0.3	
Brake	Forward on voltage	VF	$I_F = 50\text{ A}$		2.3		V
			chip terminal		2.5	3.3	
	Reverse recovery time	trr	$I_F = 50\text{ A}$			350	ns
	Zero gate voltage Collector current	ICES	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}$			1.0	mA
	Gate-Emitter leakage current	IGES	$V_{CE} = 0\text{ V}, V_{GE} = +20\text{ V}$			200	nA
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{ V}, I_c = 25\text{ A}$		2.1		V
			chip terminal		2.25	2.7	
	Turn-on time	ton	$V_{cc} = 600\text{ V}$		0.35	1.2	us
		tr	$I_c = 25\text{ A}$		0.25	0.6	
	Turn-off time	toff	$V_{GE} = +15\text{ V}$		0.45	1.0	
		tf	$R_G = 51\text{ ohm}$		0.08	0.3	
Converter	Reverse current	IRRM	$V_R = 1200\text{ V}$			1.0	mA
	Forward on voltage	VFM	$I_F = 50\text{ A}$		1.1		V
			chip terminal		1.2	1.5	
Thermistor	Reverse current	IRRM	$V_R = 1600\text{ V}$			1.0	mA
	Resistance	R	$T = 25^\circ\text{C}$		5000		ohm
			$T = 100^\circ\text{C}$	465	495	520	
	B value	B	$T = 25/50^\circ\text{C}$	3305	3375	3450	K

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	$R_{th(j-c)}$	Inverter IGBT			0.35	C/W
		Inverter FWD			0.75	
		Brake IGBT			0.69	
		Converter Diode			0.50	
Contact Thermal resistance	$R_{th(c-f)}$	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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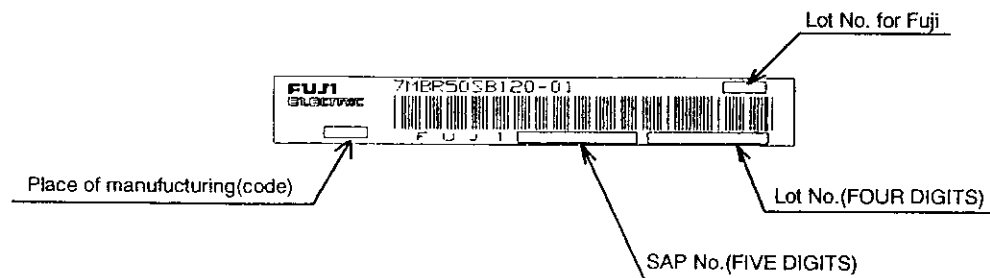
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6. Indication on module



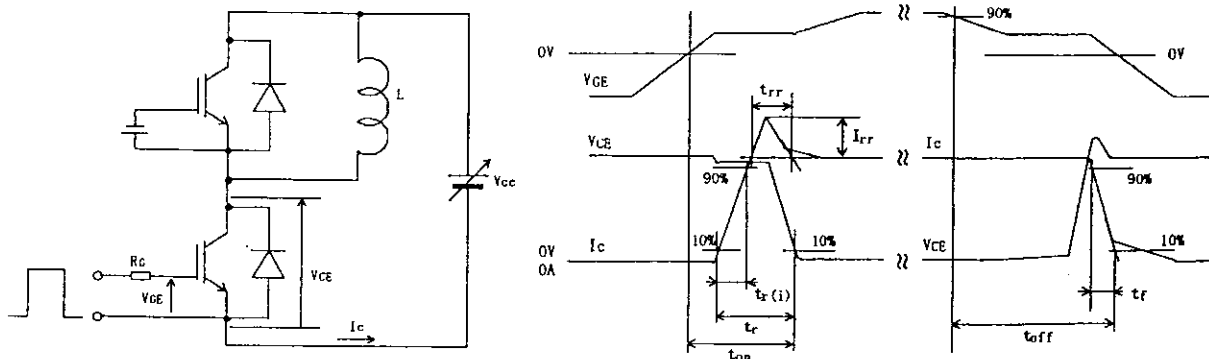
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR50SB120-01.

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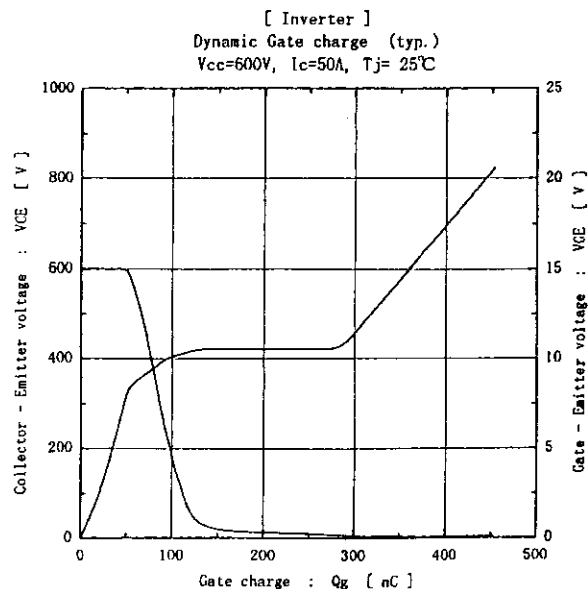
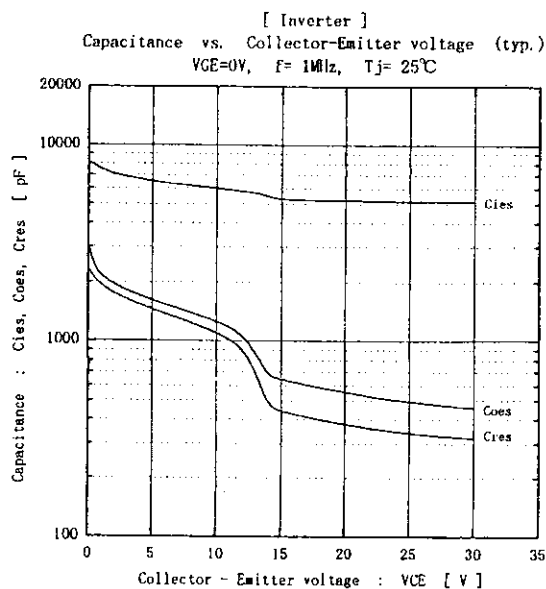
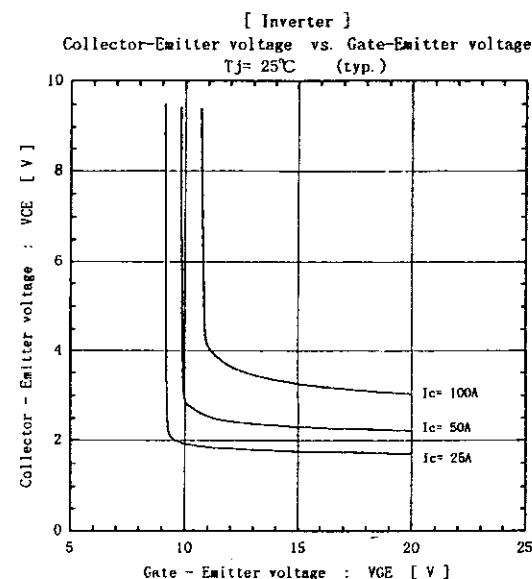
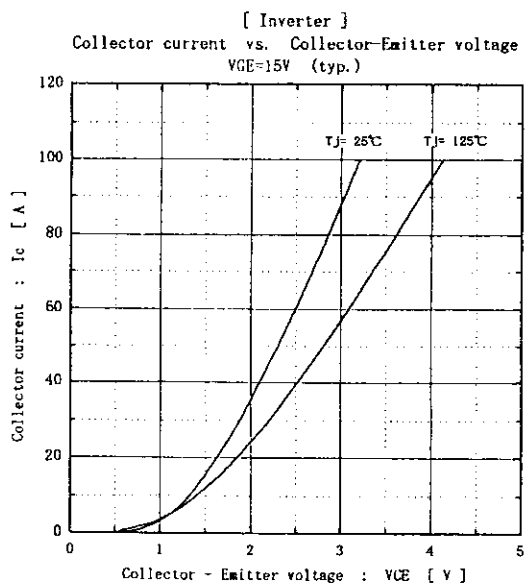
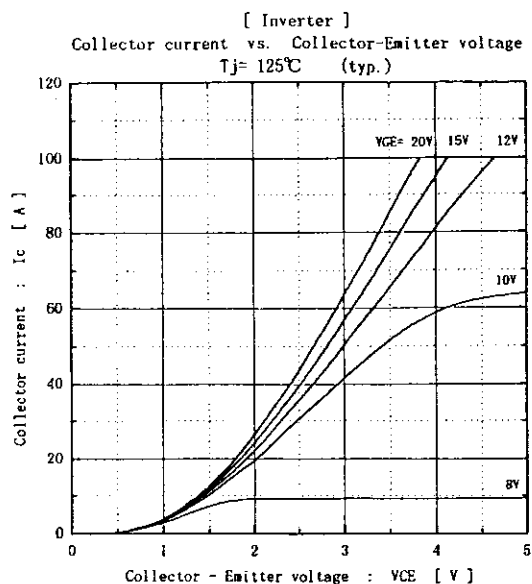
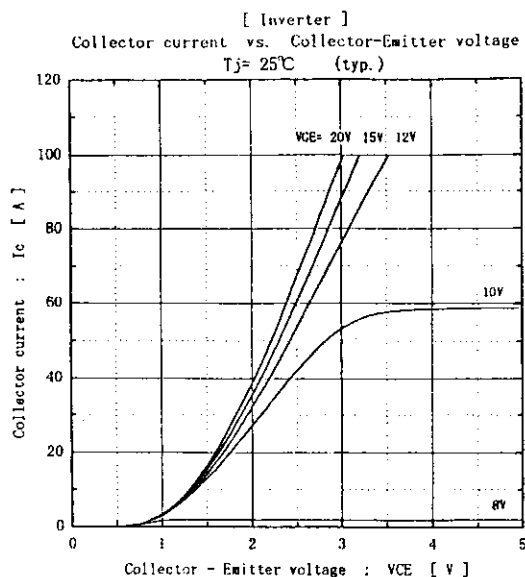
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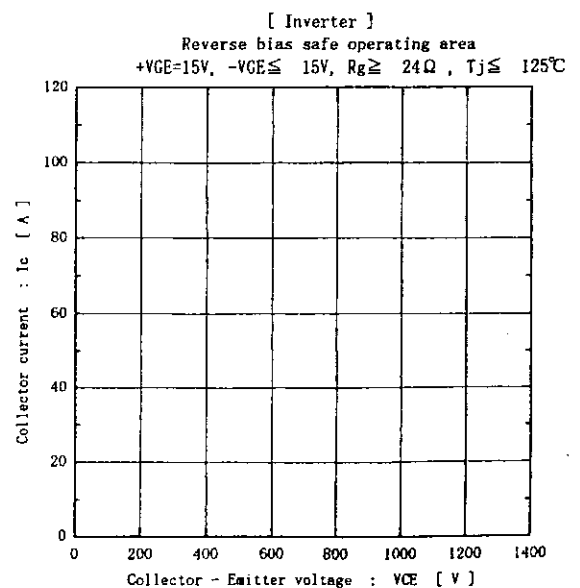
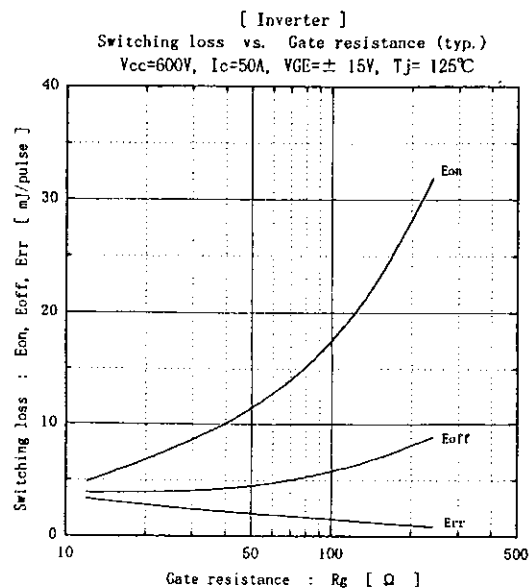
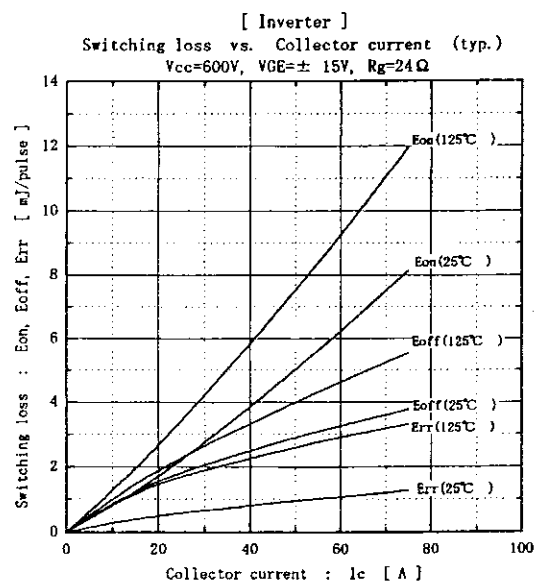
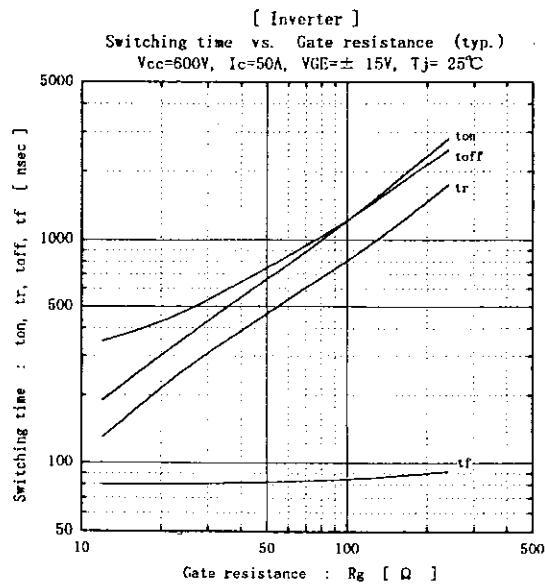
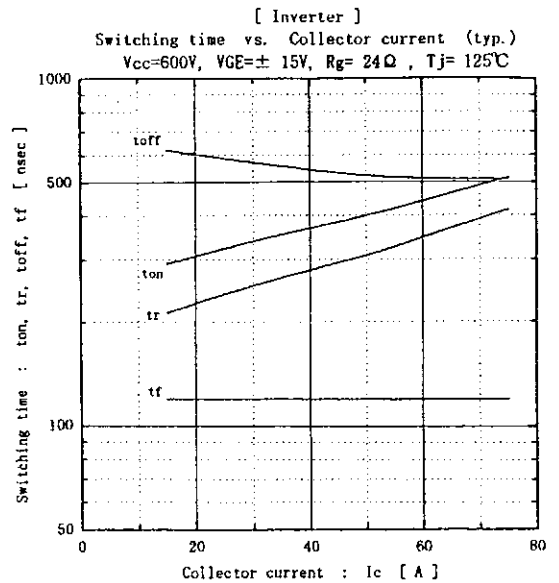
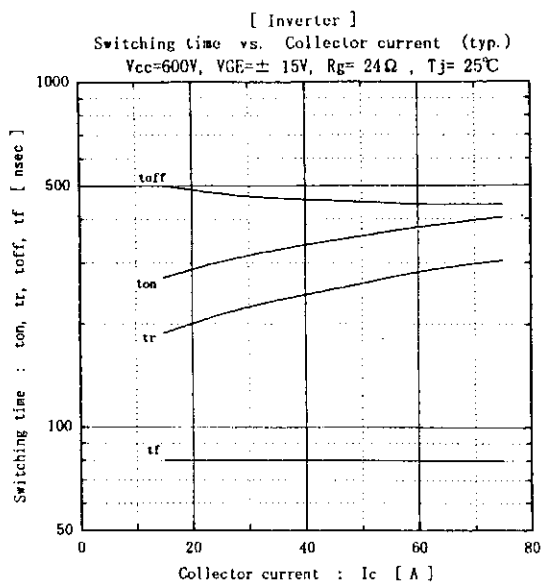
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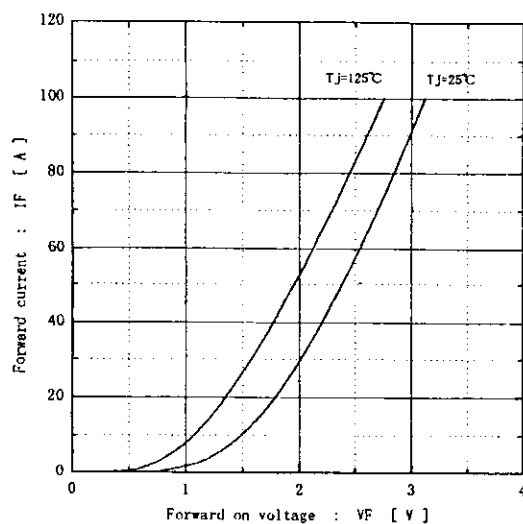
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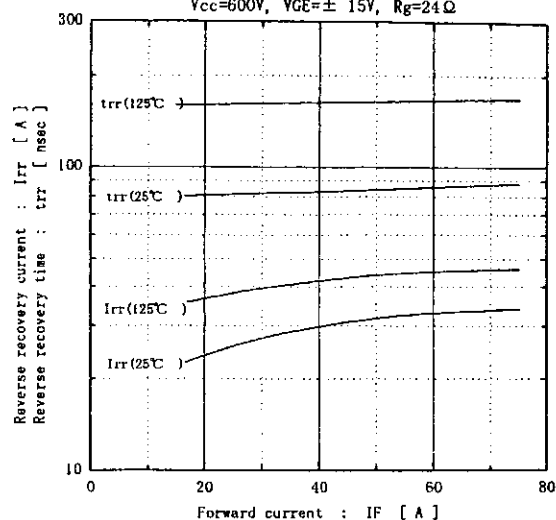
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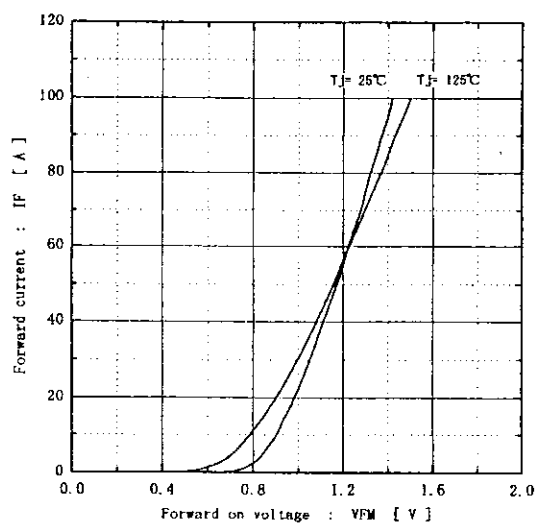
[Inverter]
Forward current vs. Forward on voltage (typ.)



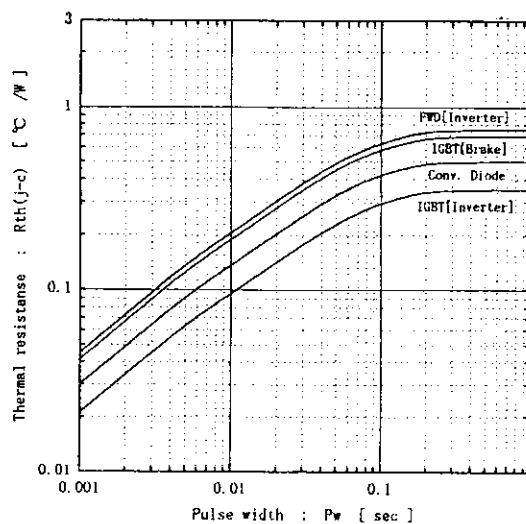
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_g=24\Omega$



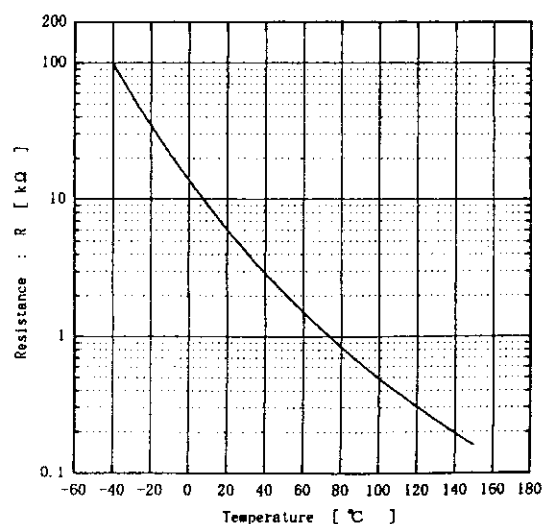
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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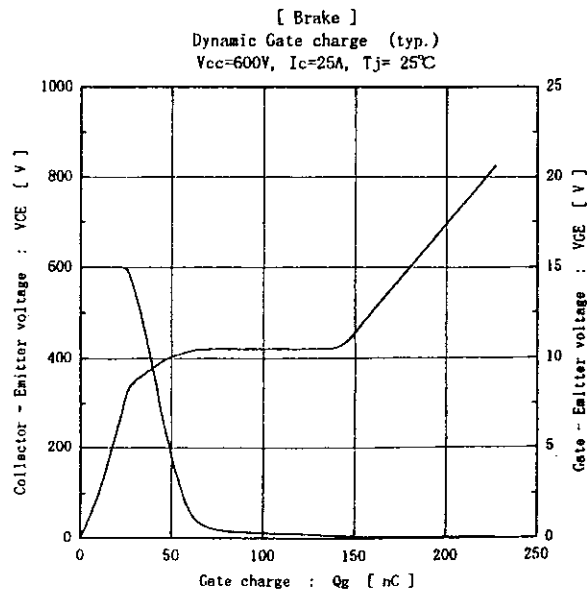
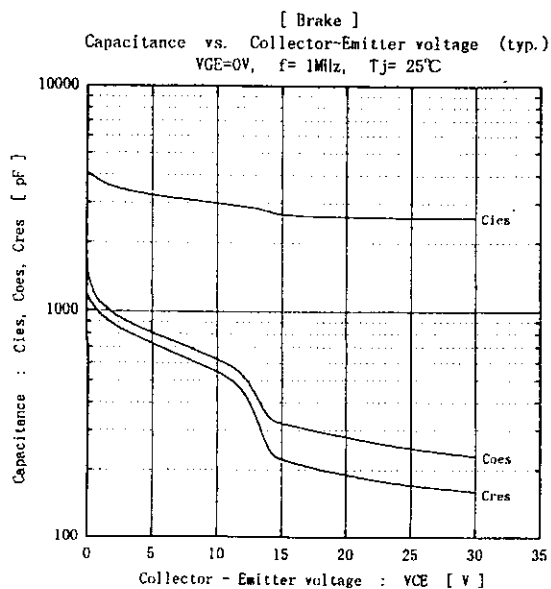
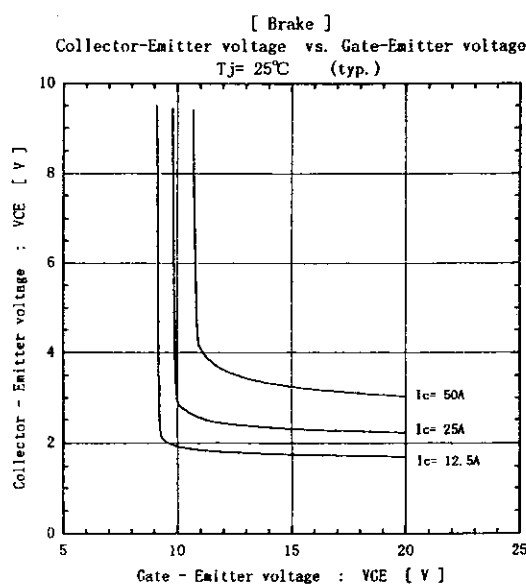
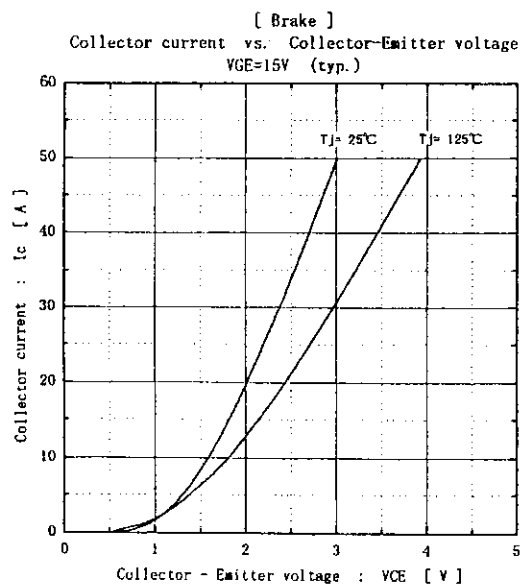
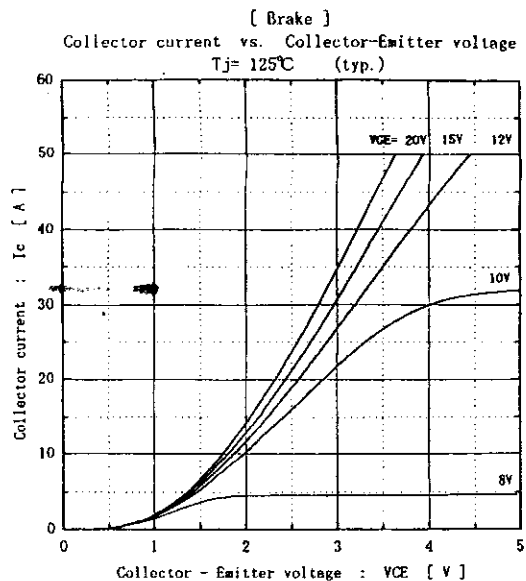
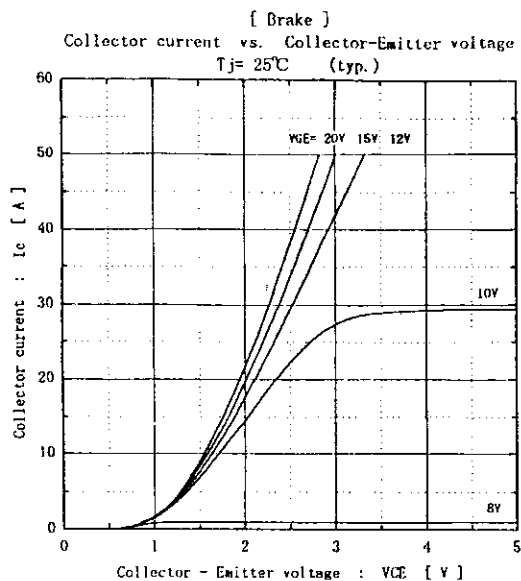
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