

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.		
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H04-004-05

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 / 10

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H04-004-03

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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 = 50 mA		5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE = 15 V, Ic = 50 A	chip	2.1		V	
				terminal	2.3	2.7		
	Input capacitance	Cies	VGE = 0 V, VCE = 10 V f = 1 MHz		6000		pF	
	Turn-on time	ton	Vcc = 600 V		0.35	1.2	us	
		tr	Ic = 50 A		0.25	0.6		
		tr(0)	VGE = +-15 V		0.1			
	Turn-off time	toff	RG = 24 ohm		0.45	1.0	us	
tf				0.08	0.3			
Forward on voltage	VF	IF = 50 A	chip	2.3		V		
			terminal	2.5	3.3			
Reverse recovery time	trr	IF = 50 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, Ic = 25 A	chip	2.1		V	
				terminal	2.25	2.7		
	Turn-on time	ton	Vcc = 600 V		0.35	1.2	us	
		tr	Ic = 25 A		0.25	0.6		
	Turn-off time	toff	VGE = +-15 V		0.45	1.0	us	
tf		RG = 51 ohm		0.08	0.3			
Reverse current	IRRM	VR = 1200 V			1.0	mA		
Converter	VFM	IF = 50 A	chip	1.1		V		
			terminal	1.2	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			0.35	C/W
		Inverter FWD			0.75	
		Brake IGBT			0.69	
		Converter Diode			0.50	
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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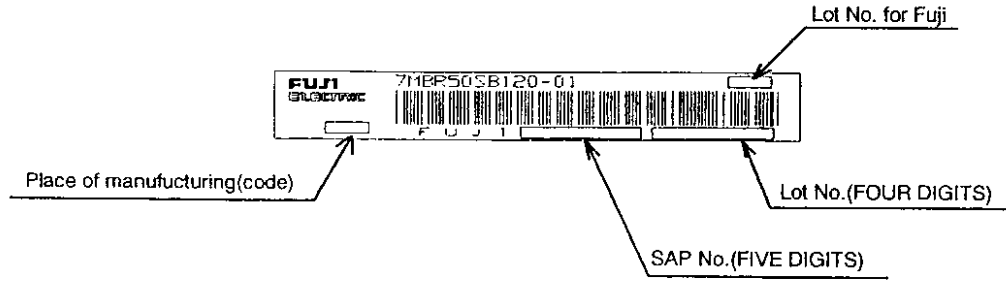
MS6M 0555

5 / 10

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H04-004-03

6. Indication on module



7. Applicable category

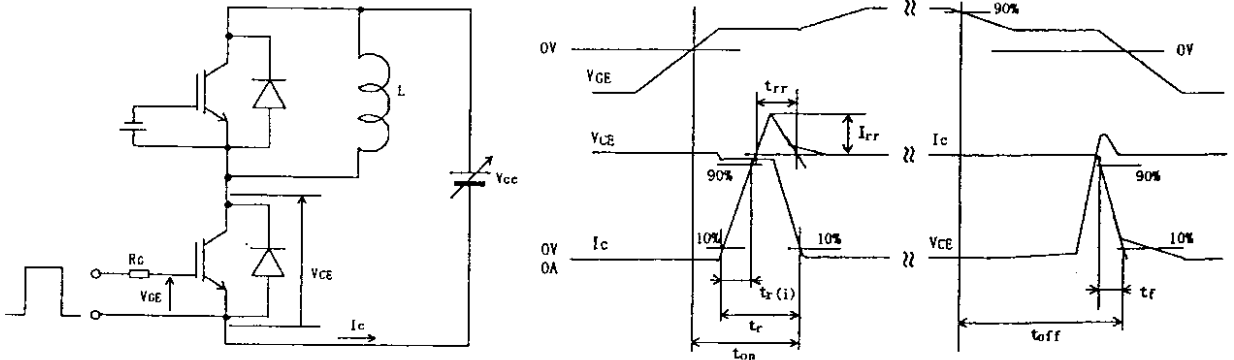
This specification is applied to Power Integrated Module named 7MBR50SB120-01 .

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.

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9. Definitions of switching time



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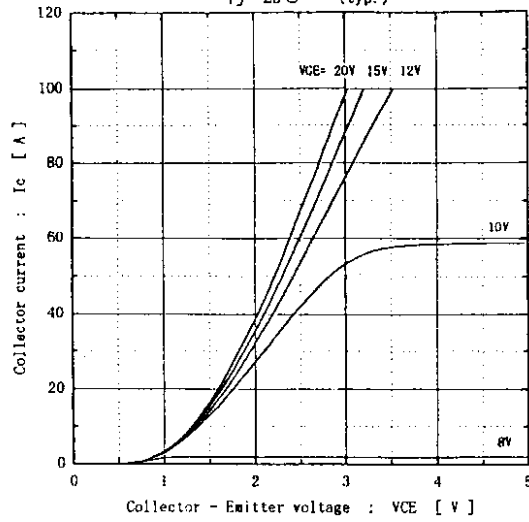
6 / 10

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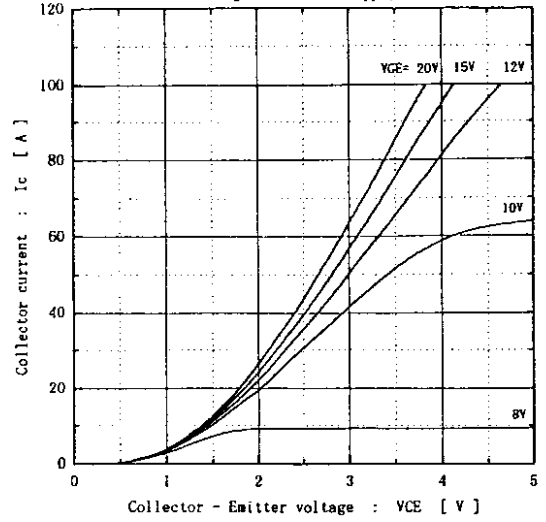
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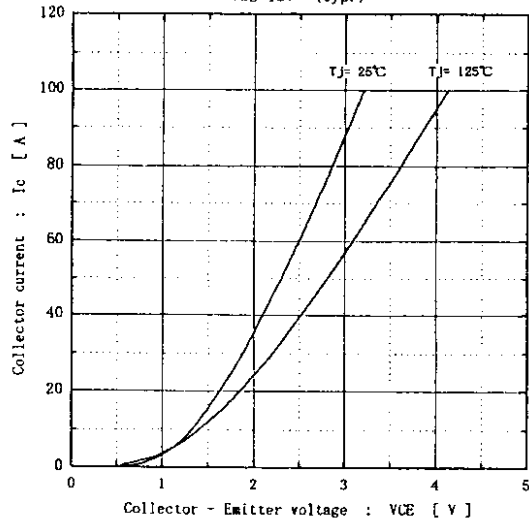
[Inverter]
Collector current vs. Collector-Emmitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



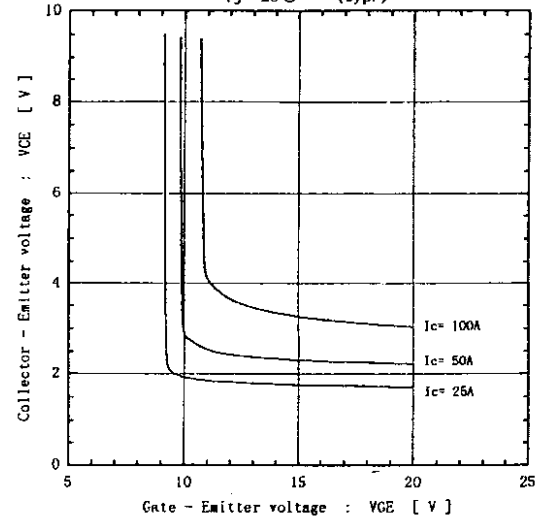
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Collector current vs. Collector-Emmitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



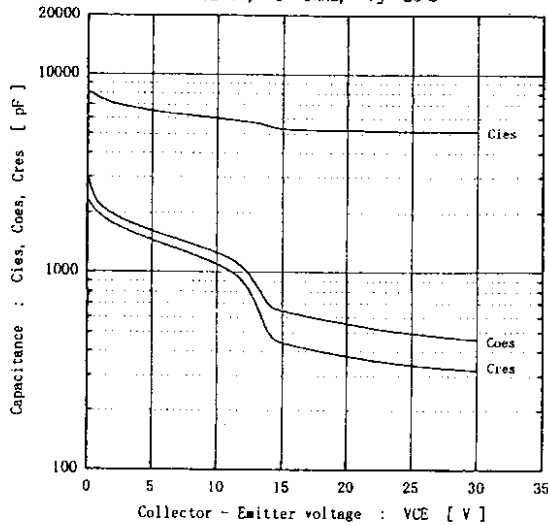
[Inverter]
Collector current vs. Collector-Emmitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



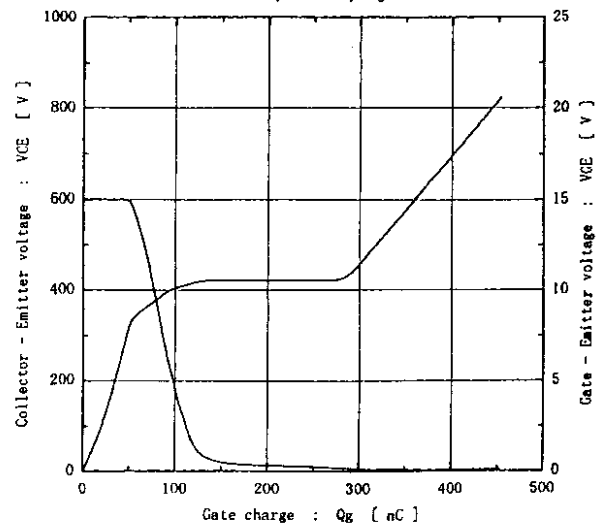
[Inverter]
Collector-Emmitter voltage vs. Gate-Emmitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



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



[Inverter]
Dynamic Gate charge (typ.)
 $V_{CC} = 600\text{V}$, $I_c = 50\text{A}$, $T_j = 25^\circ\text{C}$



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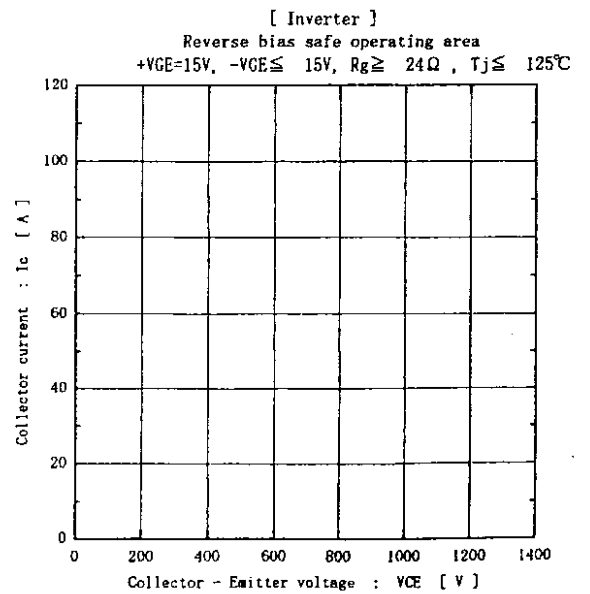
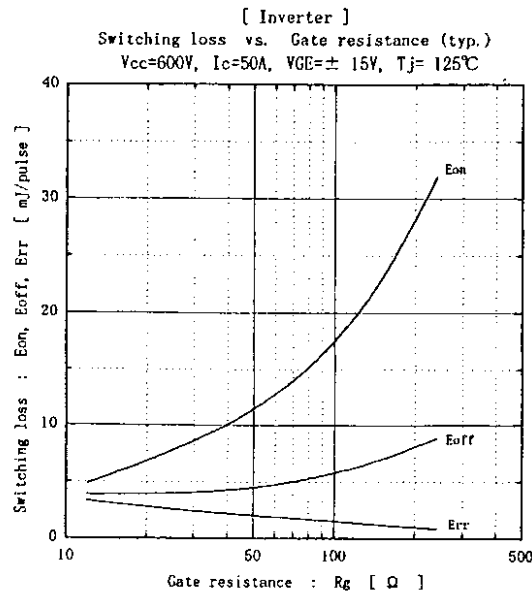
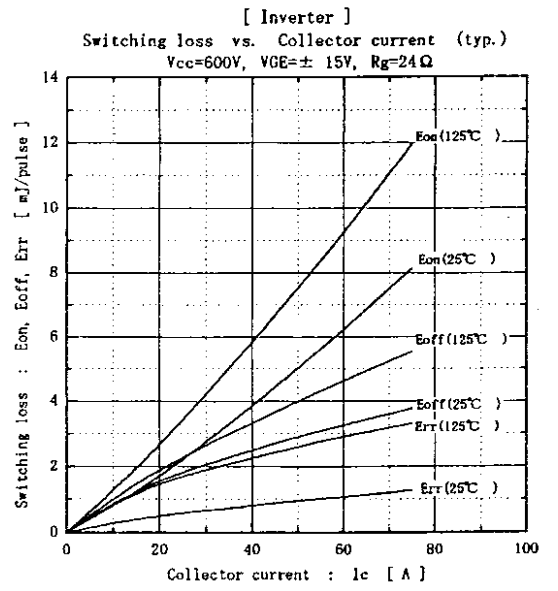
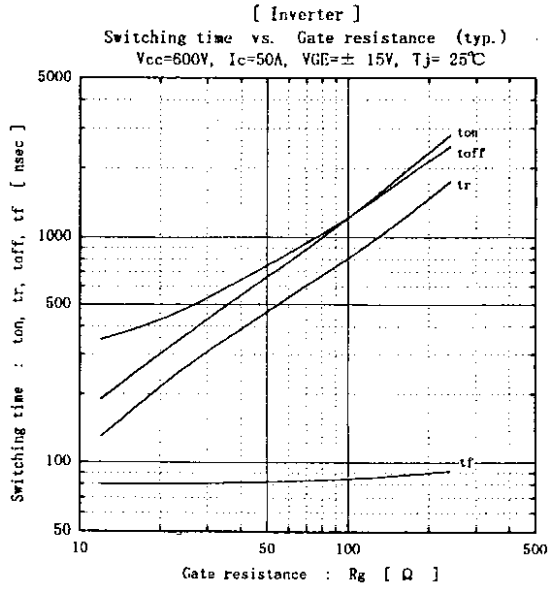
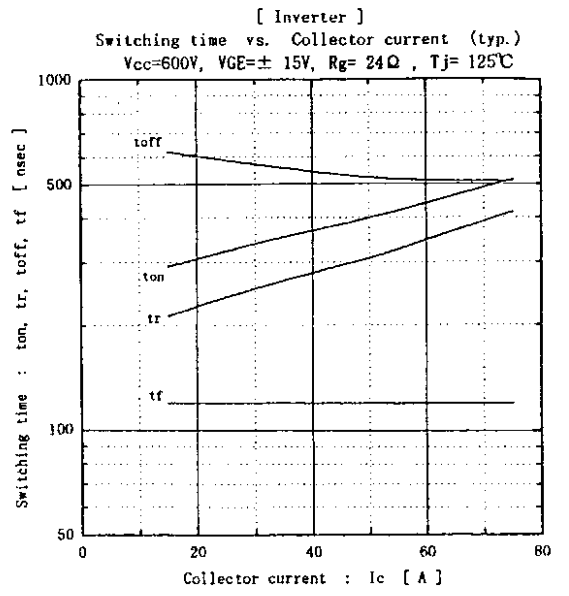
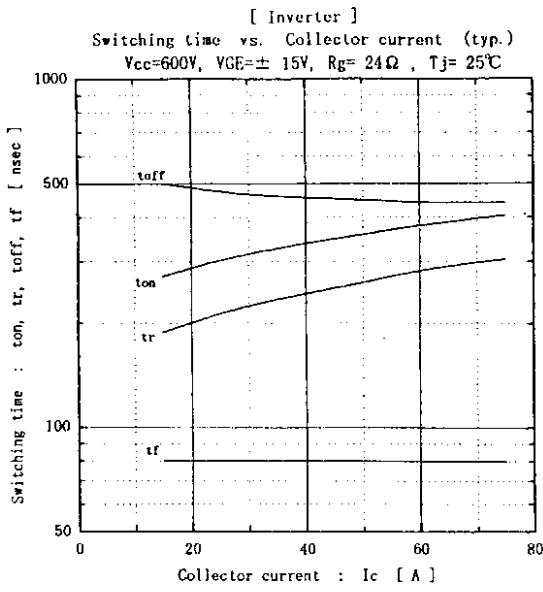
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7/10

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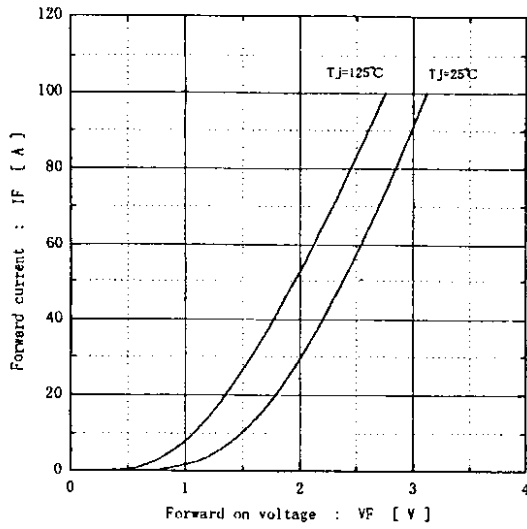
8 / 10

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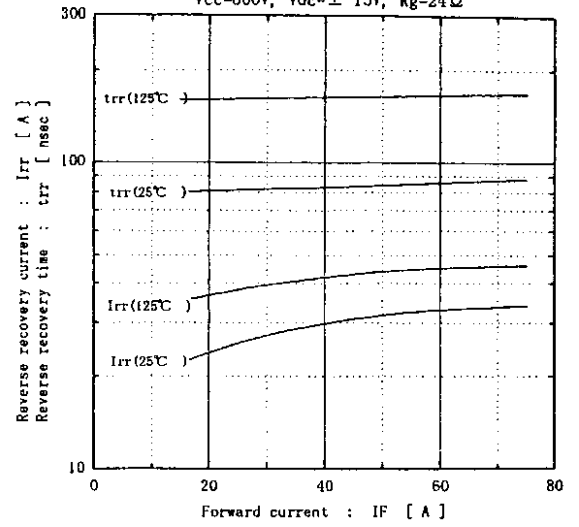
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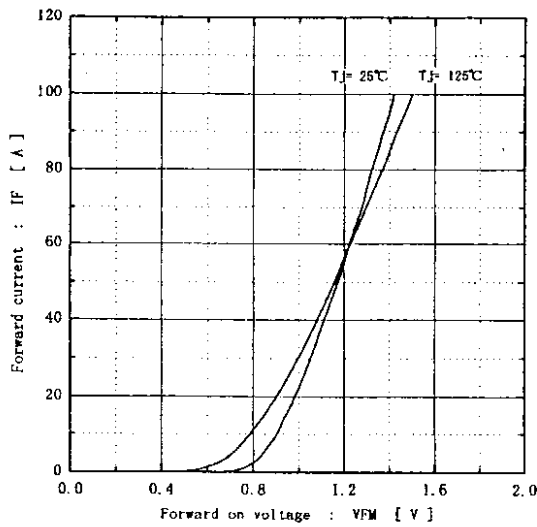
[Inverter]
Forward current vs. Forward on voltage (typ.)



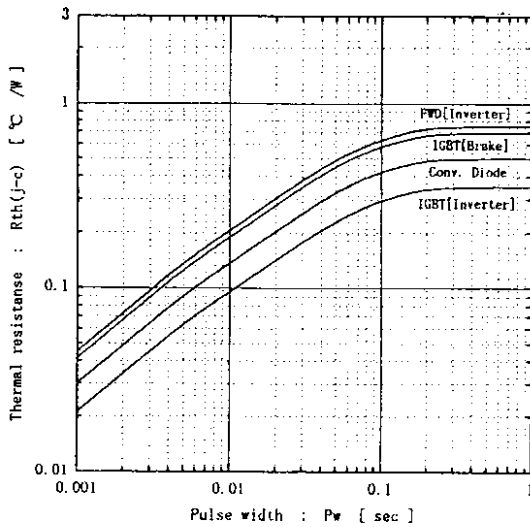
[Inverter]
Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}±15V, R_g=24Ω



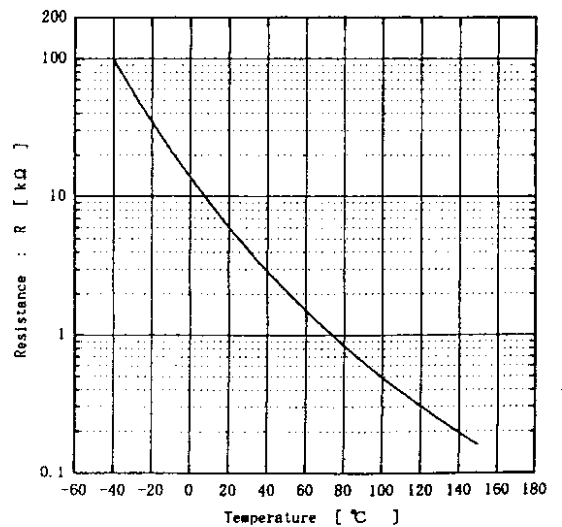
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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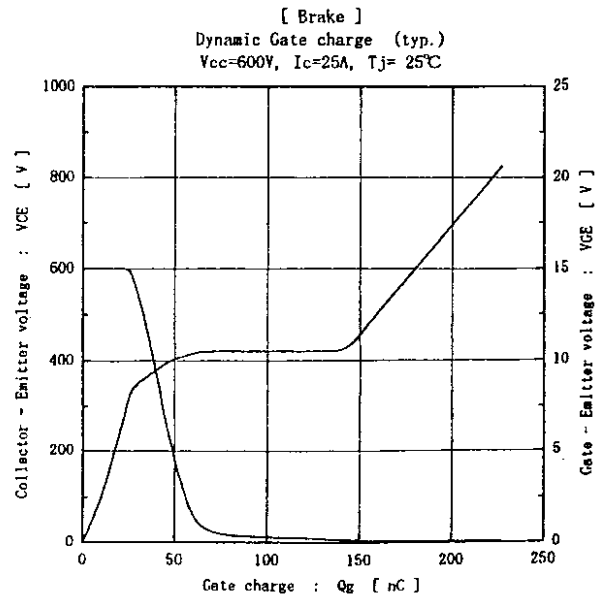
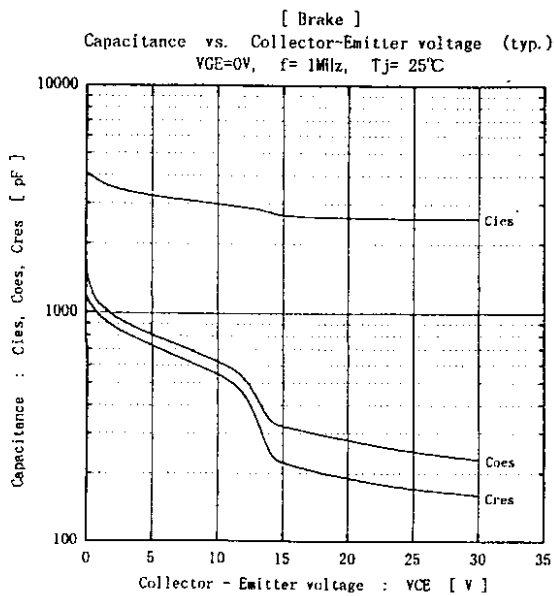
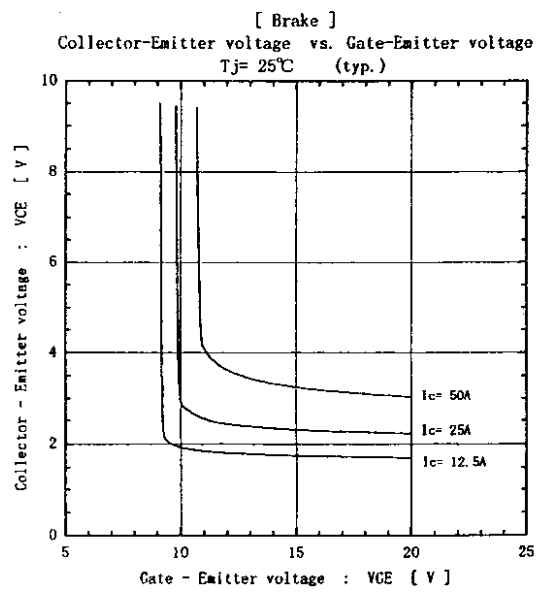
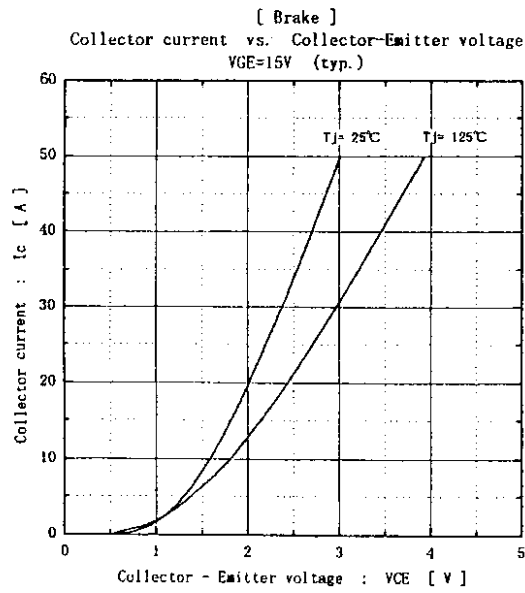
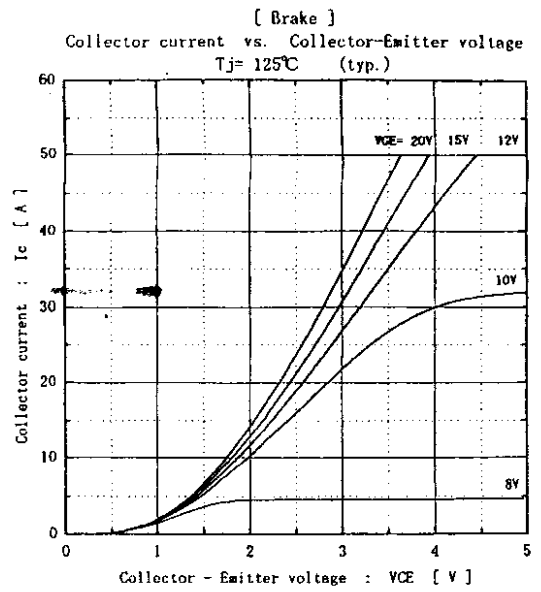
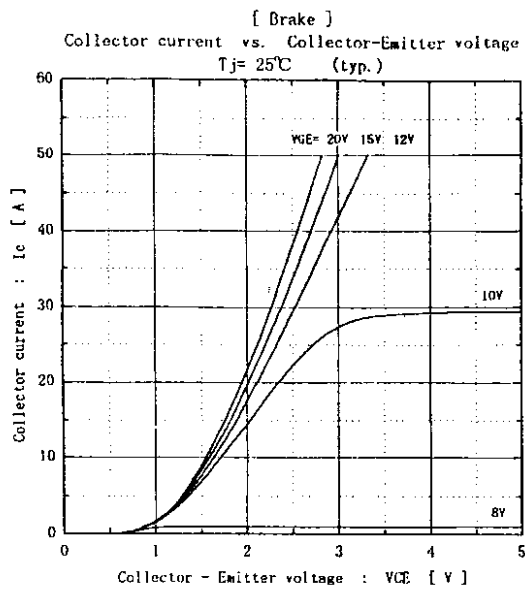
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9 / 10

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10 / 10

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