

SPECIFICATION

Device Name : Power Integrated Module

Type Name : 7 M B R 3 5 S B 1 4 0

Spec. No. : M S 6 M 0 4 7 4

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Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Nov. - 10 - '99	J. Kobayashi	<i>J. Kobayashi</i>	DWG. NO.	M S 6 M 0 4 7 4	1 / 10
CHECKED	Nov. - 10 - '99	S. M. H. A.				

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Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Nov.-10-'99	enactment	—	—————	Issued date	—	S. Koyama	J. Miyasaka

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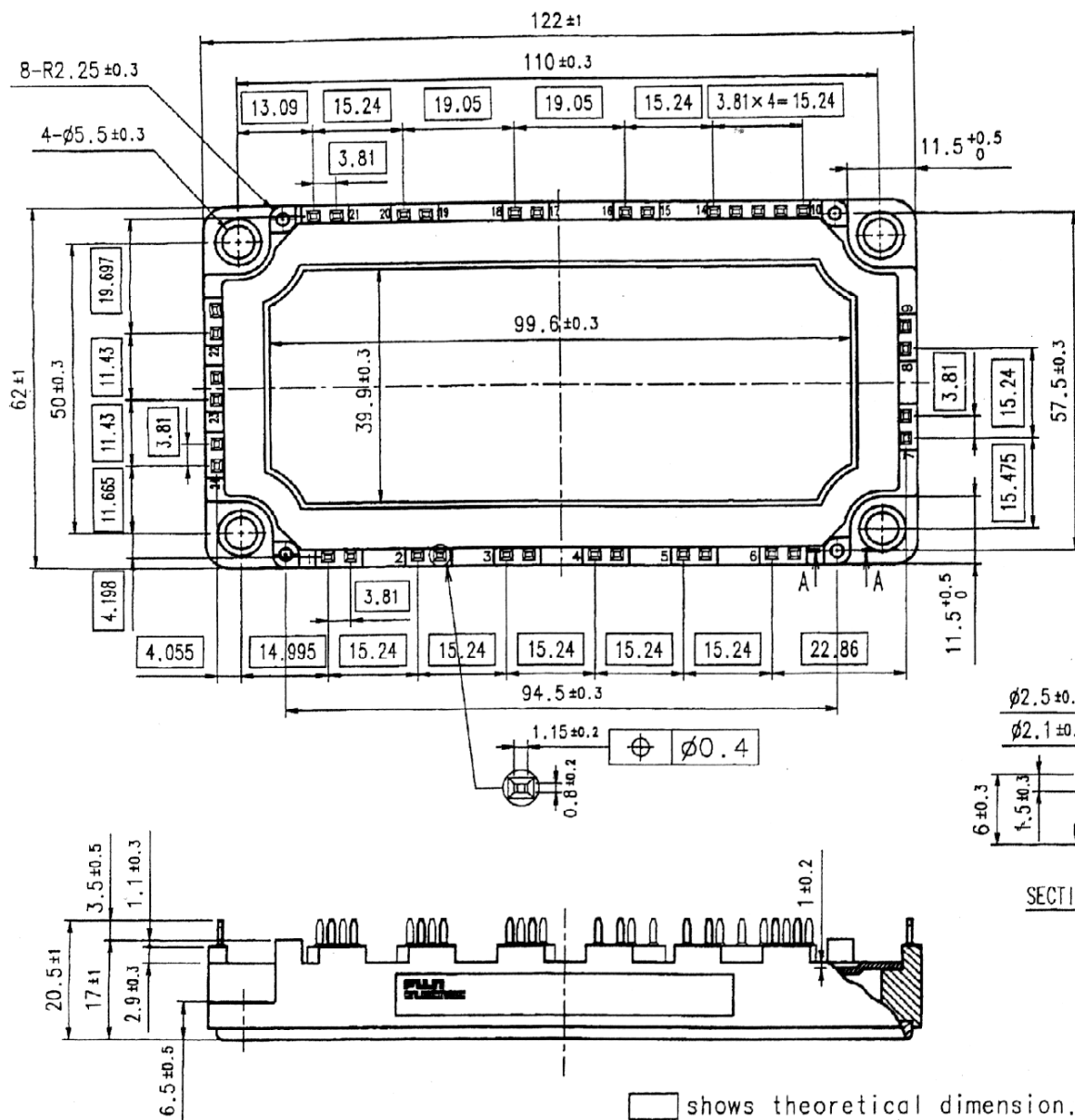
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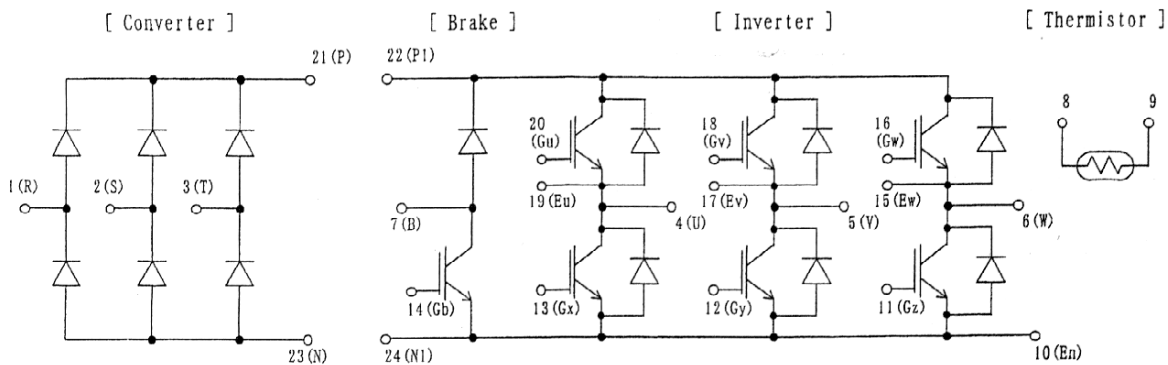
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1. Outline Drawing (Unit : mm)



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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	VCES		1400	V	
	Gate-Emitter voltage	VGES		±20	V	
	Collector current	Ic	Continuous	Tc=25°C	50	A
				Tc=75°C	35	
		Icp	1ms	Tc=25°C	100	A
				Tc=75°C	70	
-Ic			35	A		
Collector Power Dissipation	Pc	1 device	240	W		
Brake	Collector-Emitter voltage	VCES		1400	V	
	Gate-Emitter voltage	VGES		±20	V	
	Collector current	Ic	Continuous	Tc=25°C	35	A
				Tc=75°C	25	
		Icp	1ms	Tc=25°C	70	A
				Tc=75°C	50	
Collector Power Dissipation	Pc	1 device	180	W		
Repetitive peak reverse Voltage (Diode)	VRRM		1400	V		
Converter	Repetitive peak reverse Voltage	VRRM		1600	V	
	Average Output Current	Io	50Hz/60Hz sine wave	35	A	
	Surge Current (Non-Repetitive)	IFSM	Tj=150°C, 10ms	360	A	
	I ² t (Non-Repetitive)	I ² t	half sine wave	648	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	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 = 25°C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	Max.			
Inverter	Zero gate voltage Collector current	ICES	VGE = 0 V, VCE = 1400 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 = 35 mA	5.5	7.2	8.5	V	
	Collector-Emitter saturation voltage	VCE(sat)	VGE = 15 V, Ic = 35 A	chip	2.2			V
				terminal	2.35	2.7		
	Input capacitance	Cies	VGE = 0 V, VCE = 10 V f = 1 MHz		4200		pF	
	Turn-on time	ton	Vcc = 800 V		0.35	1.2	μs	
		tr	Ic = 35 A		0.25	0.6		
		tr(t)	VGE = ±15 V		0.1			
	Turn-off time	toff	RG = 33 Ω		0.45	1.0	μs	
tf				0.08	0.3			
Forward on voltage	VF	IF = 35 A	chip	2.4		V		
			terminal	2.55	3.4			
Reverse recovery time	trr	IF = 35 A			350	ns		
Brake	Zero gate voltage Collector current	ICES	VGE = 0 V, VCE = 1400 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	2.2		V	
				terminal	2.35	2.8		
	Turn-on time	ton	Vcc = 800 V		0.35	1.2	μs	
		tr	Ic = 25 A		0.25	0.6		
	Turn-off time	toff	VGE = ±15 V		0.45	1.0	μs	
tf		RG = 51 Ω		0.08	0.3			
Reverse current	IRRM	VR = 1400 V			1.0	mA		
Converter	Forward on voltage	VFM	IF = 35 A	chip	1.1		V	
				terminal	1.2	1.5		
Reverse current	IRRM	VR = 1600 V			1.0	mA		
Thermistor	Resistance	R	T = 25°C	5000		Ω		
			T = 100°C	465	495		520	
B value	B	T = 25/50°C	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			0.52	°C/W
		Inverter FWD			0.90	
		Brake IGBT			0.69	
		Converter Diode			0.75	
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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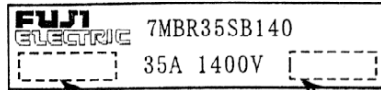
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6. Indication on module (モジュール表示)



Lot No.

Place of manufacturing (code)

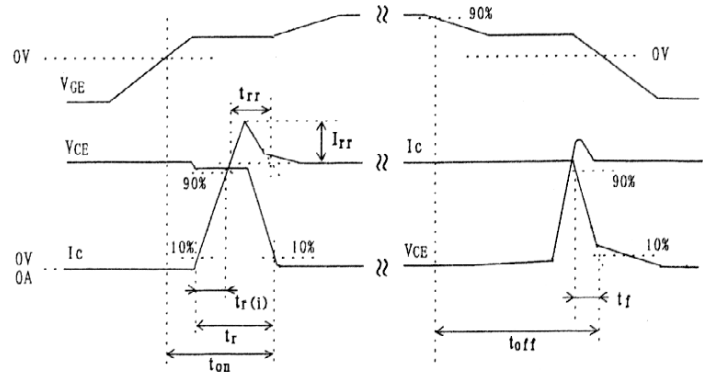
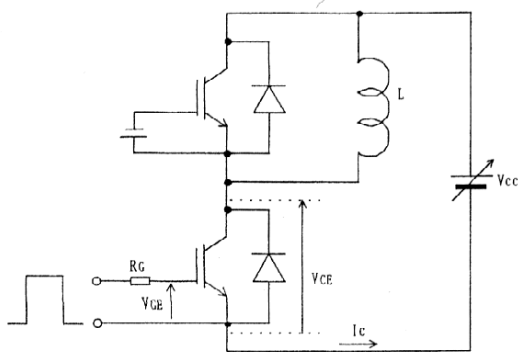
7. Applicable category (適用範囲)

This specification is applied to Power Integrated Module, named 7MBR35SB140 .
 本納入仕様書は パワー集積モジュール 7MBR35SB140 に適用する。

8. Storage and transportation notes (保管・運搬上の注意事項)

- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
 常温・常湿保存が望ましい。(5~35°C, 45~75%)
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
 急激な温度変化のなきこと。(モジュール表面が結露しないこと)
- Avoid exposure to corrosive gases and dust.
 腐蝕性ガスの発生場所, 塵埃の多い場所は避けること。
- Avoid excessive external force on the module.
 製品に荷重がかからないように 十分注意すること。
- Store modules with unprocessed terminals.
 モジュールの端子は未加工の状態 で保管すること。
- Do not drop or otherwise shock the modules when transporting.
 製品の運搬時に衝撃を与えたり, 落下させたりしないこと。

9. Definitions of switching time (スイッチング時間の定義)



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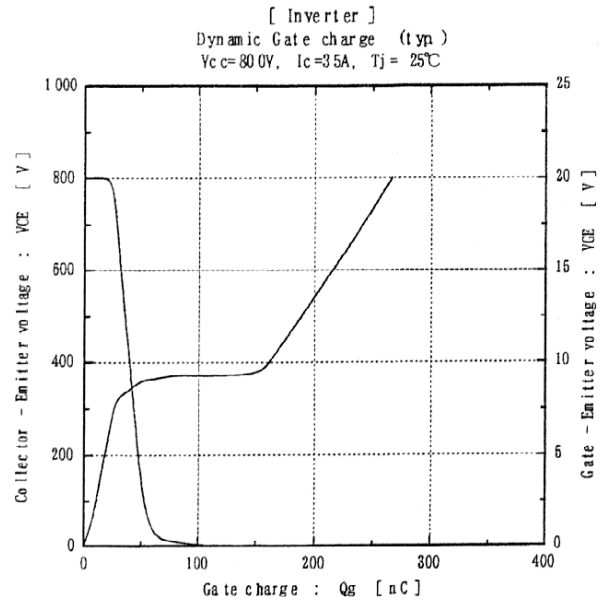
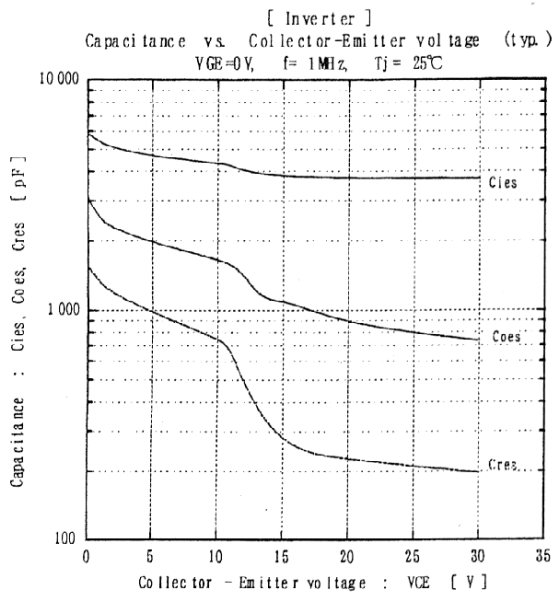
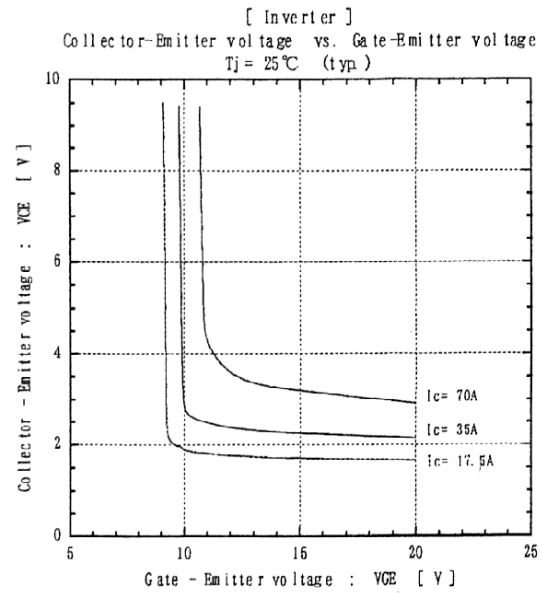
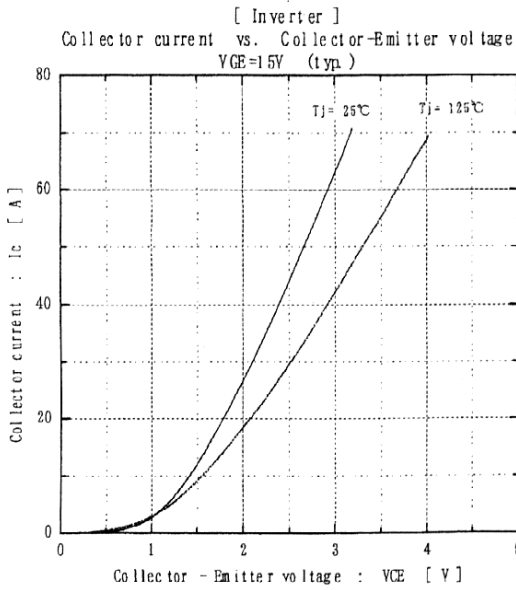
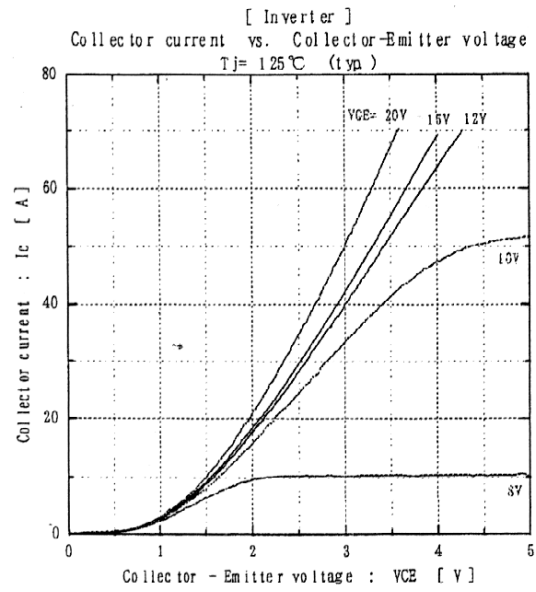
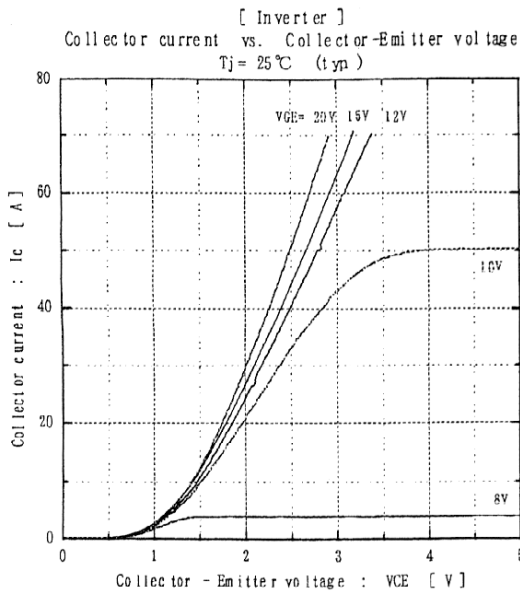
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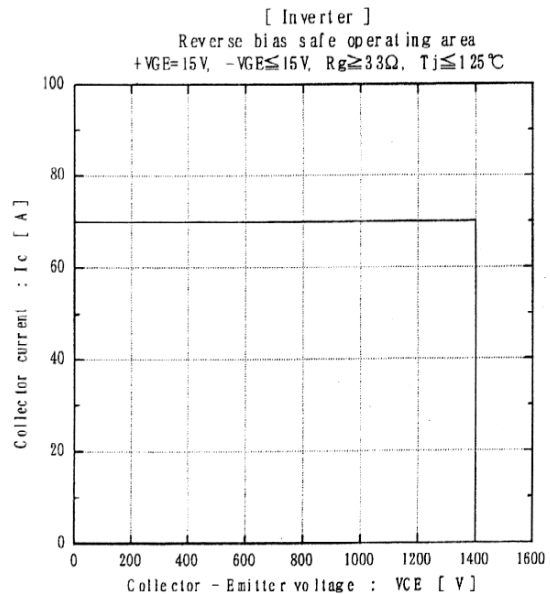
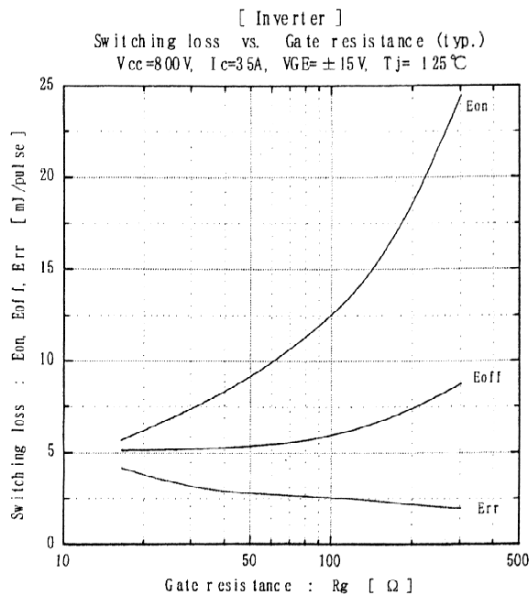
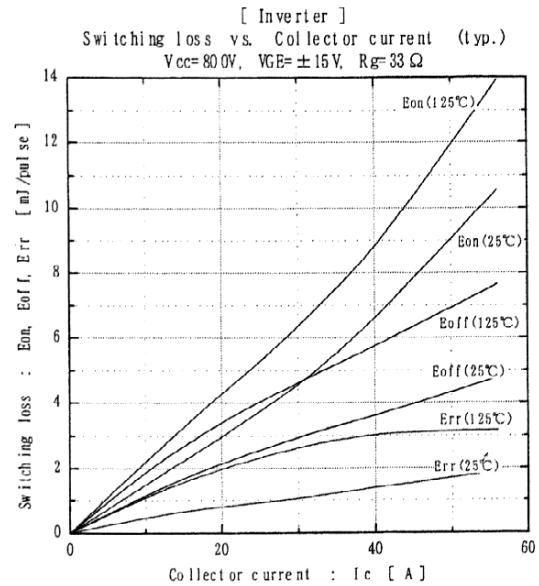
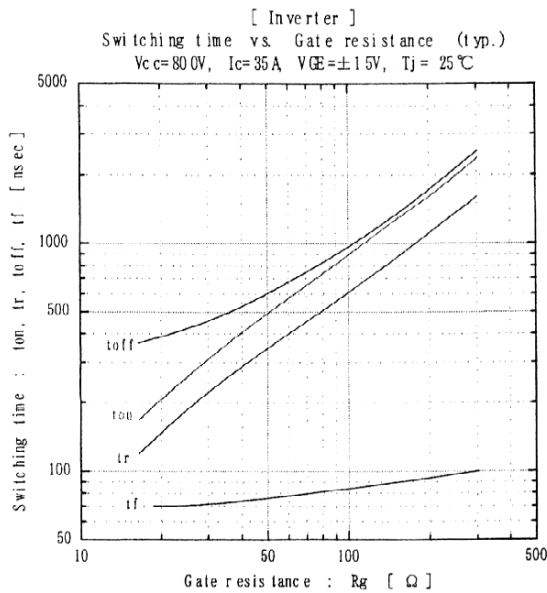
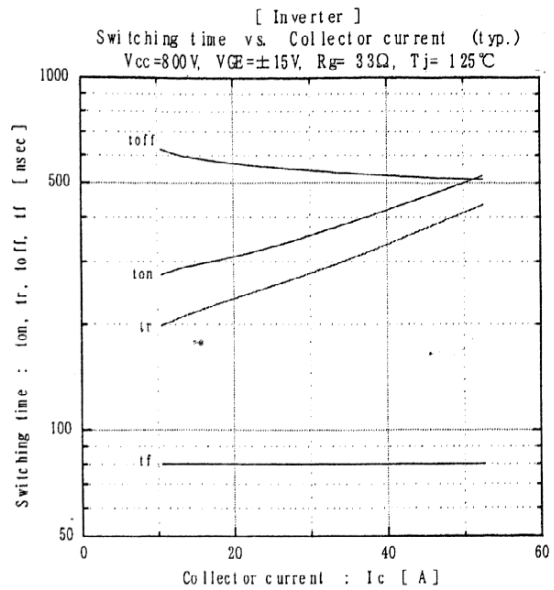
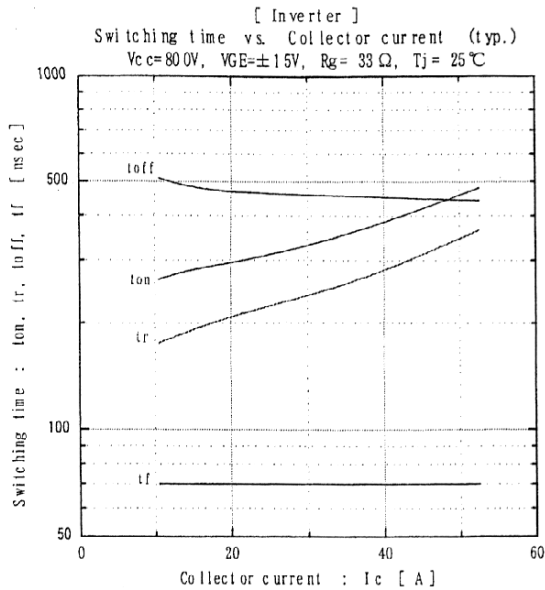
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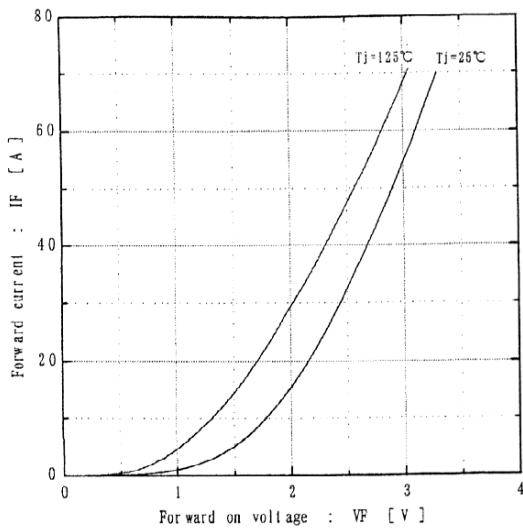
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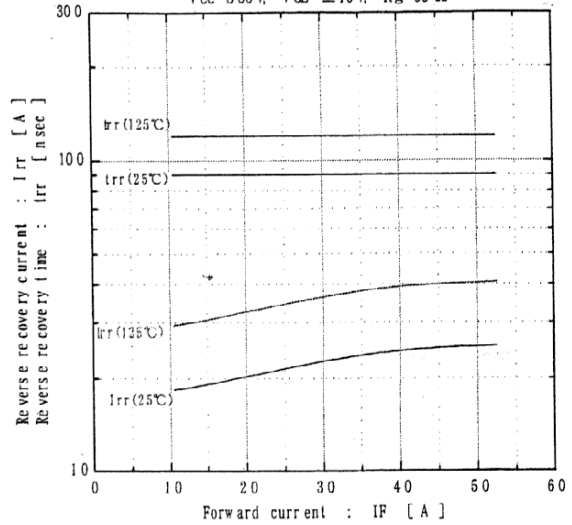
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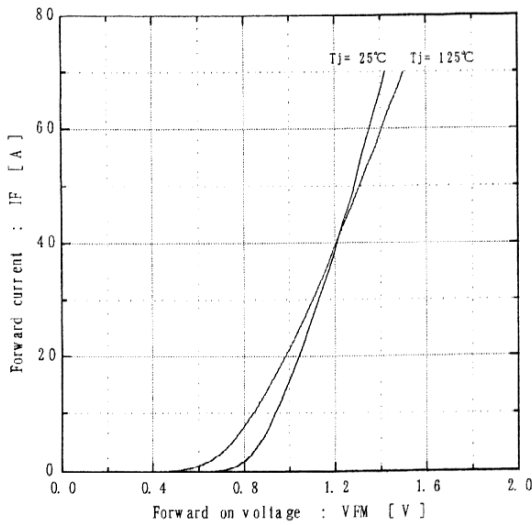
[Inverter]
Forward current vs. Forward on voltage (typ.)



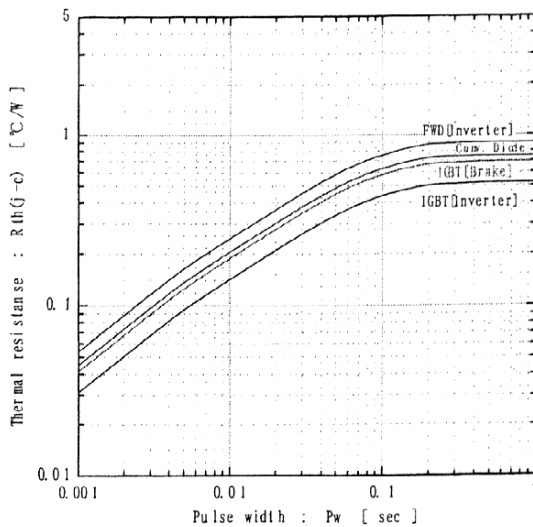
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC}=8.00V, V_{GE}=\pm 15V, R_{\theta}=33\Omega$



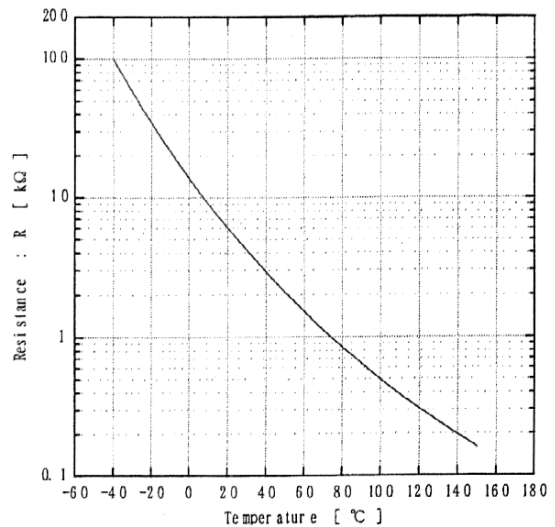
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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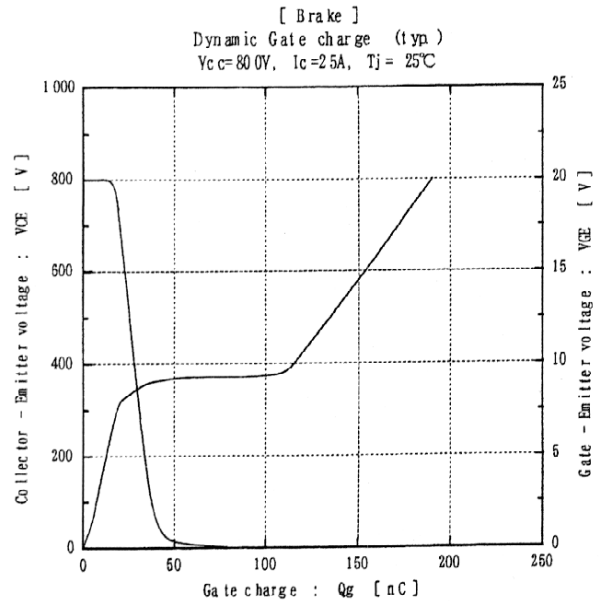
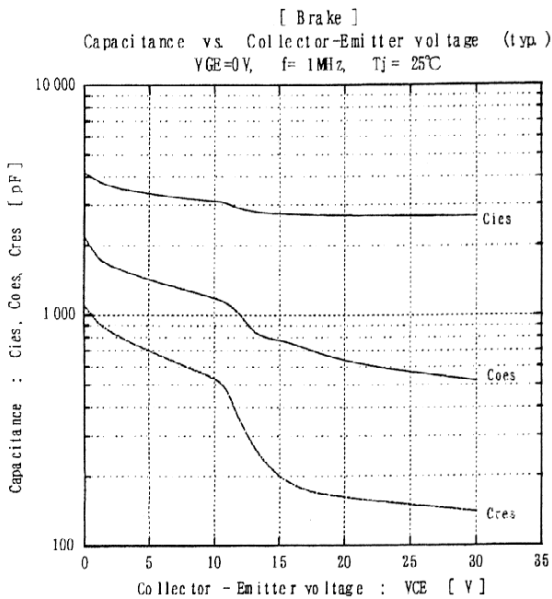
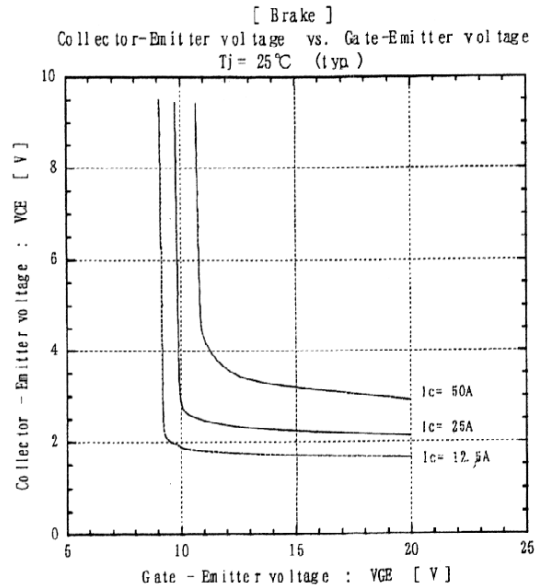
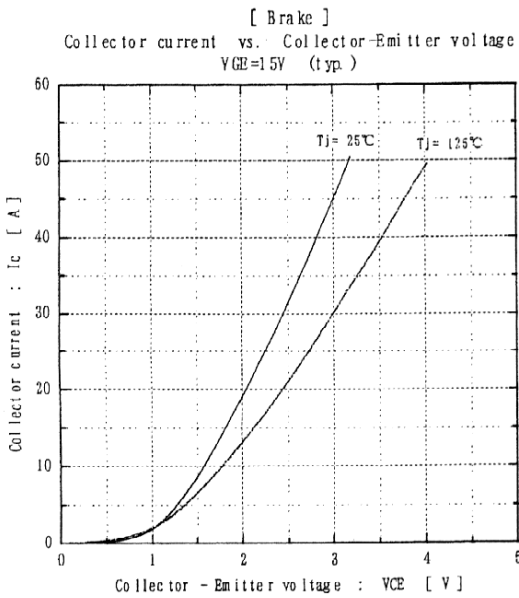
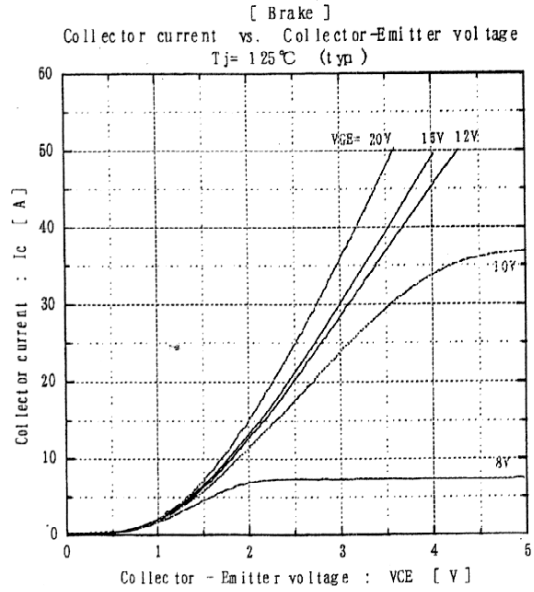
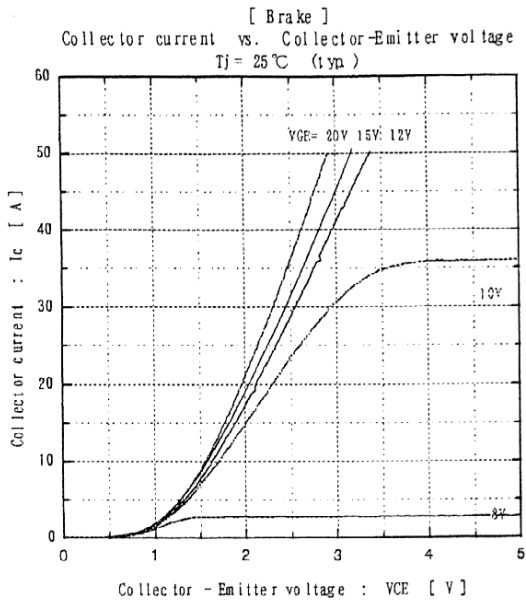
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