

SPECIFICATION

Device Name : Power Integrated Module

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

Spec. No. : M S 6 M 0 4 7 2

Fuji Electric Co., Ltd.
Matsumoto Factory

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	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Nov. - 10 - '99	<i>T. Kobayashi</i>	<i>T. Hiyasaka</i>	DWG. NO.	M S 6 M 0 4 7 2	1 / 10
CHECKED	Nov. - 10 - '99	<i>S. M. H.</i>				

Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Nov.-10-49	enactment	—	—	Issued date	—	S. Koyata	T. Miyasaka

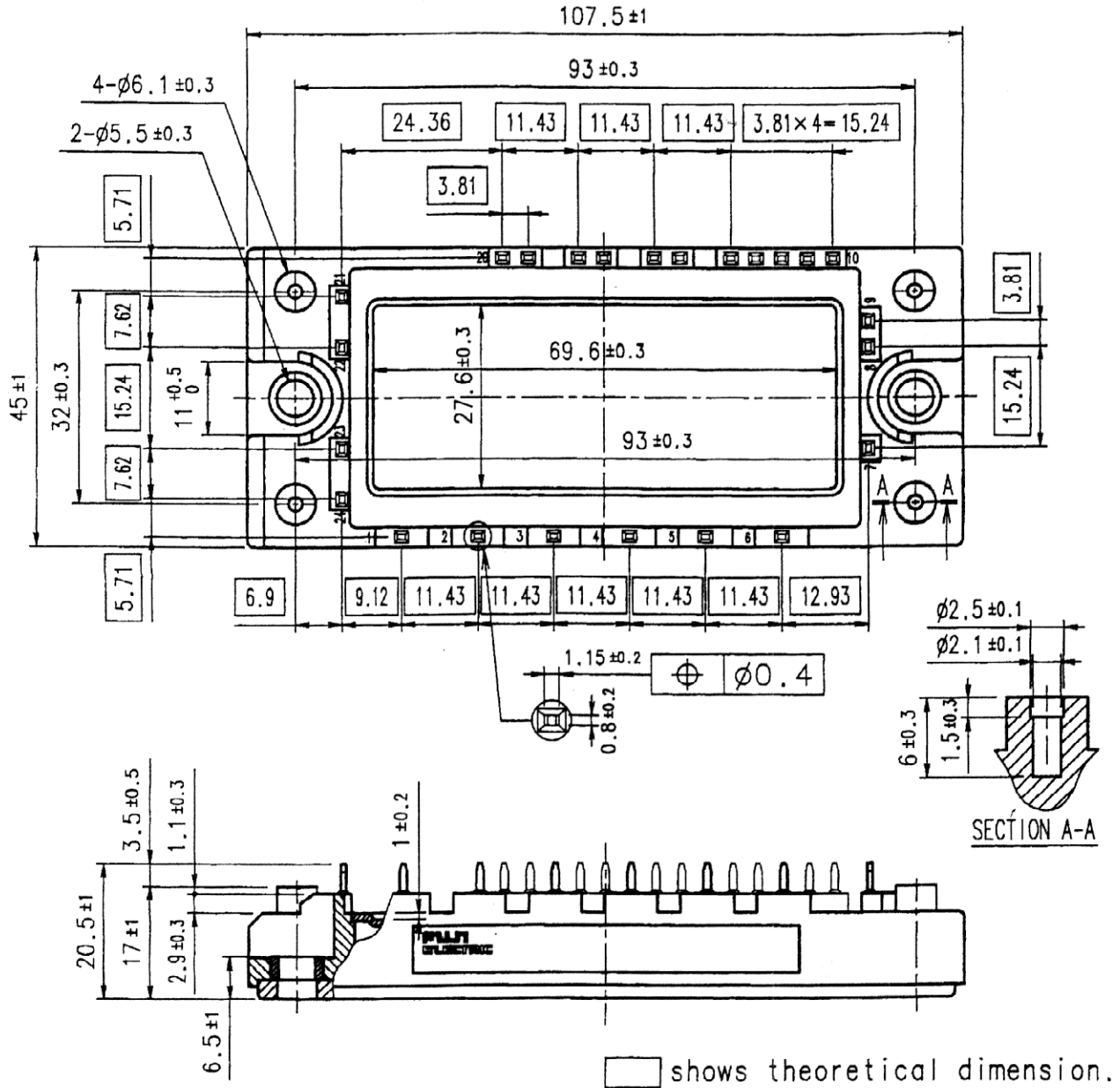
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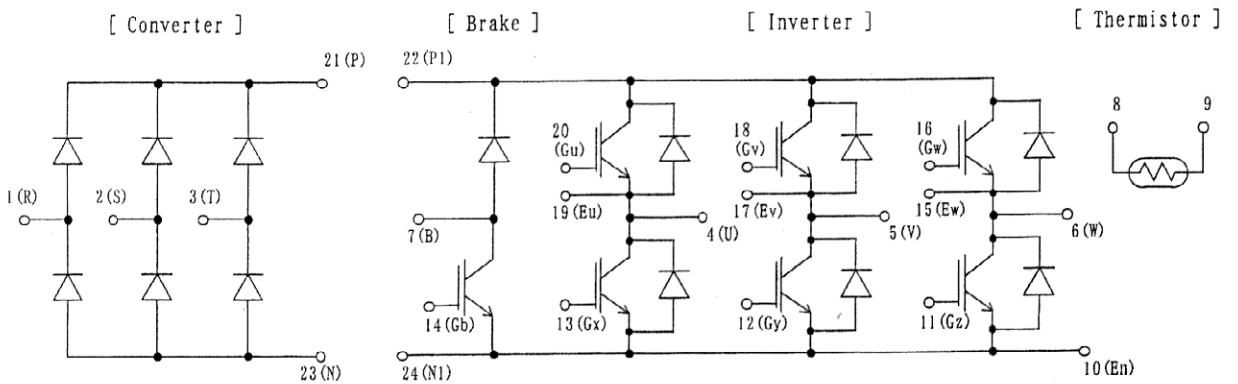
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7 M B R 1 5 S A 1 4 0

1. Outline Drawing (Unit : mm)



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	25	A
				Tc=75°C	15	
		Icp	1ms	Tc=25°C	50	A
				Tc=75°C	30	
-Ic			15	A		
Collector Power Dissipation	Pc	1 device		110	W	
Brake	Collector-Emitter voltage	VCES		1400	V	
	Gate-Emitter voltage	VGES		±20	V	
	Collector current	Ic	Continuous	Tc=25°C	25	A
				Tc=75°C	15	
		Icp	1ms	Tc=25°C	50	A
				Tc=75°C	30	
Collector Power Dissipation	Pc	1 device		110	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	15	A	
	Surge Current (Non-Repetitive)	IFSM	Tj=150°C, 10ms	155	A	
	I ² t (Non-Repetitive)	I ² t	half sine wave		120	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)

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 = 15 mA		5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE = 15 V, chip Ic = 15 A	terminal	2.2	2.25	2.7	V
	Input capacitance	Cies	VGE = 0 V, VCE = 10 V f = 1 MHz		1800			pF
	Turn-on time	ton	Vcc= 800 V		0.35	1.2	μs	
		tr	Ic = 15 A		0.25	0.6		
		tr(i)	VGE = ±15 V		0.1			
	Turn-off time	toff	RG = 82 Ω		0.45	1.0	μs	
		tf			0.08	0.3		
Forward on voltage	VF	IF = 15 A	chip	2.4		V		
			terminal	2.45	3.3			
Reverse recovery time	trr	IF = 15 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, chip Ic = 15 A	terminal	2.2	2.3	2.7	V
	Turn-on time	ton	Vcc= 800 V		0.35	1.2	μs	
		tr	Ic = 15 A		0.25	0.6		
	Turn-off time	toff	VGE = ±15 V		0.45	1.0	μs	
		tf	RG = 82 Ω		0.08	0.3		
Reverse current	IRRM	VR = 1400 V			1.0	mA		
Forward on voltage	VFM	IF = 15 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	

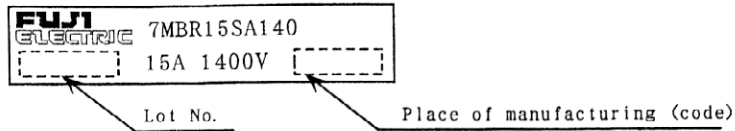
5. Thermal resistance characteristics

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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6. Indication on module (モジュール表示)



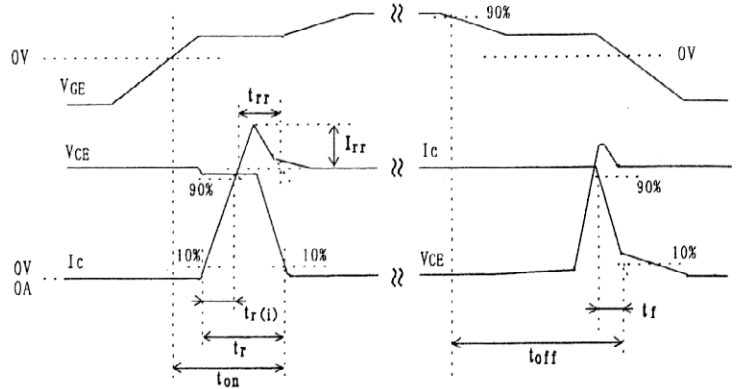
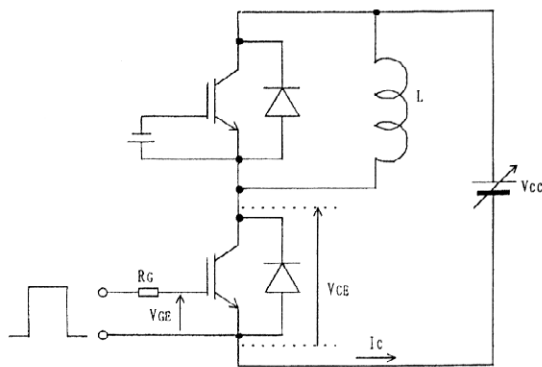
7. Applicable category (適用範囲)

This specification is applied to Power Integrated Module named 7MBR15SA140 .
 本納入仕様書は パワー集積モジュール 7MBR15SA140 に適用する。

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

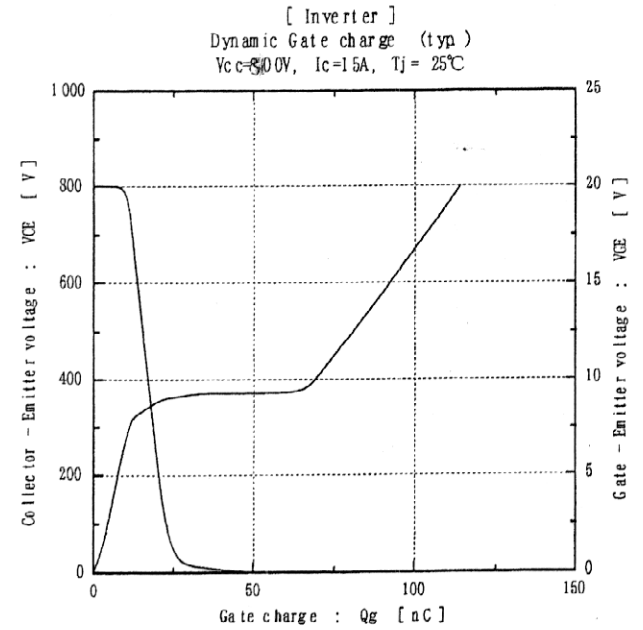
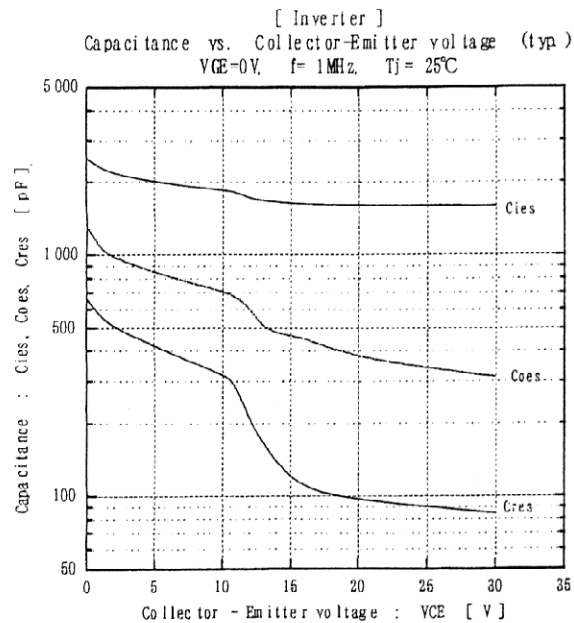
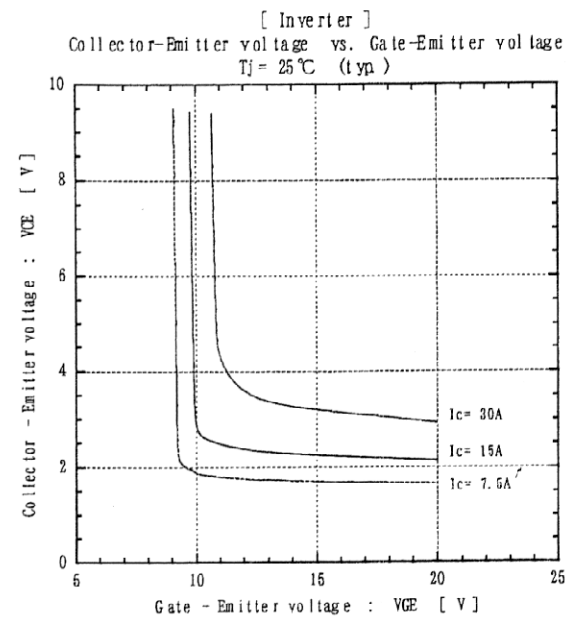
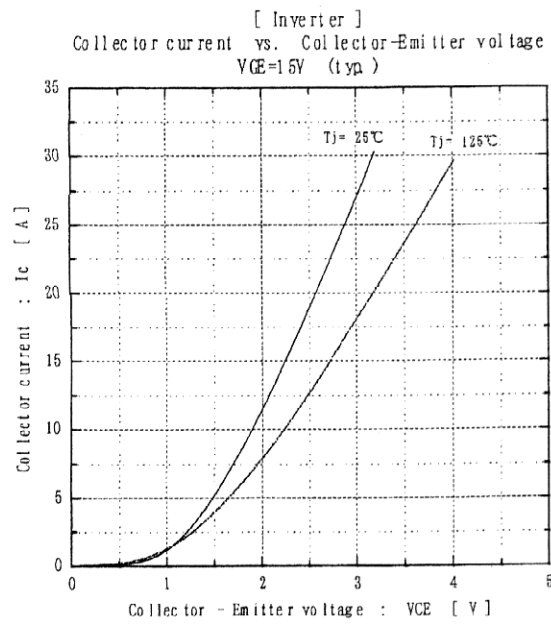
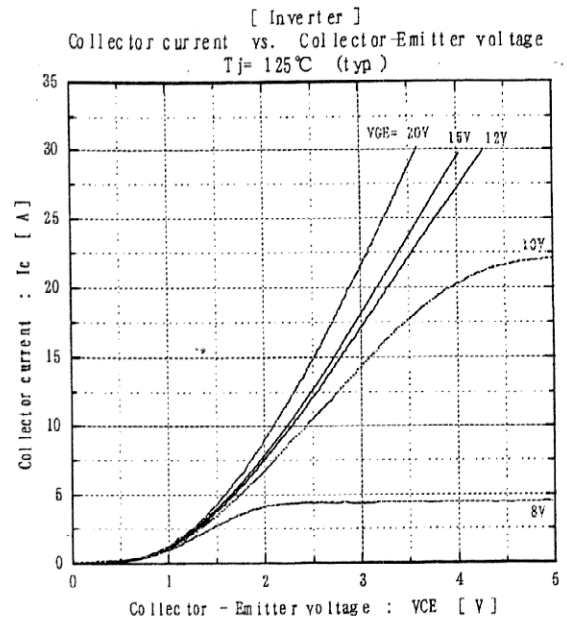
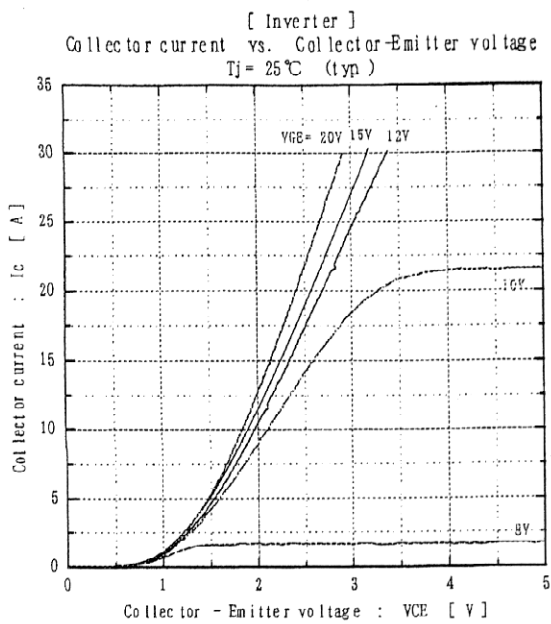
- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
 常温・常温保存が望ましい。(5~35°C, 45~75%)
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
 急激な温度変化のなきこと。(モジュール表面が結露しないこと)
- Avoid exposure to corrosive gases 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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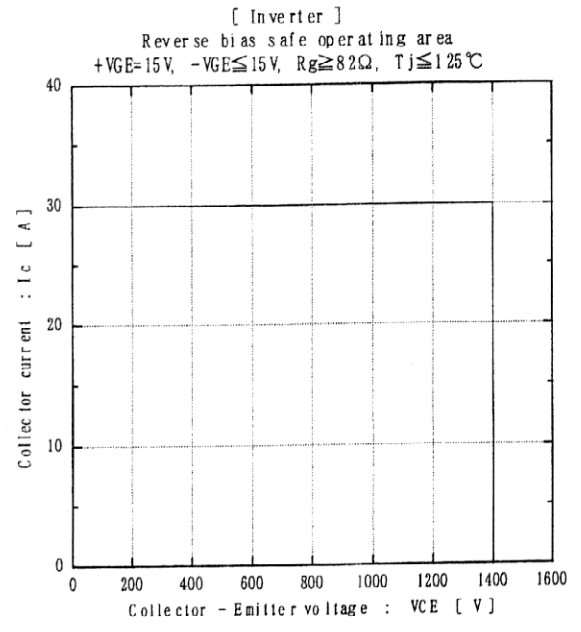
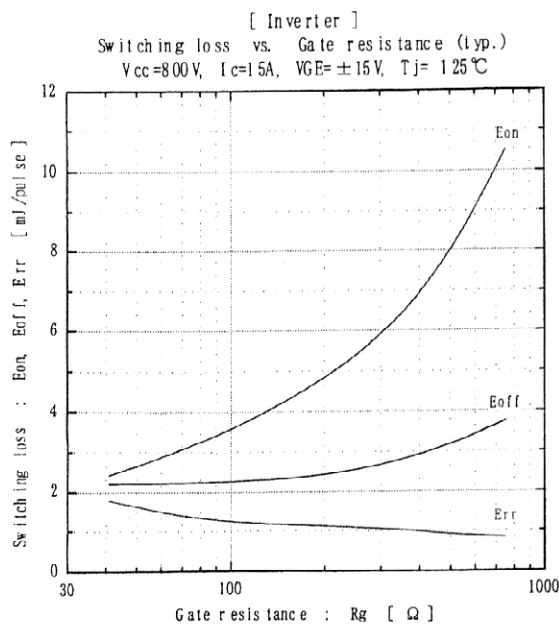
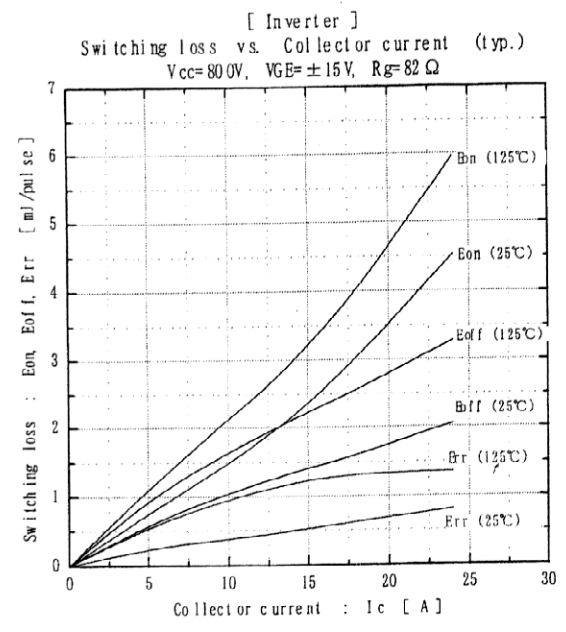
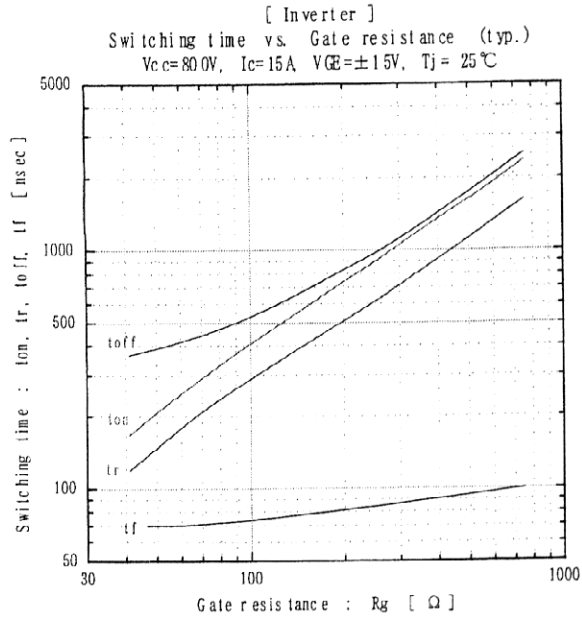
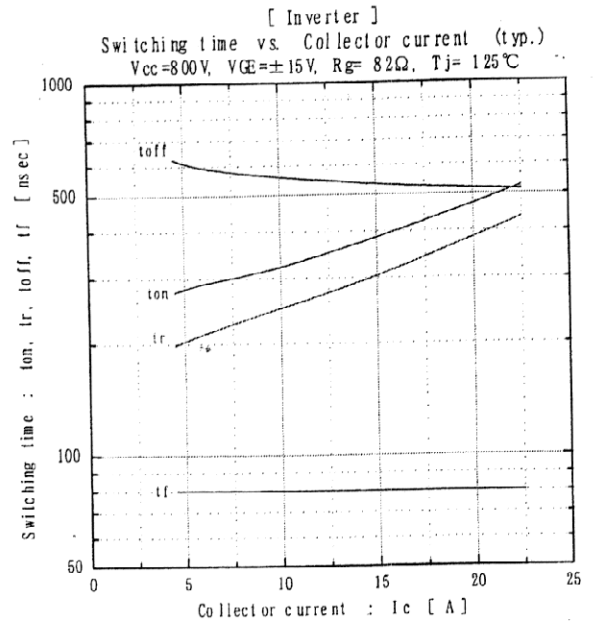
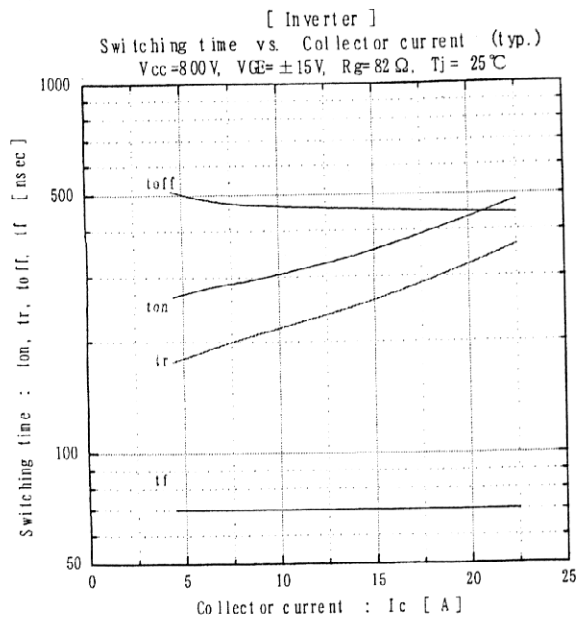
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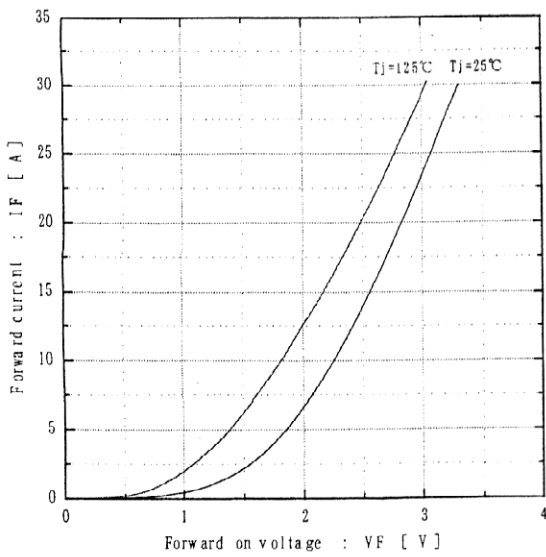
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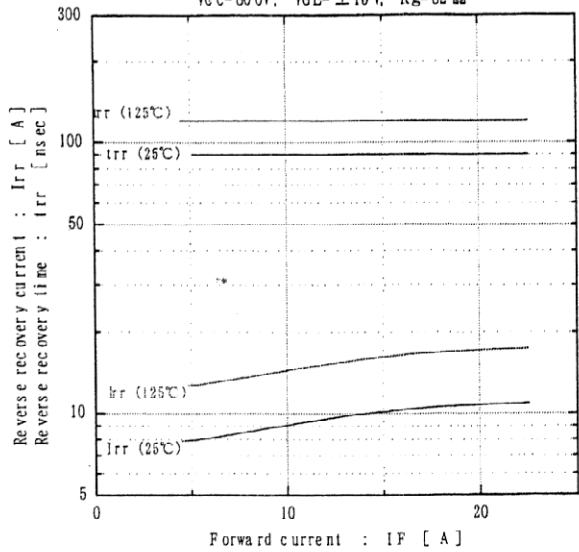
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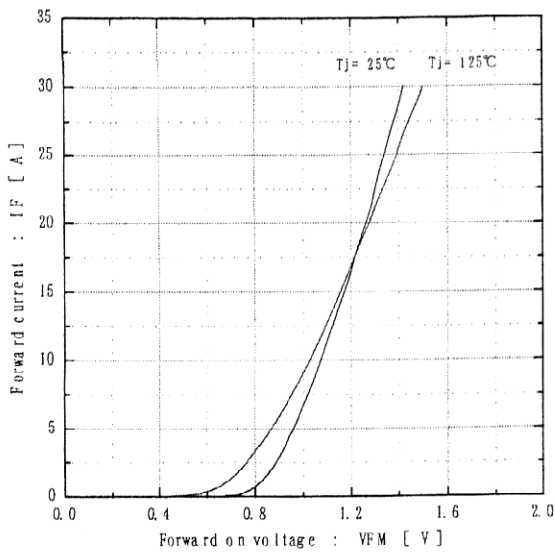
[Inverter]
Forward current vs. Forward on voltage (typ.)



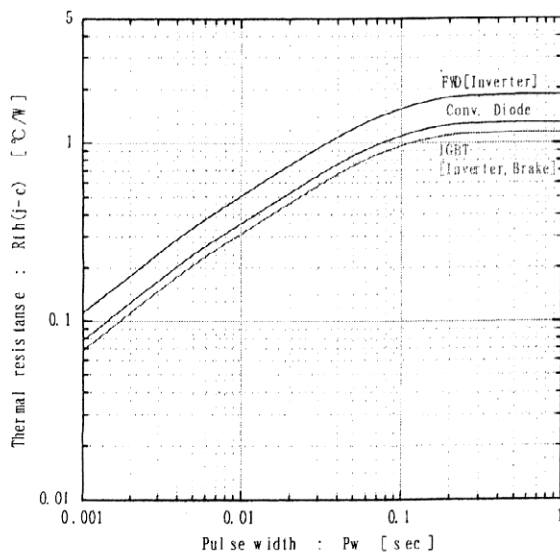
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC}=80\text{OV}$, $V_{GE}=\pm 15\text{V}$, $R_g=82\ \Omega$



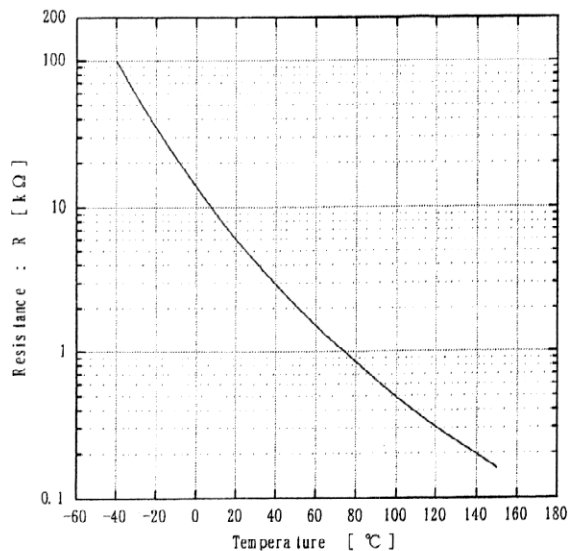
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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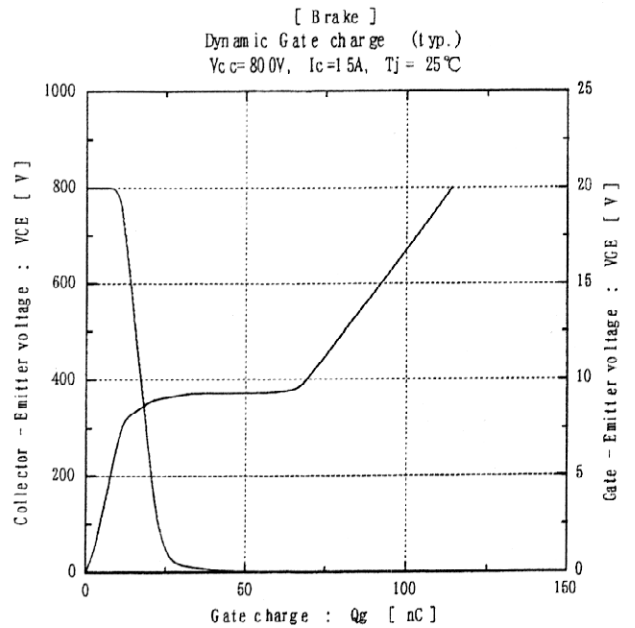
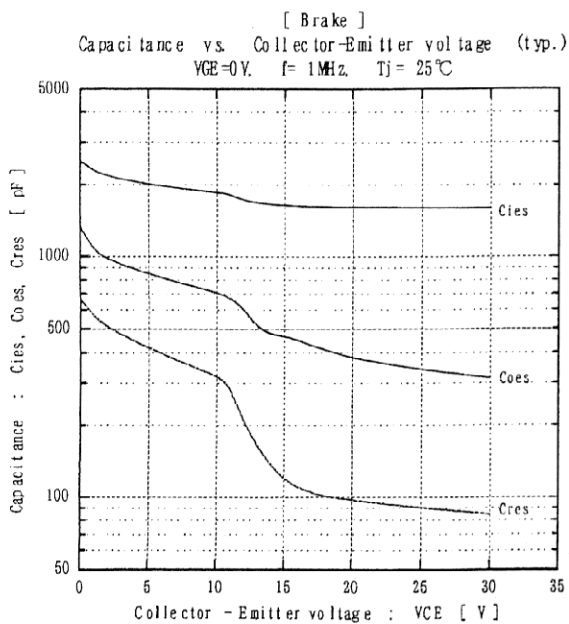
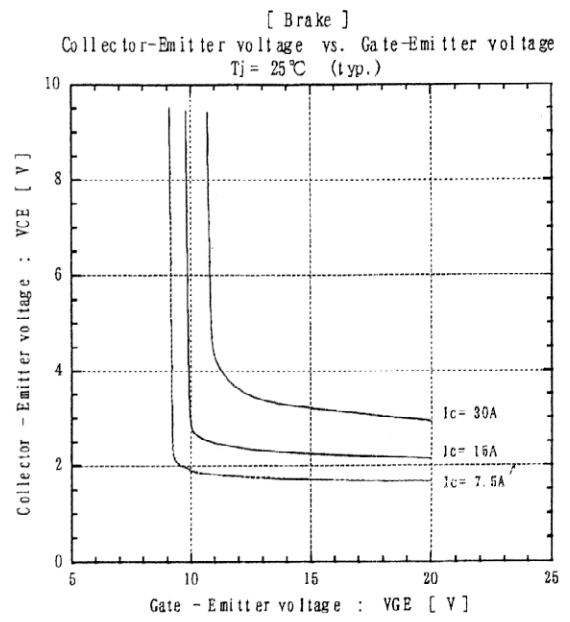
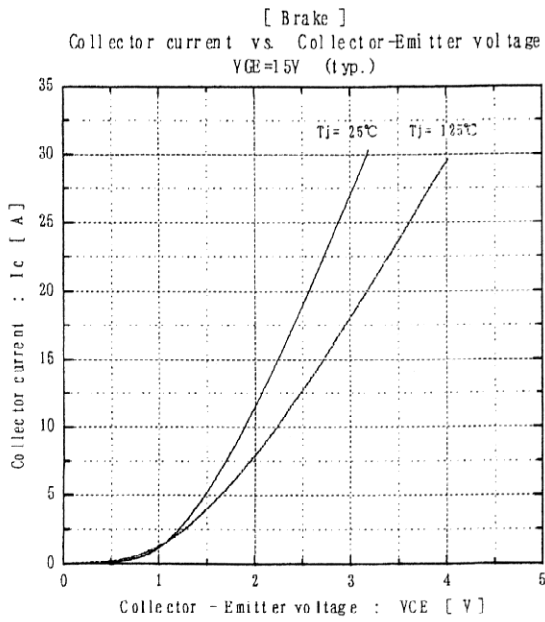
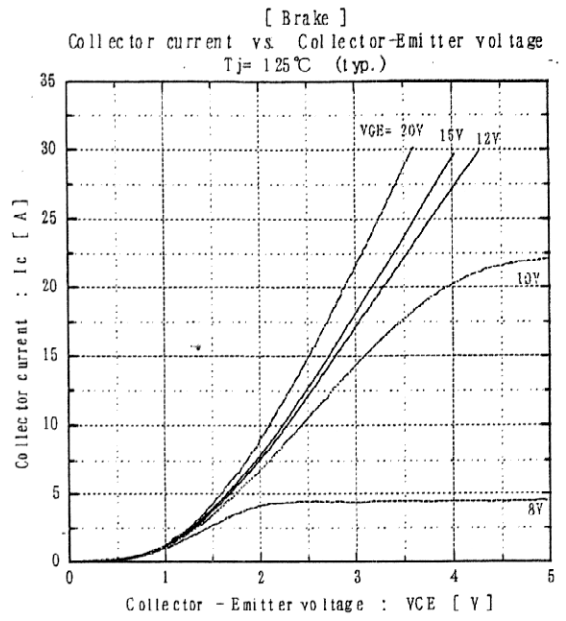
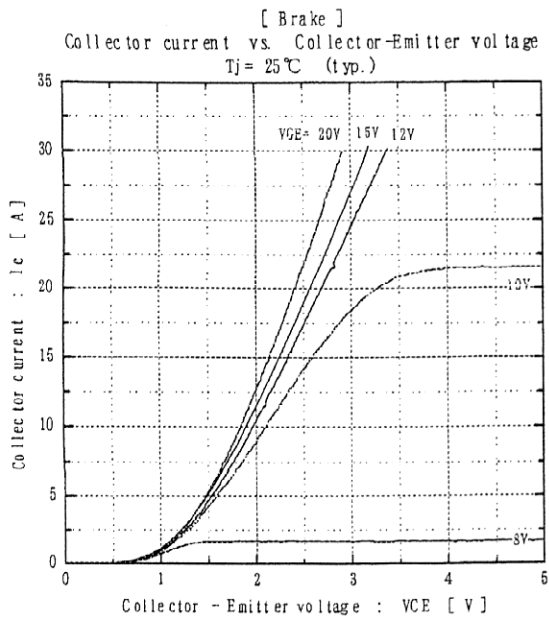
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