

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

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.			
DRAWN	Nov. - 10 - '99	T. Kobayashi		DWG. NO.	M S 6 M 0 4 7 4	1 / 10	
CHECKED	Nov. - 10 - '99	S. M. Hira	T. Hiraoka				

Revised Records

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DWG. NO.

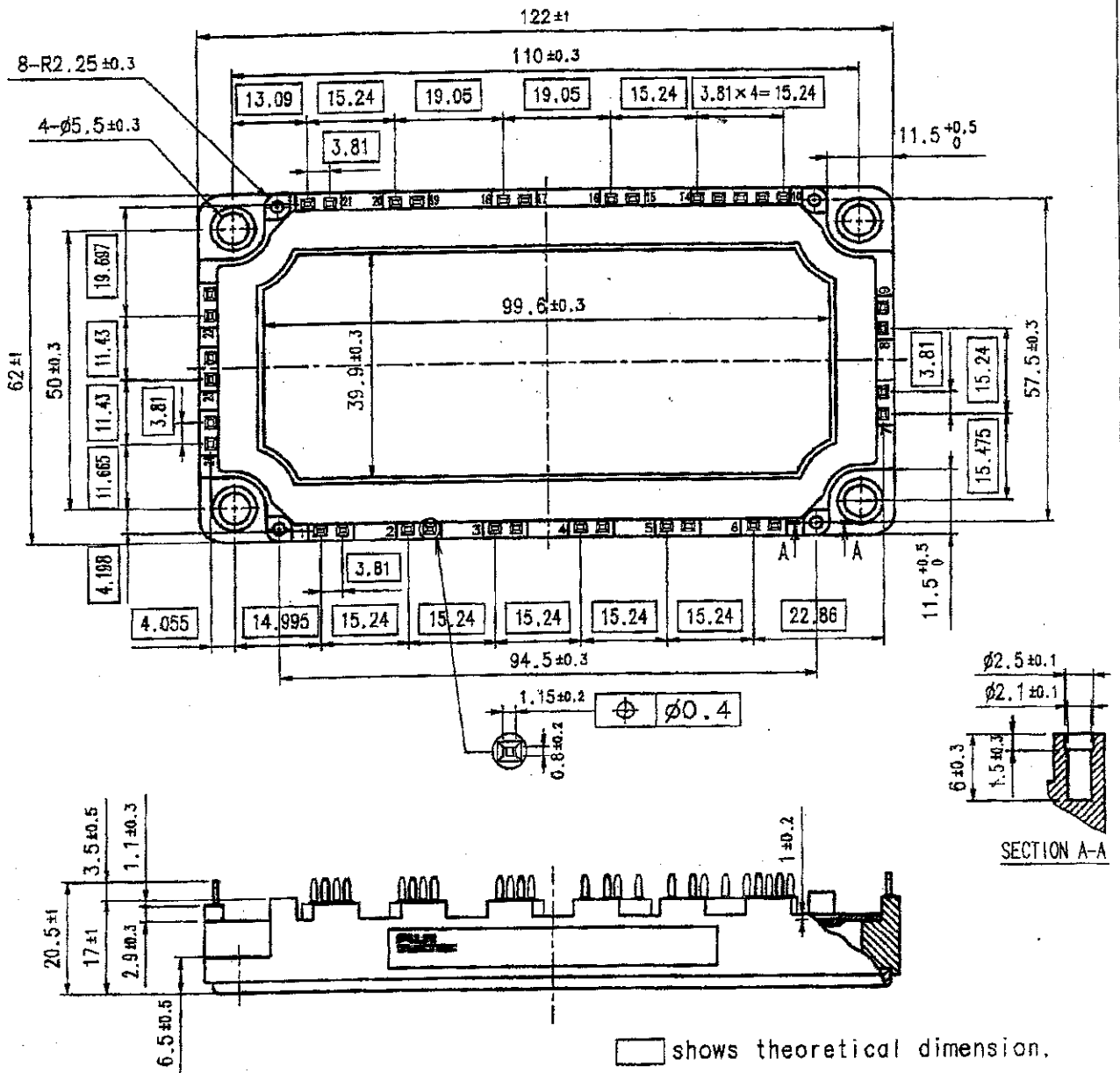
MS 6M 0474

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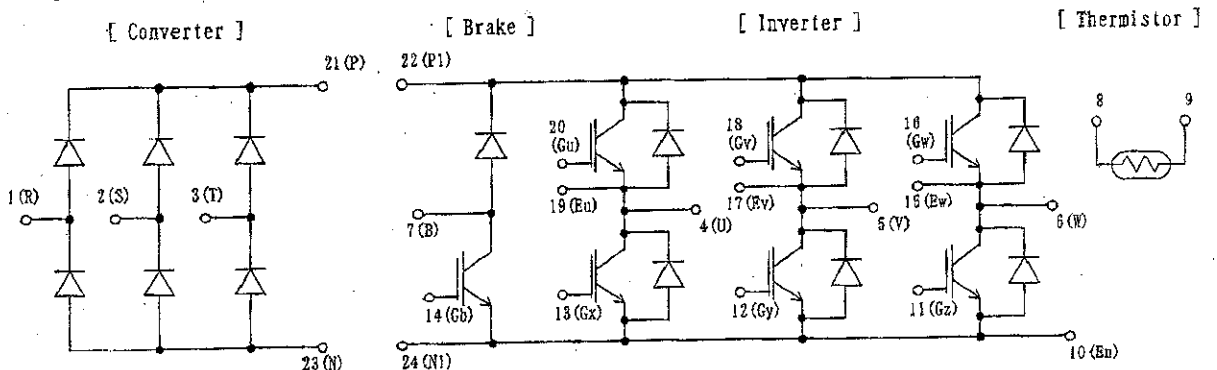
H04-004-06

7MBR35SB140

1. Outline Drawing (Unit : mm)



2. Equivalent circuit



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H04-004-03

3. Absolute Maximum Ratings (at Tc= 25°C unless otherwise specified)

Items		Symbols	Conditions		Maximum Ratings	Units
Inverter	Collector-Emitter voltage	V _{CES}			1400	V
	Gate-Emitter voltage	V _{GES}			±20	V
	Collector current	I _c	Continuous	T _c =25℃	50	A
				T _c =75℃	35	
		I _{cp}	1ms	T _c =25℃	100	A
				T _c =75℃	70	
		-I _c			35	A
Collector Power Dissipation	P _c	1 device		240	W	
Brake	Collector-Emitter voltage	V _{CES}			1400	V
	Gate-Emitter voltage	V _{GES}			±20	V
	Collector current	I _c	Continuous	T _c =25℃	35	A
				T _c =75℃	25	
		I _{cp}	1ms	T _c =25℃	70	A
				T _c =75℃	50	
	Collector Power Dissipation	P _c	1 device		180	W
Repetitive peak reverse Voltage (Diode)	V _{RRM}			1400	V	
Converter	Repetitive peak reverse Voltage	V _{RRM}			1600	V
	Average Output Current	I _o	50Hz/60Hz sine wave		35	A
	Surge Current (Non-Repetitive)	I _{FSM}	T _j =150℃, 10ms		360	A
	I ² t (Non-Repetitive)	I ² t	half sine wave		648	A ² s
	Junction temperature	T _j			150	℃
Storage temperature		T _{stg}			-40~ +125	℃
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)

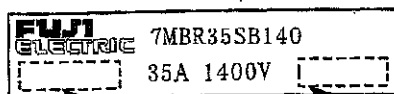
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Inverter	Zero gate voltage Collector current	ICES VGE = 0 V, VCE = 1400 V			1.0	mA
	Gate-Emitter leakage current	ICES VCE = 0 V, VGE = ±20 V			200	nA
	Gate-Emitter threshold voltage	VGE(th) VCE = 20 V, Ic = 35 mA	5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat) VGE = 15 V, chip		2.2		V
		Ic = 35 A terminal		2.35	2.7	
	Input capacitance	Cies VGE = 0 V, VCE = 10 V f = 1 MHz		4200		pF
	Turn-on time	Vcc= 800 V Ic = 35 A		0.35	1.2	μs
				0.25	0.6	
				0.1		
	Turn-off time	VGE = ±15 V RG = 33 Ω		0.45	1.0	
				0.08	0.3	
Brake	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
	Zero gate voltage Collector current	ICES VGE = 0 V, VCE = 1400 V			1.0	mA
	Gate-Emitter leakage current	ICES VCE = 0 V, VGE = ±20 V			200	nA
	Collector-Emitter saturation voltage	VCE(sat) VGE = 15 V, chip		2.2		V
		Ic = 25 A terminal		2.35	2.8	
	Turn-on time	Vcc= 800 V Ic = 25 A		0.35	1.2	μs
				0.25	0.6	
	Turn-off time	VGE = ±15 V RG = 51 Ω		0.45	1.0	
				0.08	0.3	
Converter	Reverse current	IRRM VR = 1400 V			1.0	mA
	Forward on voltage	VFM IF = 35 A chip		1.1		V
		terminal		1.2	1.5	
Thermistor	Reverse current	IRRM VR = 1600 V			1.0	mA
	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			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.

6. Indication on module (モジュール表示)



Lot No.

Place of manufacturing (code)

7. Applicable category (適用範囲)

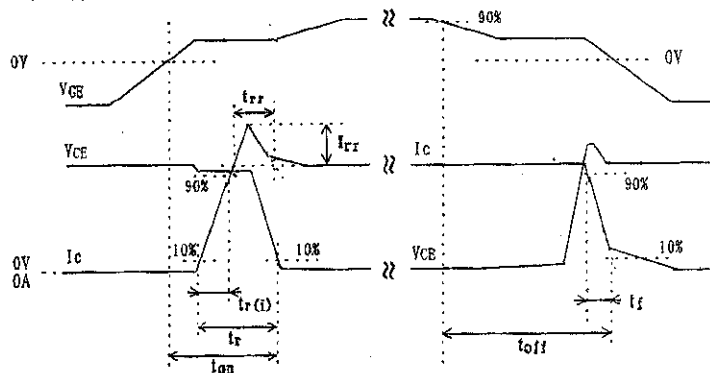
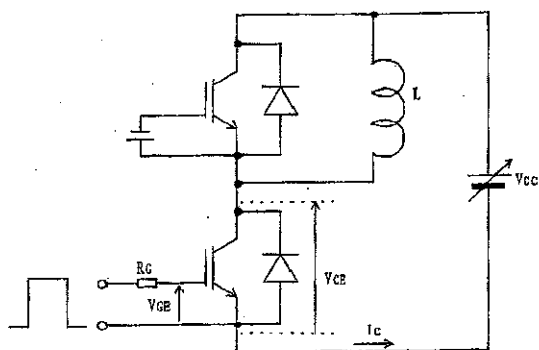
This specification is applied to Power Integrated Module named 7MBR35SB140.

本納入仕様書は パワー集積モジュール 7MBR35SB140 に適用する。

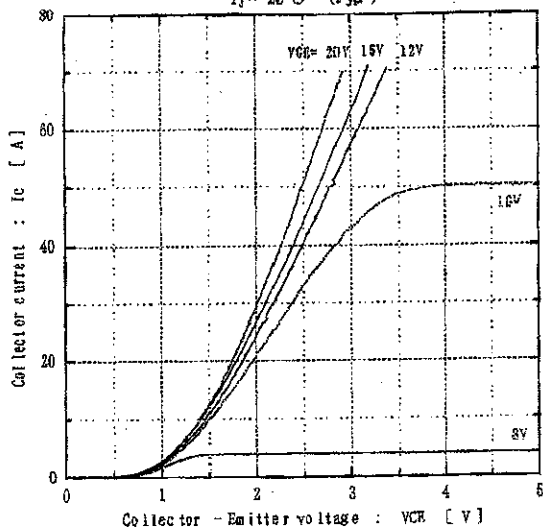
8. Storage and transportation notes (保管・運搬上の注意事項)

- 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。

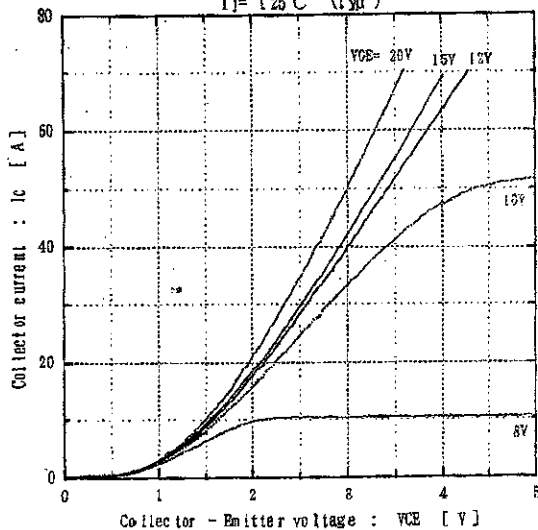
9. Definitions of switching time (スイッチング時間の定義)



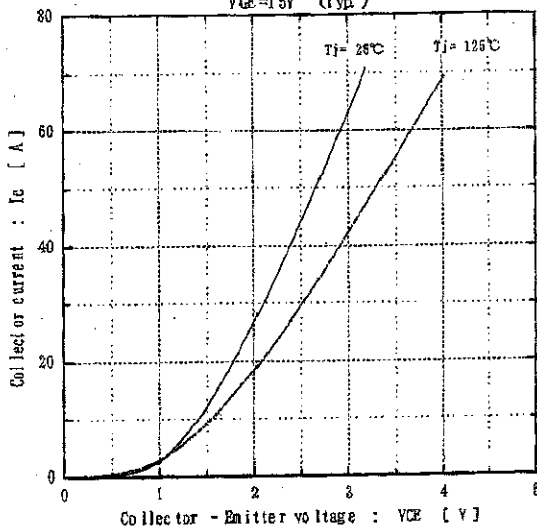
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ)



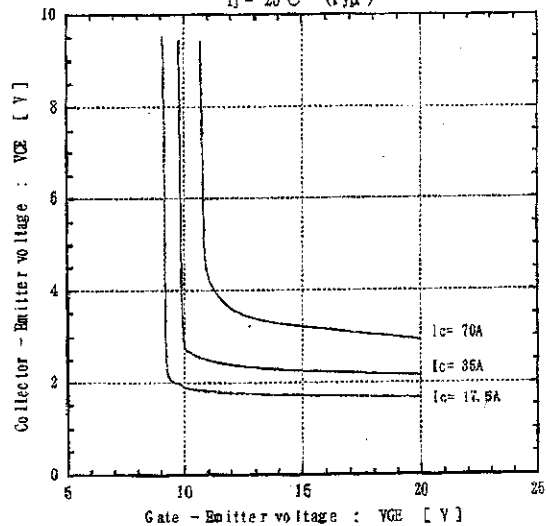
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ)



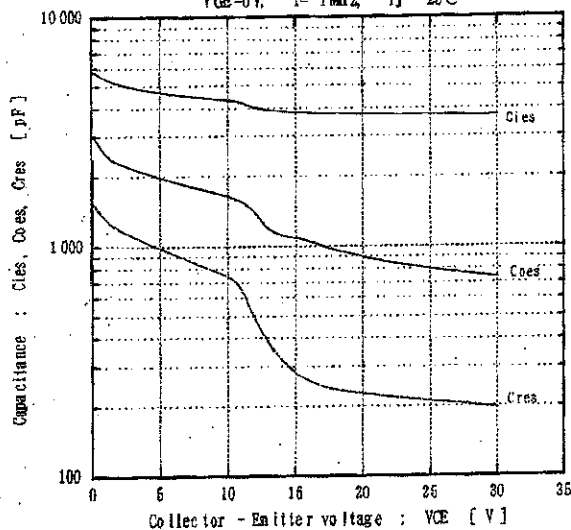
[Inverter]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ)



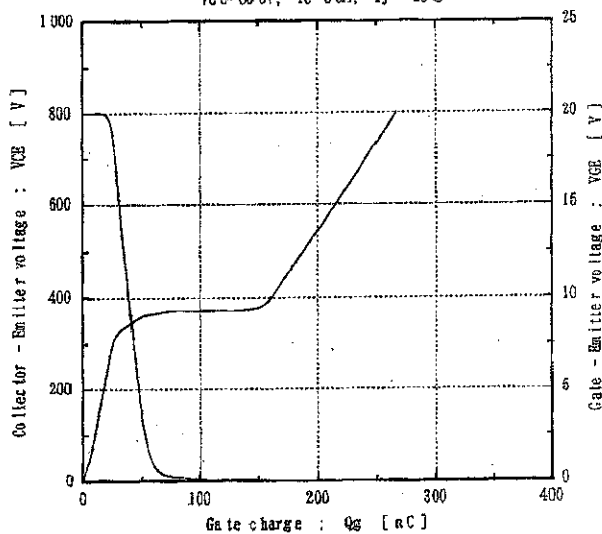
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ)

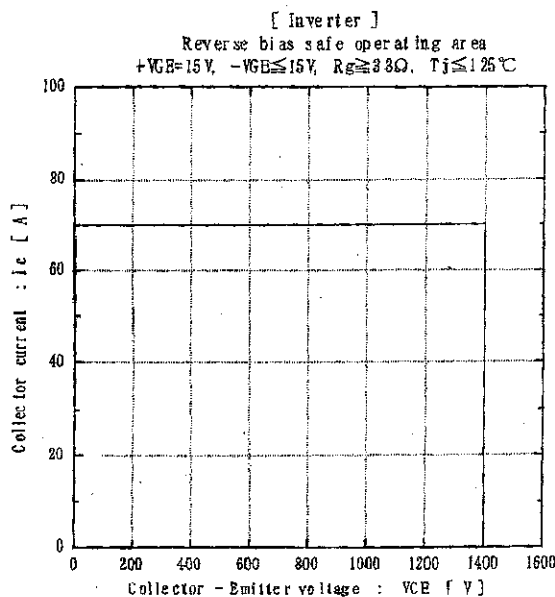
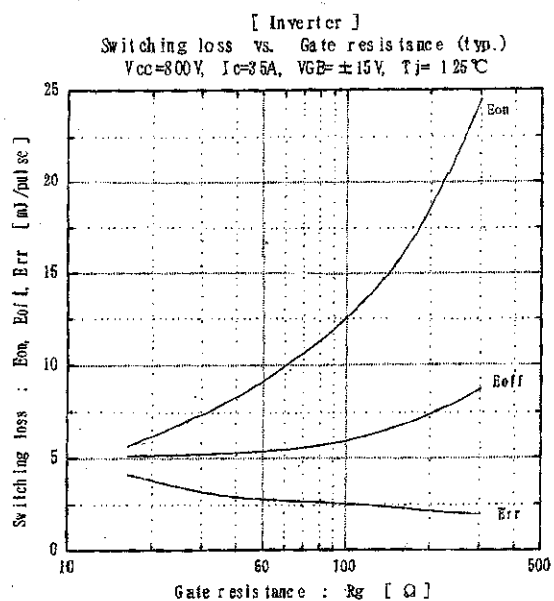
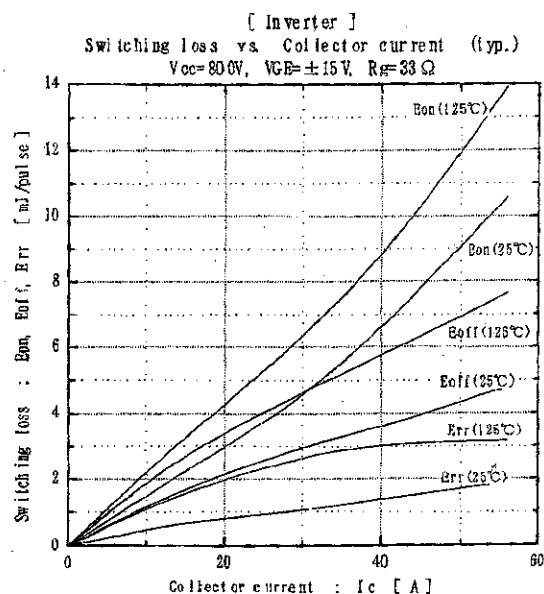
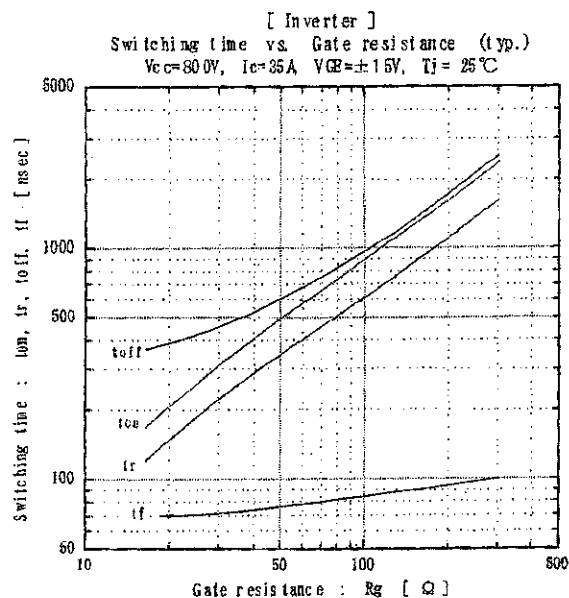
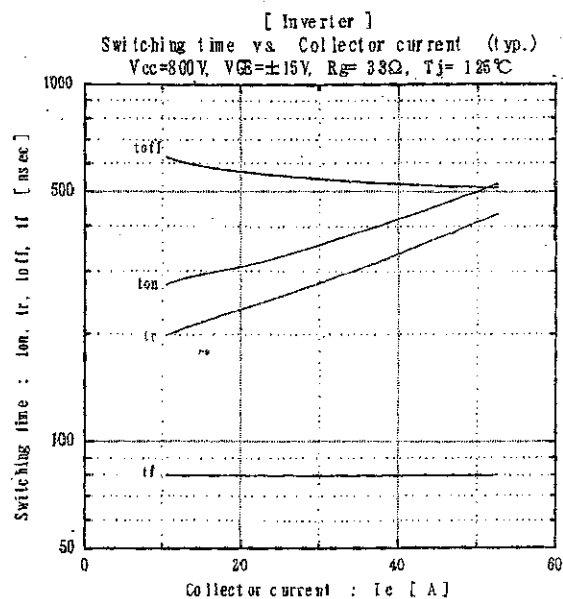
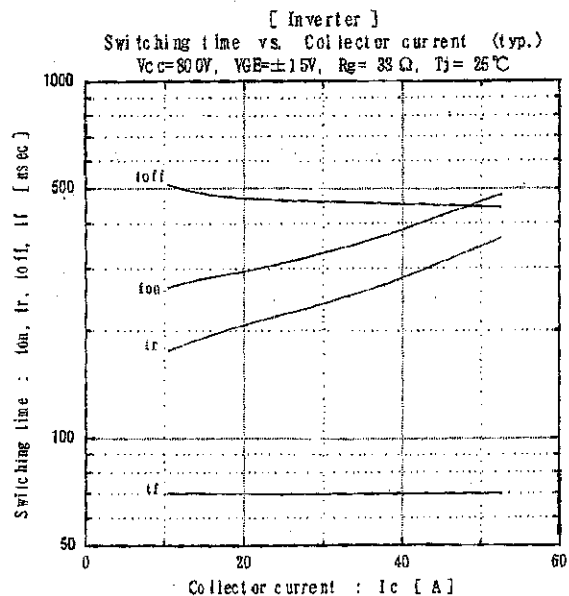


[Inverter]
Capacitance vs. Collector-Emitter voltage (typ)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$

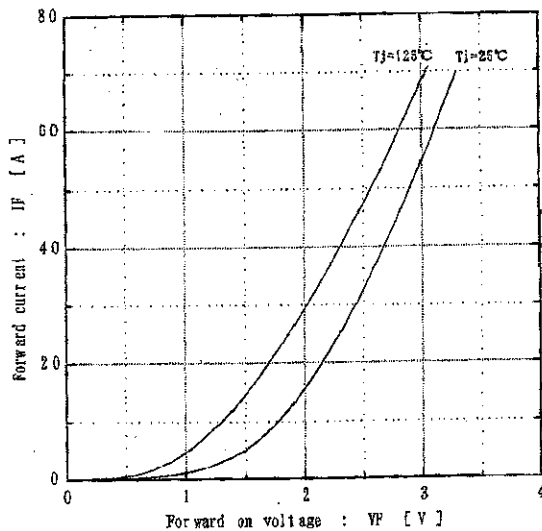


[Inverter]
Dynamic Gate charge (typ)
 $V_{CC} = 80\text{V}$, $I_C = 35\text{A}$, $T_j = 25^\circ\text{C}$

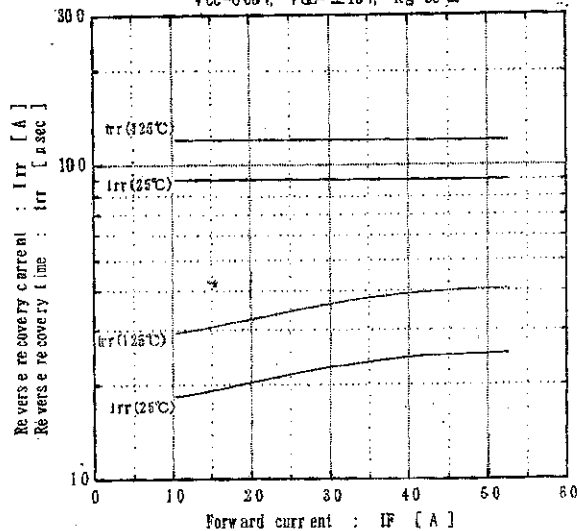




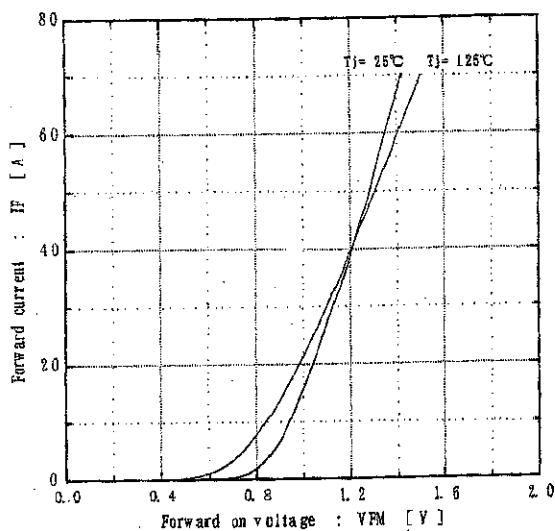
[Inverter]
Forward current vs. Forward on voltage (typ.)



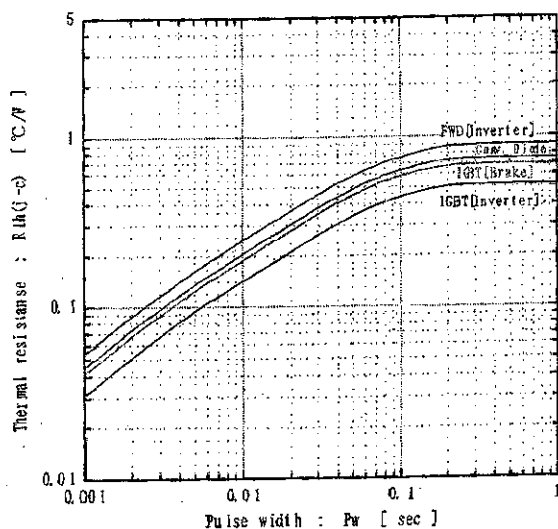
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC}=800V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$



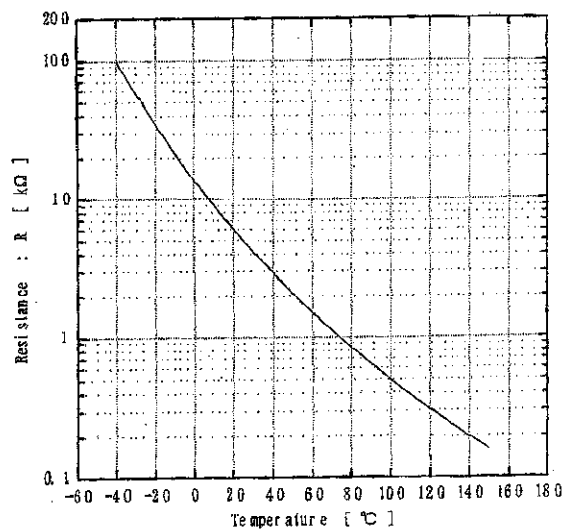
[Converter]
Forward current vs. Forward on voltage (typ.)



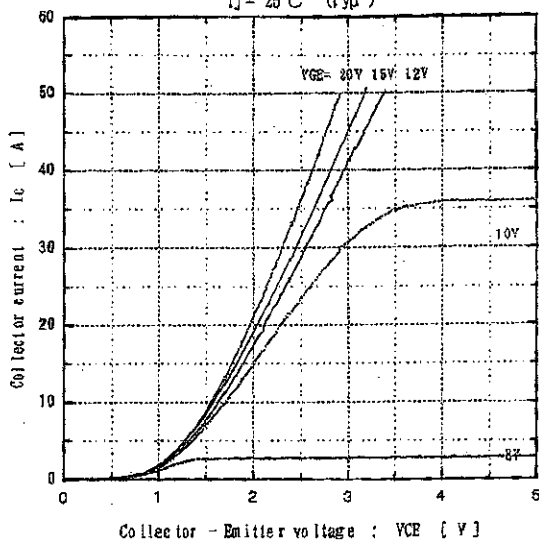
Transient thermal resistance



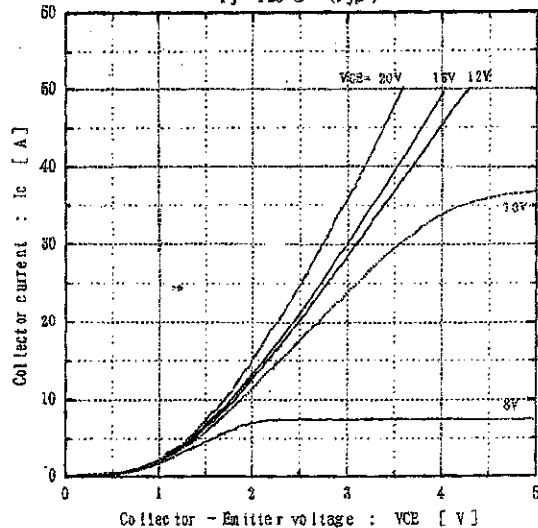
[Thermistor]
Temperature characteristic (typ.)



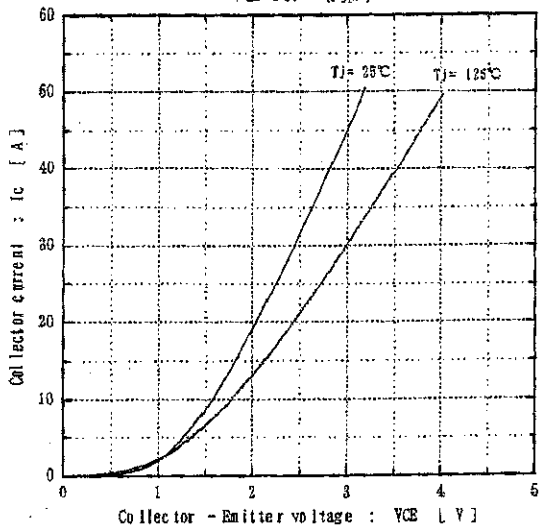
[Brake]
Collector current vs. Collector-Emittter voltage
 $T_J = 25^\circ\text{C}$ (typ)



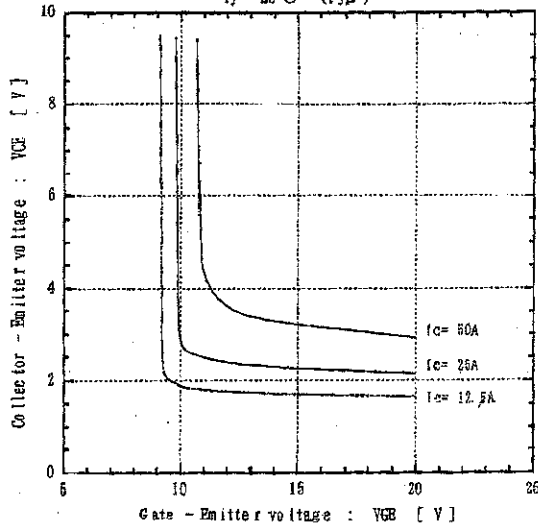
[Brake]
Collector current vs. Collector-Emittter voltage
 $T_J = 125^\circ\text{C}$ (typ)



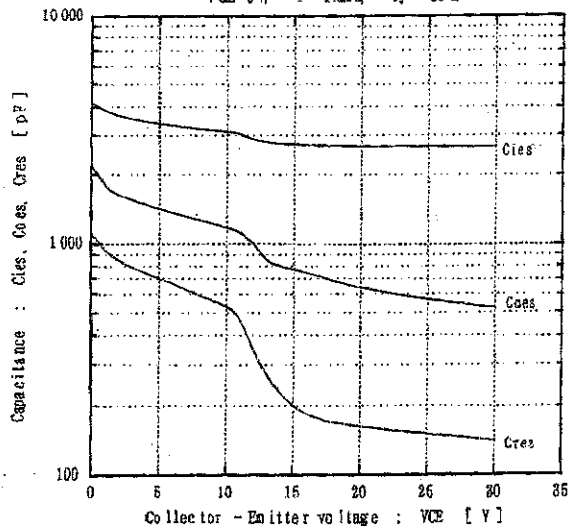
[Brake]
Collector current vs. Collector-Emittter voltage
 $V_{GE} = 15\text{V}$ (typ)



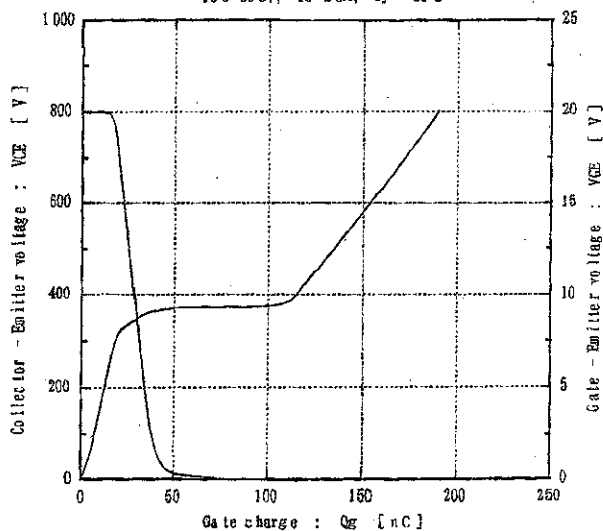
[Brake]
Collector-Emittter voltage vs. Gate-Emittter voltage
 $T_J = 25^\circ\text{C}$ (typ)



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



[Brake]
Dynamic Gate charge (typ)
 $V_{CC} = 80\text{V}$, $I_C = 25\text{A}$, $T_J = 25^\circ\text{C}$



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