

SPECIFICATION

Device Name : Power Integrated Module

Type Name : 7 M B R 3 0 S A 0 6 0

Spec. No. : M S 6 M 0 4 1 3

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Matsumoto Factory

	DATE	NAME	APPROVED		Fuji Electric Co., Ltd.	
DRAWN	Jan - 12 - '99	N. Ankawa			DWG. NO.	M S 6 M 0 4 1 3
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Revised Records

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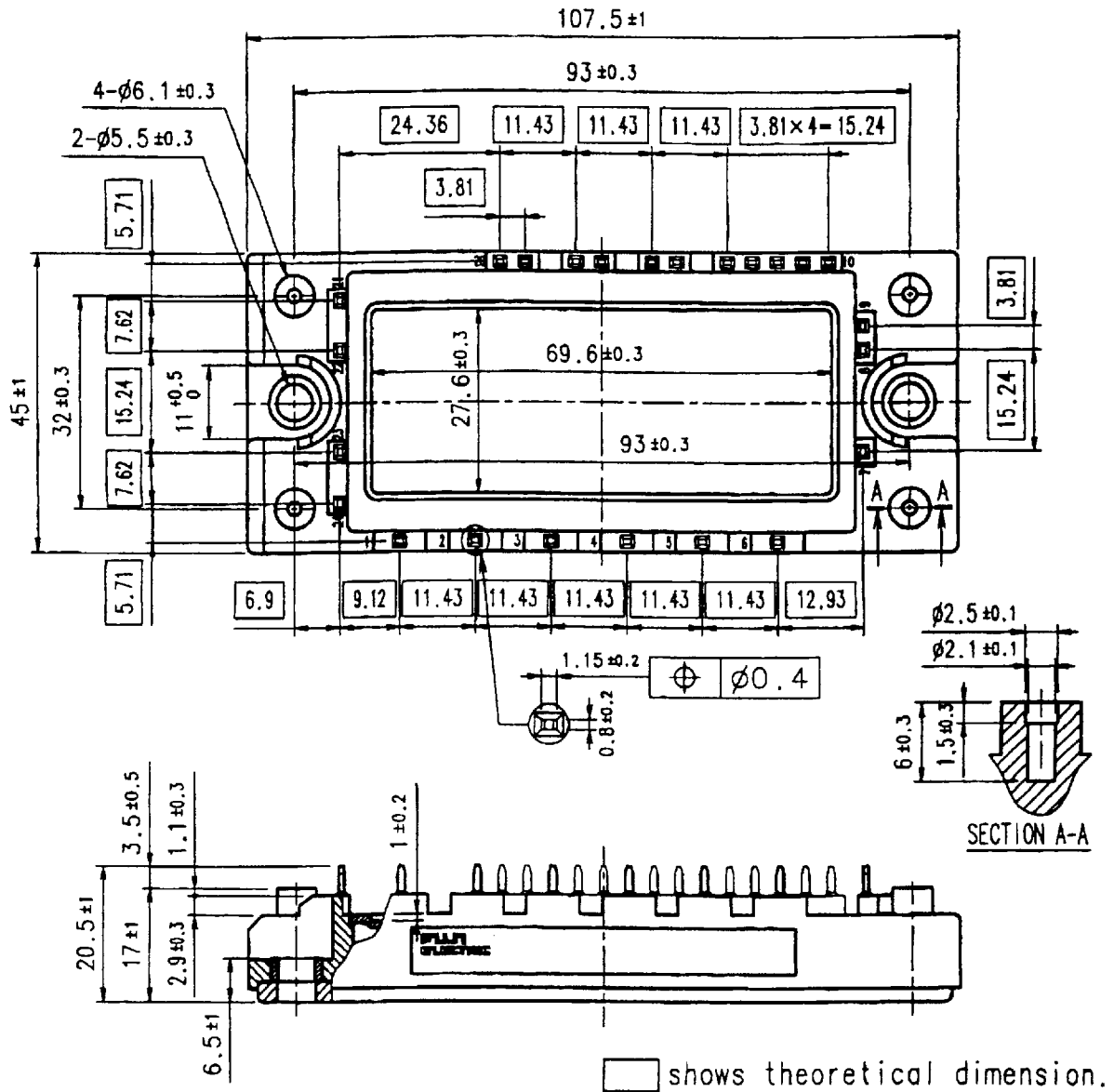
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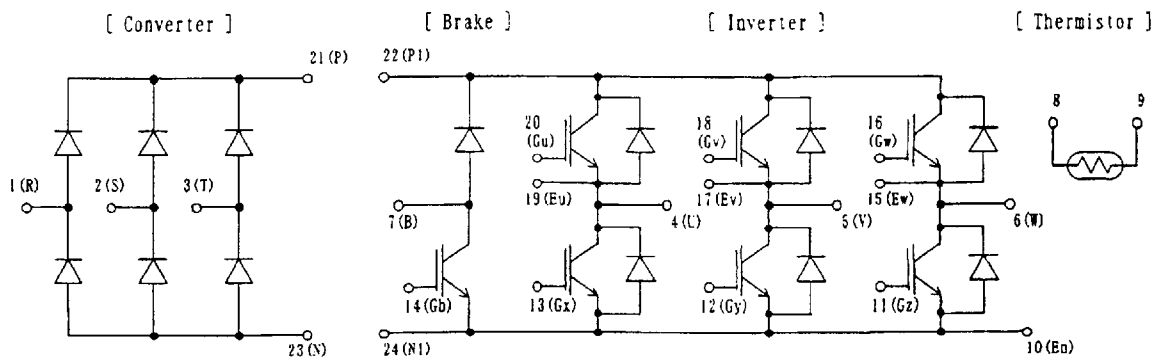
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1. Outline Drawing (Unit : mm)



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	V _{CES}		600	V	
	Gate-Emitter voltage	V _{GES}		±20	V	
	Collector current	I _c	Continuous	30	A	
		I _{cp}	1ms	60	A	
		-I _c		30	A	
Collector Power Dissipation		P _c	1 device	120	W	
Brake	Collector-Emitter voltage	V _{CES}		600	V	
	Gate-Emitter voltage	V _{GES}		±20	V	
	Collector current	I _c	Continuous	20	A	
		I _{cp}	1ms	40	A	
	Collector Power Dissipation		P _c	1 device	80	W
	Repetitive peak reverse Voltage(Diode)		V _{RRM}		600	V
Converter	Repetitive peak reverse Voltage	V _{RRM}		800	V	
	Average Output Current	I _o	50Hz/60Hz sine wave	30	A	
	Surge Current (Non-Repetitive)	I _{FSM}	T _j =150℃, 10ms	210	A	
	I ² t (Non-Repetitive)	I ² t	half sine wave	221	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)

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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	$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}$			1.0	mA
	Gate-Emitter leakage current	IGES	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$			200	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20\text{ V}, I_c = 30\text{ mA}$	5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{ V},$ chip		1.8		V
			$I_c = 30\text{ A}$ terminal		1.95	2.4	
	Input capacitance	C_{ies}	$V_{GE} = 0\text{ V}, V_{CE} = 10\text{ V}$ $f = 1\text{ MHz}$		3000		pF
	Turn-on time	t_{on}	$V_{cc} = 300\text{ V}$		0.45	1.2	μs
		t_r	$I_c = 30\text{ A}$		0.25	0.6	
		$t_{r(1)}$	$V_{GE} = \pm 15\text{ V}$		0.08		
	Turn-off time	t_{off}	$R_G = 82\ \Omega$		0.40	1.0	
		t_f			0.05	0.35	
	Forward on voltage	VF	$I_F = 30\text{ A}$ chip		1.8		V
			terminal		1.95	2.6	
	Reverse recovery time	t_{rr}	$I_F = 30\text{ A}$			300	ns
Brake	Zero gate voltage Collector current	ICES	$V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}$			1.0	mA
	Gate-Emitter leakage current	IGES	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$			200	nA
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{ V},$ chip		1.8		V
			$I_c = 20\text{ A}$ terminal		1.95	2.4	
	Turn-on time	t_{on}	$V_{cc} = 300\text{ V}$		0.45	1.2	μs
		t_r	$I_c = 20\text{ A}$		0.25	0.6	
	Turn-off time	t_{off}	$V_{GE} = \pm 15\text{ V}$		0.40	1.0	
		t_f	$R_G = 120\ \Omega$		0.05	0.35	
Converter	Reverse current	IRRM	$V_R = 600\text{ V}$			1.0	mA
	Forward on voltage	VFM	$I_F = 30\text{ A}$ chip		1.1		V
			terminal		1.2	1.5	
Thermistor	Reverse current	IRRM	$V_R = 800\text{ V}$			1.0	mA
	Resistance	R	$T = 25^\circ\text{C}$		5000		Ω
			$T = 100^\circ\text{C}$	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			1.04	$^\circ\text{C/W}$
		Inverter FWD			2.00	
		Brake IGBT			1.56	
		Converter Diode			4.05	
Contact Thermal resistance	$R_{th(c-f)}$	with Thermal Compound (※)		0.05		$^\circ\text{C/W}$

※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

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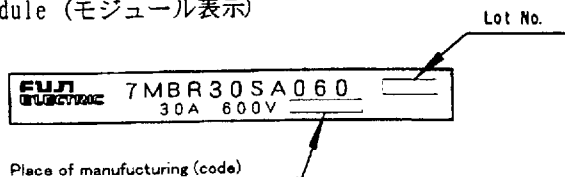
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6. Indication on module (モジュール表示)



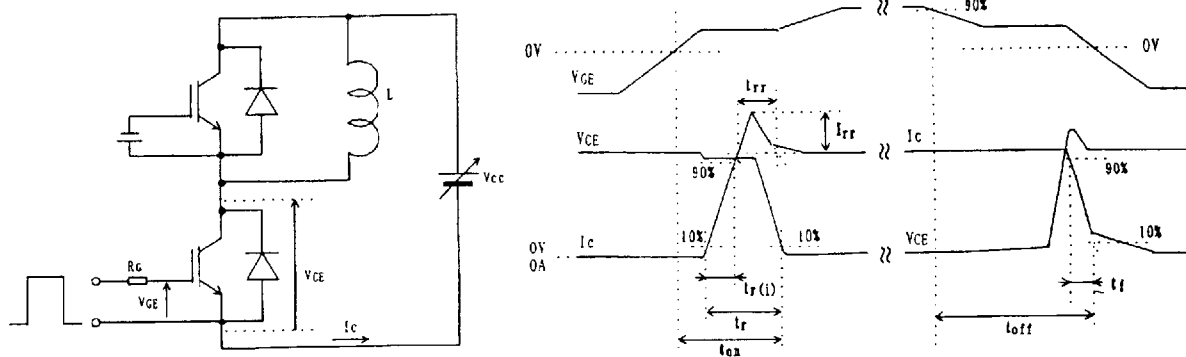
7. Applicable category (適用範囲)

This specification is applied to Power Integrated Module named 7MBR30SA060.
 本納入仕様書は パワー集積モジュール 7MBR30SA060 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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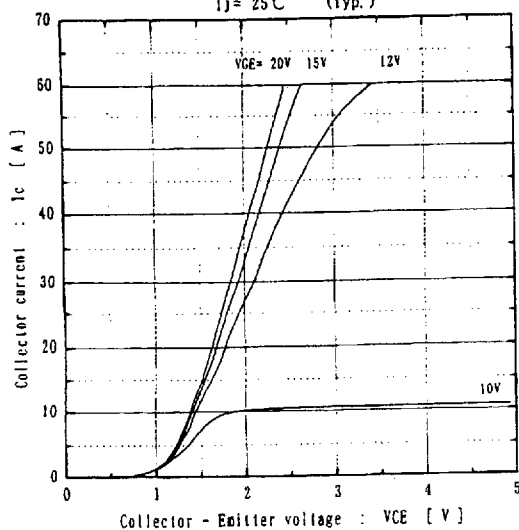
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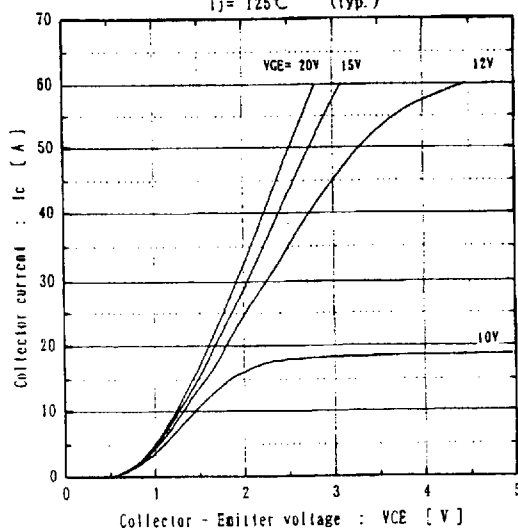
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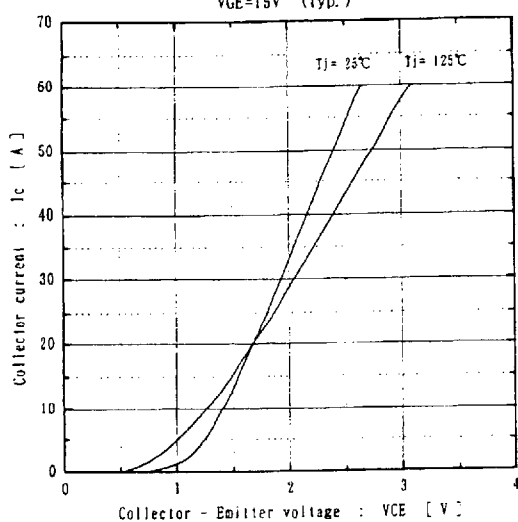
[Inverter]
Collector current vs. Collector-Emittor voltage
 $T_j = 25^\circ\text{C}$ (typ.)



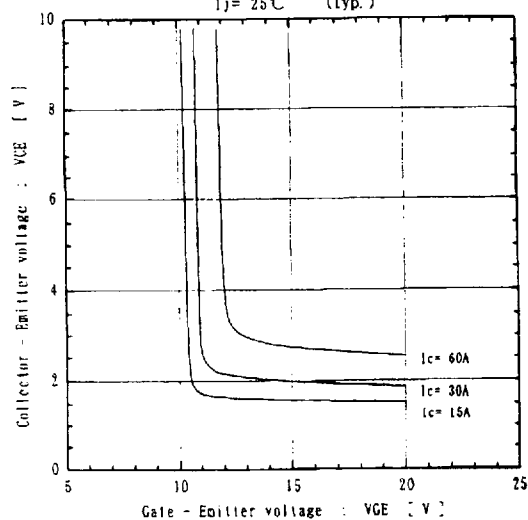
[Inverter]
Collector current vs. Collector-Emittor voltage
 $T_j = 125^\circ\text{C}$ (typ.)



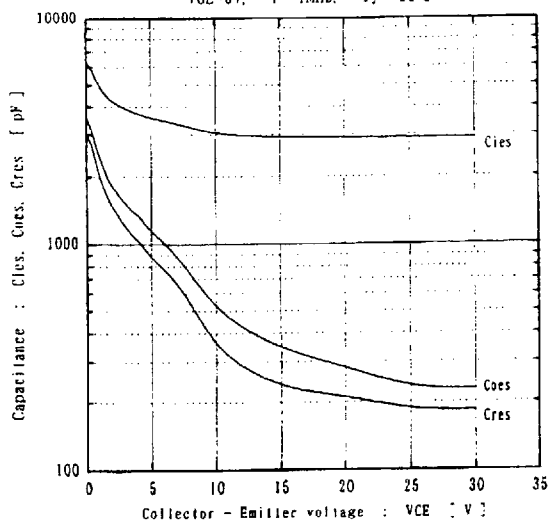
[Inverter]
Collector current vs. Collector-Emittor voltage
 $V_{GE} = 15\text{V}$ (typ.)



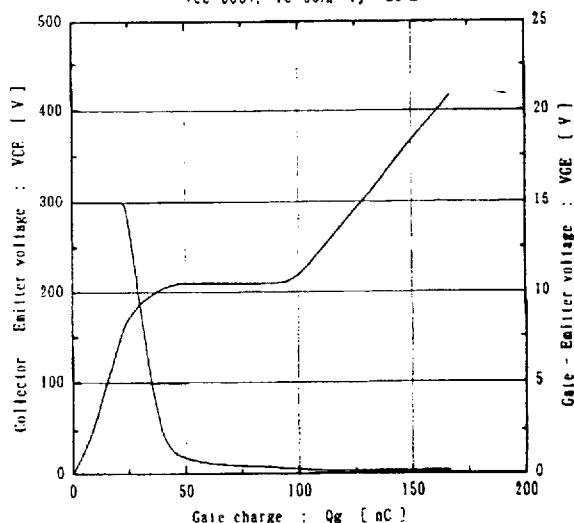
[Inverter]
Collector-Emittor voltage vs. Gate-Emittor voltage
 $T_j = 25^\circ\text{C}$ (typ.)



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



[Inverter]
Dynamic Gate charge (typ.)
 $V_{CC} = 300\text{V}$, $I_c = 30\text{A}$, $T_j = 25^\circ\text{C}$



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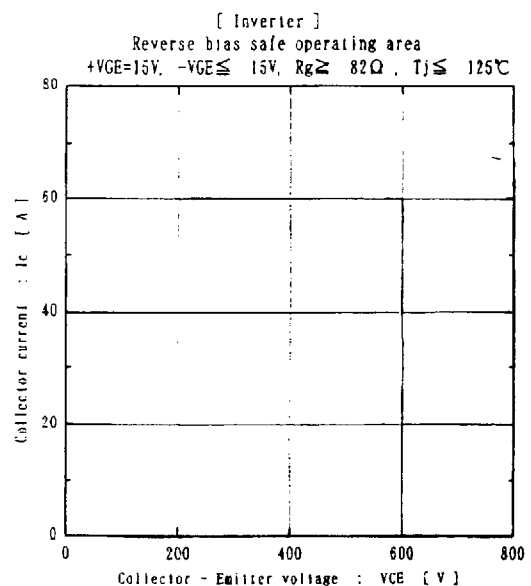
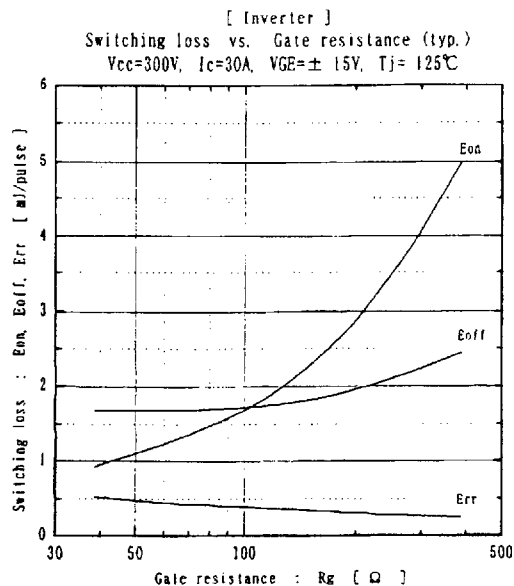
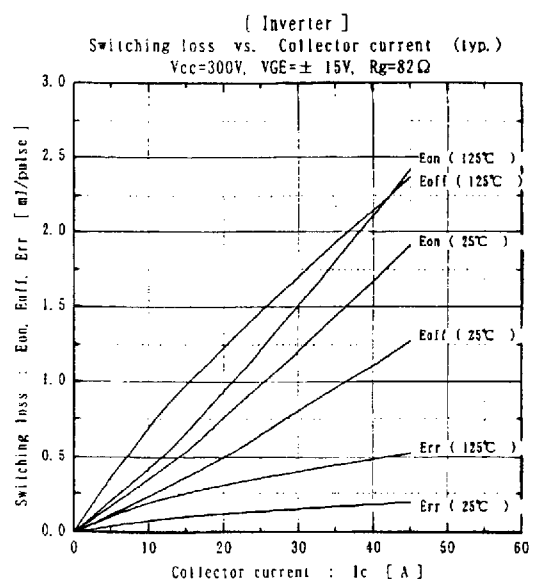
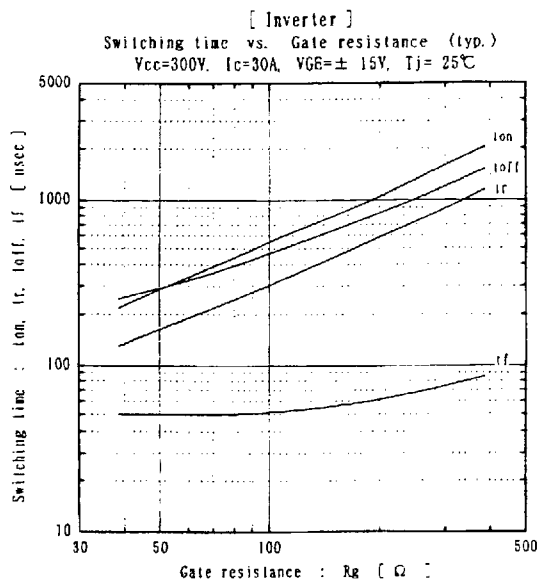
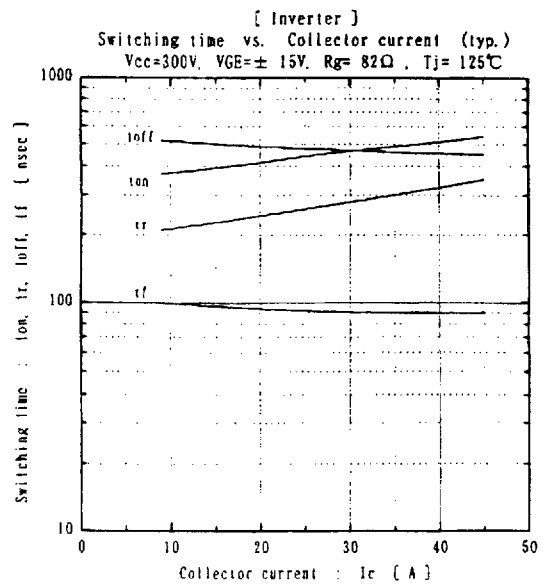
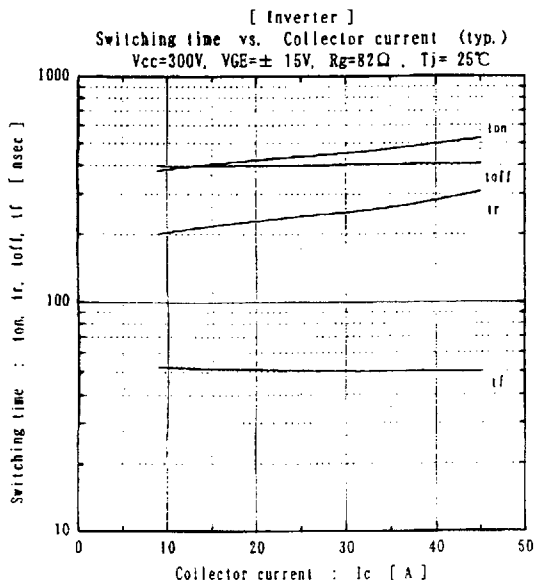
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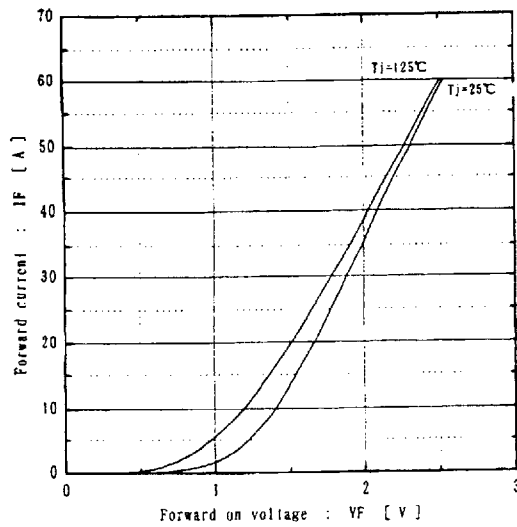
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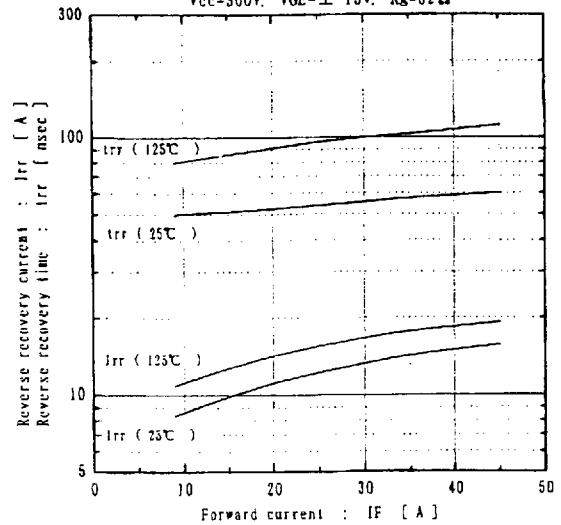
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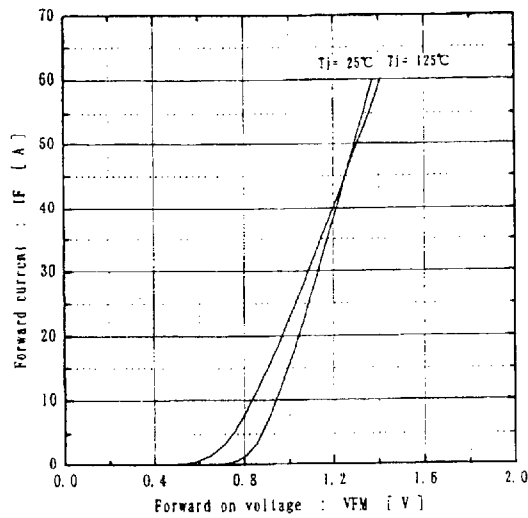
[Inverter]
Forward current vs. Forward on voltage (typ.)



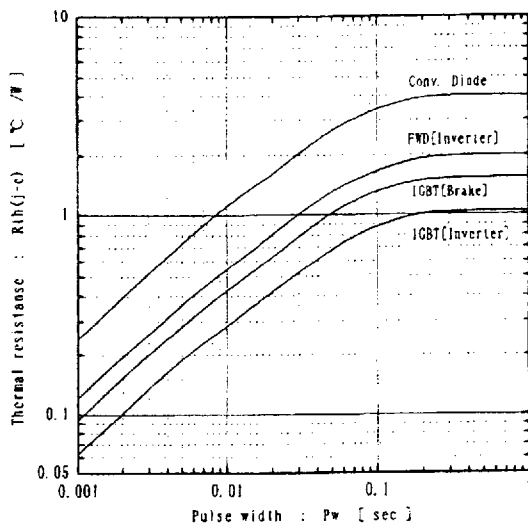
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC}=300V$, $V_{GE}=\pm 15V$, $R_g=82\Omega$



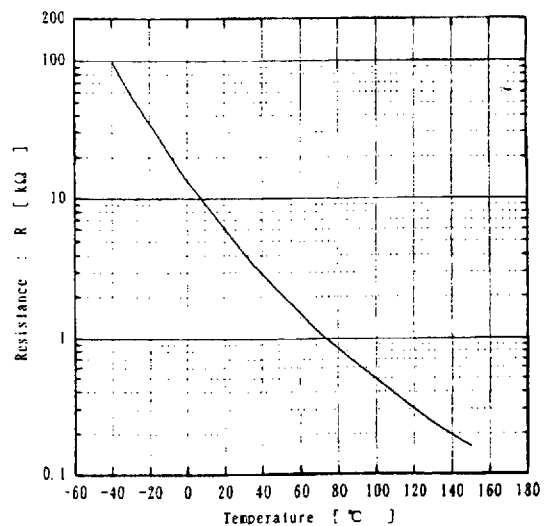
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



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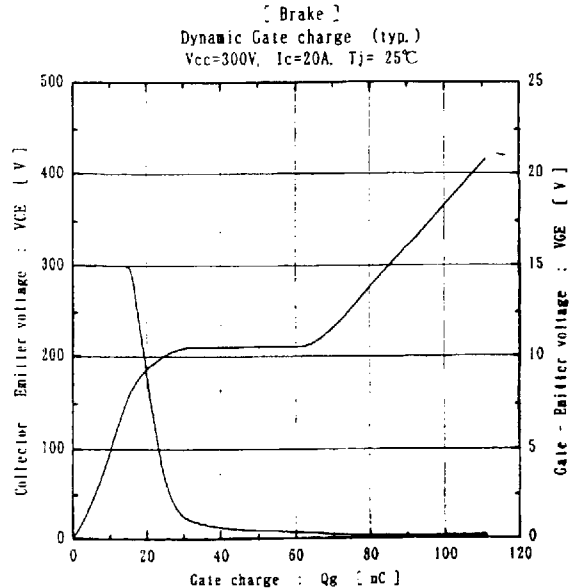
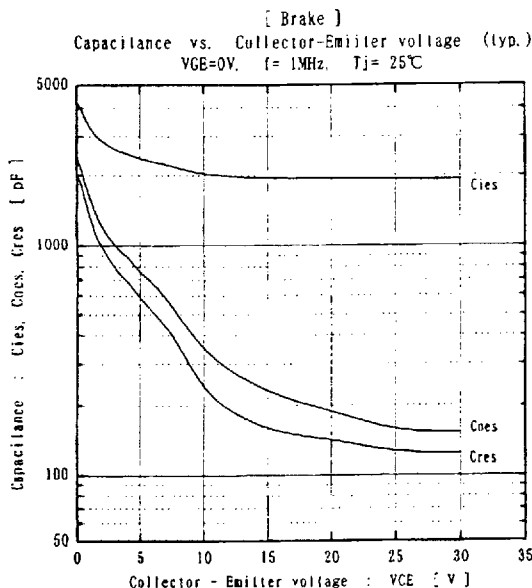
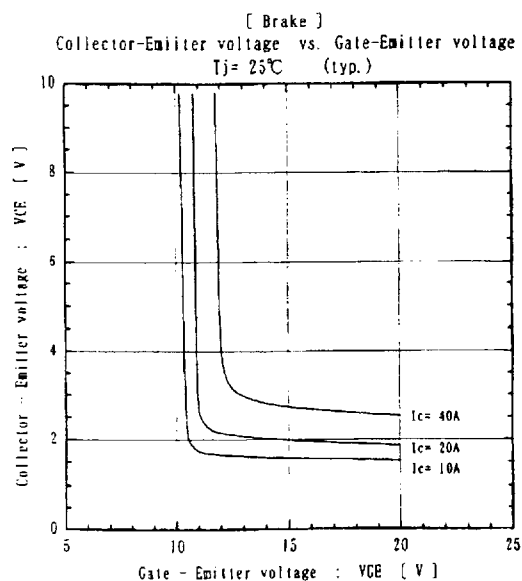
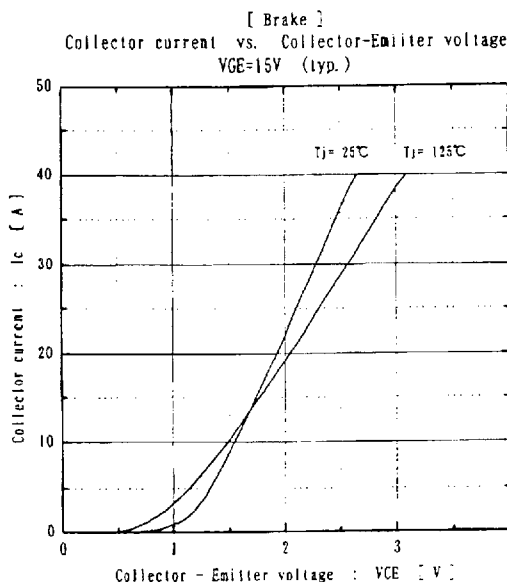
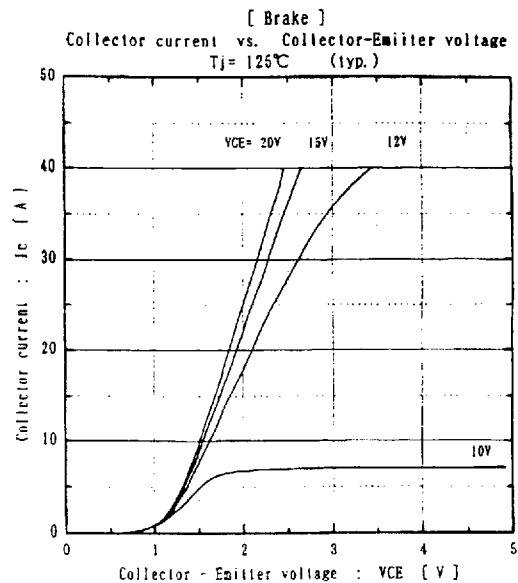
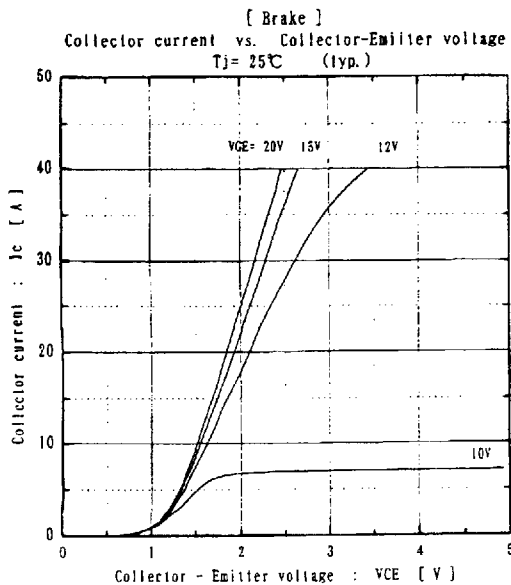
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