

Messrs. Rockwell Automation

SPECIFICATION

Device Name : IGBT Module
Type Name : 7MBR30SA060E-01
Spec. No. : MS6M 0543
Date : Jun. - 02 - 2000

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Fuji Electric Co., Ltd.
Matsumoto Factory

DATE	NAME	APPROVED	Fuji Electric Co., Ltd.	
DRAWN: Jan. - 2 - '00	J. Kobayashi	J. Hiyata	DWG. NO.	MS6M 0543
CHECKED: June - 2 - 00	S. Naito			

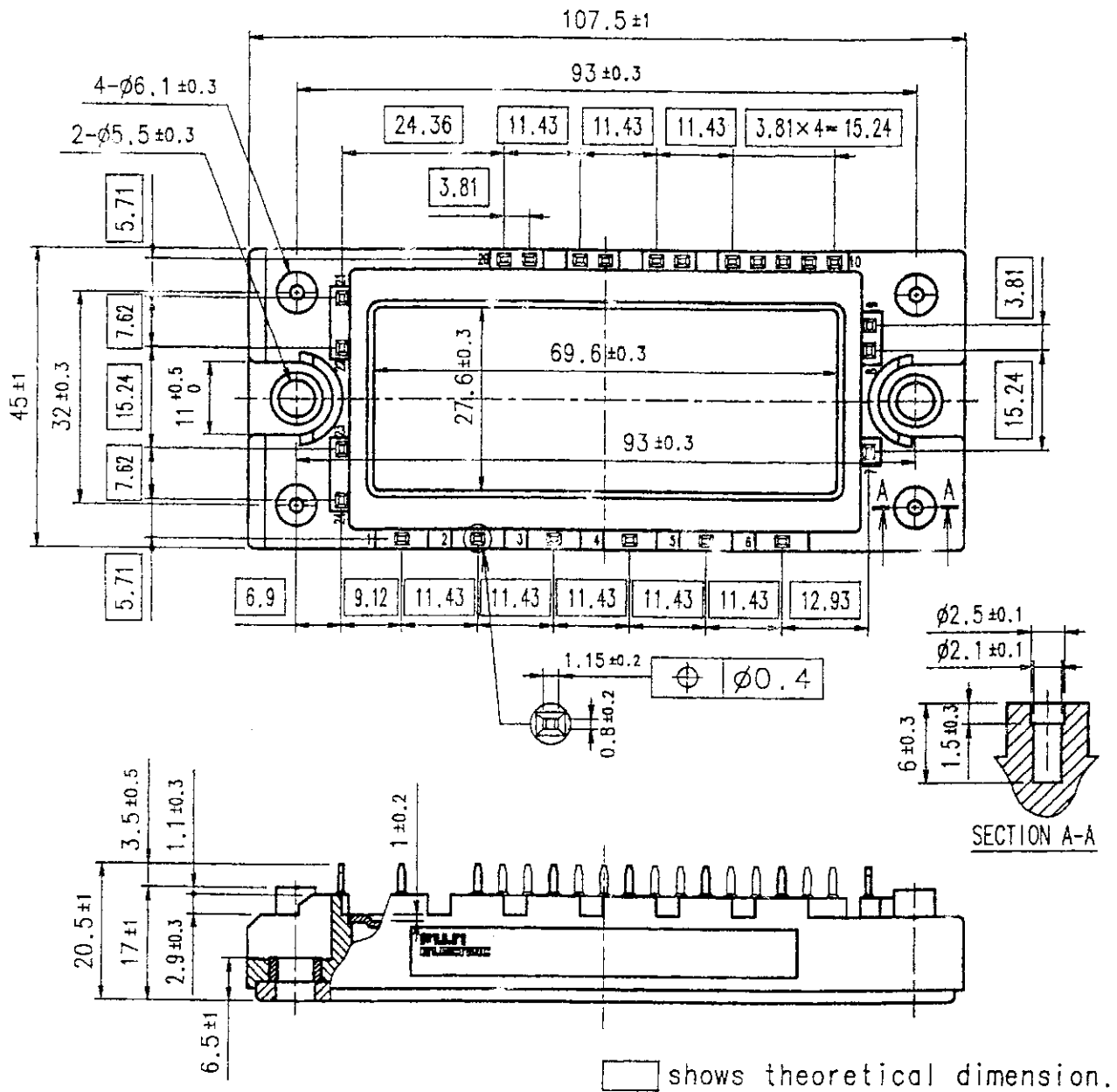
Revised Records

Date	Classi- fication	Ind.	Content	Applied date	Drawn	Checked	Approved
Jan-2-'00	enactment	—	—	Issued date	—	S. M. H. H.	T. Miyasaka

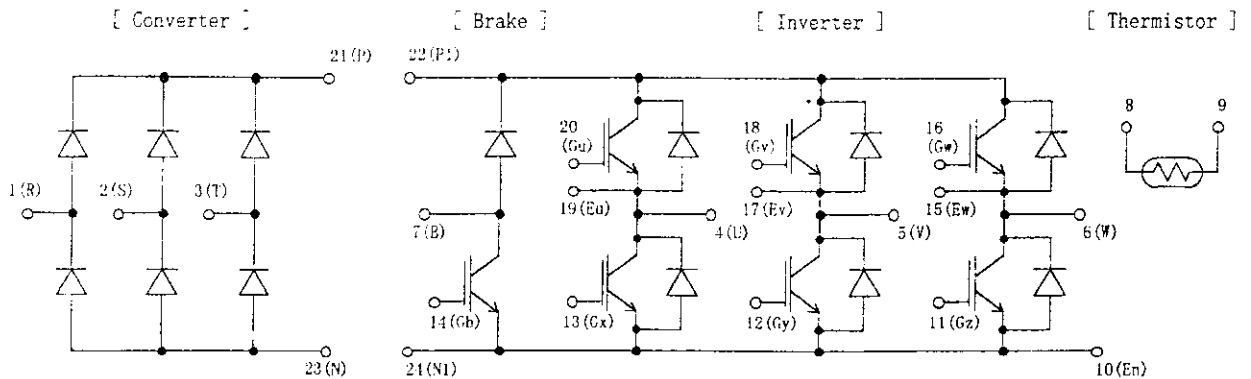
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7MBR30SA060E-01

1. Outline Drawing (Unit : mm)



2. Equivalent circuit



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

Items		Symbols	Conditions	Maximum Ratings	Units
Inverter	Collector-Emitter voltage	VCES		600	V
	Gate-Emitter voltage	VGES		+ -20	V
	Collector current	lc	Continuous	30	A
		lcp	1ms	60	A
		-lc		30	A
Collector Power Dissipation	Pc	1 device	120	W	
Brake	Collector-Emitter voltage	VCES		600	V
	Gate-Emitter voltage	VGES		+ -20	V
	Collector current	lc	Continuous	20	A
		lcp	1ms	40	A
	Collector Power Dissipation	Pc	1 device	80	W
	Repetitive peak reverse Voltage(Diode)	VRRM		600	V
Converter	Repetitive peak reverse Voltage	VRRM		800	V
	Average Output Current	Io	50Hz/60Hz sine wave	50	A
	Surge Current (Non-Repetitive)	IFSM	Tj= 150C, 10ms	350	A
	I ² t (Non-Repetitive)	I ² t	half sine wave	613	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	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. 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	600 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 =	30 mA	5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE	15 V, chip		1.8			V
			Ic =	30 A terminal		1.95	2.4		
	Input capacitance	Cies	VGE	0 V, VCE	10 V		3000		pF
	Turn-on time	ton	Vcc =	300 V			0.45	1.2	us
		tr	Ic =	30 A			0.25	0.6	
		tr(β)	VGE	+15 V			0.08		
	Turn-off time	toff	RG =	82 ohm			0.40	1.0	
tf						0.05	0.35		
Forward on voltage	VF	IF =	30 A chip			1.8		V	
			terminal			1.95	2.6		
Reverse recovery time	trr	IF =	30 A				300	ns	
Brake	Zero gate voltage Collector current	ICES	VGE	0 V, VCE	600 V			1.0	nA
	Gate-Emitter leakage current	IGES	VCE	0 V, VGE	+20 V			200	nA
	Collector-Emitter saturation voltage	VCE(sat)	VGE	15 V, chip		1.8			V
			Ic =	20 A terminal		1.95	2.4		
	Turn-on time	ton	Vcc =	300 V			0.45	1.2	us
		tr	Ic =	20 A			0.25	0.6	
	Turn-off time	toff	VGE	+15 V			0.40	1.0	
		tf	RG =	120 ohm			0.05	0.35	
	Reverse current	IRRM	VR =	600 V				1.0	mA
	Converter	VFM	IF =	30 A chip			1.0		V
			terminal			1.1	1.5		
Reverse current	IRRM	VR =	800 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			1.04	C/W
		Inverter FWD			2.00	
		Brake IGBT			1.56	
		Converter Diode			0.90	
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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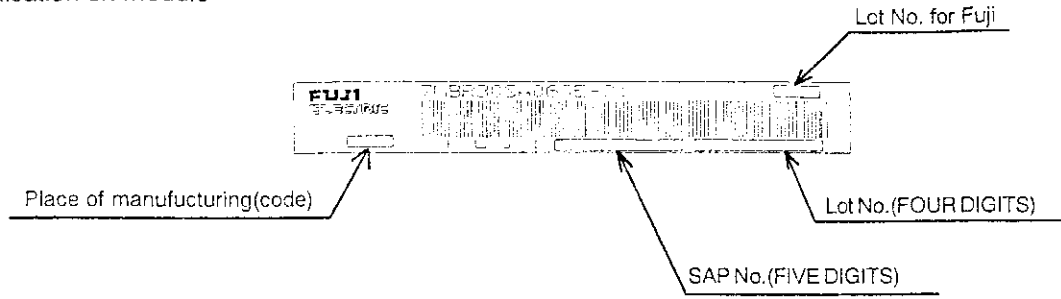
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6. Indication on module



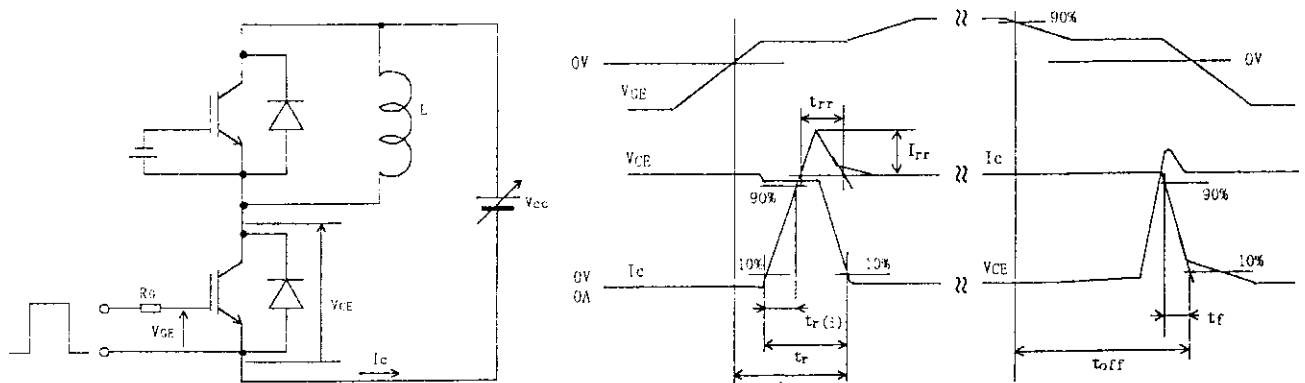
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR30SA060E-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.

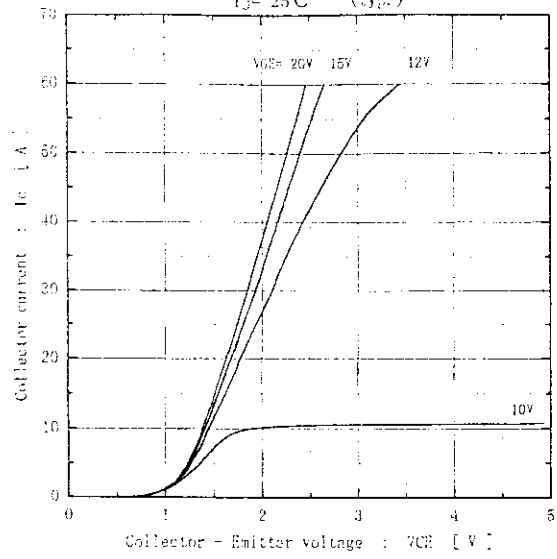
9. Definitions of switching time



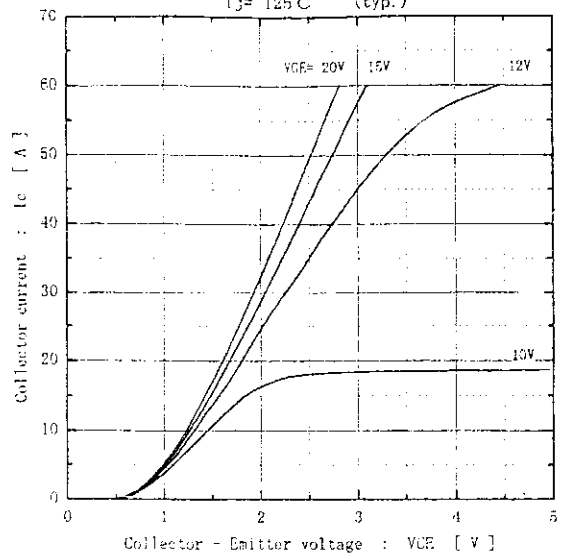
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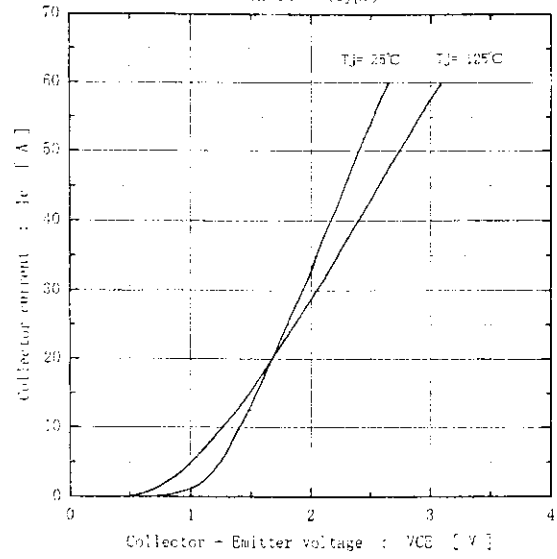
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



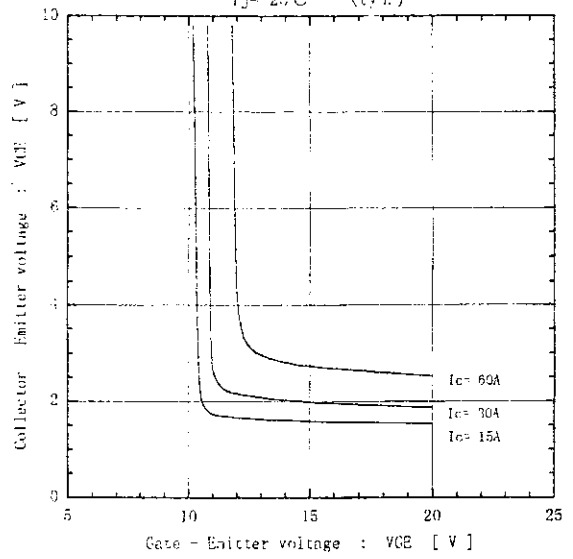
[Inverter]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



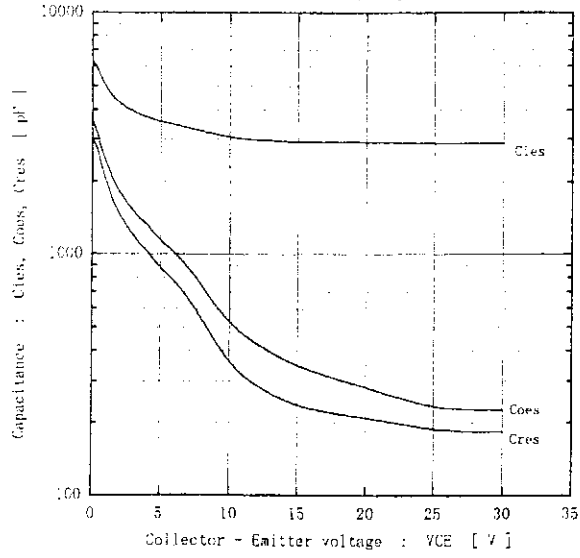
[Inverter]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



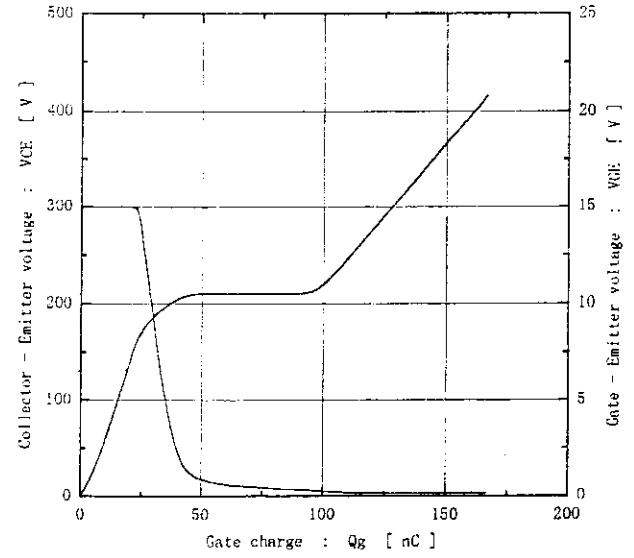
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



[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.)
 $V_{ce} = 300\text{V}$, $I_c = 30\text{A}$, $T_j = 25^\circ\text{C}$



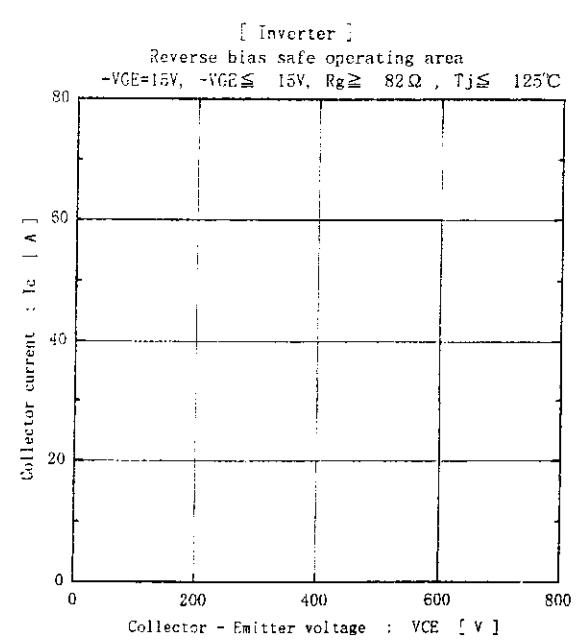
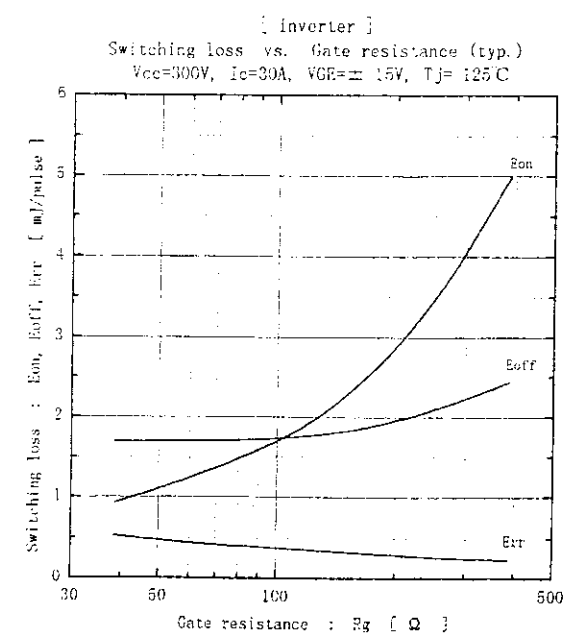
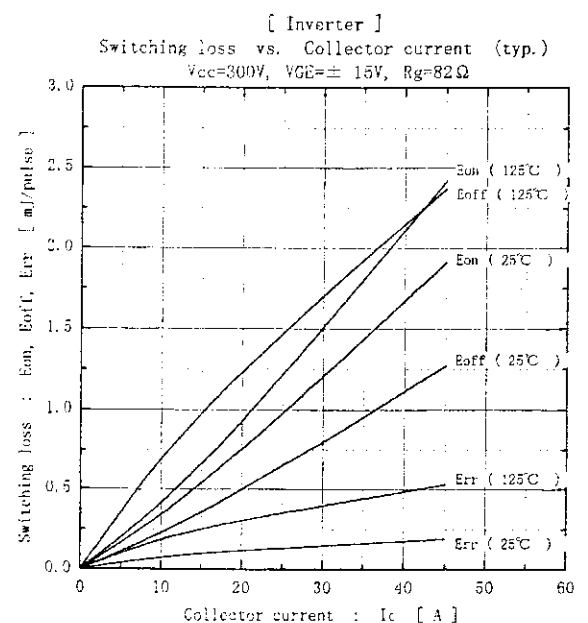
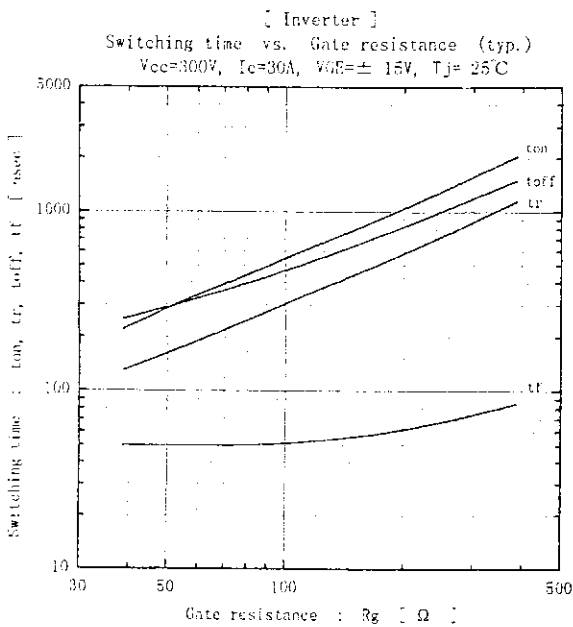
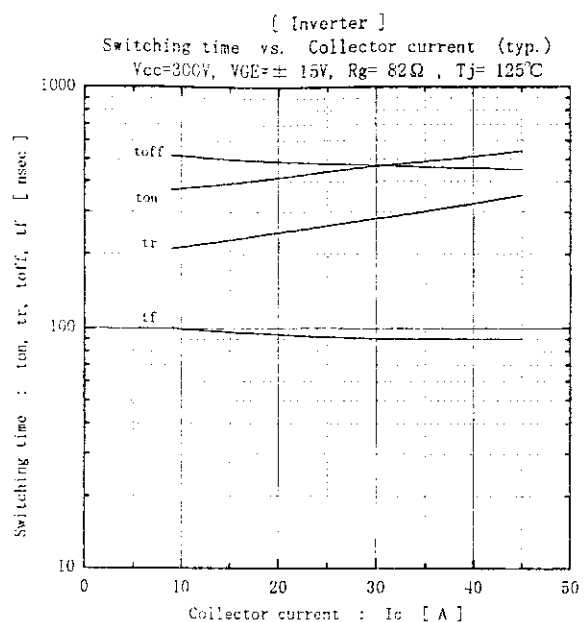
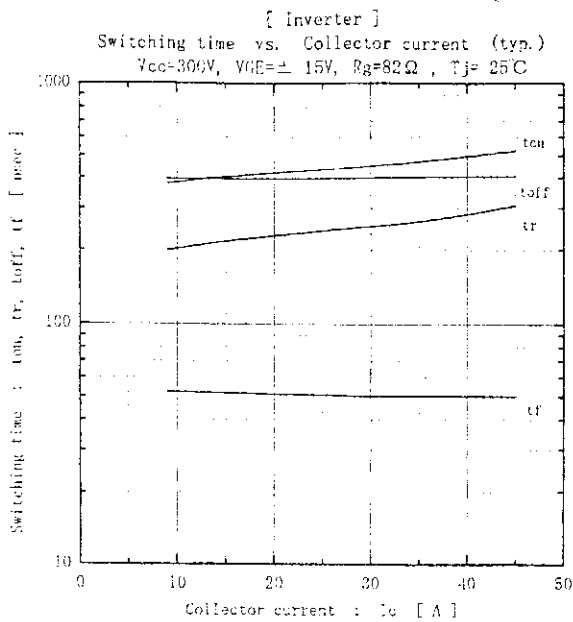
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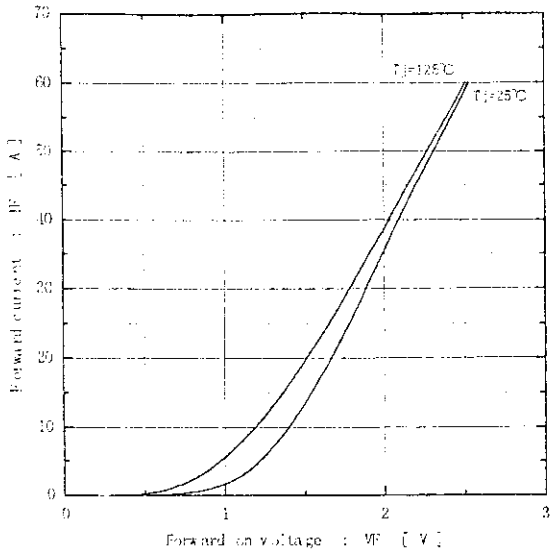
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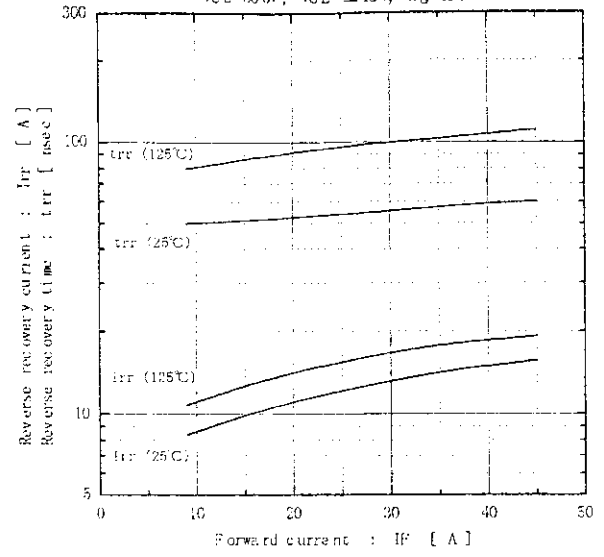
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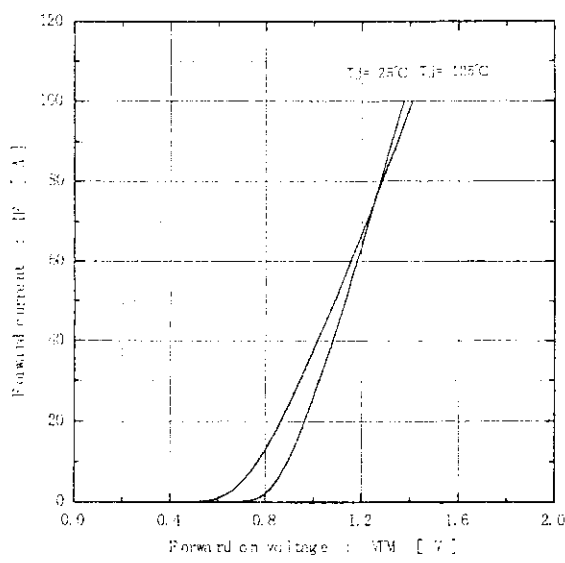
[Inverter]
Forward current vs. Forward on voltage (typ.)



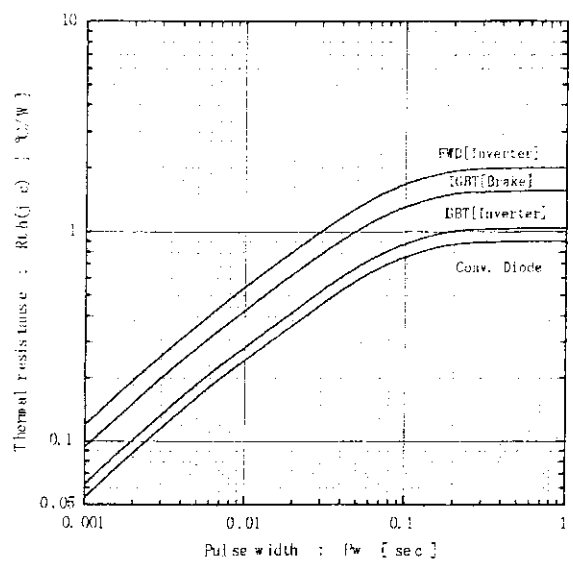
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{ce} = 100V, V_{GE} = \pm 15V, R_g = 82\Omega$



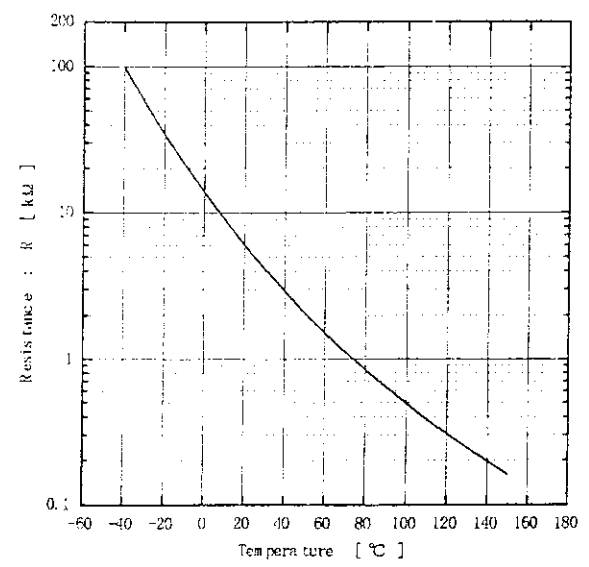
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance

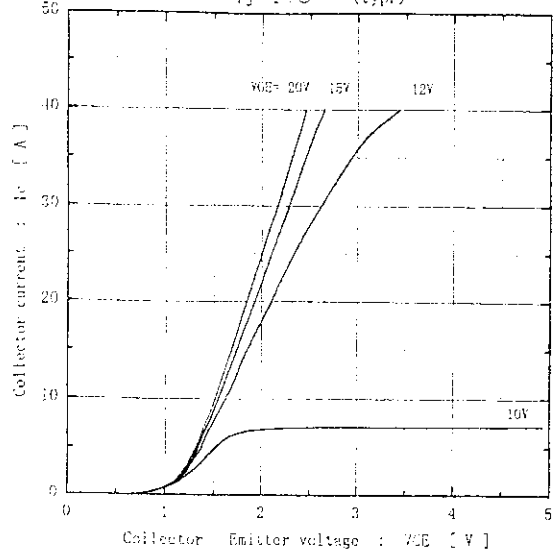


[Thermistor]
Temperature characteristic (typ.)

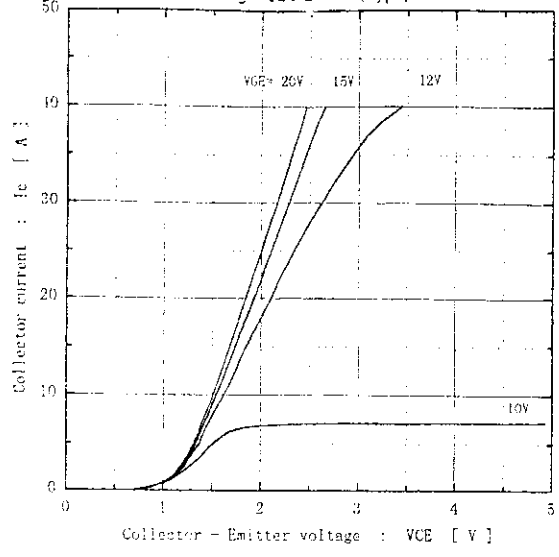


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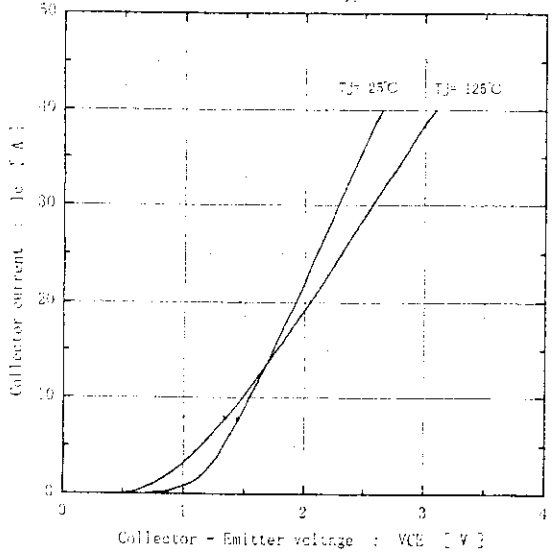
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ (typ.)



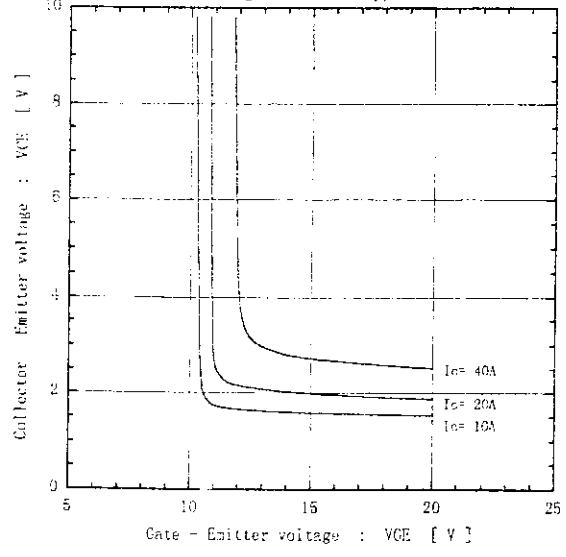
[Brake]
Collector current vs. Collector-Emitter voltage
 $T_j = 125^\circ\text{C}$ (typ.)



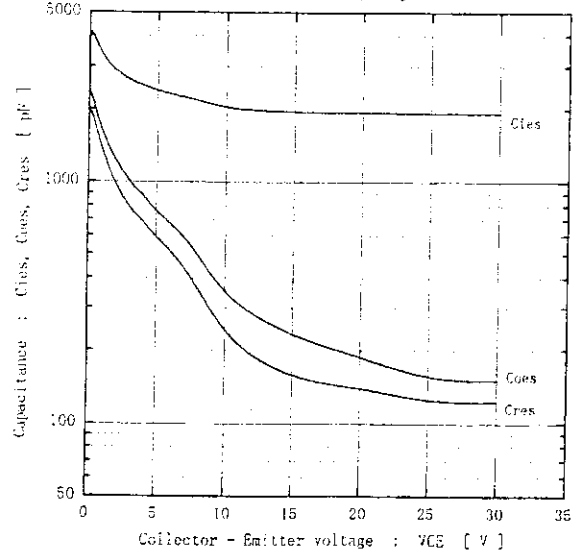
[Brake]
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ (typ.)



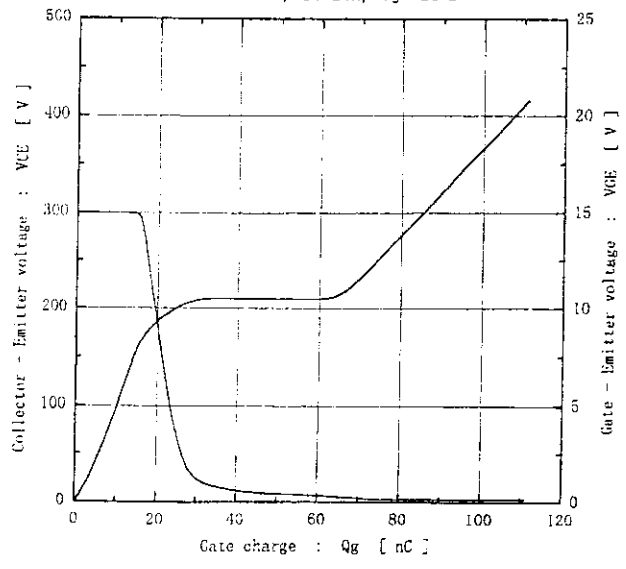
[Brake]
Collector-Emittor voltage vs. Gate-Emittor voltage
 $T_j = 25^\circ\text{C}$ (typ.)



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



[Brake]
Dynamic Gate charge (typ.)
 $V_{CC} = 300\text{V}$, $I_c = 20\text{A}$, $T_j = 25^\circ\text{C}$



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