

Messrs. Rockwell Automation

SPECIFICATION

Device Name : IGBT Module
Type Name : 7MBR10SA140E-01
Spec. No. : MS6M 0548
Date : Jun. - 02 - 2000

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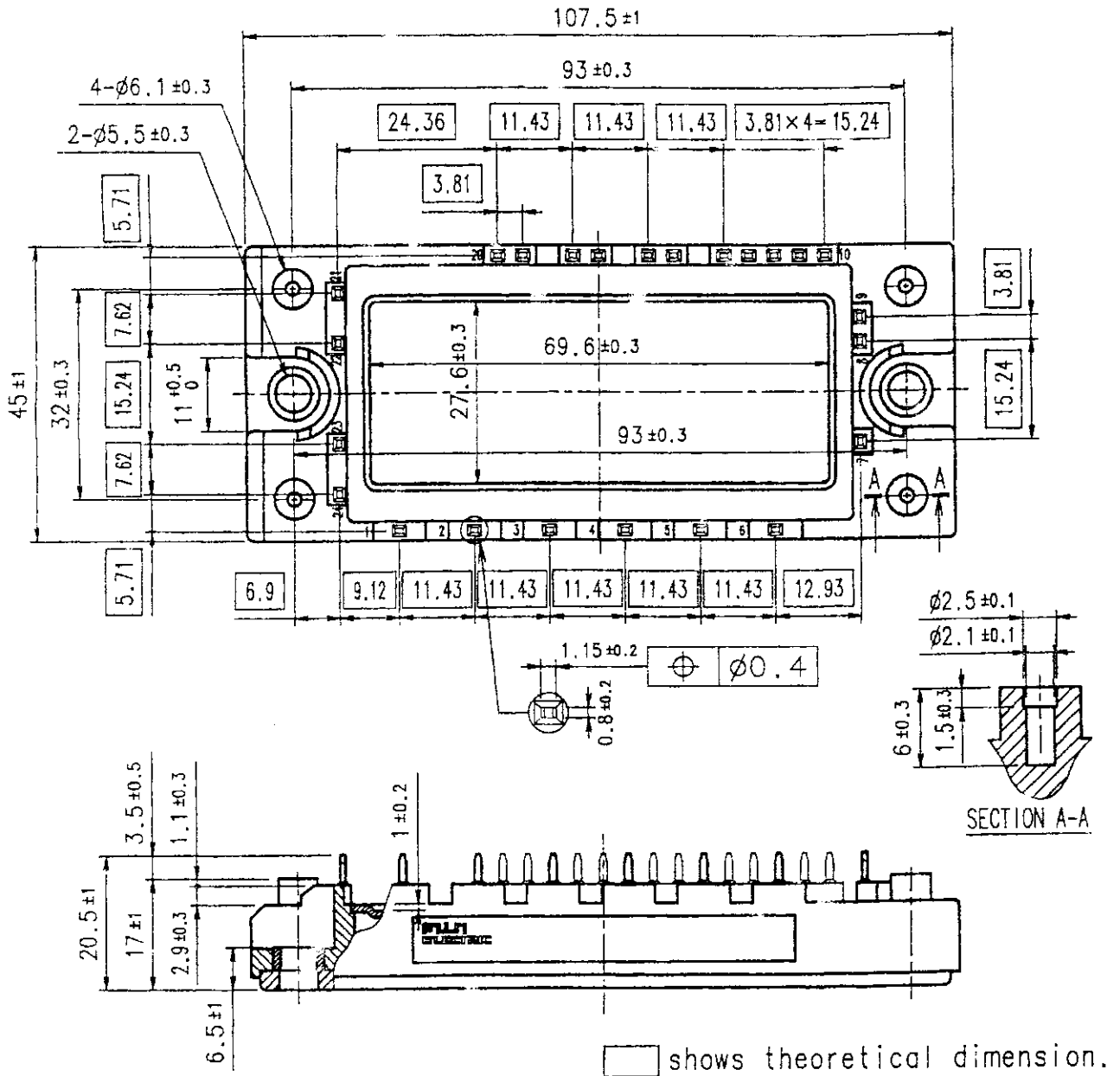
Fuji Electric Co., Ltd.
Matsumoto Factory

DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN Jun - 2 - '00	<i>F. Kobayashi</i>		DWG. NO.	MS6M 0548
CHECKED June - 2 - 00	<i>S. M. H. C.</i>	<i>T. Miyata</i>		

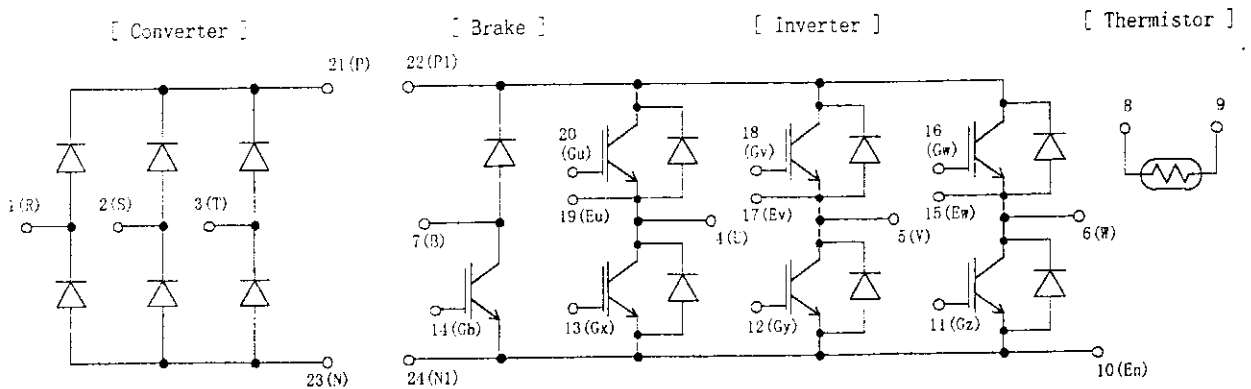
H04-004-05

7MBR10SA140E-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		1400	V	
	Gate-Emitter voltage	VGES		+20	V	
	Collector current	Ic	Continuous	Tc=25C	15	A
				Tc=75C	10	
		Icp	1ms	Tc=25C	30	A
				Tc=75C	20	
-Ic			10	A		
Collector Power Dissipation	Pc	1 device	75	W		
Brake	Collector-Emitter voltage	VCES		1400	V	
	Gate-Emitter voltage	VGES		+20	V	
	Collector current	Ic	Continuous	Tc=25C	15	A
				Tc=75C	10	
		Icp	1ms	Tc=25C	30	A
				Tc=75C	20	
Collector Power Dissipation	Pc	1 device	75	W		
Repetitive peak reverse Voltage(Diode)	VFRM		1400	V		
Converter	Repetitive peak reverse Voltage	VRRM		1600	V	
	Average Output Current	Io	50Hz/60Hz sine wave	25	A	
	Surge Current (Non-Repetitive)	IFSM	Tj=150C,10ms	260	A	
	I ² t (Non-Repetitive)	I ² t	half sine wave	338	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 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 = 10 mA	5.5	7.2	8.5	V	
	Collector-Emitter saturation voltage	VCE(sat)	VGE 15 V, chip		2.2			V
			Ic = 10 A, terminal		2.25	2.7		
	Input capacitance	Cies	VGE 0 V, VCE 10 V f = 1 MHz		1200			pF
	Turn-on time	ton	Vcc= 800 V		0.35	1.2		us
		tr	Ic = 10 A		0.25	0.6		
		tr(θ)	VGE +-15 V		0.1			
	Turn-off time	toff	RG = 120 ohm		0.45	1.0		us
tf				0.08	0.3			
Forward on voltage	VF	IF = 10 A, chip		2.4			V	
		terminal		2.45	3.3			
Reverse recovery time	trr	IF = 10 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		2.2			V
			Ic = 10 A, terminal		2.3	2.7		
	Turn-on time	ton	Vcc= 800 V		0.35	1.2		us
		tr	Ic = 10 A		0.25	0.6		
	Turn-off time	toff	VGE +-15 V		0.45	1.0		us
tf		RG = 120 ohm		0.08	0.3			
Reverse current	IRRM	VR = 1400 V				1.0	mA	
Converter	Forward on voltage	VFM	IF = 10 A, chip		1.0		V	
			terminal		1.1	1.5		
Reverse current	IRRM	VR = 1600 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	

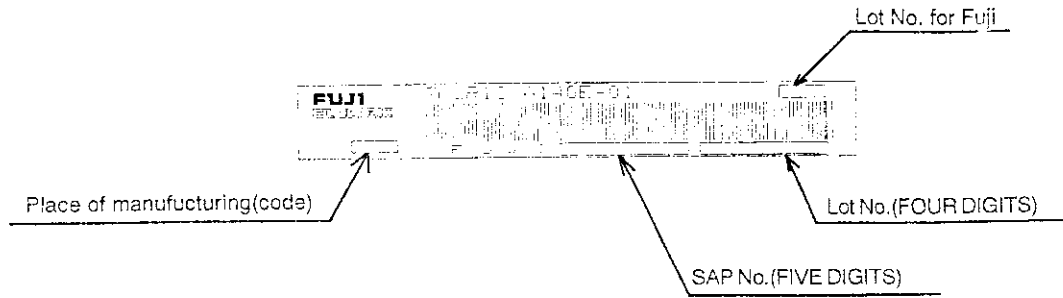
5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			1.67	C/W
		Inverter FWD			2.78	
		Brake IGBT			1.67	
		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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6. Indication on module



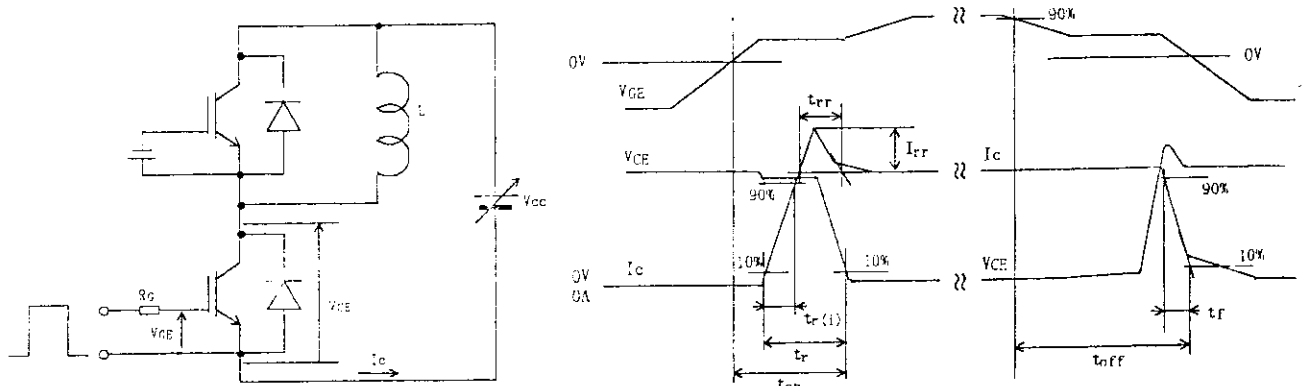
7. Applicable category

This specification is applied to Power Integrated Module named 7MBR10SA140E-01 .

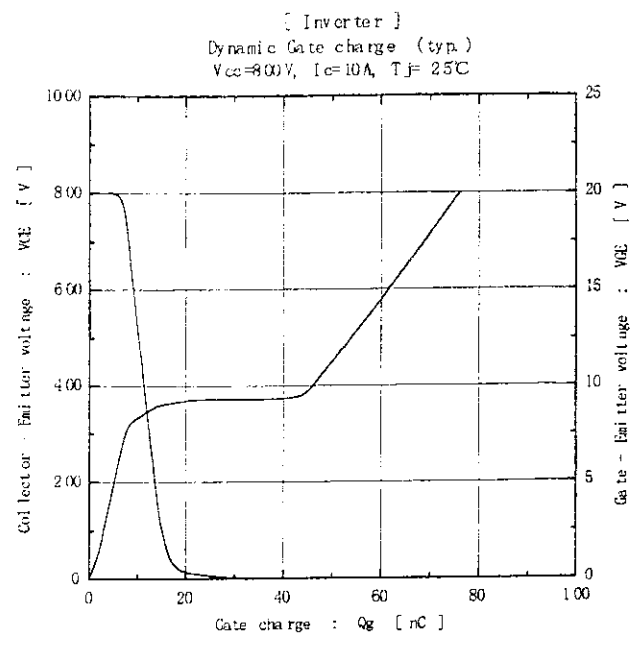
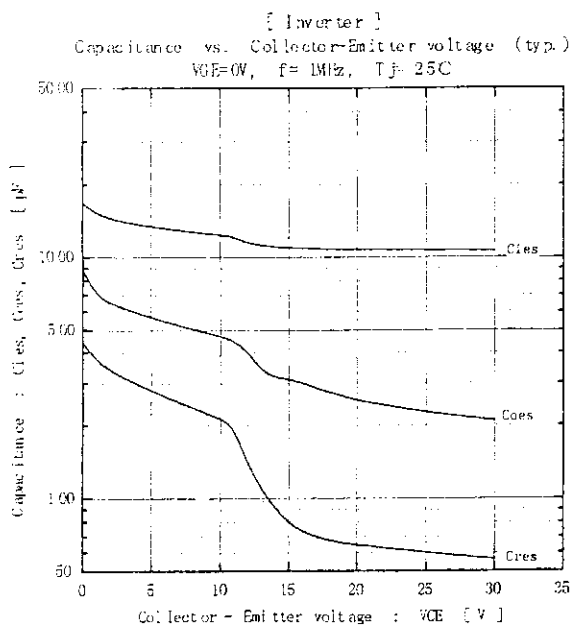
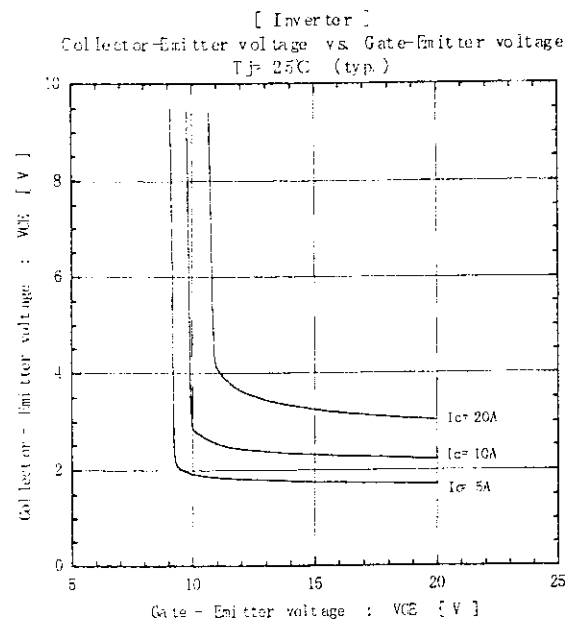
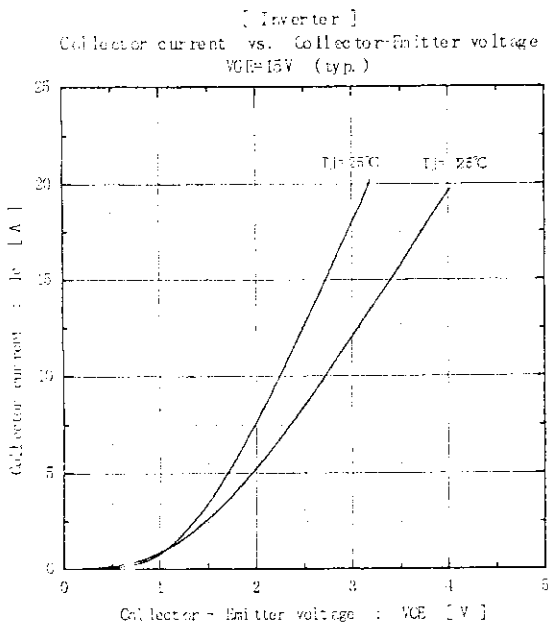
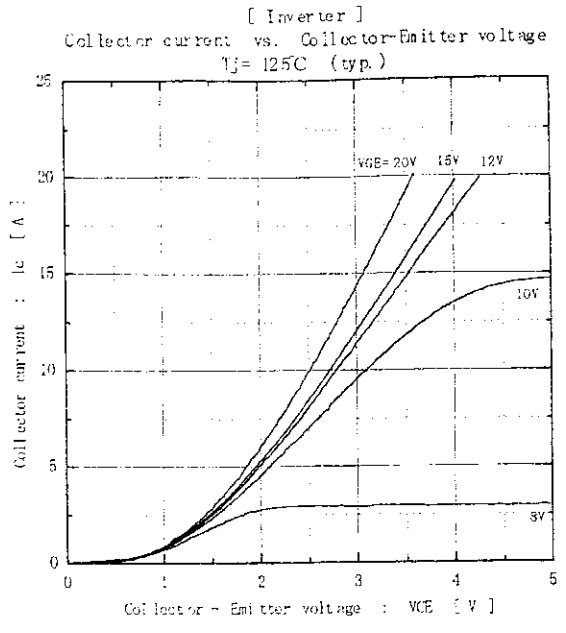
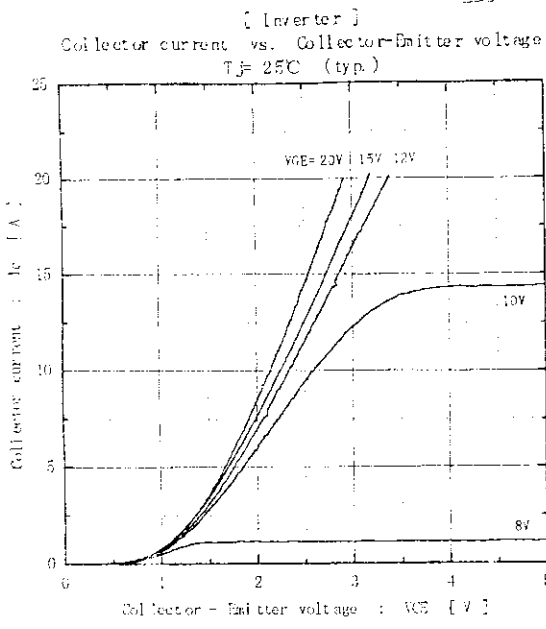
8. Storage and transportation notes (保管・運搬上の注意事項)

- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
- 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.

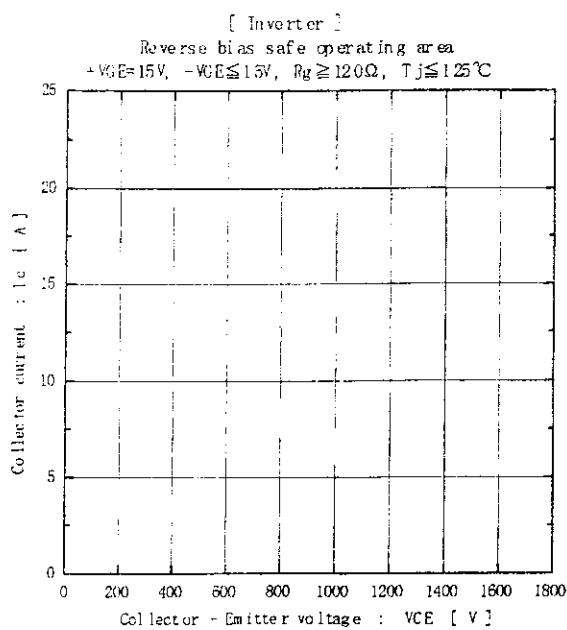
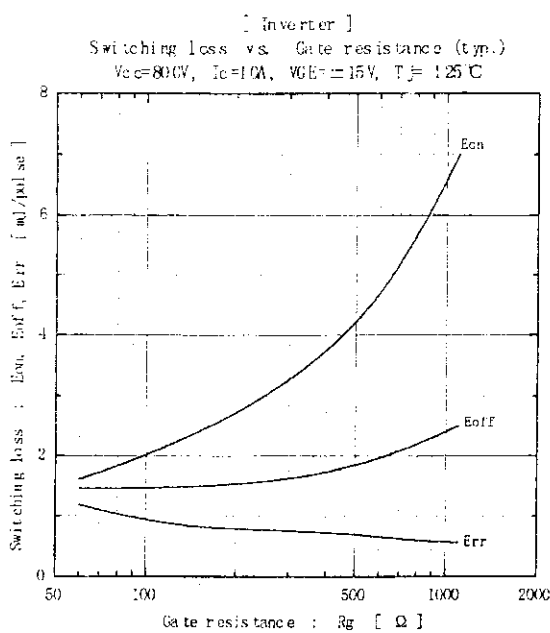
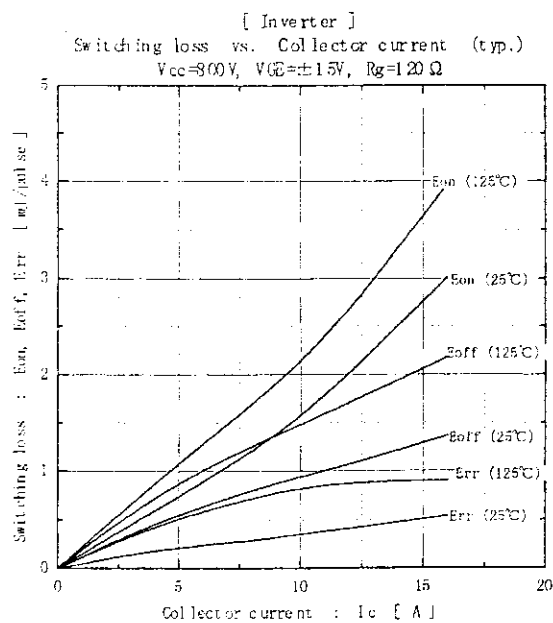
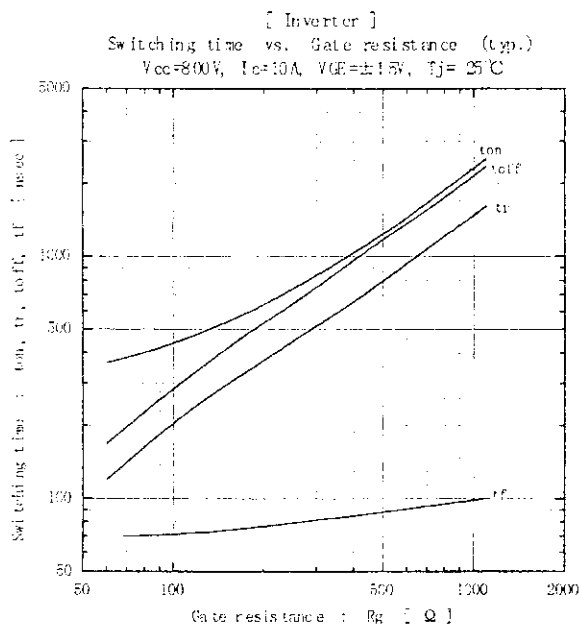
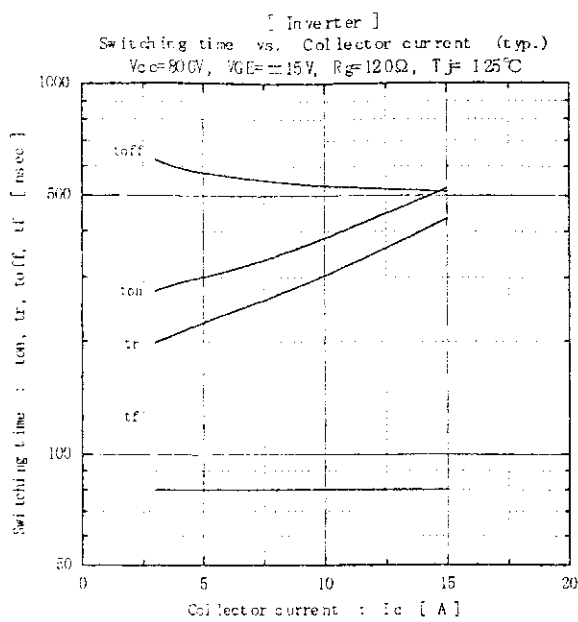
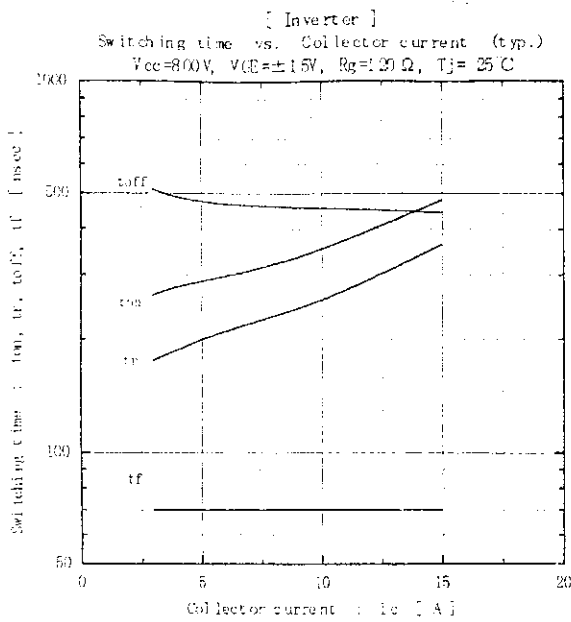
9. Definitions of switching time



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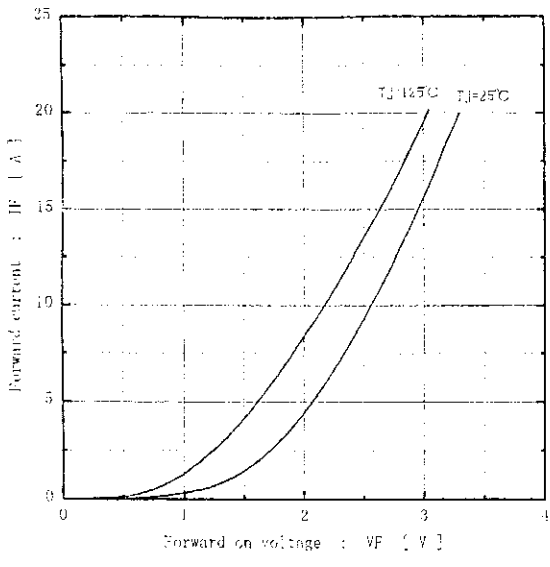
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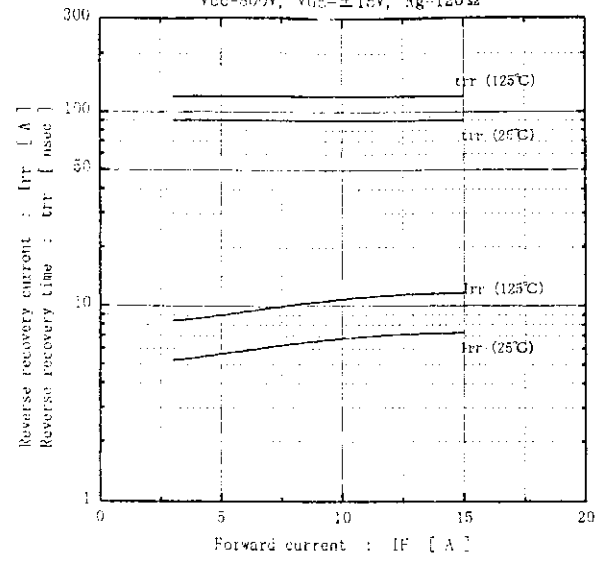
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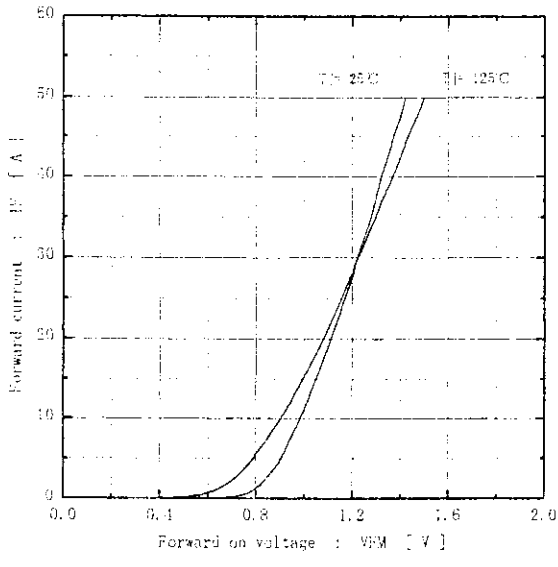
[Inverter]
Forward current vs. Forward on voltage (typ.)



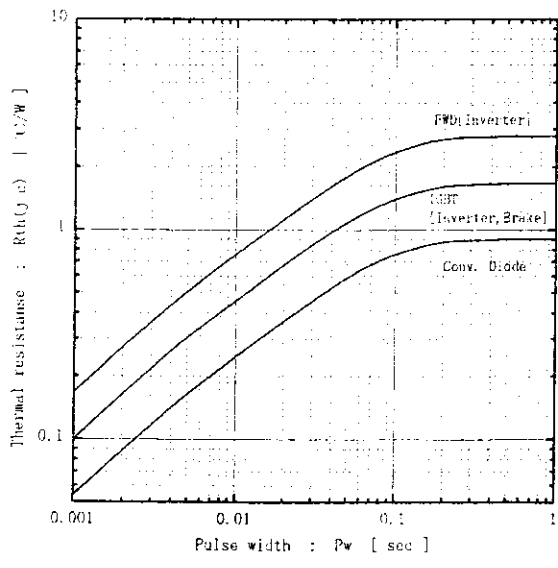
[Inverter]
Reverse recovery characteristics (typ.)
V_{CC}=800V, V_{GE}=±15V, R_G=120Ω



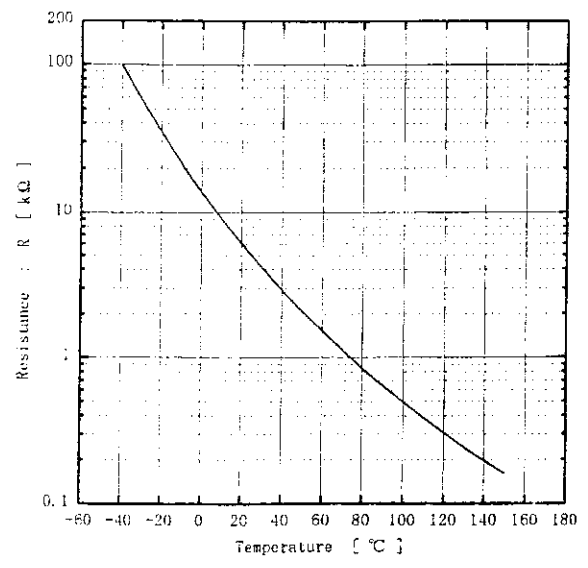
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



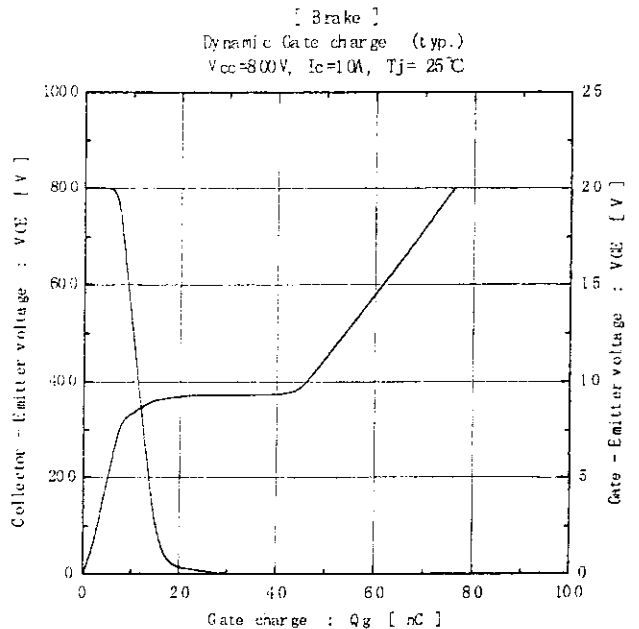
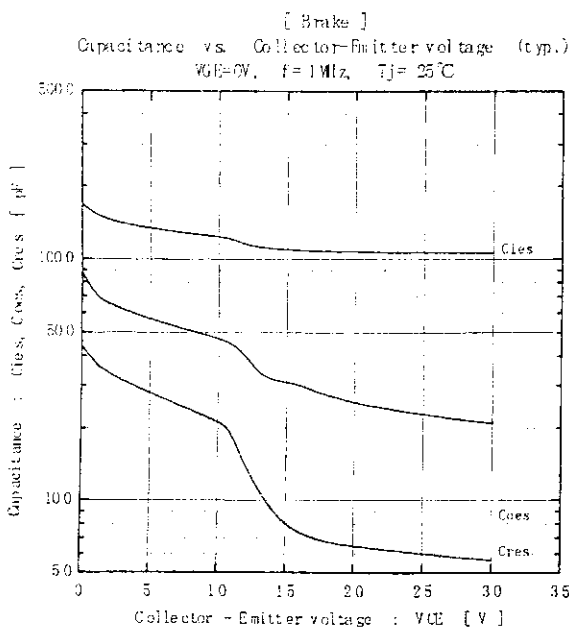
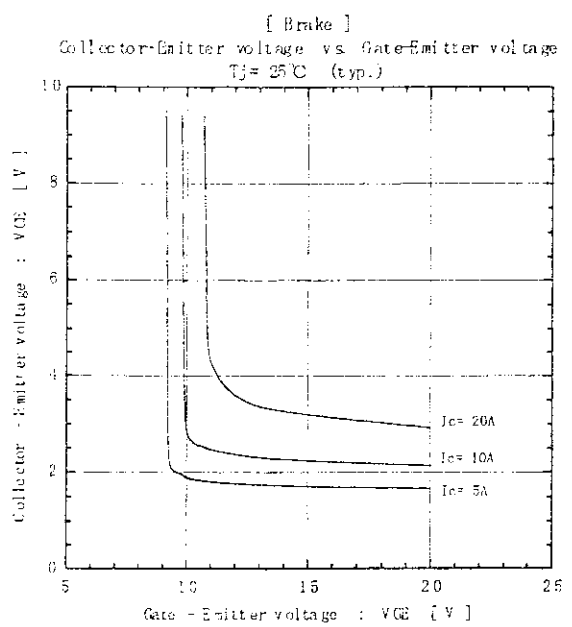
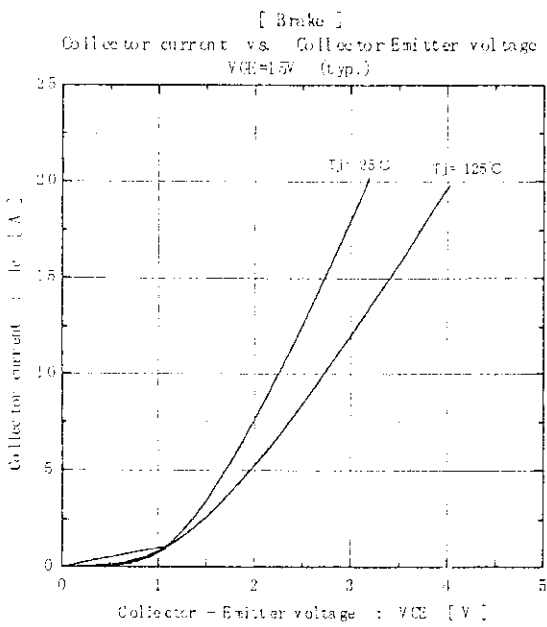
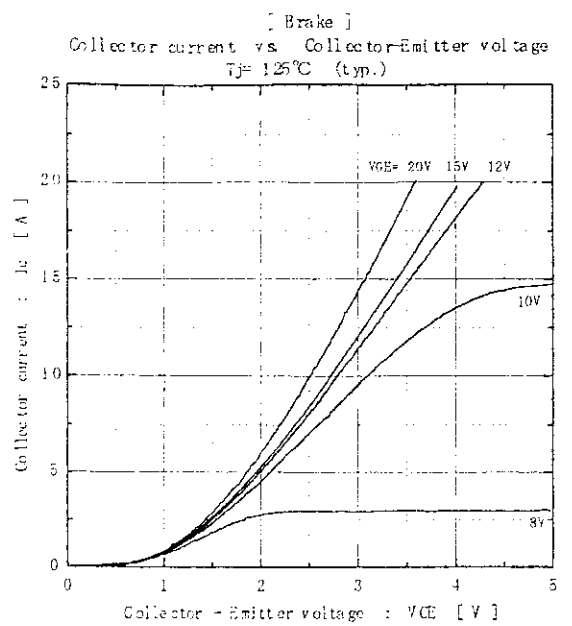
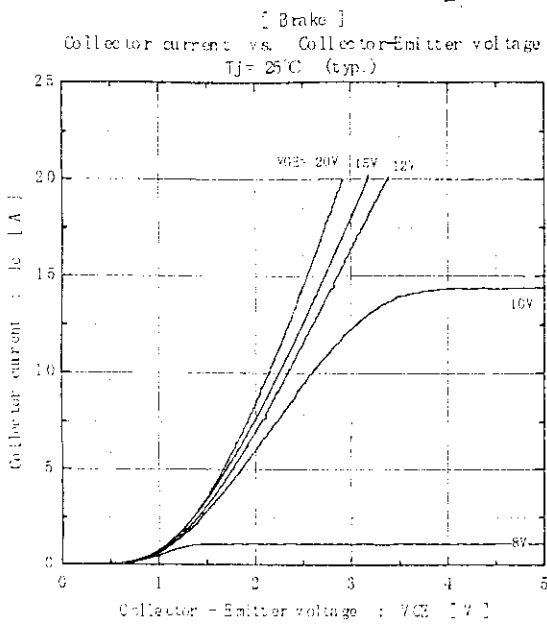
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