

# SPECIFICATION

Device Name : IGBT Module

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Type Name : 6MBI100S-140-01

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Spec. No. : MS5F 4850

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Date : Jun. - 02 - 2000

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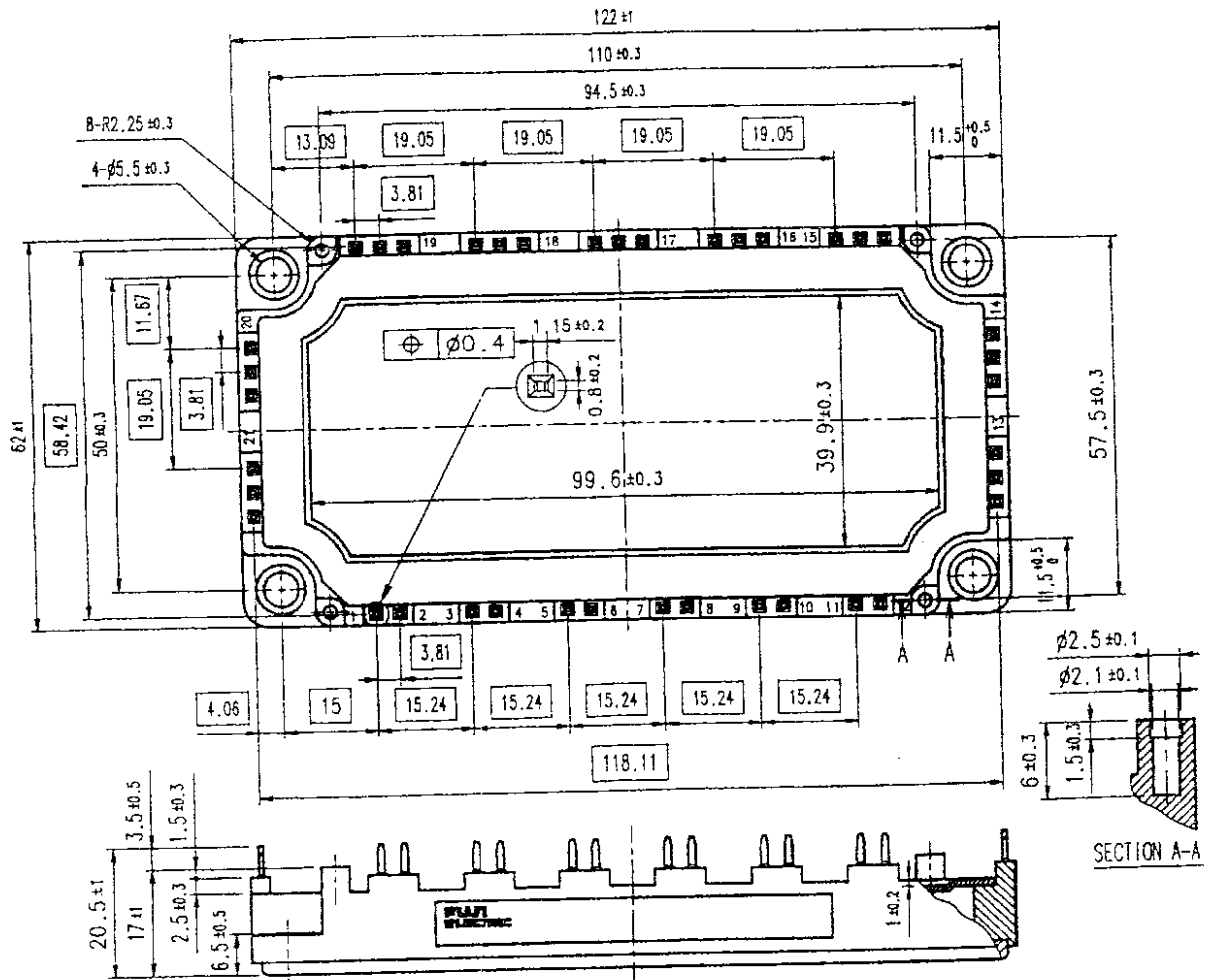
Fuji Electric Co., Ltd.  
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co., Ltd.		
DRAWN	Jun. - 2 - '00	<i>T. Kobayashi</i>		DWG. NO.	MS5F 4850	1 / 8
CHECKED	June - 2 - 00	<i>S. Nishida</i>	<i>T. Kobayashi</i>			

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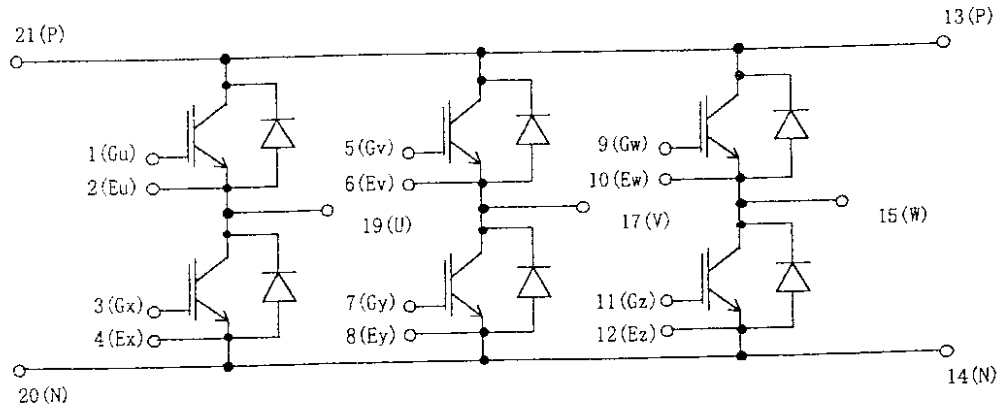
1. Outline Drawing ( Unit : mm )



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□ shows theoretical dimension.

2. Equivalent circuit



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

Items	Symbols	Conditions	Maximum Ratings		Units
Collector-Emitter voltage	V <sub>CES</sub>		1400		V
Gate-Emitter voltage	V <sub>GES</sub>		+20		V
Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =25C	150	A
			T <sub>c</sub> =75C	100	
	I <sub>c</sub> pulse	1ms	T <sub>c</sub> =25C	300	
			T <sub>c</sub> =75C	200	
	-I <sub>c</sub>			100	
-I <sub>c</sub> pulse	1ms		200		
Collector Power Dissipation	P <sub>c</sub>	1 device	700		W
Junction temperature	T <sub>j</sub>		150		C
Storage temperature	T <sub>stg</sub>		-40~ +125		C
Isolation voltage <sup>(*)</sup>	Viso	AC : 1min.	2500		V
Mounting Screw Torque <sup>(*)</sup>			3.5		Nm

(\*1) All terminals should be connected together when isolation test will be done.

(\*2) Recommendable Value : 2.5~3.5 Nm (M5)

4. Electrical characteristics ( at Tj= 25C unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Zero gate voltage Collector current	ICES	V <sub>GE</sub> 0 V, V <sub>CE</sub> 1400 V			1.0	mA
Gate-Emitter leakage current	IGES	V <sub>CE</sub> 0 V, V <sub>GE</sub> +20 V			200	nA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> 20 V, I <sub>c</sub> = 100 mA	5.5	7.2	8.5	V
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	V <sub>GE</sub> 15 V, I <sub>c</sub> = 100 A	T <sub>j</sub> = 25 C	2.4	2.7	V
			T <sub>j</sub> = 125 C		3.0	
Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> 0 V			12000	pF
Output capacitance	C <sub>oes</sub>	V <sub>CE</sub> 10 V			2500	
Reverse transfer capacitance	C <sub>res</sub>	f = 1 MHz			2200	
Turn-on time	t <sub>on</sub>	V <sub>cc</sub> = 800 V		0.35	1.2	us
	t <sub>r</sub>	I <sub>c</sub> = 100 A		0.25	0.6	
	t <sub>r(0)</sub>	V <sub>GE</sub> +15 V		0.1		
Turn-off time	t <sub>off</sub>	R <sub>G</sub> = 12 ohm		0.45	1.0	us
	t <sub>f</sub>			0.08	0.3	
Forward on voltage	V <sub>F</sub>	I <sub>F</sub> = 100 A	T <sub>j</sub> = 25 C	2.6	3.4	V
			T <sub>j</sub> = 125 C	2.2		
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 100 A			0.35	us

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	R <sub>th(j-c)</sub>	IGBT			0.18	C/W
		FWD			0.36	
Contact Thermal resistance	R <sub>th(c-f)</sub>	with Thermal Compound <sup>(*)</sup>		0.05		

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

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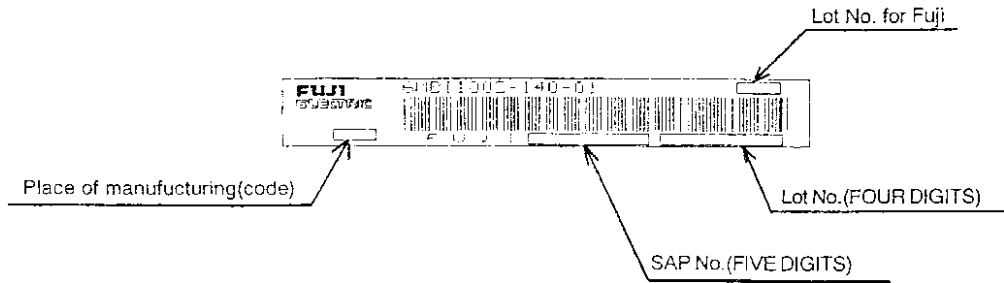
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6. Indication on module



7. Applicable category

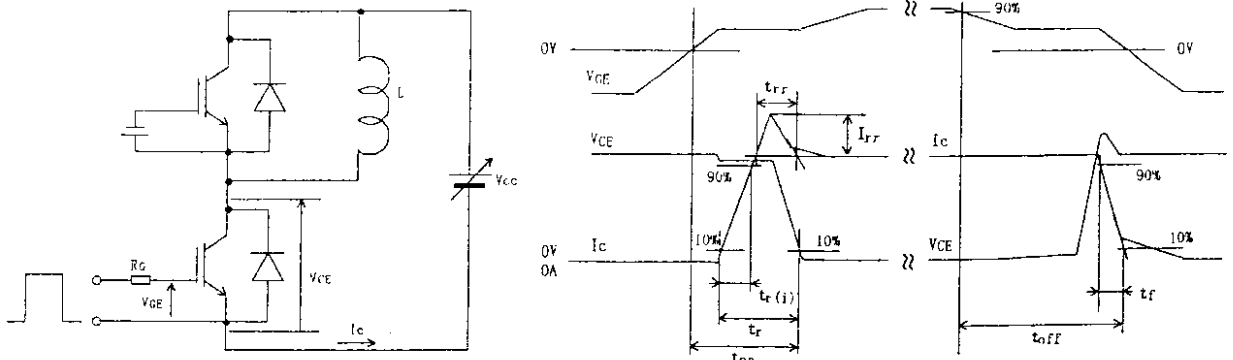
This specification is applied to IGBT Module named 6MBI100S-140-01.

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.

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9. Definitions of switching time



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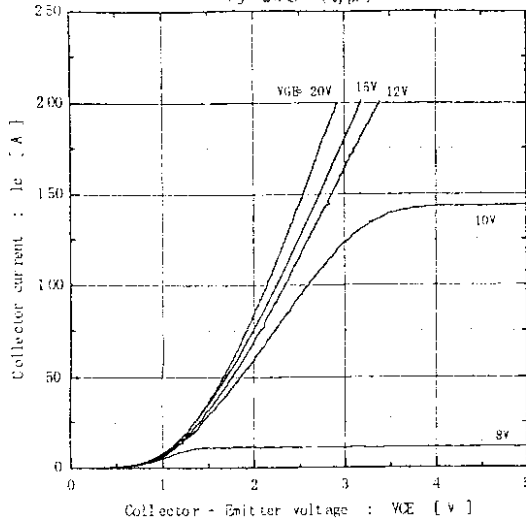
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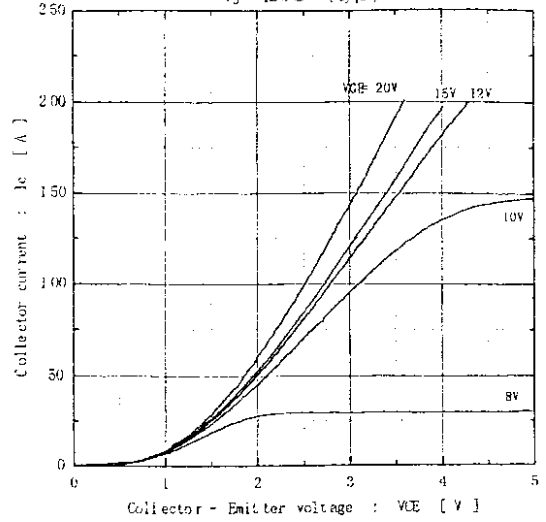
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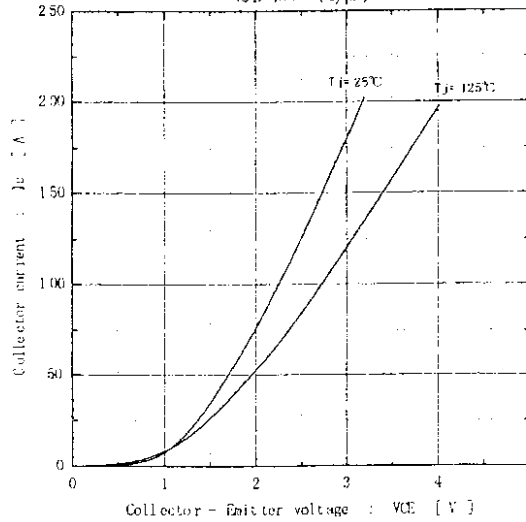
Collector current vs. Collector-Emitter voltage  
Tj= 25°C (typ.)



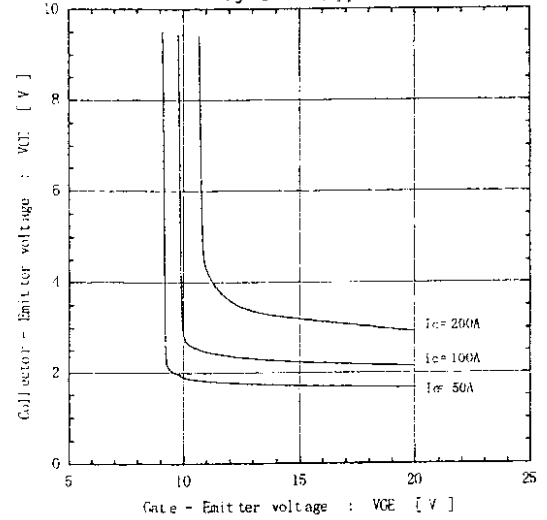
Collector current vs. Collector-Emitter voltage  
Tj= 125°C (typ.)



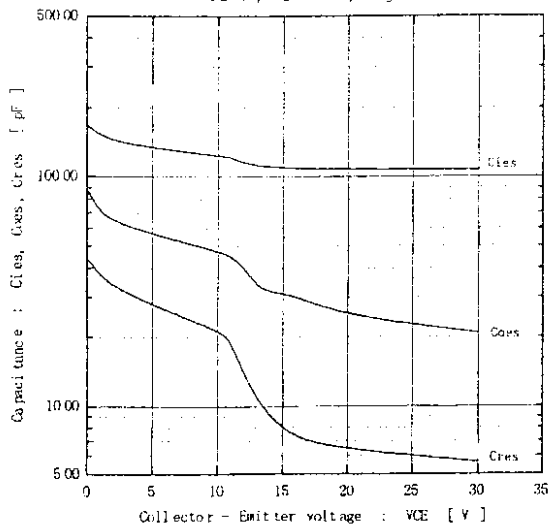
Collector current vs. Collector-Emitter voltage  
VGE=15V (typ.)



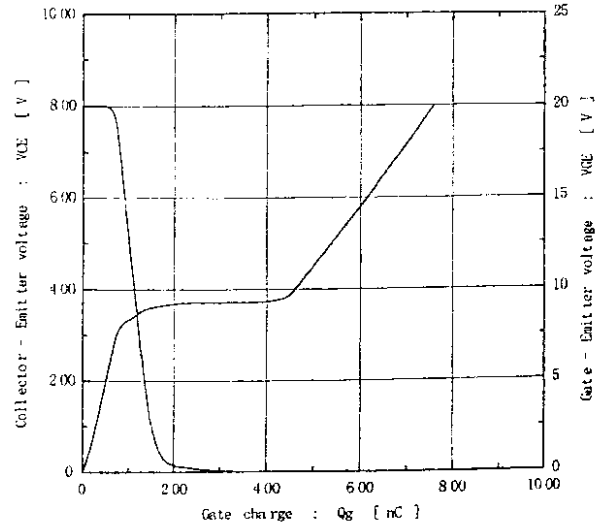
Collector-Emitter voltage vs. Gate-Emitter voltage  
Tj= 25°C (typ.)



Capacitance vs. Collector-Emitter voltage (typ.)  
VGE=0V, f=1MHz, Tj= 25°C



Dynamic Gate charge (typ.)  
Vce=800V, Ic=100A, Tj= 25°C



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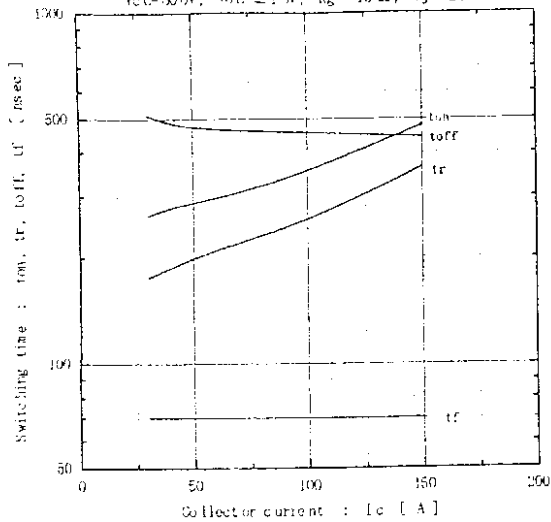
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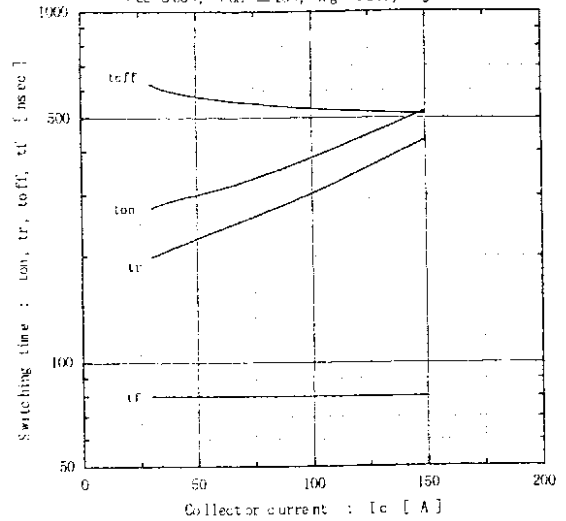
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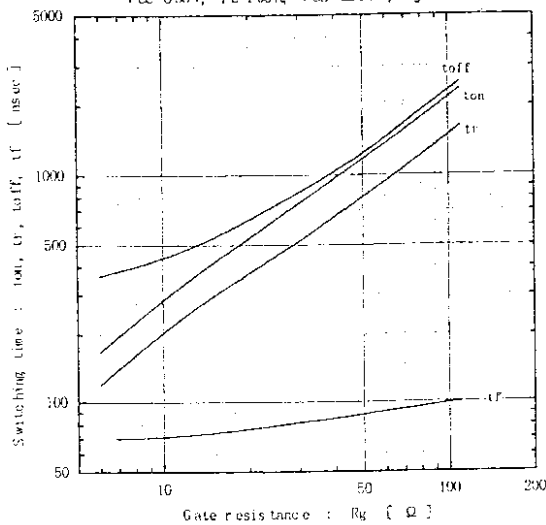
Switching time vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$ ,  $T_j=25^\circ C$



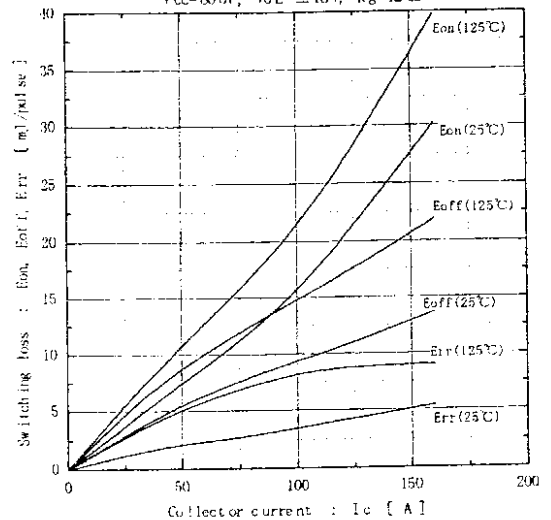
Switching time vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$ ,  $T_j=125^\circ C$



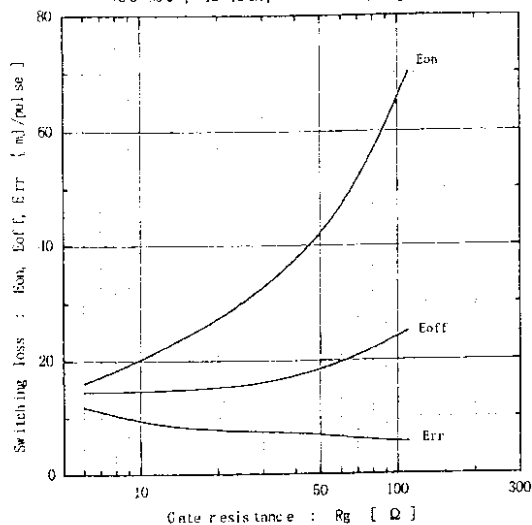
Switching time vs. Gate resistance (typ.)  
 $V_{CC}=800V$ ,  $I_c=100A$ ,  $V_{GE}=\pm 15V$ ,  $T_j=25^\circ C$



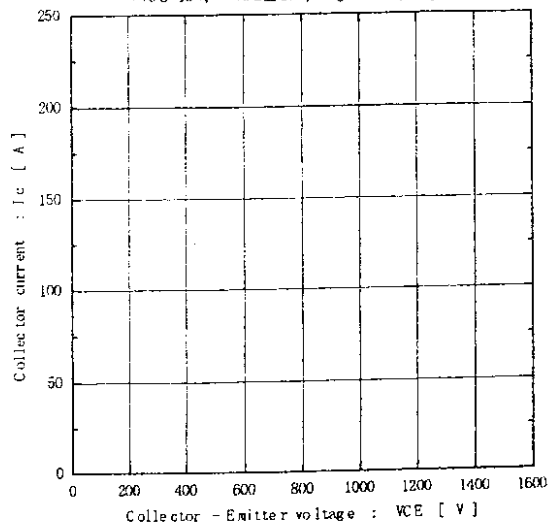
Switching loss vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$



Switching loss vs. Gate resistance (typ.)  
 $V_{CC}=800V$ ,  $I_c=100A$ ,  $V_{GE}=\pm 15V$ ,  $T_j=125^\circ C$



Reverse bias safe operating area  
 $+V_{GE}=15V$ ,  $-V_{GE}\le 15V$ ,  $R_g\ge 12\Omega$ ,  $T_j\le 125^\circ C$



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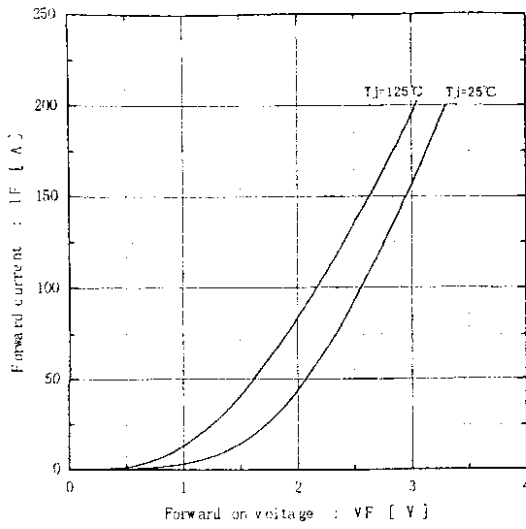
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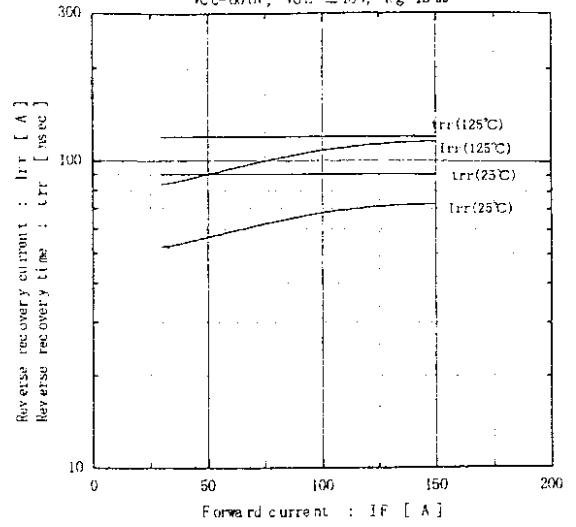
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Forward current vs. Forward on voltage (Typ.)

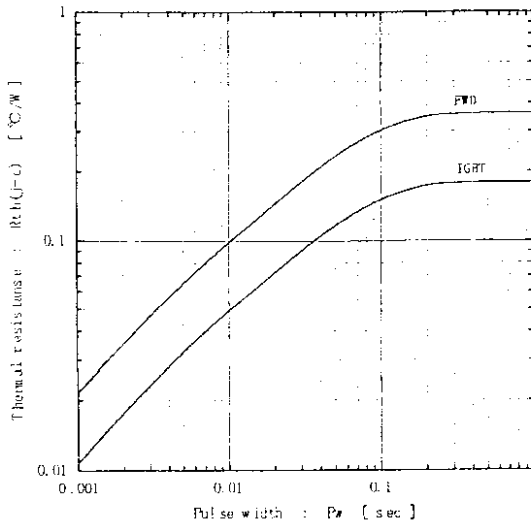


Reverse recovery characteristics (typ.)

$V_{CE} = 800V$ ,  $V_{CE} = \pm 15V$ ,  $R_g = 12\Omega$



Transient thermal resistance



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