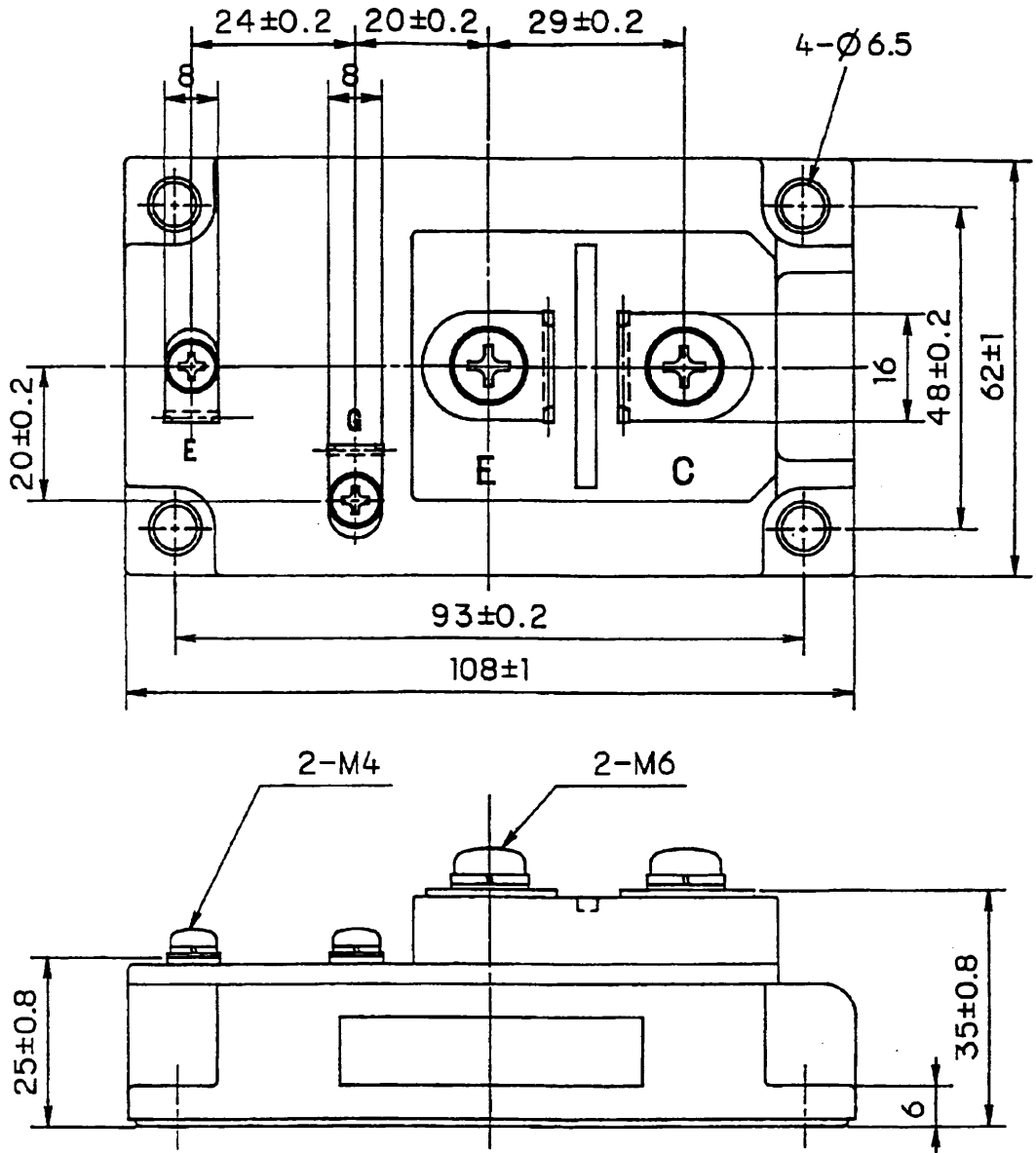
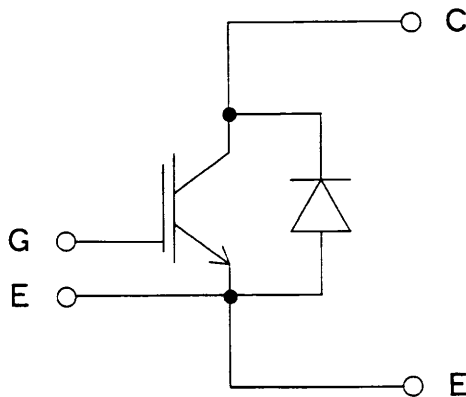


Target Specification of 1MBI400S-120

1. Outline Drawing ( Unit : mm )



2. Equivalent circuit



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DATE	NAME	APPROVED
DRAWN Feb-11-99	N. Arikawa	
CHECKED Feb-11-99	S. Miyata	
		T. Miyazaki

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

Items	Symbols	Conditions	Maximum Ratings		Units
Collector-Emitter voltage	V <sub>CE</sub> S		1200		V
Gate-Emitter voltage	V <sub>GE</sub> S		±20		V
Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =25°C	600	A
			T <sub>c</sub> =80°C	400	
	I <sub>c</sub> pulse	1ms	T <sub>c</sub> =25°C	1200	
			T <sub>c</sub> =80°C	800	
	-I <sub>c</sub>			400	
-I <sub>c</sub> pulse	1ms		800		
Collector Power Dissipation	P <sub>c</sub>	1 device	2500		W
Junction temperature	T <sub>j</sub>		150		°C
Storage temperature	T <sub>stg</sub>		-40 ~ +125		°C
Isolation voltage <sup>(#1)</sup>	Viso	AC : 1min.	2500		V
Screw Torque	Mounting <sup>(#2)</sup>		3.5		N · m
	Terminals <sup>(#3)</sup>		4.5		
	Terminals <sup>(#4)</sup>		1.7		

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

(\*2) Recommendable Value : 2.5 ~ 3.5 N · m (M5) or (M6)

(\*3) Recommendable Value : 3.5 ~ 4.5 N · m (M6)

(\*4) Recommendable Value : 1.3 ~ 1.7 N · m (M4)

4. Electrical characteristics ( at Tj= 25°C 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> = 1200 V			4.0	mA
Gate-Emitter leakage current	IGES	V <sub>CE</sub> = 0 V, V <sub>GE</sub> = ±20 V			0.8	μA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> = 20 V, I <sub>c</sub> = 400 mA	5.5	7.2	8.5	V
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	V <sub>GE</sub> = 15 V, T <sub>j</sub> = 25 °C		2.3	2.6	V
		I <sub>c</sub> = 400 A, T <sub>j</sub> = 125 °C		2.8		
Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> = 0 V		48000		pF
Output capacitance	C <sub>oes</sub>	V <sub>CE</sub> = 10 V		10000		
Reverse transfer capacitance	C <sub>res</sub>	f = 1 MHz		8800		
Turn-on time	t <sub>on</sub>	V <sub>cc</sub> = 600 V			1.2	μs
	t <sub>r</sub>	I <sub>c</sub> = 400 A			0.6	
	t <sub>r(i)</sub>	V <sub>GE</sub> = ±15 V		0.1		
Turn-off time	t <sub>off</sub>	RG = 1.8 Ω			1.0	μs
	t <sub>f</sub>			0.08	0.3	
Forward on voltage	V <sub>F</sub>	I <sub>F</sub> = 400 A, T <sub>j</sub> = 25 °C		2.4	3.3	V
		T <sub>j</sub> = 125 °C		2.0		
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 400 A			0.35	μs

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	Max.	
Thermal resistance (1 device)	R <sub>th(j-c)</sub>	IGBT			0.050	°C/W
		FWD			0.160	
Contact Thermal resistance	R <sub>th(c-f)</sub>	with Thermal Compound (※)		0.0125		

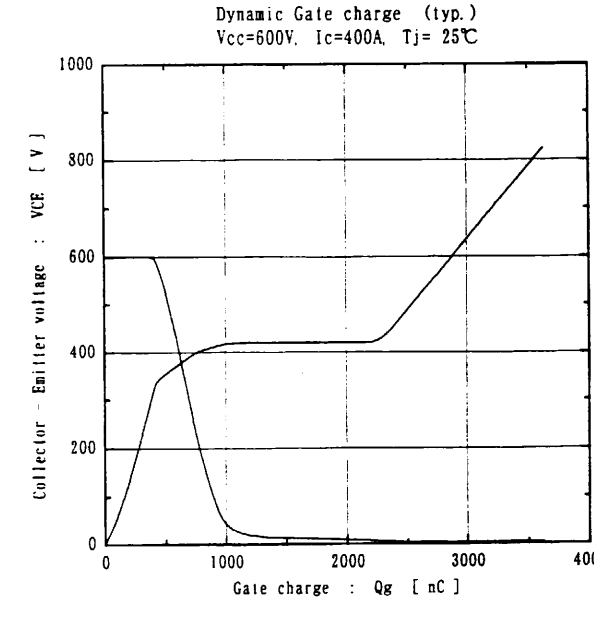
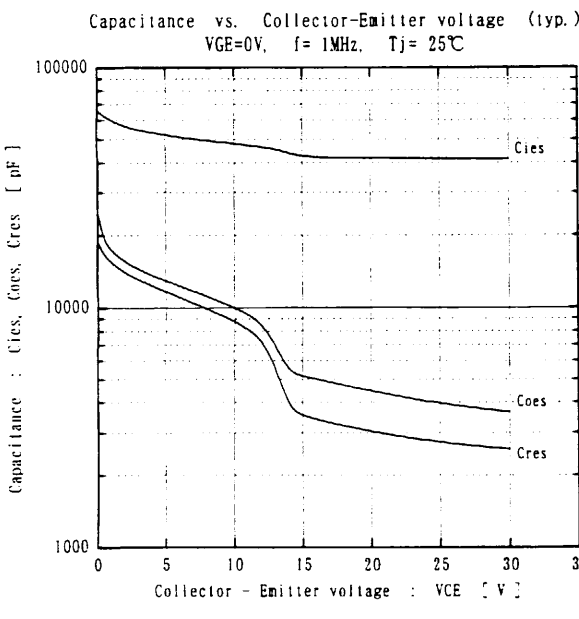
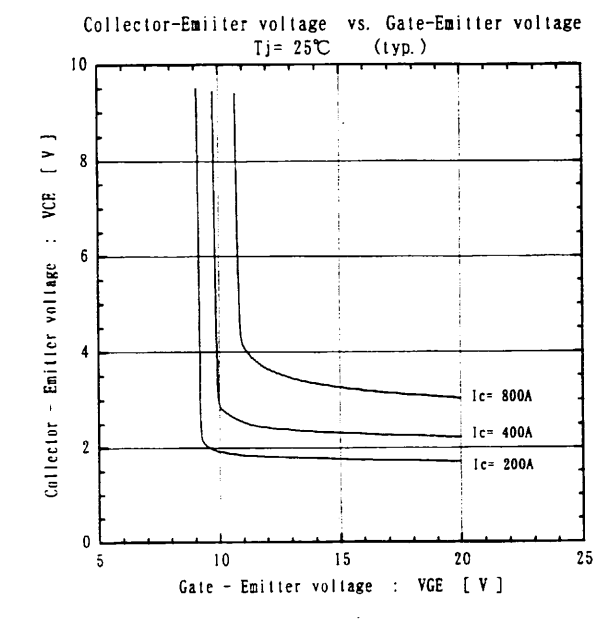
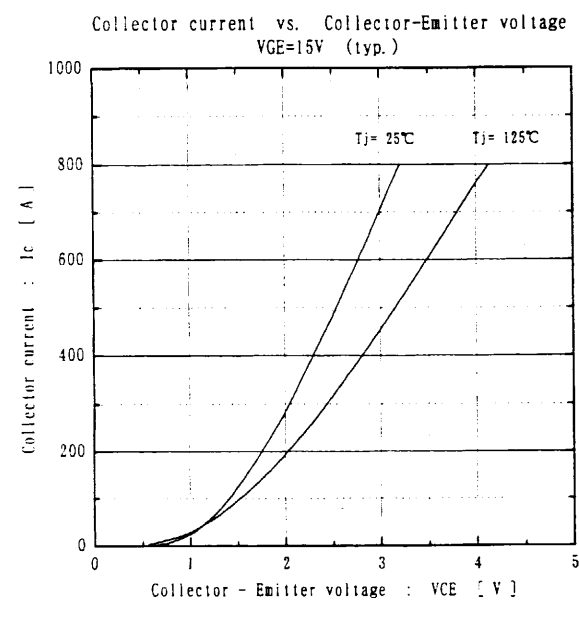
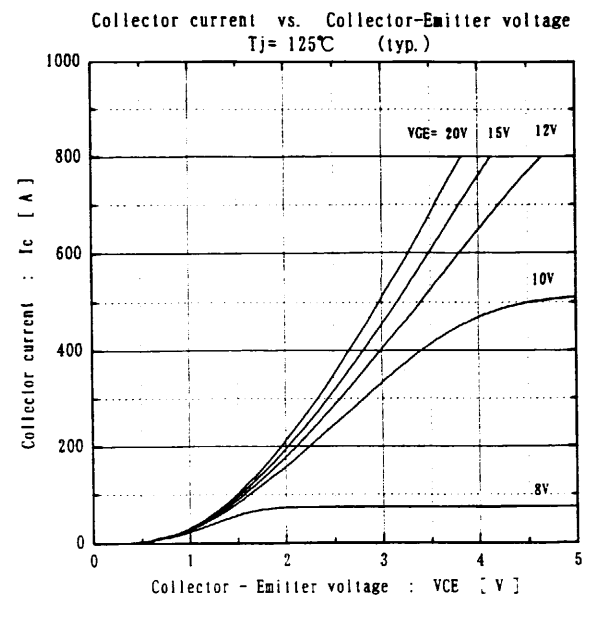
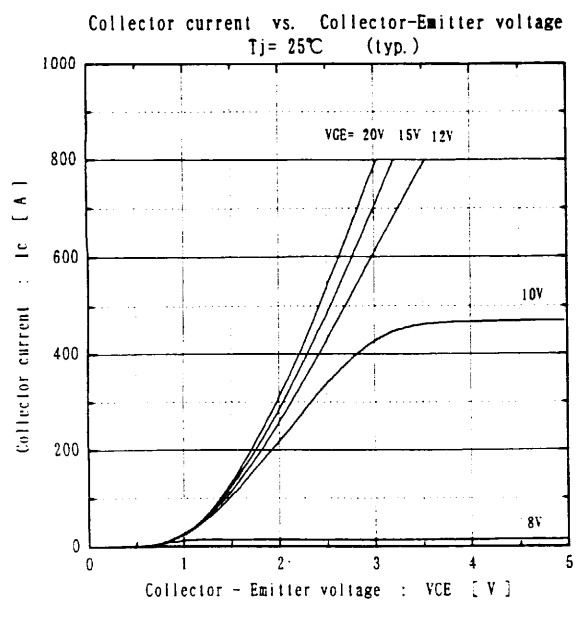
※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

Note :

- This specification is only for technical considerations, and not for contract.
- This specification is subject to be changed without notices.

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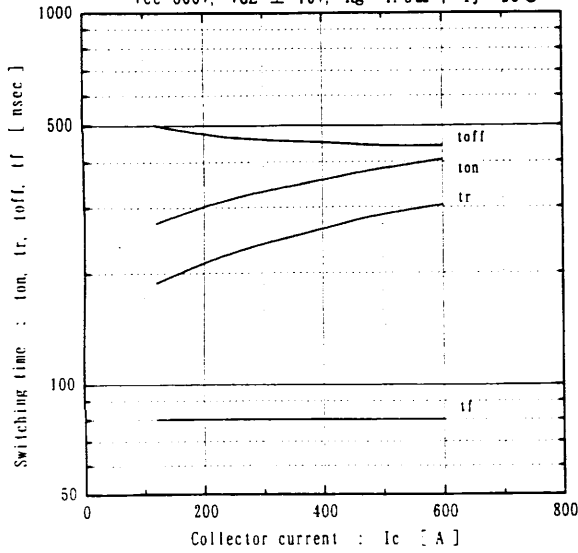
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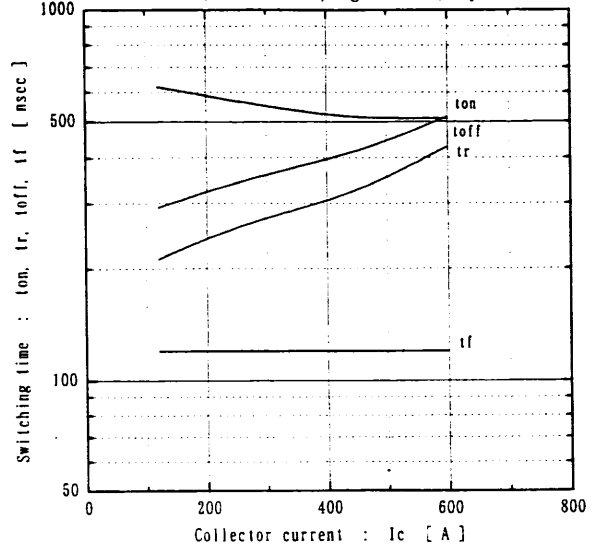
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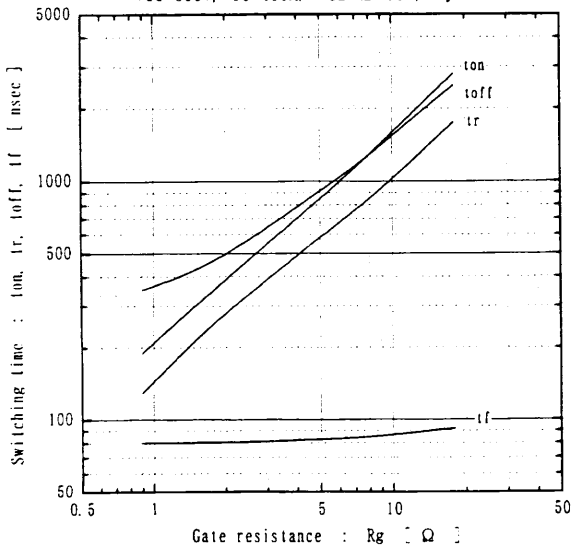
Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega, T_j=25^\circ C$



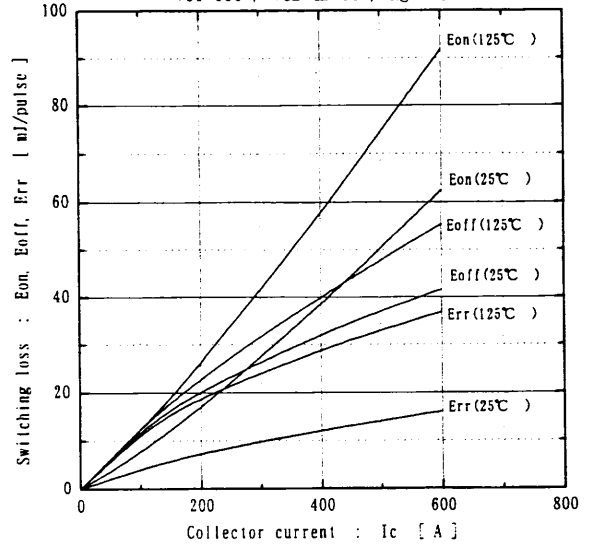
Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega, T_j=125^\circ C$



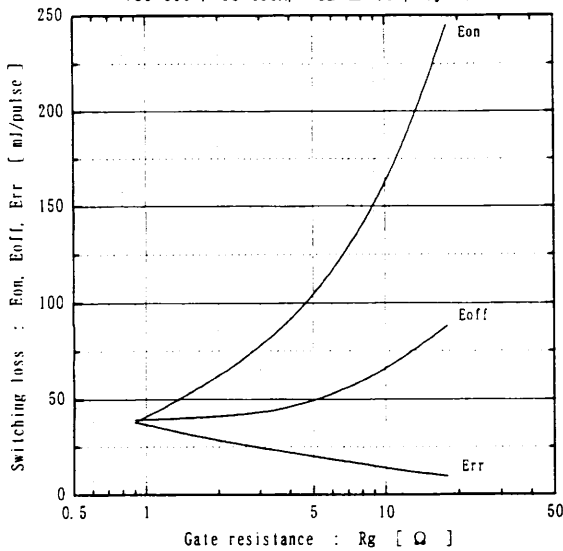
Switching time vs. Gate resistance (typ.)  
 $V_{cc}=600V, I_c=400A, V_{GE}=\pm 15V, T_j=25^\circ C$



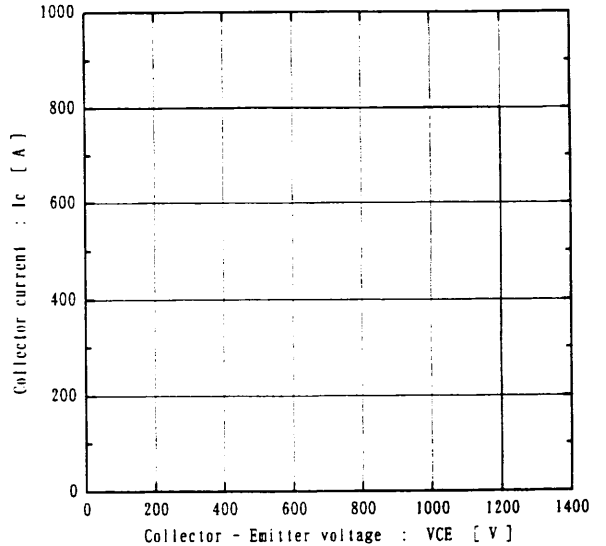
Switching loss vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega$



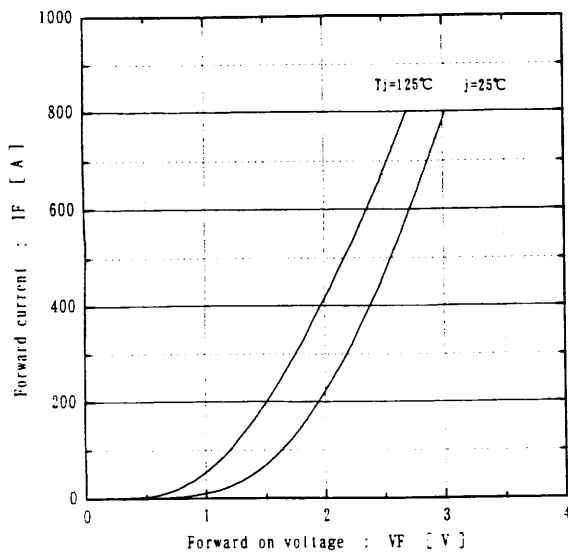
Switching loss vs. Gate resistance (typ.)  
 $V_{cc}=600V, I_c=400A, V_{GE}=\pm 15V, T_j=125^\circ C$



Reverse bias safe operating area  
 $+V_{GE}=15V, -V_{GE}\leq 15V, R_g\geq 1.8\Omega, T_j\leq 125^\circ C$

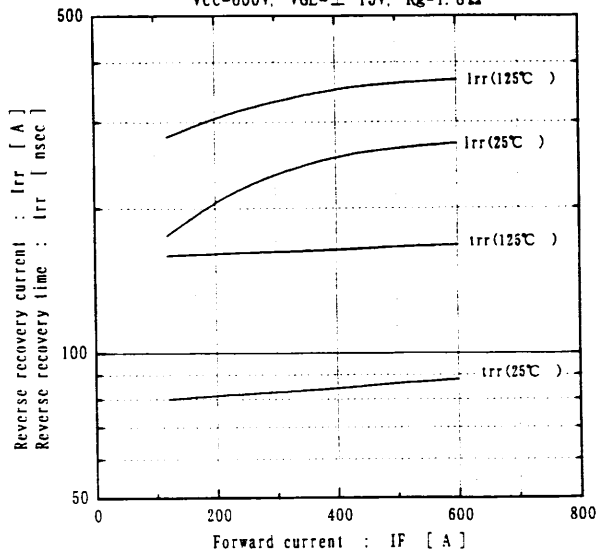


Forward current vs. Forward on voltage (typ.)

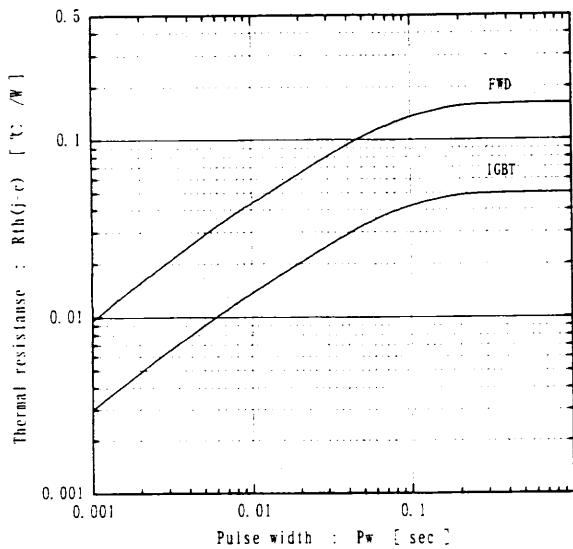


Reverse recovery characteristics (typ.)

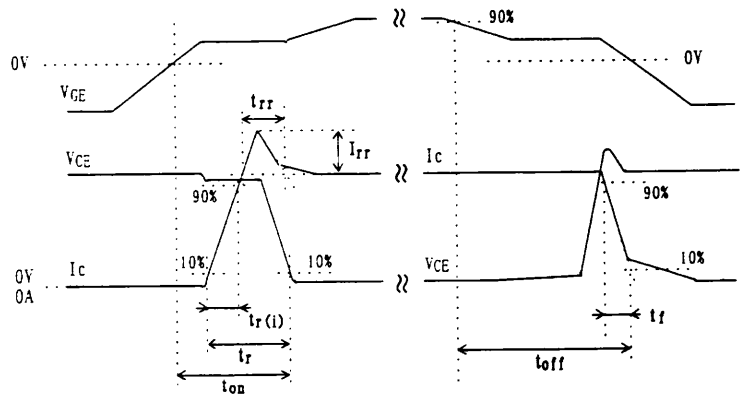
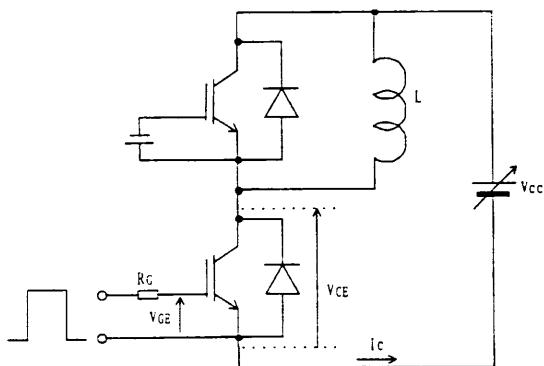
Vcc=600V, VGE=± 15V, Rg=1.8Ω



Transient thermal resistance



Definitions of switching time



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