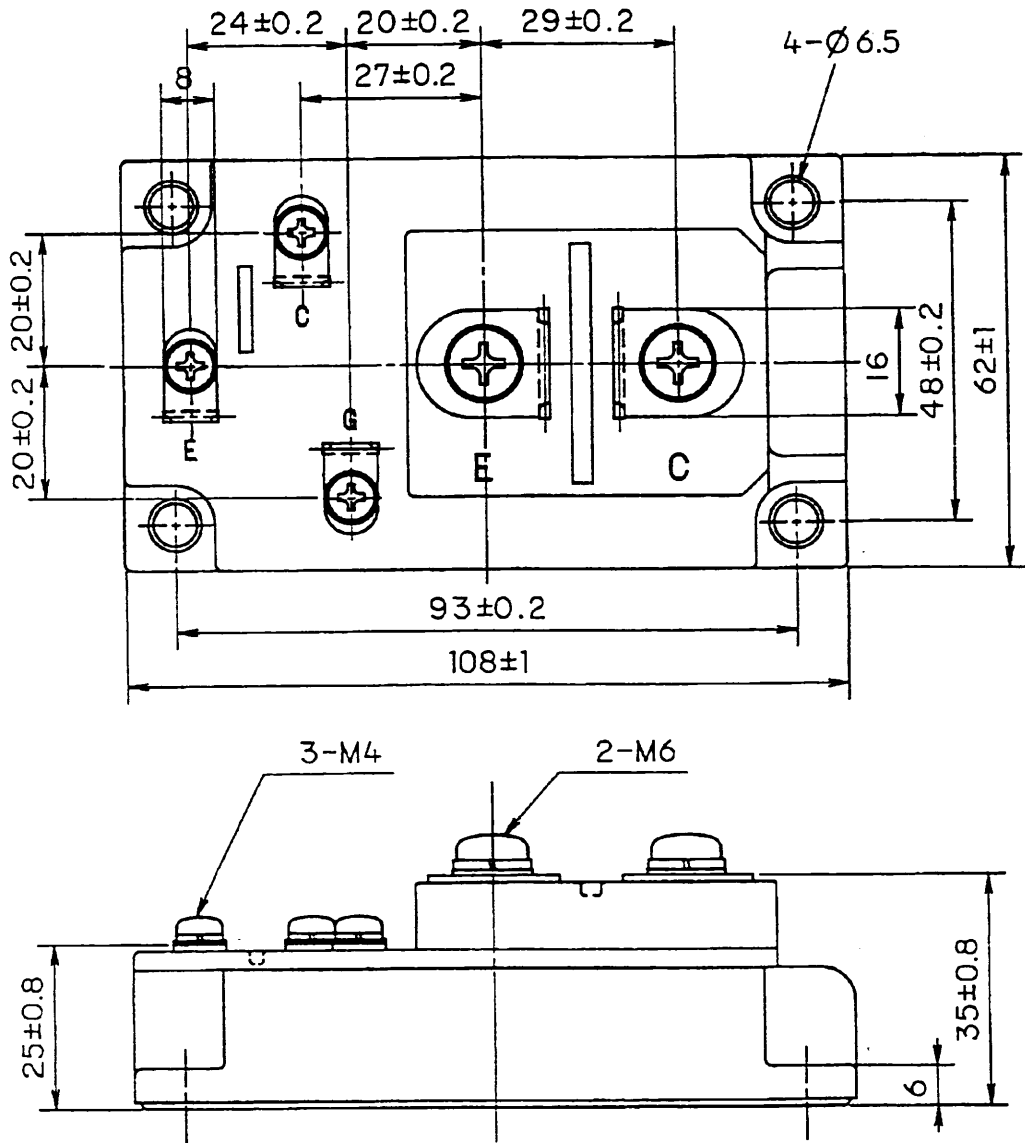
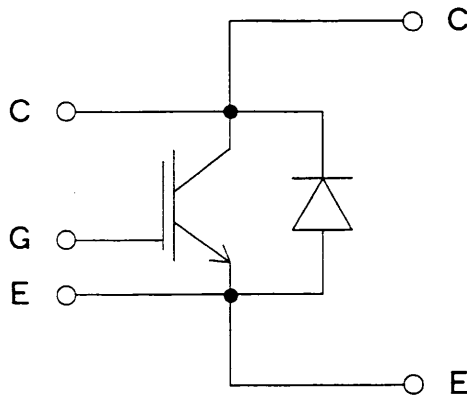


Target Specification of 1MBI400SA-120

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. Miyata

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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 _{CE}		1200		V
Gate-Emitter voltage	V _{GE}		±20		V
Collector current	I _c	Continuous	Tc=25°C	600	A
			Tc=80°C	400	
	I _c pulse	1ms	Tc=25°C	1200	
			Tc=80°C	800	
	-I _c			400	
-I _c pulse	1ms		800		
Collector Power Dissipation	P _c	1 device	2500		W
Junction temperature	T _j		150		°C
Storage temperature	T _{stg}		-40~+125		°C
Isolation voltage ^(*1)	V _{iso}	AC : 1min.	2500		V
Screw Torque	Mounting ^(*2)		3.5		N · m
	Terminals ^(*3)		4.5		
	Terminals ^(*4)		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	I _{CE}	V _{GE} = 0 V, V _{CE} = 1200 V			4.0	mA
Gate-Emitter leakage current	I _{GE}	V _{CE} = 0 V, V _{GE} = ±20 V			0.8	μA
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20 V, I _c = 400 mA	5.5	7.2	8.5	V
Collector-Emitter saturation voltage	V _{CE(sat)}	V _{GE} = 15 V I _c = 400 A	T _j = 25 °C	2.3	2.6	V
			T _j = 125 °C	2.8		
Input capacitance	C _{ies}	V _{GE} = 0 V		48000		pF
Output capacitance	C _{oes}	V _{CE} = 10 V		10000		
Reverse transfer capacitance	C _{res}	f = 1 MHz		8800		
Turn-on time	t _{on}	V _{cc} = 600 V			1.2	μs
	t _r	I _c = 400 A			0.6	
	t _{r(l)}	V _{GE} = ±15 V		0.1		
Turn-off time	t _{off}	RG = 1.8 Ω			1.0	μs
	t _f			0.08	0.3	
Forward on voltage	V _F	I _F = 400 A	T _j = 25 °C	2.4	3.3	V
			T _j = 125 °C	2.0		
Reverse recovery time	t _{rr}	I _F = 400 A			0.35	μs

5. Thermal resistance characteristics

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

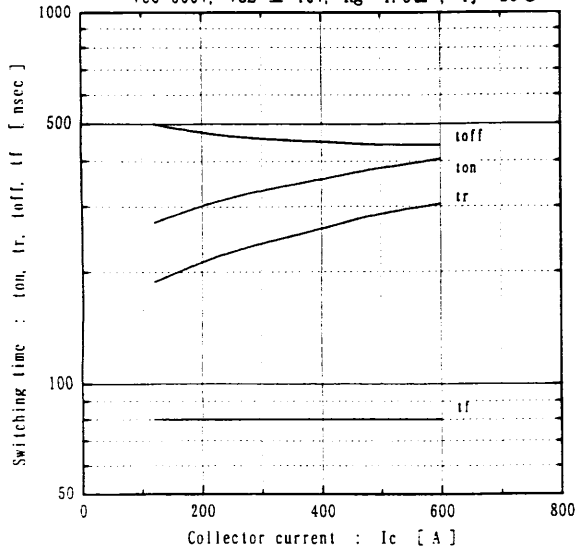
※ This is the value which is defined mounting on the additional cooling fin with thermal compound.

Note :

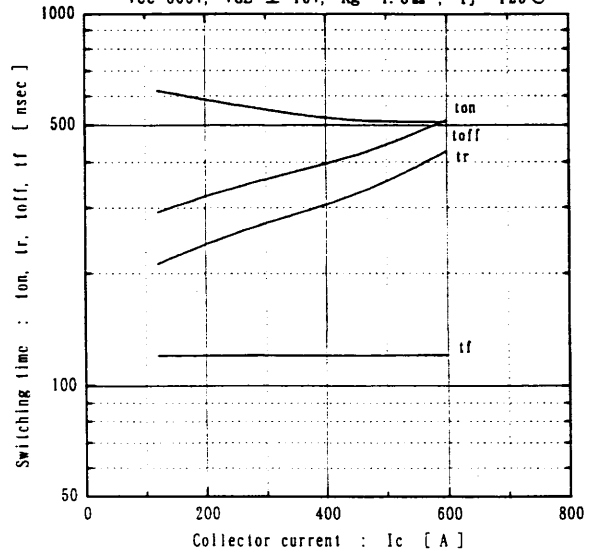
- This specification is only for technical considerations, and not for contract.
- This specification is subject to be changed without notices.

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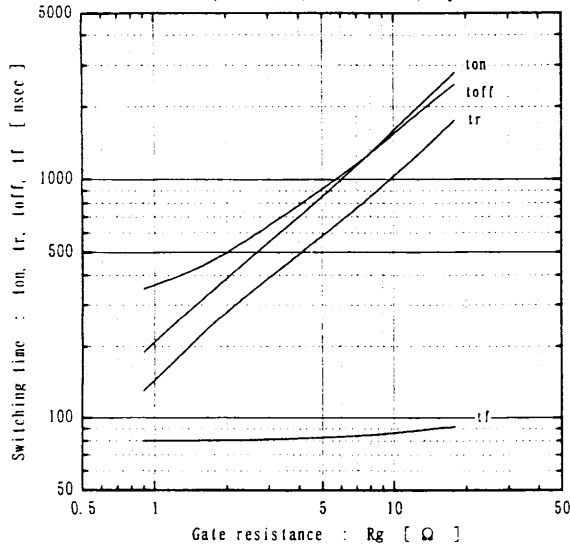
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega, T_j=25^\circ C$



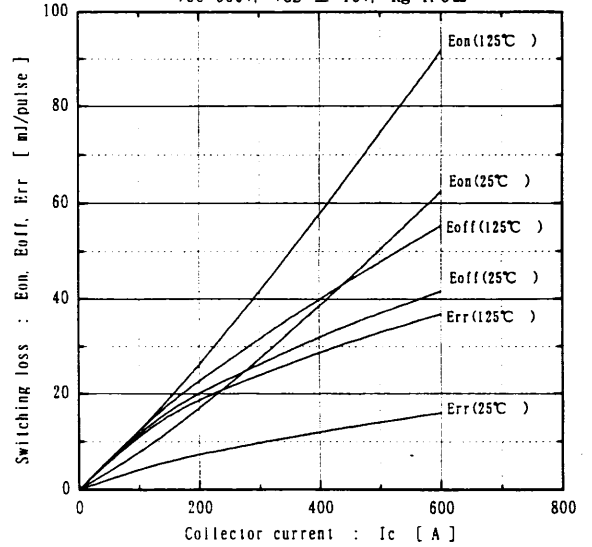
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega, T_j=125^\circ C$



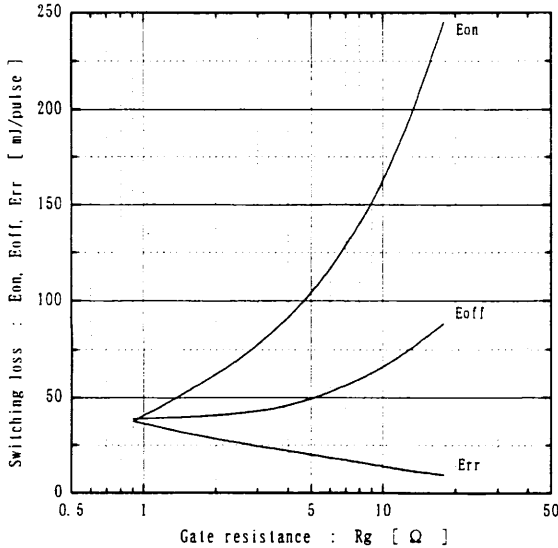
Switching time vs. Gate resistance (typ.)
 $V_{cc}=600V, I_c=400A, V_{GE}=\pm 15V, T_j=25^\circ C$



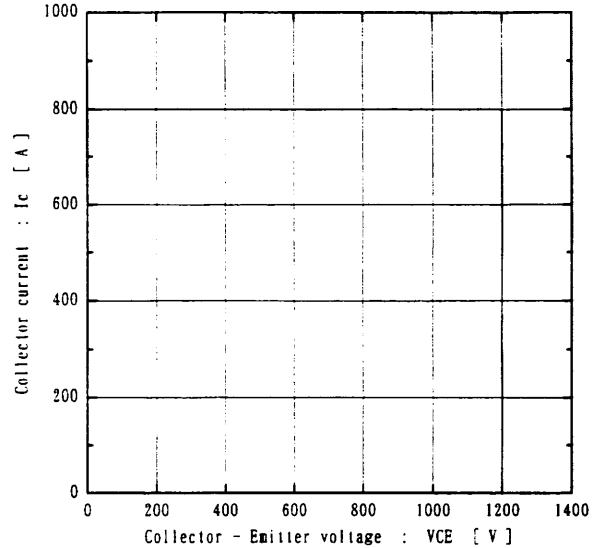
Switching loss vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=1.8\Omega$



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

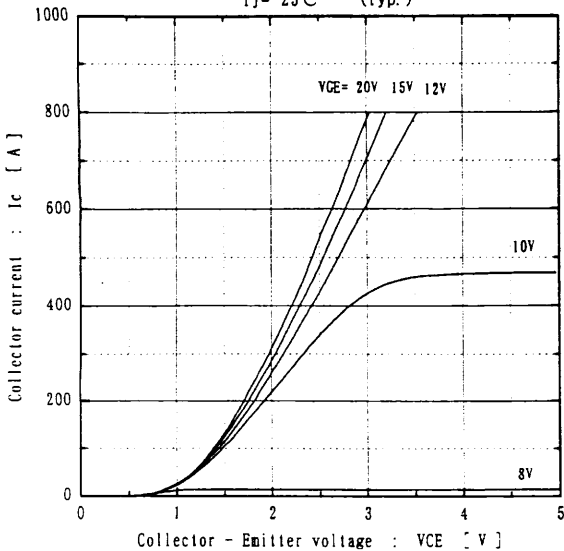


Reverse bias safe operating area
 $+V_{GE}=15V, -V_{GE}\leq 15V, R_g\geq 1.8\Omega, T_j\leq 125^\circ C$

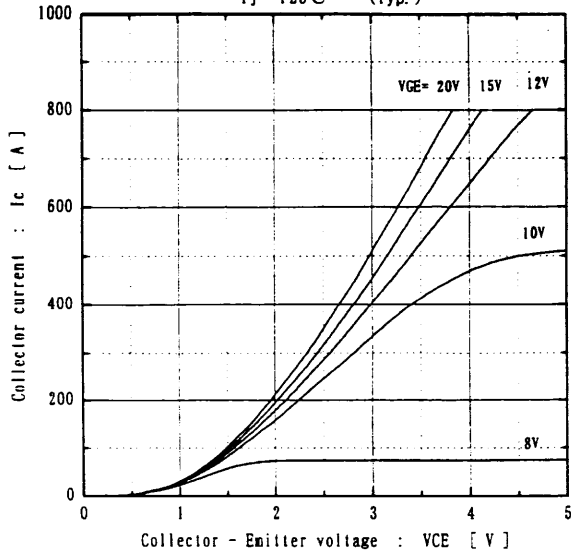


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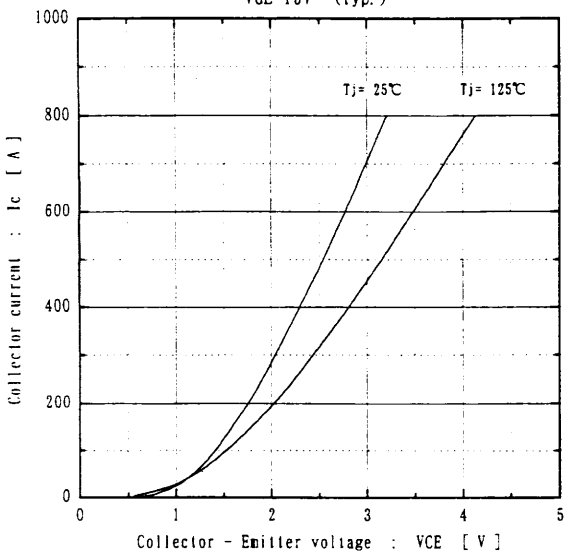
Collector current vs. Collector-Emittor voltage
T_j = 25°C (typ.)



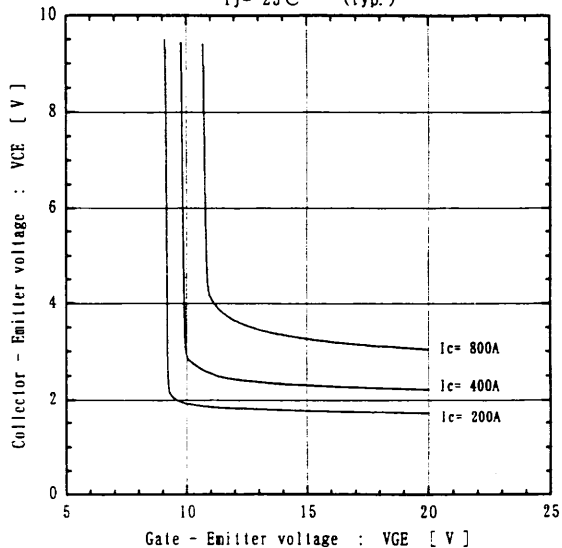
Collector current vs. Collector-Emittor voltage
T_j = 125°C (typ.)



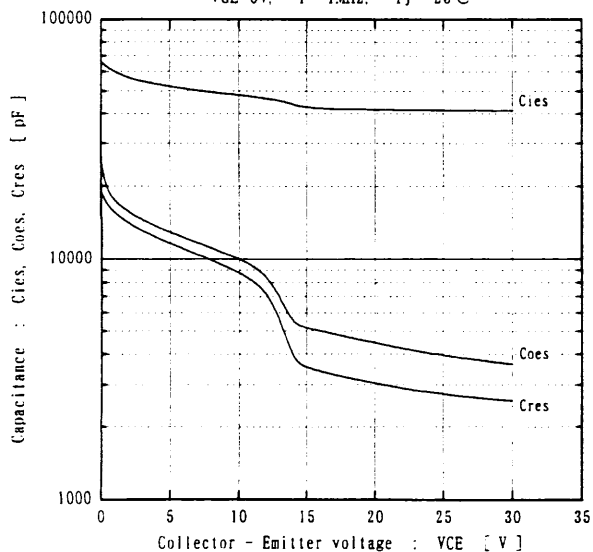
Collector current vs. Collector-Emittor voltage
VGE = 15V (typ.)



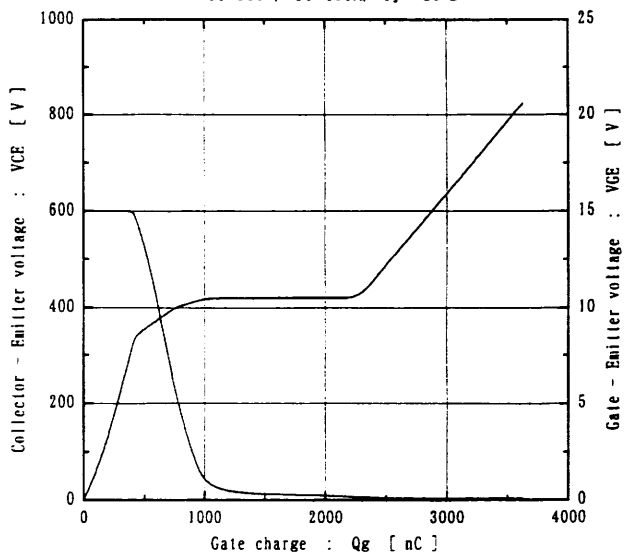
Collector-Emittor voltage vs. Gate-Emittor voltage
T_j = 25°C (typ.)



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



Dynamic Gate charge (typ.)
Vcc = 600V, Ic = 400A, T_j = 25°C



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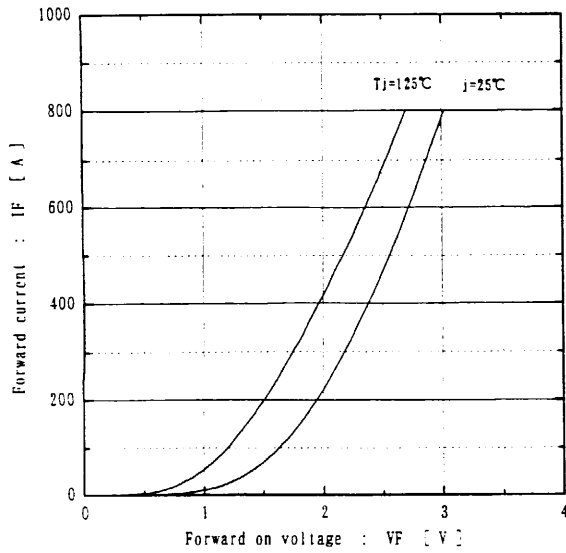
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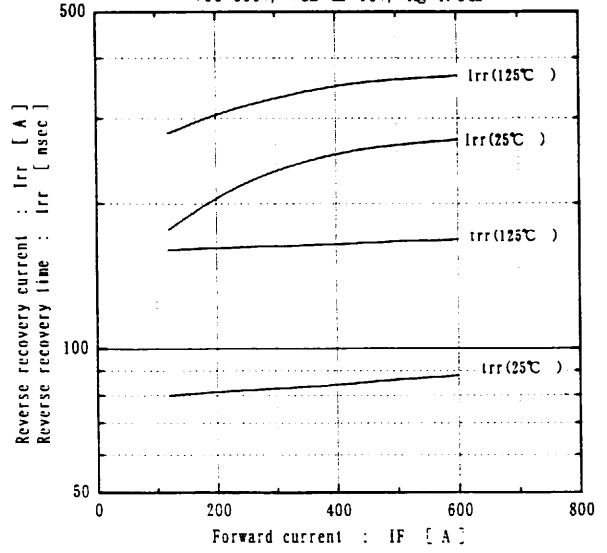
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Forward current vs. Forward on voltage (typ.)

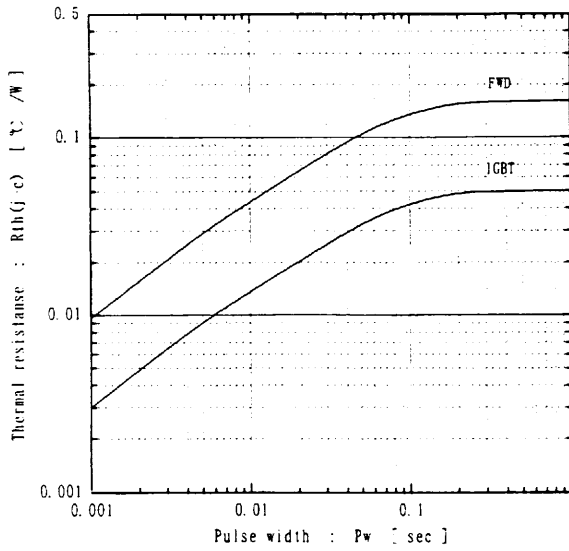


Reverse recovery characteristics (typ.)

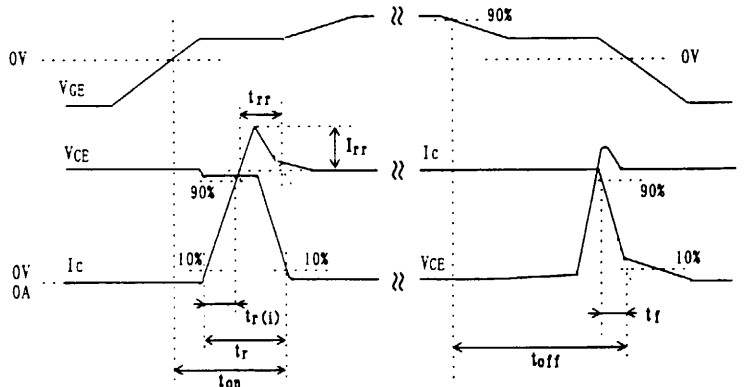
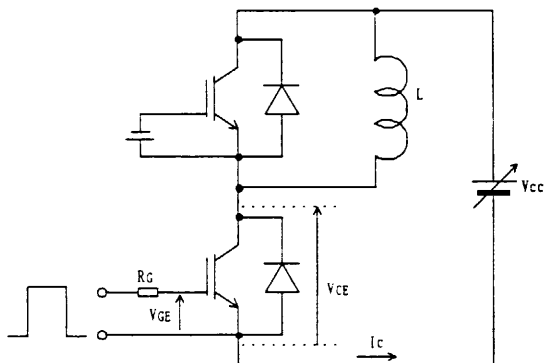
V_{CC}=600V, V_{GE}=±15V, R_g=1.8Ω



Transient thermal resistance



Definitions of switching time



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