SPECIFICATION

DEVICE NAME	:	IGBT
TYPE NAME	:	1MBH10D-120
SPEC. No.	:	MS5F 4091
DATE	:	July-15-1997

Fuji Electric Co., Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED
DRAWN	July 15-'97	K. Sawada	
CHECKED	July-15-'97	T. Igarashi	

Fuji Electric Co.,Ltd.

DWG.NO. MS5F4091 1/14

H04-004-07

Revised Records

Date	Classi-fication	Ind.	Content	Applied date	Drawn	Checked	Approved
July-15-1997	enactment	—	—	Issued date	—	[signature]	[signature]

- Scope

This specification is applied to Fuji discrete IGBT 1MBH10D-120 supplied for Rockwell Automation Co., Ltd.

- Construction

1. Package dimension
   There is a package dimension in 4/14 page .

2. Outview
   There are no remarkable flaws on a product .

3. Indication
   ① Tradmark
   ② Type Name
   ③ Lot No.

- Ratings and Characteristics

1. There are some ratings and characteristics tables in 4/14 page and 5/14 page .

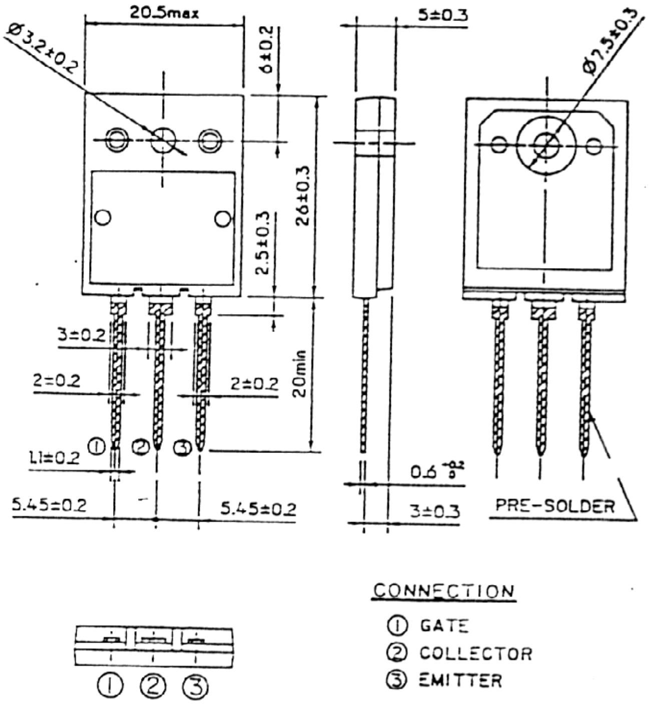
2. There are some performance curves in from 6/14 page to 14/14 page .

- Packing

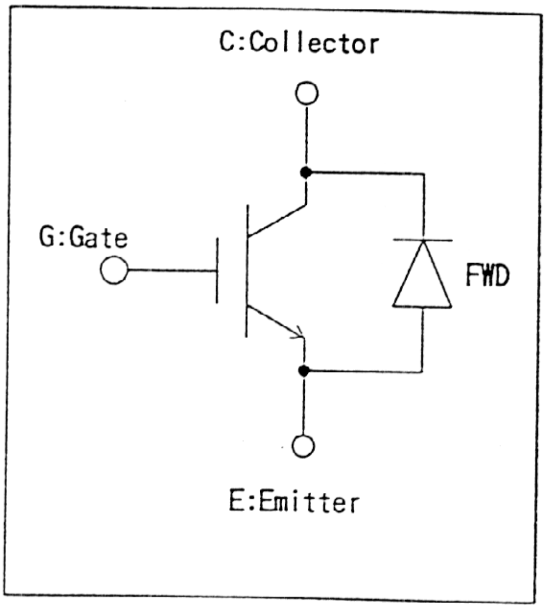
Packing style follows our packing specification MS5Q0026 .

1MBH10D−120

1. Outline Drawing



2. Equivalent circuit



3. Absolute maximum ratings (Tc=25℃)

Items			Symbols	Ratings	Units
Collector-Emitter Voltage			V_{CES}	1200	V
Gate-Emitter Voltage			V_{GES}	±22	V
Collector Current	DC	Tc=25 ℃	Ic_{25}	18	A
		Tc=105℃	Ic_{105}	10	A
	1ms	Tc=25 ℃	Icp	48	A
IGBT Max. Power Dissipation			Pc	155	W
FWD Max. Power Dissipation			Pc	105	W
Operating Temperature			Tj	+ 150	℃
Storage Temperature			Tstg	-40 ~ +150	℃
Mounting Screw Torque			——	70	N・cm

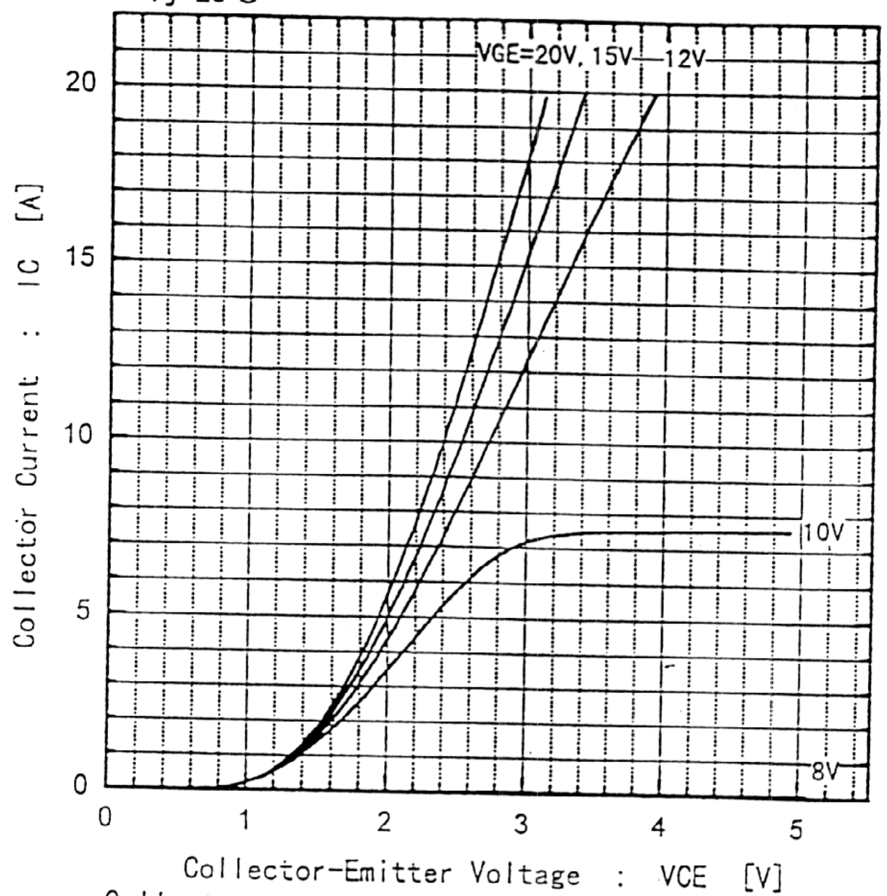
4. Electrical Characteristics (at Tc=25℃ unless otherwise specified)

Items		Symbols	Characteristics			Conditions	Unit
			min.	typ.	max.		
Zero gate voltage Collector Current		I_{CES}			1.0	V_{GE} = 0V V_{CE} =1200V	mA
Gate-Emitter leakage Current		I_{GES}			20	V_{CE} = 0V V_{GE} = ±22V	μA
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	5.5		8.5	V_{CE} = 20V Ic = 10mA	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			3.5	V_{GE} = 15V Ic = 10A	V
Input capacitance		Cies		1200		V_{GE} = 0V	pF
Output capacitance		Coes		250		V_{CE} = 10V	
Reverse transfer capacitance		Cres		80		f = 1MHz	
Switching Time	Turn-on time	ton			1.2	Vcc = 600V Ic = 10A V_{GE} = ±15V R_G = 160Ω (Half Bridge)	μs
		tr			0.6		
	Turn-off time	toff			1.5		
		tf			0.5		
	Turn-on time	ton		0.16		Vcc = 600V Ic = 10A V_{GE} = +15V R_G = 16 Ω (Half Bridge)	
		tr		0.11			
	Turn-off time	toff		0.30			
		tf			0.50		
FWD forward voltage drop		VF			3.0	I_F = 10A	V
Reverse recovery time		trr			0.35	IF= 10A, VGE=-10V VR= 200V di/dt=100A/μs	μs

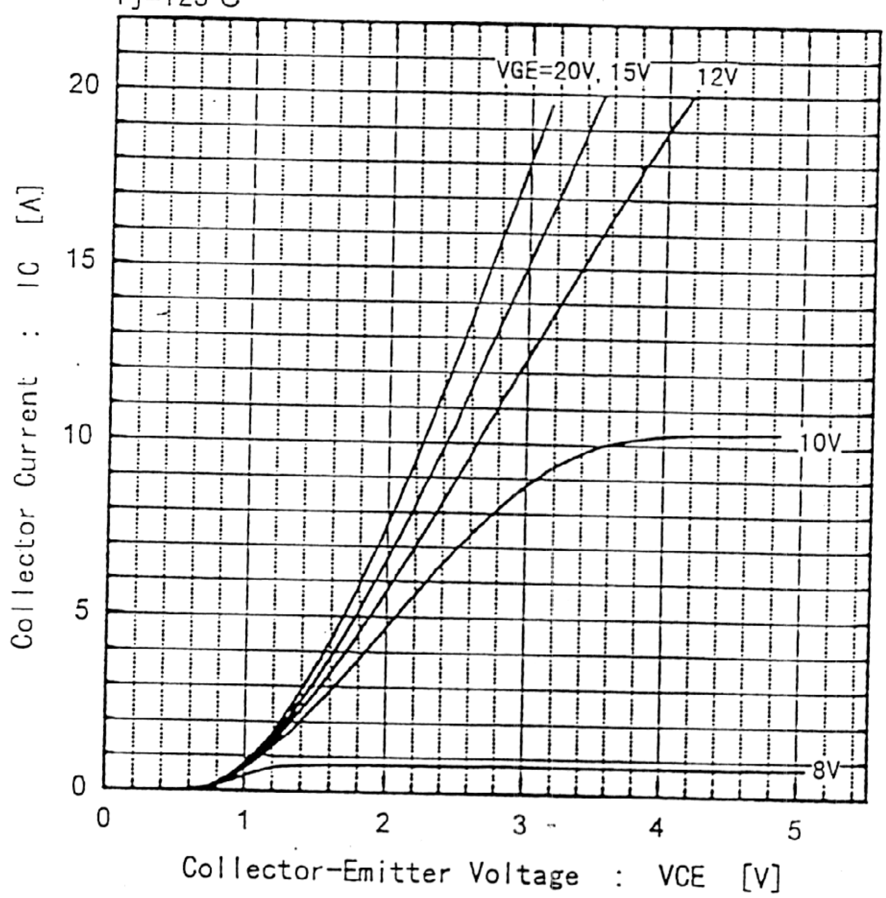
5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	Rth(j-c)			0.80	IGBT	℃/W
	Rth(j-c)			1.19	FWD	

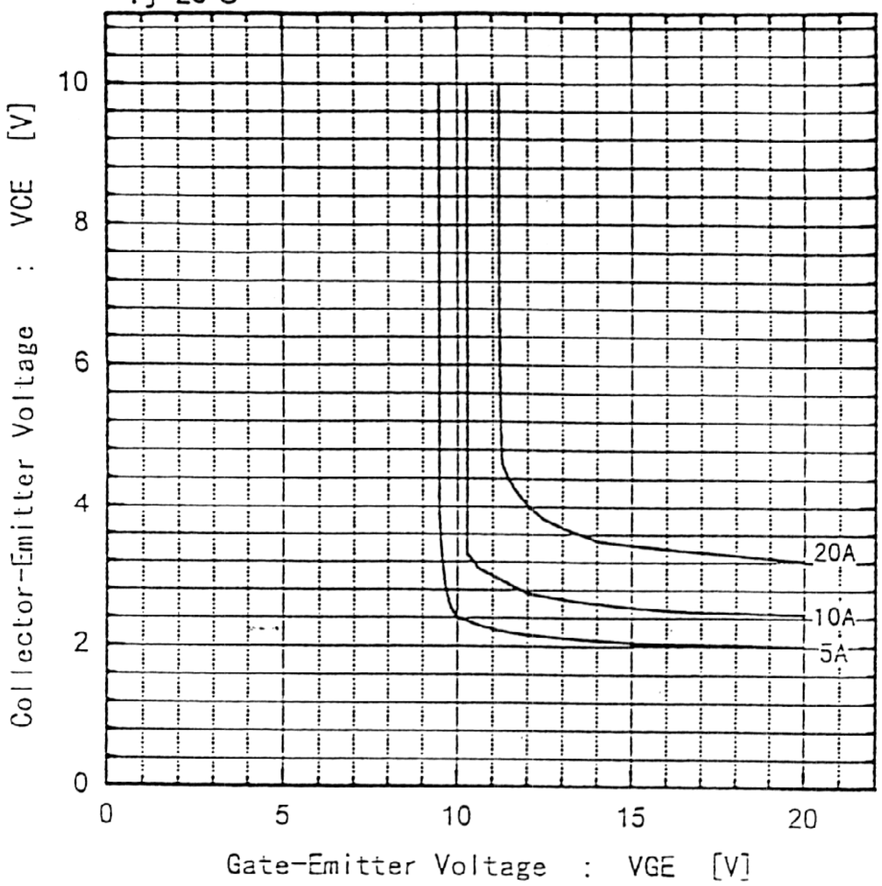
Collector Current vs. Collector-Emitter Voltage
Tj=25℃



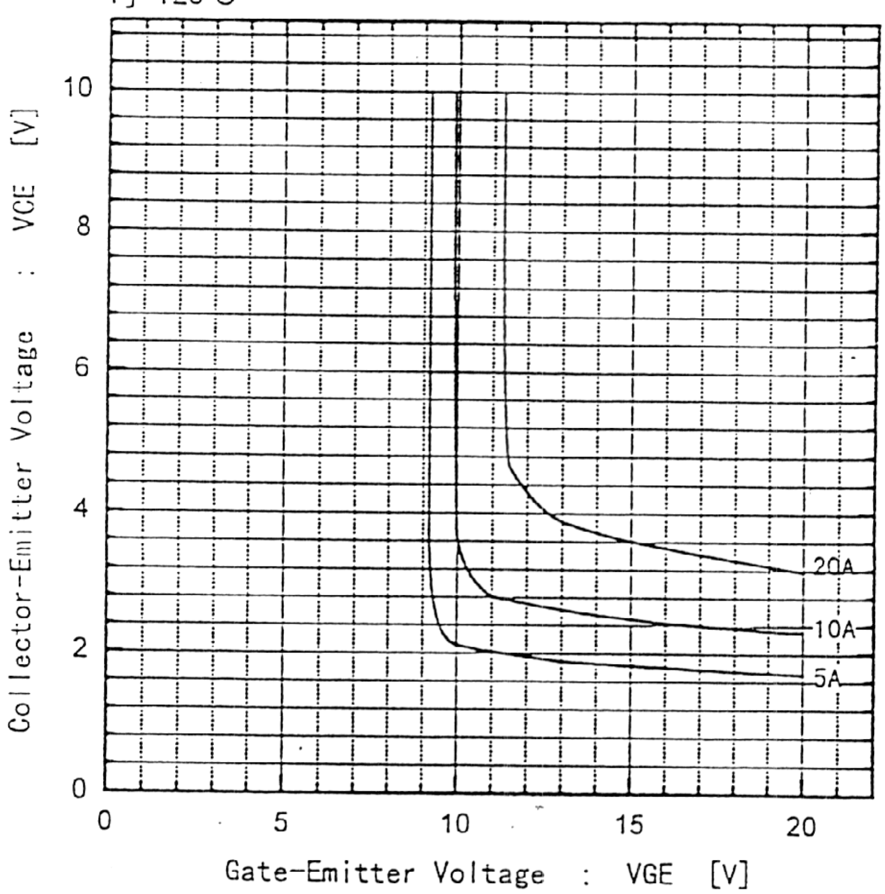
Collector Current vs. Collector-Emitter Voltage
Tj=125℃



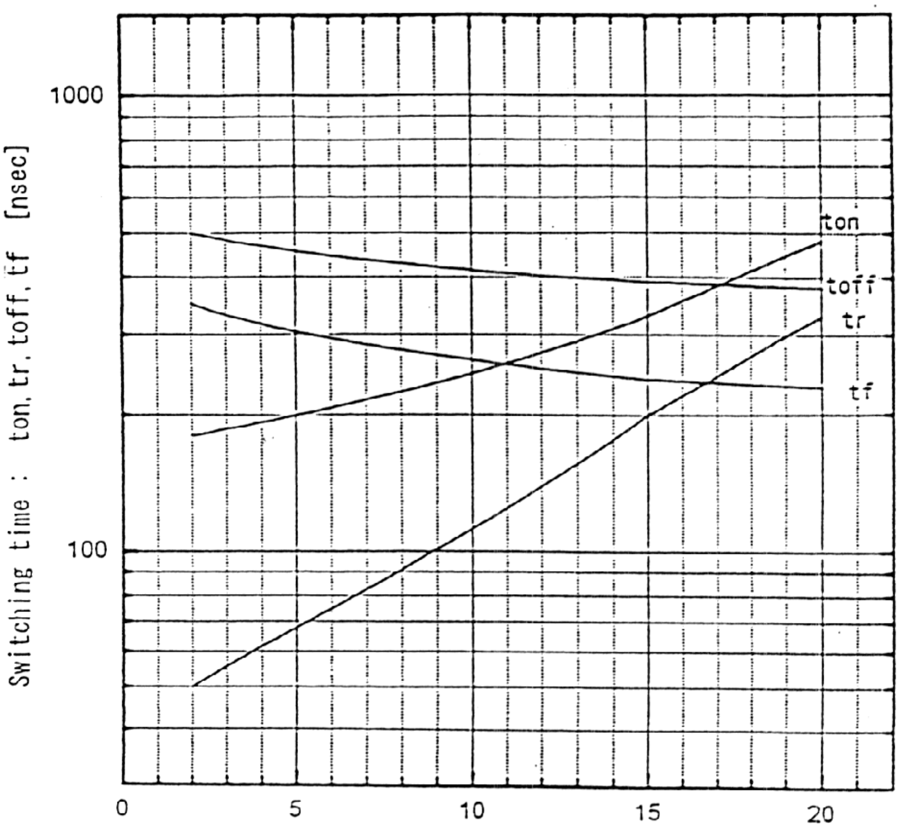
Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=25°C



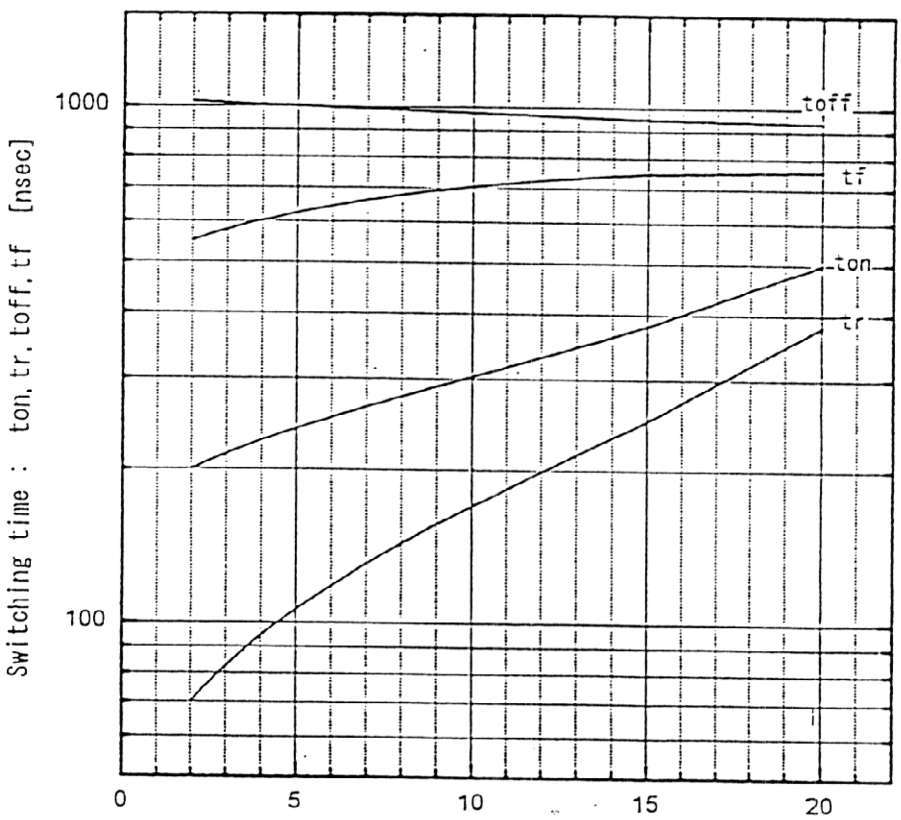
Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=125°C



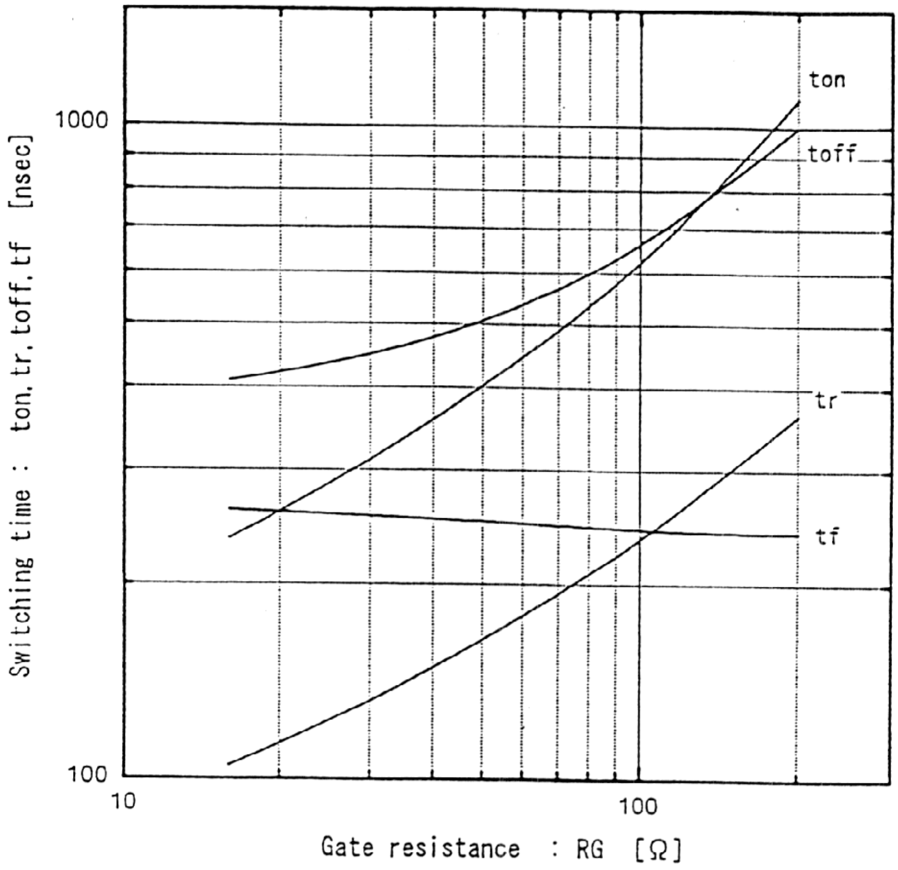
Switching time vs. Collector current
Vcc=600V, RG=16Ω, VGE=±15V, Tj=25°C



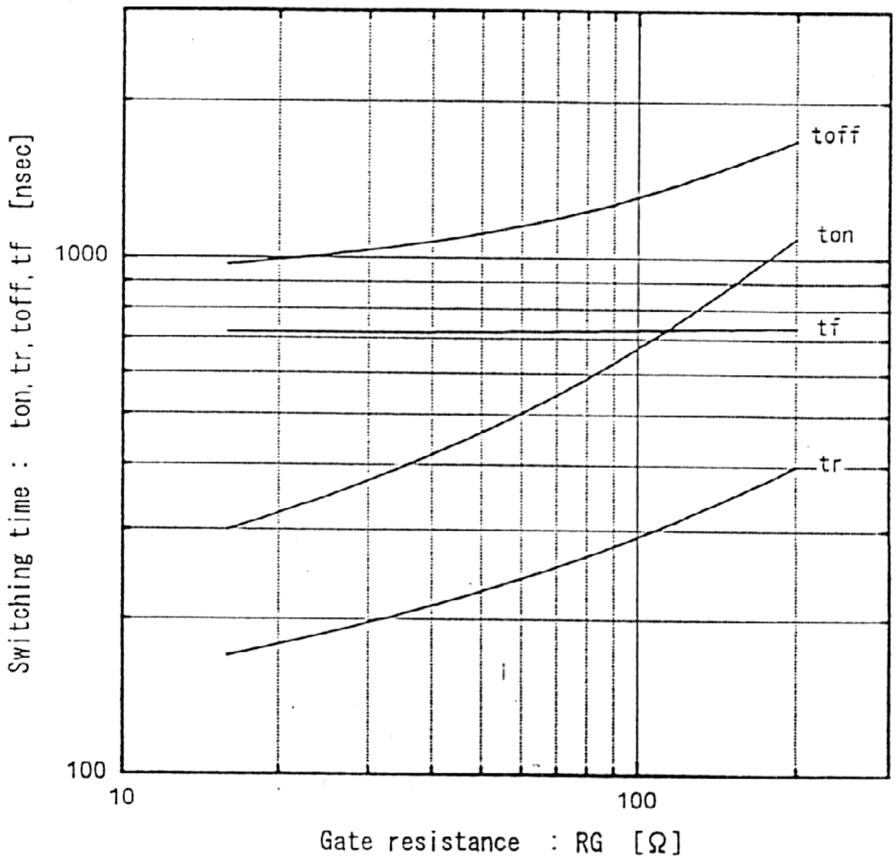
Switching time vs. Collector current
Vcc=600V, RG=16Ω, VGE=±15V, Tj=25°C

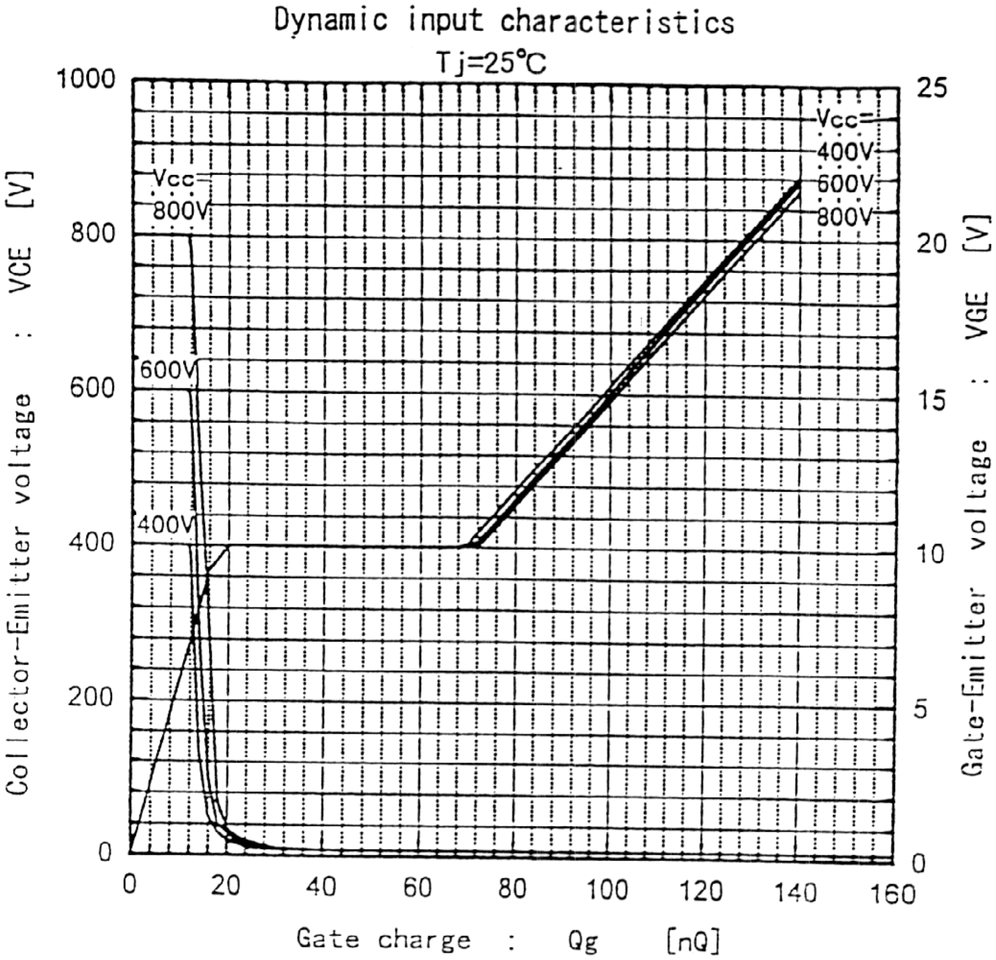


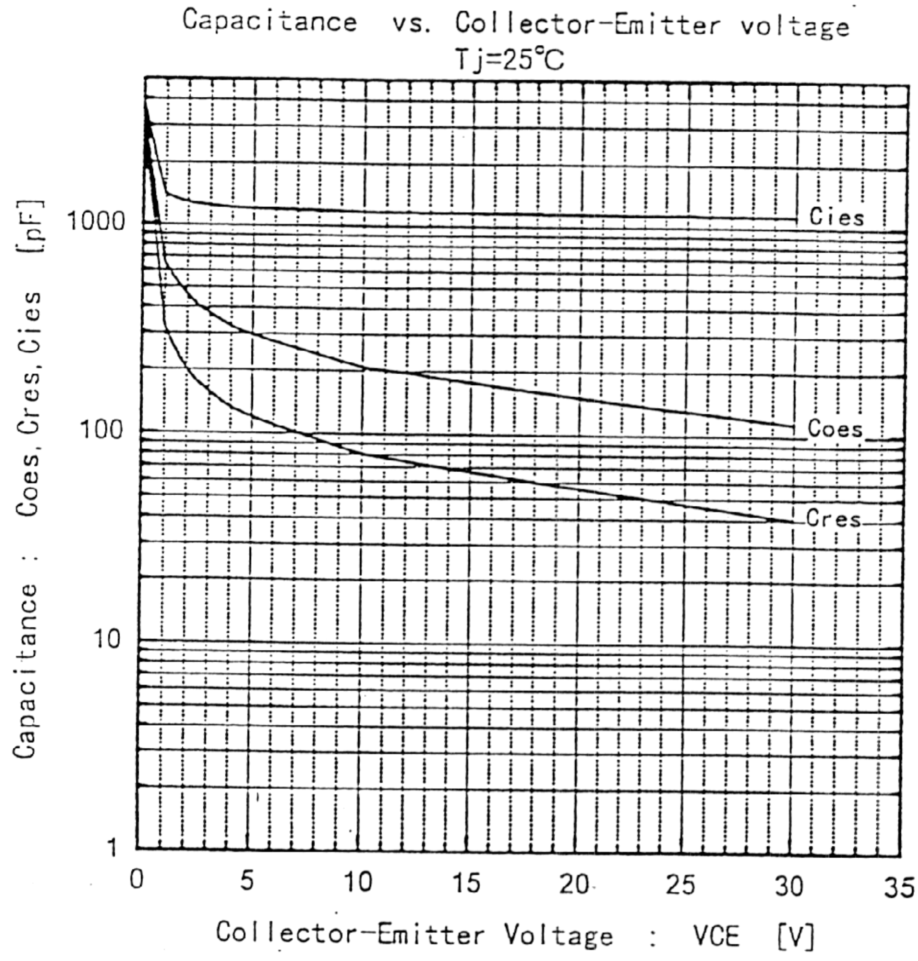
Switching time vs. RG
Vcc=600V, IC=10A, VGE=±15V, Tj=25°C

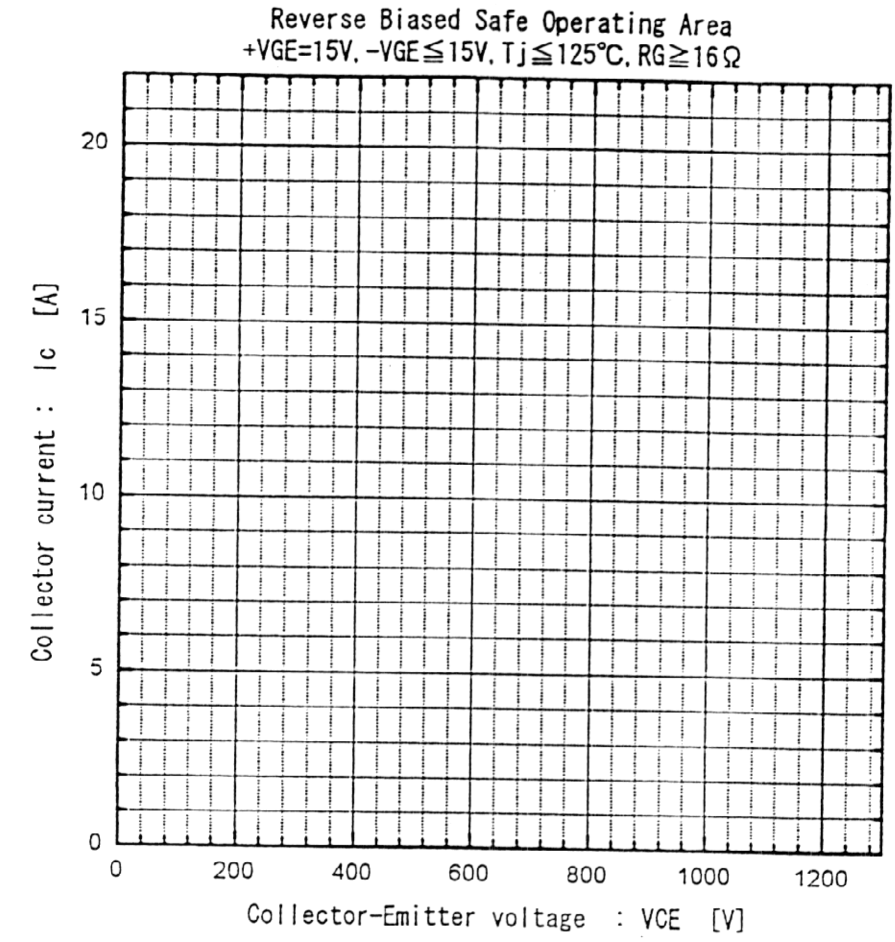


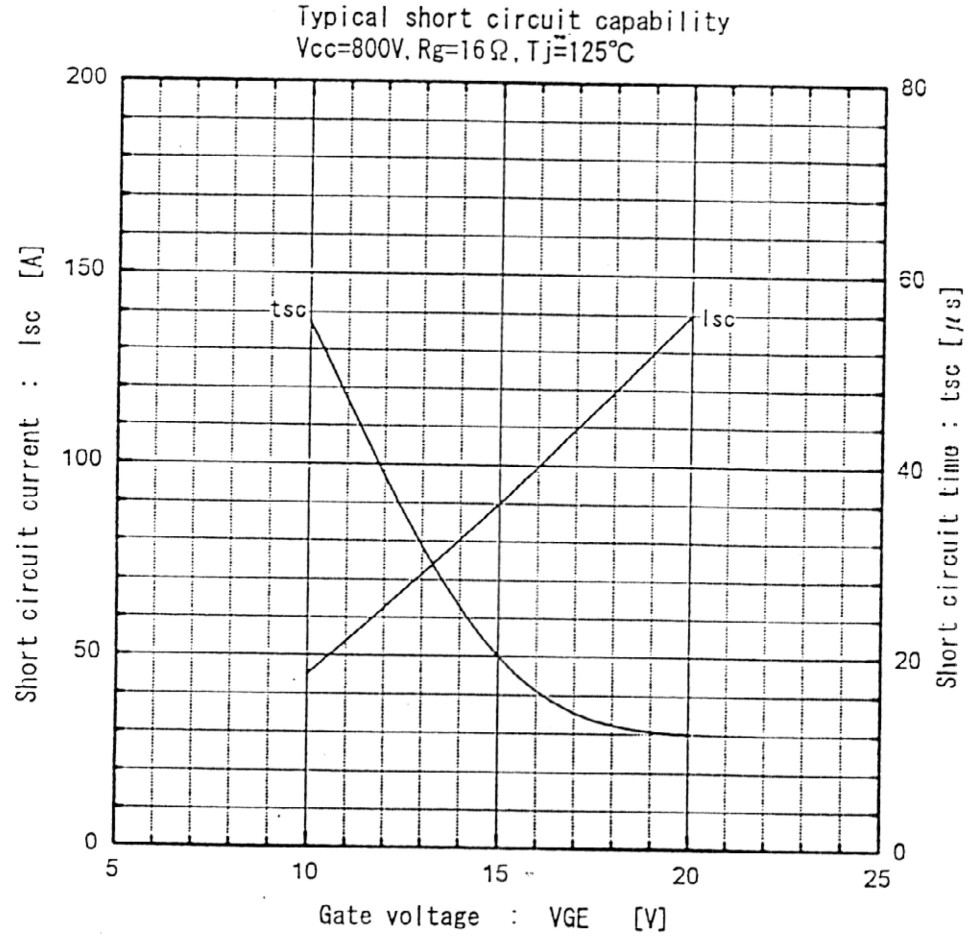
Switching time vs. RG
Vcc=600V, IC=10A, VGE=±15V, Tj=125°C




Dynamic input characteristics
Tj=25°C
Vcc=
800V
600V
400V
Vcc=
400V
600V
800V
1000
800
600
400
200
0
25
20
15
10
5
0
0 20 40 60 80 100 120 140 160
Collector-Emitter voltage : VCE [V]
Gate-Emitter voltage : VGE [V]
Gate charge : Qg [nQ]


Capacitance vs. Collector-Emitter voltage
Tj=25°C
Cies
Coes
Cres
1000
100
10
1
0 5 10 15 20 25 30 35
Capacitance : Coes, Cres, Cies [pF]
Collector-Emitter Voltage : VCE [V]





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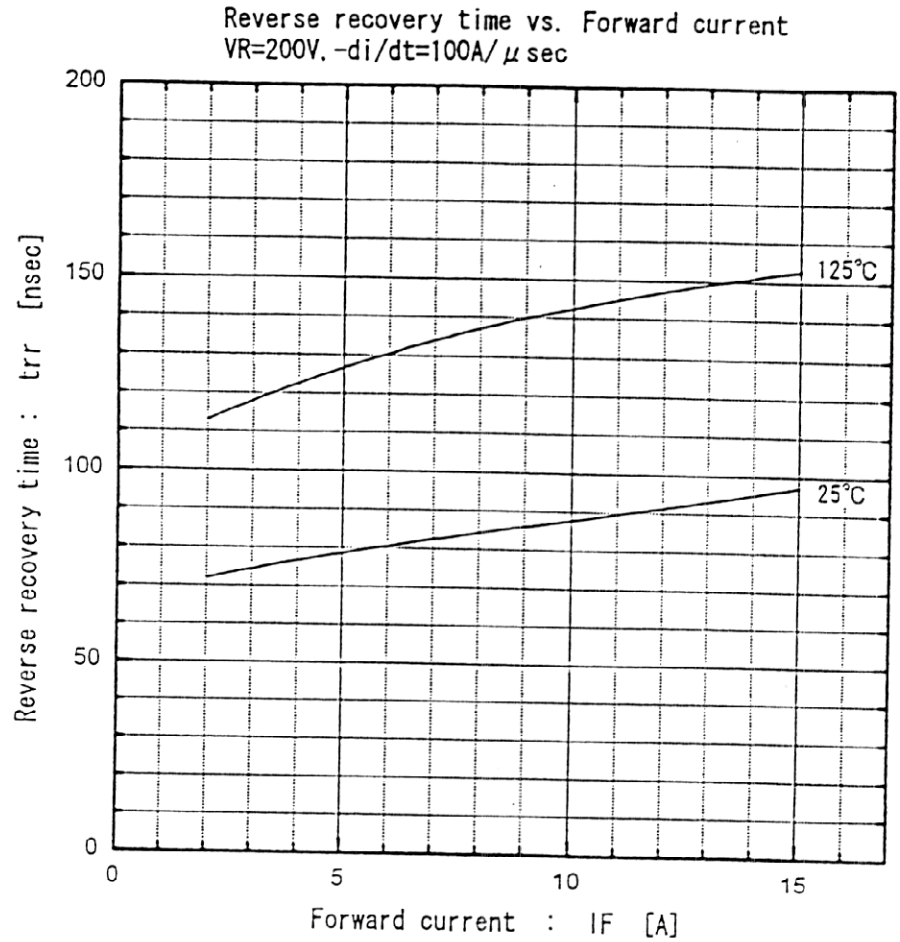
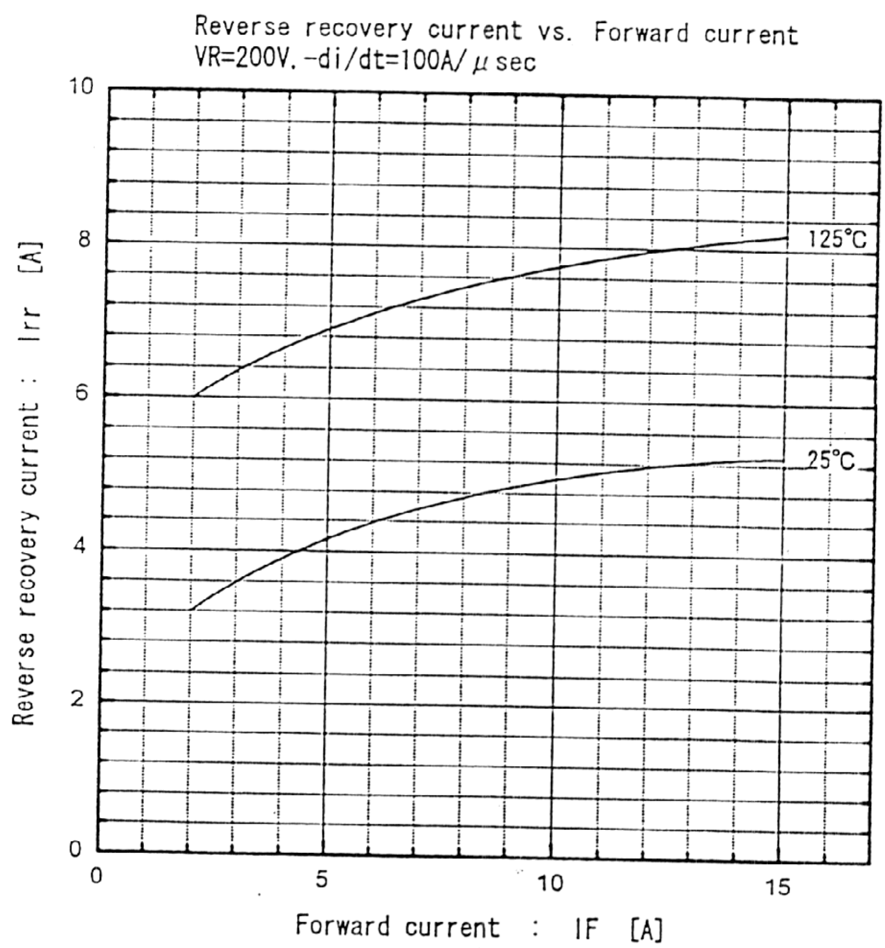
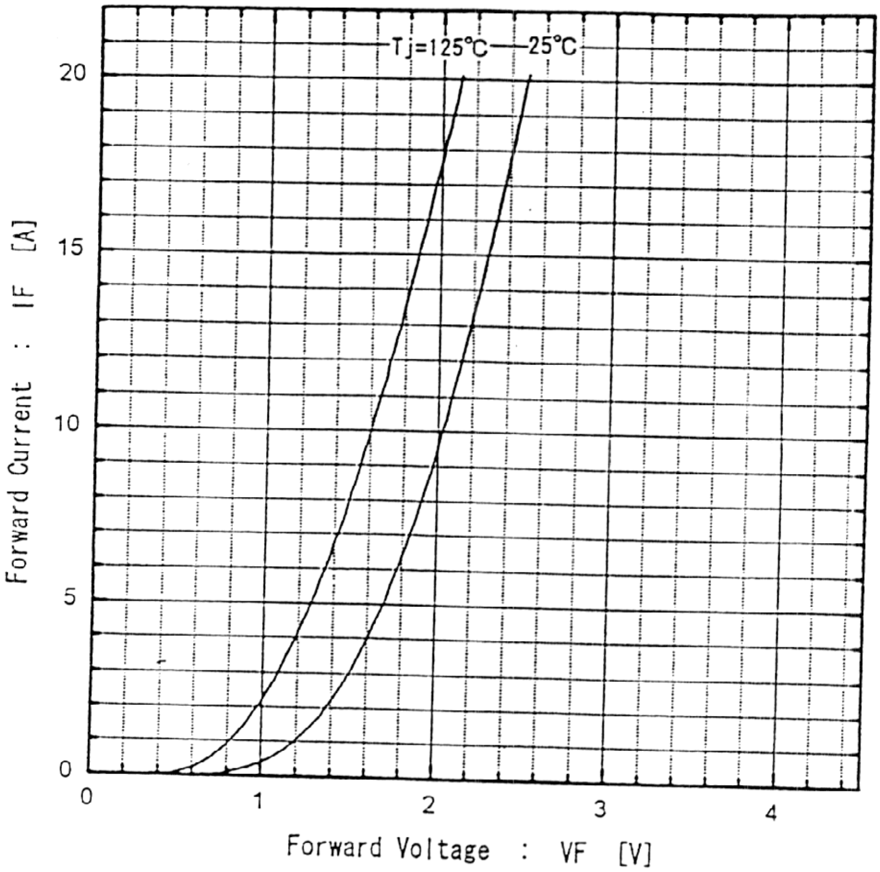
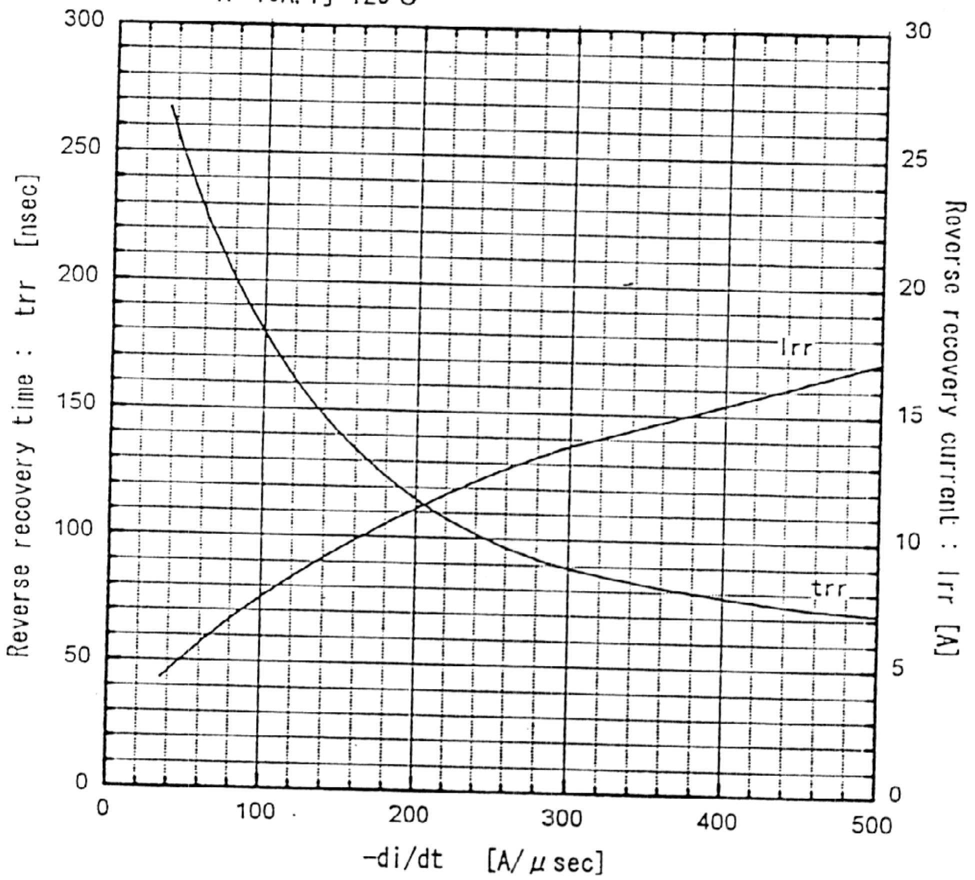

Reverse recovery time vs. Forward current
VR=200V, -di/dt=100A/μsec
Reverse recovery time : trr [nsec]
Forward current : IF [A]
125°C
25°C
0
50
100
150
200
5
10
15


Reverse recovery current vs. Forward current
VR=200V, -di/dt=100A/μsec
Reverse recovery current : Irr [A]
Forward current : IF [A]
125°C
25°C
0
2
4
6
8
10
5
10
15

Forward voltage vs. Forward current



Reverse recovery chracteristics vs. -di/dt
IF=10A, Tj=125°C



Transient thermal resistance