SPECIFICATION

DEVICE NAME	:	IGBT
TYPE NAME	:	1MBH20D-060
SPEC. No.	:	MS5F 4086
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. MS5F4086 1/14

H04-004-07

Revised Records

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

・ Scope

This specification is applied to Fuji discrete IGBT 1MBH20D-060
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 .

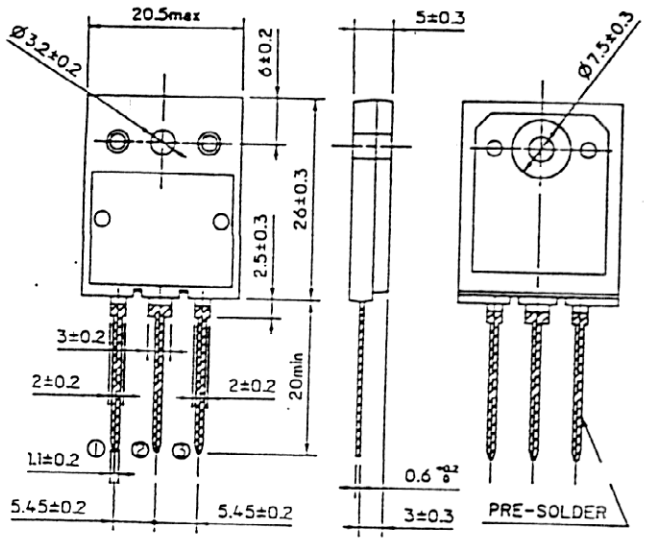
2. There are some performance curves in from 6/14 page to 14/14 page .

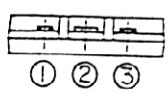
・ Packing

Packing style follows our packing specification MS5Q0026 .

1MBH20D-060

1. Outline Drawing

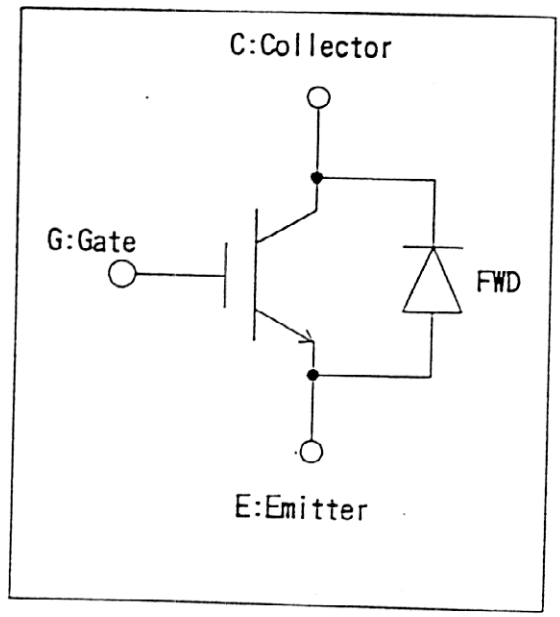




CONNECTION

① GATE
② COLLECTOR
③ EMITTER

2. Equivalent circuit



3. Absolute maximum ratings (Tc=25℃)

Items			Symbols	Ratings	Units
Collector-Emitter Voltage			V_{CES}	600	V
Gate-Emitter Voltage			V_{GES}	±22	V
Collector Current	DC	Tc=25 ℃	Ic_{25}	45	A
		Tc=110℃	Ic_{110}	20	A
	1ms	Tc=25 ℃	Icp	152	A
IGBT Max. Power Dissipation			Pc	170	W
FWD Max. Power Dissipation			Pc	95	W
Operating Temperature			Tj	+ 150	℃
Storage Temperature			Tstg	-40 ～ +150	℃
Mounting Screw Torque			——	70	N・cm

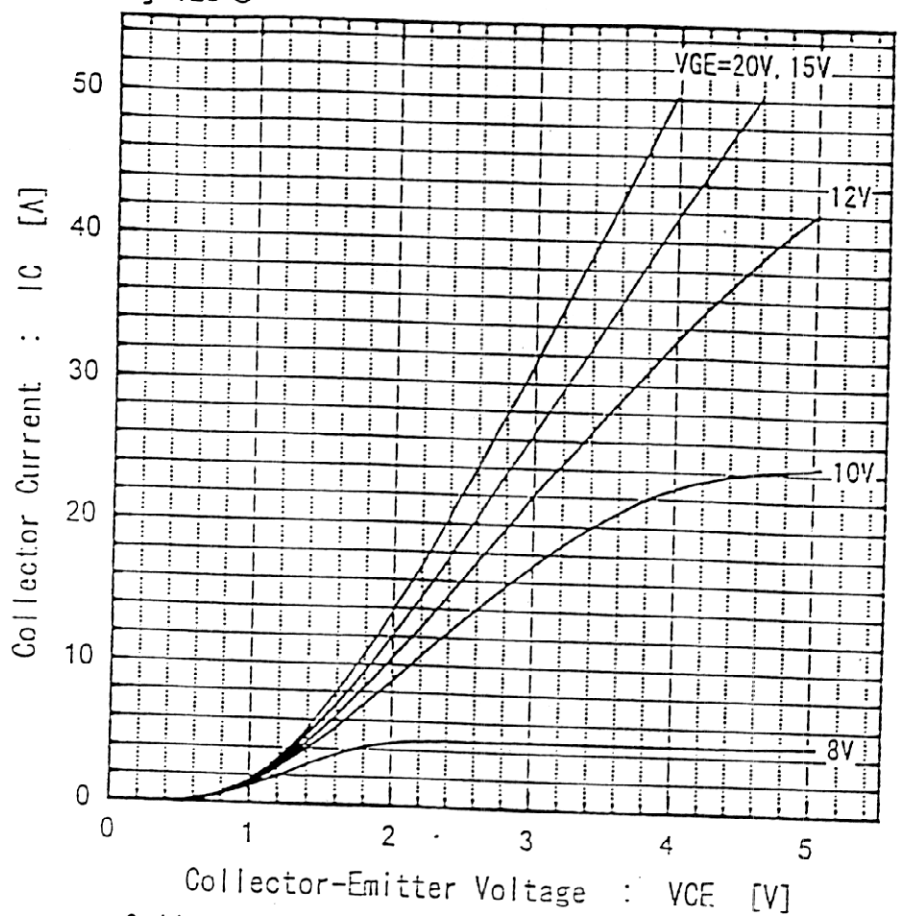
4. Electrical Characteristics (at Tc=25℃ unless otherwise specified)

Items		Symbols	Characteristics			Conditions	Unit
			min.	typ.	max.		
Zero gate voltage Collector Current		I_{CES}			1.0	V_{GE} = 0V V_{CE} = 600V	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 = 20mA	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			3.0	V_{GE} = 15V Ic = 20A	V
Input capacitance		Cies		1300		V_{GE} = 0V V_{CE} = 10V f = 1MHz	pF
Output capacitance		Coes		300			
Reverse transfer capacitance		Cres		70			
Switching Time	Turn-on time	ton			1.2	Vcc = 300V Ic = 20A V_{GE} = ±15V R_G = 120Ω (Half Bridge)	μs
		tr			0.6		
	Turn-off time	toff			1.0		
		tf			0.35		
	Turn-on time	ton		0.16		Vcc = 300V Ic = 20A V_{GE} = +15V R_G = 12 Ω (Half Bridge)	
		tr		0.11			
	Turn-off time	toff		0.30			
		tf			0.35		
FWD forward voltage drop		VF			3.0	I_F = 20A	V
Reverse recovery time		trr			0.3	IF=20A, V_{GE}=-10V VR= 200V di/dt=100A/μs	μs

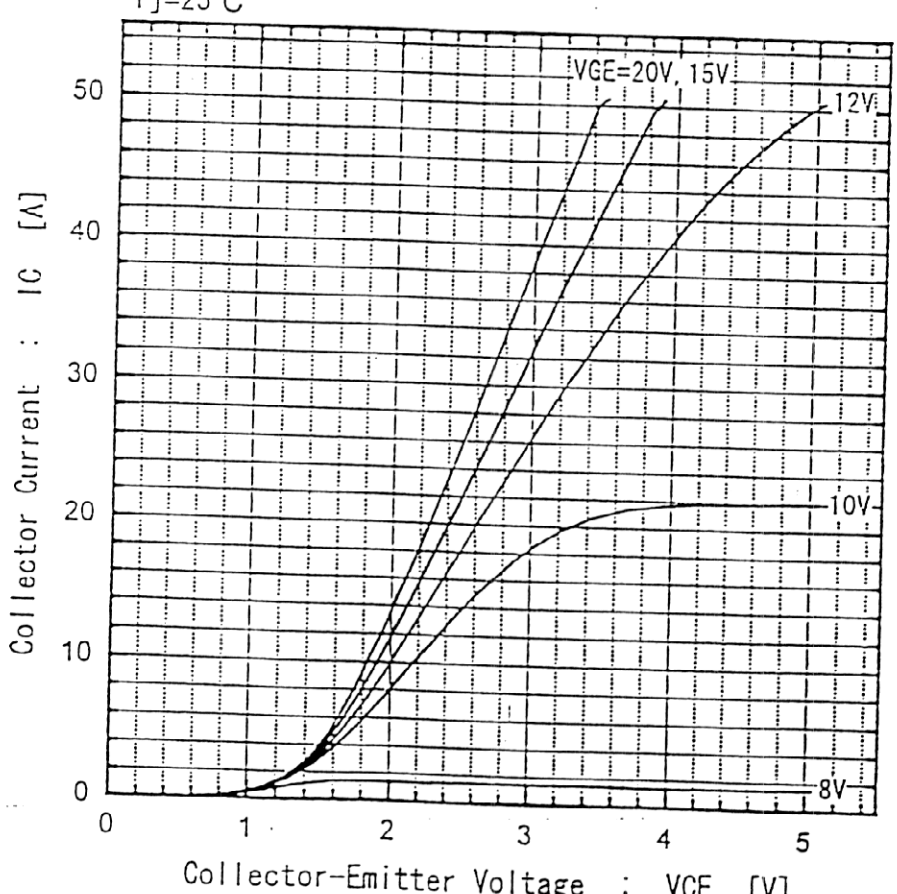
5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	Rth(j-c)			0.73	IGBT	℃/W
	Rth(j-c)			1.31	FWD	

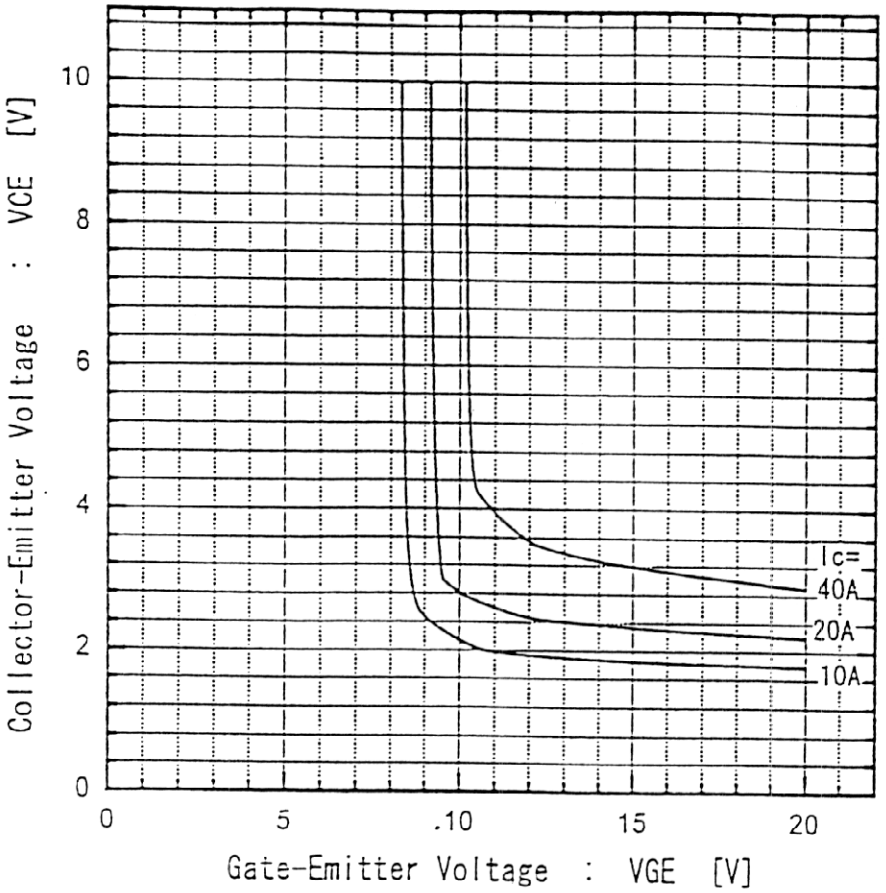
Collector Current vs. Collector-Emitter Voltage
Tj=125°C



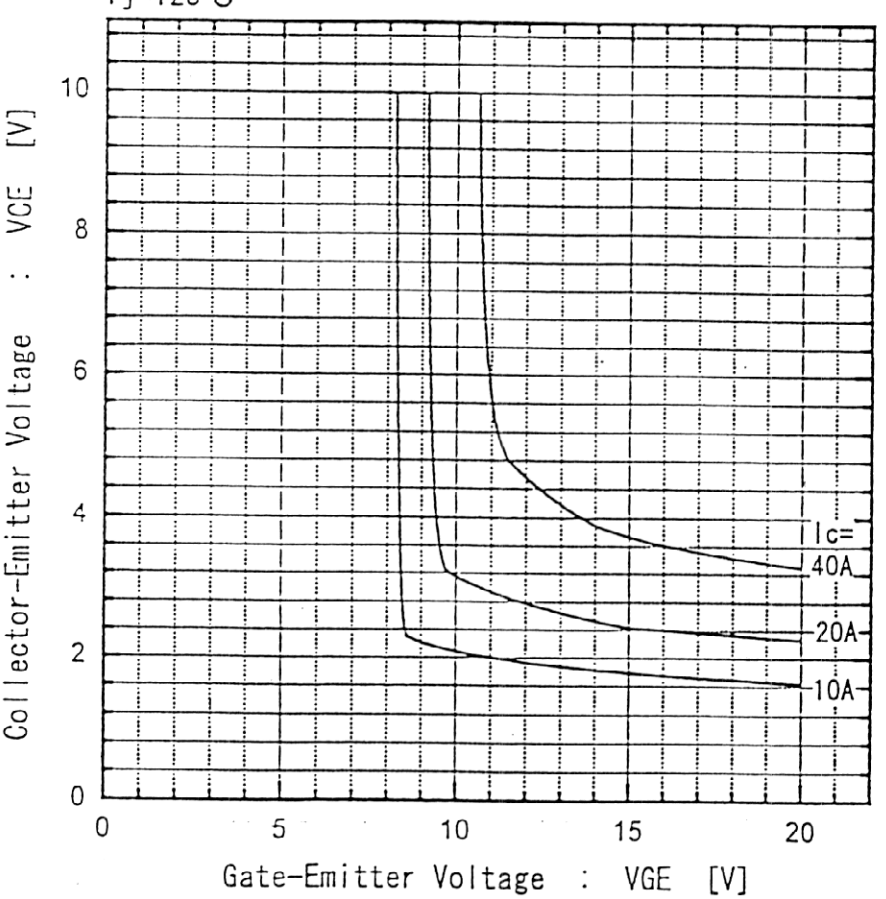
Collector Current vs. Collector-Emitter Voltage
Tj=25°C



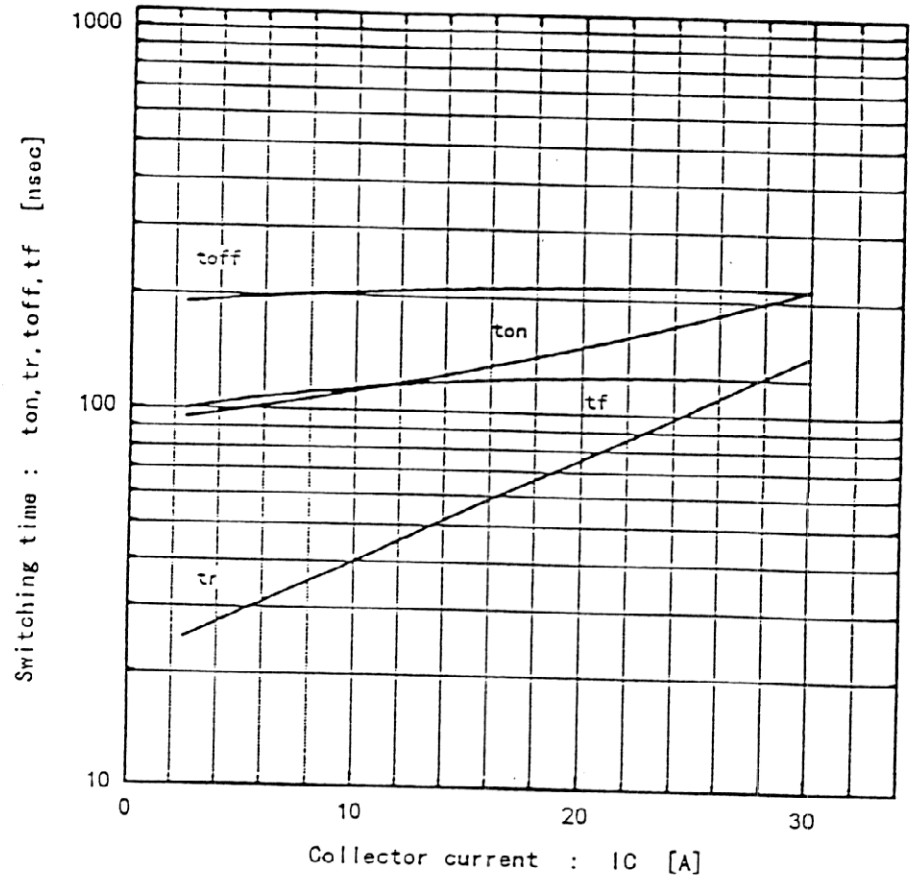
Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=25℃



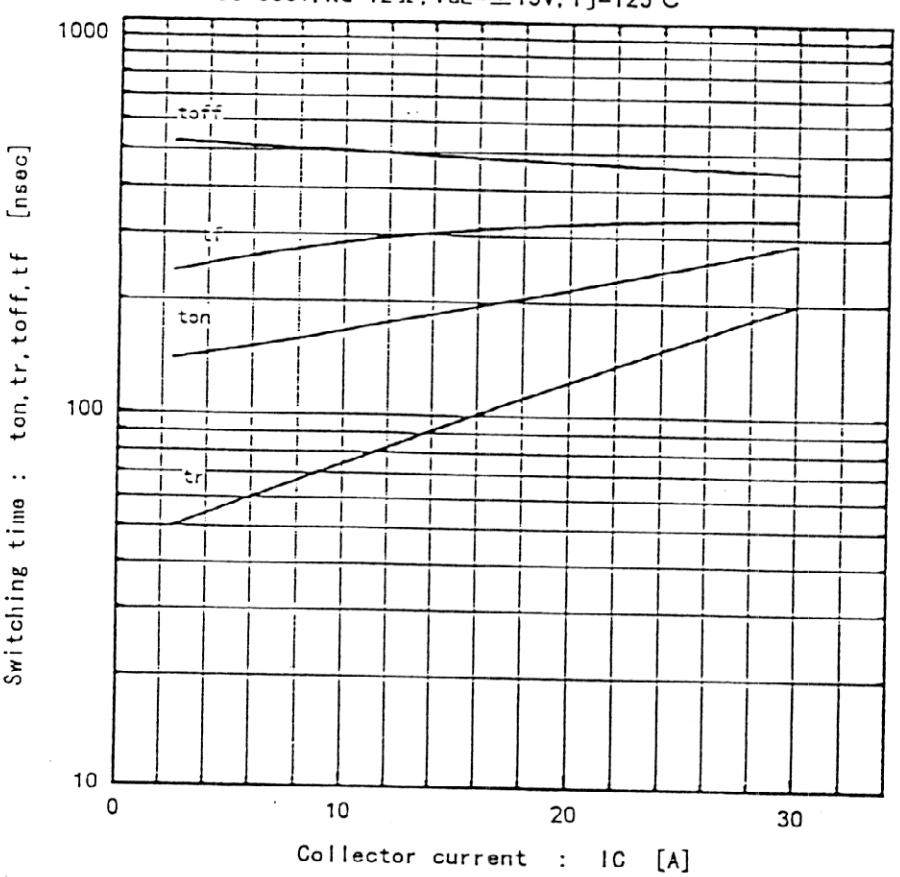
Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=125℃



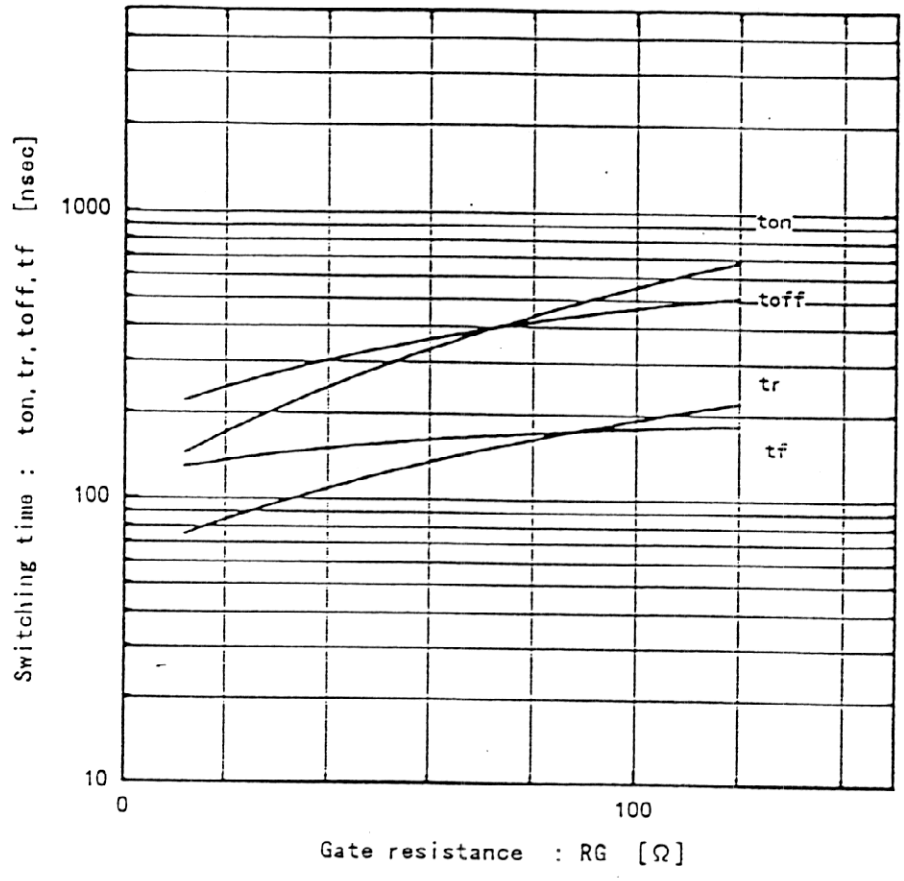
Switching time vs. Collector current
Vcc=300V. RG=12Ω. VGE=±15V. Tj=25℃



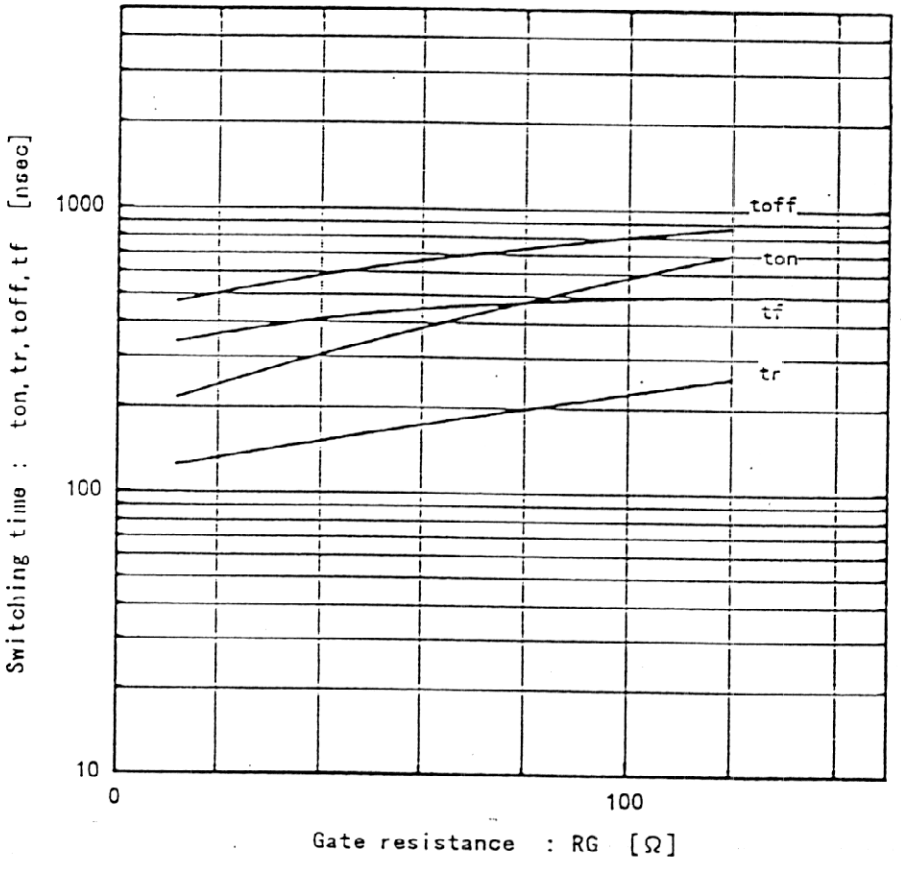
Switching time vs. Collector current
Vcc=300V. RG=12Ω. VGE=±15V. Tj=125℃



Switching time vs. RG
Vcc=300V, IC=20A, VGE=±15V, Tj=25°C

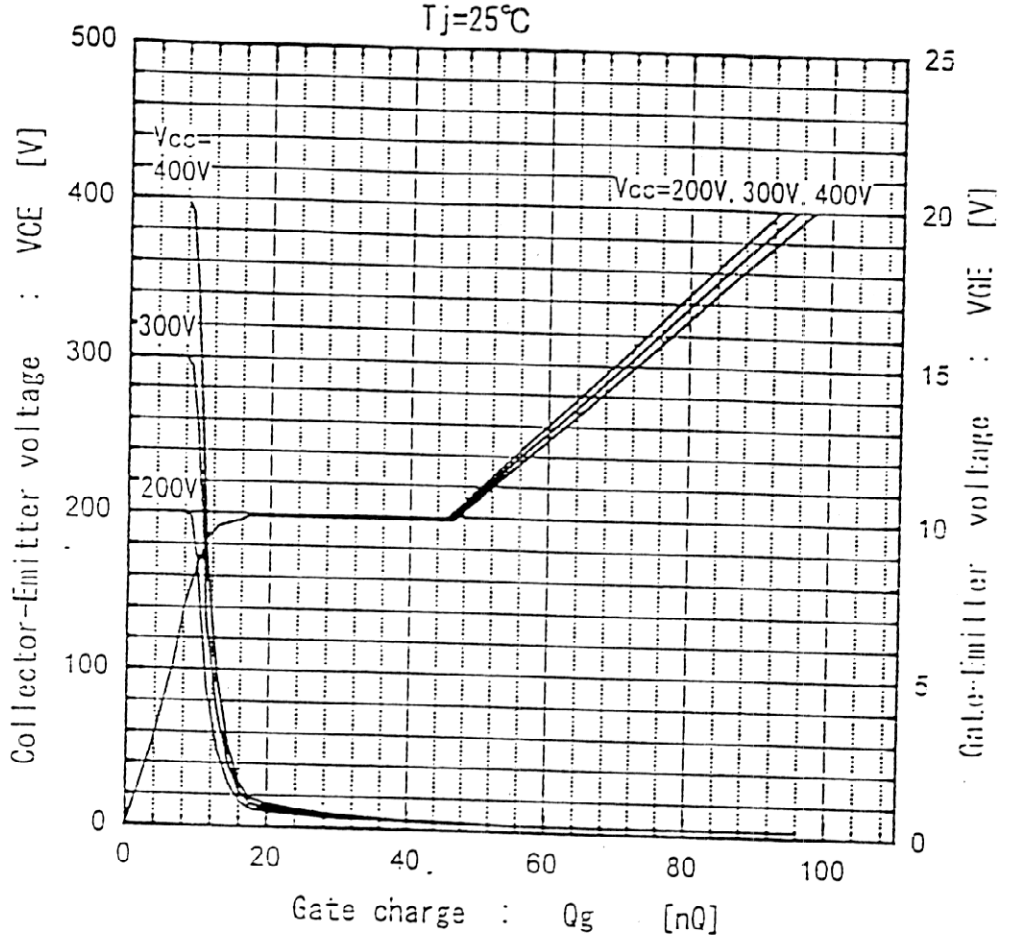


Switching time vs. RG
Vcc=300V, IC=20A, VGE=±15V, Tj=125°C



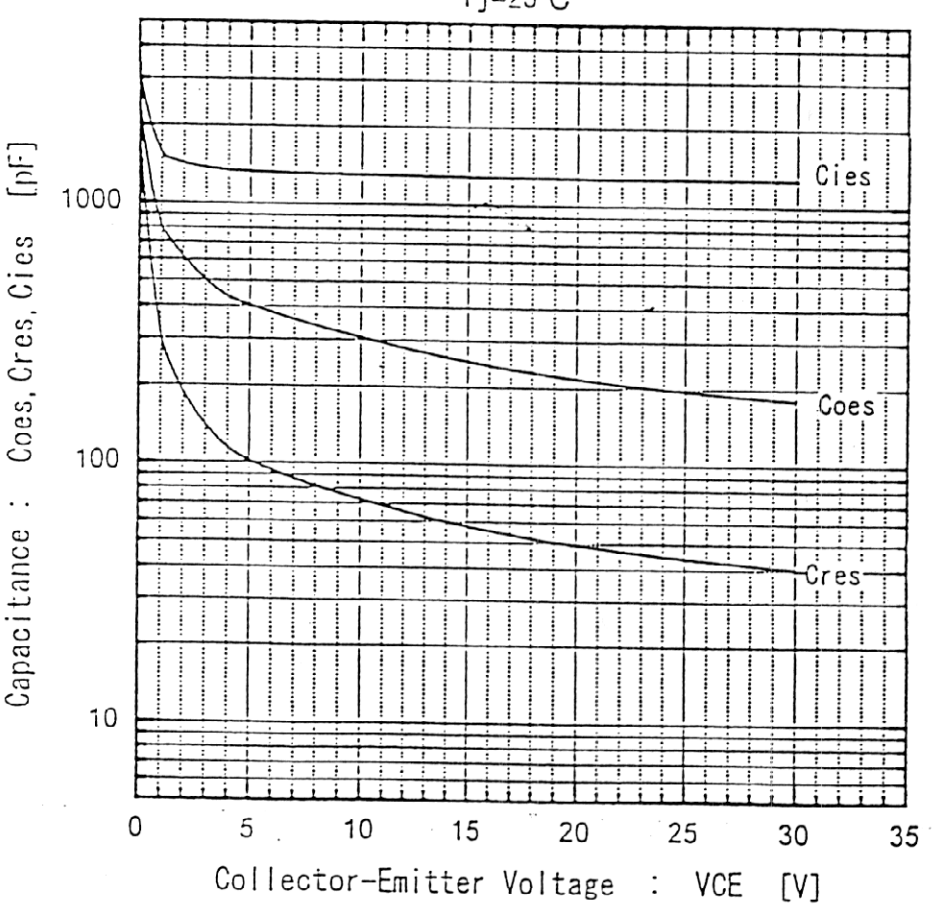
Dynamic input characteristics

Tj=25℃



Capacitance vs. Collector-Emitter voltage

Tj=25℃



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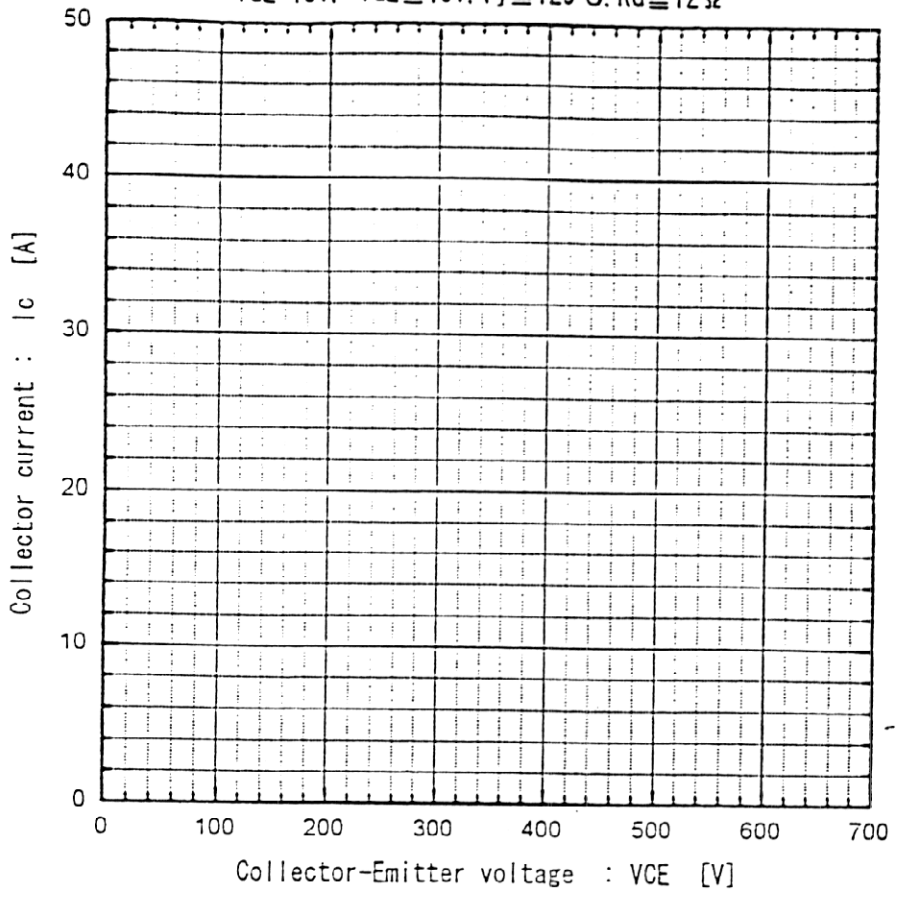
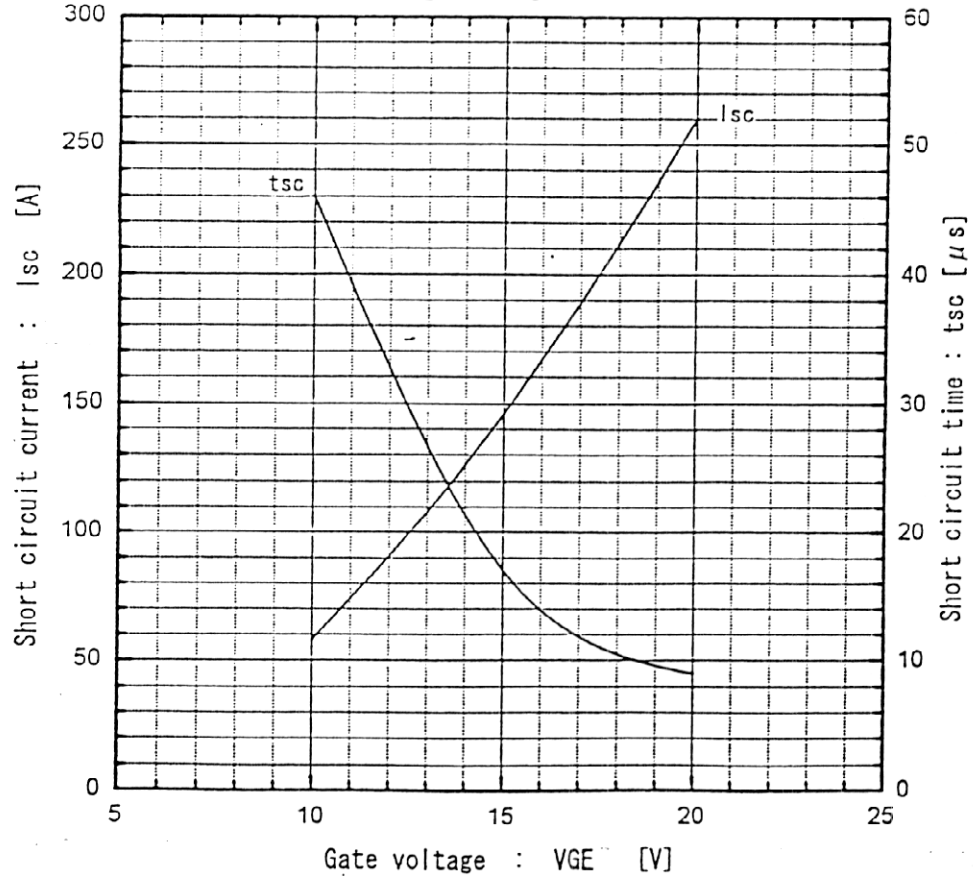
Reverse Biased Safe Operating Area
+VGE=15V. -VGE≦15V. Tj≦125°C. RG≧12Ω



Typical short circuit capability
Vcc=400V. Rg=12Ω. Tj=125°C



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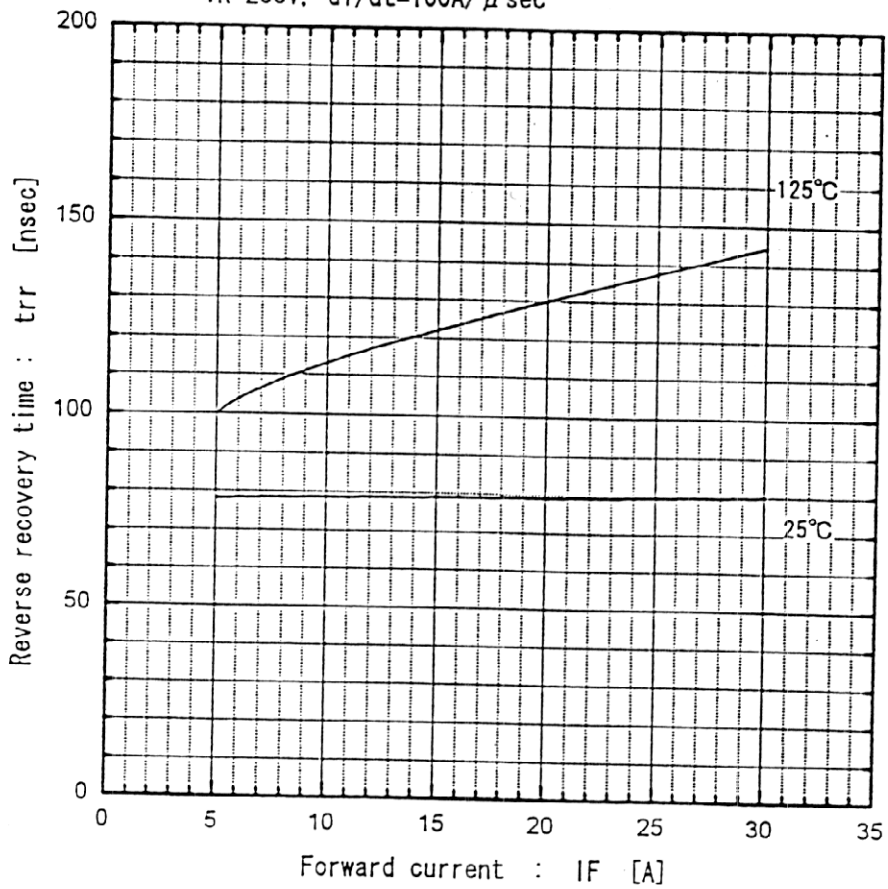
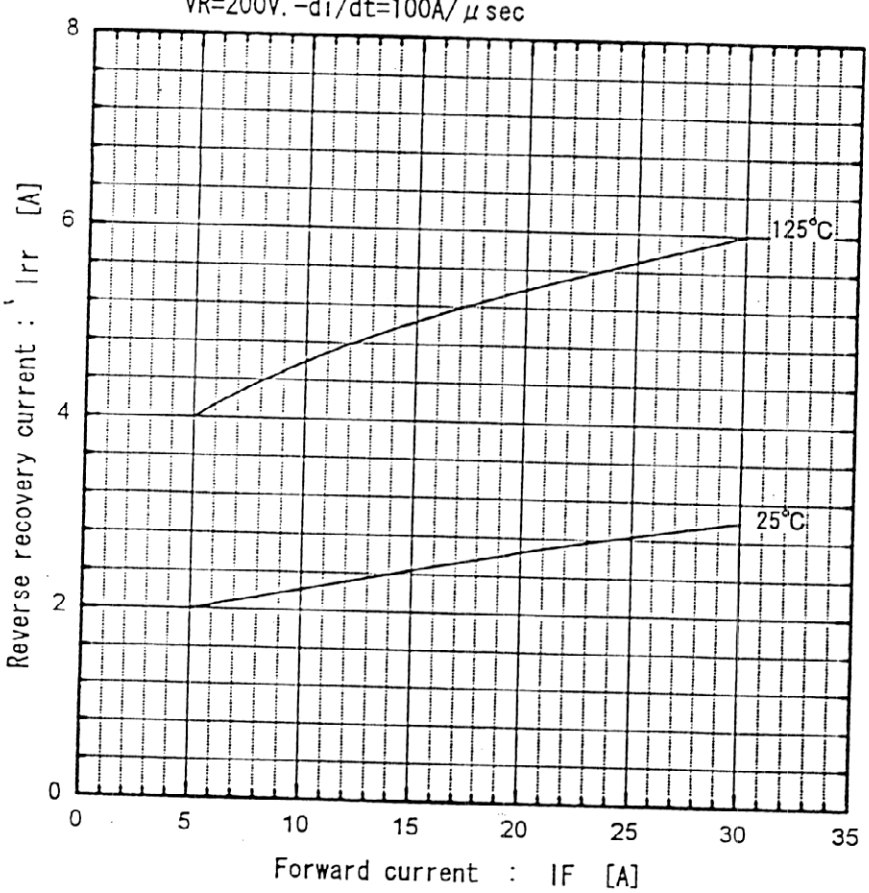
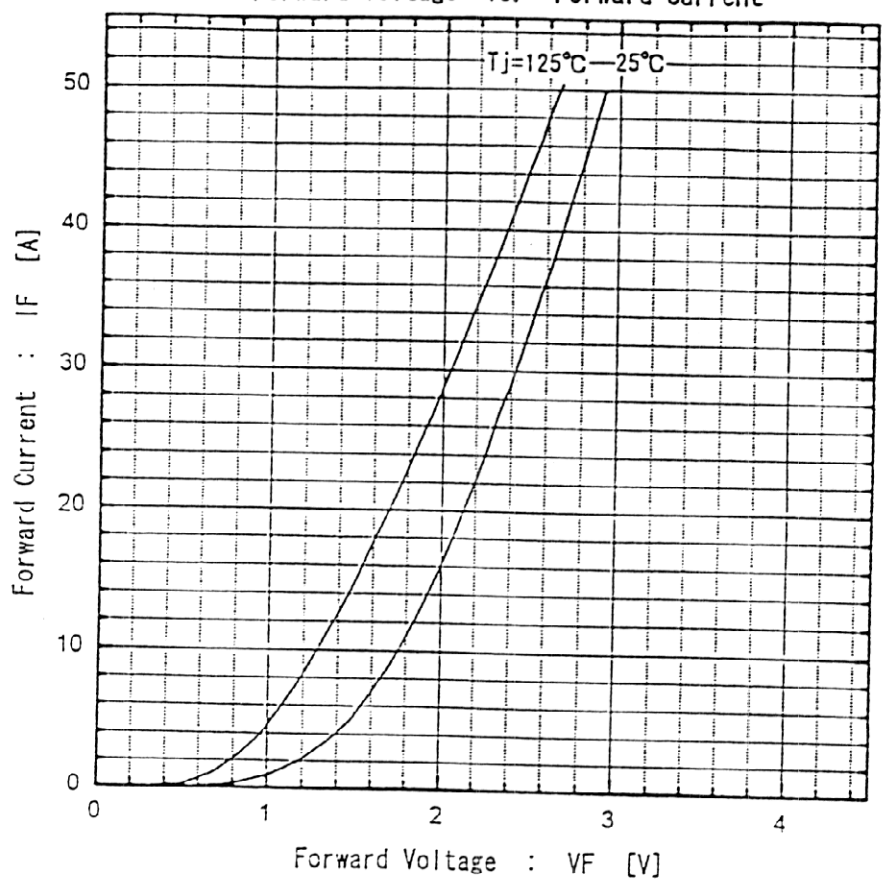
Reverse recovery time vs. Forward current
VR=200V. -di/dt=100A/μsec



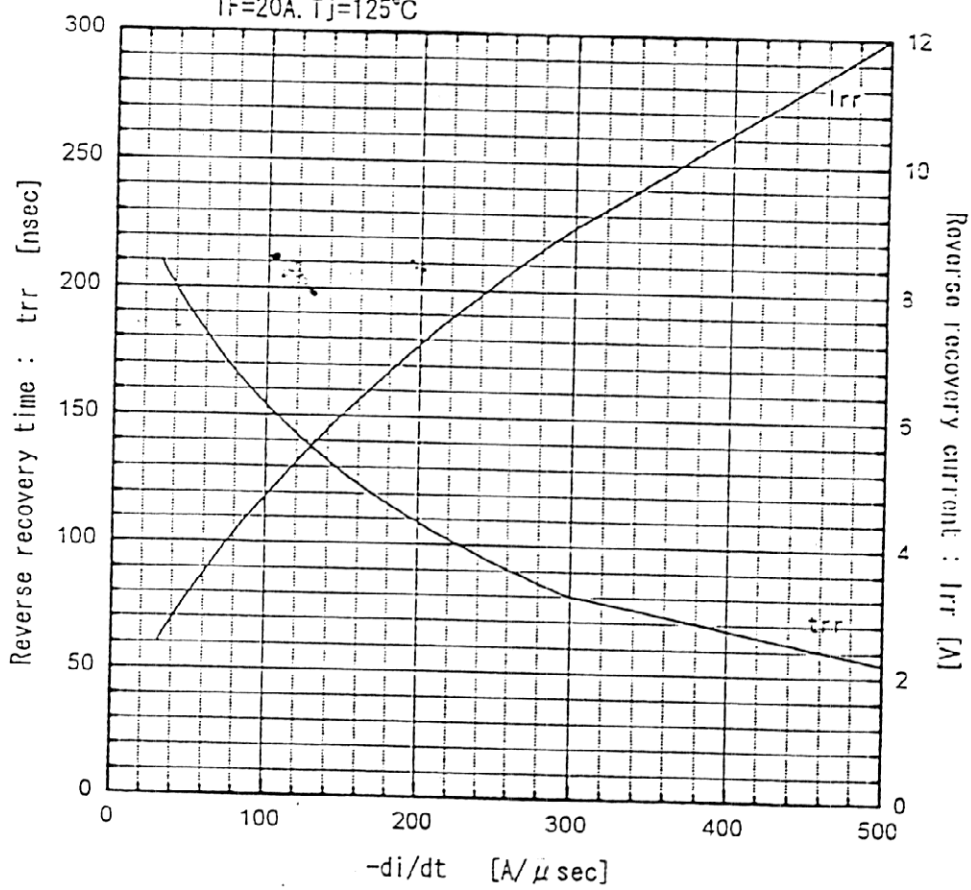
Reverse recovery current vs. Forward current
VR=200V. -di/dt=100A/μsec



Forward voltage vs. Forward current



Reverse recovery chracteristics vs. -di/dt
IF=20A. Tj=125°C



Transient thermal resistance