

Messrs. Rockwell Automation Co.,Ltd.

SPECIFICATION

Device Name : IGBT

Type Name : 1MBH05D-120-S06TT

Spec. No. : MS5F-4089

Date : June-11-1998

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Fuji Electric Co.,Ltd.
Matsumoto Factory

	DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
DRAWN	June-11-98	R. Sawada		DWG. NO.	MS5F4089
CHECKED	June-11-98	T. Igarashi			

• Scope

This specification is applied to Fuji discrete IGBT 1MBH05D-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 Trademark
 - 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 ~~MS500026~~

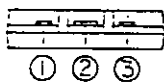
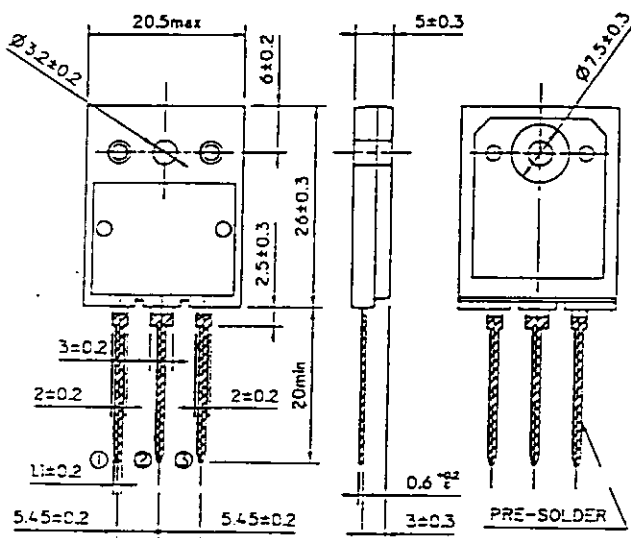
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Ratings and characteristics of Fuji IGBT

1MBH05D-120

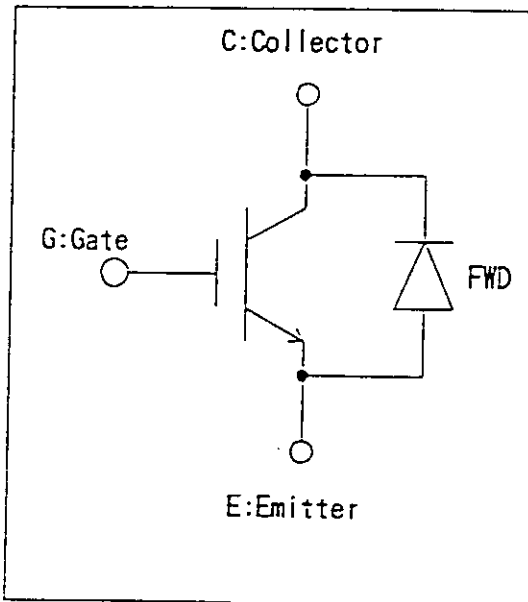
1. Outline Drawing



CONNECTION

- ① GATE
- ② COLLECTOR
- ③ EMITTER

2. Equivalent circuit



3. Absolute maximum ratings (Tc=25°C)

Items		Symbols	Ratings	Units	
Collector-Emitter Voltage		V_{CES}	1200	V	
Gate-Emitter Voltage		V_{GES}	± 22	V	
Collector Current	DC	Tc=25 °C	I_{C25}	10	A
		Tc=105°C	I_{C105}	5	A
	1ms	Tc=25 °C	I_{cp}	27	A
IGBT Max. Power Dissipation		P_c	115	W	
FWD Max. Power Dissipation		P_c	75	W	
Operating Temperature		T_j	+ 150	°C	
Storage Temperature		T_{stg}	-40 ~ +150	°C	
Mounting Screw Torque		—	70	N · cm	

4. Electrical Characteristics (at Tc=25°C 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	$V_{CE} = 0V$ $V_{GE} = \pm 22V$	μA	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	5.5		8.5	$V_{CE} = 20V$ $I_C = 5mA$	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			3.5	$V_{GE} = 15V$ $I_C = 5A$	V	
Input capacitance	C_{ies}		650		$V_{GE} = 0V$	pF	
Output capacitance	C_{oes}		150		$V_{CE} = 10V$		
Reverse transfer capacitance	C_{res}		40		$f = 1MHz$		
Switching Time	Turn-on time	t_{on}		1.2	$V_{CC} = 600V$ $I_C = 5A$ $V_{GE} = \pm 15V$ $R_G = 330\Omega$ (Half Bridge)	μs	
		t_r		0.6			
	Turn-off time	t_{off}		1.5			
		t_f		0.5			
	Turn-on time	t_{on}		0.16	$V_{CC} = 600V$ $I_C = 5A$ $V_{GE} = +15V$ $R_G = 33\Omega$ (Half Bridge)		
		t_r		0.11			
	Turn-off time	t_{off}		0.30			
		t_f		0.50			
FWD forward voltage drop	V_F			3.0		$I_F = 5A$	V
Reverse recovery time	t_{rr}			0.35		$I_F = 5A, V_{GE} = -10V$ $V_R = 200V$ $di/dt = 100A/\mu s$	μs

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	$R_{th(j-c)}$			1.08	IGBT	$^{\circ}C/W$
	$R_{th(j-c)}$			1.66	FWD	

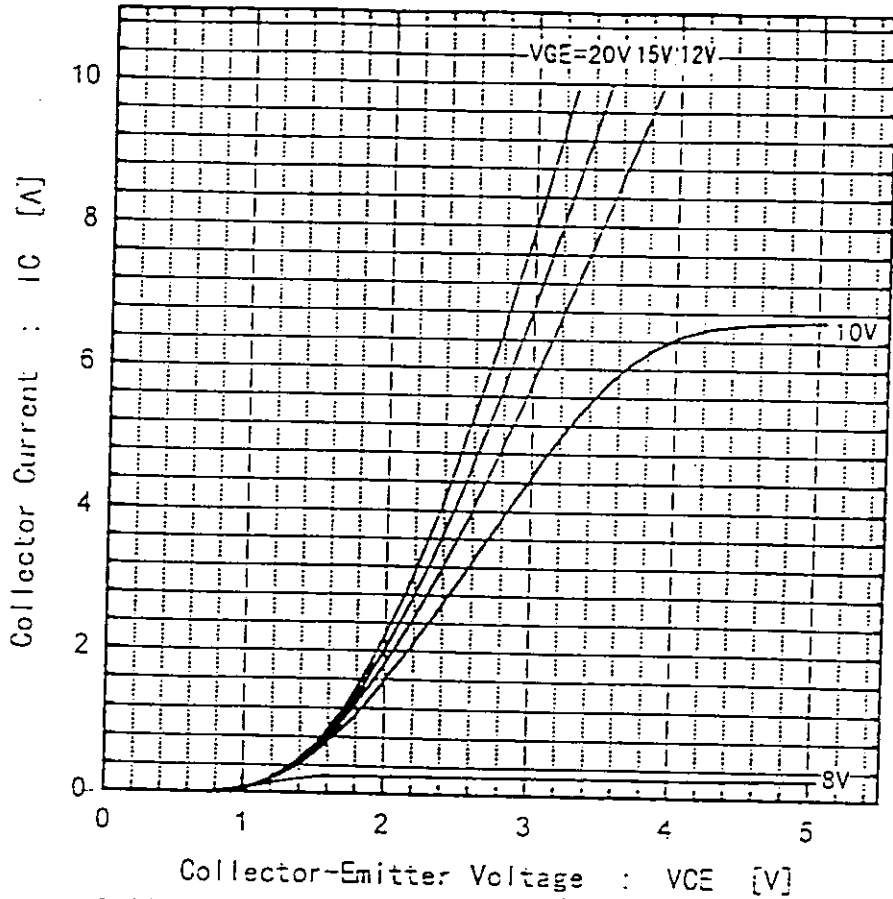
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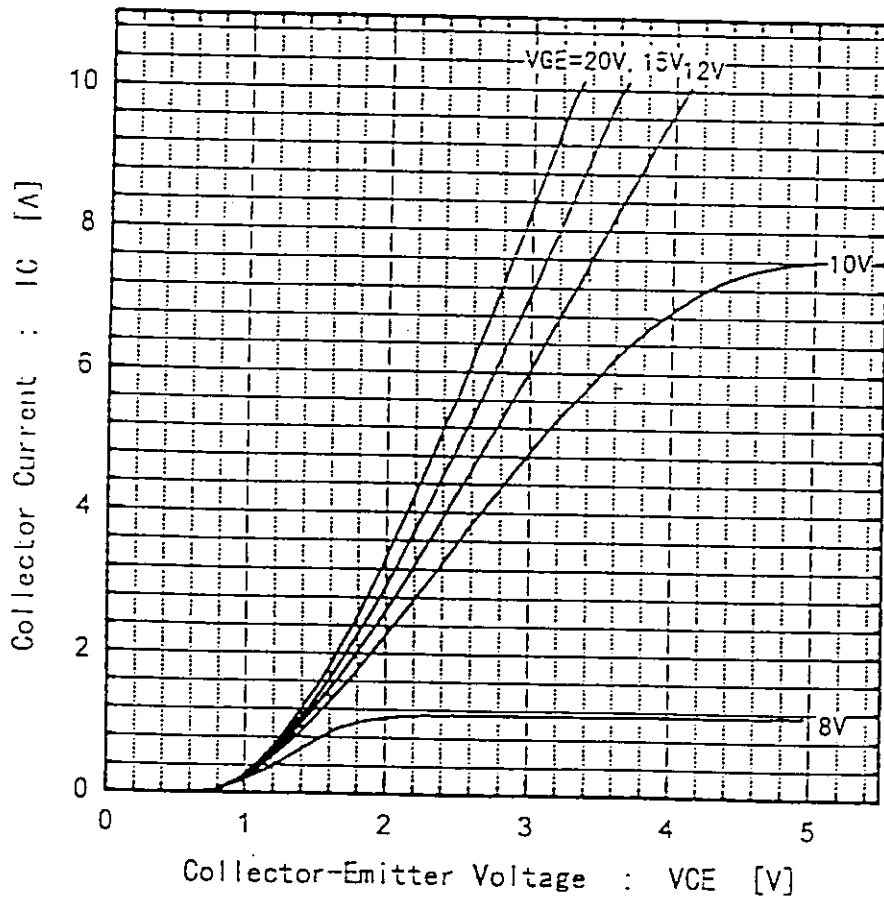
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Collector Current vs. Collector-Emitter Voltage
 $T_j=25^\circ\text{C}$



Collector Current vs. Collector-Emitter Voltage
 $T_j=125^\circ\text{C}$



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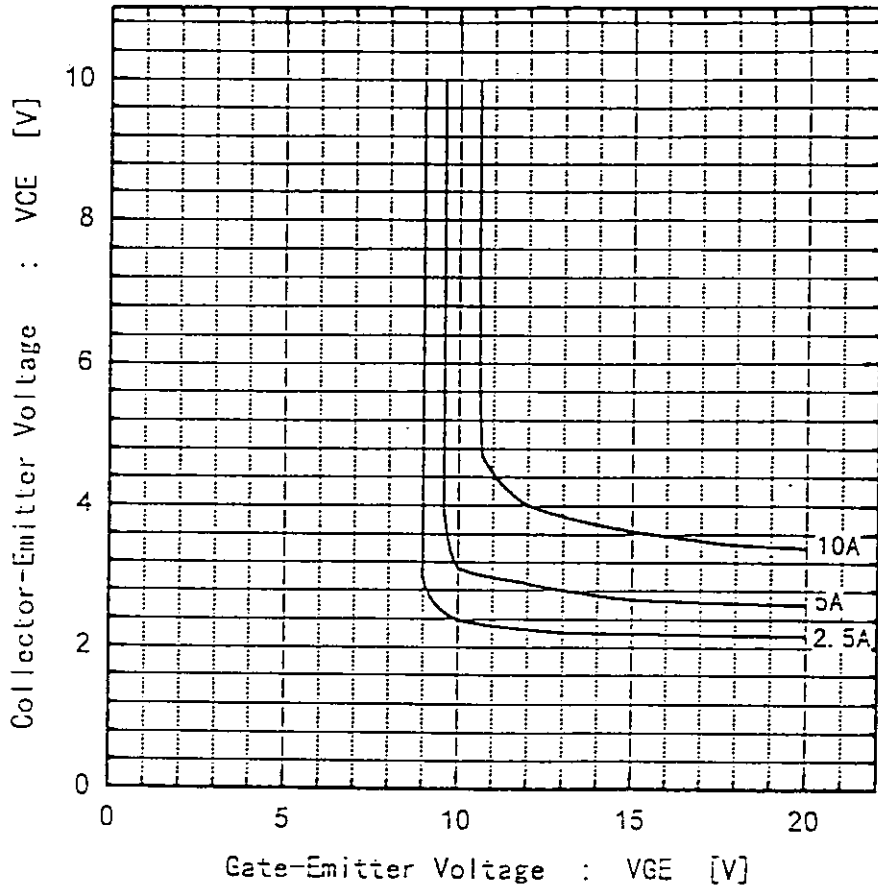
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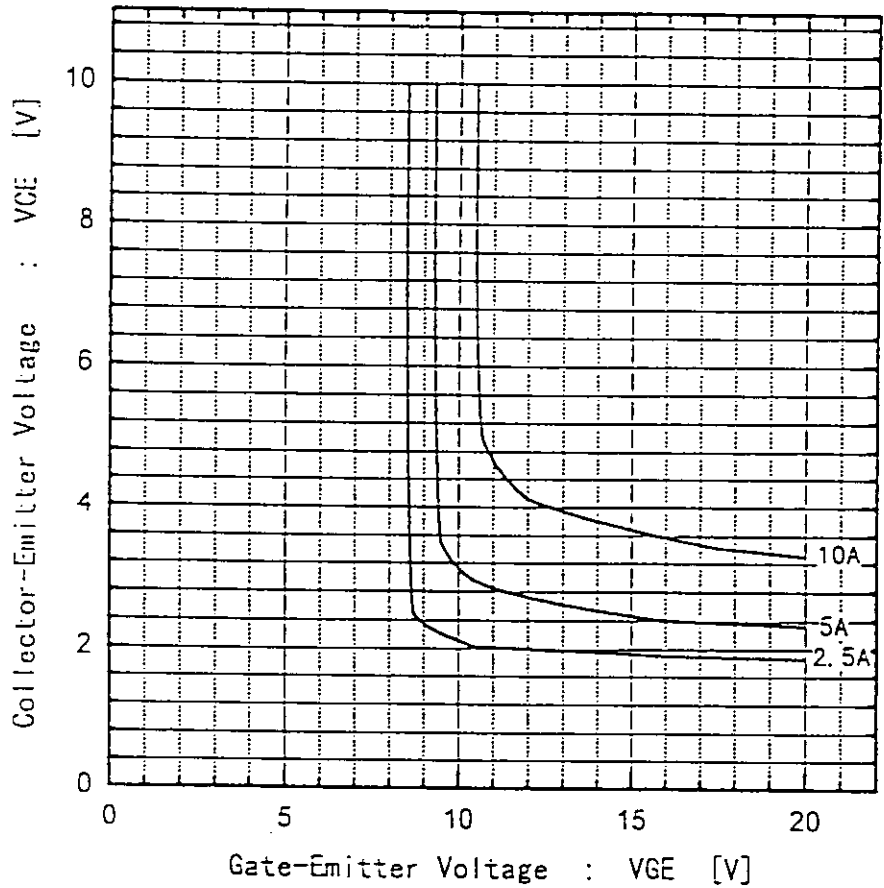
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Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j=25^\circ\text{C}$

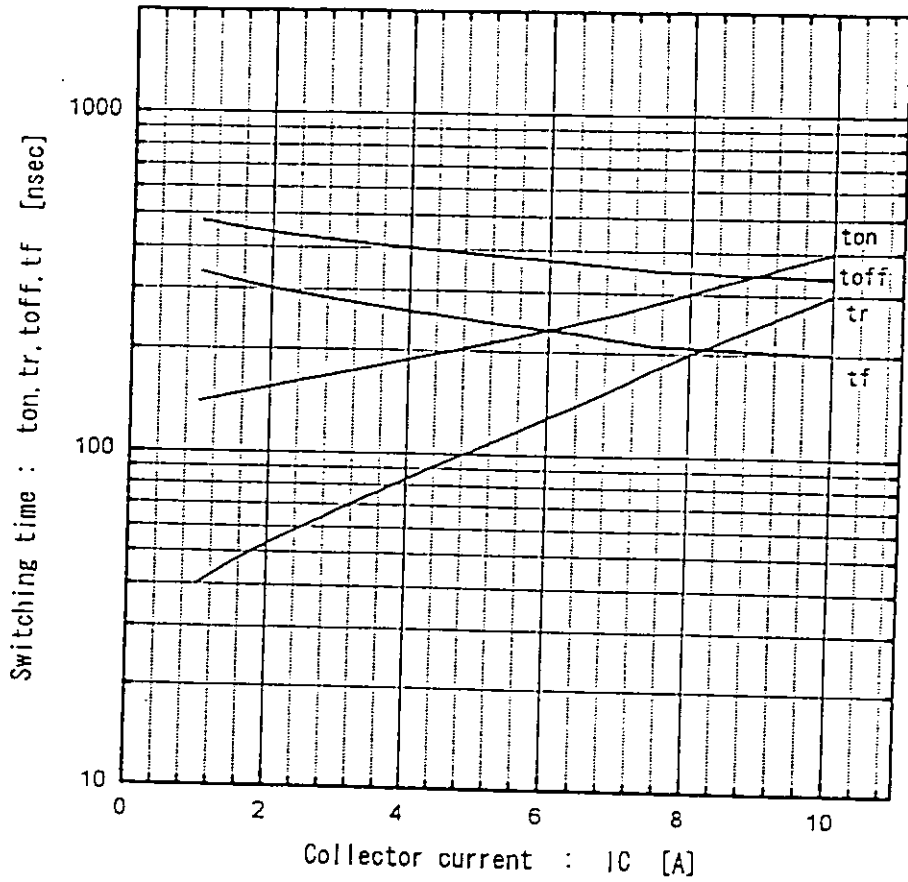


Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j=125^\circ\text{C}$

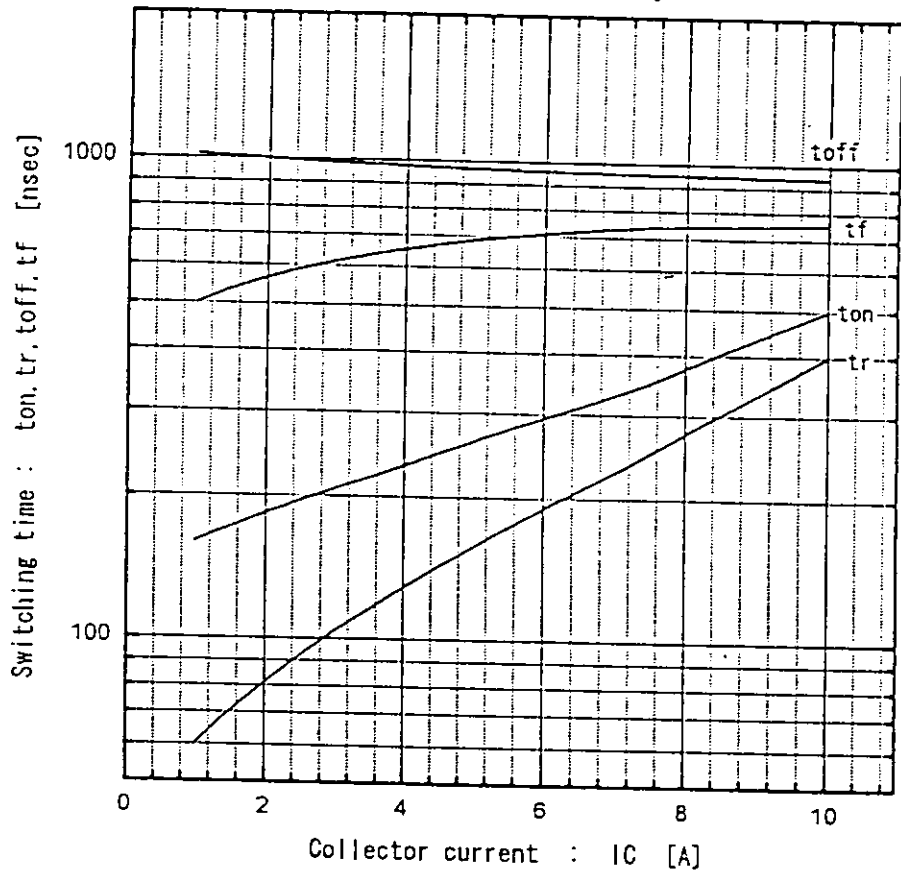


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Switching time vs. Collector current
 $V_{CC}=600V, R_G=33\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs. Collector current
 $V_{CC}=600V, R_G=33\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$



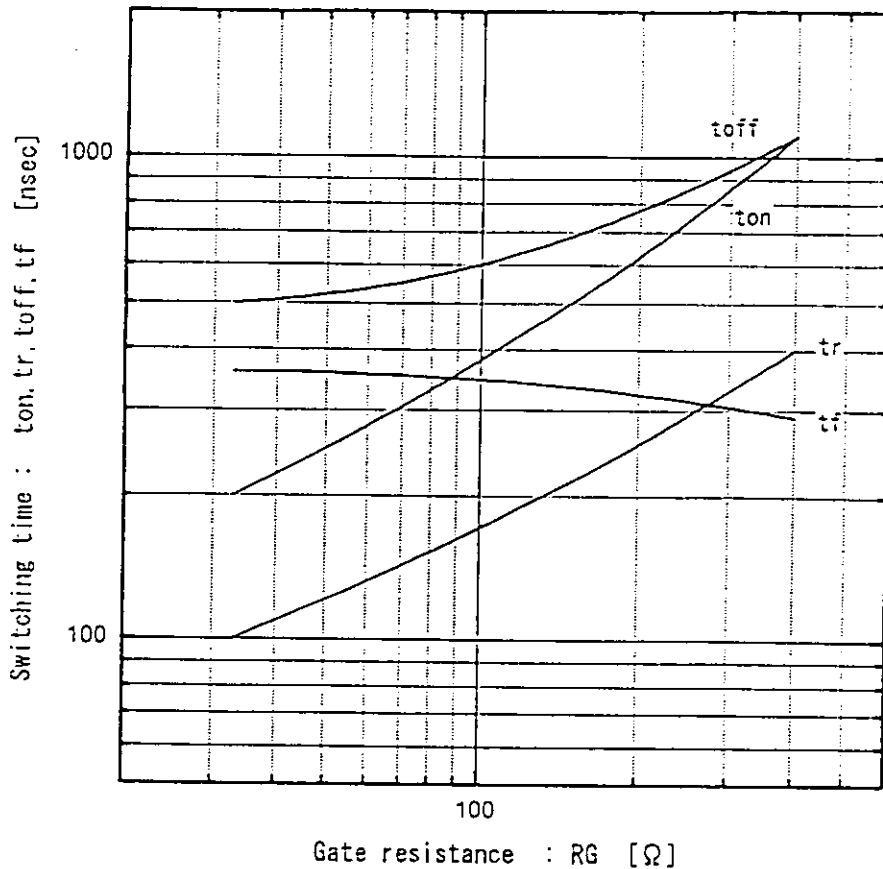
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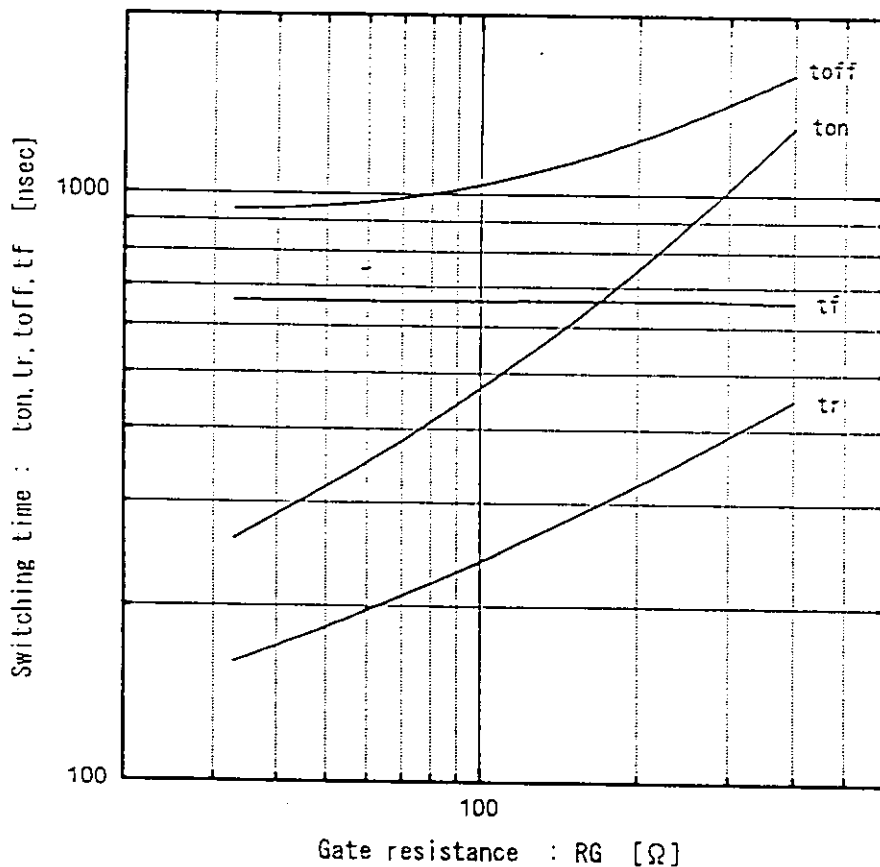
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Switching time vs. RG
 $V_{CC}=600V, I_C=5A, V_{GE}=\pm 15V, T_j=25^\circ C$



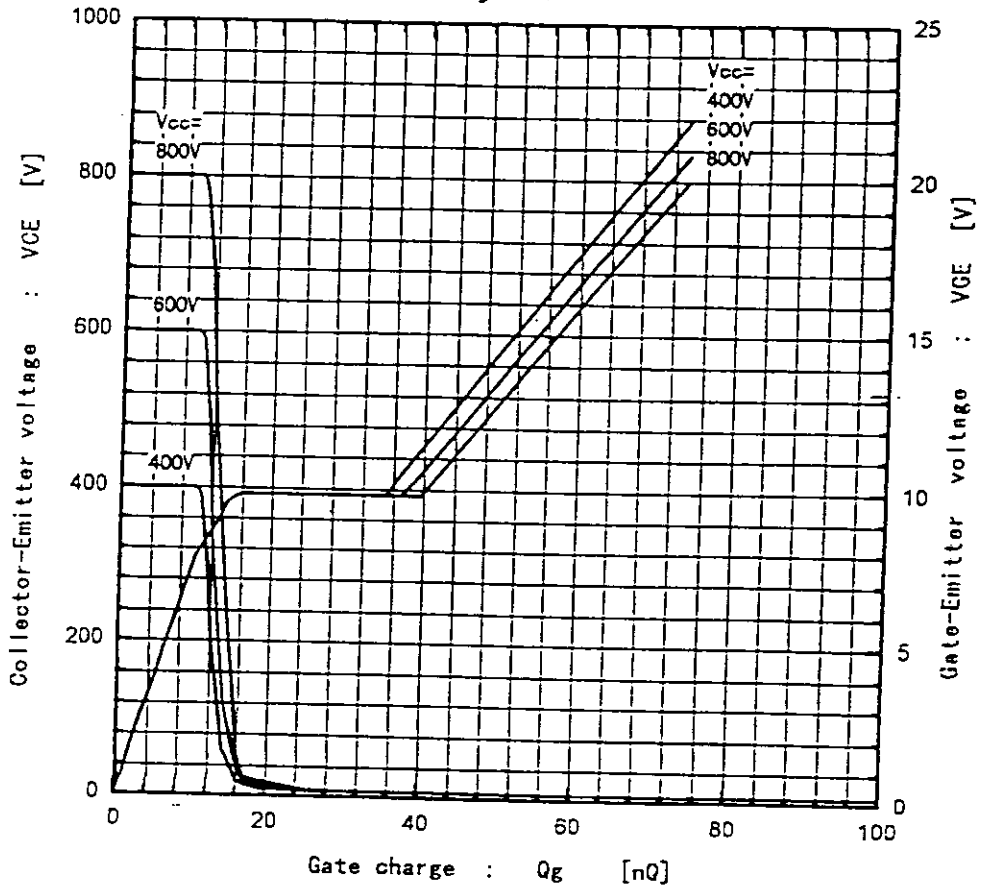
Switching time vs. RG
 $V_{CC}=500V, I_C=5A, V_{GE}=\pm 15V, T_j=125^\circ C$



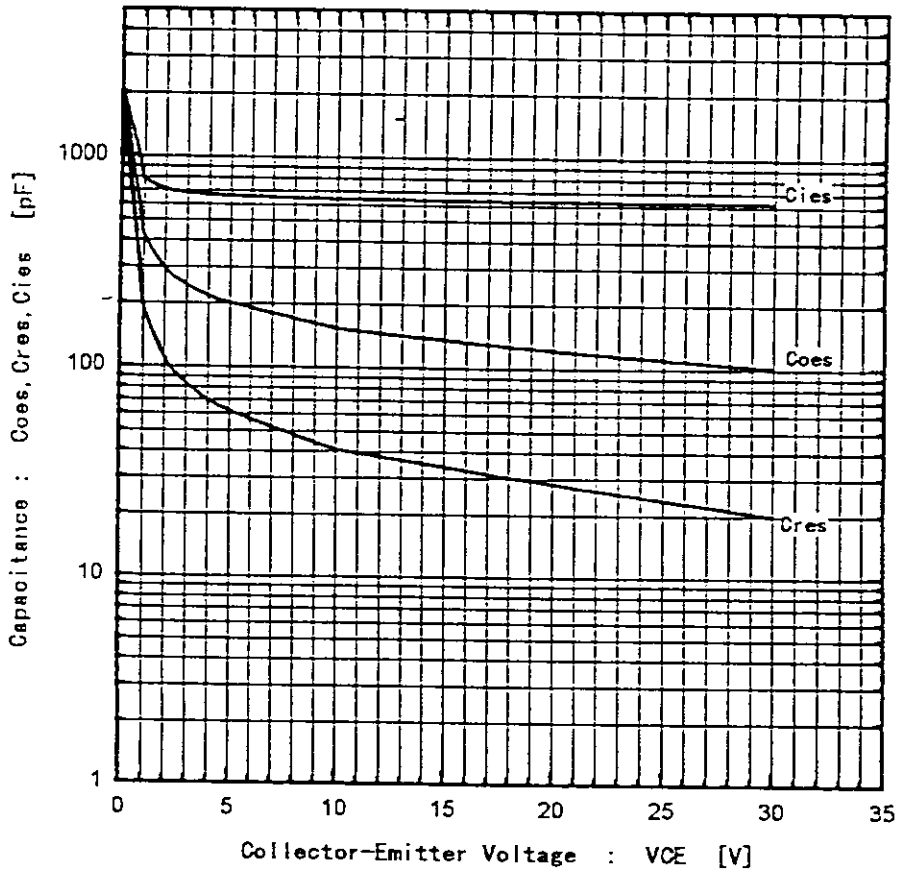
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Dynamic input characteristics
Tj=25°C



Capacitance vs. Collector-Emitter voltage
Tj=25°C



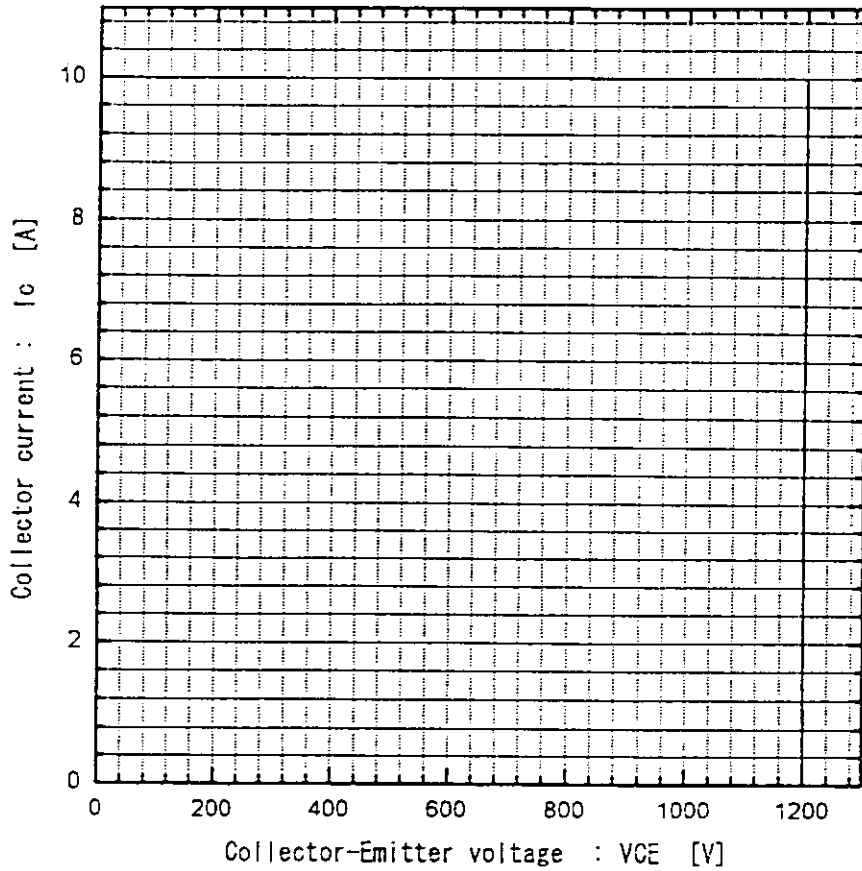
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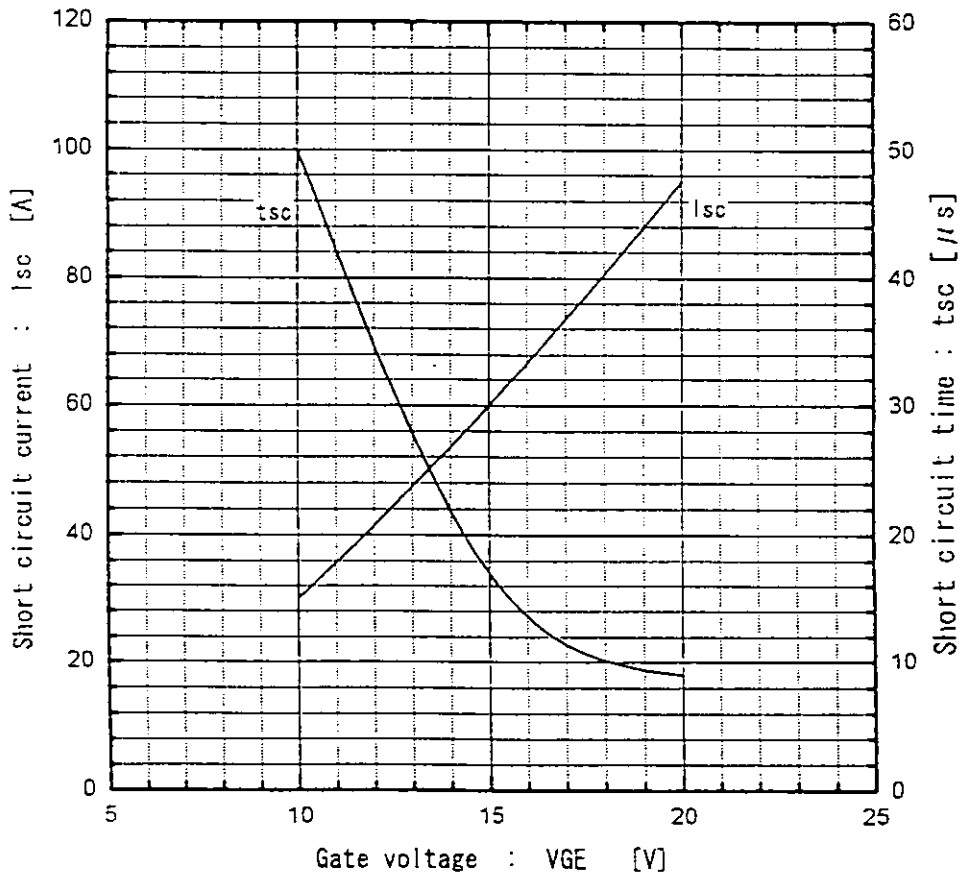
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Reverse Biased Safe Operating Area
 $+V_{GE} = 15V, -V_{GE} \leq 15V, T_j \leq 125^\circ C, R_G \geq 33\Omega$



Typical short circuit capability
 $V_{CC} = 800V, R_G = 33\Omega, T_j = 125^\circ C$



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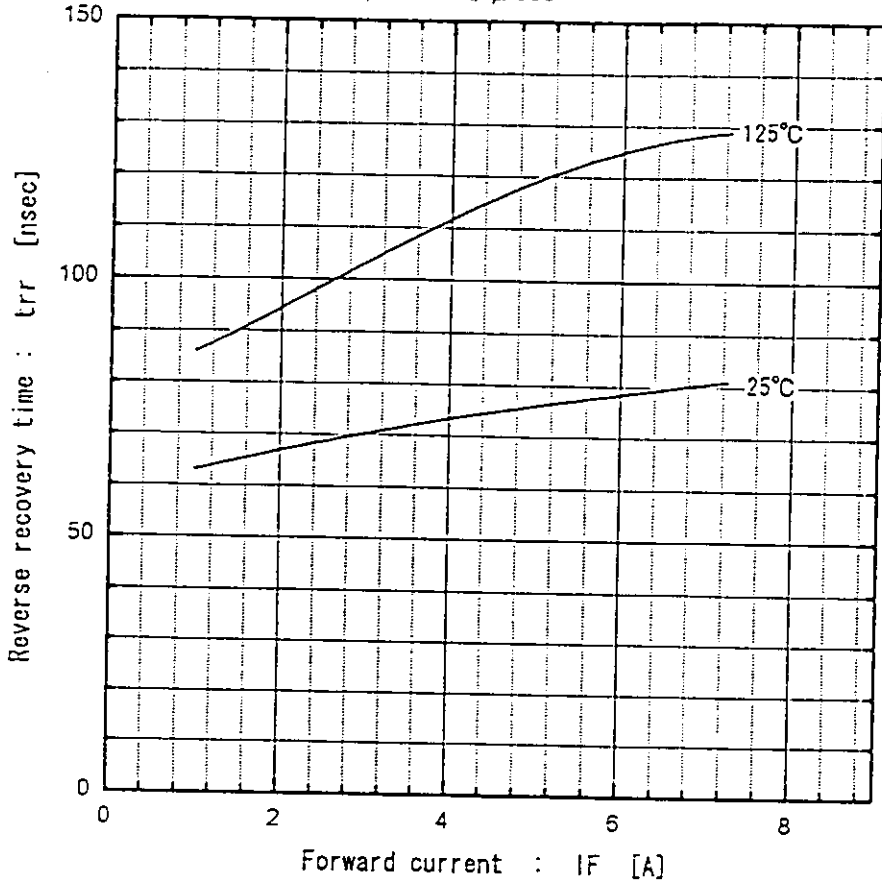
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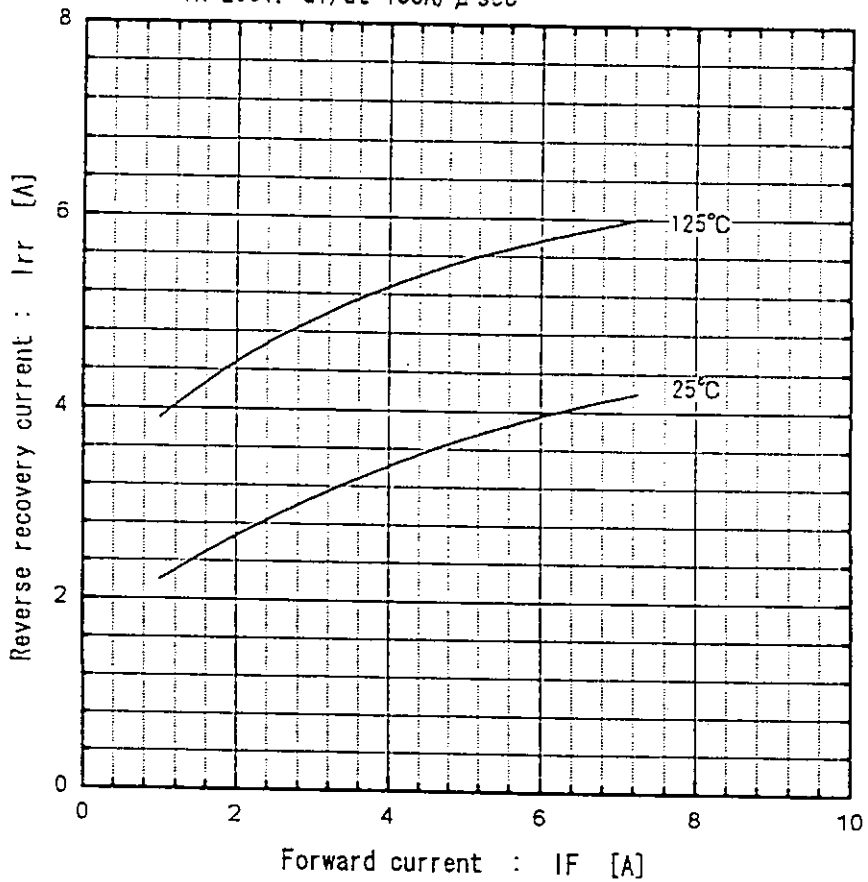
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Reverse recovery time vs. Forward current
 $VR=200V, -di/dt=100A/\mu sec$



Reverse recovery current vs. Forward current
 $VR=200V, -di/dt=100A/\mu sec$



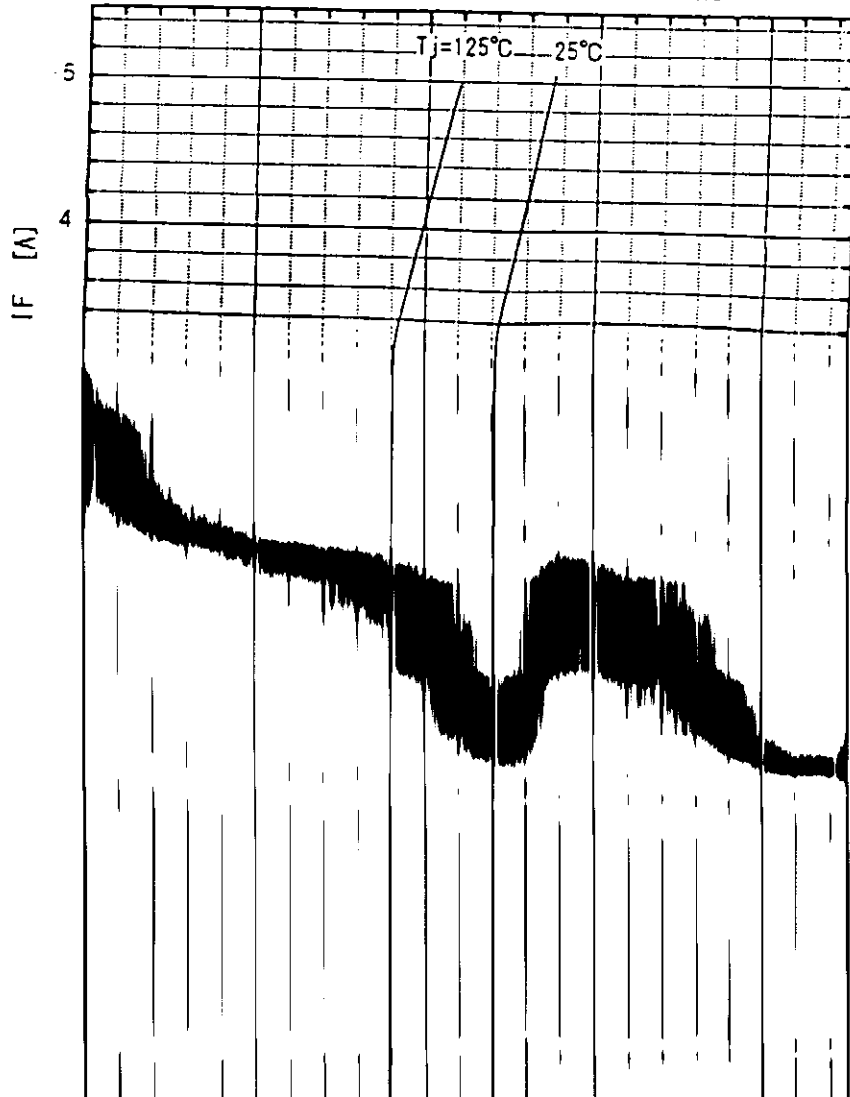
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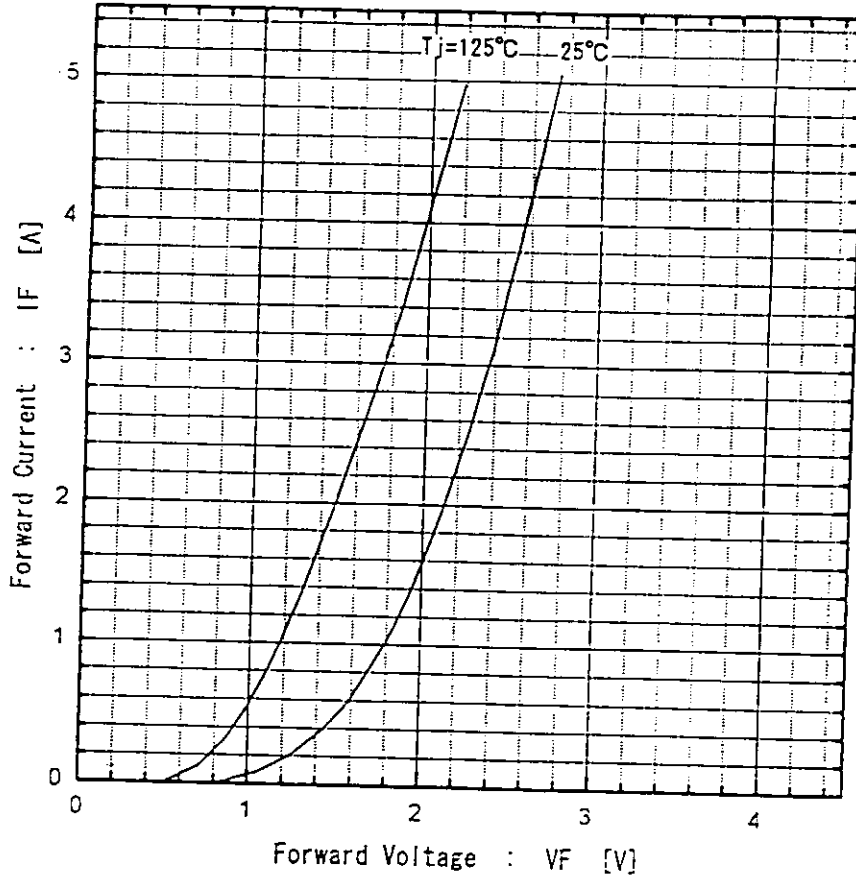
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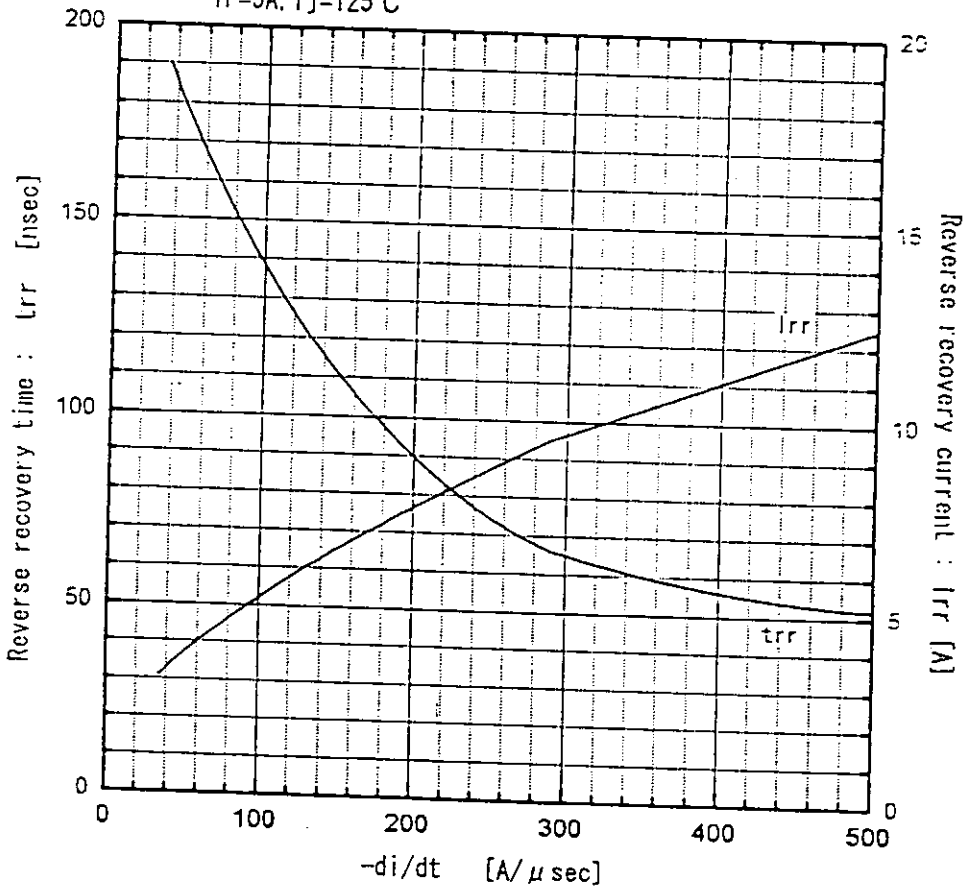
Forward voltage vs. Forward current



Forward voltage vs. Forward current



Reverse recovery characteristics vs. $-di/dt$
IF=5A, Tj=125°C



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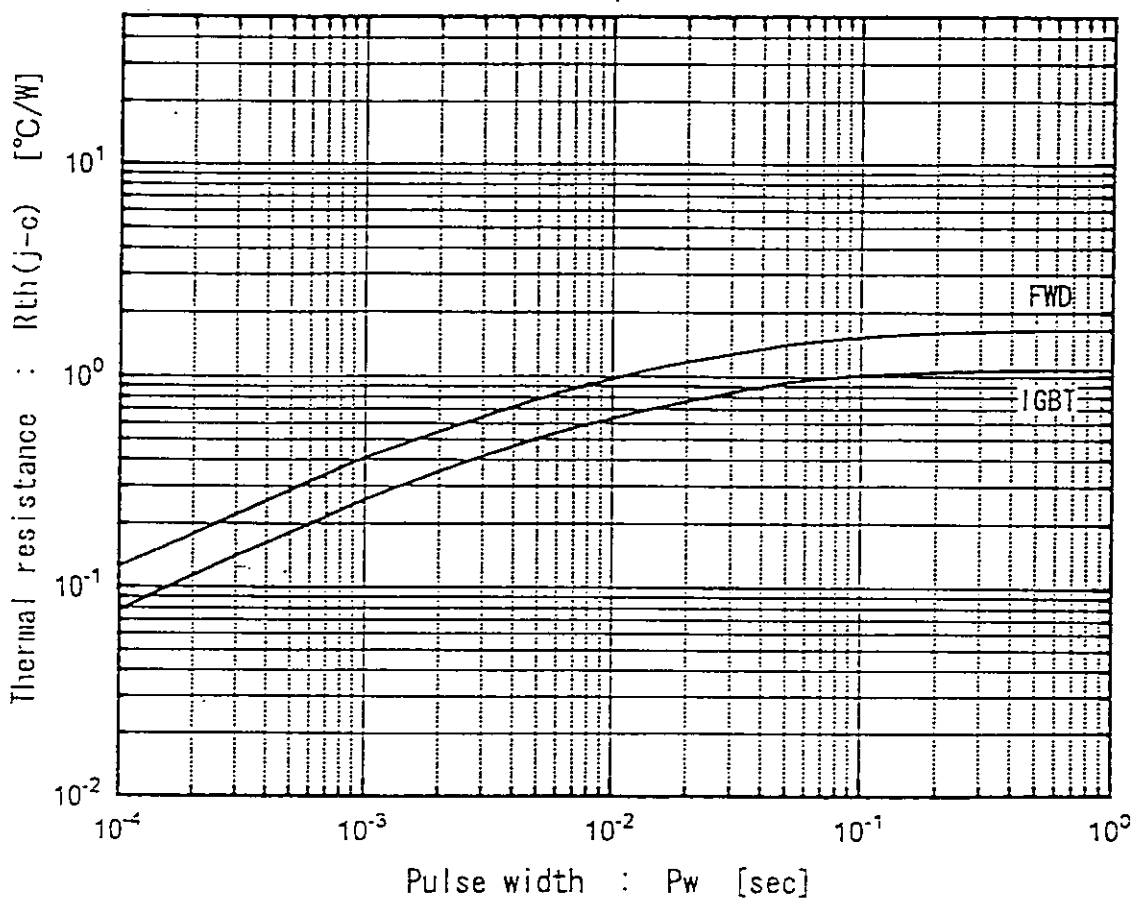
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Transient thermal resistance



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