SPECIFICATION

(TENTATIVE)

Device Name : IGBT

Type Name : 1MBH50D-060S

Spec. No. : MS5F 4622

Date : June-21-1999

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Matsumoto Factory

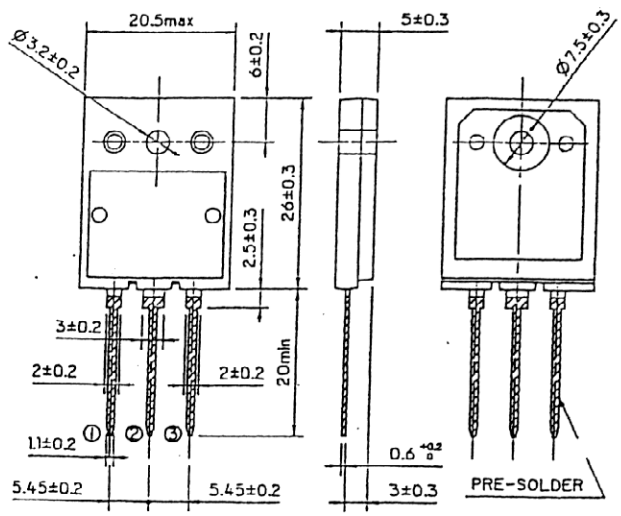
	DATE	NAME	APPROVED
DRAWN	June-21-99	K. Sawada	
CHECKED	Jun-21-'99	T. HOSEN	T. HOSEN

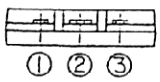
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DWG. NO. MS5F 4622 1/13

1MBH50D-060S

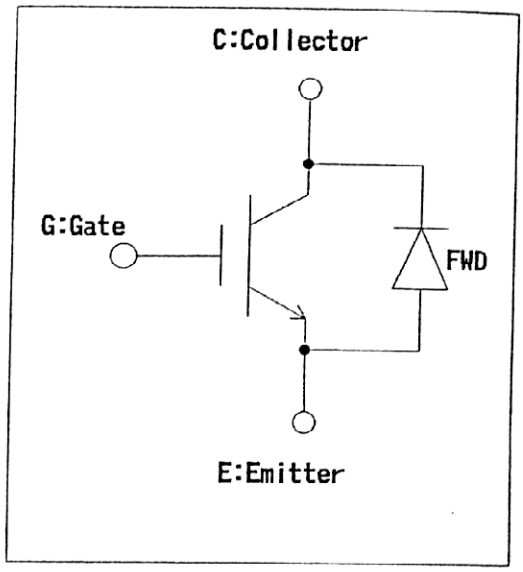
1. Outline Drawing





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}	600	V
Gate-Emitter Voltage			V_{GES}	±30	V
Collector Current	DC	Tc=25 °C	Ic_{25}	75	A
		Tc=100°C	Ic_{100}	50	A
	1ms	Tc=25 °C	Icp	150	A
IGBT Max. Power Dissipation			Pc	230	W
FWD Max. Power Dissipation			Pc	150	W
Operating Temperature			Tj	+ 150	°C
Storage Temperature			Tstg	-40 ～ +150	°C
Mounting Screw Torque			——	70	N・cm

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

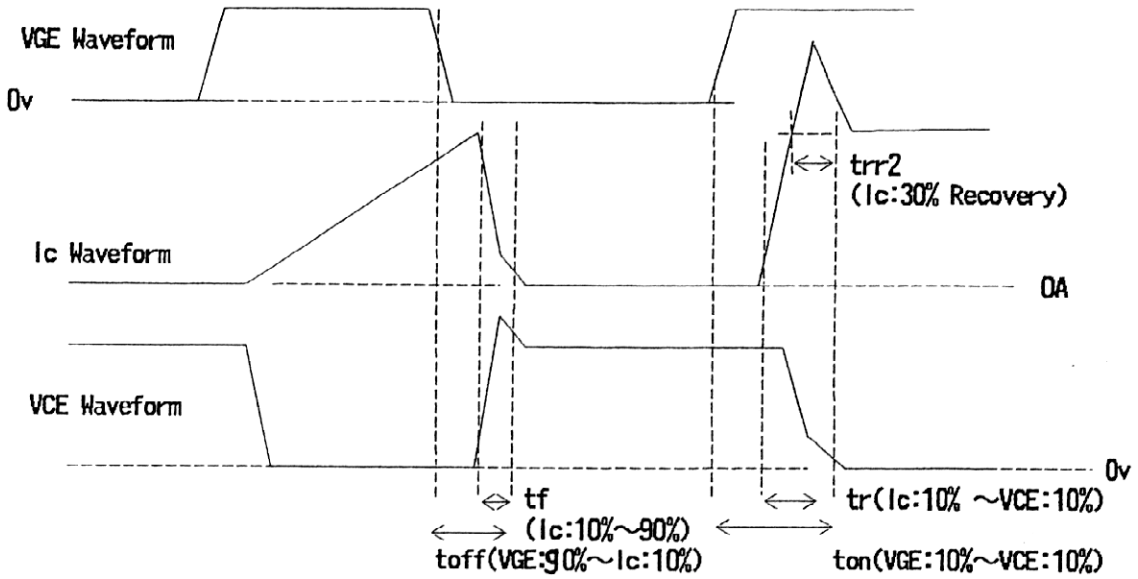
Items		Symbols	Characteristics min.	Characteristics typ.	Characteristics max.	Conditions	Unit
Zero gate voltage Collector Current		I_{CES}	—	—	1.0	V_{GE} = 0V V_{CE} = 600V	mA
Gate-Emitter leakage Current		I_{GES}	—	—	10	V_{CE} = 0V V_{GE} = ±30V	μA
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	4.0	5.0	6.0	V_{CE} = 20V Ic = 50mA	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	—	2.4	2.9	V_{GE} = 15V Ic = 50A	V
Input capacitance		Cies	—	2500	—	V_{GE} = 0V	pF
Output capacitance		Coes	—	240	—	V_{CE} = 25V	
Reverse transfer capacitance		Cres	—	130	—	f = 1MHz	
Switching Time	Turn-on time	ton ※	—	0.15	—	Vcc = 300V Ic = 50A V_{GE} = ±15V R_G = 33 Ω (Half Bridge) Inductance Load	μs
		tr ※	—	0.09	—		
		trr2	—	0.03	—		
	Turn-off time	toff	—	0.50	0.62		
		tf	—	0.10	0.17		
	Turn-on time	ton ※	—	0.15	—	Vcc = 300V Ic = 50A V_{GE} = +15V R_G = 8.0Ω (Half Bridge) Inductance Load	
		tr ※	—	0.09	—		
		trr2	—	0.03	—		
	Turn-off time	toff	—	0.50	0.62		
		tf	—	0.10	0.17		
FWD forward voltage		VF	—	2.0	2.5	IF=50A, VGE=0V	
Reverse recovery time		trr	—	0.60	0.10	IF=50A, VGE=-10V VR=300V, dv/dt=100A/μs	μs

※ Turn-on characteristics iclude trr2. Seee figure.A in next page.

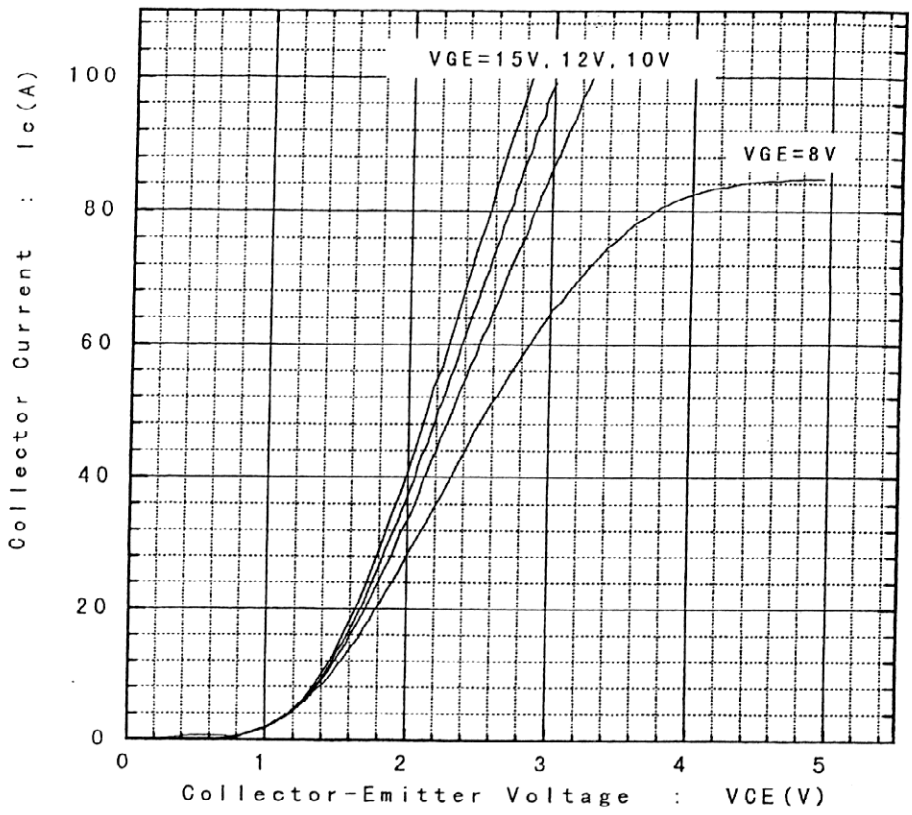
5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	Rth(j-c)	—	—	0.54	IGBT	°C/W
	Rth(j-c)	—	—	0.83	FWD	

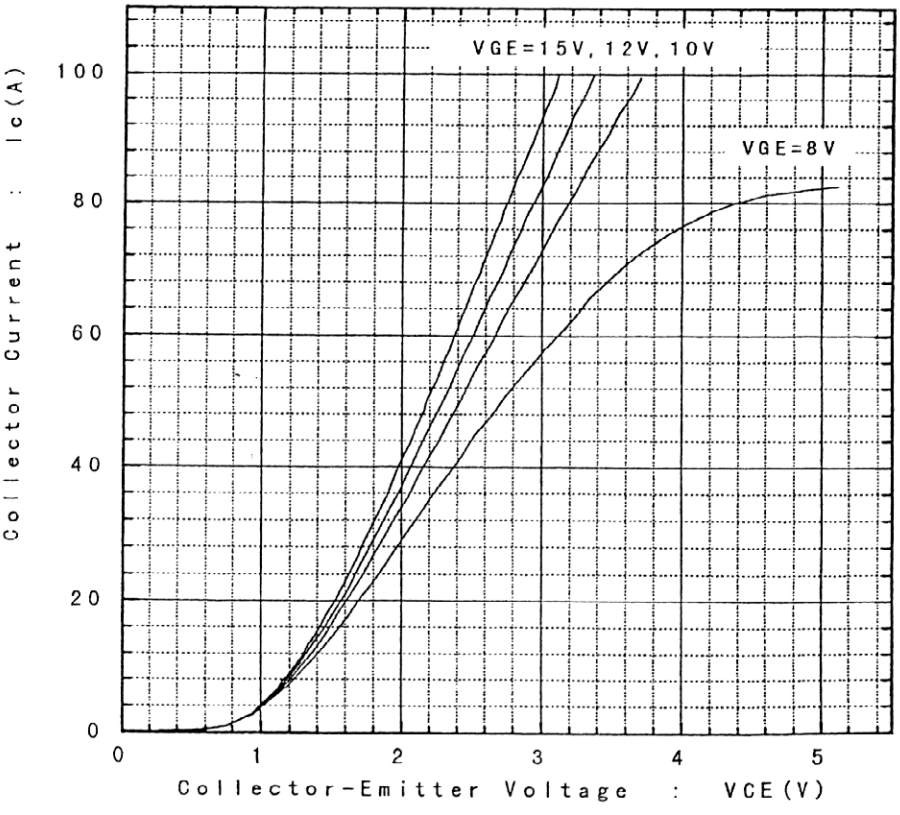
6. Switching waveform



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



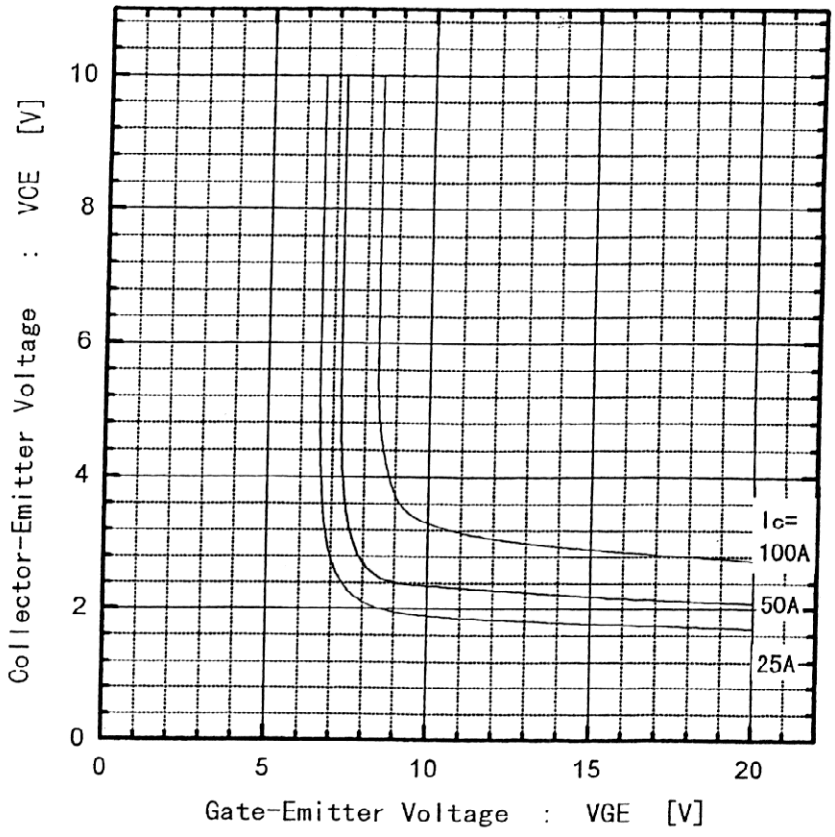
Collector Current vs. Collector-Emitter Voltage
Tj=125℃



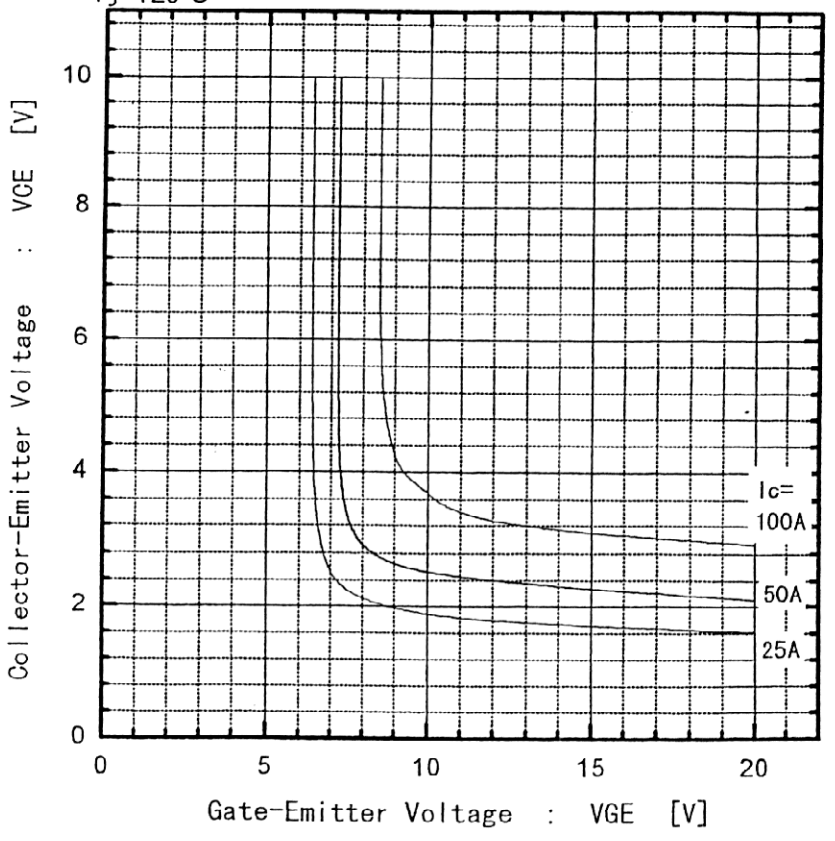
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Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=25℃

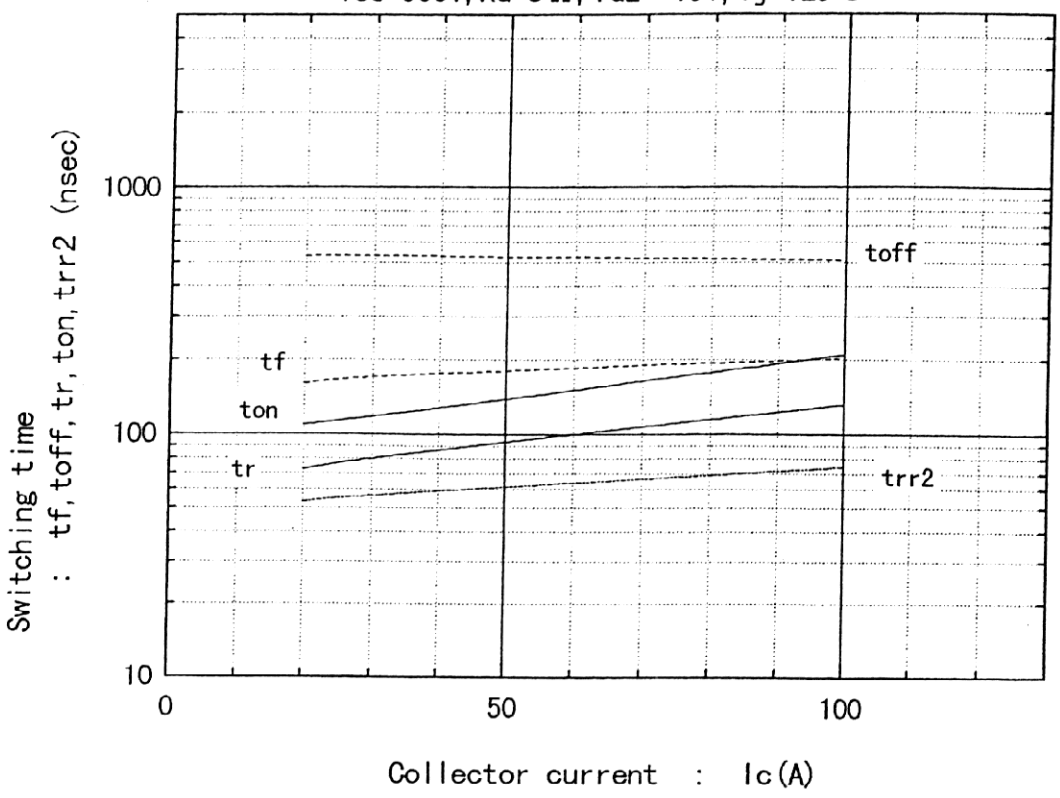


Collector-Emitter Voltage vs Gate-Emitter Voltage
Tj=125℃

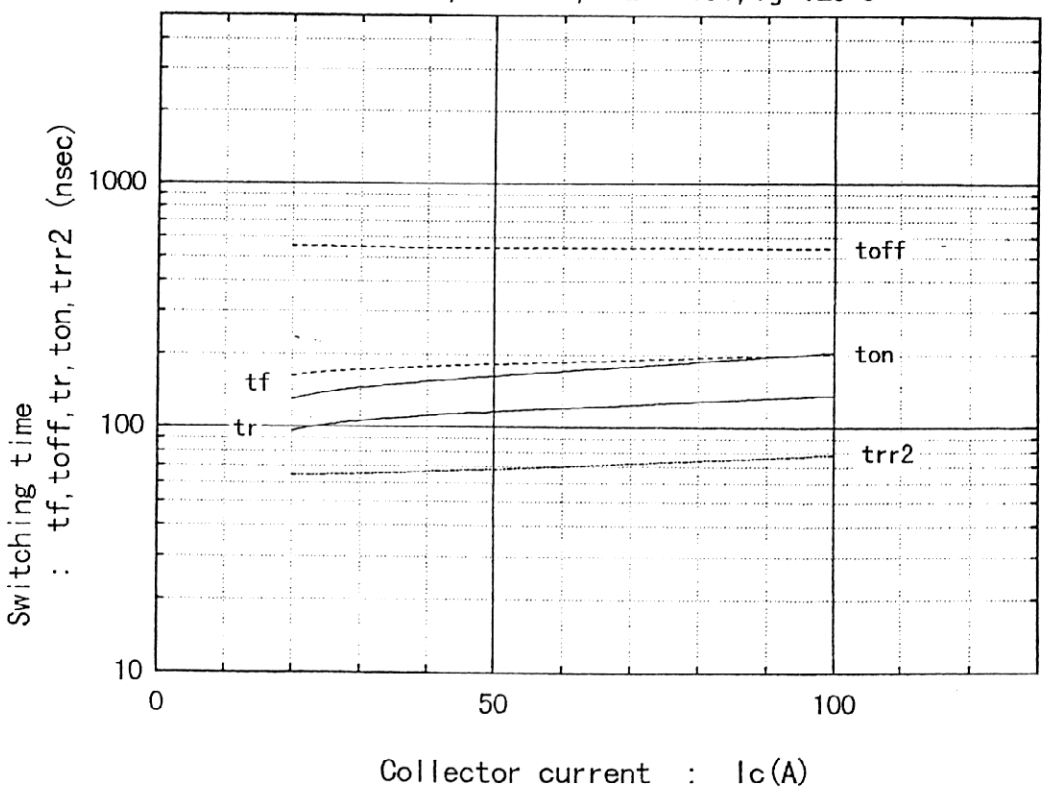


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Switching time vs Collector current
Vcc=300V, RG=8Ω, VGE=+15V, Tj=125℃



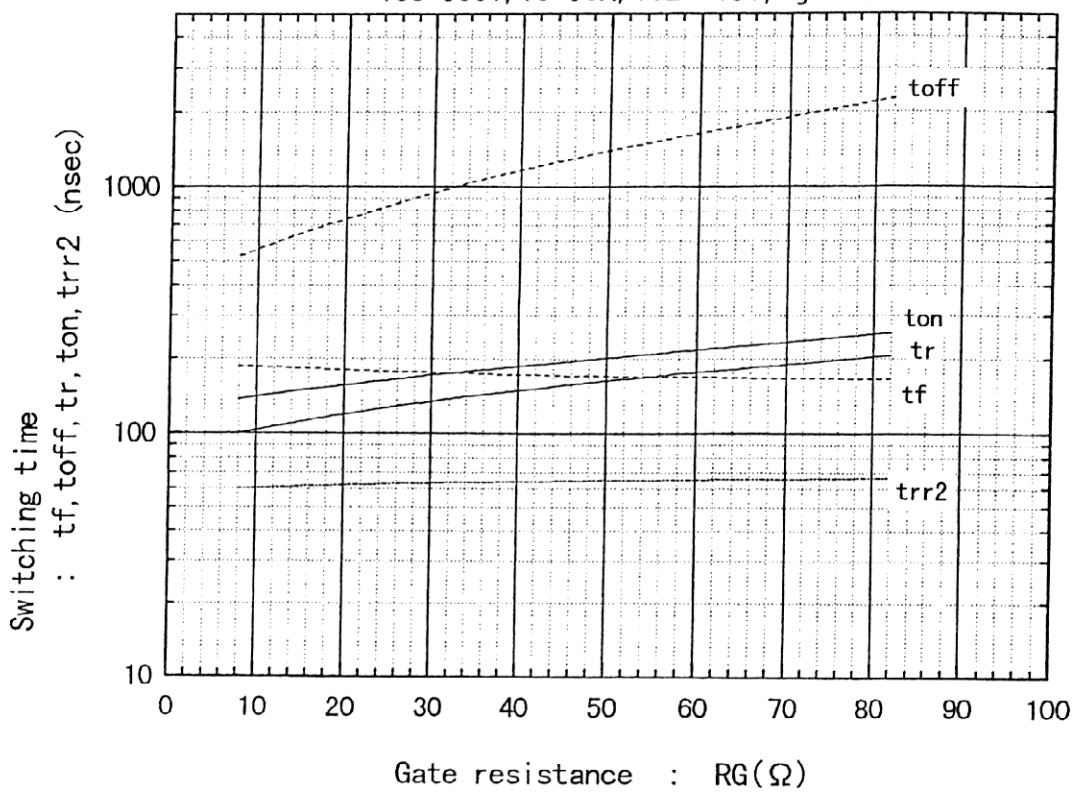
Switching time vs Collector current
Vcc=300V, RG=33Ω, VGE=±15V, Tj=125℃



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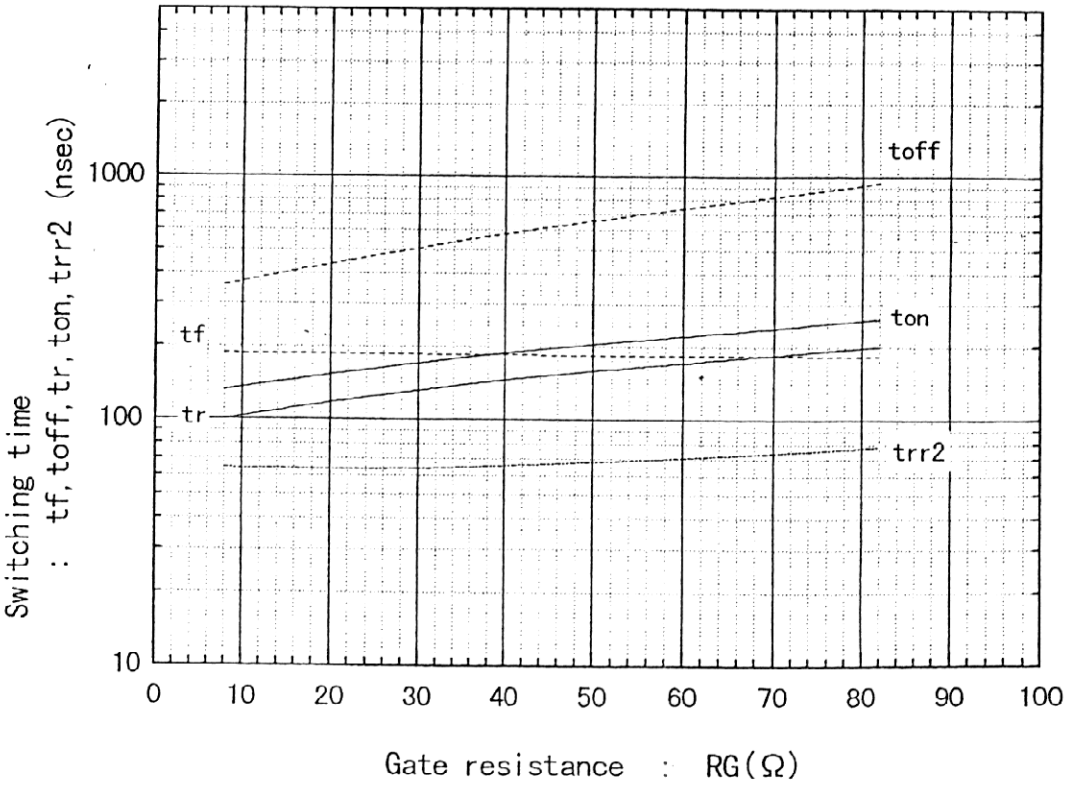
Switching time vs RG

Vcc=300V, Ic=50A, VGE=+15V, Tj=125°C



Switching time vs RG

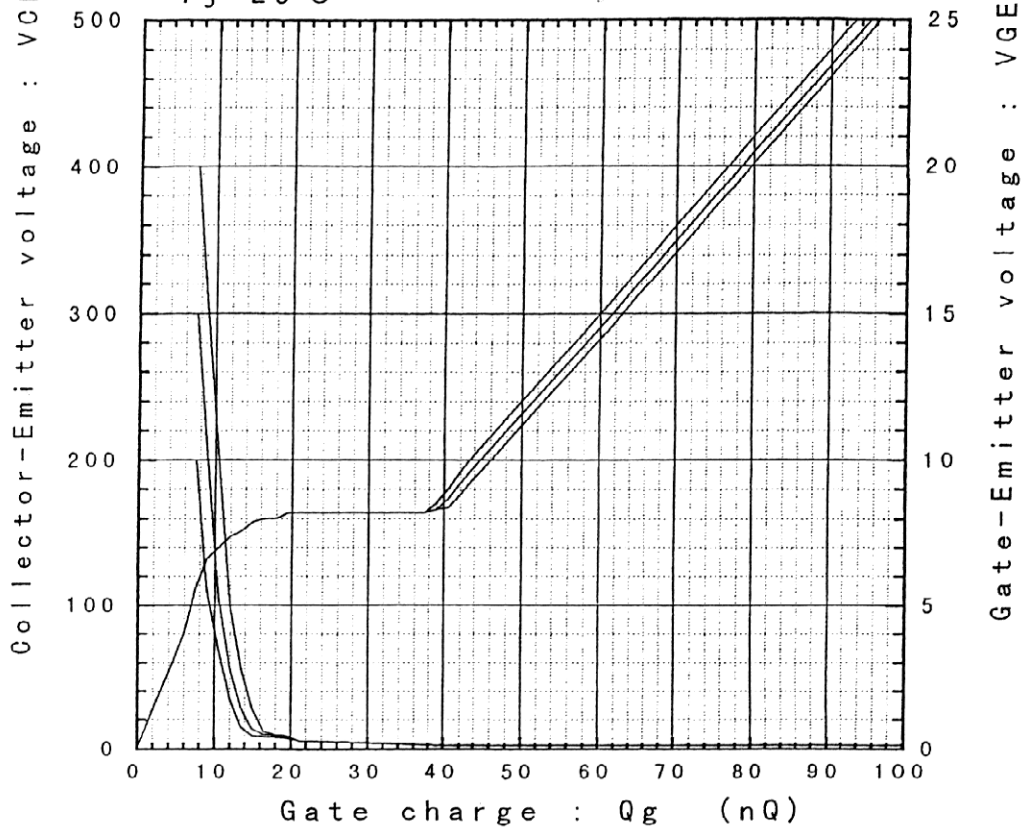
Vcc=300V, Ic=50A, VGE=±15V, Tj=125°C



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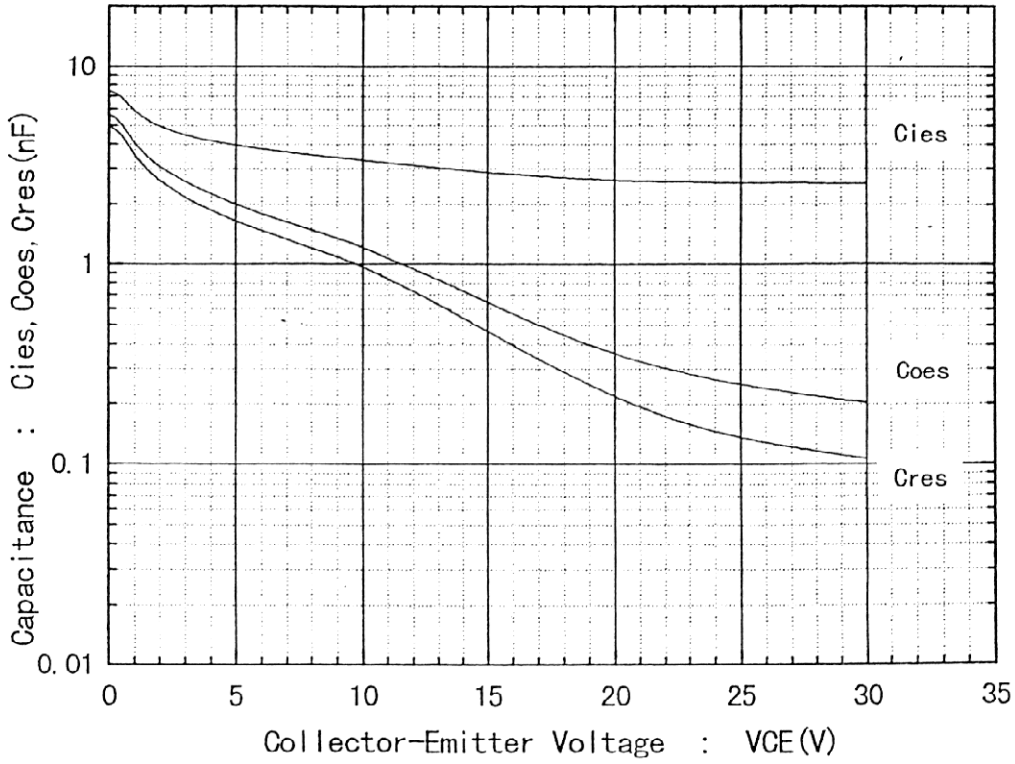
Dynamic input characteristics

Tj=25℃



Capacitance vs. Collector-Emitter Voltage

Tj=25℃

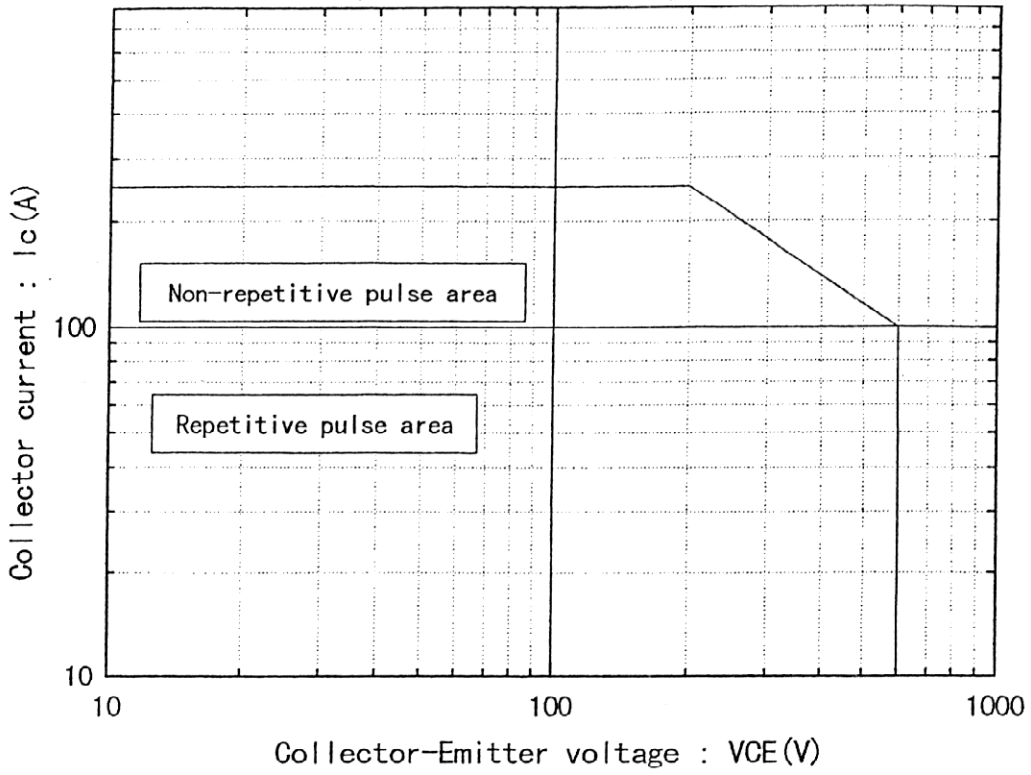


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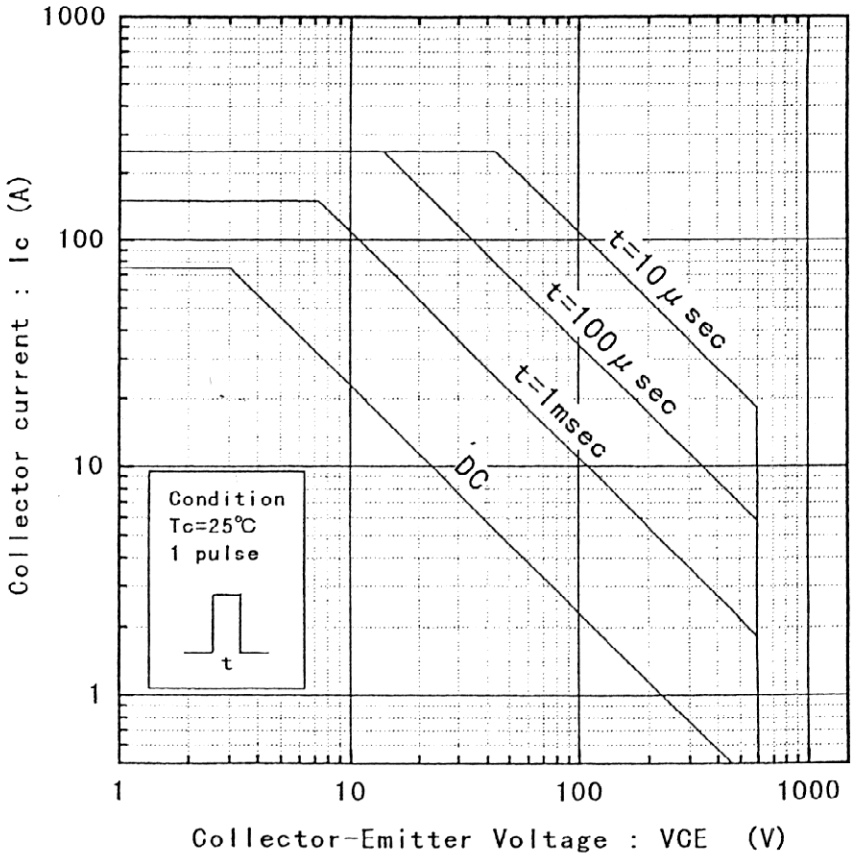
Reverse Biased Safe Operating Area

RG=8Ω, +VGE≦30V, -VGE=15V, Tj≦125℃



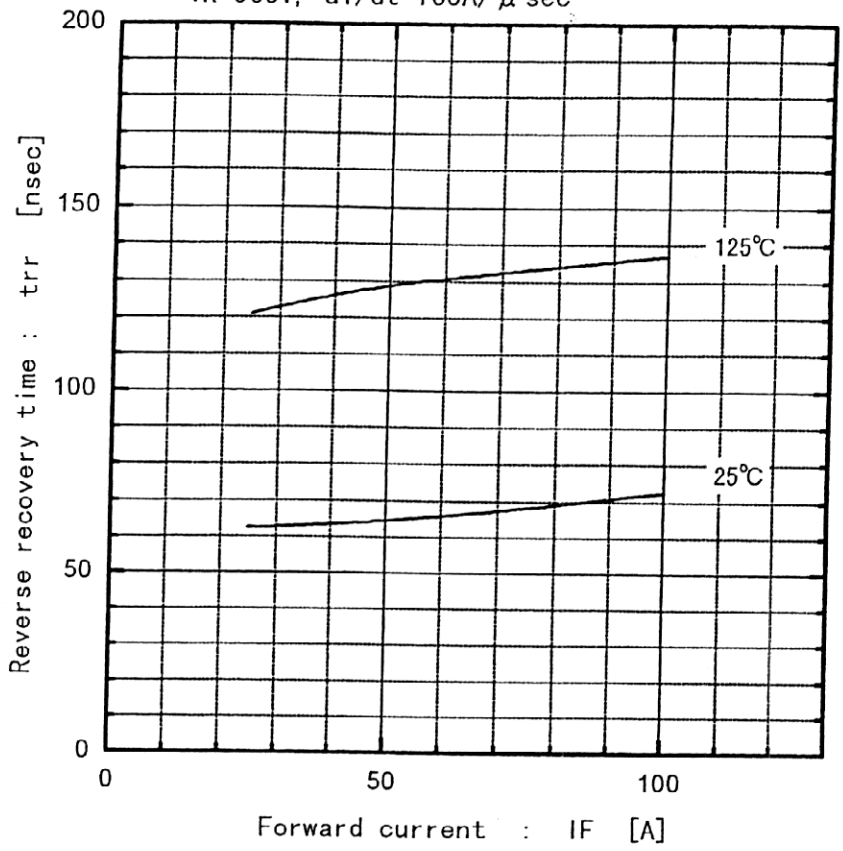
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Forward Bias Safe Operating Area

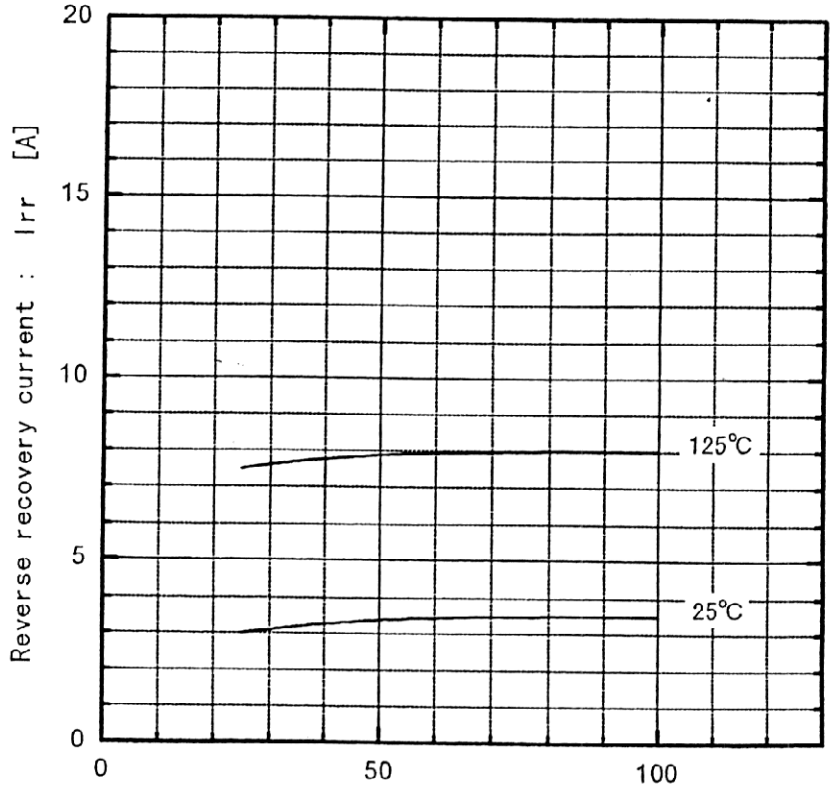


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Reverse recovery time vs. Forward current
VR=300V, -di/dt=100A/μsec

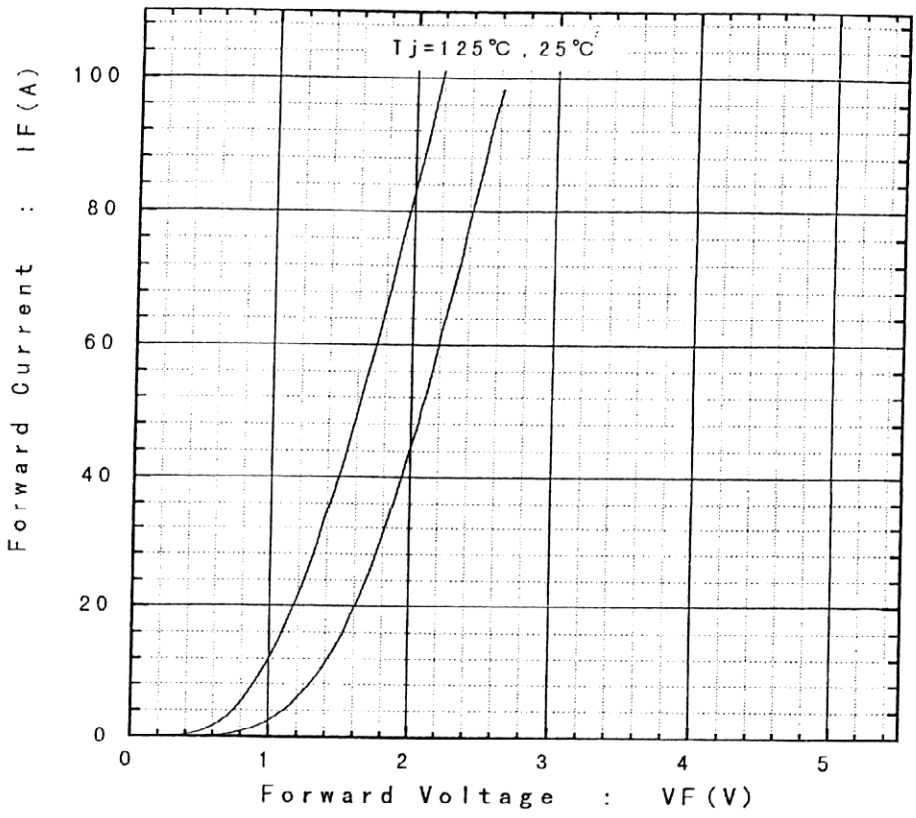


Reverse recovery current vs. Forward current
VR=300V, -di/dt=100A/μsec

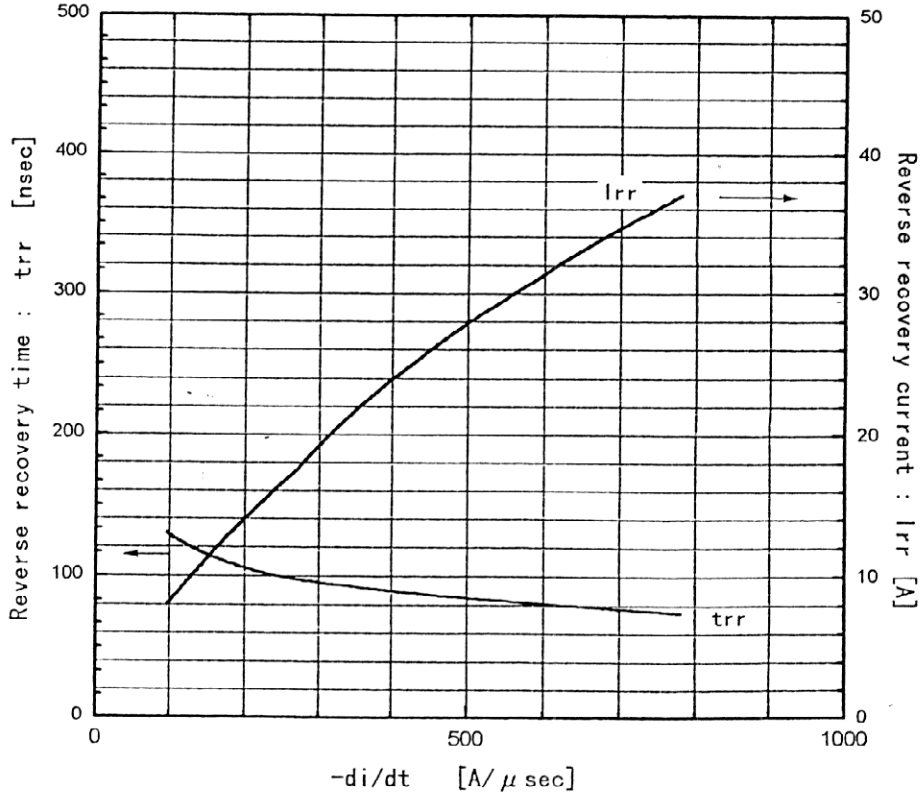


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Forward Voltage vs. Forward current



Reverse recovery chracteristics vs. -di/dt
VR=300V, IF=50A, Tj=125℃



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Transient thermal resistance

