

# SPECIFICATION

(TENTATIVE)

Device Name : IGBT

Type Name : 1MBH75D-060S

Spec. No. : MS5F 4623

Date : June-21-1999

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Fuji Electric Co.,Ltd.  
Matsumoto Factory

DATE	NAME	APPROVED	Fuji Electric Co.,Ltd.	
Jun-21-99	T. HOSEN	T. HOSEN	MS5F 4623	1/13

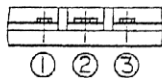
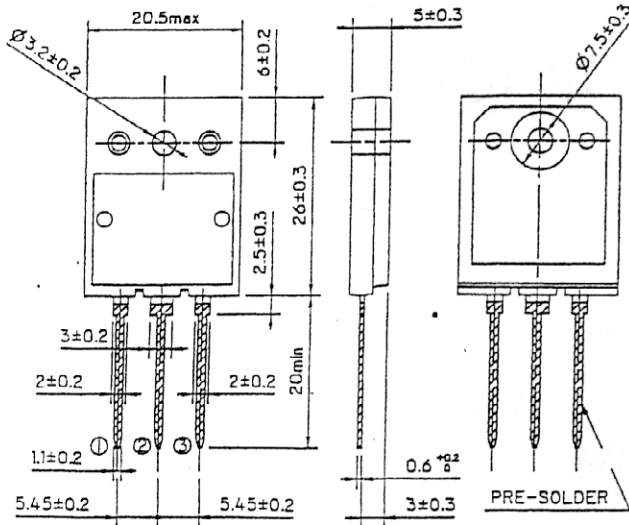


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Ratings and characteristics of Fuji IGBT

1MBH75D-060S

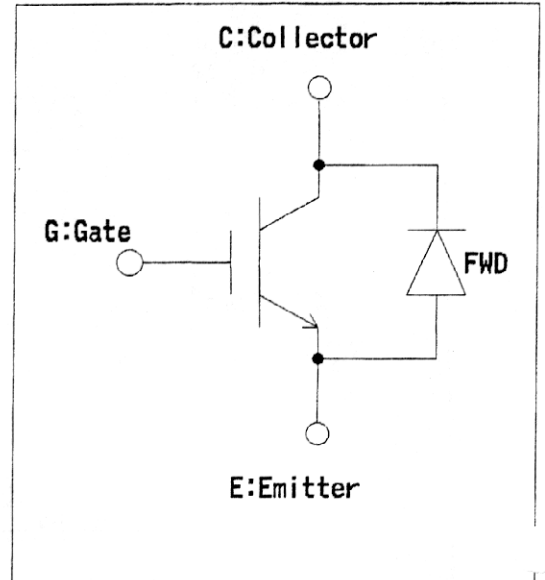
1. Outline Drawing



CONNECTION

- ① GATE
- ② COLLECTOR
- ③ EMITTER

2. Equivalent circuit



3. Absolute maximum ratings (  $T_c=25^\circ\text{C}$  )

Items		Symbols	Ratings	Units	
Collector-Emitter Voltage		$V_{CES}$	600	V	
Gate-Emitter Voltage		$V_{GES}$	$\pm 30$	V	
Collector Current	DC	$T_c=25^\circ\text{C}$	$I_{C25}$	82	A
		$T_c=100^\circ\text{C}$	$I_{C100}$	75	A
	1ms	$T_c=25^\circ\text{C}$	$I_{cp}$	225	A
IGBT Max. Power Dissipation		$P_c$	310	W	
FWD Max. Power Dissipation		$P_c$	180	W	
Operating Temperature		$T_j$	+ 150	$^\circ\text{C}$	
Storage Temperature		$T_{stg}$	-40 ~ +150	$^\circ\text{C}$	
Mounting Screw Torque		—	70	N · cm	

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

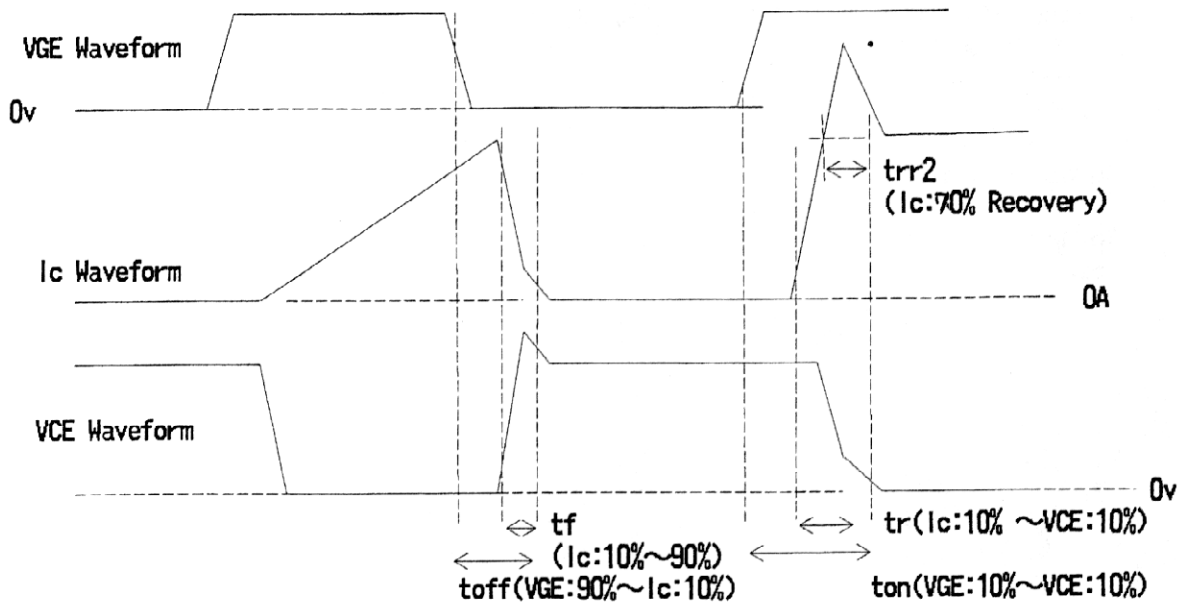
Items		Symbols	Characteristics			Conditions	Unit		
			min.	typ.	max.				
Zero gate voltage Collector Current		$I_{CES}$	—	—	1.0	$V_{GE} = 0V$ $V_{CE} = 600V$	mA		
Gate-Emitter leakage Current		$I_{GES}$	—	—	10	$V_{CE} = 0V$ $V_{GE} = \pm 30V$	$\mu A$		
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	4.0	5.0	6.0	$V_{CE} = 20V$ $I_C = 75mA$	V		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	—	2.4	2.9	$V_{GE} = 15V$ $I_C = 75A$	V		
Input capacitance		$C_{ies}$	—	3700	—	$V_{GE} = 0V$	pF		
Output capacitance		$C_{oes}$	—	350	—	$V_{CE} = 25V$			
Reverse transfer capacitance		$C_{res}$	—	190	—	$f = 1MHz$			
Switching Time	Turn-on time	$t_{on} *$	—	0.15	—	$V_{CC} = 300V$ $I_C = 75A$ $V_{GE} = \pm 15V$ $R_G = 24 \Omega$ (Half Bridge)	$\mu S$		
		$t_r *$	—	0.09	—				
		$t_{rr2}$	—	0.03	—				
	Turn-off time	$t_{off}$	—	0.50	0.62			Inductance Load	
		$t_f$	—	0.10	0.17				
	Turn-on time	Turn-on time	$t_{on} *$	—	0.15			—	$V_{CC} = 300V$ $I_C = 75A$ $V_{GE} = +15V$ $R_G = 6.0 \Omega$ (Half Bridge)
			$t_r *$	—	0.09	—			
			$t_{rr2}$	—	0.03	—			
		Turn-off time	$t_{off}$	—	0.50	0.62	Inductance Load		
			$t_f$	—	0.10	0.17			
FWD forward voltage		$V_F$	—	2.0	2.5	$I_F = 75A, V_{GE} = 0V$			
Reverse recovery time		$t_{rr}$	—	0.06	0.10	$I_F = 75A, V_{GE} = -10V$ $V_R = 300V,$ $dv/dt = 100A/\mu S$	$\mu S$		

\* Turn-on characteristics include  $t_{rr2}$ . See figure.A in next page.

### 5. Thermal resistance characteristics

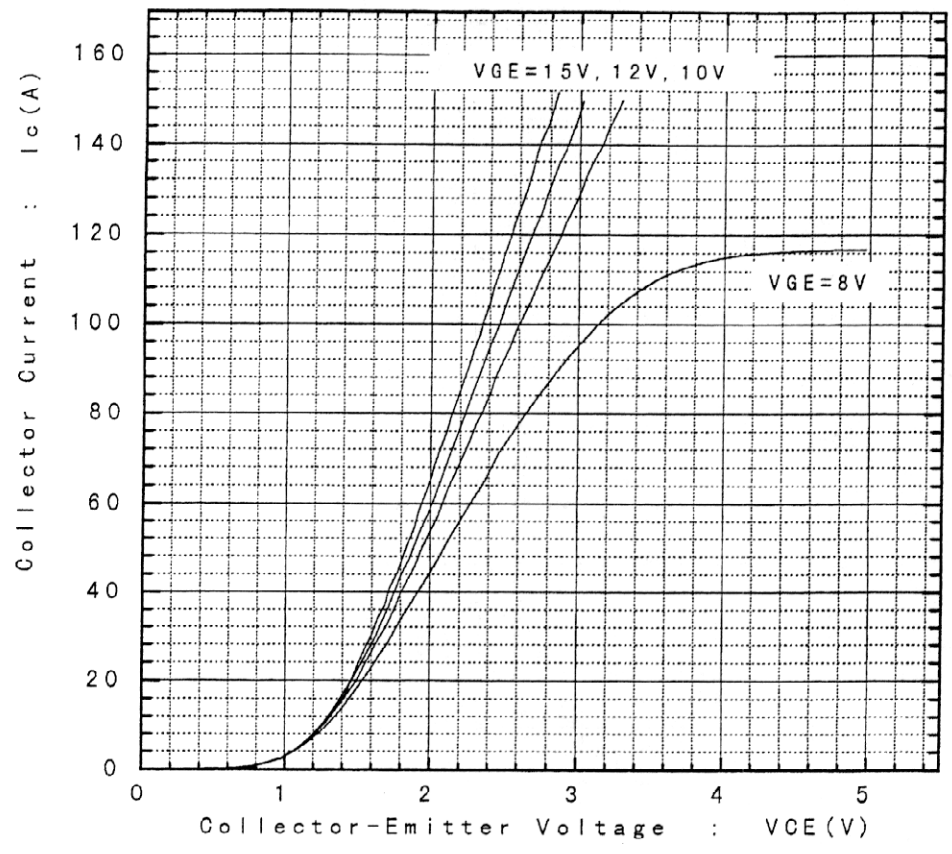
Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	Rth(j-c)	—	—	0.40	IGBT	°C/W
	Rth(j-c)	—	—	0.69	FWD	

### 6. Switching waveform

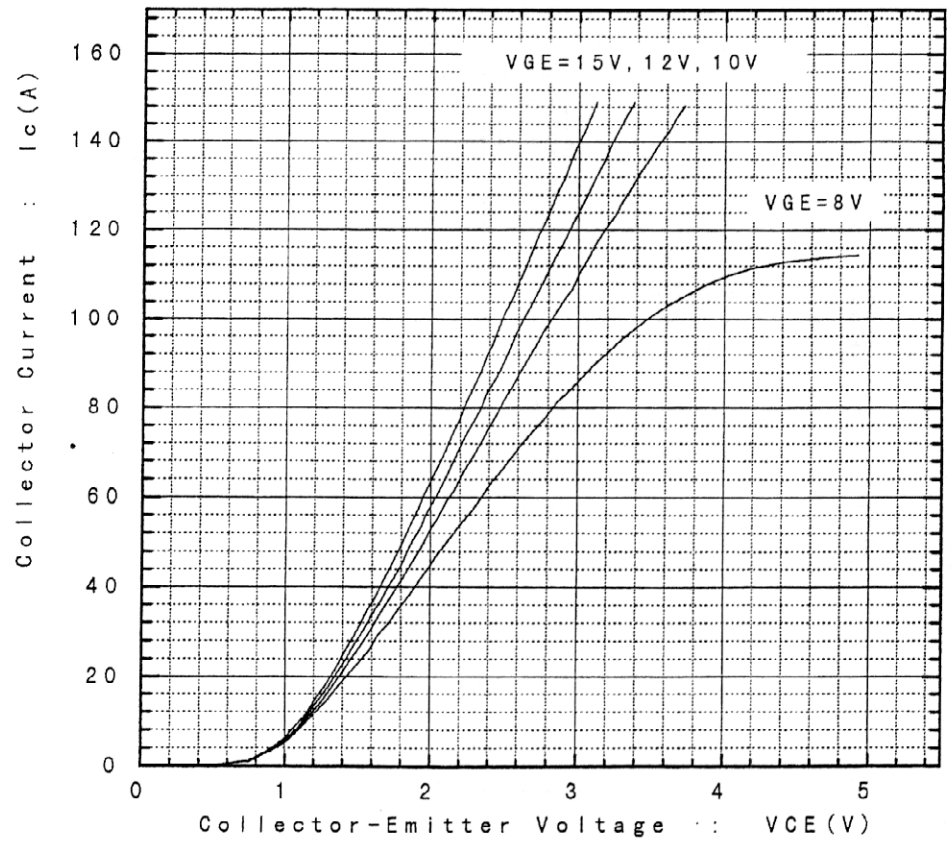


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Collector Current vs. Collector-Emittter Voltage  
 $T_j = 25^\circ\text{C}$

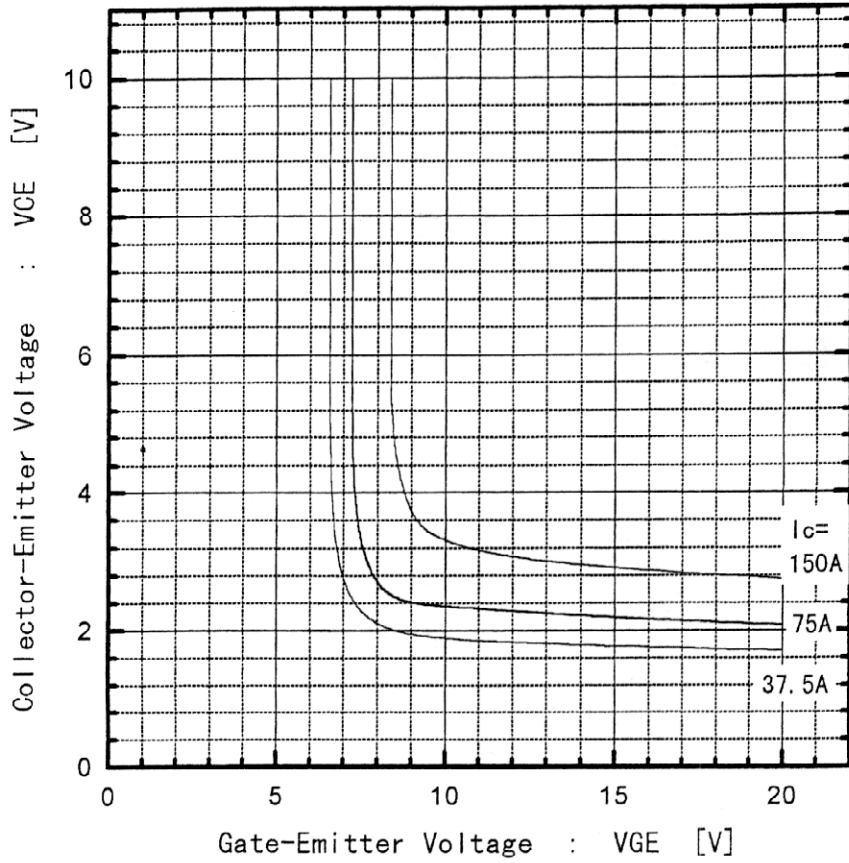


Collector Current vs. Collector-Emittter Voltage  
 $T_j = 125^\circ\text{C}$

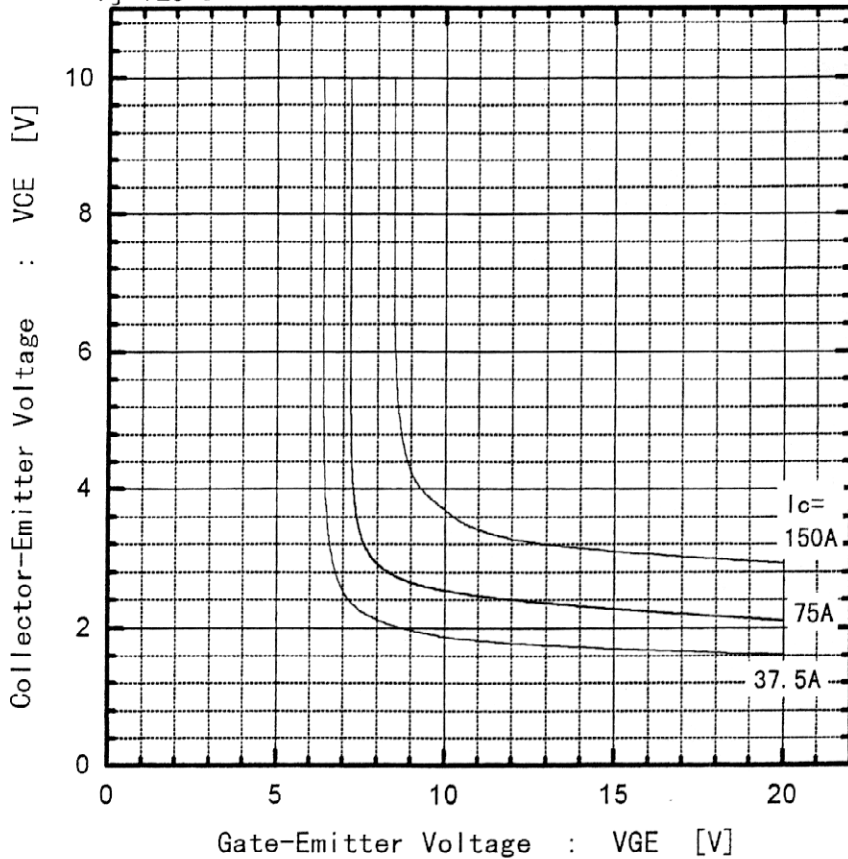


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Collector-Emitter Voltage vs Gate-Emitter Voltage  
 $T_j=25^\circ\text{C}$

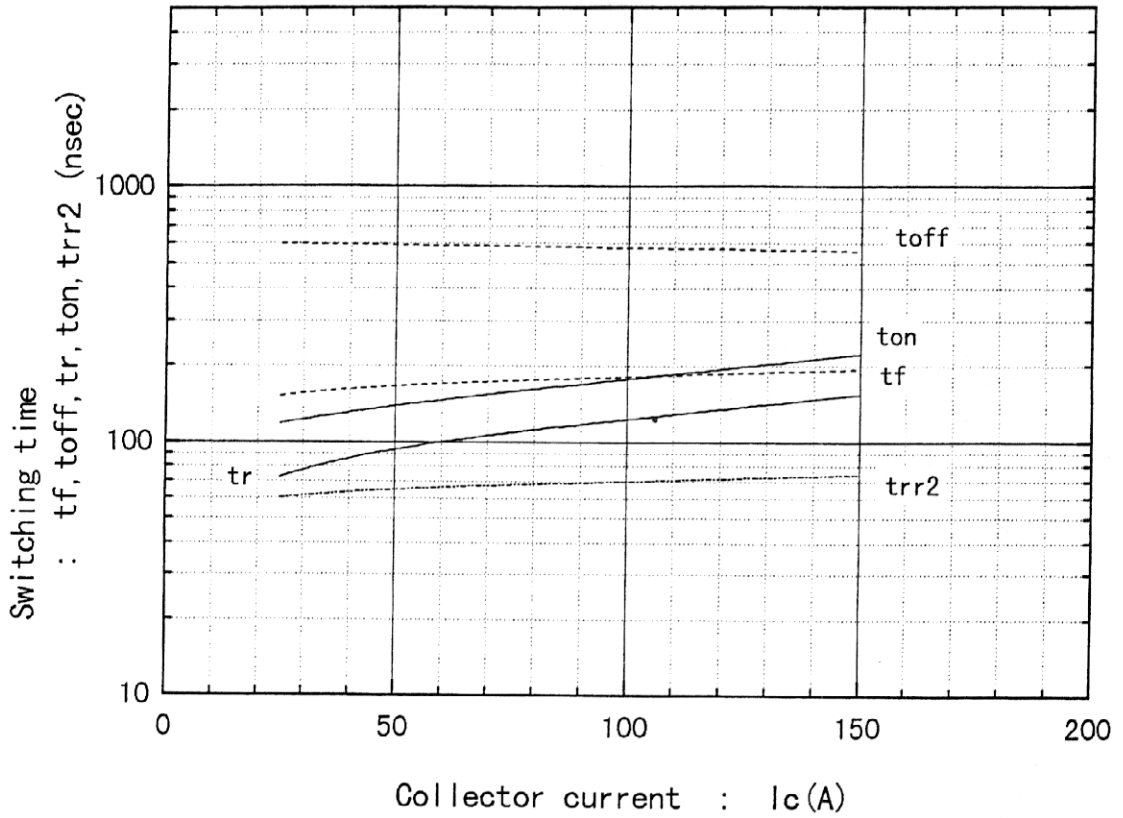


Collector-Emitter Voltage vs Gate-Emitter Voltage  
 $T_j=125^\circ\text{C}$

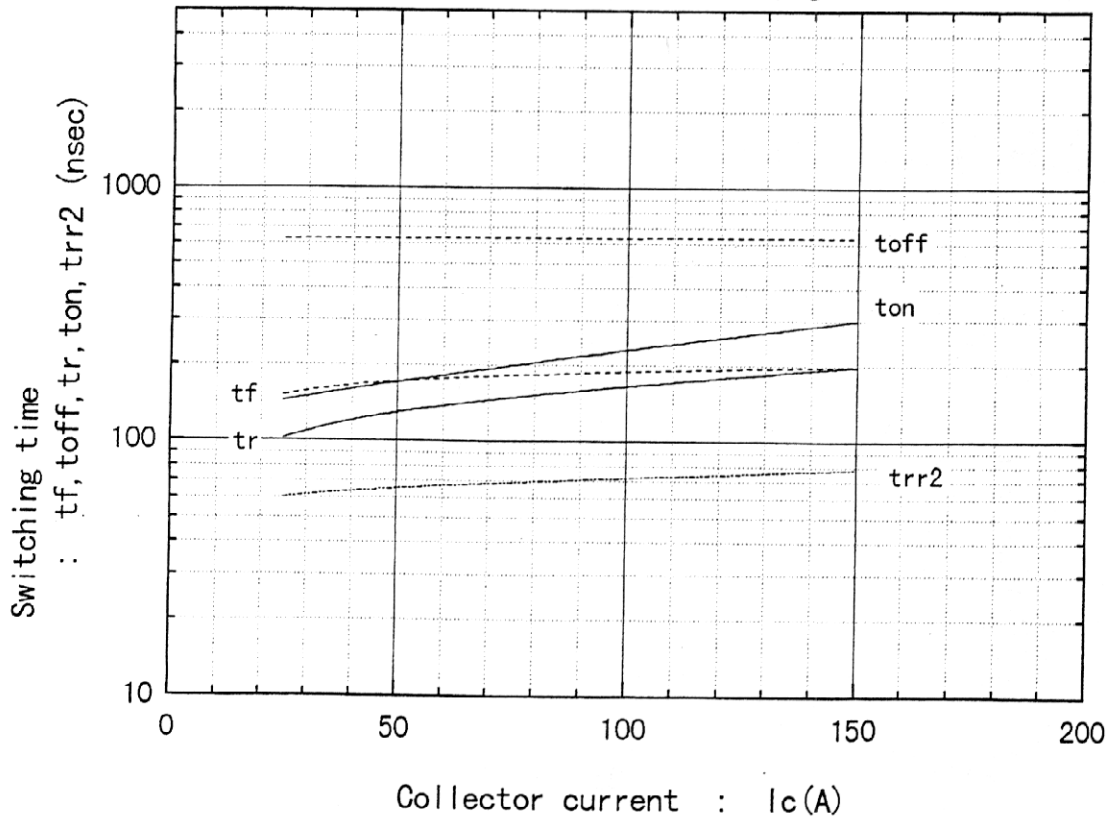


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Switching time vs Collector current  
 $V_{cc}=300V, R_G=6\Omega, V_{GE}=+15V, T_j=125^\circ C$



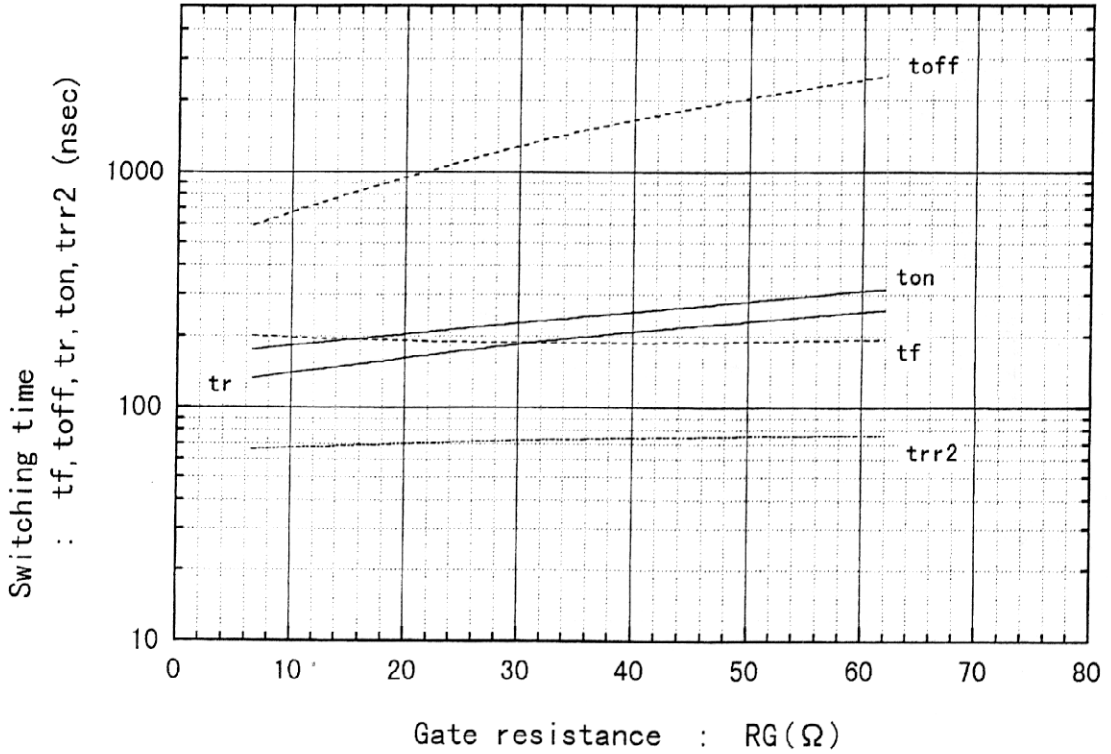
Switching time vs Collector current  
 $V_{cc}=300V, R_G=24\Omega, V_{GE}=\pm 15V, T_j=125^\circ C$



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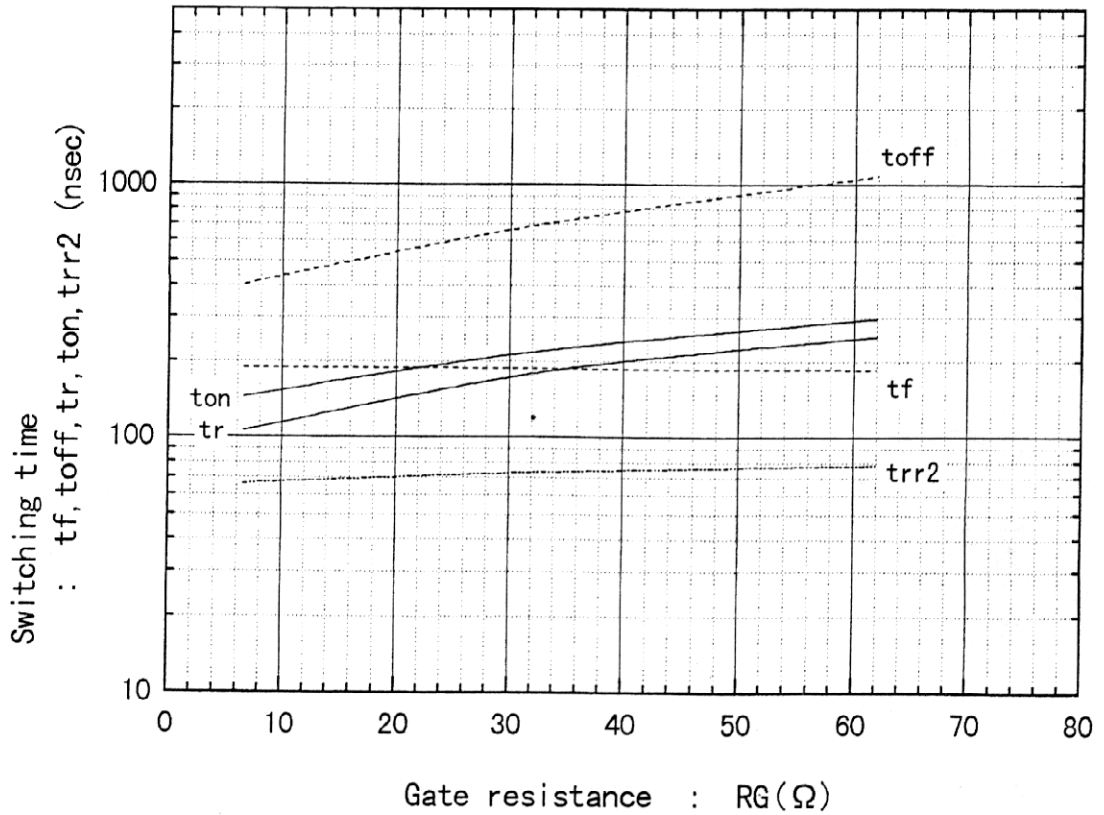
### Switching time vs RG

$V_{cc}=300V, I_c=75A, V_{GE}=+15V, T_j=125^{\circ}C$



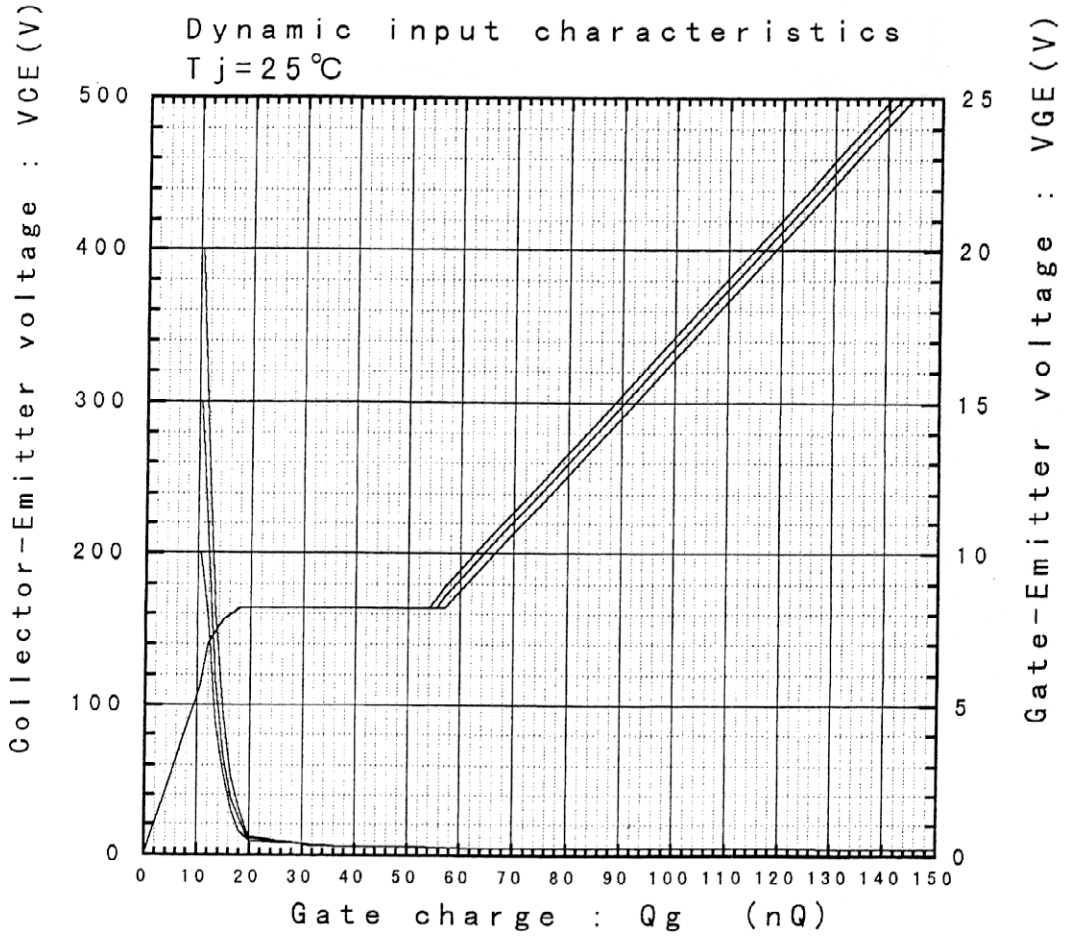
### Switching time vs RG

$V_{cc}=300V, I_c=75A, V_{GE}=\pm 15V, T_j=125^{\circ}C$

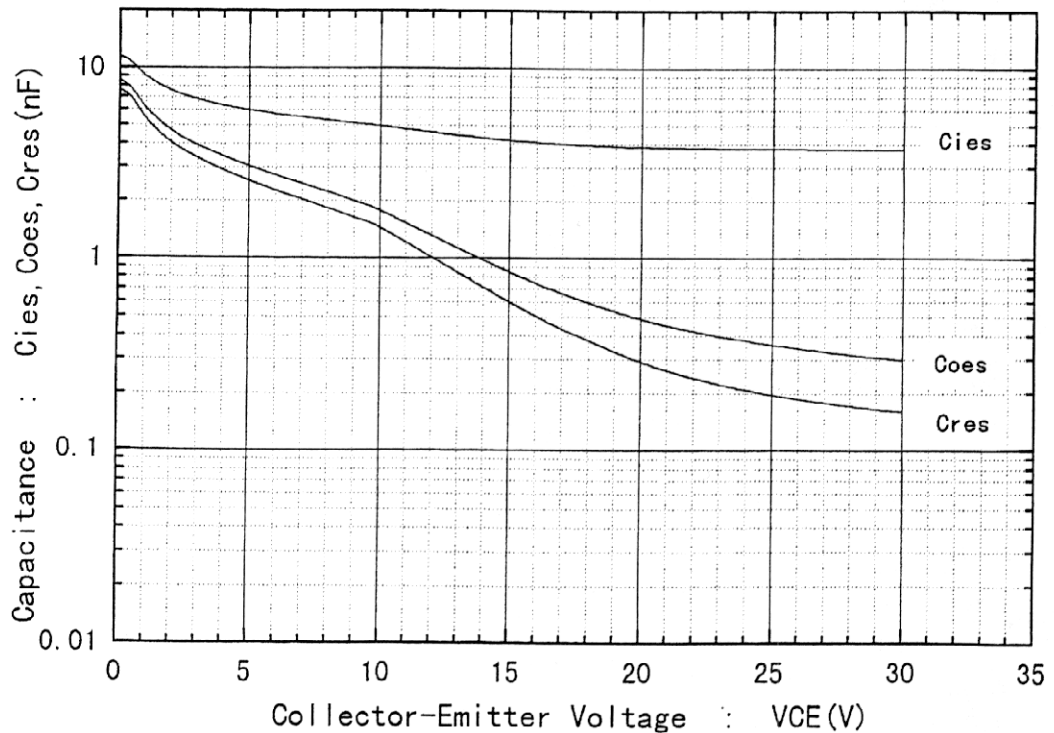




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### Capacitance vs. Collector-Emitter Voltage $T_j = 25^\circ\text{C}$

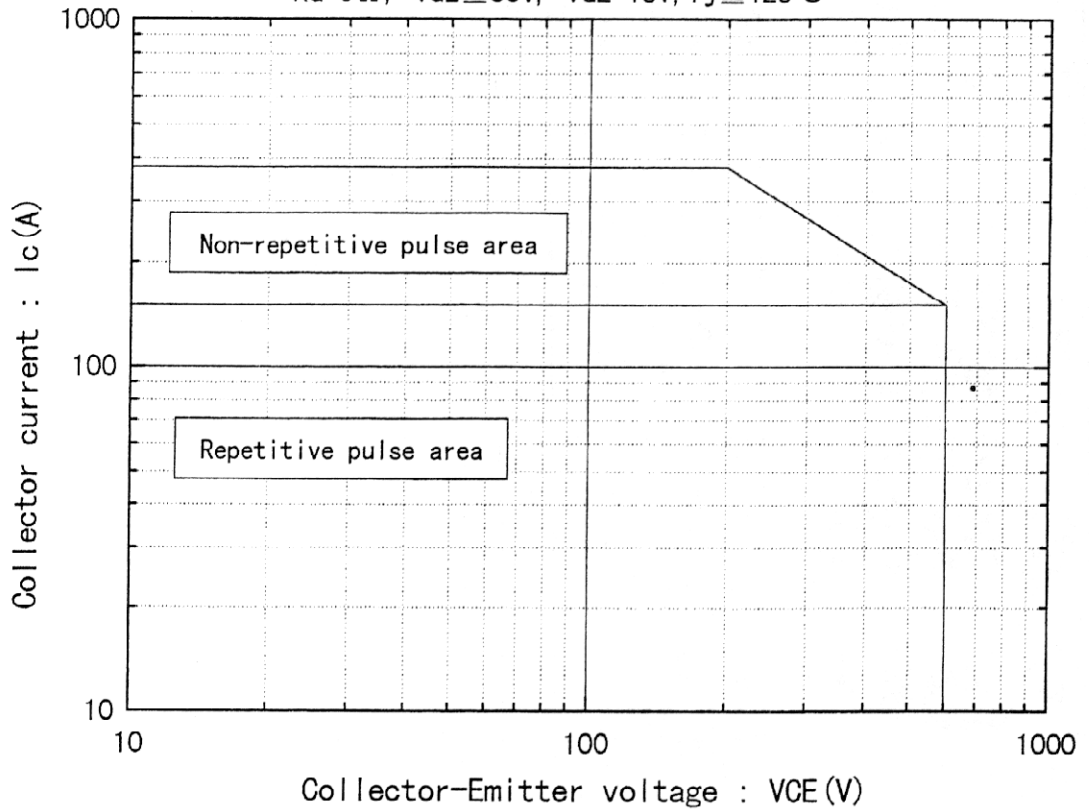


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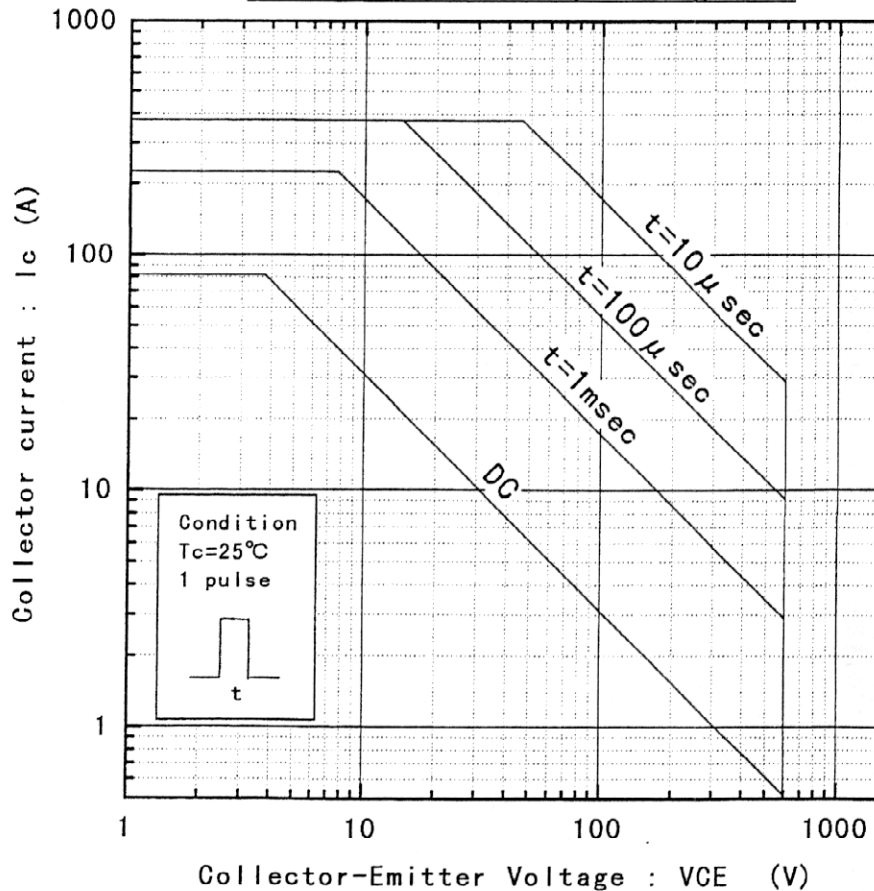
Reverse Biased Safe Operating Area

$R_G=6\Omega$ ,  $+V_{GE} \leq 30V$ ,  $-V_{GE}=15V$ ,  $T_j \leq 125^\circ C$



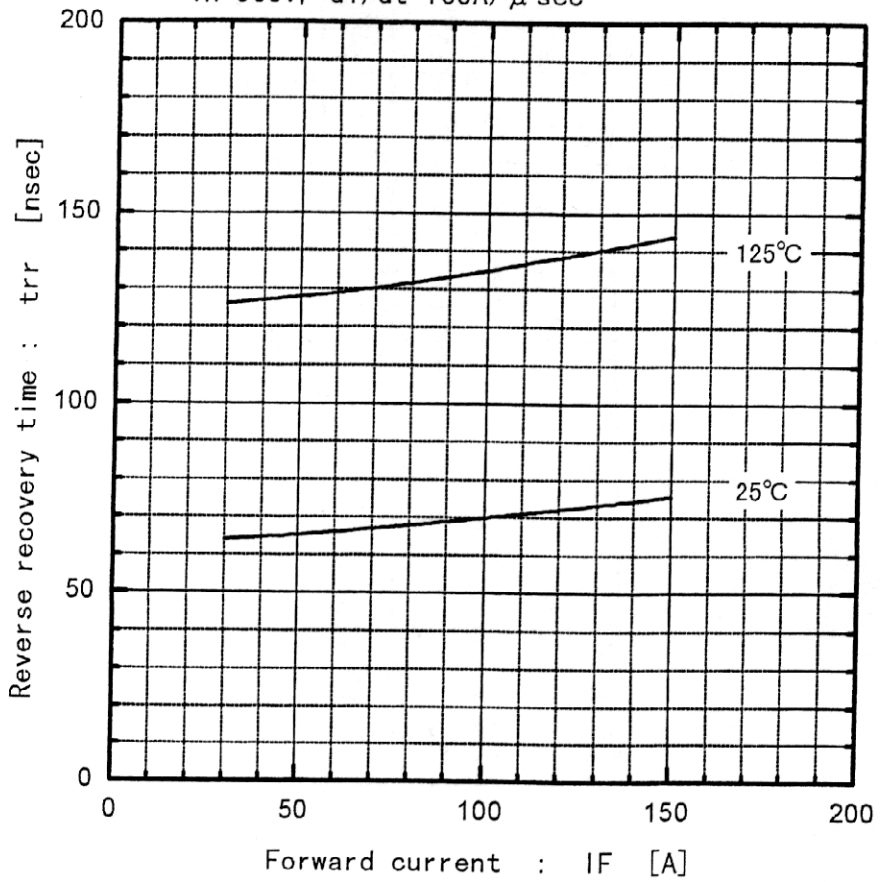
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Forward Bias Safe Operating Area

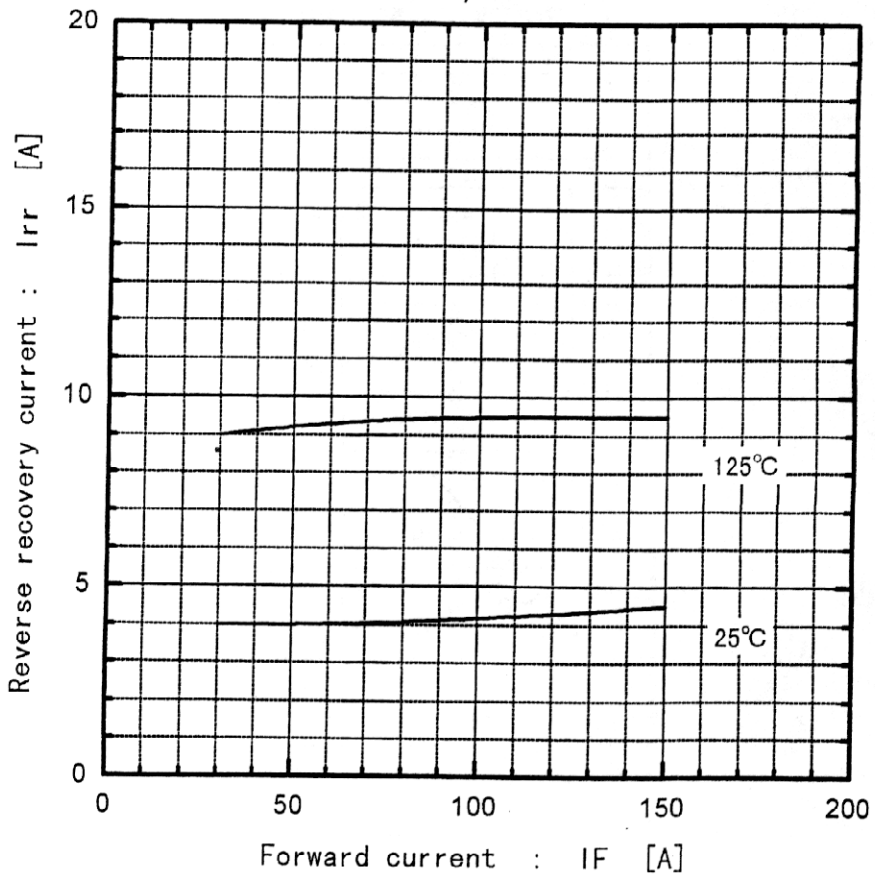


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Reverse recovery time vs. Forward current  
VR=300V,  $-di/dt=100A/\mu\text{sec}$

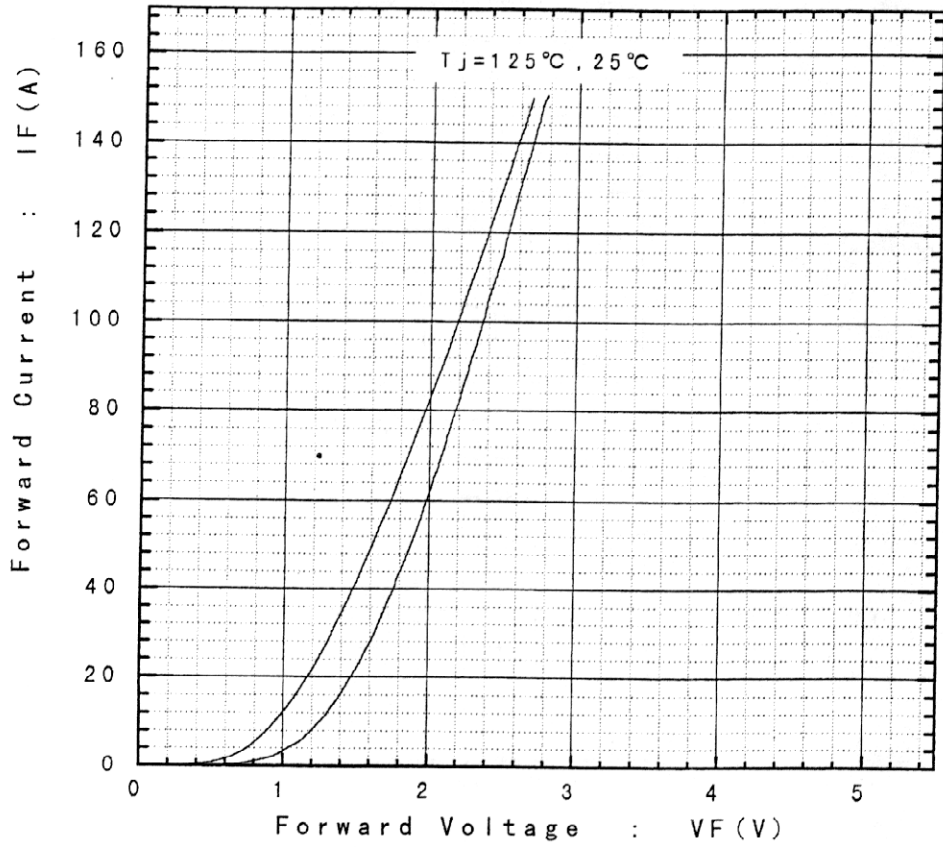


Reverse recovery current vs. Forward current  
VR=300V,  $-di/dt=100A/\mu\text{sec}$

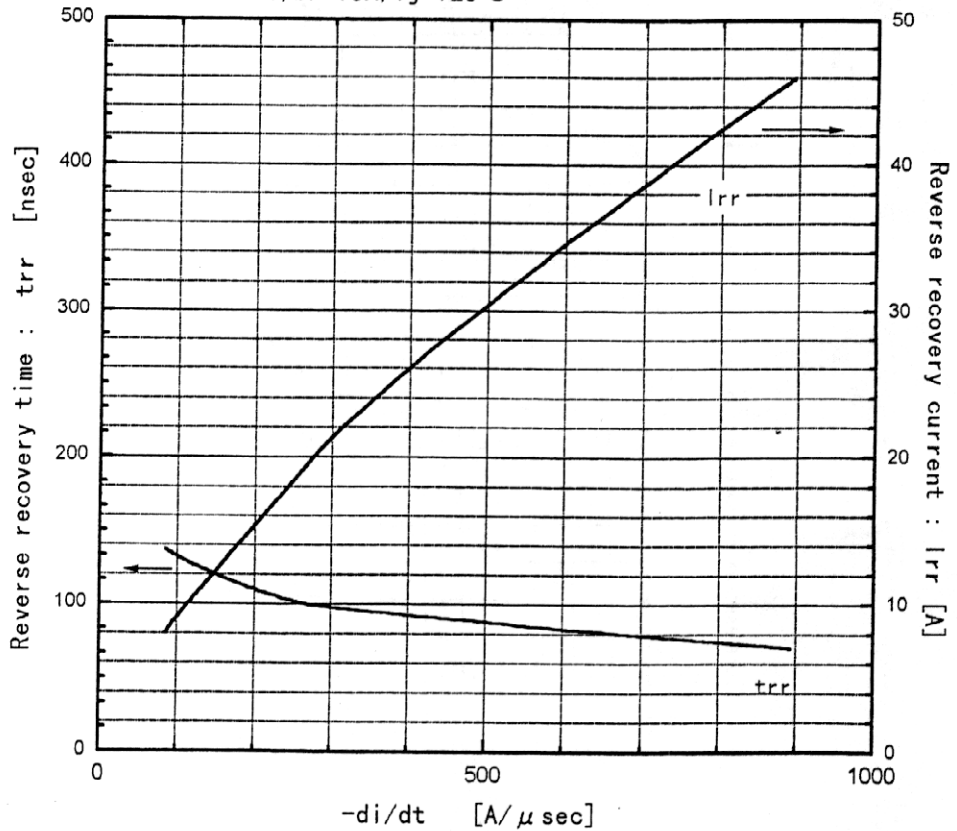


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Forward Voltage vs. Forward current



Reverse recovery characteristics vs.  $-di/dt$   
 $V_R = 300\text{V}, I_F = 75\text{A}, T_j = 125^\circ\text{C}$



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### Transient thermal resistance

