

# SPECIFICATION

Device Name : IGBT  
Type Name : 1MBH30D-060-S06TT  
Spec. No. : MS5F-4087  
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	T. Sawada		<b>MS5F4087</b>
CHECKED	June-11-98	T. Izarashi		
				1/14



• Scope

This specification is applied to Fuji discrete IGBT 1MBH30D-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 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~~.

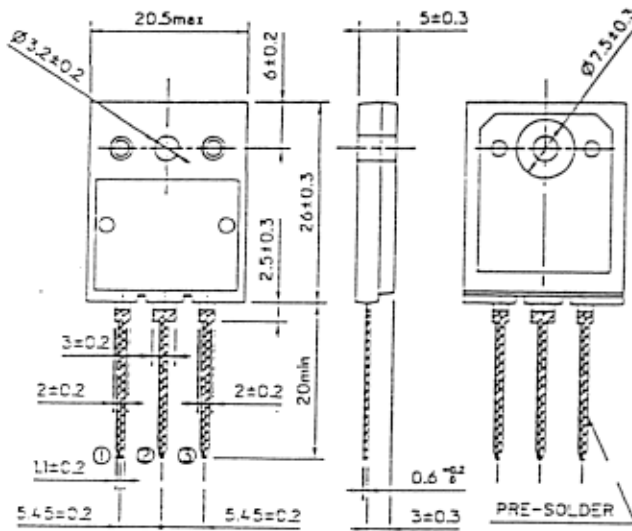
MS500026. (2)

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Ratings and characteristics of Fuji IGBT

1MBH30D-060

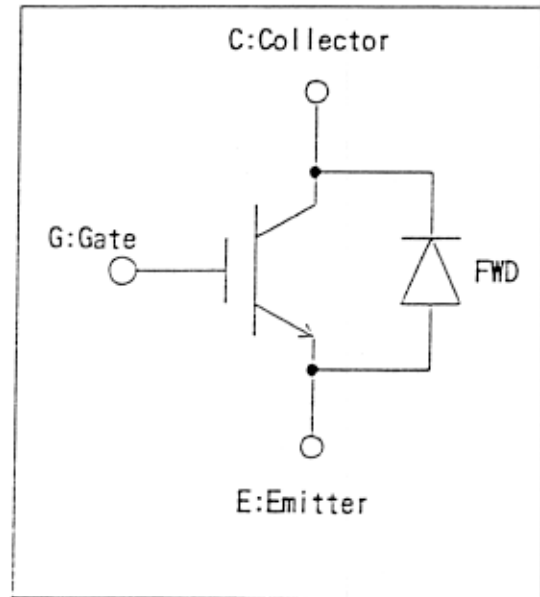
1. Outline Drawing



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		$V_{GES}$	±22	V	
Collector Current	DC	Tc=25 °C	$I_{C25}$	58	A
		Tc=100°C	$I_{C100}$	30	A
	1ms	Tc=25 °C	$I_{cp}$	232	A
IGBT Max. Power Dissipation		$P_c$	220	W	
FWD Max. Power Dissipation		$P_c$	120	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 )

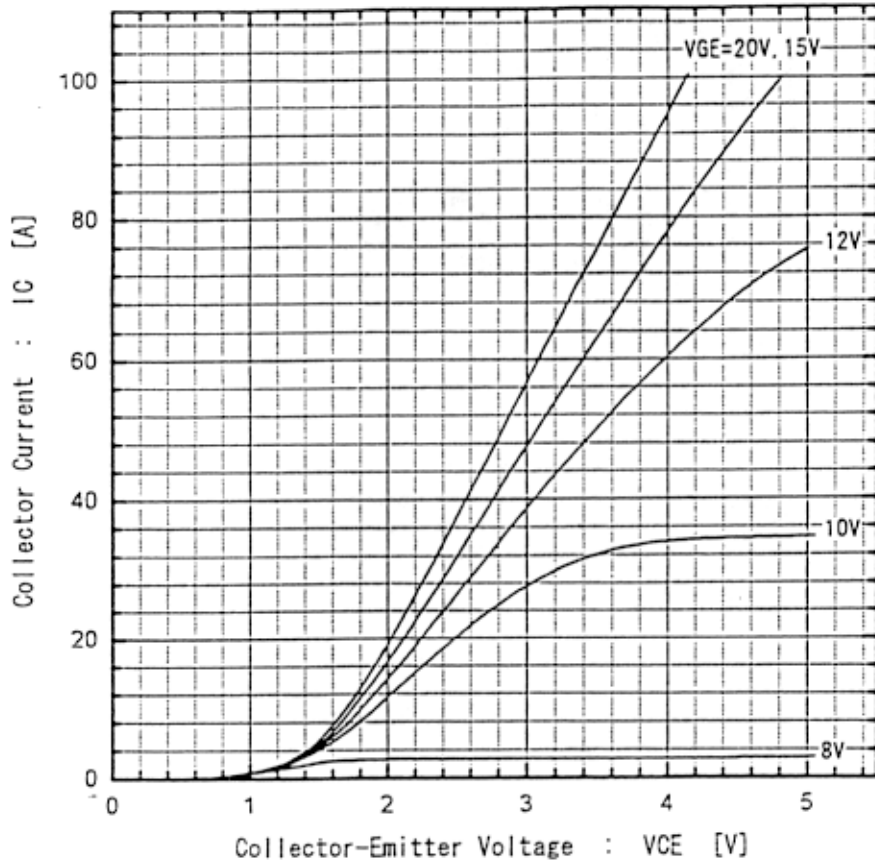
Items	Symbols	Characteristics			Conditions	Unit	
		min.	typ.	max.			
Zero gate voltage Collector Current	$I_{CES}$			1.0	$V_{GE} = 0V$ $V_{CE} = 600V$	mA	
Gate-Emitter leakage Current	$I_{GES}$			20	$V_{CE} = 0V$ $V_{GE} = \pm 22V$	$\mu A$	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	5.5		8.5	$V_{CE} = 20V$ $I_C = 30mA$	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			3.0	$V_{GE} = 15V$ $I_C = 30A$	V	
Input capacitance	$C_{ies}$		1900		$V_{GE} = 0V$	pF	
Output capacitance	$C_{oes}$		400		$V_{CE} = 10V$		
Reverse transfer capacitance	$C_{res}$		100		$f = 1MHz$		
Switching Time	Turn-on time	$t_{on}$		1.2	$V_{CC} = 300V$ $I_C = 30A$ $V_{GE} = \pm 15V$ $R_G = 82\Omega$ (Half Bridge)	$\mu s$	
		$t_r$		0.6			
	Turn-off time	$t_{off}$		1.0			
		$t_f$		0.35			
	Turn-on time	$t_{on}$		0.16			$V_{CC} = 300V$ $I_C = 30A$ $V_{GE} = +15V$ $R_G = 8\Omega$ (Half Bridge)
		$t_r$		0.11			
Turn-off time	$t_{off}$		0.30				
	$t_f$		0.35				
FWD forward voltage drop	$V_F$			3.0	$I_F = 30A$	V	
Reverse recovery time	$t_{rr}$			0.3	$I_F = 30A, V_{GE} = -10V$ $V_R = 200V$ $di/dt = 100A/\mu s$	$\mu s$	

5. Thermal resistance characteristics

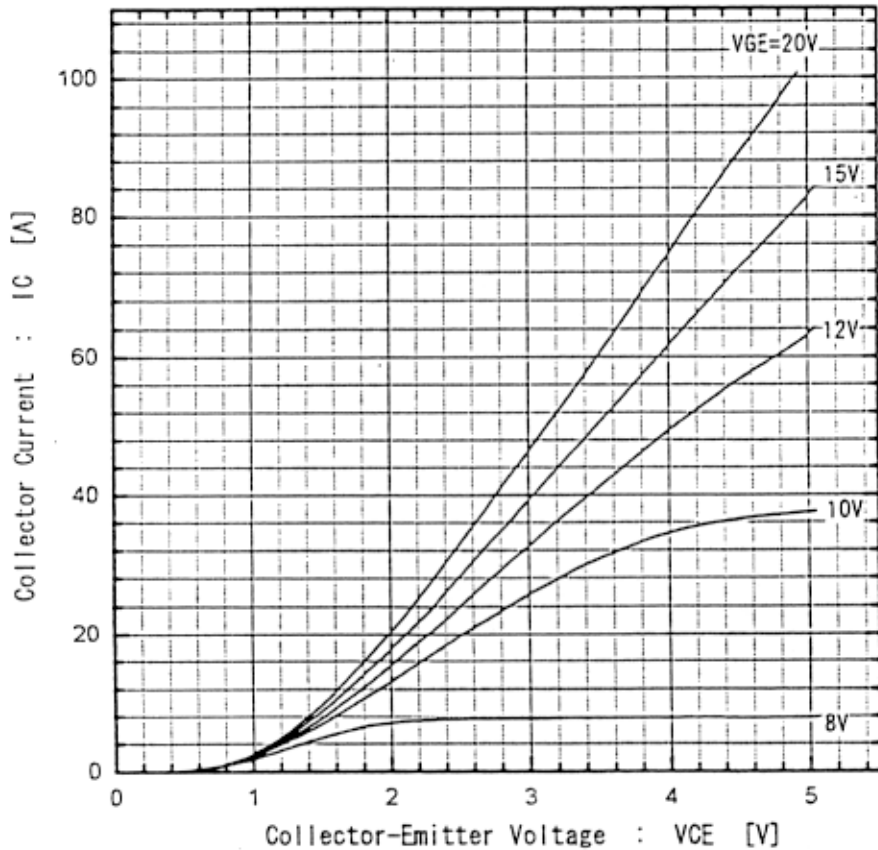
Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	$R_{th(j-c)}$			0.56	IGBT	$^{\circ}C/W$
	$R_{th(j-c)}$			1.04	FWD	

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

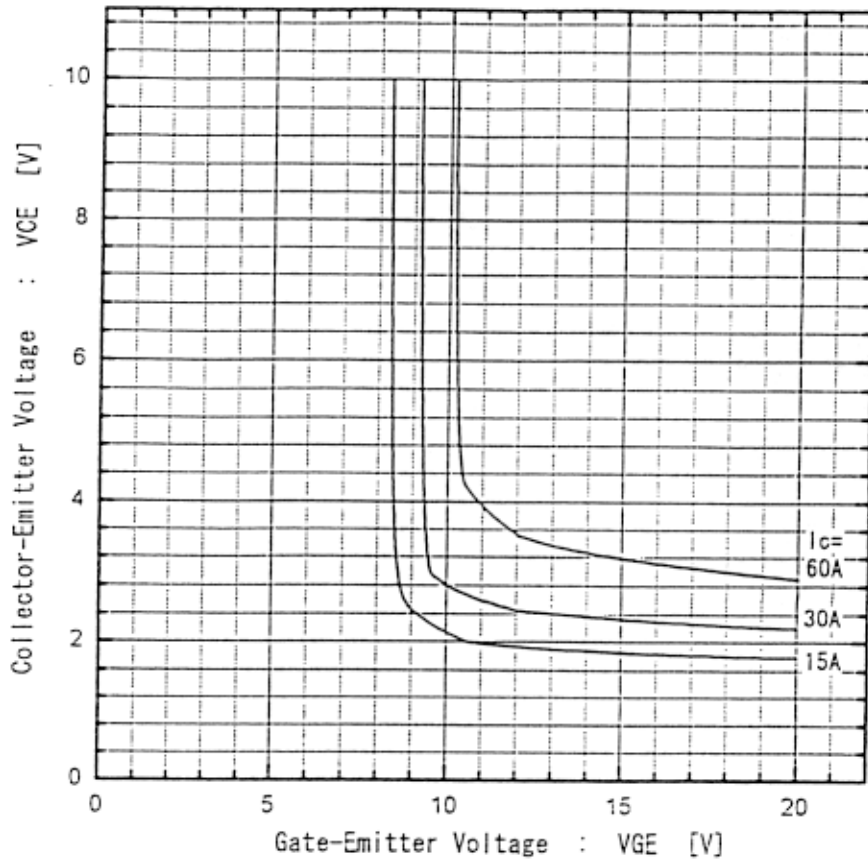


Collector Current vs. Collector-Emitter Voltage  
 $T_j=125^\circ\text{C}$

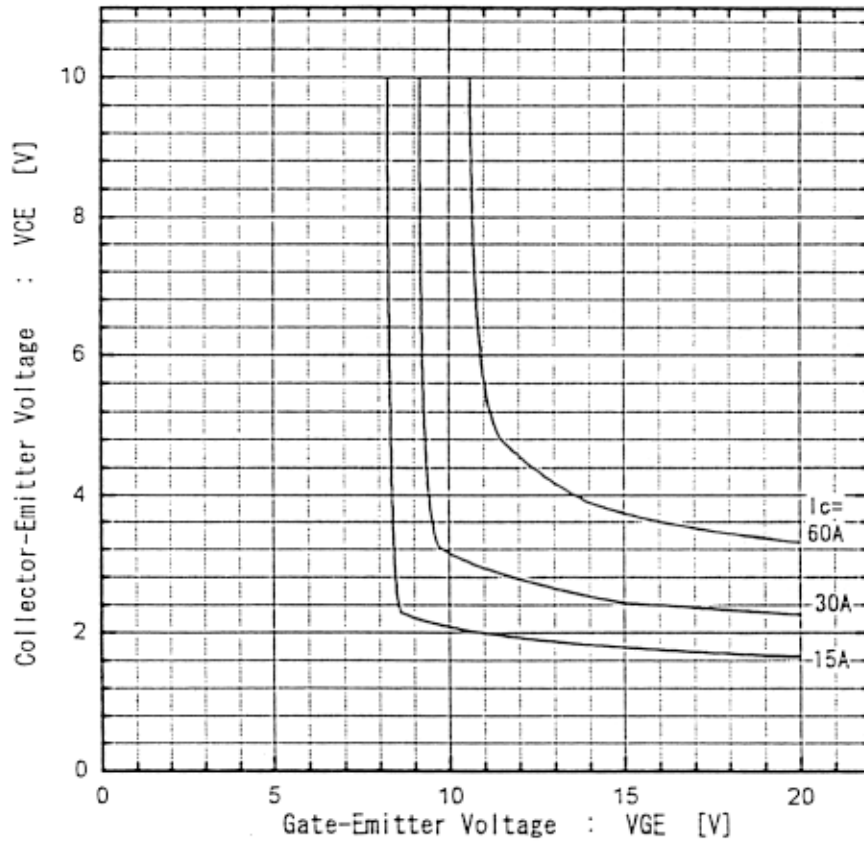


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Collector-Emitter Voltage vs Gate-Emitter Voltage  
 $T_j=25^\circ\text{C}$

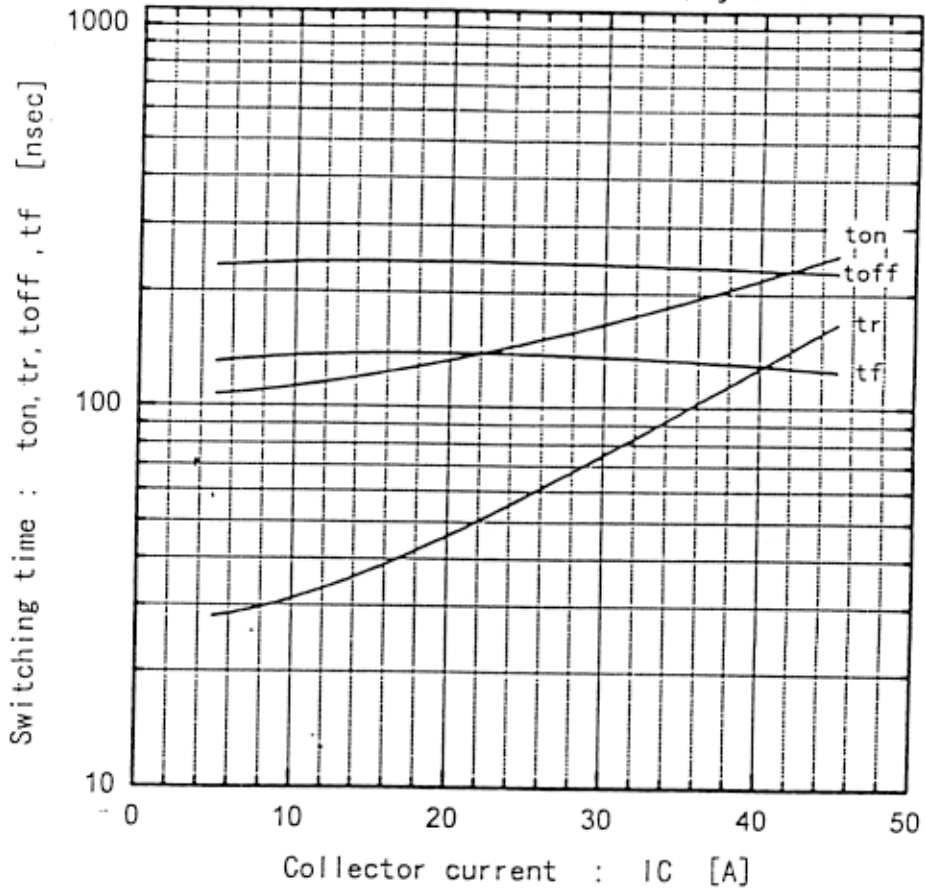


Collector-Emitter Voltage vs Gate-Emitter Voltage  
 $T_j=125^\circ\text{C}$

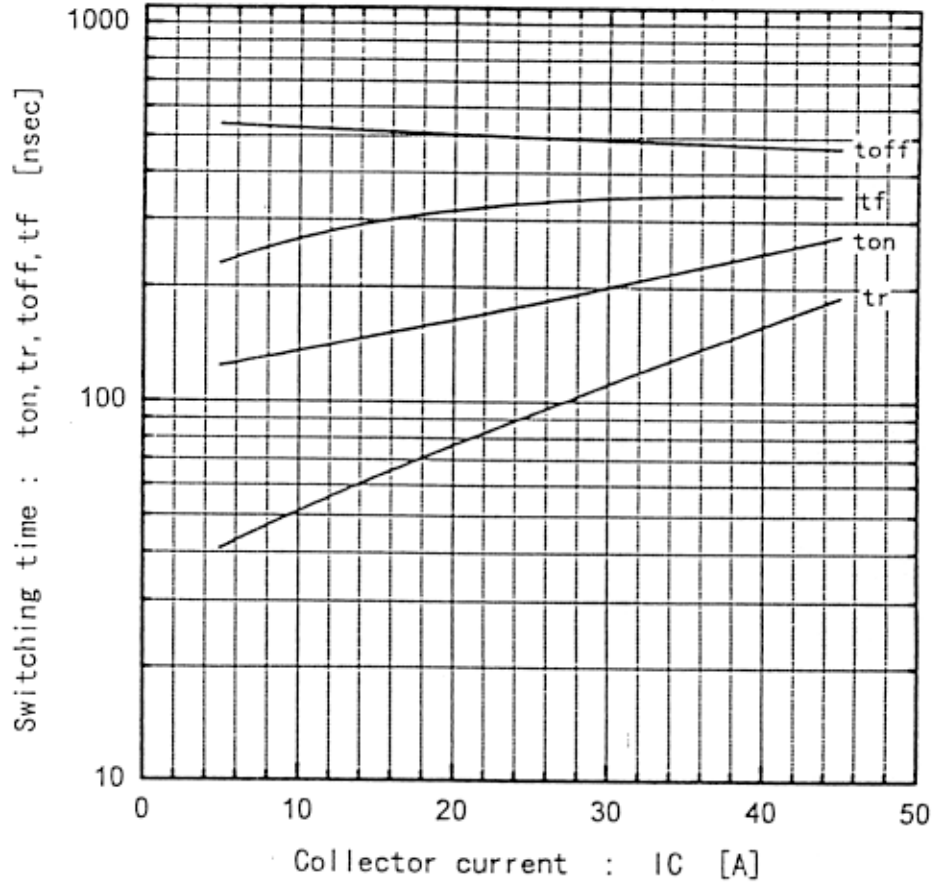


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Switching time vs. Collector current  
 $V_{CC}=300V, R_G=8.2\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs. Collector current  
 $V_{CC}=300V, R_G=8.2\Omega, V_{GE}=\pm 15V, T_j=125^\circ C$



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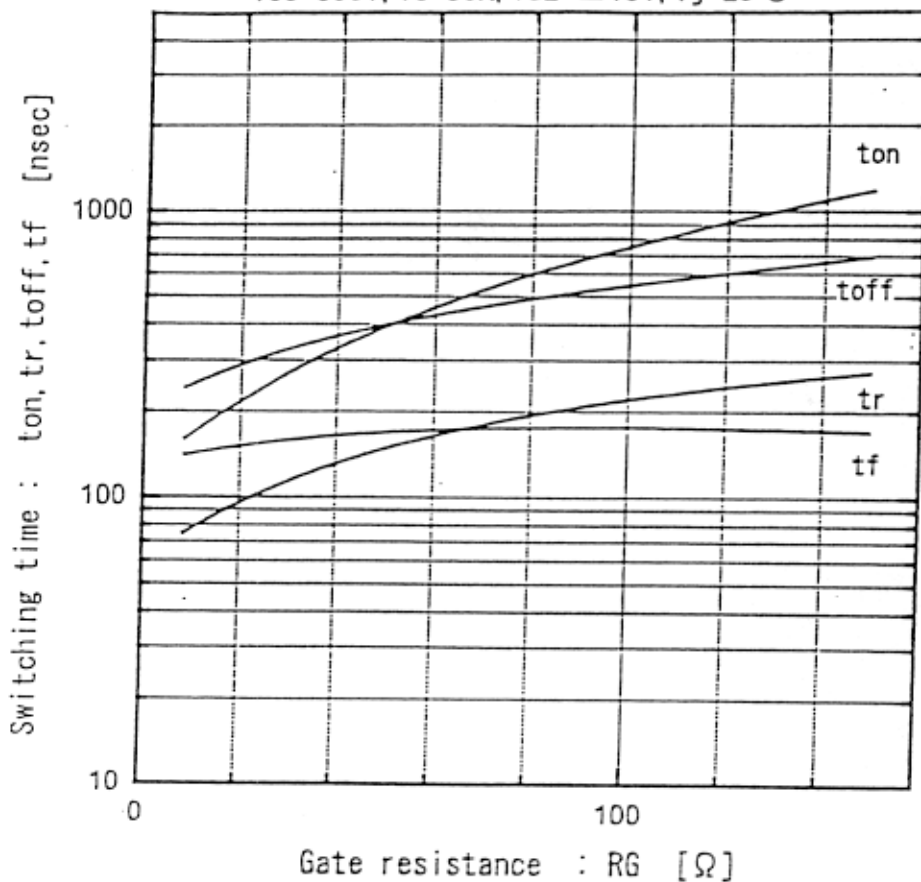
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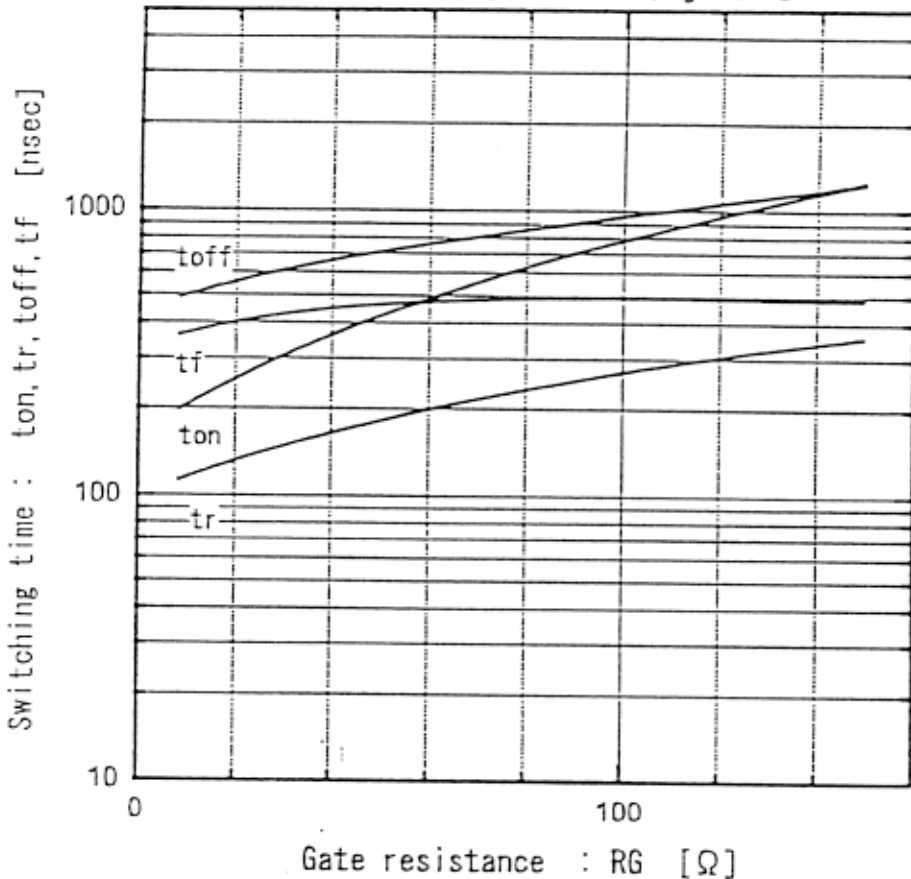
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Switching time vs.  $R_G$   
 $V_{CC}=300V, I_C=30A, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs.  $R_G$   
 $V_{CC}=300V, I_C=30A, V_{GE}=\pm 15V, T_j=125^\circ C$



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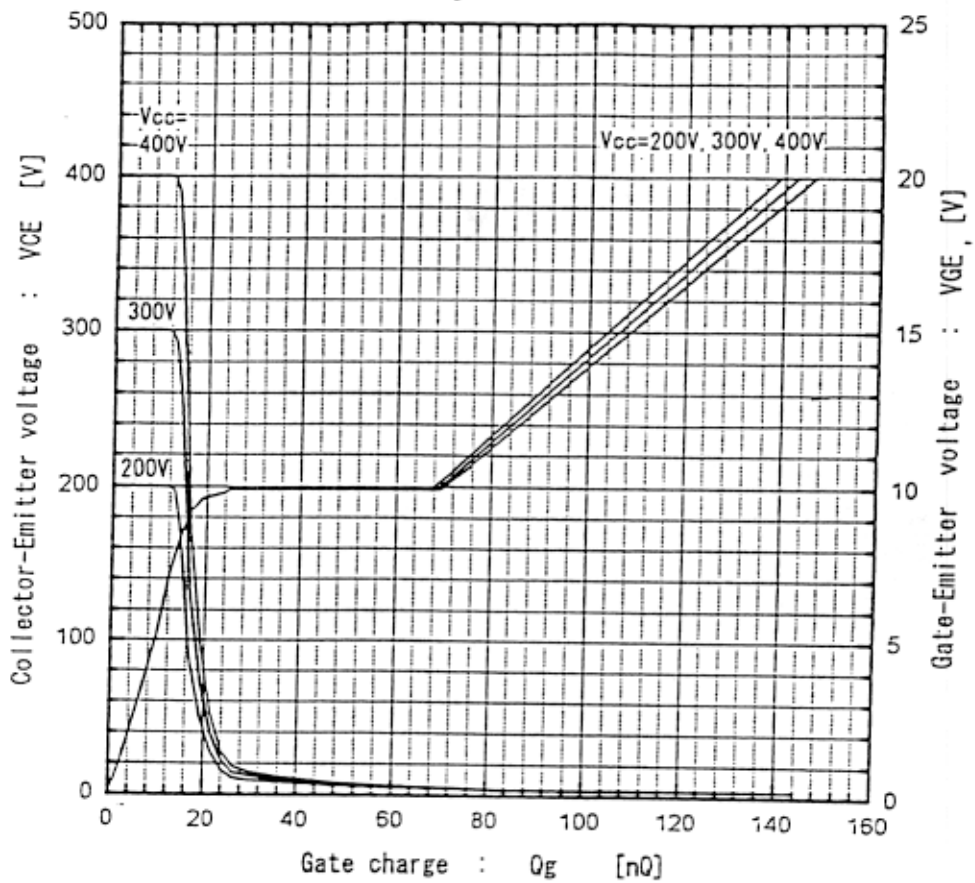
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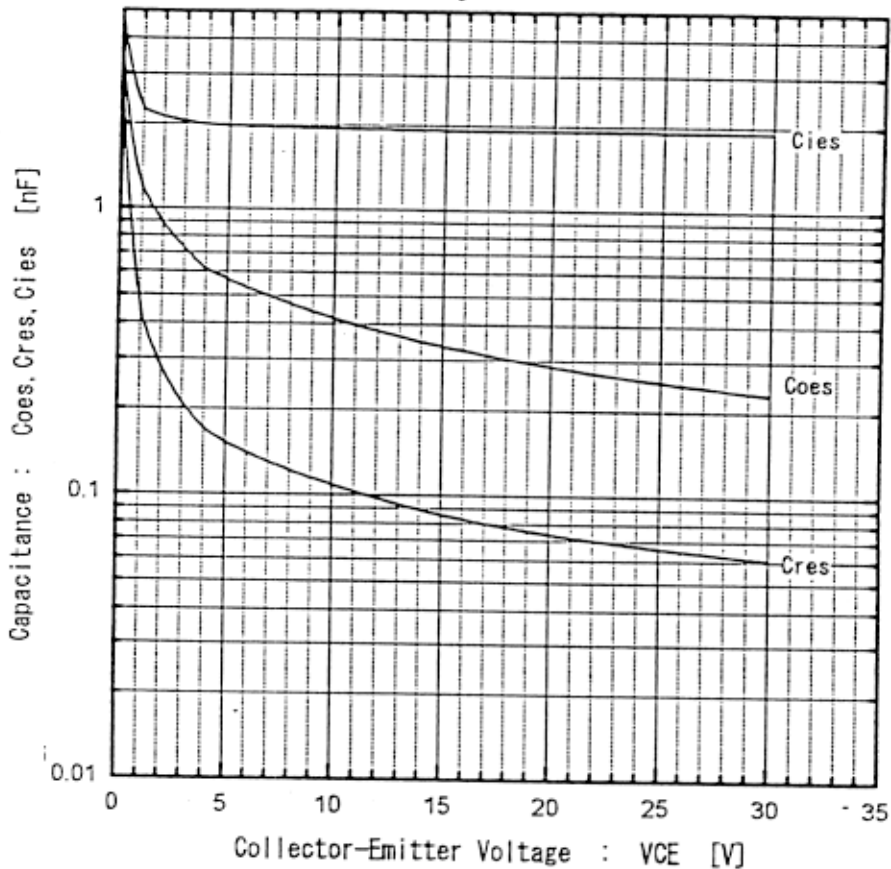
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Dynamic input characteristics  
T<sub>j</sub>=25°C



Capacitance vs. Collector-Emitter voltage  
T<sub>j</sub>=25°C



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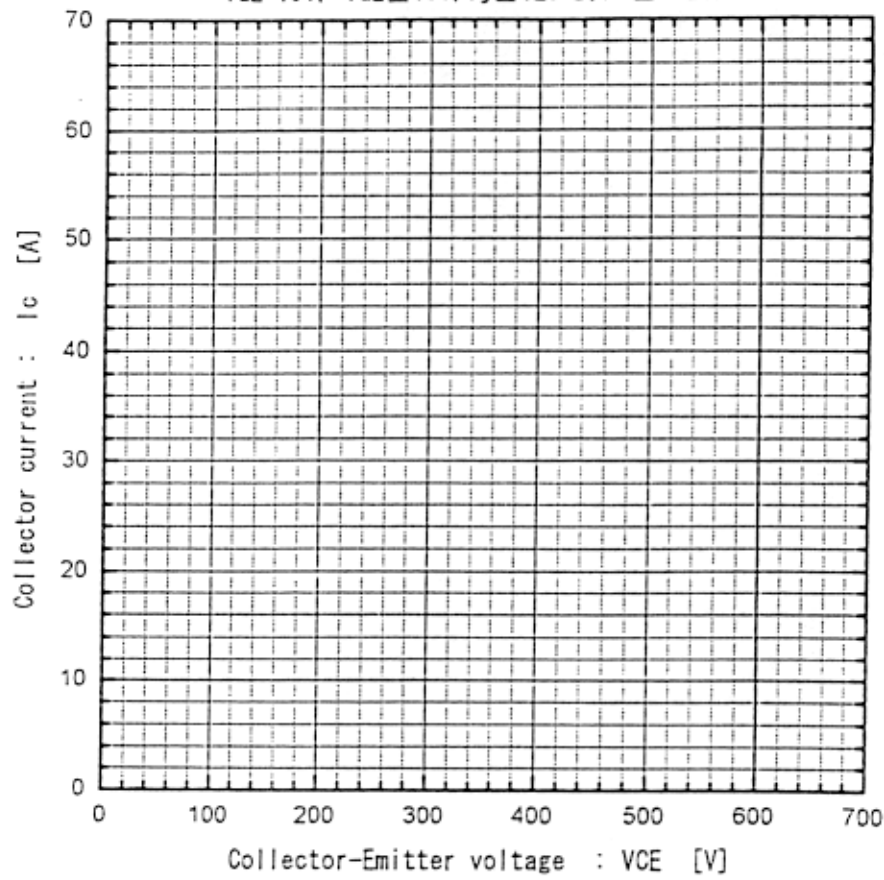
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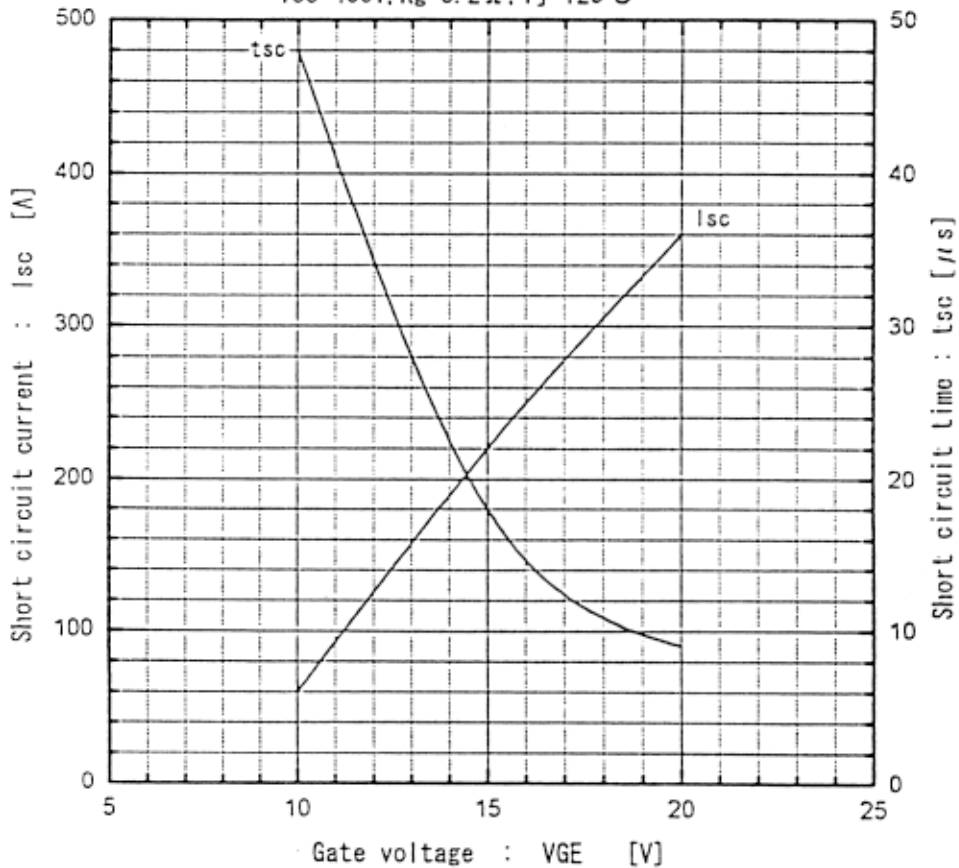
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Reverse Biased Safe Operating Area  
 $+V_{GE}=15V, -V_{GE} \leq 15V, T_j \leq 125^\circ C, R_G \geq 8.2 \Omega$



Typical short circuit capability  
 $V_{CC}=400V, R_G=8.2 \Omega, T_j=125^\circ C$



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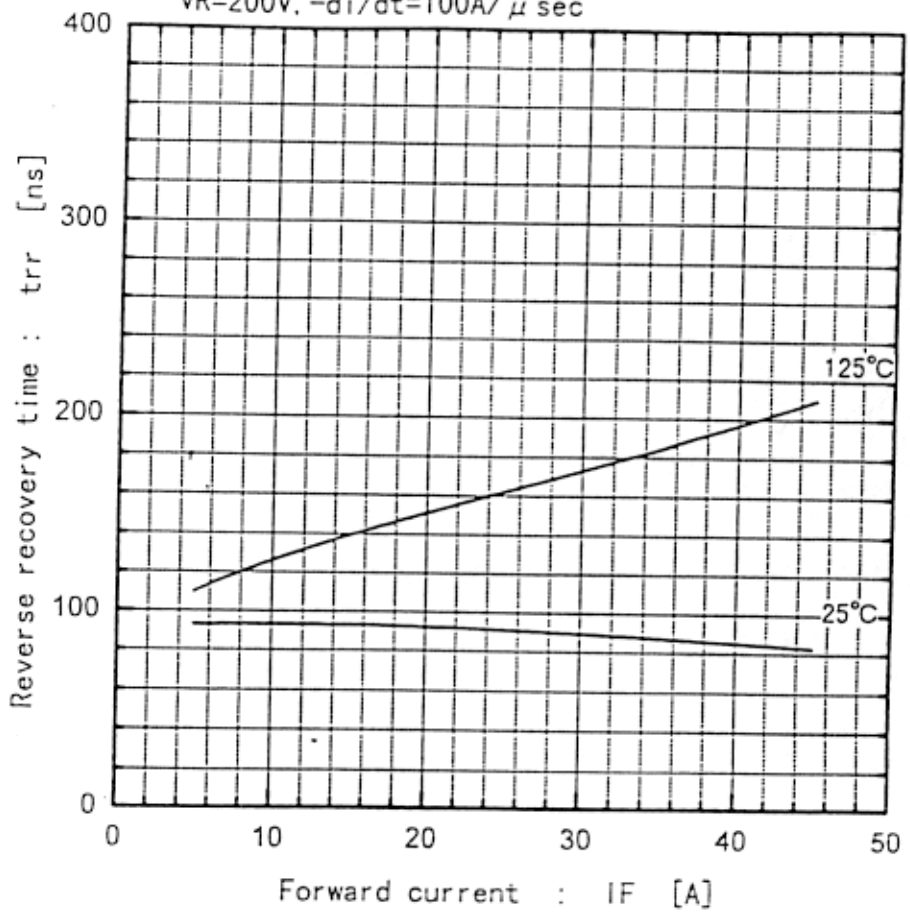
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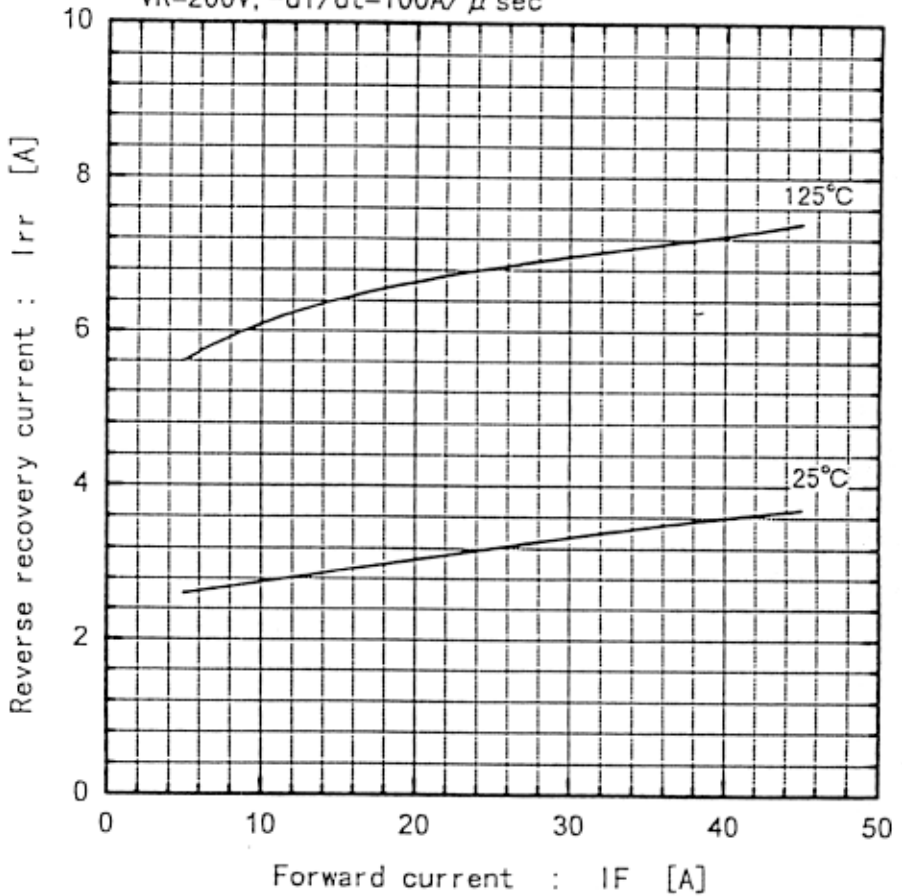
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Reverse recovery time vs. Forward current  
 $V_R=200V, -di/dt=100A/\mu sec$



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



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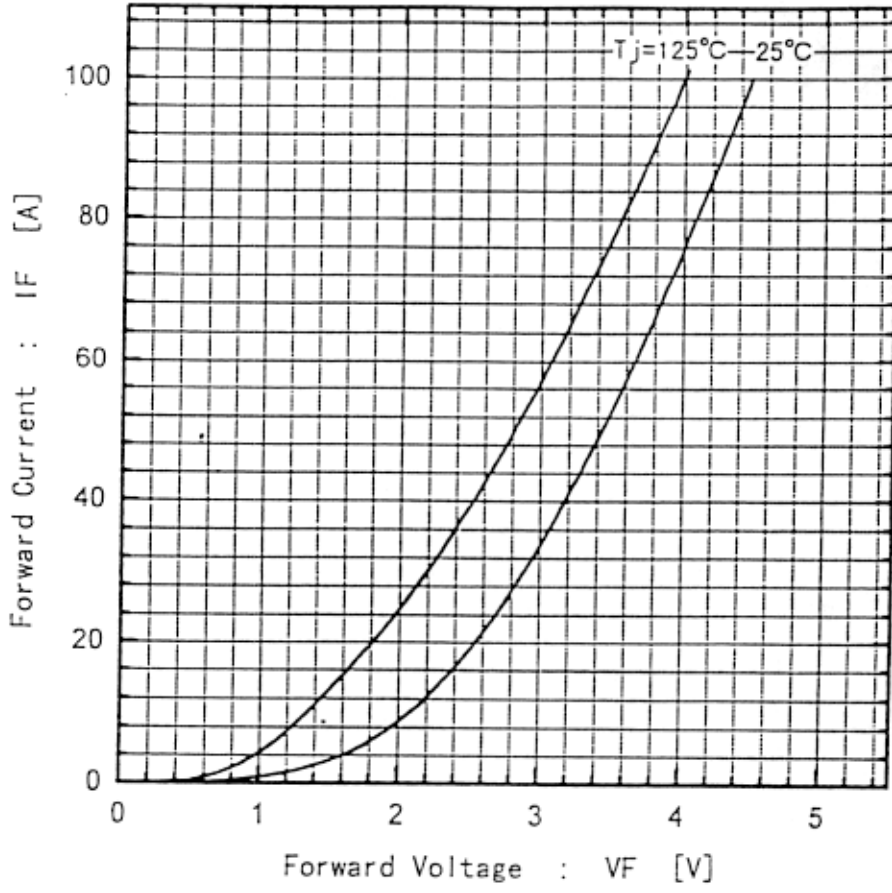
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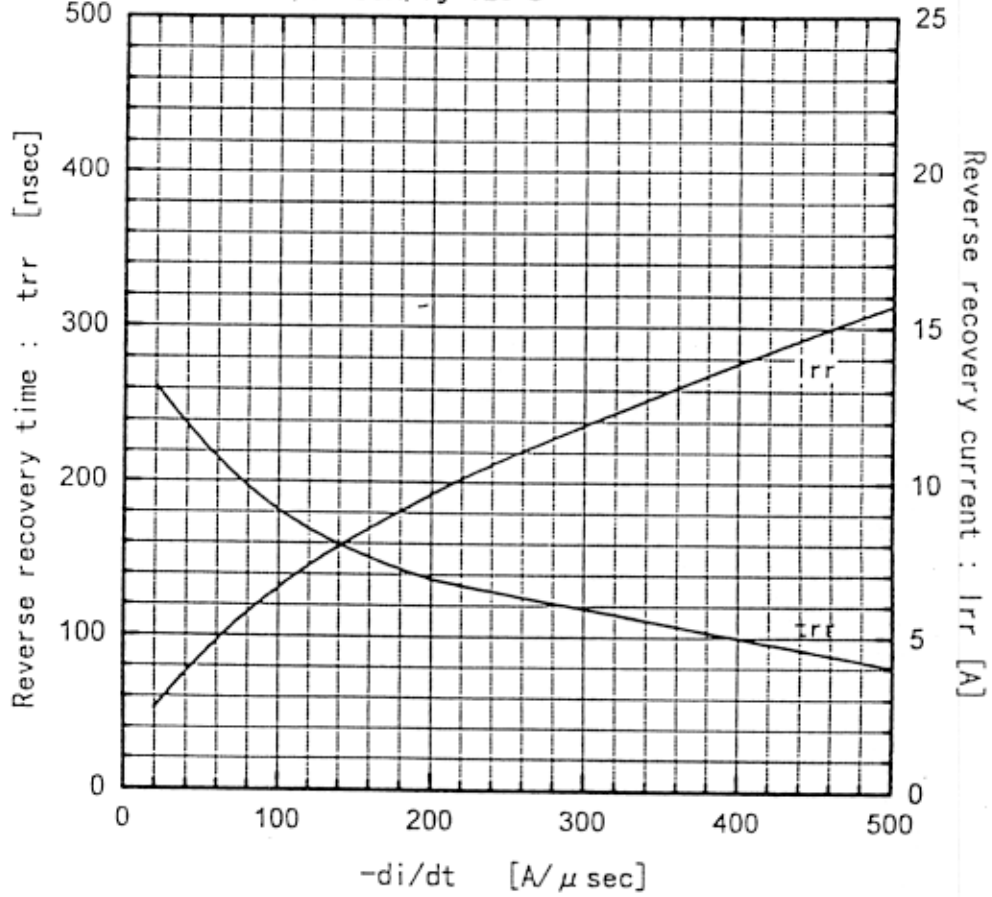
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Forward voltage vs. Forward current



Reverse recovery characteristics vs.  $-di/dt$   
 $VR=200V, IF=30A, Tj=125^\circ C$



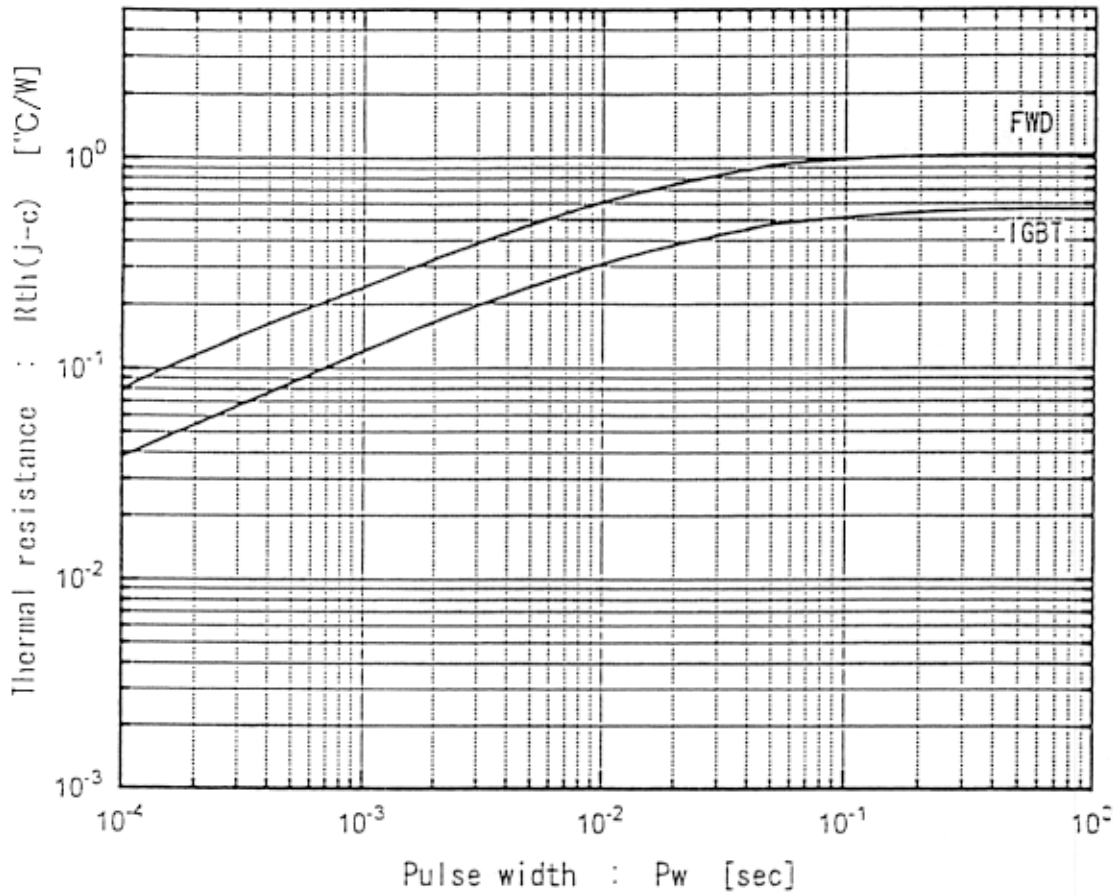
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Transient thermal resistance



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