

# SPECIFICATION

DEVICE NAME : IGBT  
 TYPE NAME : 1MBH10D-060  
 SPEC. No. :  
 DATE :

Fuji Electric Co.,Ltd.

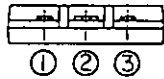
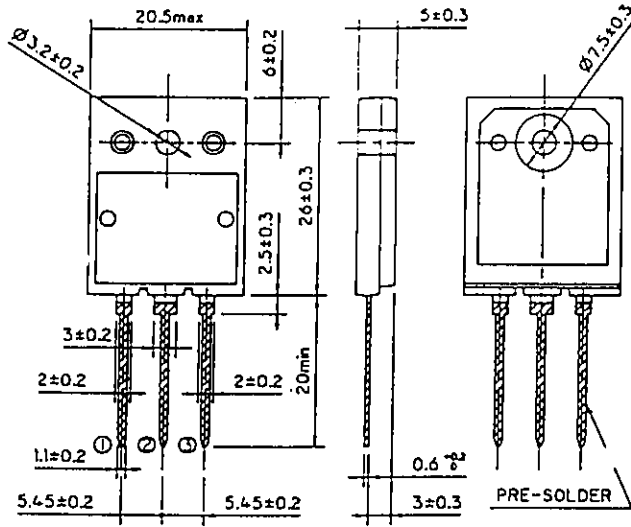
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Ratings and characteristics of Fuji IGBT

1MBH10D-060

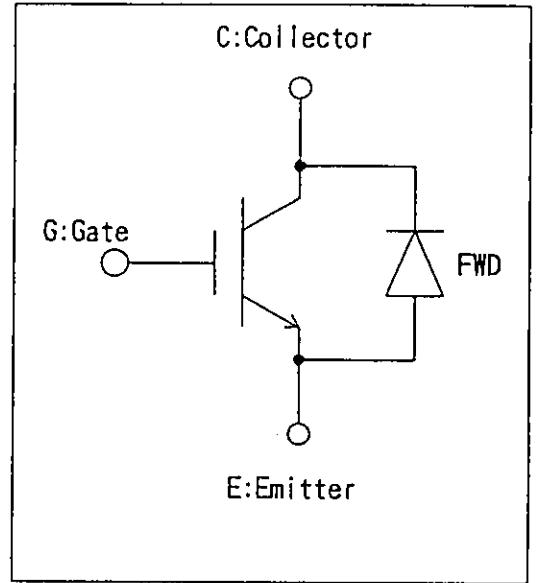
1. Outline Drawing



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		$V_{GEE}$	±20	V	
Collector Current	DC	Tc=25 °C	$I_{C25}$	30	A
		Tc=115°C	$I_{C115}$	10	A
	1ms	Tc=25 °C	$I_{cp}$	80	A
IGBT Max. Power Dissipation		$P_c$	115	W	
FWD Max. Power Dissipation		$P_c$	55	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	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	$\mu A$	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	5.5		8.5	$V_{CE} = 20V$ $I_C = 10mA$	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			3.0	$V_{GE} = 15V$ $I_C = 10A$	V	
Input capacitance	$C_{ies}$		700		$V_{GE} = 0V$	pF	
Output capacitance	$C_{oes}$		150		$V_{CE} = 10V$		
Reverse transfer capacitance	$C_{res}$		20		$f = 1MHz$		
Switching Time	Turn-on time	$t_{on}$		1.2	$V_{CC} = 300V$ $I_C = 10A$ $V_{GE} = \pm 15V$ $R_G = 220\Omega$ (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			$V_{CC} = 300V$ $I_C = 10A$ $V_{GE} = +15V$ $R_G = 22\Omega$ (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	$I_F = 10A$	V	
Reverse recovery time	$t_{rr}$			0.3	$I_F = 10A, V_{GE} = -10V$ $V_R = 200V$ $di/dt = 100A/\mu s$	$\mu s$	

5. Thermal resistance characteristics

Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	$R_{th(j-c)}$			1.08	IGBT	$^{\circ}C/W$
	$R_{th(j-c)}$			2.27	FWD	

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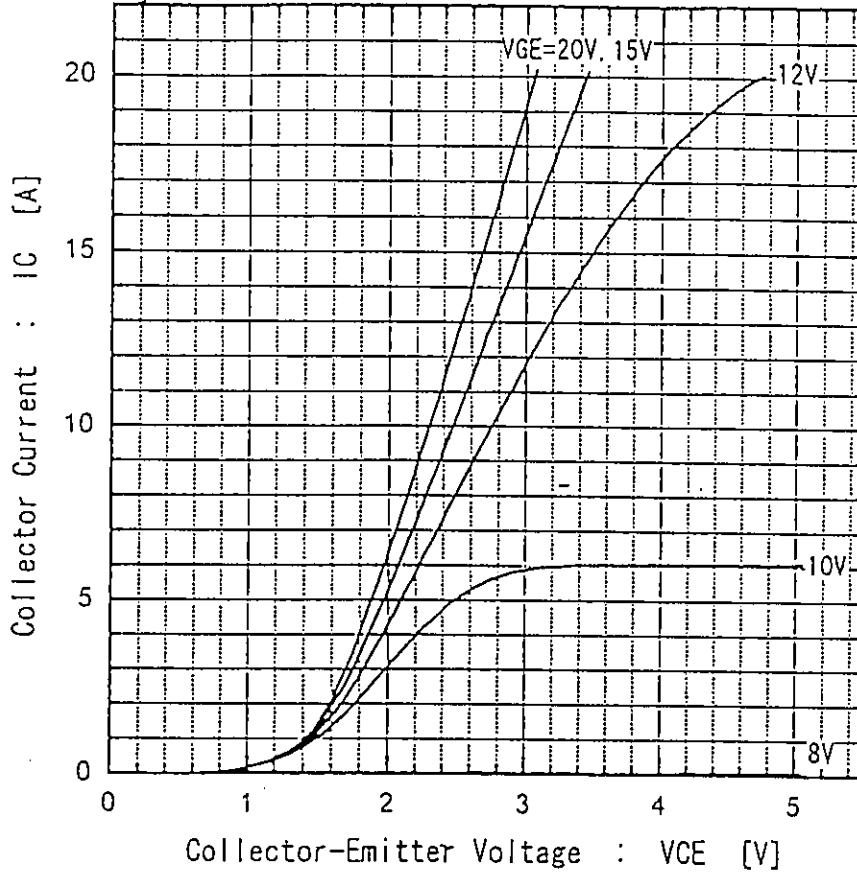
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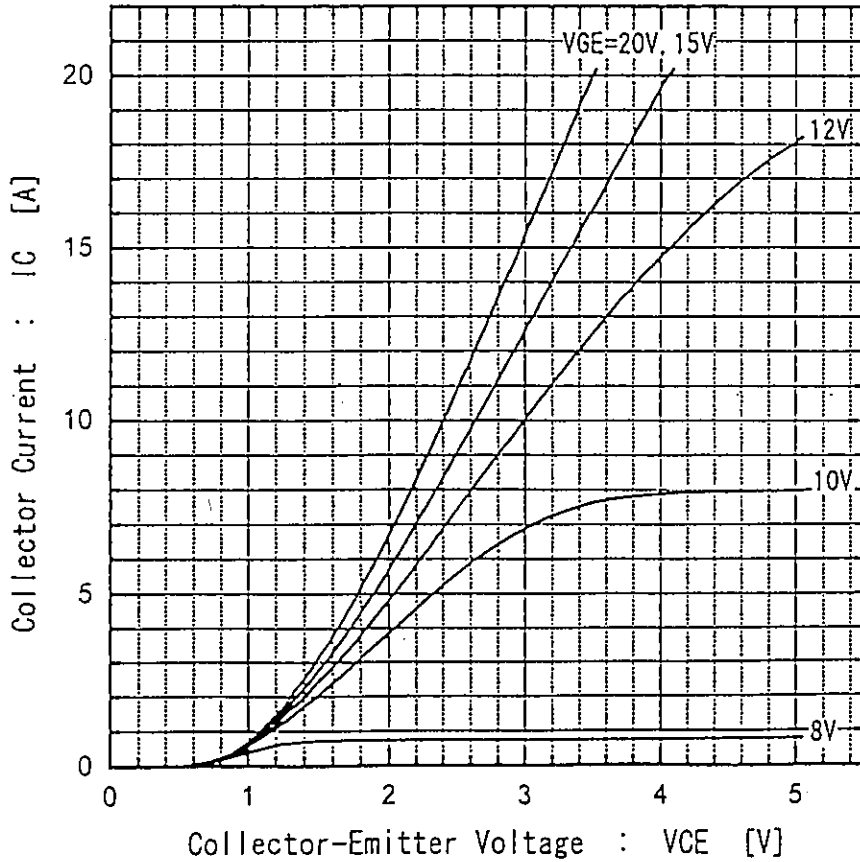
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Collector Current vs. Collector-Emitter Voltage  
 $T_j=25^\circ\text{C}$



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



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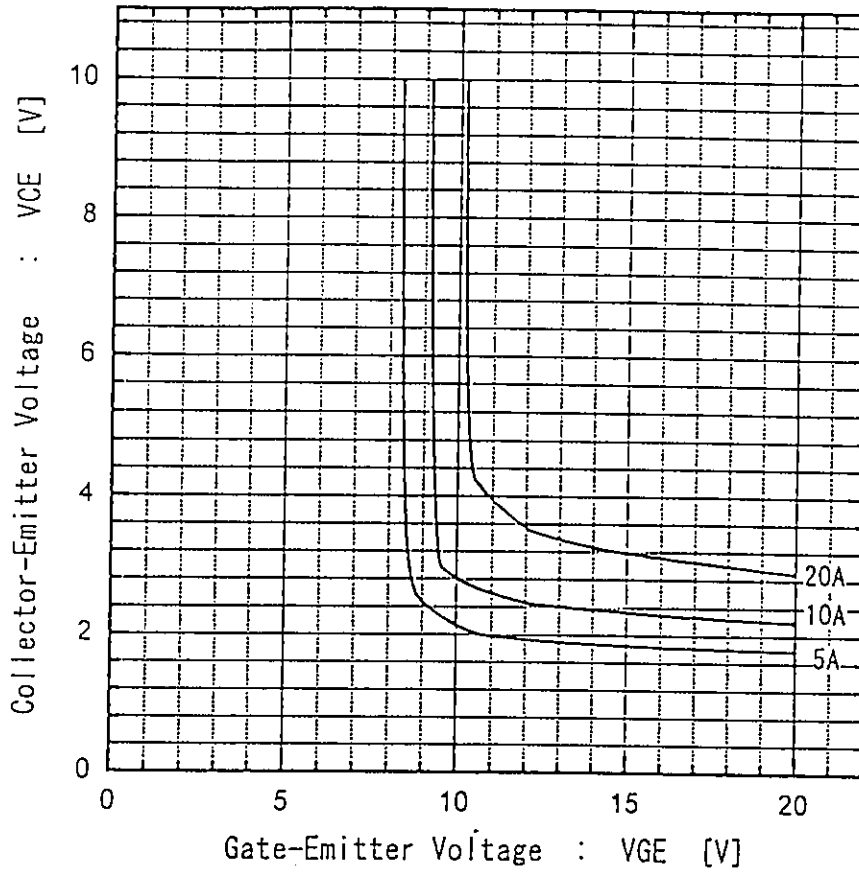
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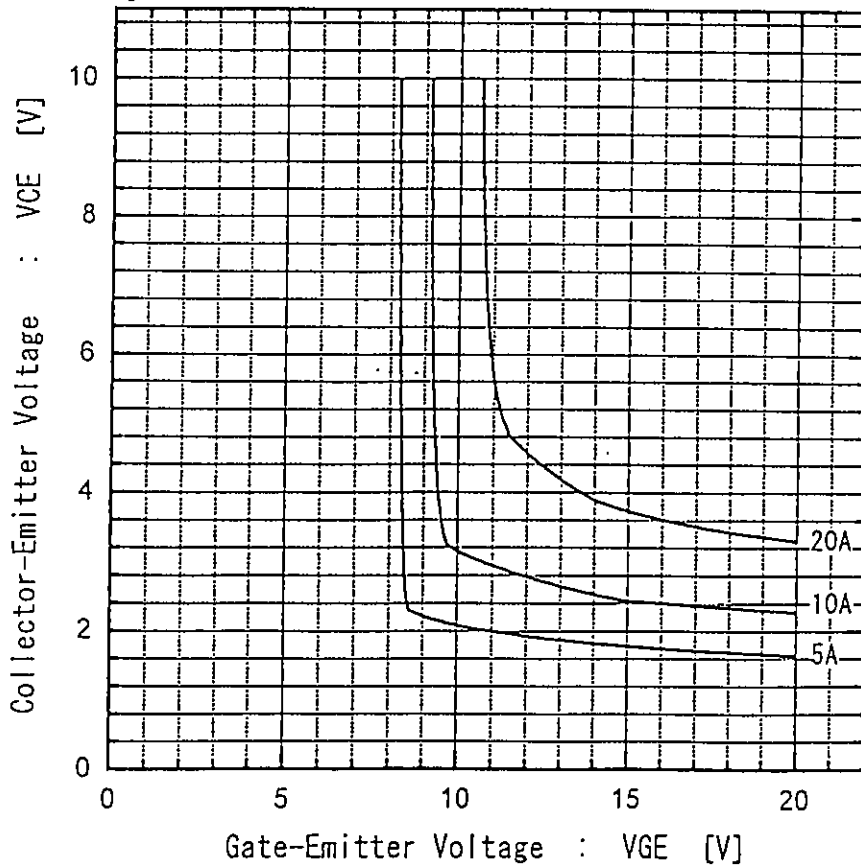
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Collector-Emitter Voltage vs Gate-Emitter Voltage  
 $T_j=25^\circ\text{C}$



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



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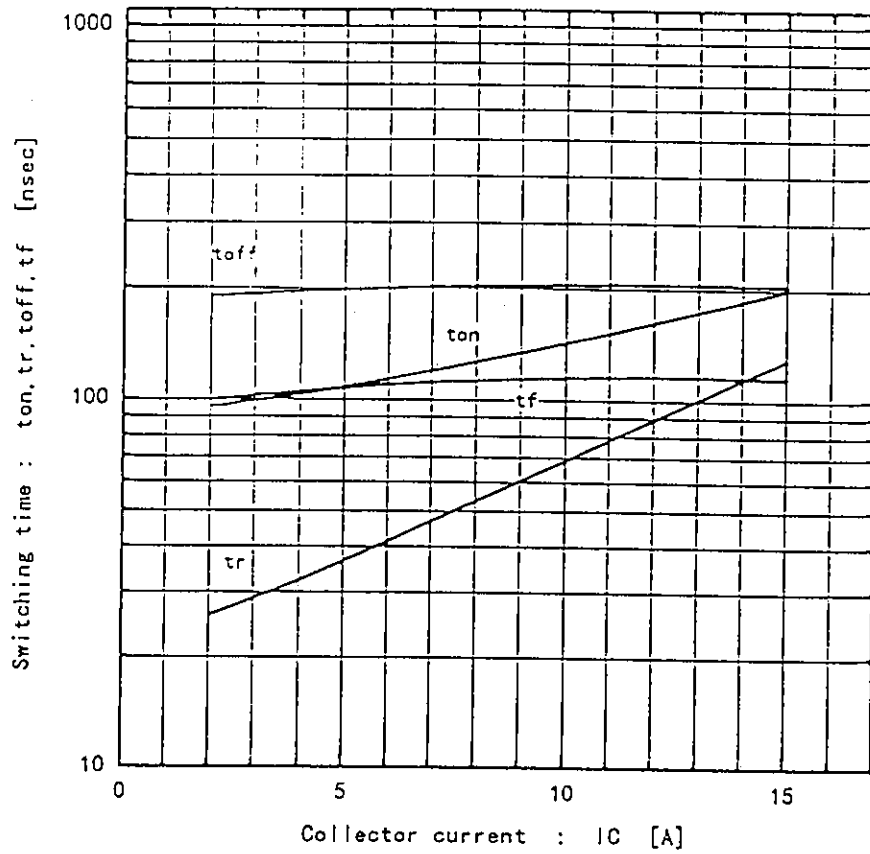
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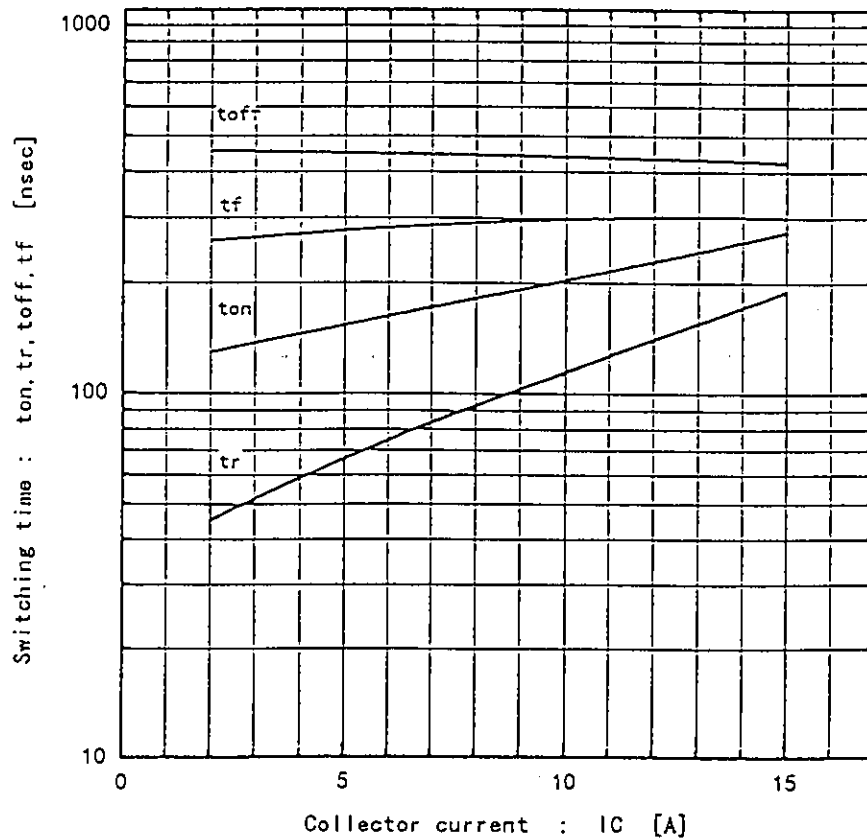
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Switching time vs. Collector current  
 $V_{cc}=300V, R_G=22\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs. Collector current  
 $V_{cc}=300V, R_G=22\Omega, V_{GE}=\pm 15V, T_j=125^\circ C$



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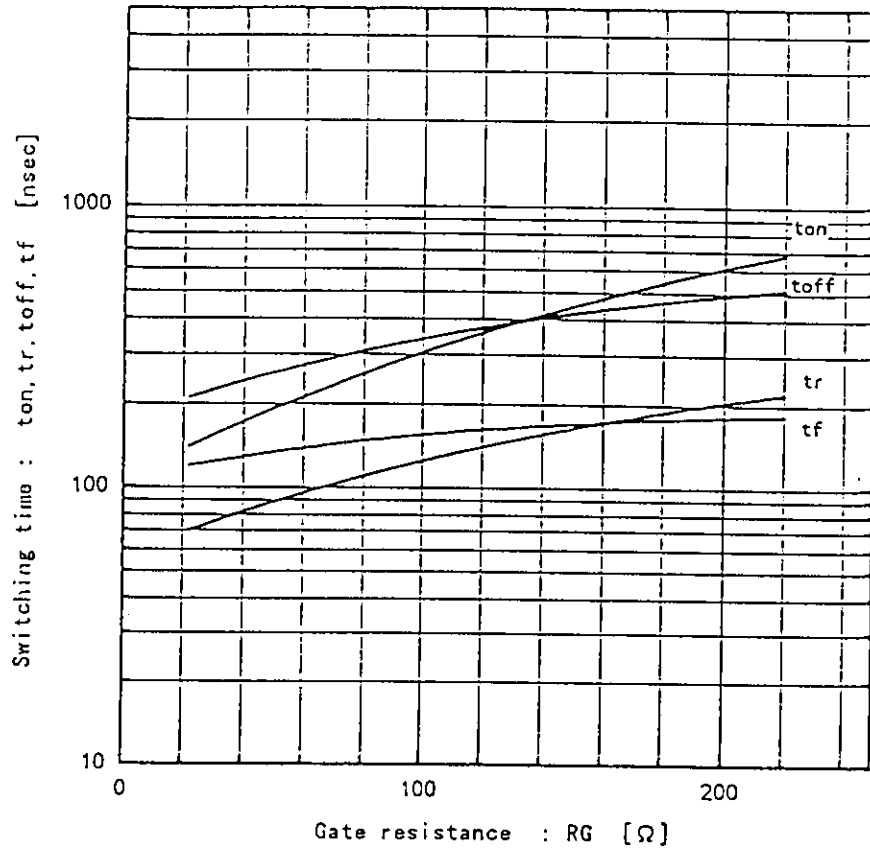
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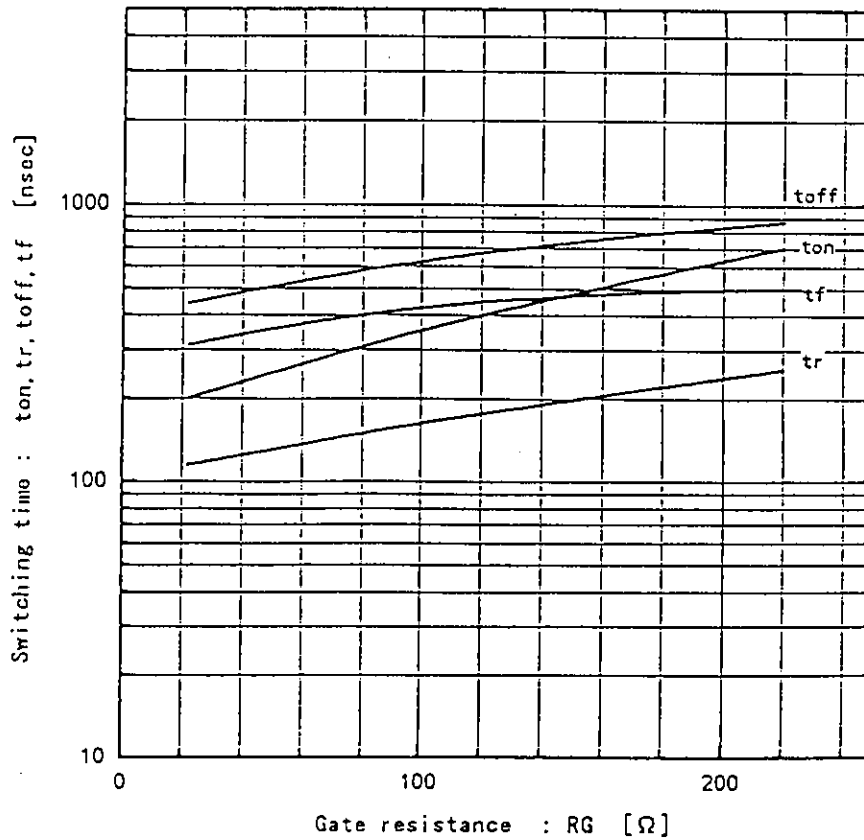
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Switching time vs. RG  
 $V_{cc}=300V, I_C=10A, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs. RG  
 $V_{cc}=300V, I_C=10A, V_{GE}=\pm 15V, T_j=125^\circ C$



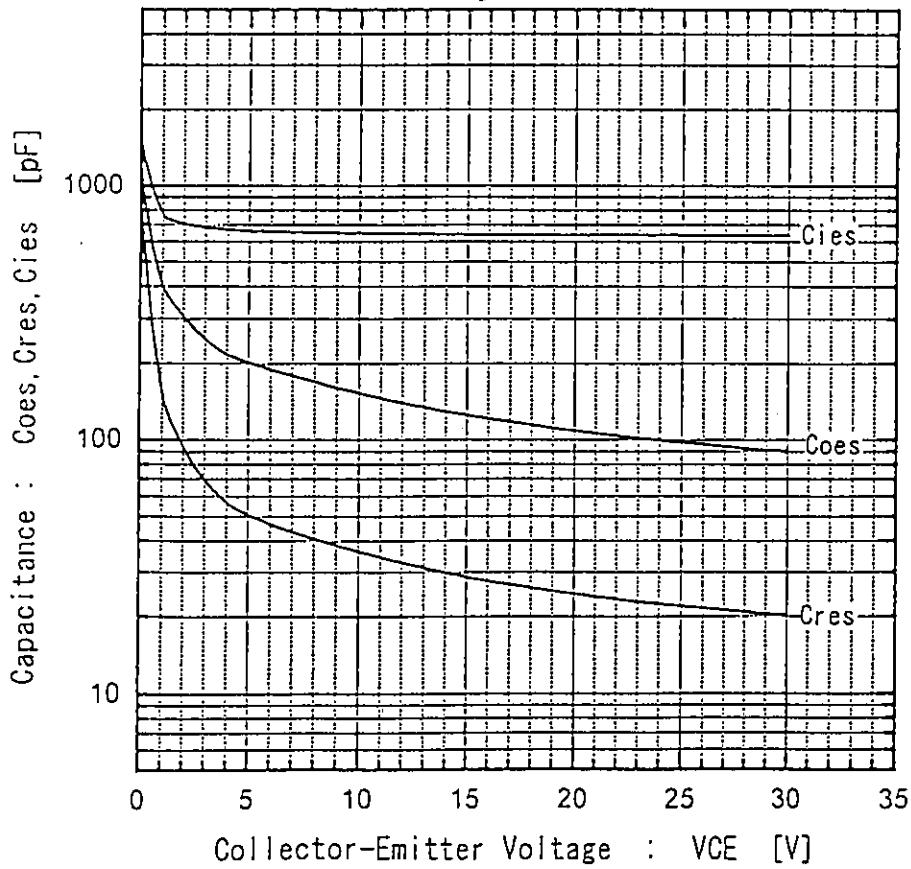
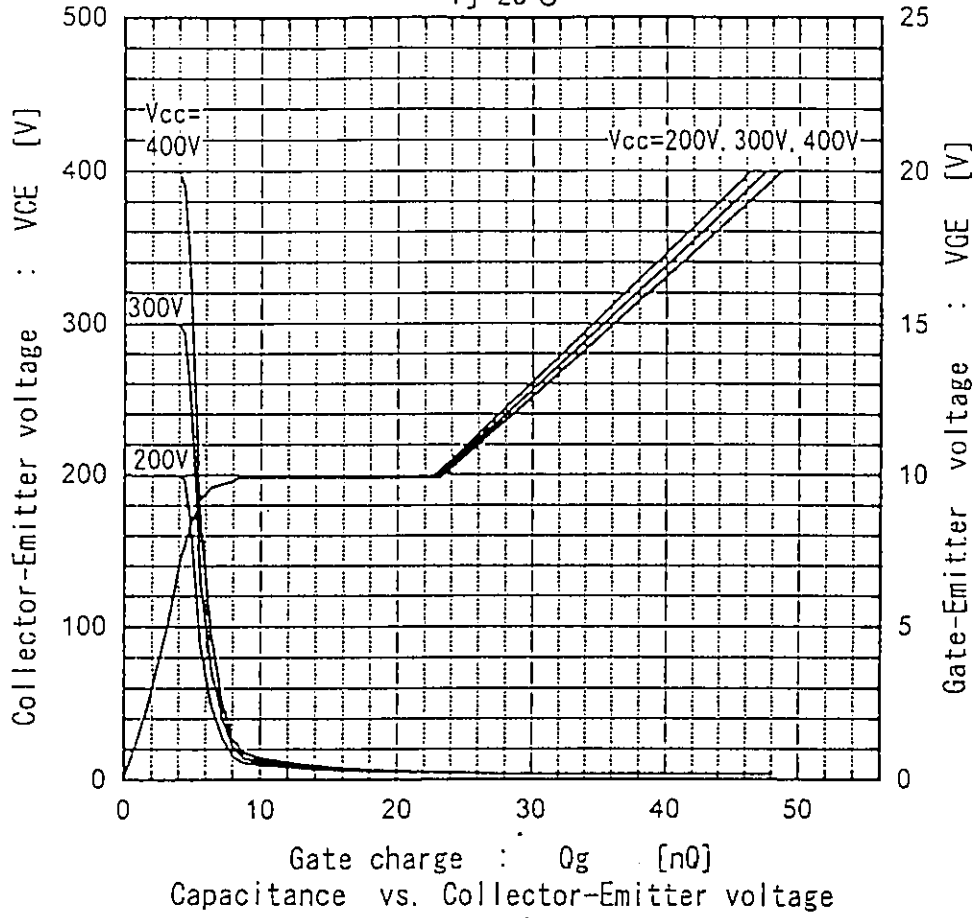
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Dynamic input characteristics  
 $T_j=25^\circ\text{C}$



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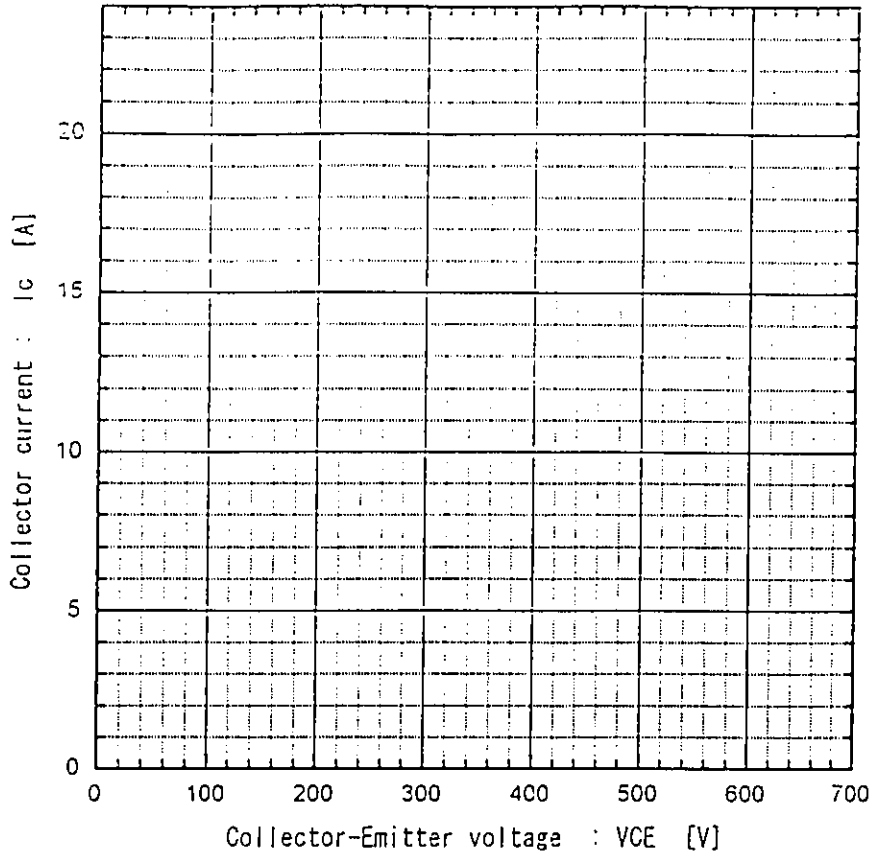
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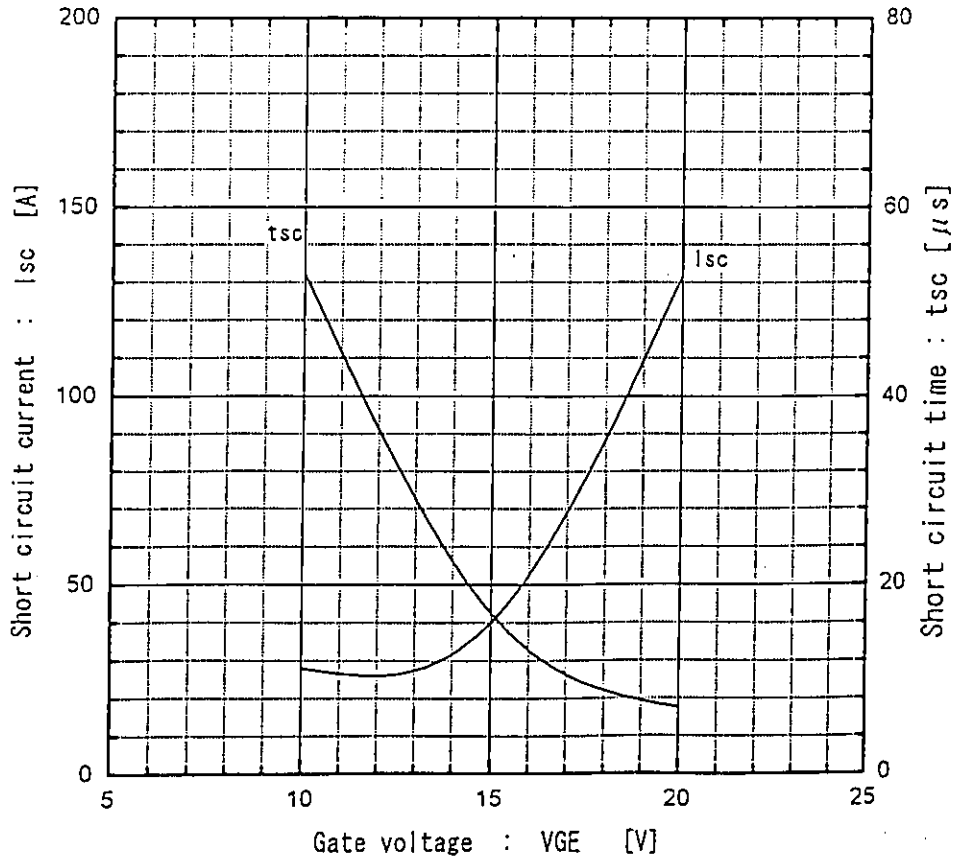
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Reverse Biased Safe Operating Area  
 $+V_{GE} = 15V$ ,  $-V_{GE} \leq 15V$ ,  $T_j \leq 125^\circ C$ ,  $R_G \geq 22\Omega$



Typical short circuit capability  
 $V_{CC} = 400V$ ,  $R_G = 22\Omega$ ,  $T_j = 125^\circ C$



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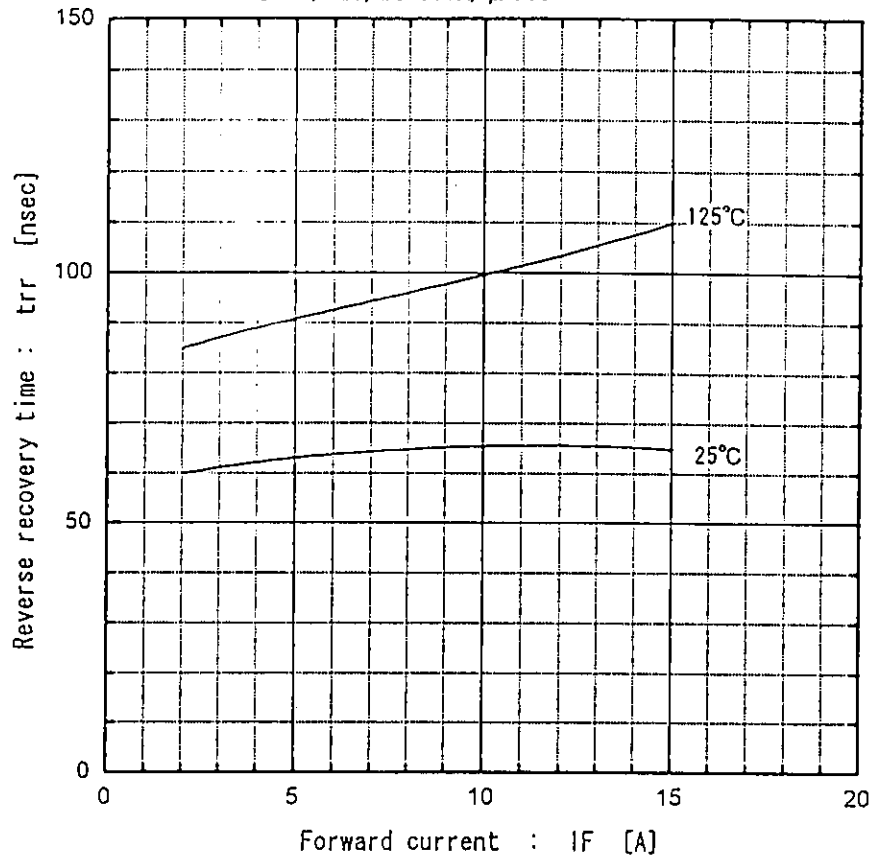
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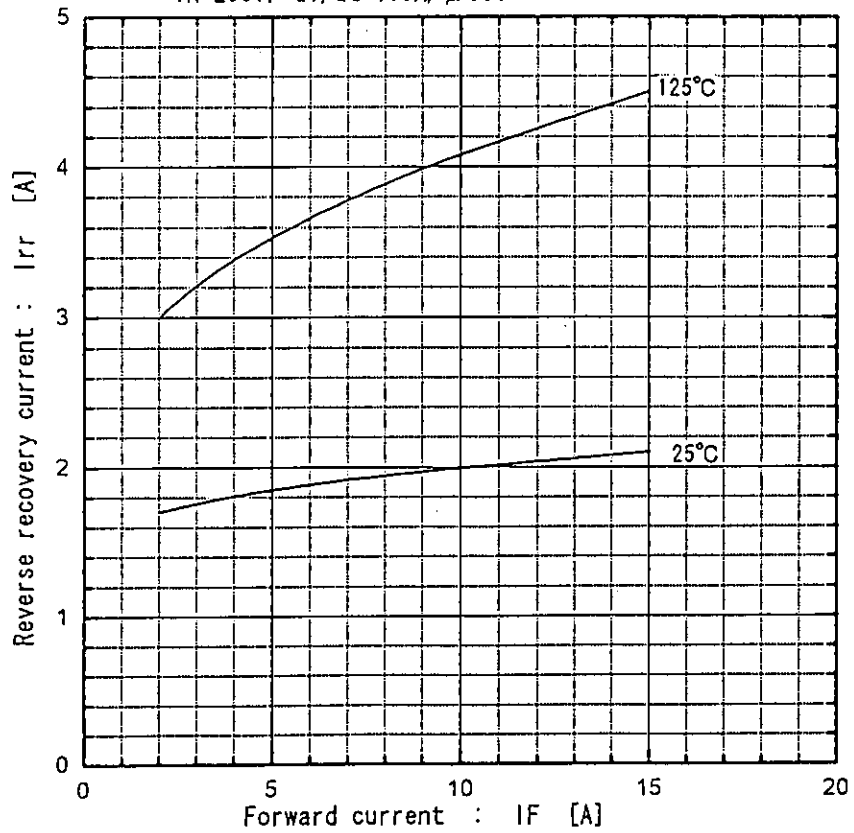
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Reverse recovery time vs. Forward current  
VR=200V, -di/dt=100A/ $\mu$ sec



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



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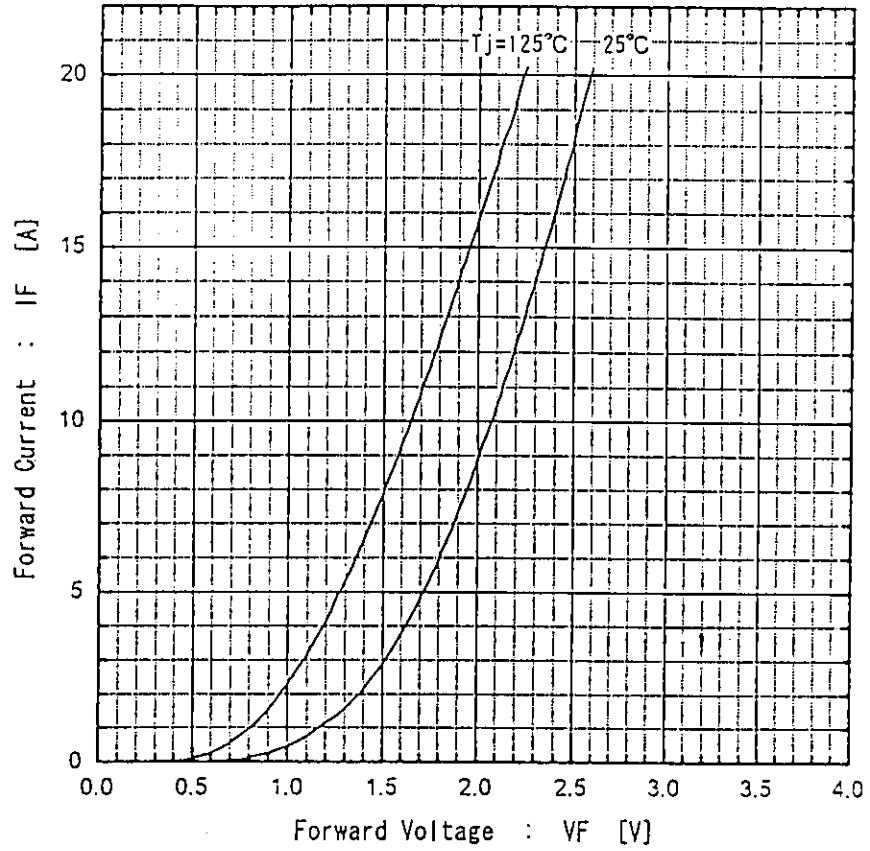
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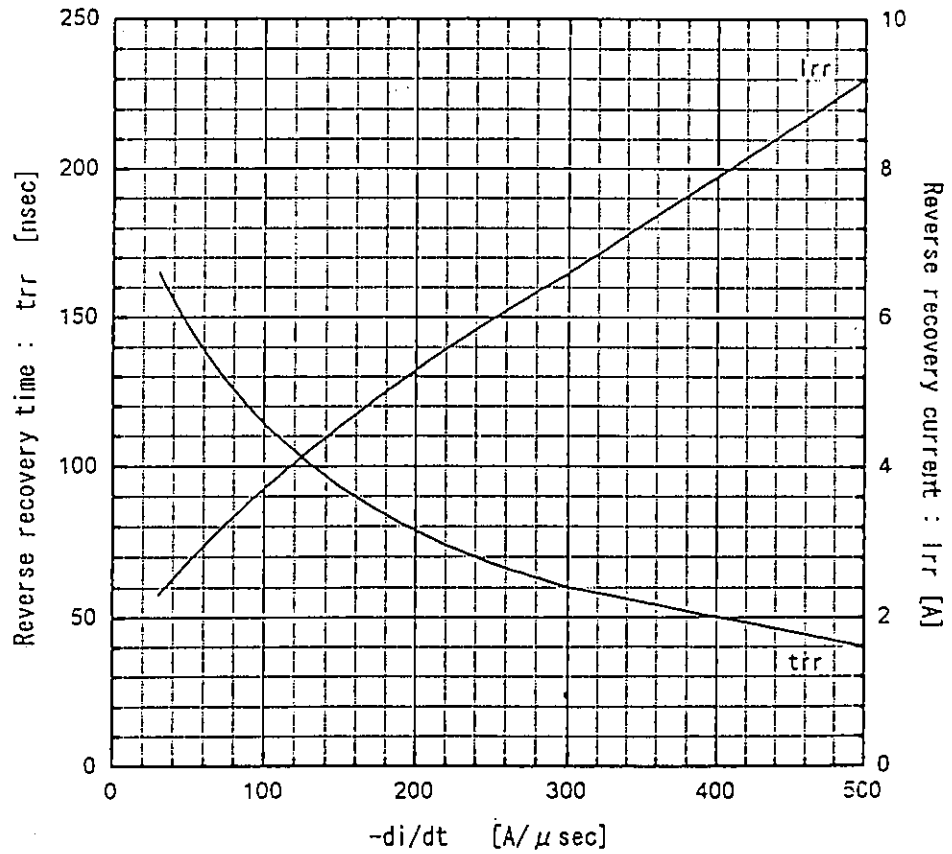
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Forward voltage vs. Forward current



Reverse recovery characteristics vs.  $-di/dt$   
 $I_F=10A, T_j=125^\circ C$



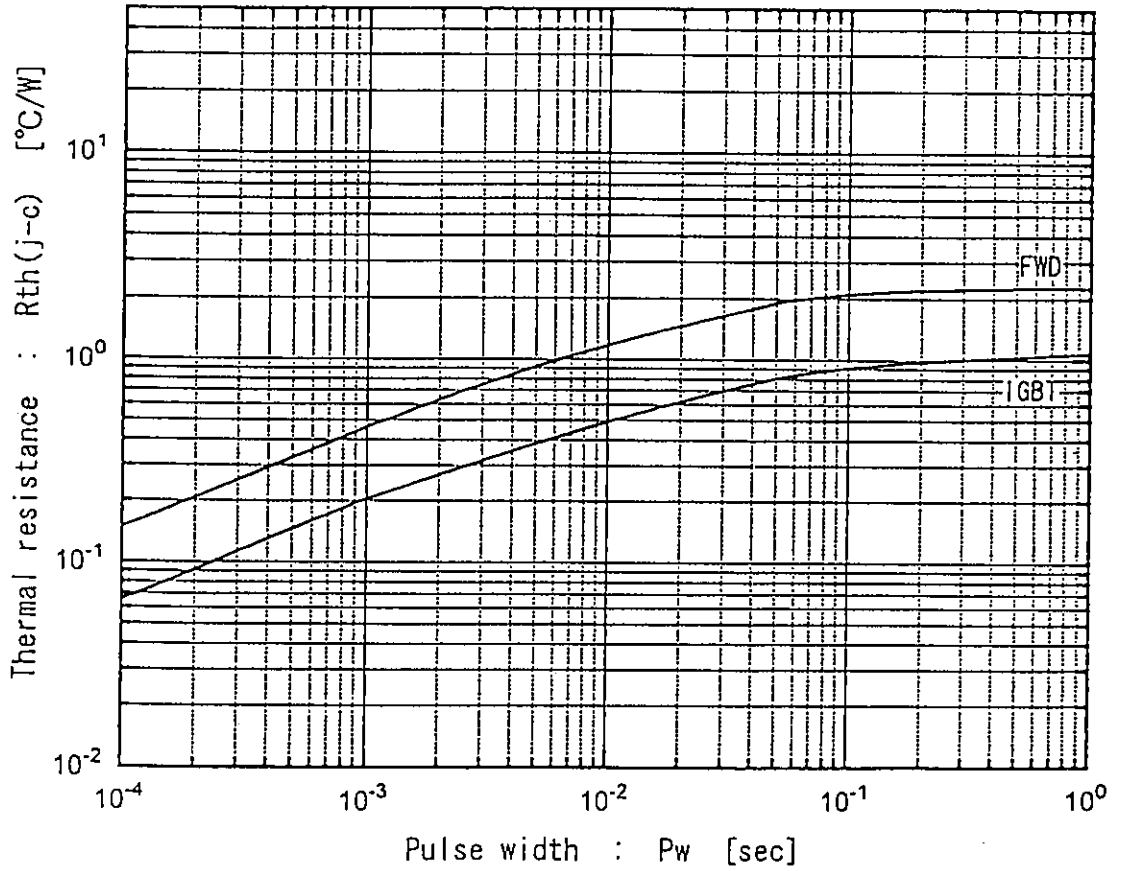
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# Transient thermal resistance



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