

SPECIFICATION

DEVICE NAME : IGBT

TYPE NAME : 1MBH05D-060

SPEC. No. :

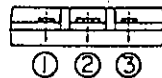
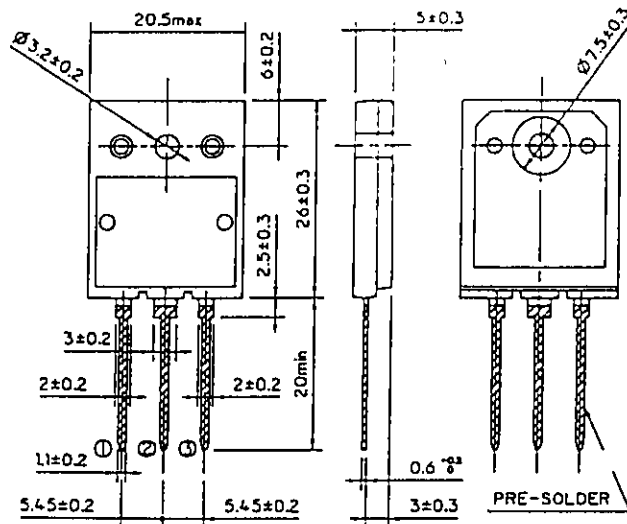
DATE :

Fuji Electric Co.,Ltd.

This Specification is subject to change without notice.

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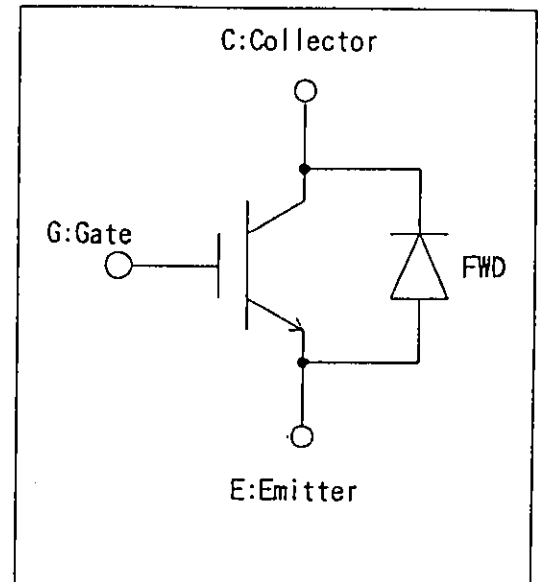
1. Outline Drawing



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}	± 20	V
Collector Current	DC	Tc=25 °C	I_{C25}	21	A
		Tc=120°C	I_{C120}	5	A
	1ms	Tc=25 °C	I_{cp}	52	A
IGBT Max. Power Dissipation			P_c	80	W
FWD Max. Power Dissipation			P_c	40	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)

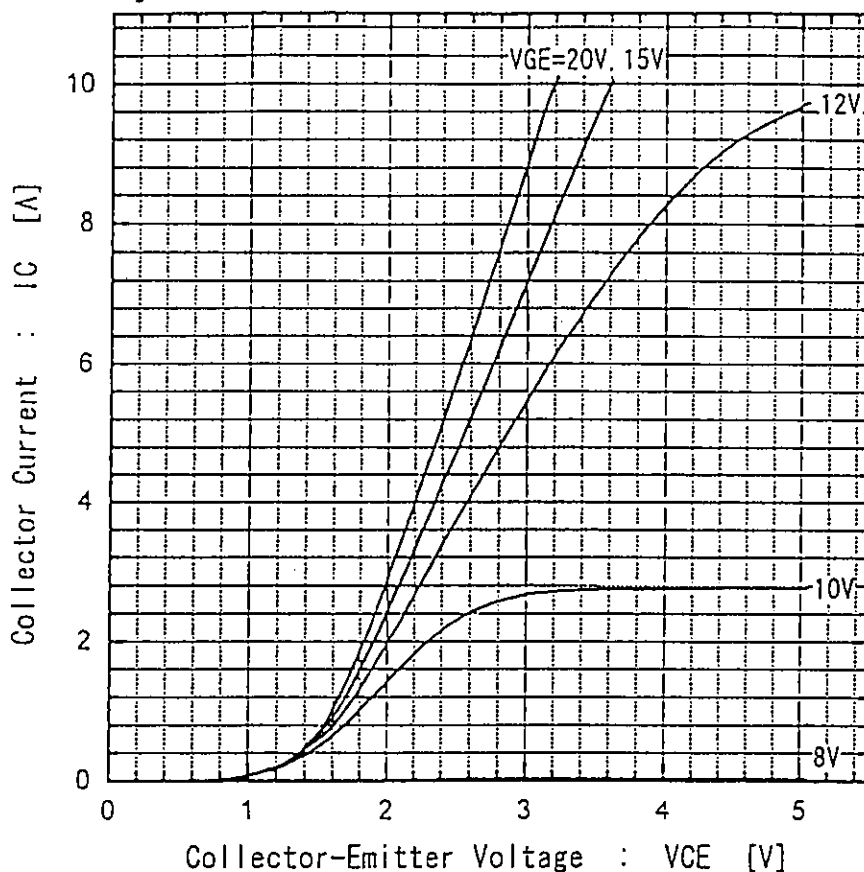
Items		Symbols	Characteristics			Conditions	Unit
			min.	typ.	max.		
Zero gate voltage Collector Current		I_{CES}			1.0	$V_{GE} = 0V$ $V_{CE} = 600V$	mA
Gate-Emitter leakage Current		I_{GES}			20	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	μA
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	5.5		8.5	$V_{CE} = 20V$ $I_C = 5mA$	V
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			3.0	$V_{GE} = 15V$ $I_C = 5A$	V
Input capacitance		C_{ies}		400		$V_{GE} = 0V$ $V_{CE} = 10V$ $f = 1MHz$	pF
Output capacitance		C_{oes}		85			
Reverse transfer capacitance		C_{res}		15			
Switching Time	Turn-on time	t_{on}			1.2	$V_{CC} = 300V$ $I_C = 5A$ $V_{GE} = \pm 15V$ $R_G = 330\Omega$ (Half Bridge)	μs
		t_r			0.6		
	Turn-off time	t_{off}			1.0		
		t_f			0.35		
	Turn-on time	t_{on}		0.16		$V_{CC} = 300V$ $I_C = 5A$ $V_{GE} = +15V$ $R_G = 33\Omega$ (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	$I_F = 5A$	V
Reverse recovery time		t_{rr}			0.3	$I_F = 5A, V_{GE} = -10V$ $V_R = 200V$ $di/dt = 100A/\mu s$	μs

5. Thermal resistance characteristics

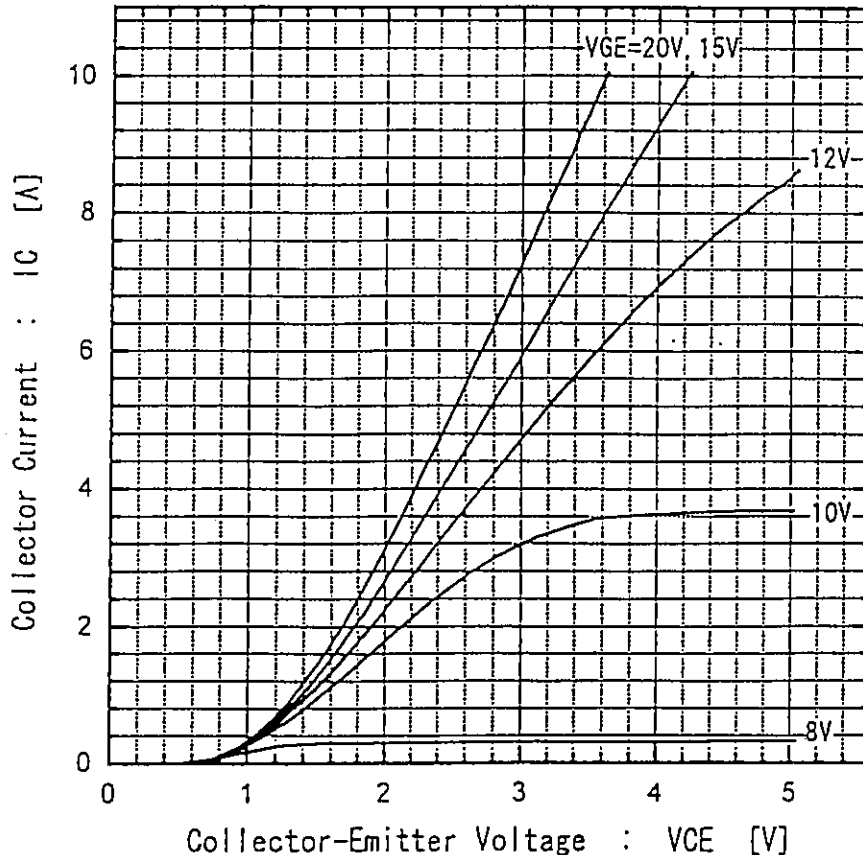
Items		Symbols	Characteristics			Conditions	Unit
			min.	typ.	max.		
Thermal resistance		$R_{th(j-c)}$			1.56	IGBT	$^{\circ}C/W$
		$R_{th(j-c)}$			3.12	FWD	

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

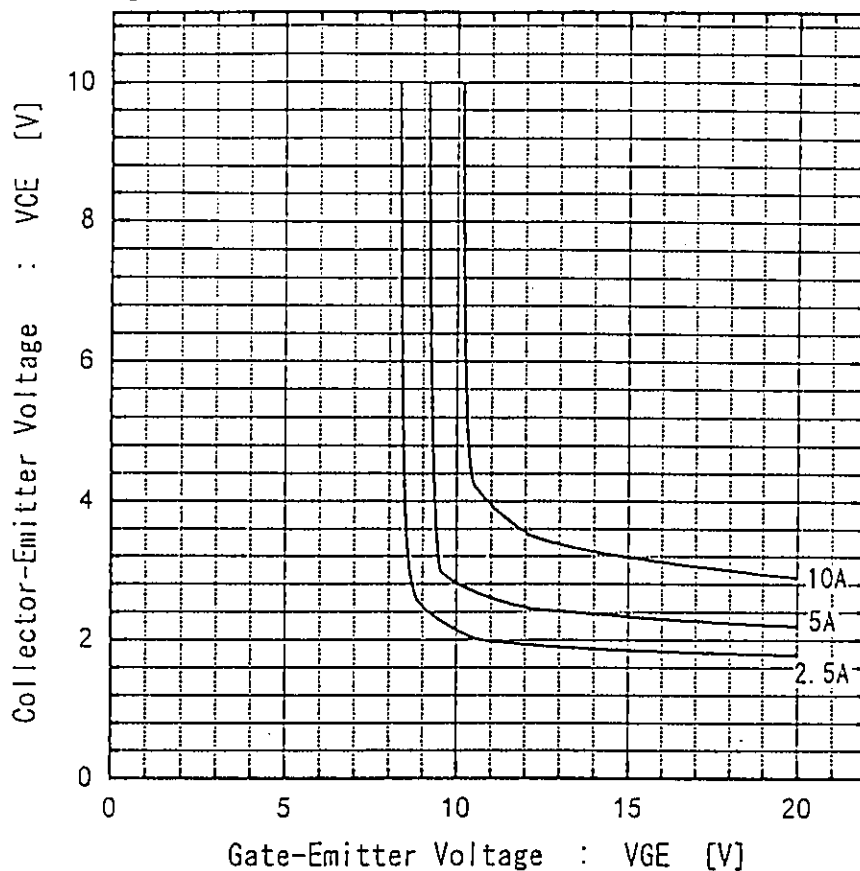


Collector Current vs. Collector-Emitter Voltage
 $T_j = 125^\circ\text{C}$

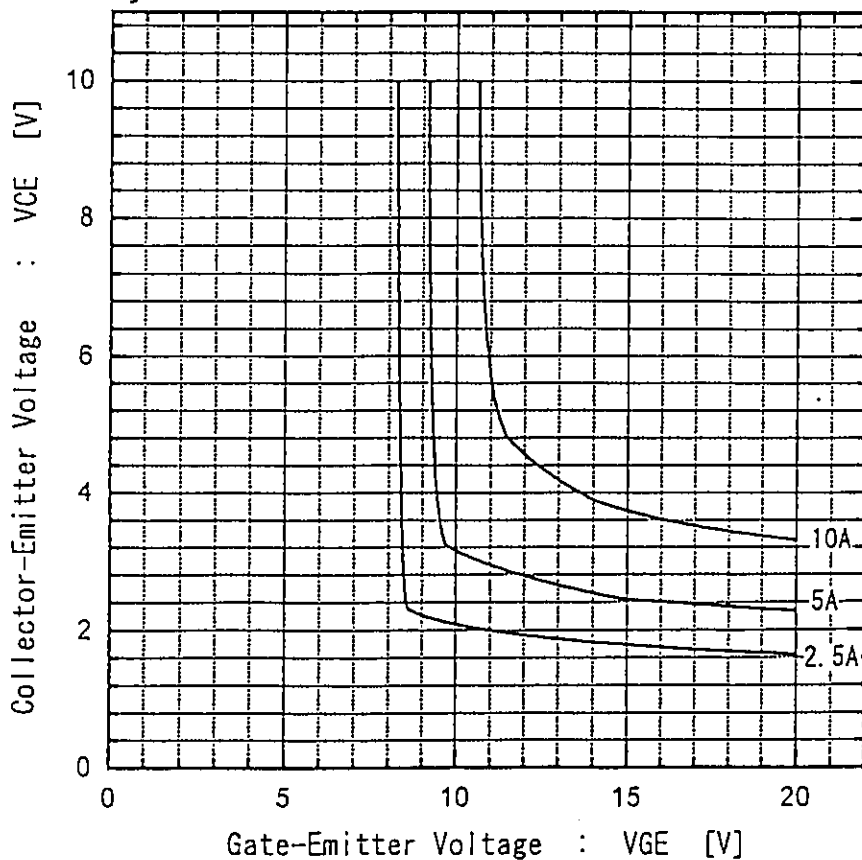


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Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j = 25^\circ\text{C}$



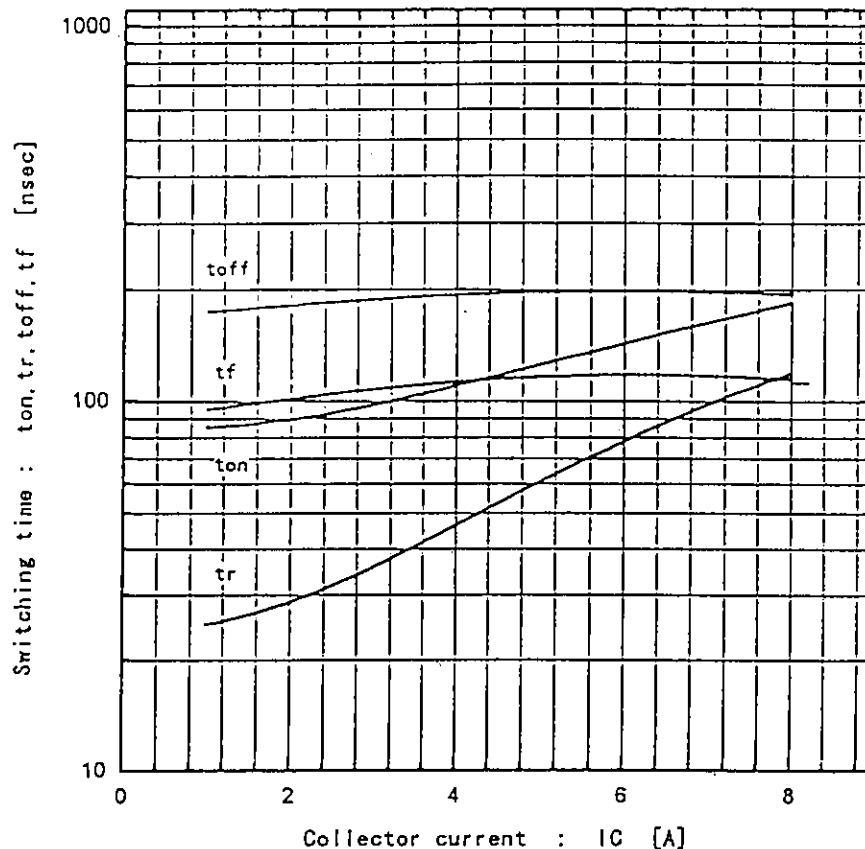
Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j = 125^\circ\text{C}$



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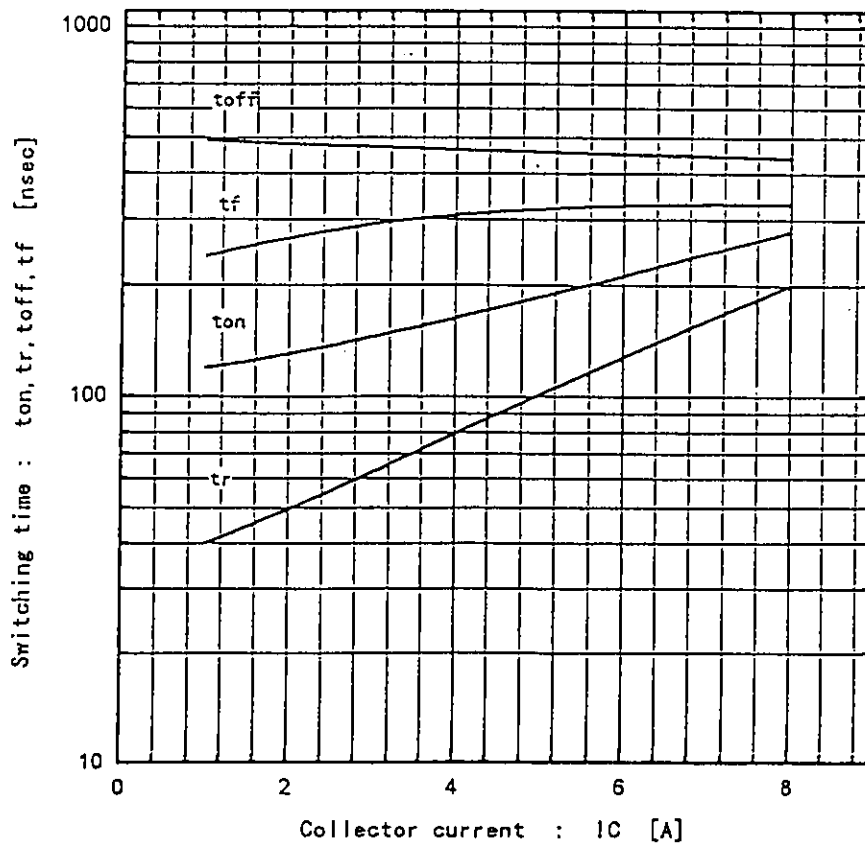
Switching time vs. Collector current

$V_{CC}=300V$, $R_G=33\Omega$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



Switching time vs. Collector current

$V_{CC}=300V$, $R_G=33\Omega$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



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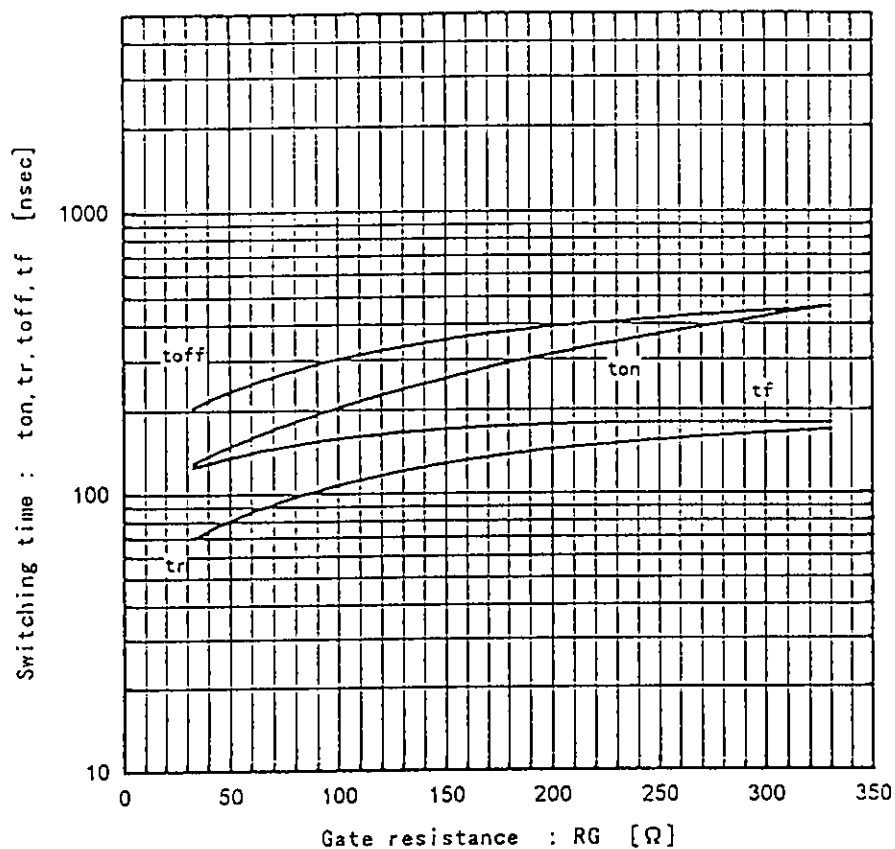
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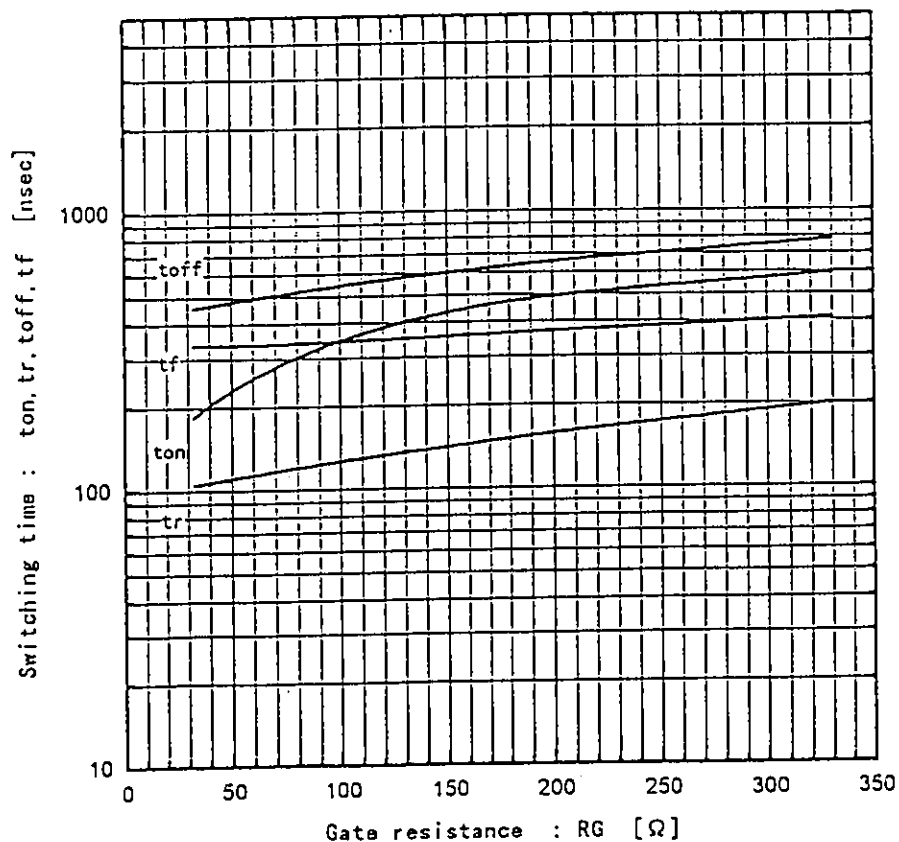
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Switching time vs. R_G
 $V_{CC}=300V, I_C=5A, V_{GE}=\pm 15V, T_j=25^\circ C$

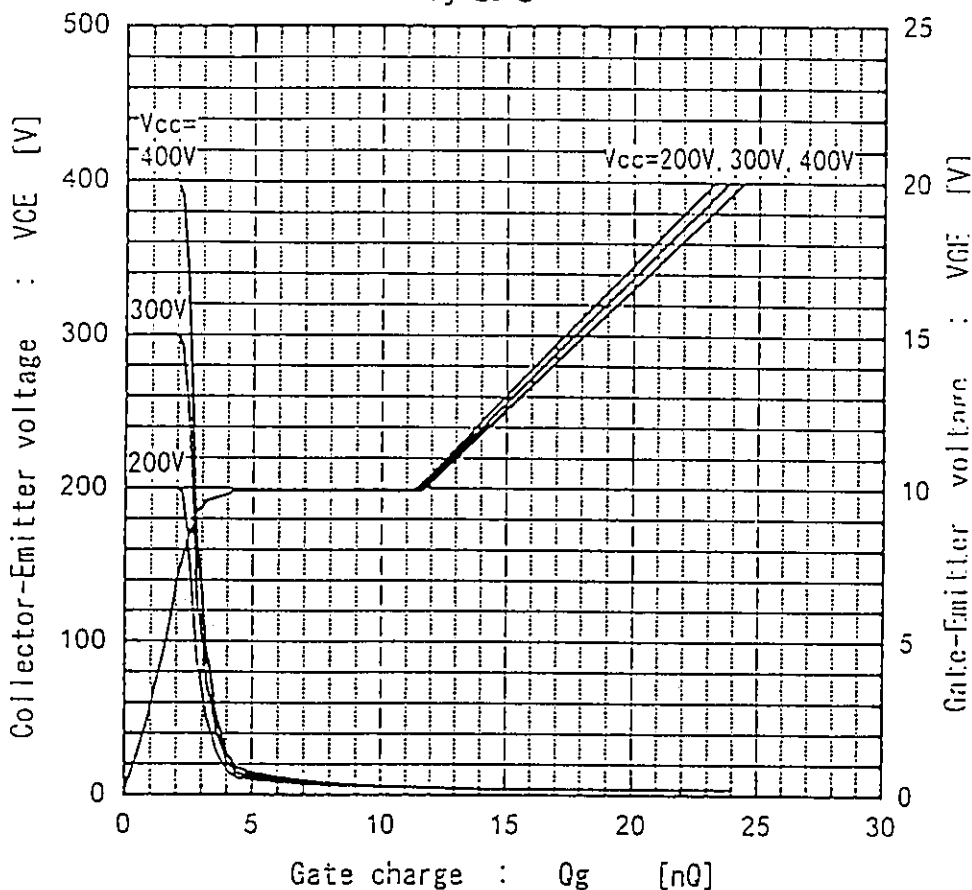


Switching time vs. R_G
 $V_{CC}=300V, I_C=5A, V_{GE}=\pm 15V, T_j=125^\circ C$

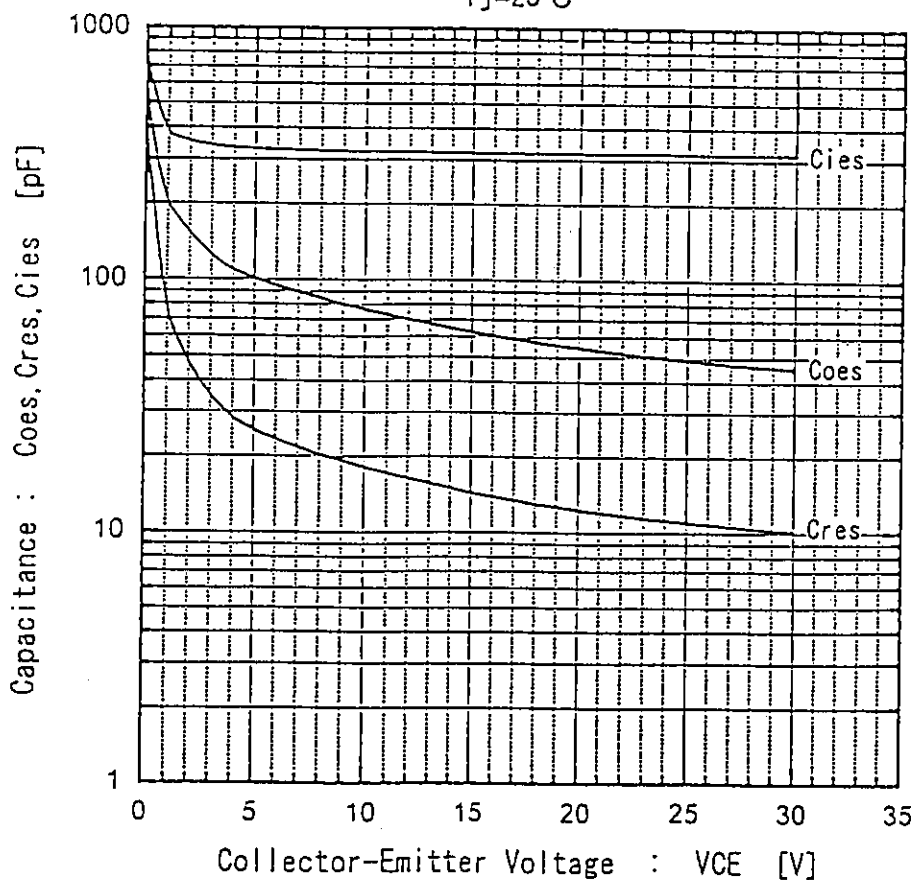


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Dynamic input characteristics Tj=25°C



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



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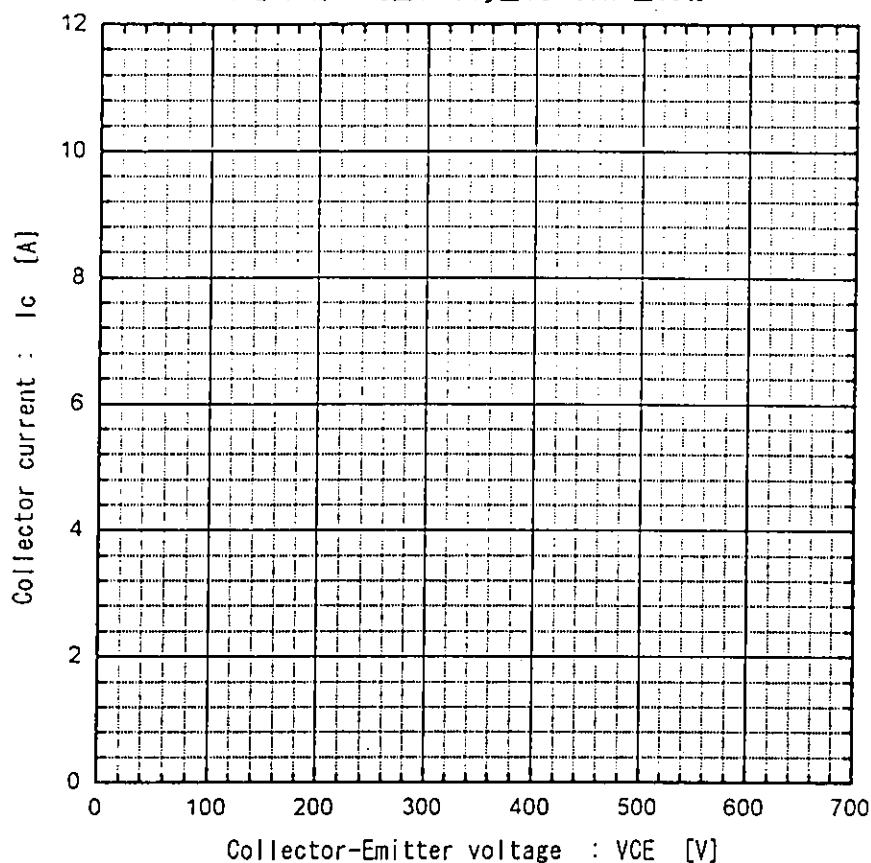
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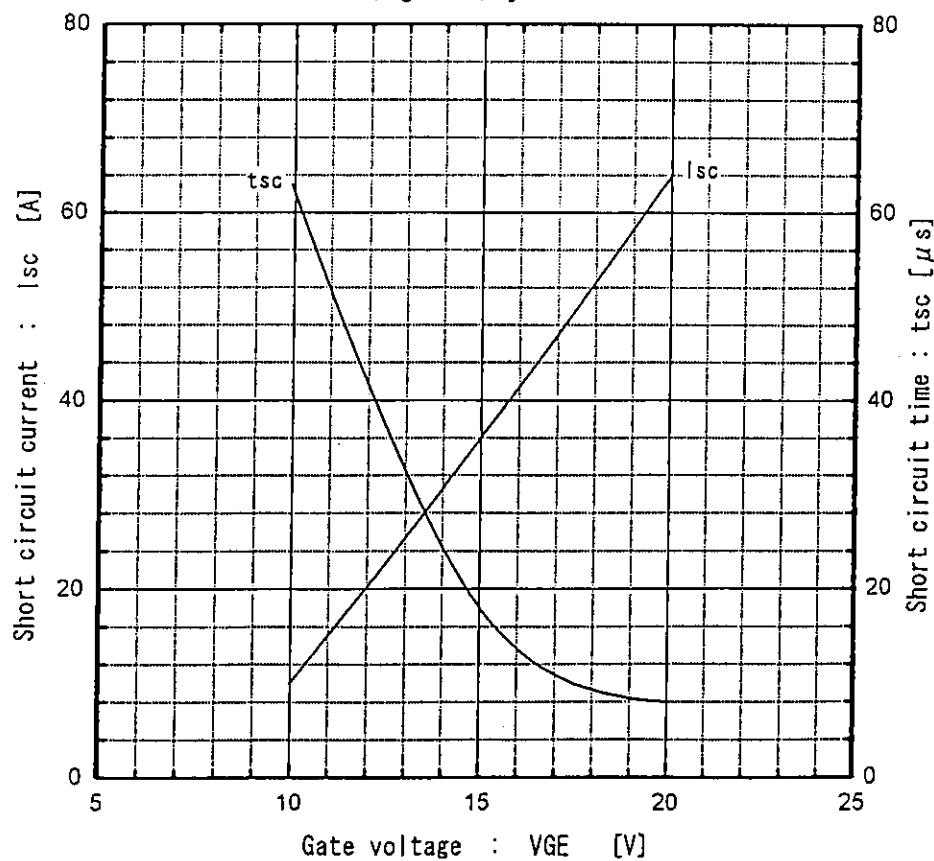
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Reverse Biased Safe Operating Area
 $+V_{GE}=15V, -V_{GE} \leq 15V, T_j \leq 125^\circ C, R_g \geq 33\Omega$



Typical short circuit capability
 $V_{CC}=400V, R_g=33\Omega, T_j=125^\circ C$



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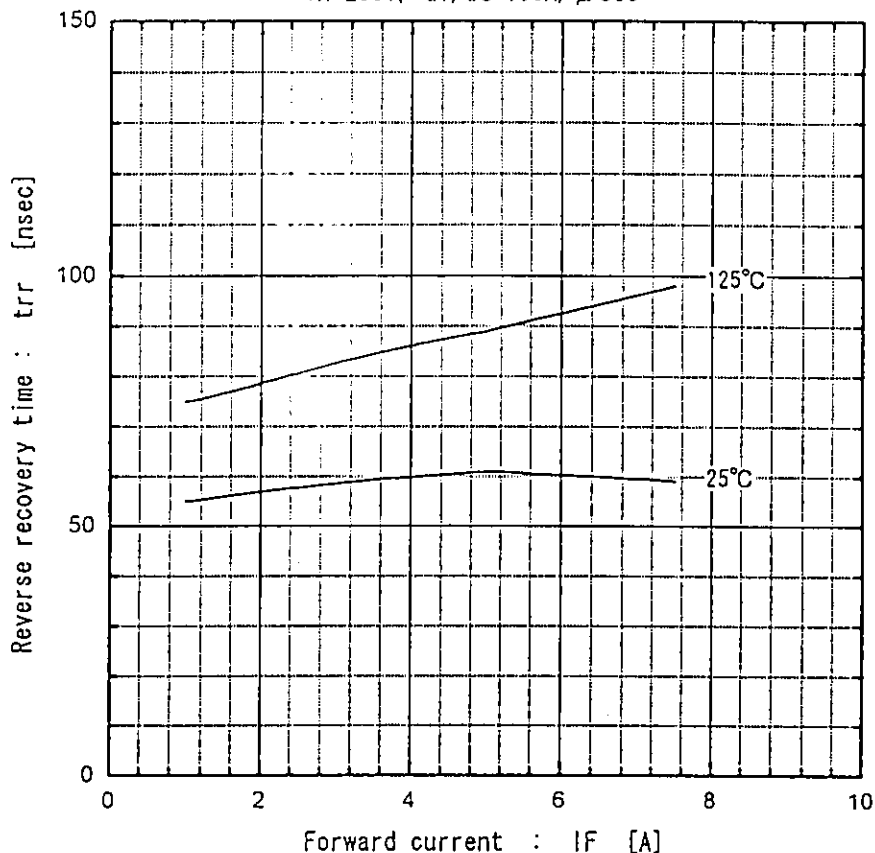
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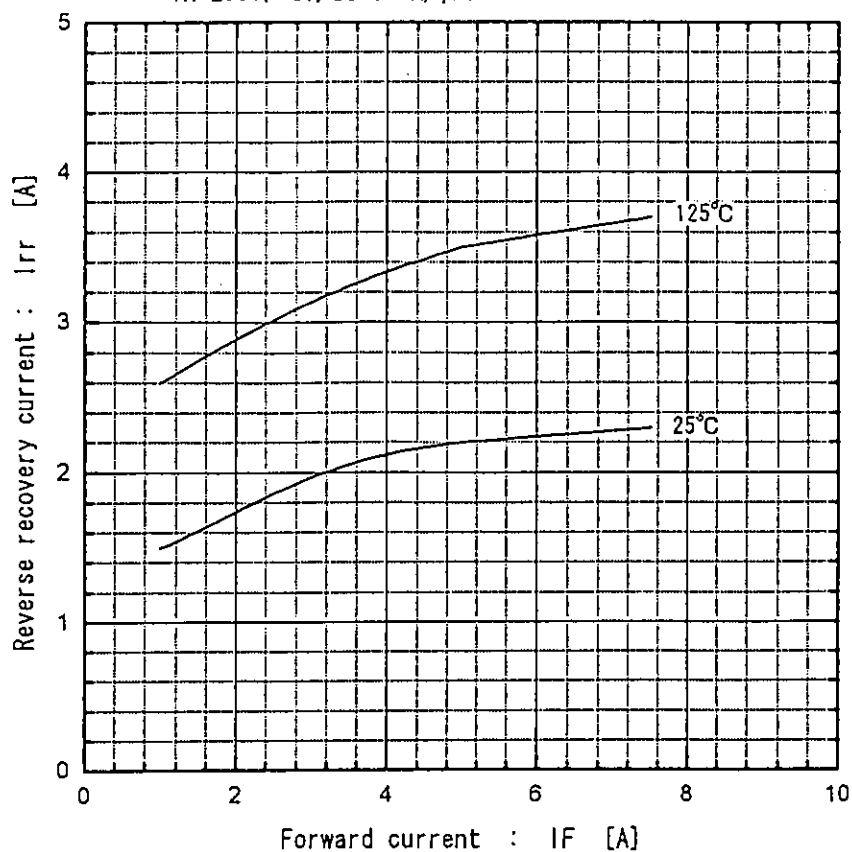
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Reverse recovery time vs. Forward current
 $V_R=200V, -di/dt=100A/\mu sec$



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



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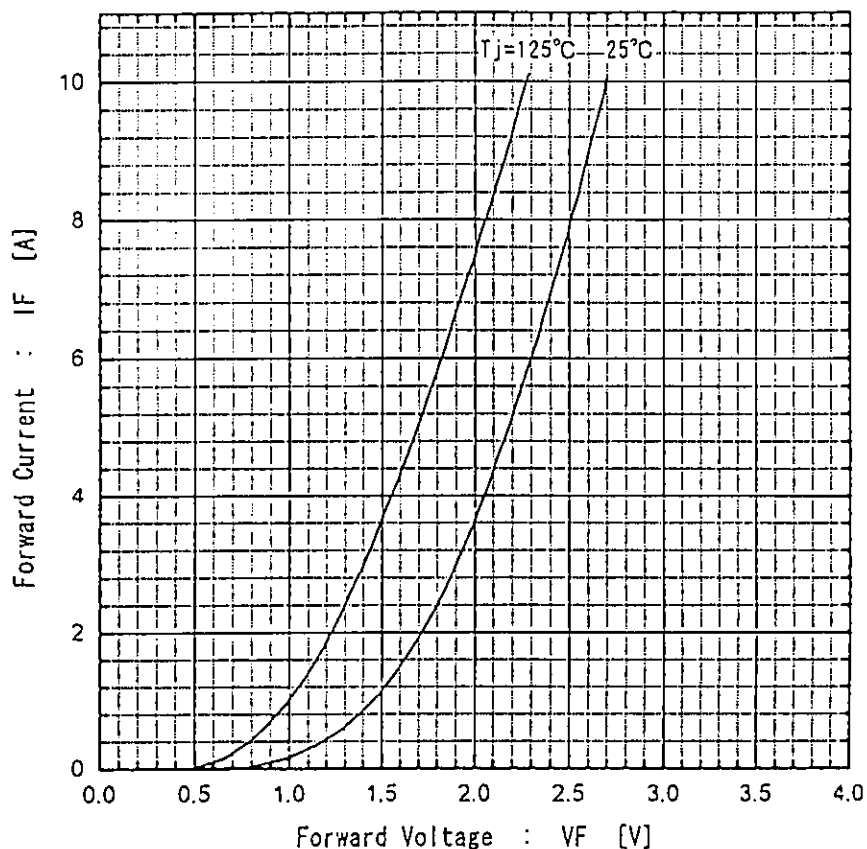
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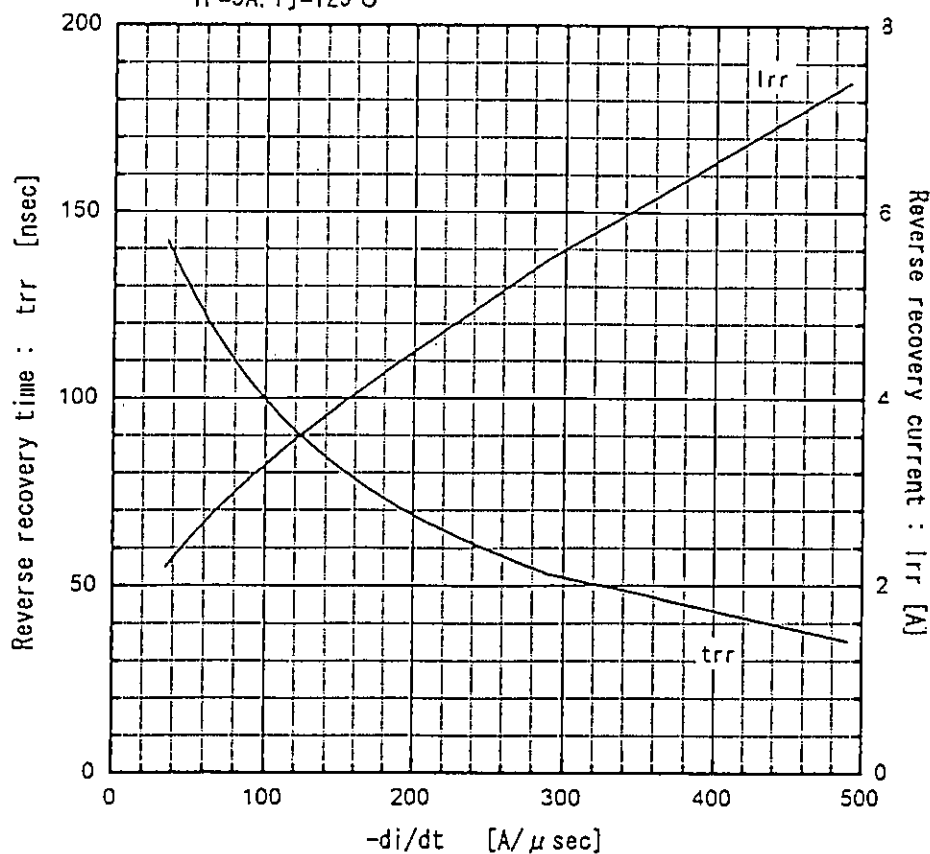
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Forward voltage vs. Forward current



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



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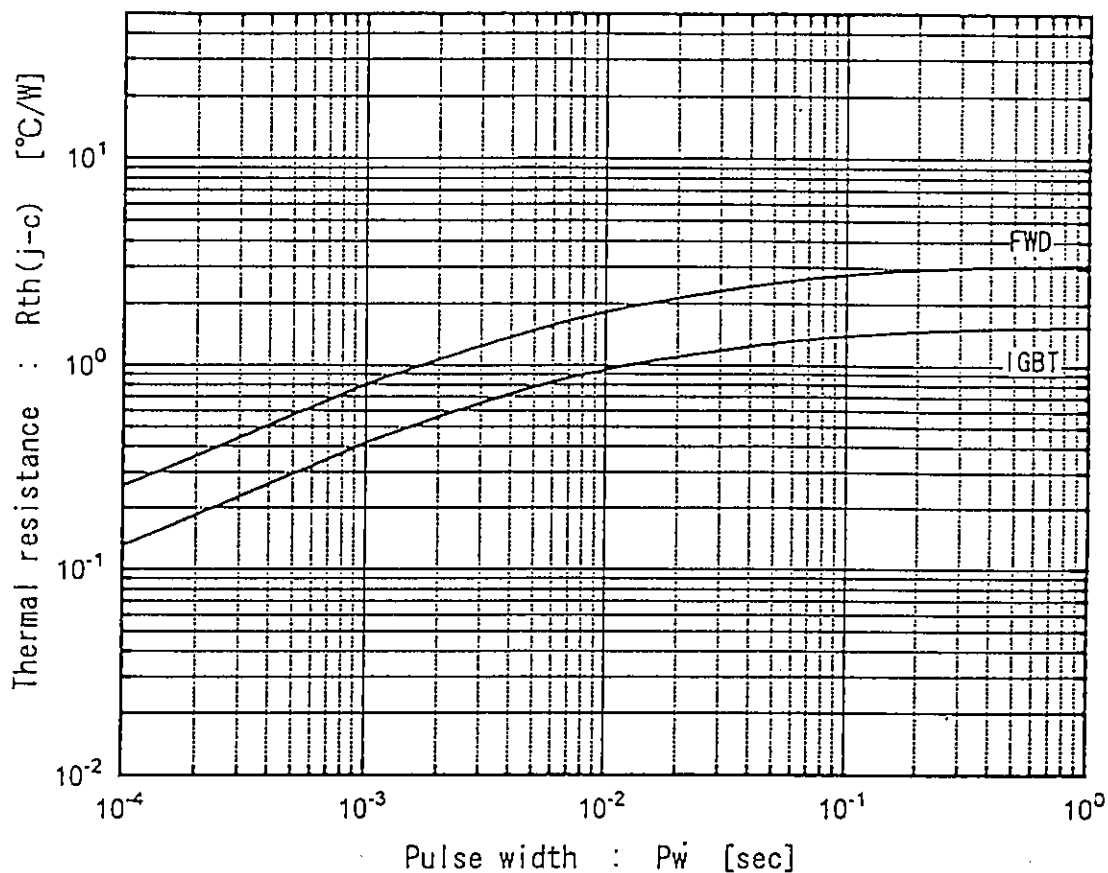
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Transient thermal resistance



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