

SPECIFICATION

DEVICE NAME : IGBT
 TYPE NAME : 1MBH03D-120
 SPEC. No. :
 DATE :

Fuji Electric Co.,Ltd.

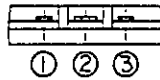
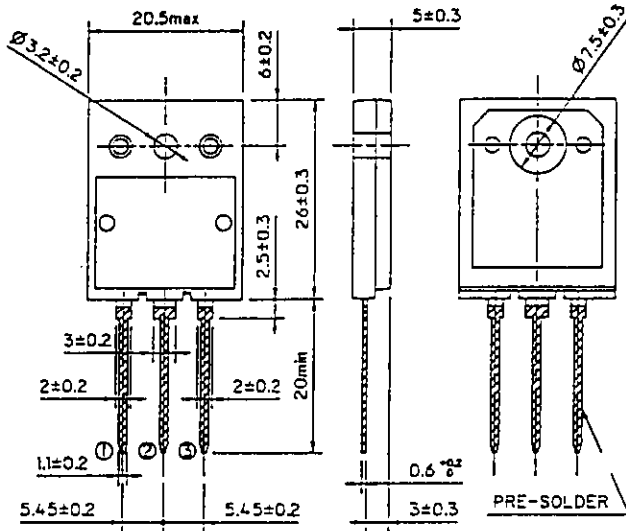
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Ratings and characteristics of Fuji IGBT

1MBH03D-120

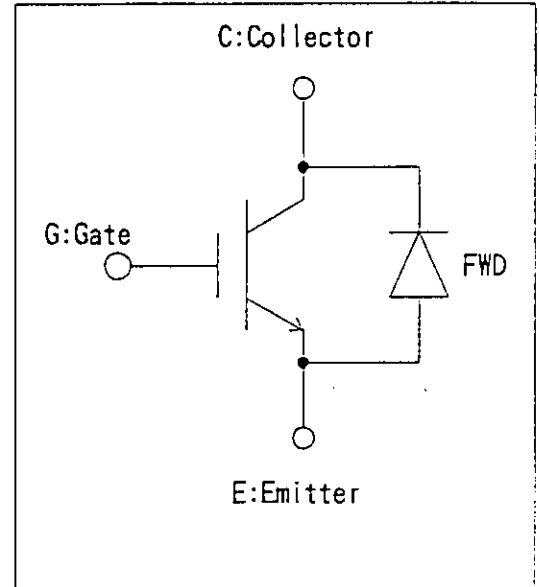
1. Outline Drawing



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}	1200	V	
Gate-Emitter Voltage		V_{GES}	± 20	V	
Collector Current	DC	Tc=25 °C	I_{C25}	5.5	A
		Tc=105°C	I_{C105}	2.5	A
	1ms	Tc=25 °C	I_{cp}	15	A
IGBT Max. Power Dissipation		P_c	80	W	
FWD Max. Power Dissipation		P_c	50	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)

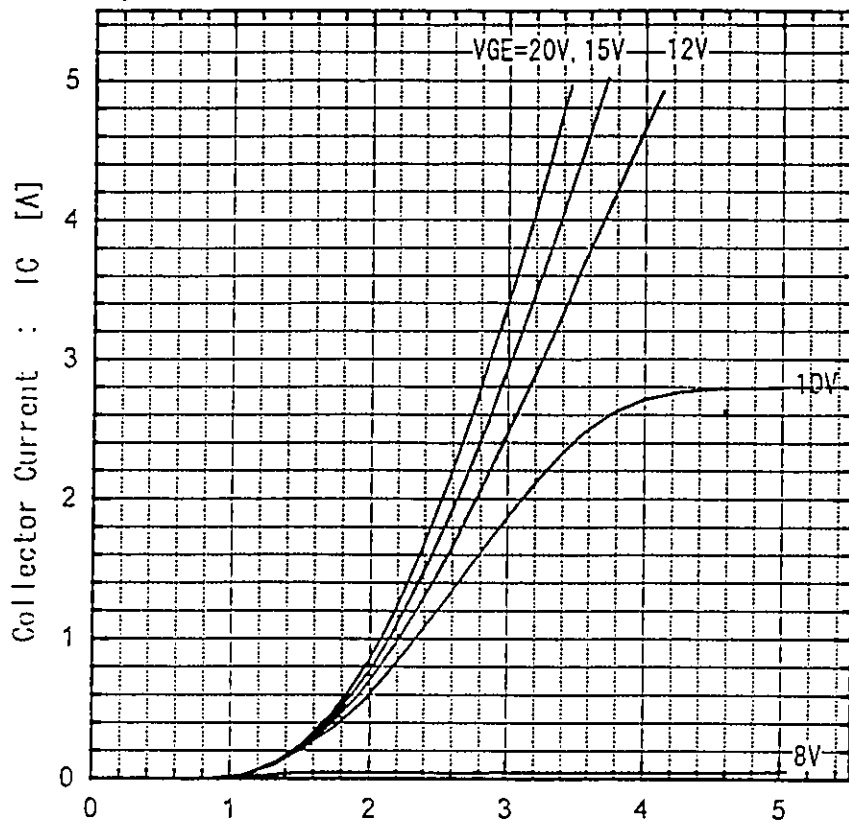
Items	Symbols	Characteristics			Conditions	Unit	
		min.	typ.	max.			
Zero gate voltage Collector Current	I_{CES}			1.0	$V_{GE} = 0V$ $V_{CE} = 1200V$	mA	
Gate-Emitter leakage Current	I_{GES}			20	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	μA	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	5.5		8.5	$V_{CE} = 20V$ $I_C = 2.5mA$	V	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			3.5	$V_{GE} = 15V$ $I_C = 2.5A$	V	
Input capacitance	C_{ies}		400		$V_{GE} = 0V$	μF	
Output capacitance	C_{oes}		70		$V_{CE} = 10V$		
Reverse transfer capacitance	C_{res}		20		$f = 1MHz$		
Switching Time	Turn-on time	t_{on}		1.2	$V_{CC} = 600V$ $I_C = 2.5A$ $V_{GE} = \pm 15V$ $R_G = 430\Omega$ (Half Bridge)	μs	
		t_r		0.6			
	Turn-off time	t_{off}		1.5			
		t_f		0.5			
	Turn-on time	t_{on}		0.16			$V_{CC} = 600V$ $I_C = 2.5A$ $V_{GE} = +15V$ $R_G = 43\Omega$ (Half Bridge)
		t_r		0.11			
Turn-off time	t_{off}		0.30				
	t_f		0.50				
FWD forward voltage drop	V_F			3.0	$I_F = 2.5A$	V	
Reverse recovery time	t_{rr}			0.35	$I_F = 2.5A, V_{GE} = -10V$ $V_R = 200V$ $di/dt = 100A/\mu s$	μs	

5. Thermal resistance characteristics

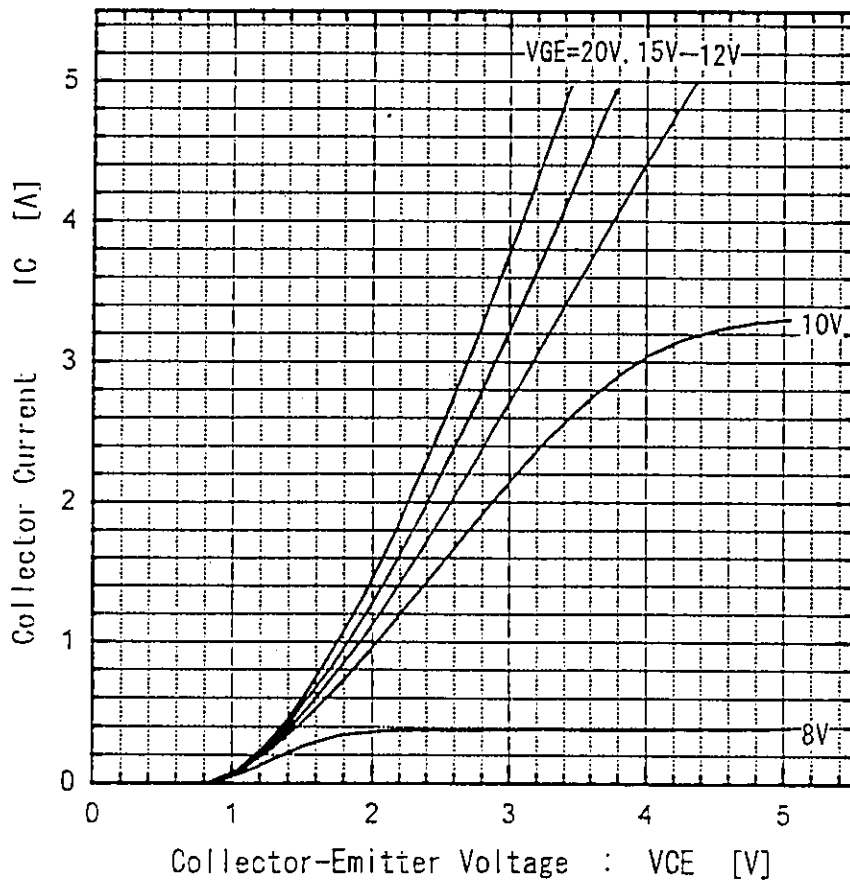
Items	Symbols	Characteristics			Conditions	Unit
		min.	typ.	max.		
Thermal resistance	$R_{th(j-c)}$			1.56	IGBT	$^{\circ}C/W$
	$R_{th(j-c)}$			2.50	FWD	

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

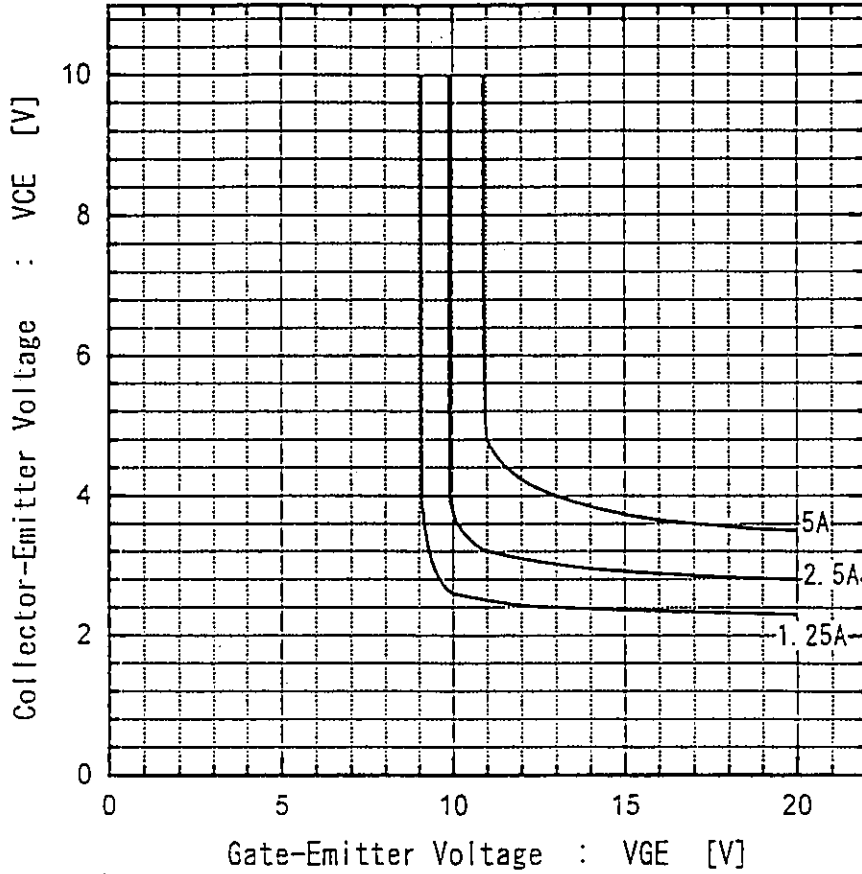


Collector Current vs. Collector-Emitter Voltage
 $T_j=125^\circ\text{C}$

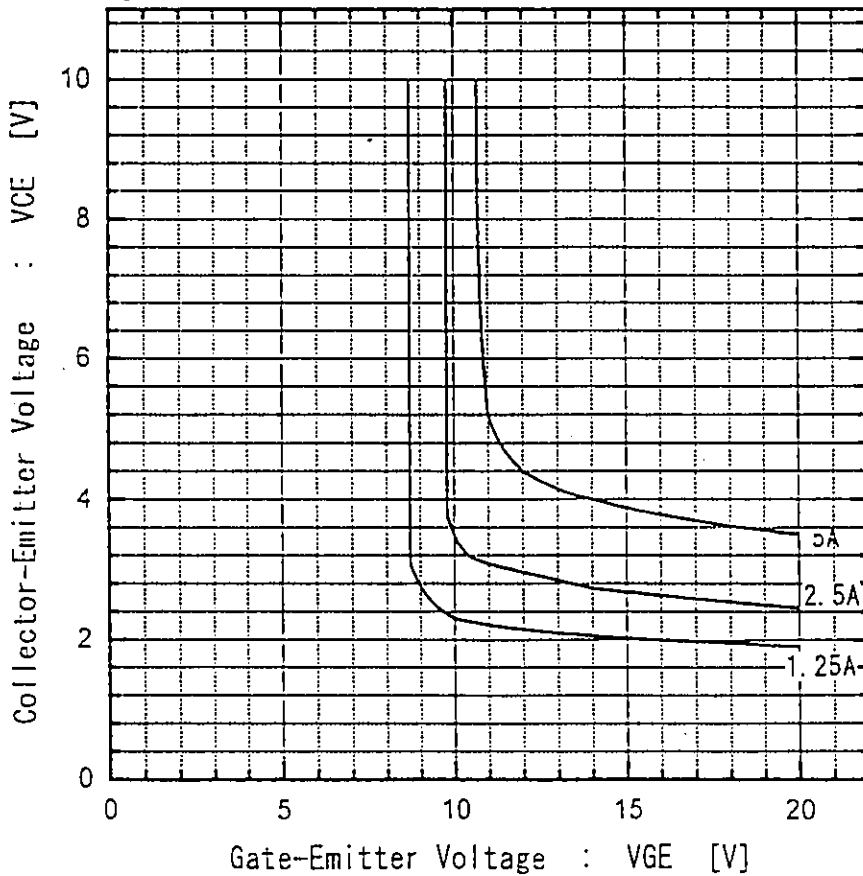


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Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j=25^\circ\text{C}$

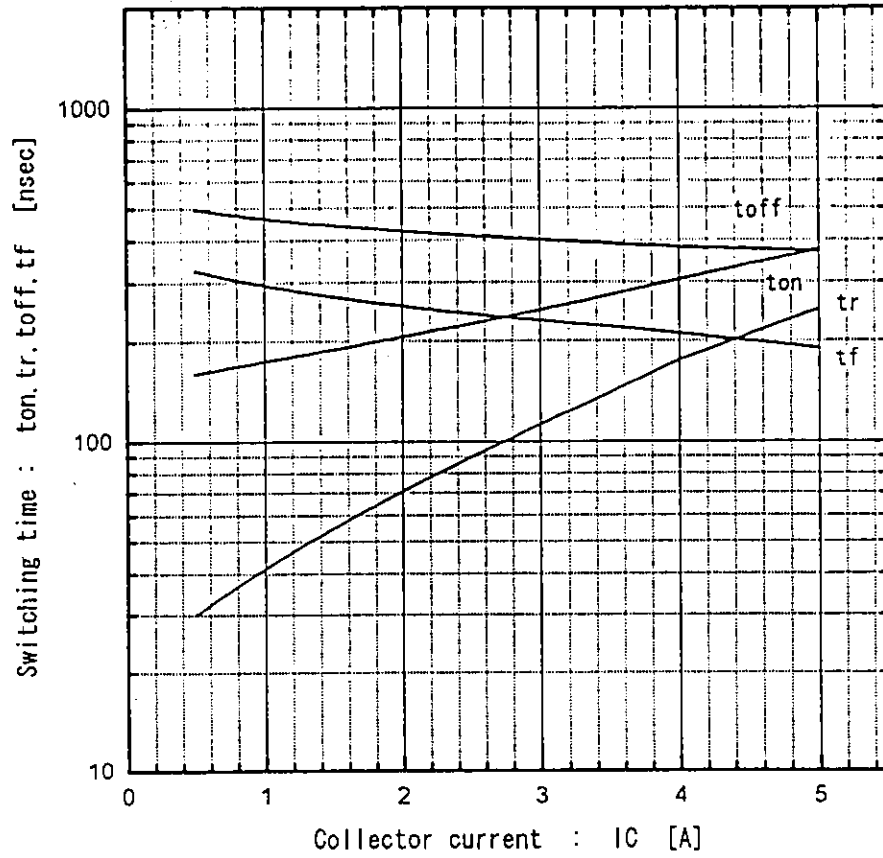


Collector-Emitter Voltage vs Gate-Emitter Voltage
 $T_j=125^\circ\text{C}$

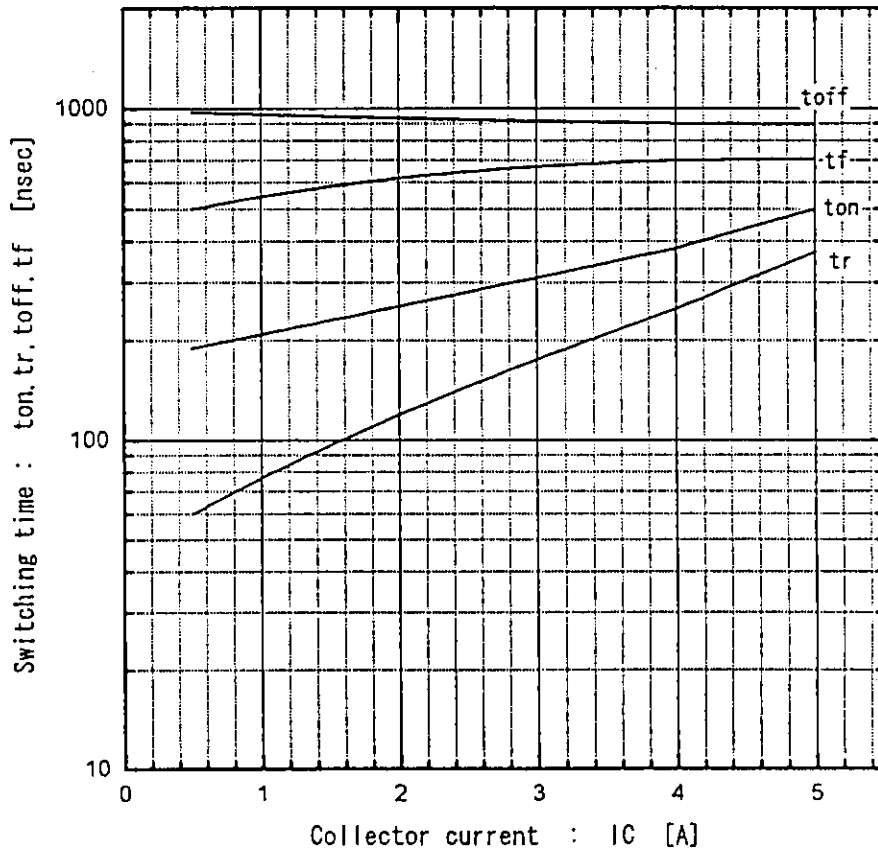


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Switching time vs. Collector current
 $V_{cc}=600V, R_G=43\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$

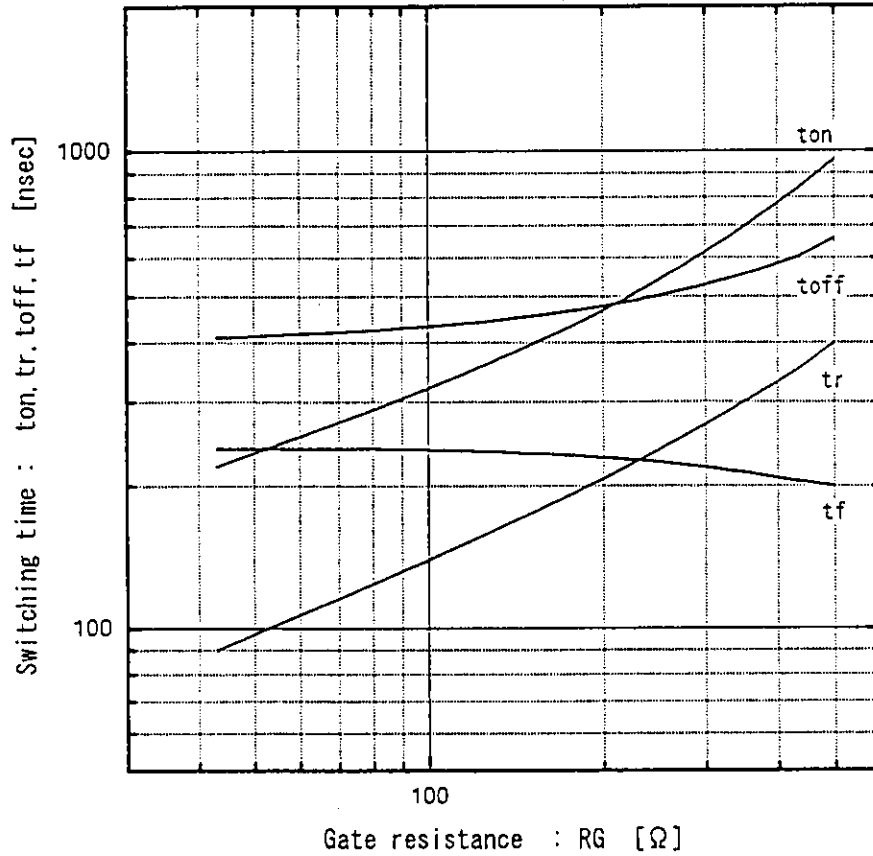


Switching time vs. Collector current
 $V_{cc}=600V, R_G=43\Omega, V_{GE}=\pm 15V, T_j=25^\circ C$

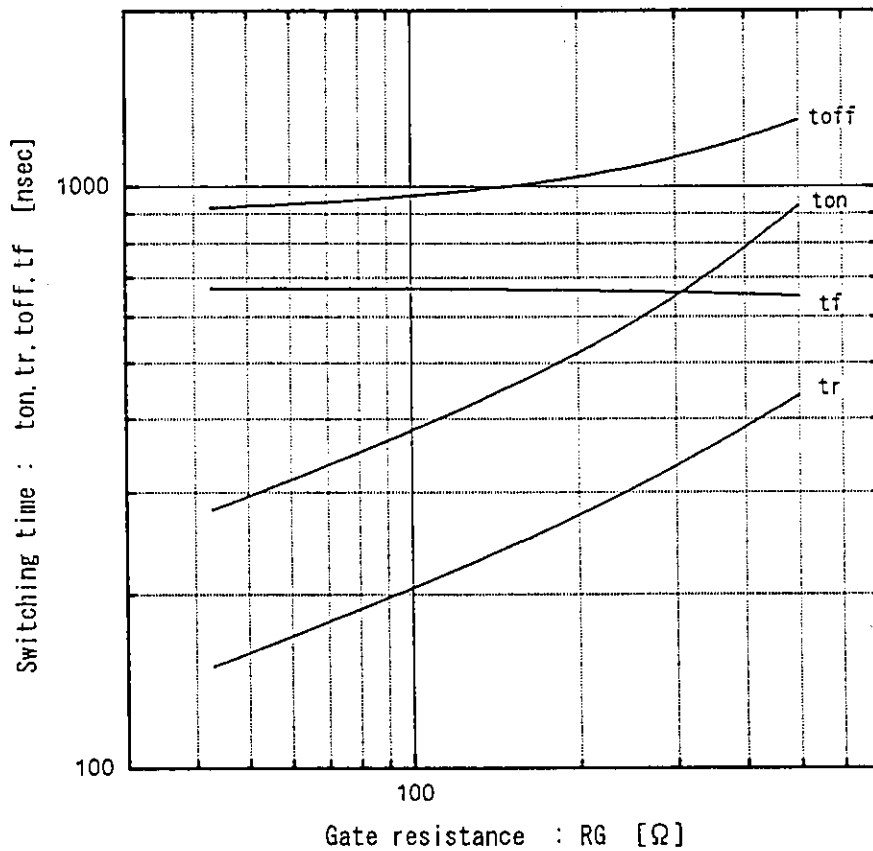


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Switching time vs. R_G
 $V_{CC}=600V, I_C=2.5A, V_{GE}=\pm 15V, T_j=25^\circ C$



Switching time vs. R_G
 $V_{CC}=600V, I_C=2.5A, V_{GE}=\pm 15V, T_j=125^\circ C$



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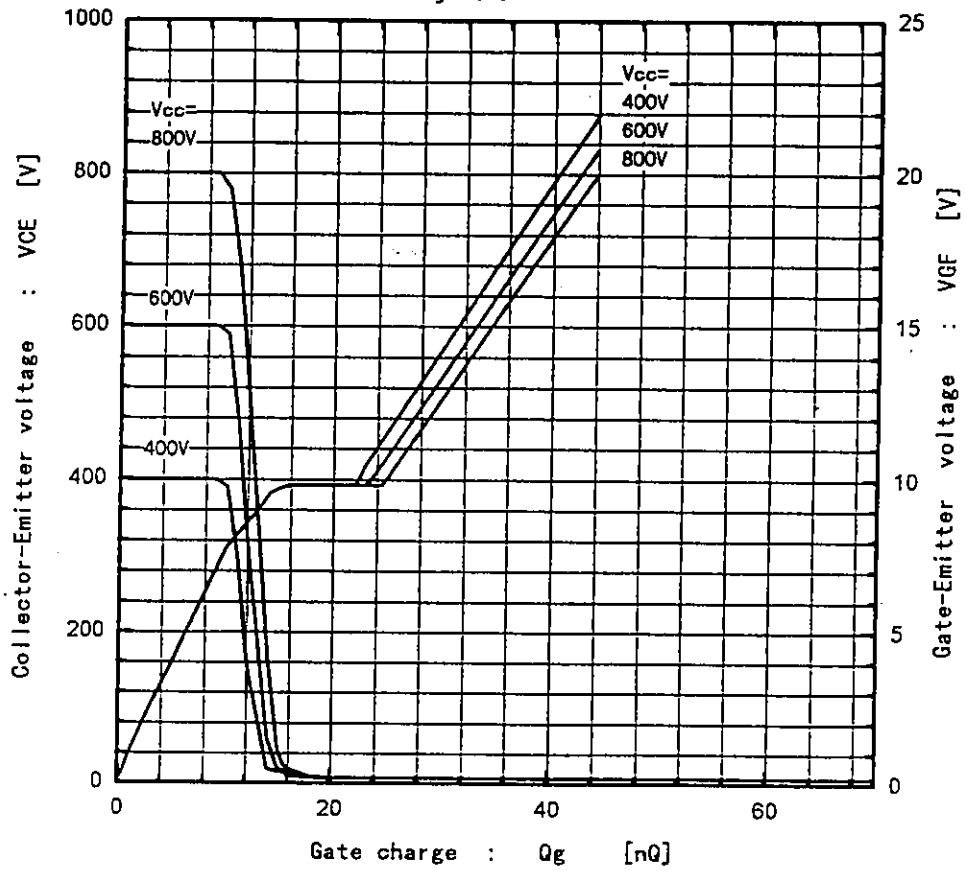
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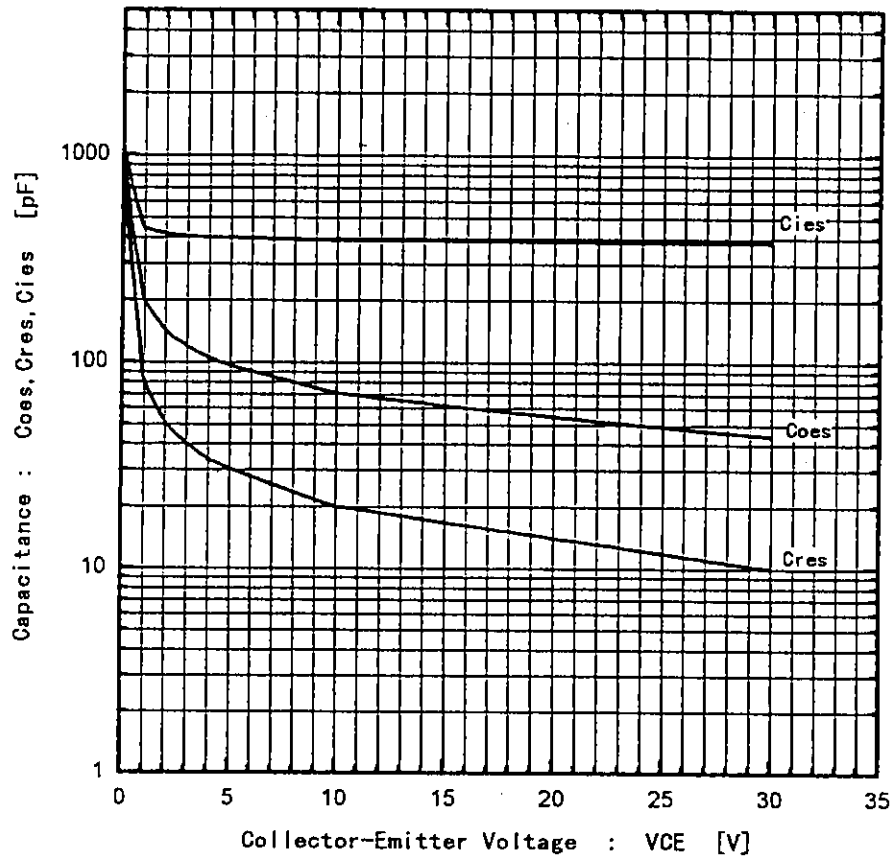
Dynamic input characteristics

$T_j=25^\circ\text{C}$



Capacitance vs. Collector-Emitter voltage

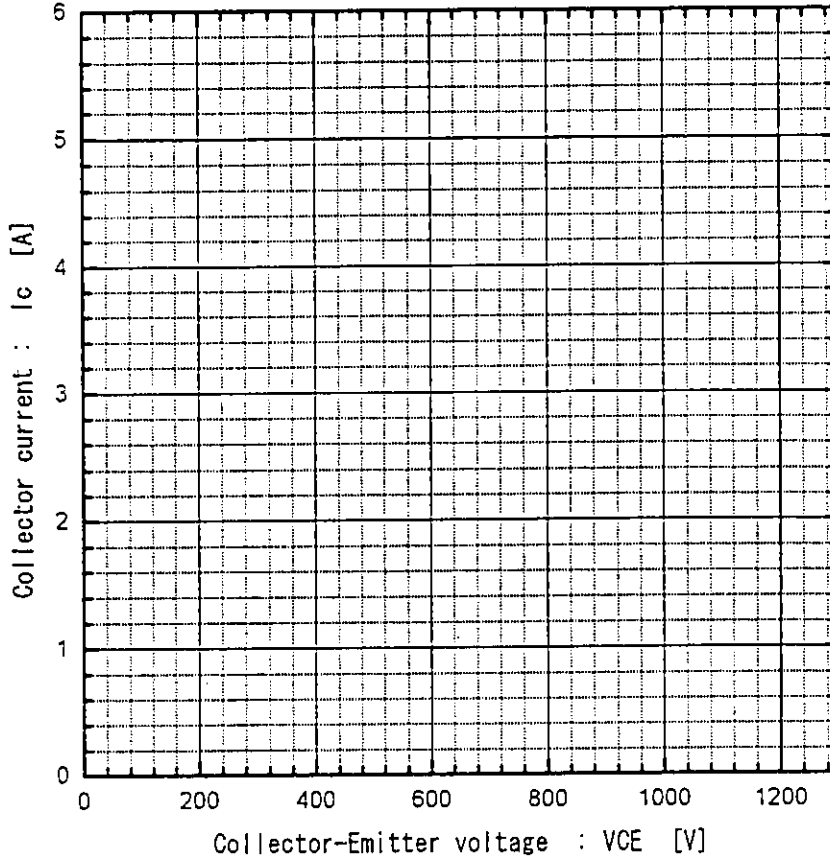
$T_j=25^\circ\text{C}$



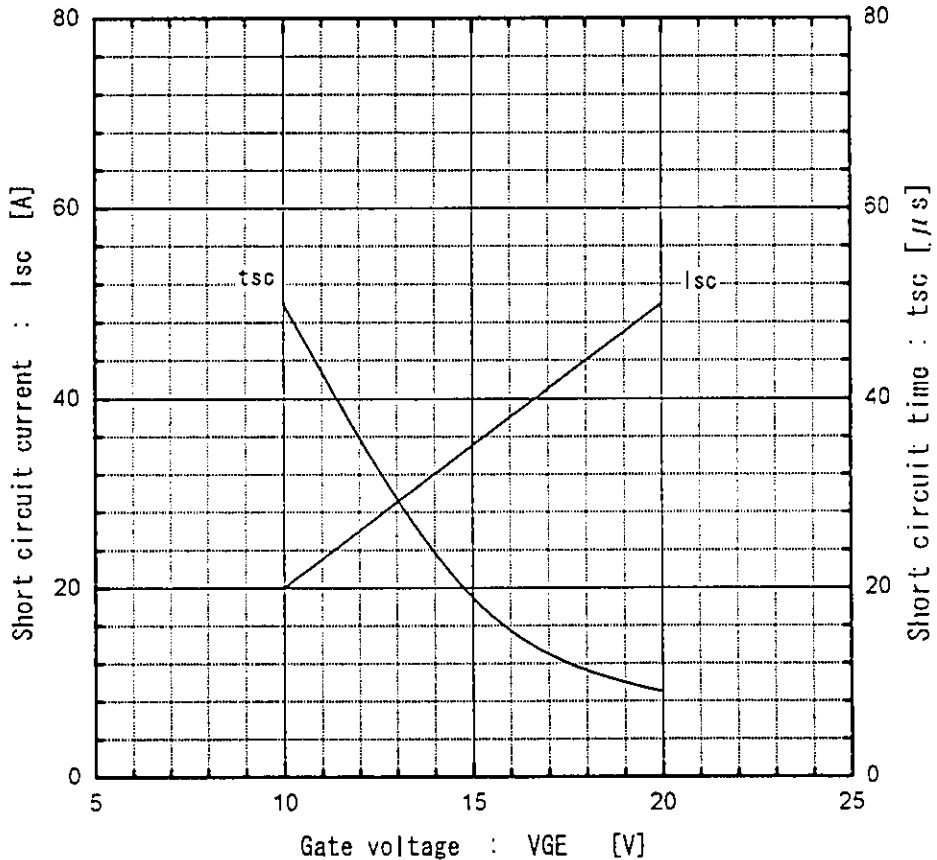
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Reverse Biased Safe Operating Area
 $+V_{GE}=15V, -V_{GE} \leq 15V, T_j \leq 125^\circ C, R_G \geq 43 \Omega$



Typical short circuit capability
 $V_{CC}=800V, R_G=43 \Omega, T_j=125^\circ C$



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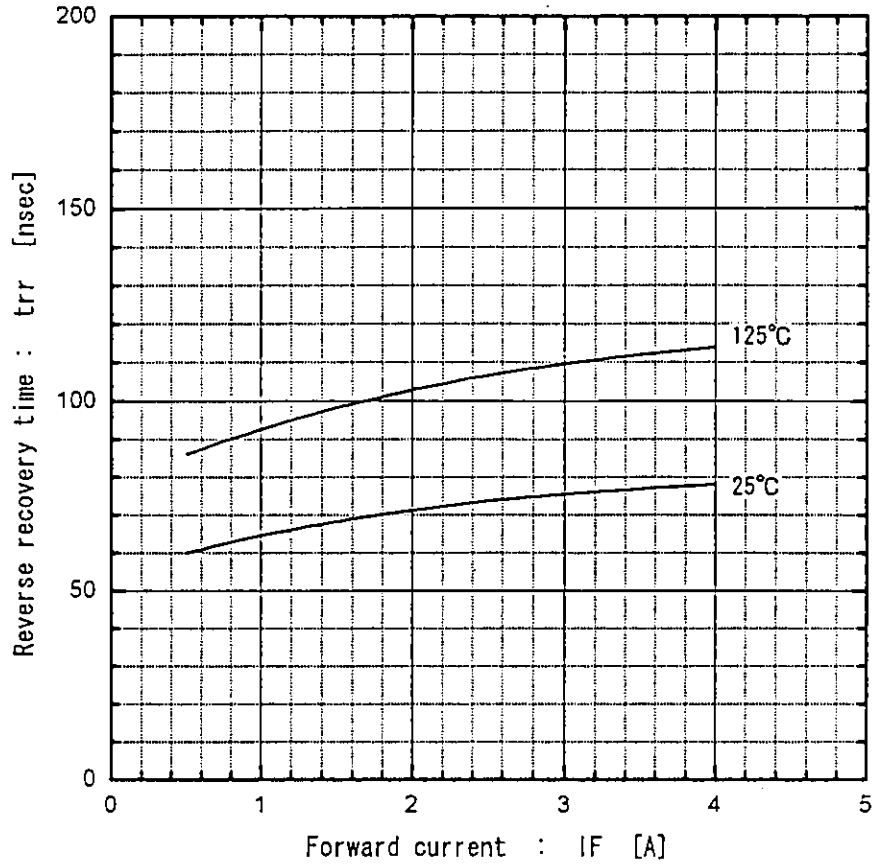
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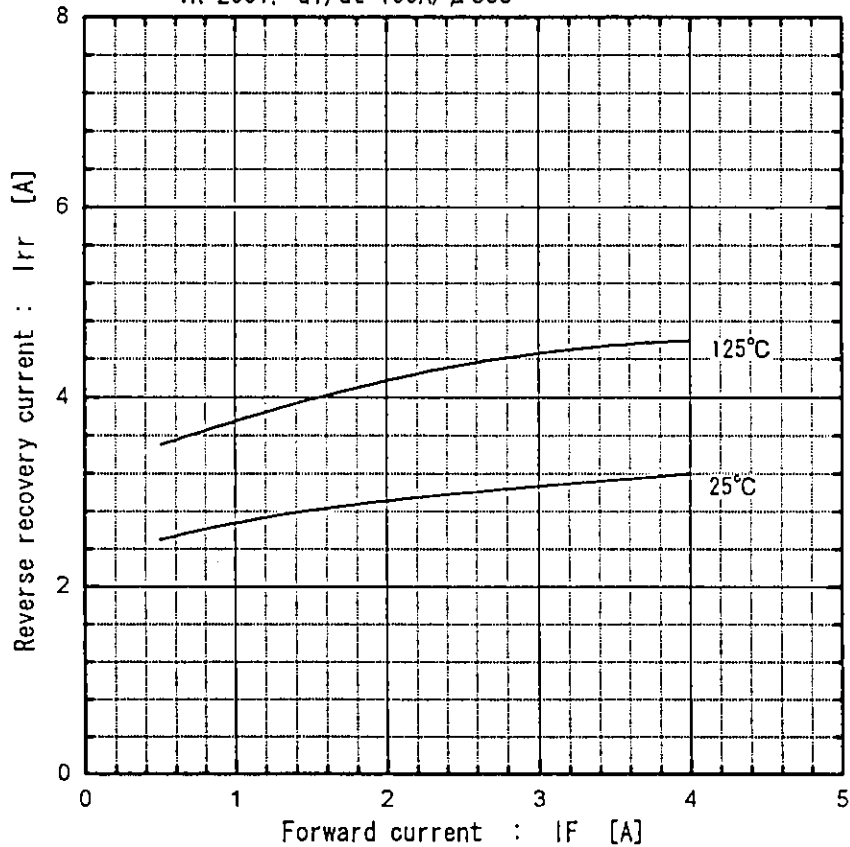
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Reverse recovery time vs. Forward current
 $V_R=200V, -di/dt=100A/\mu sec$



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



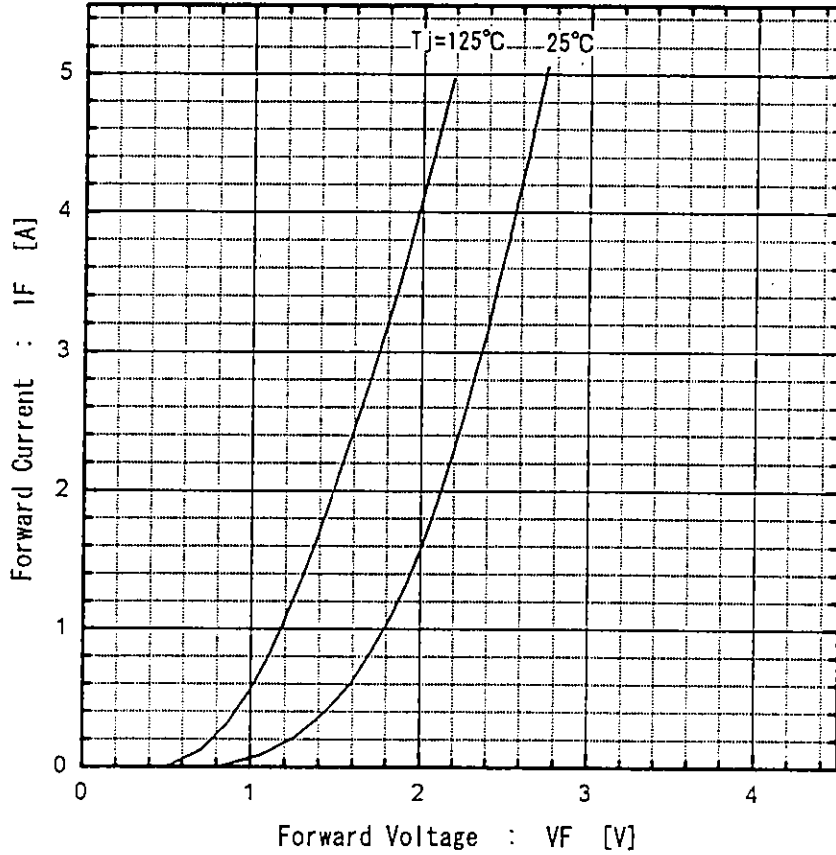
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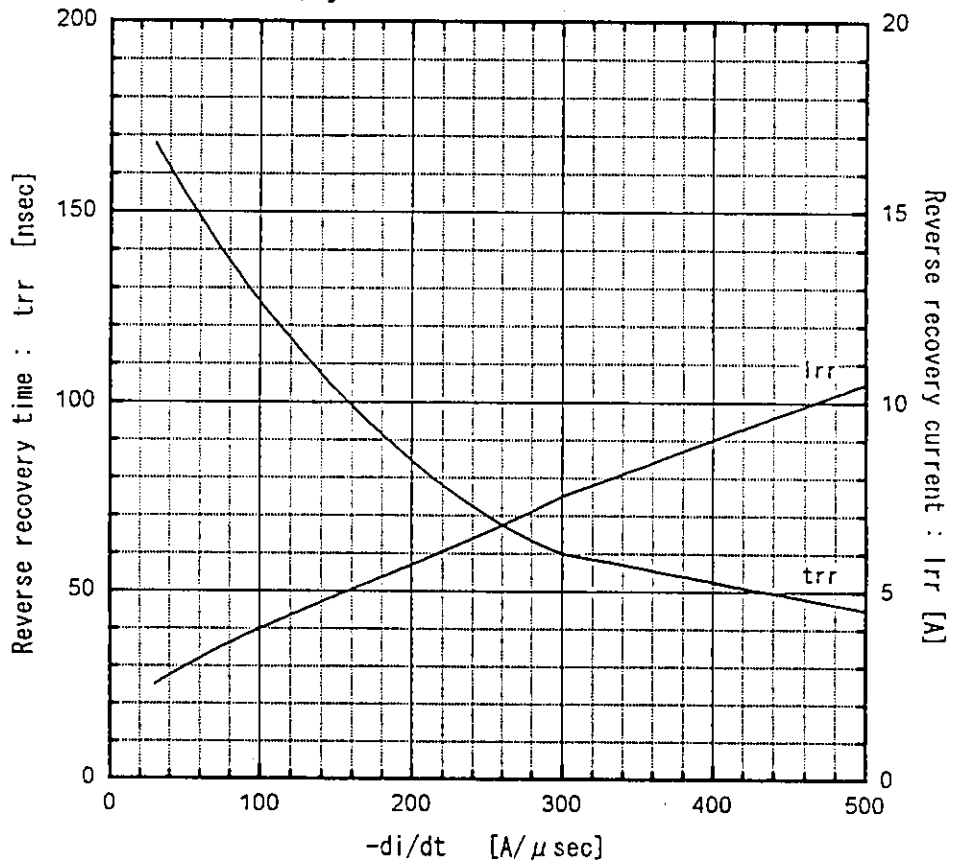
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Forward voltage vs. Forward current



Reverse recovery characteristics vs. $-di/dt$
IF=2.5A, Tj=125°C



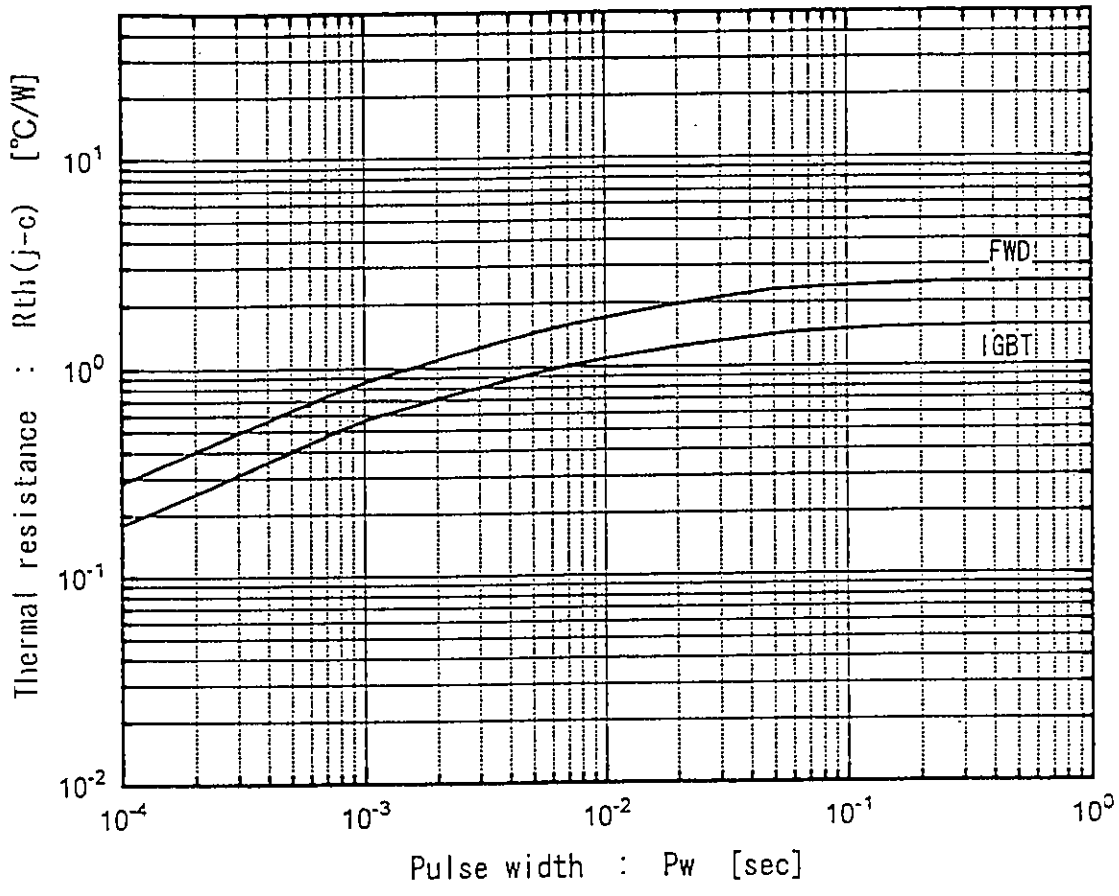
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Transient thermal resistance



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