

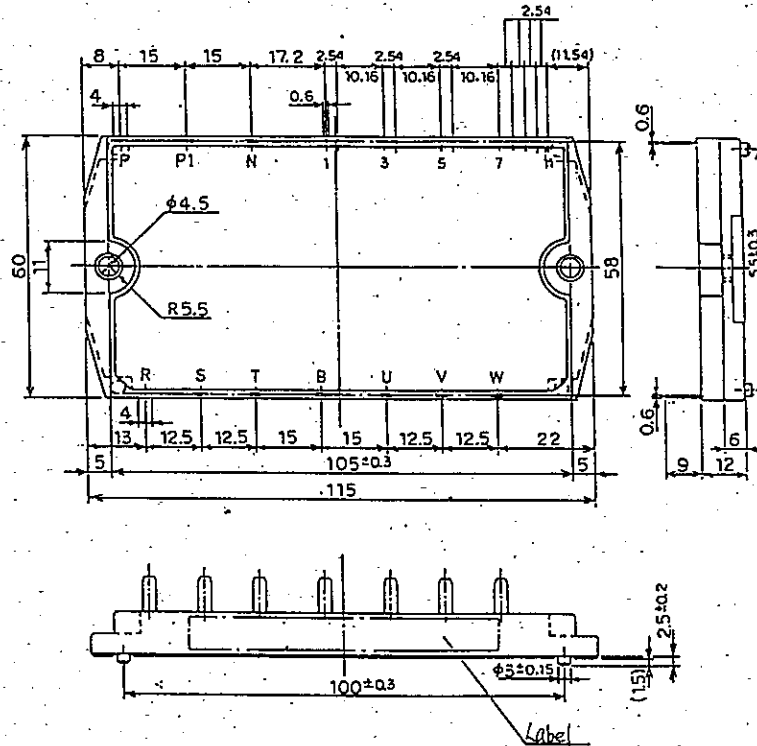
Ratings and Characteristics of Fuji Inverter Module

7 M B R 2 5 L C 1 2 0 (TENTATIVE)

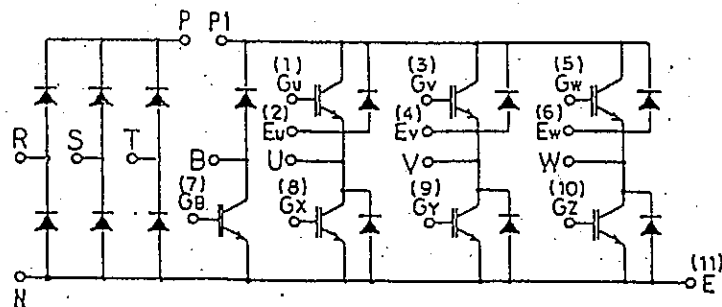
1. Outline Drawing

Unit : mm

* Isolation Voltage (Terminal to Case) : AC 2500V 1 minute



2. Equivalent Circuit of Module



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	DRAWN	Mar. 12 '93	T. HOSEN	DWG. NO.	MS6M0130 1/22
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3. Absolute Maximum Ratings (Tj=25°C unless without specified)

Item			Symbol	Condition	Maximum Ratings	Unit
Inverter	Collector-Emitter Voltage		V _{CES}		1200	V
	Gate-Emitter Voltage		V _{GES}		±20	V
	Collector Current	DC	I _c		25	A
		1ms	I _{CP}		50	A
		DC	-I _c		25	A
	Collector Power Dissipation	One	P _c		150	W
Brake	Collector-Emitter Voltage		V _{CES}		1200	V
	Gate-Emitter Voltage		V _{GES}		±20	V
	Collector Current	DC	I _c		15	A
		1ms	I _{CP}		30	A
	Collector Power Dissipation	One	P _c		90	W
	Snubber	Repetitive peak Reverse Voltage				1200
Average Forward Current		I _{F (AV)}		1	A	
Surge Current		I _{FSM}	10ms	50	A	
Converter	Repetitive Peak Reverse Voltage		V _{RRM}		1600	V
	Non-Repetitive Peak Reverse Voltage		V _{RSM}		1700	V
	Average Output Current		I _o	50Hz/60Hz sine wave	25	A
	Surge Current (Non-Repetitive)		I _{FSM}	T _j =150°C, 10ms	320	A
	I ² t (Non-Repetitive)			T _j =150°C, 10ms	512	A ² s
	Operating Junction Temperature		T _j		+ 150	°C
Storage Temperature		T _{stg}		-30 ~ +125	°C	
Isolation Voltage		Viso	AC : 1 minute	AC 2500	V	
Mounting Screw Torque				*1 1.67	N · m	

*1 Recommendable Value M4 : 1.27 ~ 1.67 N · m

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4. Electrical Characteristics ($T_j=25^\circ\text{C}$ unless without specified)

Characteristics		Symbol	Conditions		min.	max.	Unit
Inverter	Zero gate voltage collector current	I_{CES}	$T_j=25^\circ\text{C}$ $V_{CE}=1200\text{V}$ $V_{GE}=0\text{V}$			1.0	mA
	Gate-emitter leakage current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			100	nA
	Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=20\text{V}$ $I_C=25\text{mA}$		3.0	6.0	V
	Collector-emitter saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15\text{V}$ $I_C=25\text{A}$	Chip		3.5	V
				Terminal		3.6	
	Collector-Emitter Voltage	$-V_{CE}$	$-I_C = 25\text{A}$	Chip		2.5	
				Terminal		2.6	
	Input capacitance	C_{ies}	$V_{GE}=0\text{V}$ $V_{CE}=10\text{V}$ $f=1\text{MHz}$		4500 (typ.)		PF
	Switching Time	t_{on}	$V_{CC}=600\text{V}$ $I_C=25\text{A}$			0.8	μs
		t_{off}	$V_{GE}=\pm 15\text{V}$ $R_G=50\Omega$			1.5	
		t_f				0.5	
	Reverse Recovery Time of FRD	t_{rr}	$I_F=25\text{A}$ $V_{GE}=-10\text{V}$ $-di/dt=75\text{A}/\mu\text{s}$			350	ns
Brake	Zero gate voltage collector current	I_{CES}	$V_{CES}=1200\text{V}$ $V_{GE}=0\text{V}$			1.0	mA
	Gate-emitter leakage current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			100	nA
	Collector-emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=15\text{A}$ $V_{GE}=15\text{V}$	Chip		3.5	V
				Terminal		3.6	
	Switching Time	t_{on}	$V_{CC}=600\text{V}$ $I_C=15\text{A}$			0.8	μs
		t_{off}	$V_{GE}=\pm 15\text{V}$ $R_G=82\Omega$			1.5	
		t_f				0.5	

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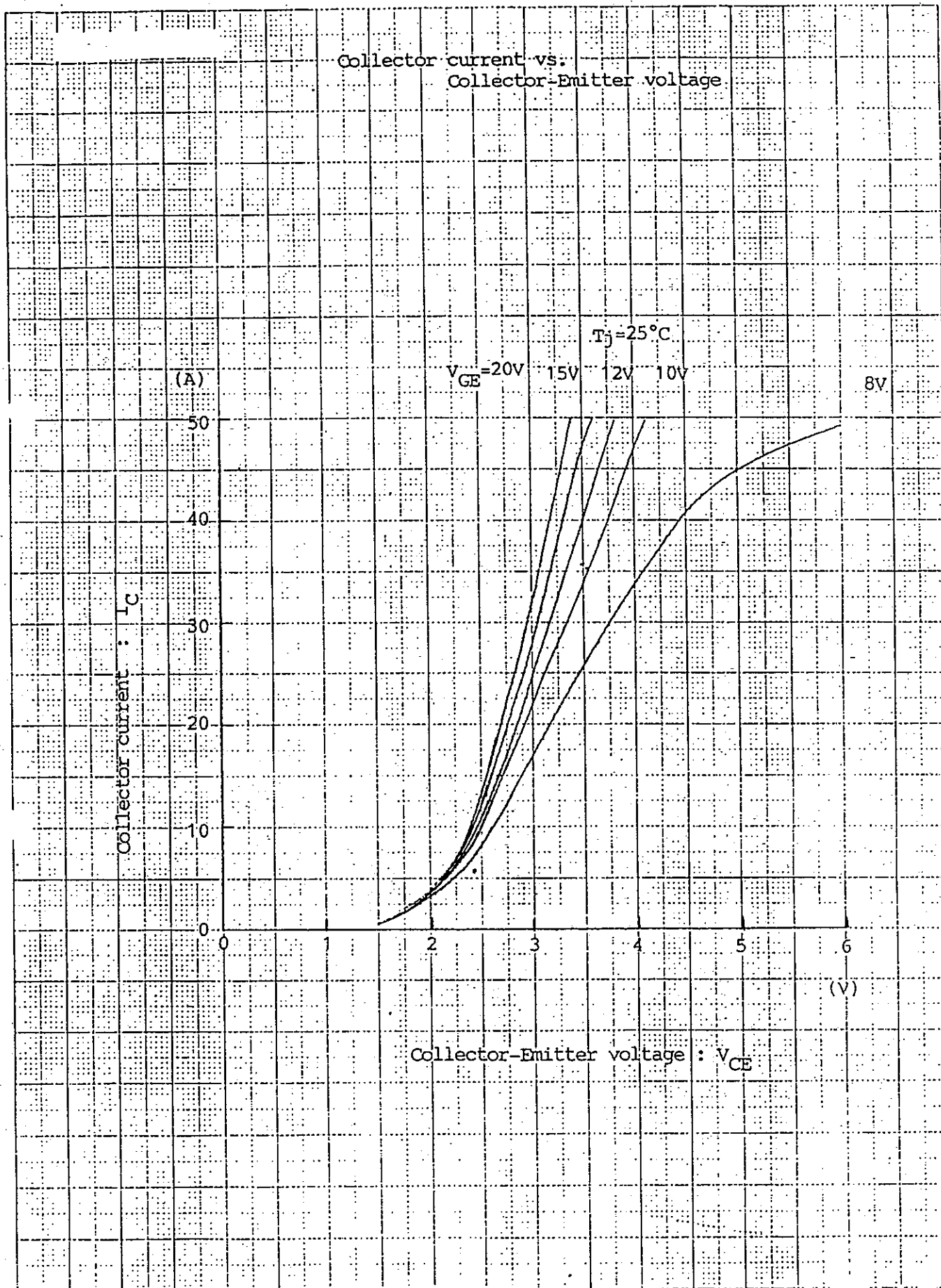
Characteristics		Symbol	Conditions		min.	max.	Unit
Snubber	Reverse Current	I_{RRM}	$V_R = V_{RRM}$			1	mA
	Reverse Recovery Time	t_{rr}				600	ns
Converter	Forward Voltage	V_{FM}	$I_F = 25A$	Chip		1.30	V
				Terminal		1.40	
	Reverse Current	I_{RRM}	$V_R = V_{RRM}$			1	mA

5. Thermal Characteristics

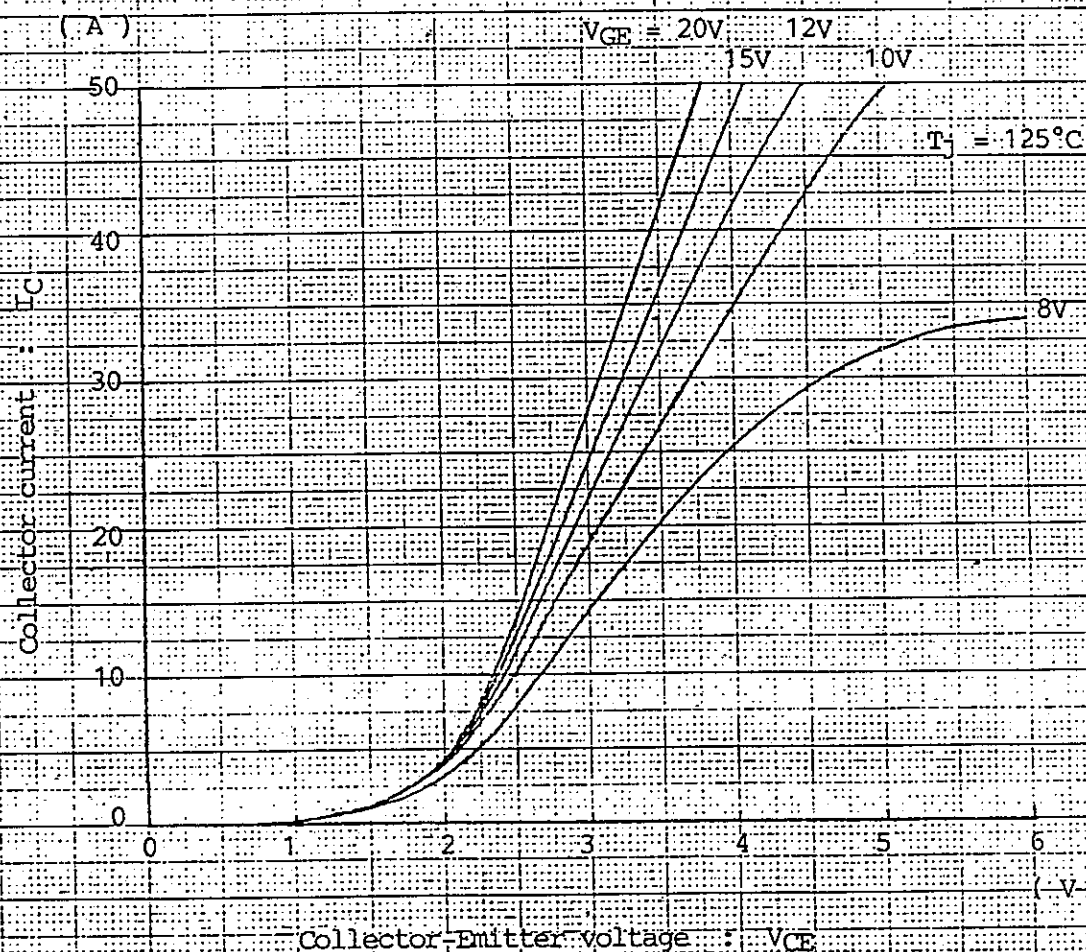
Characteristics	Symbol	Conditions	min.	max.	Unit
Thermal Resistance (1 chip)	$R_{th(j-c)}$	Inverter IGBT		0.84	°C/W
		Inverter FRD		1.25	
		Brake IGBT		1.39	
		Converter Diode		3.40	
Contact Thermal Resistance	$R_{th(c-f)}$	With Thermal Compound	(typ) 0.05		

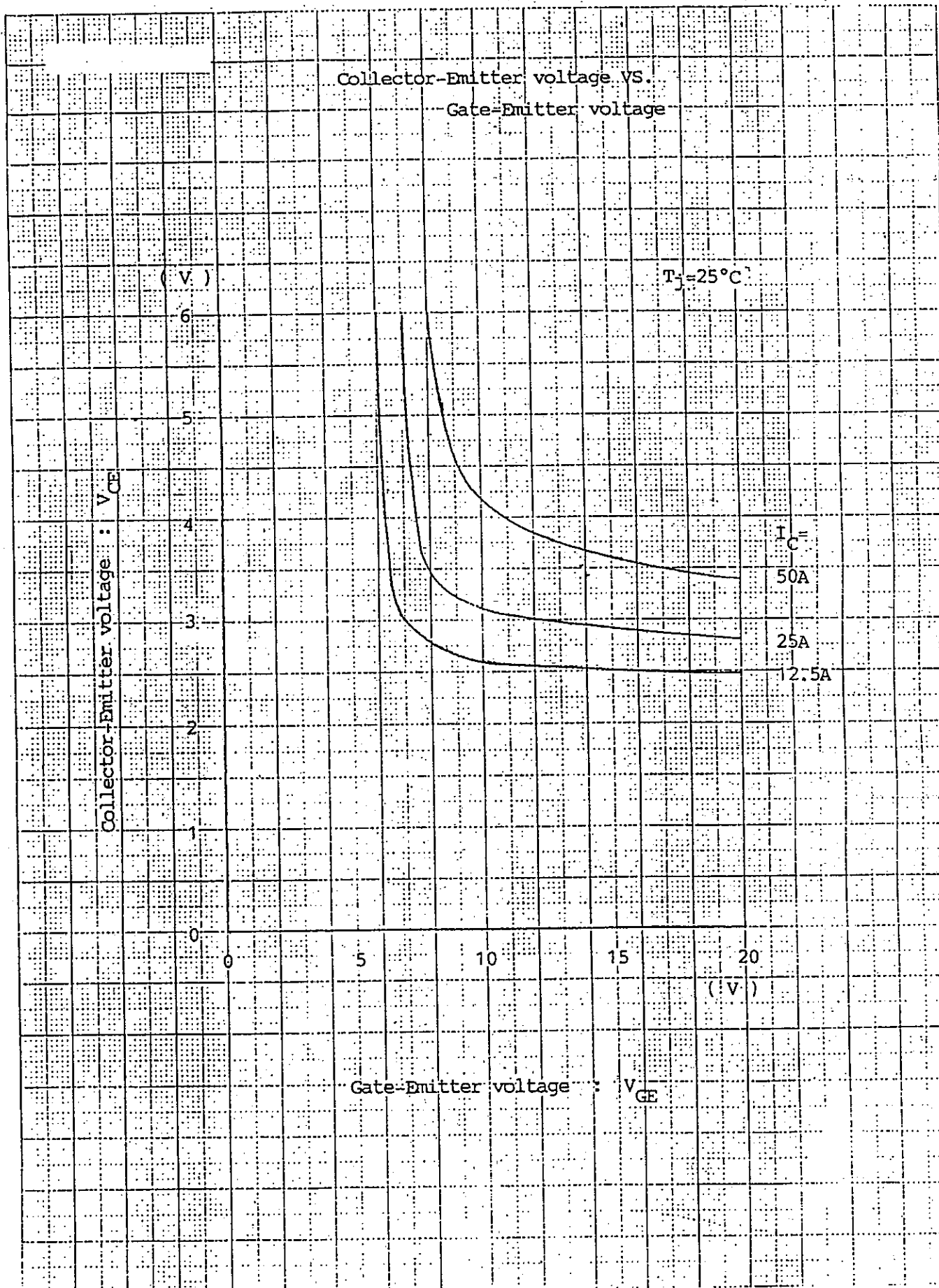
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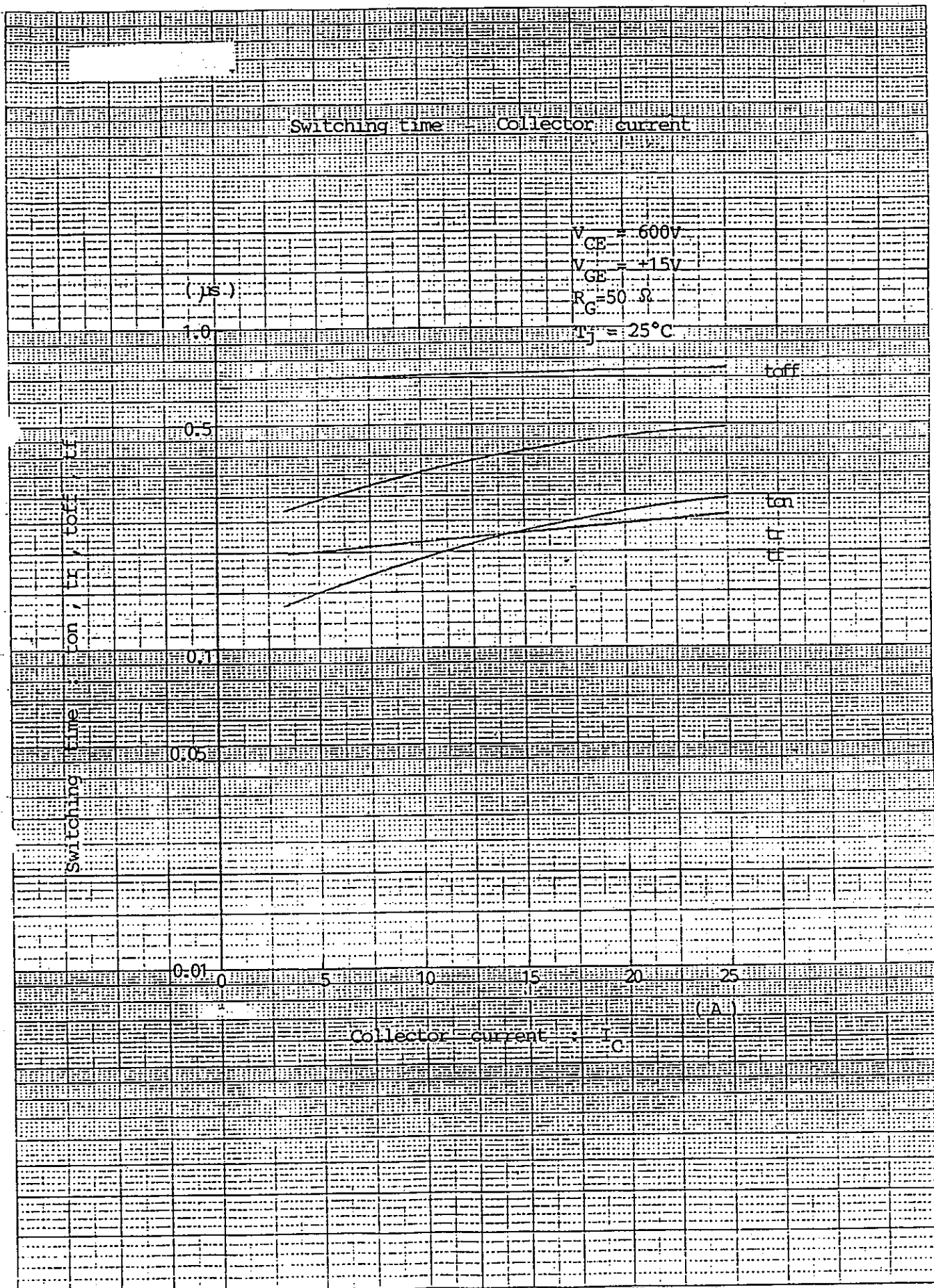
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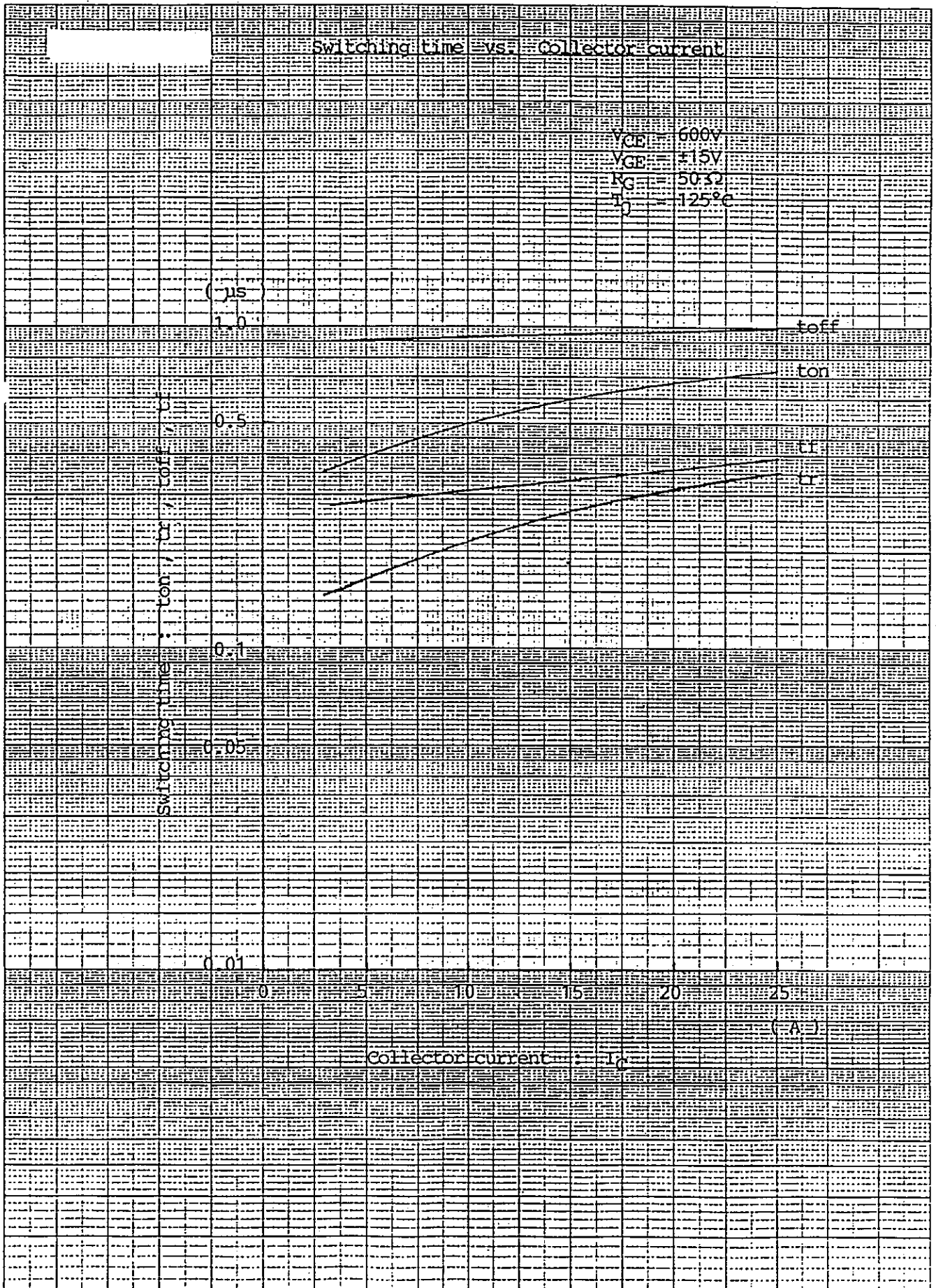


Collector current vs.
Collector-Emitter voltage

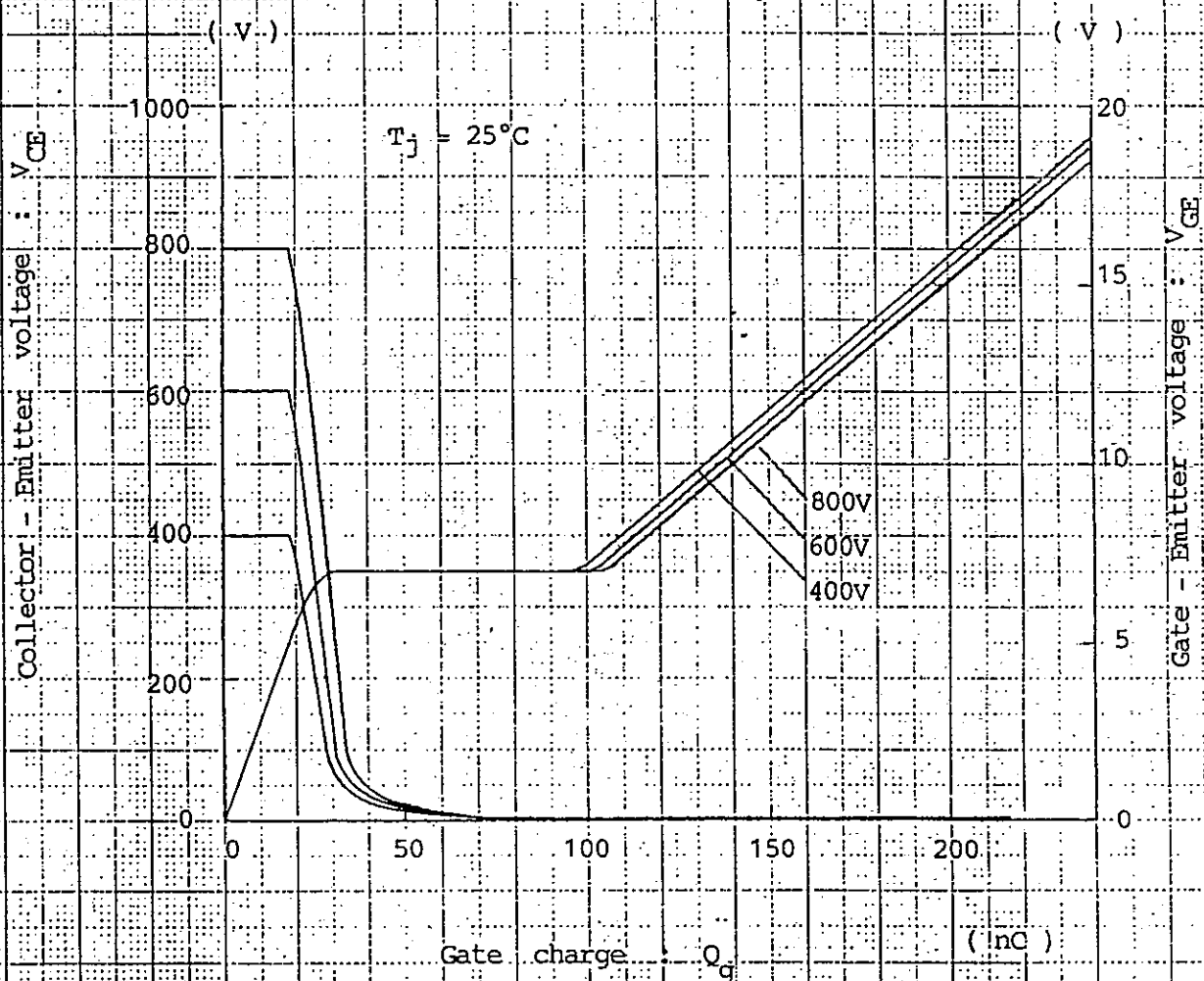


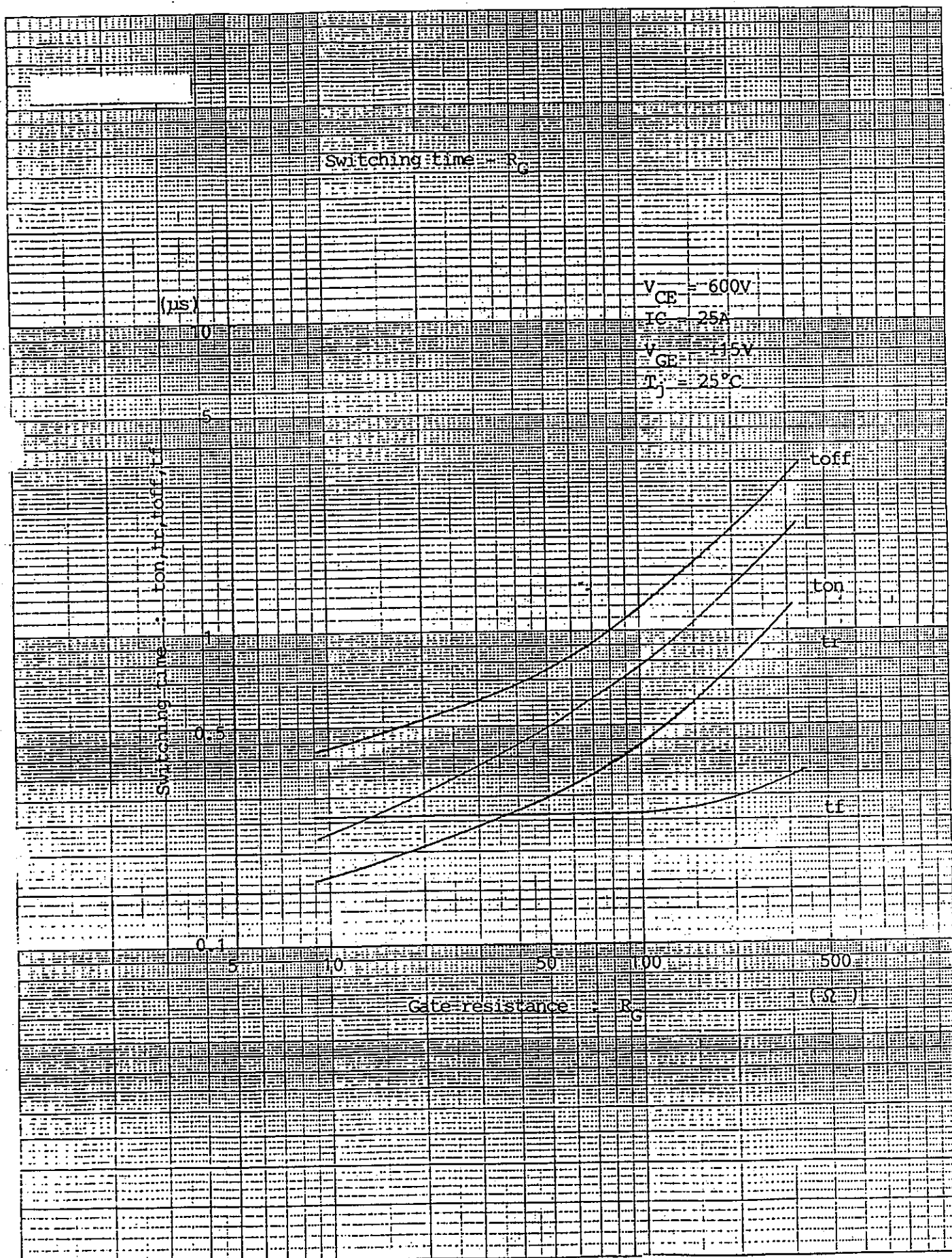


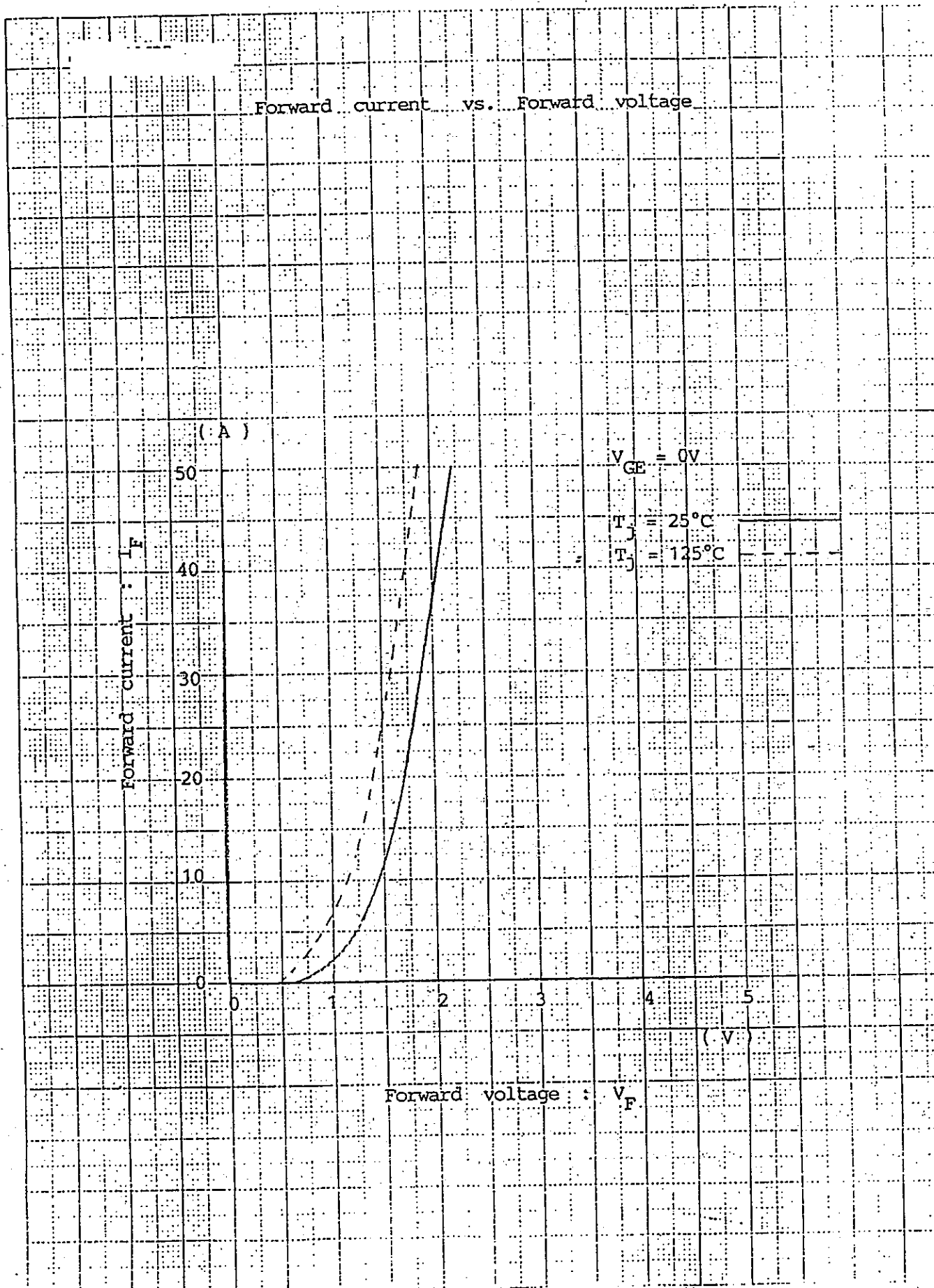


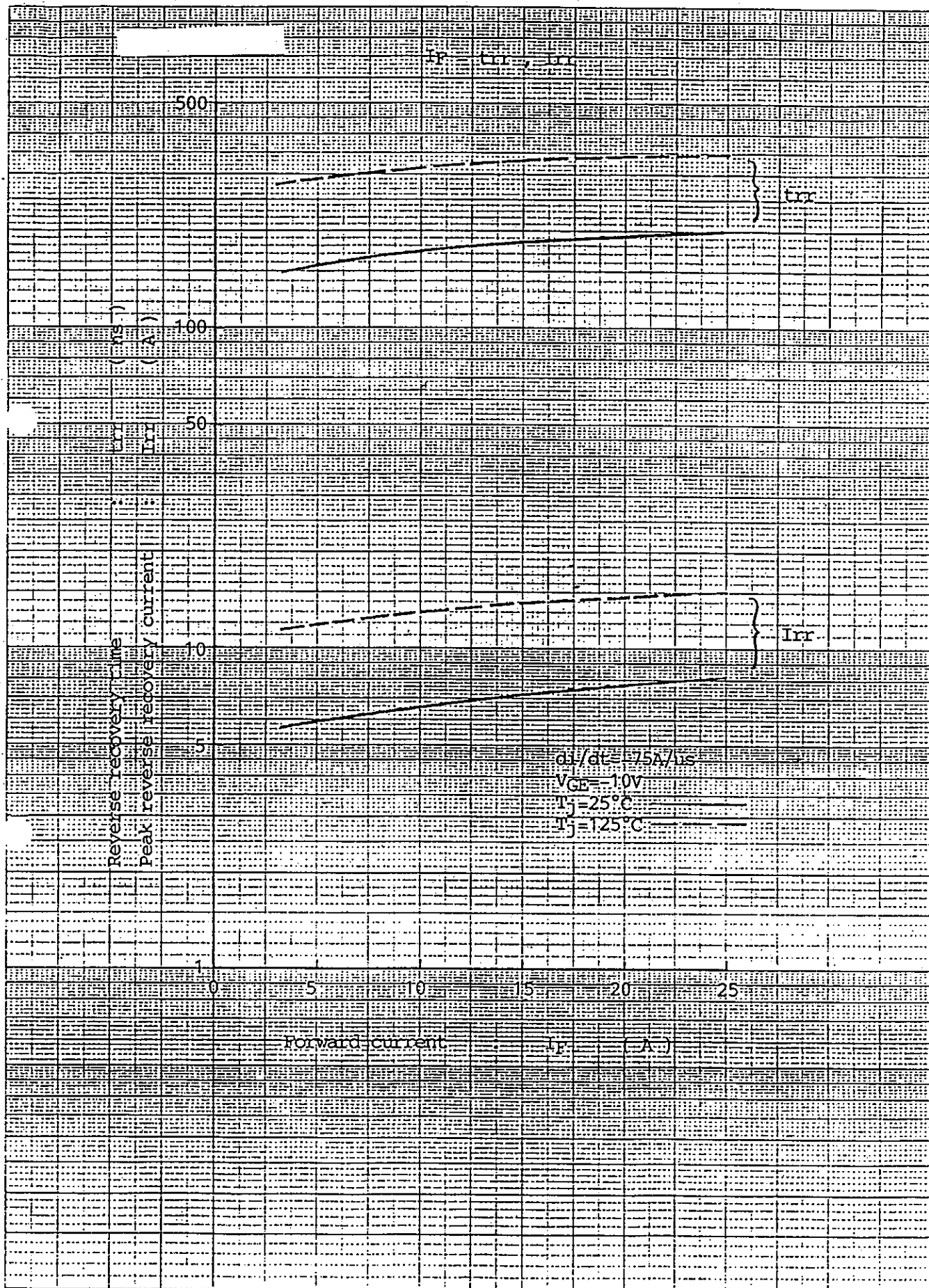


Dynamic input characteristics

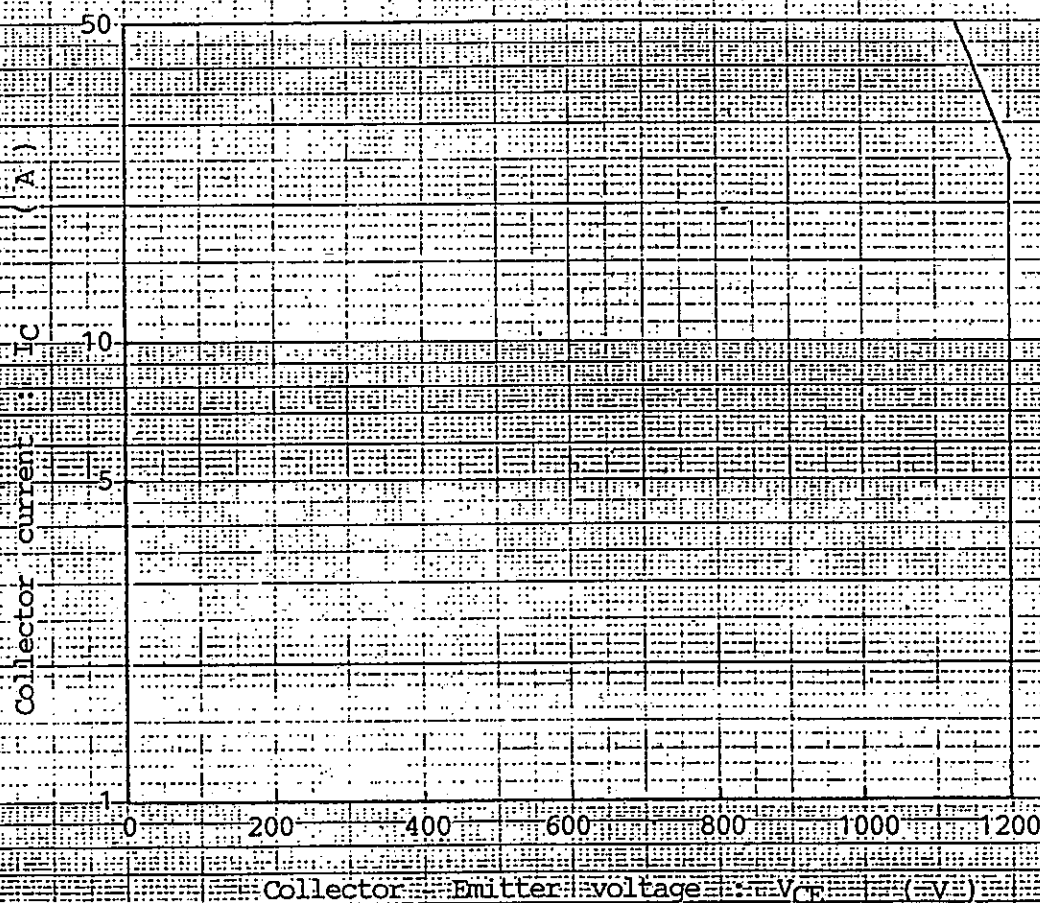


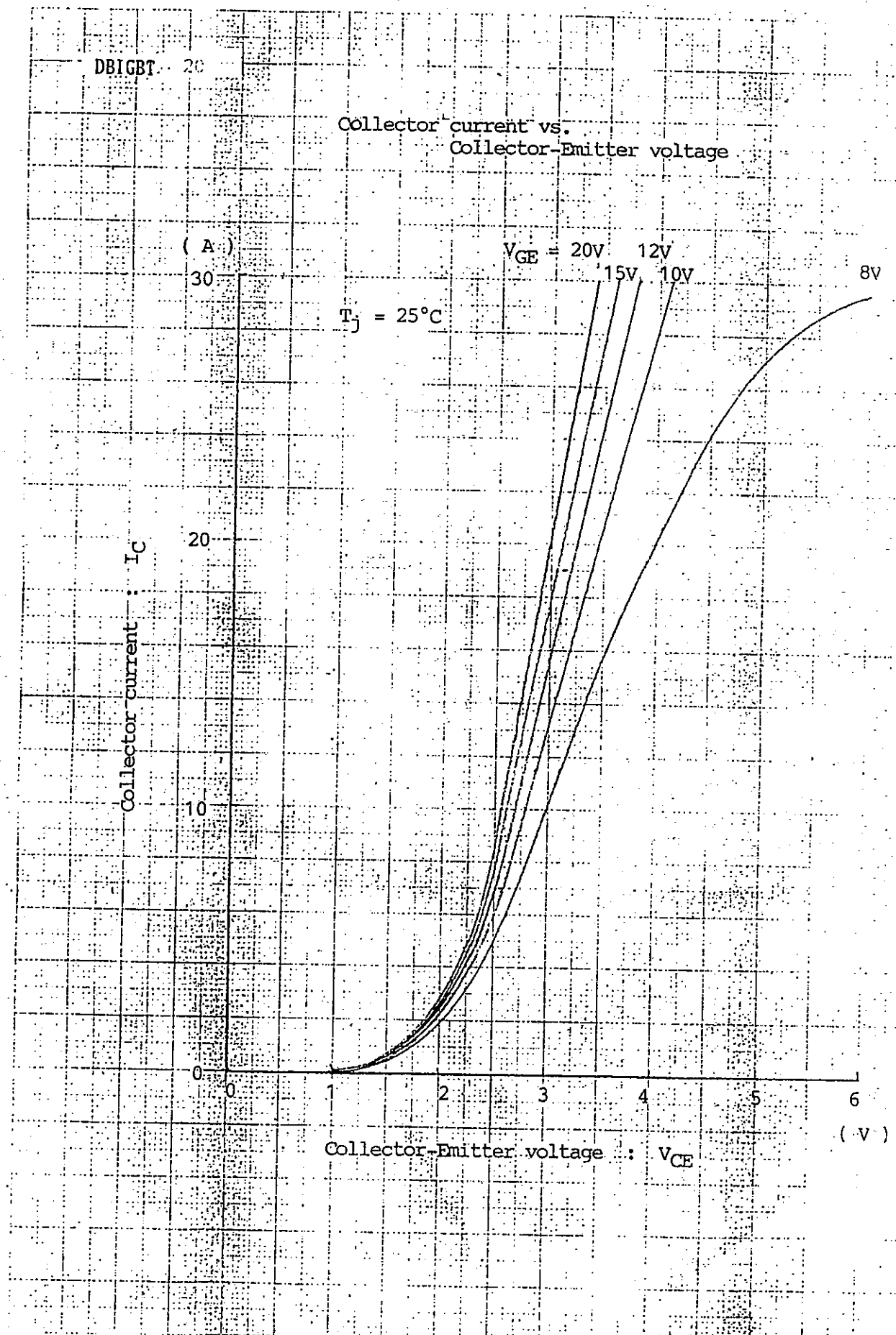


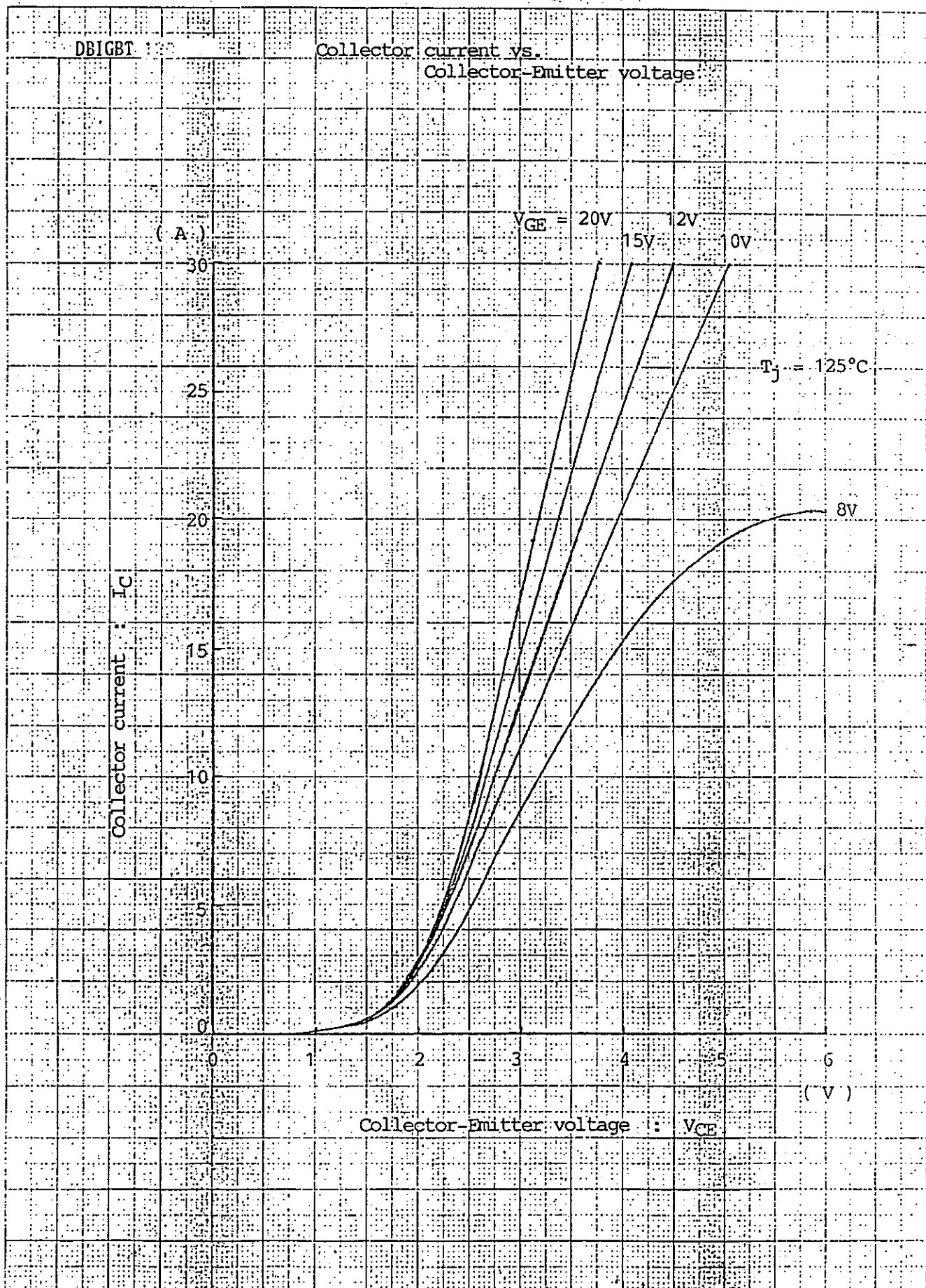




Reverse biased safe operating area

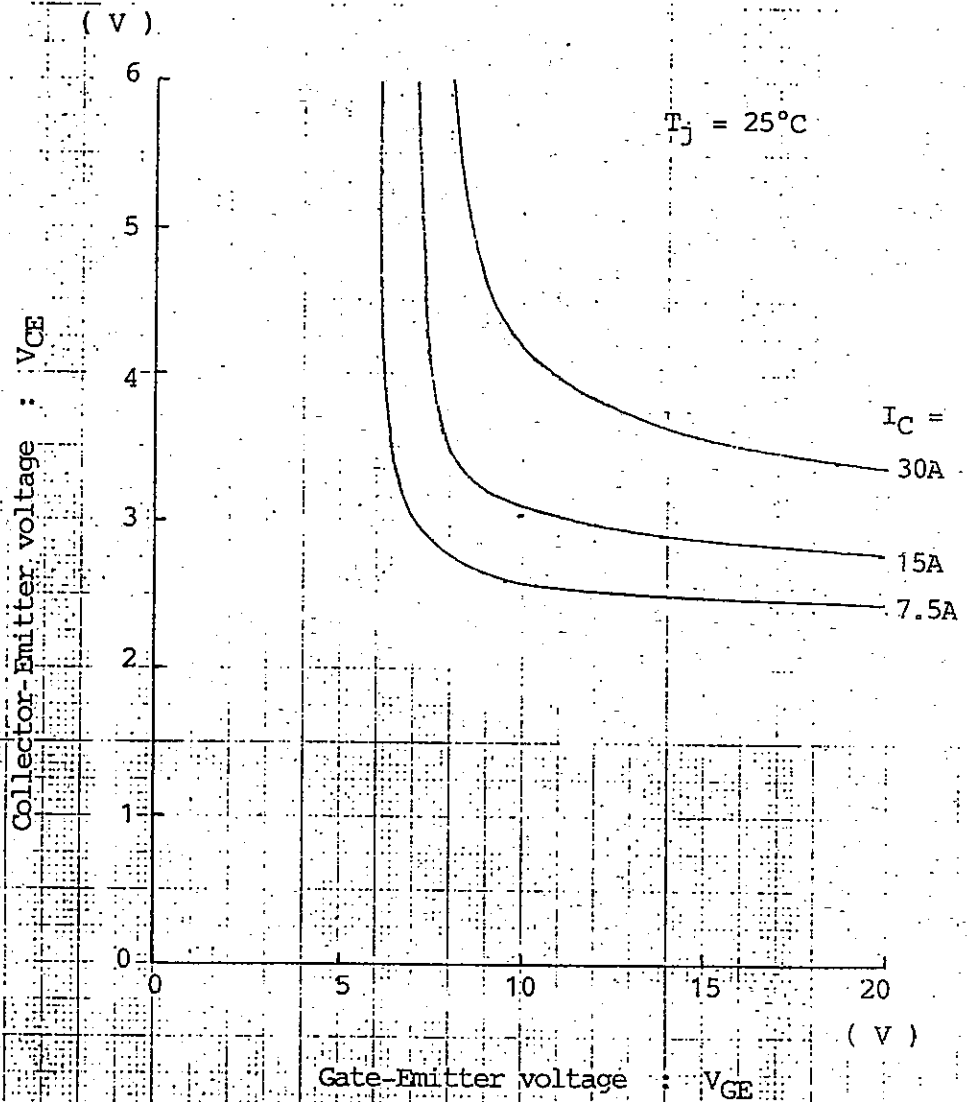
 $T_J = 25^\circ\text{C}$ $+V_{GE} = 15\text{V}$ $-V_{GE} = 15\text{V}$ $R_G = 50\Omega$ 





DBIGBT

Collector-Emitter voltage vs.
Gate-Emitter voltage



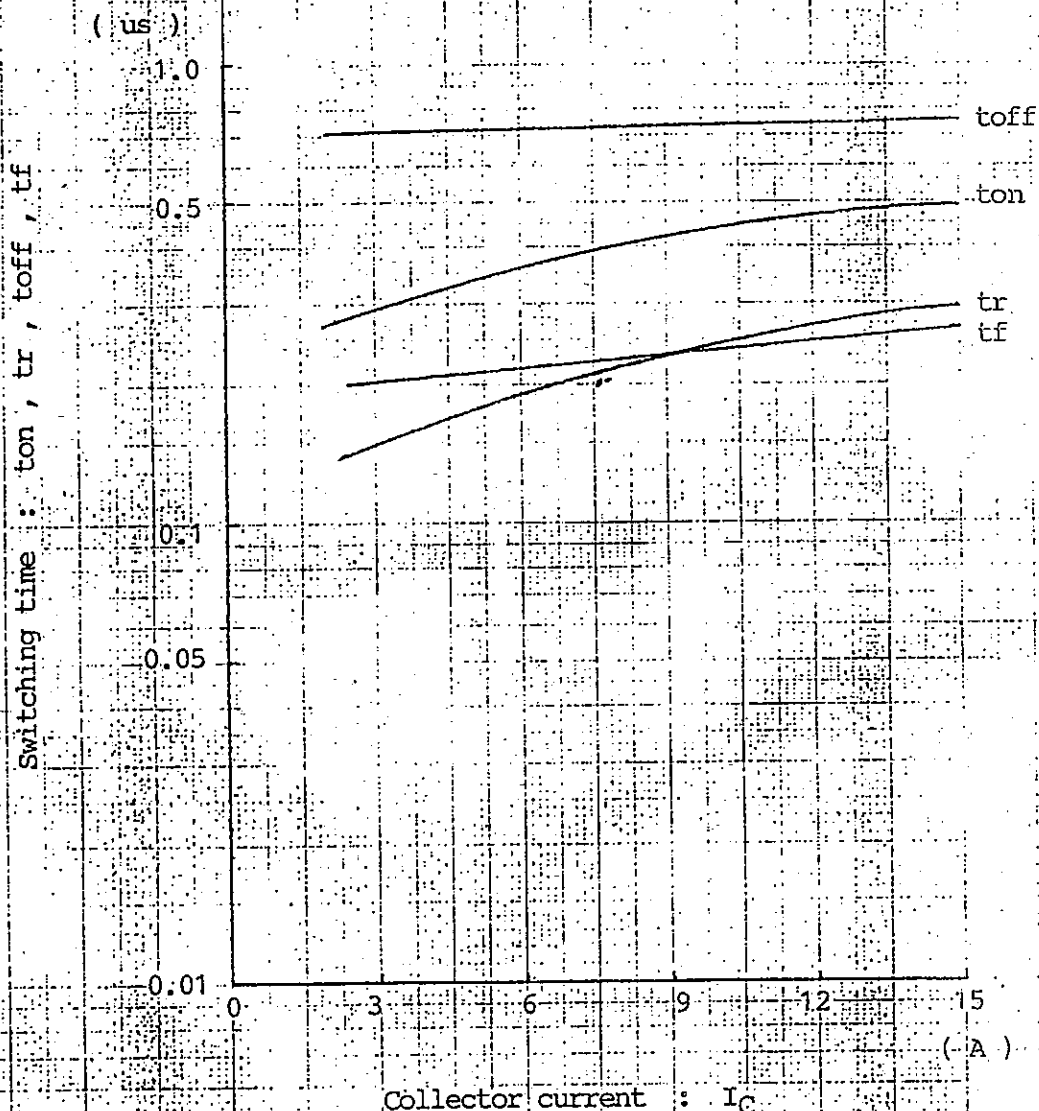
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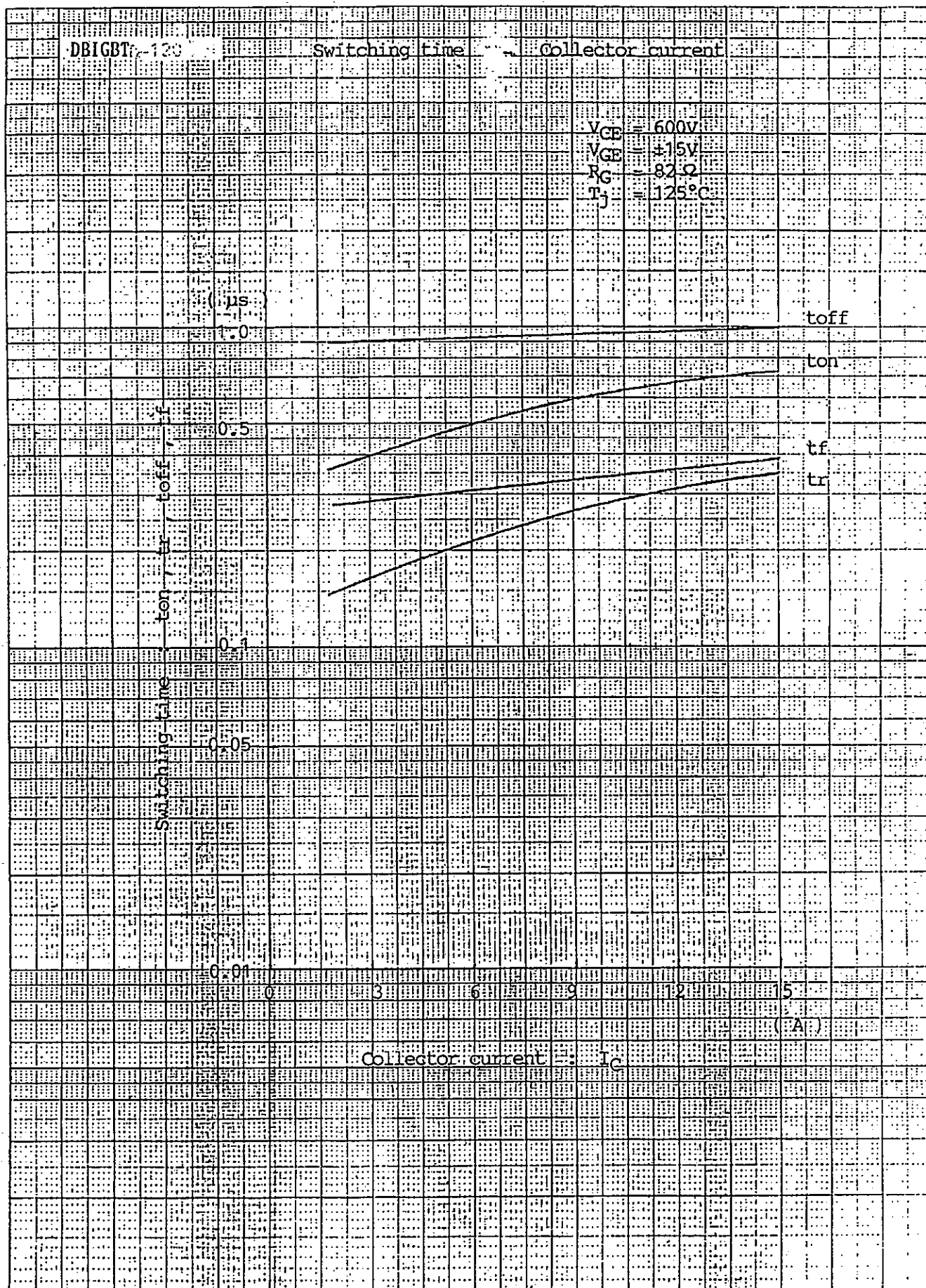
5-DBIGBT-120

Switching time - Collector current

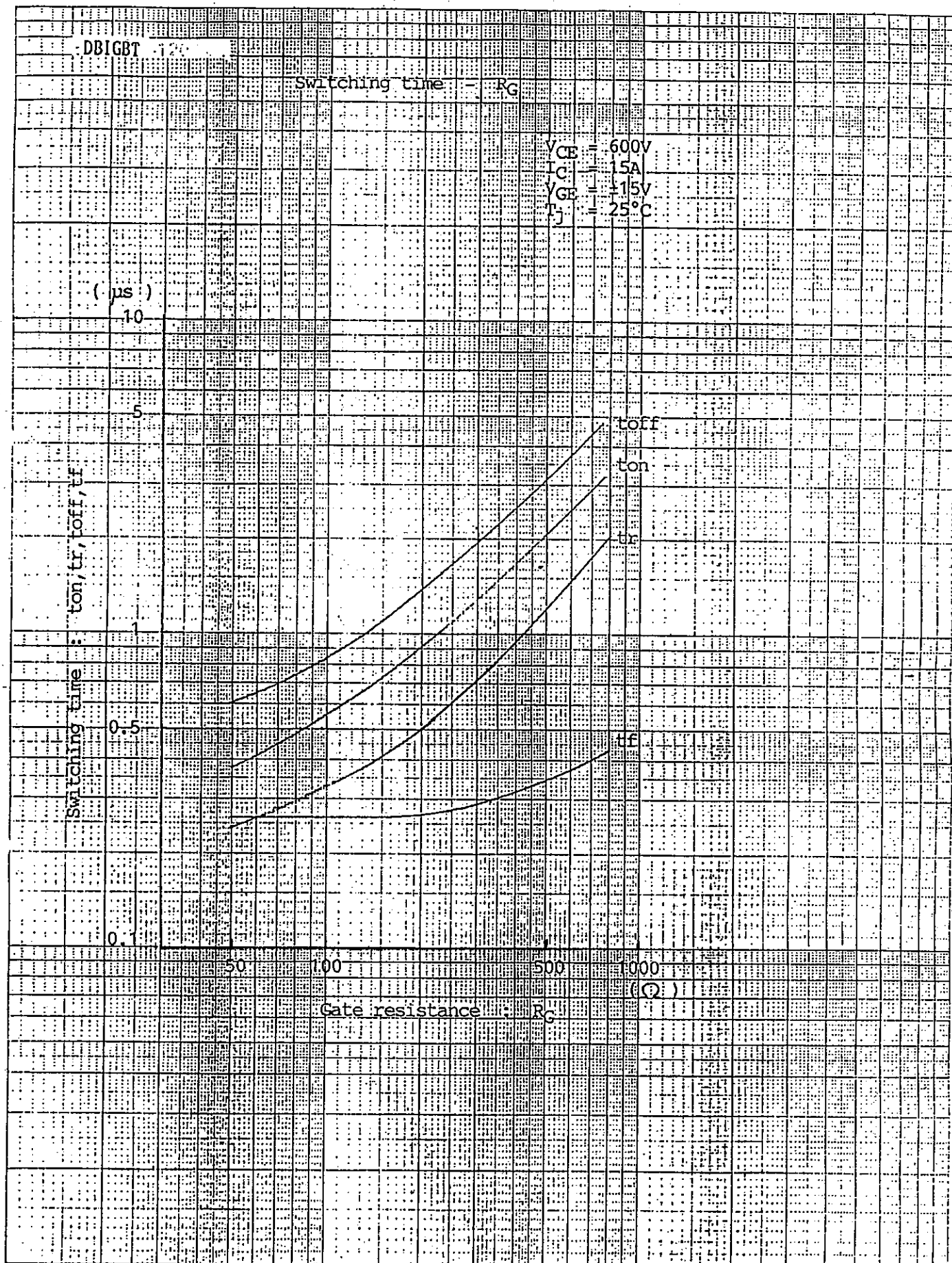
$V_{CE} = 600V$
 $V_{GE} = \pm 15V$
 $R_G = 82 \Omega$
 $T_j = 25^\circ C$



MS6M0130



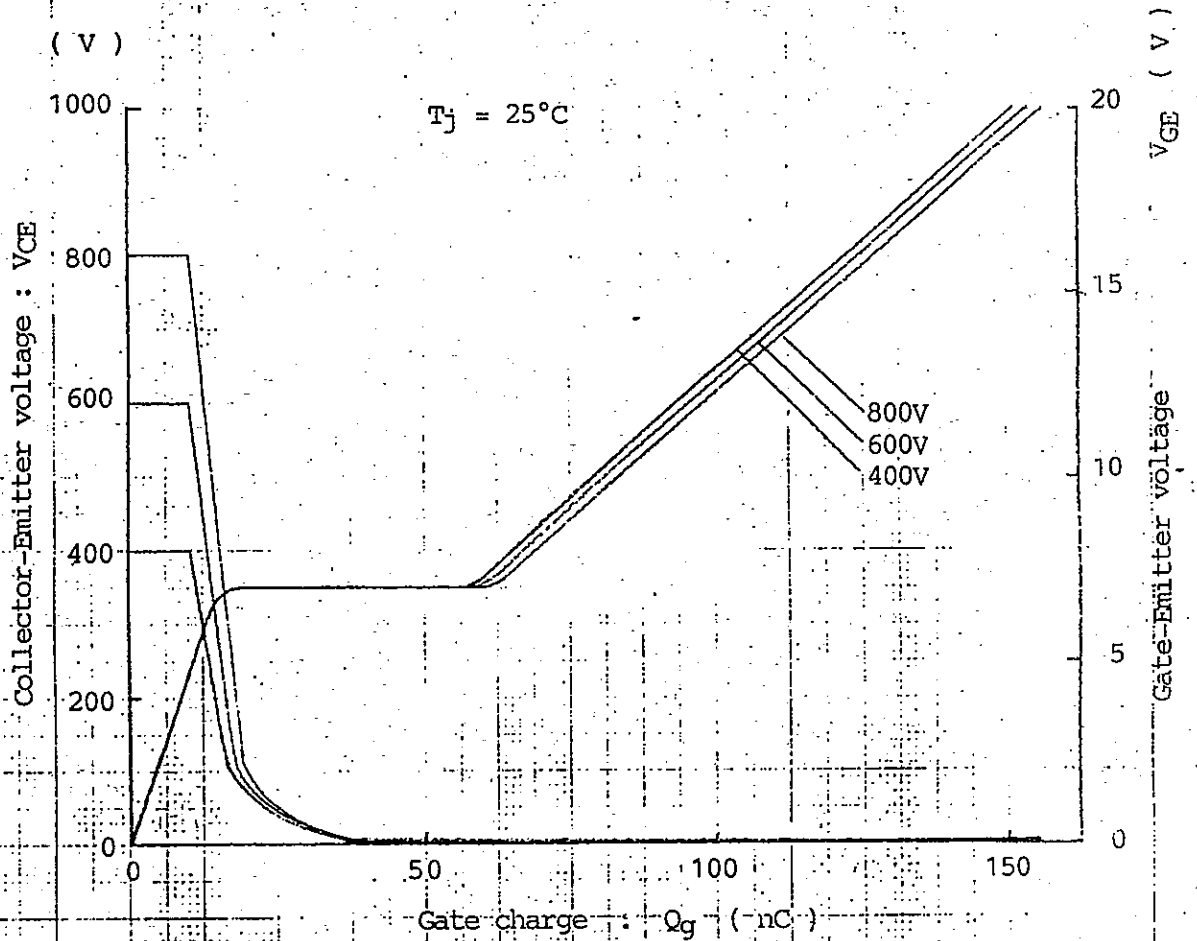
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Dynamic input characteristics



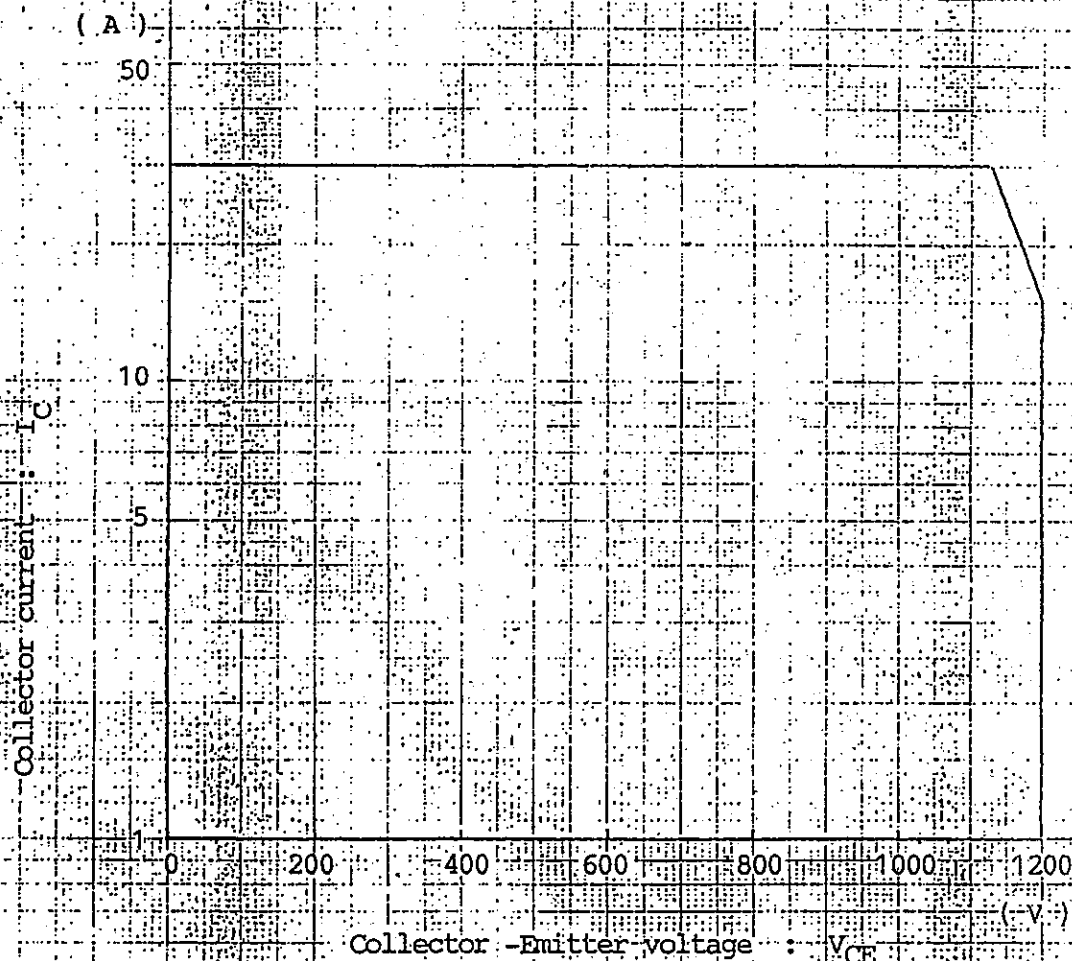
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DBIGBTL-130

Reverse biased safe operating area

$T_j = 25^\circ\text{C}$
 $+V_{GE} = 15\text{V}$
 $-V_{GE} \leq 15\text{V}$
 $R_G = 82\Omega$



MS6M0130 22/22