

**Verwendung: Schneller Silizium-npn-Planar-Epitaxie-Schalttransistor für Logikschaltungen bei Umgebungstemperaturen  $\theta_a$  von  $-40^\circ\text{C}$  bis  $+125^\circ\text{C}$**

**SS 109**

**Abmessungen: Bauform A 3/15 - 3a,**

TGL 11 811

Kollektor am Gehäuse

Masse  $\approx 0,5\text{ g}$

**Zulässige Höchstwerte** gültig bis  $\theta_{j\text{max}}$

$U_{\text{CBO}} = 20\text{ V}$        $P_{\text{tot}} = 300\text{ mW}$

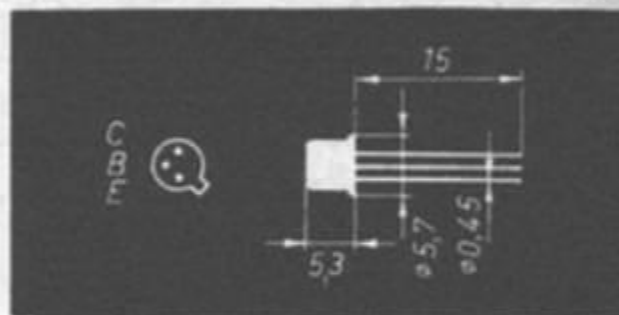
$U_{\text{CEO}} = 15\text{ V}$       bei  $\theta_a = 25^\circ\text{C}$

$U_{\text{EBO}} = 5\text{ V}$        $\theta_j = 175^\circ\text{C}$

$I_{\text{c}} = 200\text{ mA}$        $\theta_a = 125^\circ\text{C}$

bei  $t_{\text{av}} = 20\text{ ms}$

$\hat{I}_{\text{c}} = 300\text{ mA}$



**Wärmewiderstand  $R_{\text{th}} \leq 500 \frac{\text{grad}}{\text{W}}$**

**$R_{\text{thl}} \leq 150 \frac{\text{grad}}{\text{W}}$**

**Kennwerte für  $\theta_a = 25^\circ\text{C} -5\text{ grad}$**

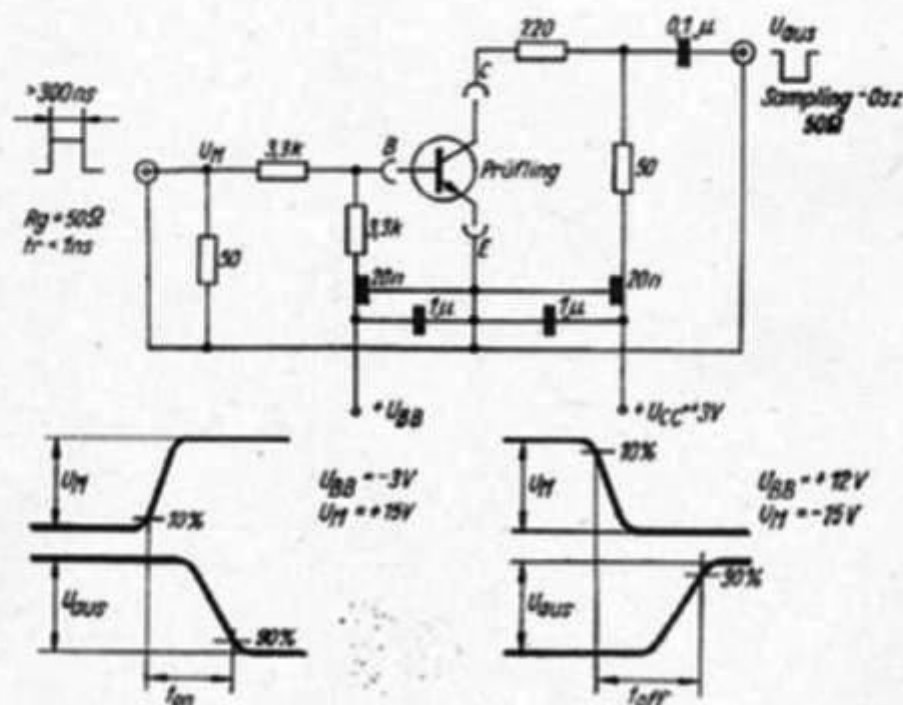
	Min.	Typ	Max.	Meßbedingungen	Stromverstärkungsgruppen
<b>Restströme</b>					
$I_{\text{CBO}}$		10 nA	50 nA	$U_{\text{CB}} = 15\text{ V}$	
<b>Durchbruchspannungen</b>					
$U_{\text{(BR)CBO}}$	20 V	40 V		$I_{\text{c}} = 10\ \mu\text{A}$	
$U_{\text{(BR)CEO}}$	15 V	35 V		$I_{\text{c}} = 5\text{ mA}$	
$U_{\text{(BR)EBO}}$	5 V	7,5 V		$I_{\text{E}} = 10\ \mu\text{A}$	
<b>Sättigungsspannung</b>					
$U_{\text{CEsat}}$		0,4 V	0,5 V	$I_{\text{c}} = 100\text{ mA}, I_{\text{B}} = 10\text{ mA}$	
$U_{\text{BEsat}}$		1,05 V	1,2 V	$I_{\text{c}} = 100\text{ mA}, I_{\text{B}} = 10\text{ mA}$	
<b>Übergangsfrequenz</b>					
$f_{\text{T}}$	200 MHz	450 MHz		$U_{\text{CE}} = 10\text{ V}, I_{\text{c}} = 10\text{ mA}, f = 100\text{ MHz}$	
<b>Ausgangskapazität</b>					
$C_{22b}$		2,8 pF	5 pF	$U_{\text{CE}} = 10\text{ V}, I_{\text{E}} = 0, f = 2\text{ MHz}$	
<b>Gleichstromverstärkung</b>					
B	18	60		$U_{\text{CE}} = 0,7\text{ V}, I_{\text{c}} = 100\text{ mA}$	A
	18		35		B
	28		71		C
	56		140		D
	112		280		

	Min.	Typ	Max.	Meßbedingungen	Stromverstärkungsgruppen
<b>Schaltzeiten</b>					
$t_{on}$		15 ns	40 ns	$I_c = 10 \text{ mA}, I_{B1} = 3 \text{ mA},$ $R_L = 270 \Omega, I_B = 1,5 \text{ mA}$	
$t_{off}$		35 ns	75 ns		

Bestellbeispiel für einen Transistor  
der Stromverstärkungsgruppe C

Transistor SS 109 C

Meßschaltung zur Messung der Einschaltzeit ( $t_{on}$ ) und der Ausschaltzeit ( $t_{off}$ )

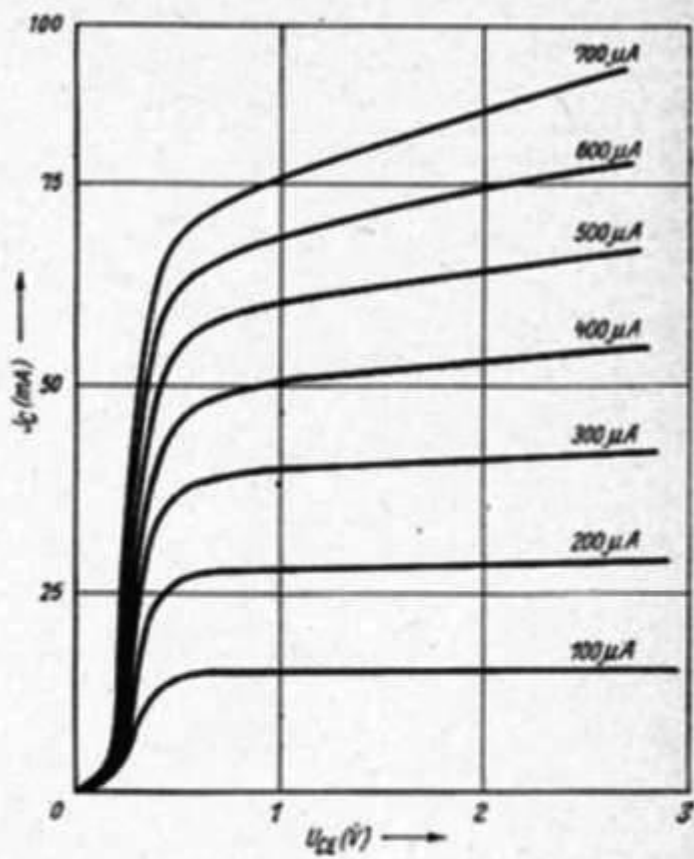
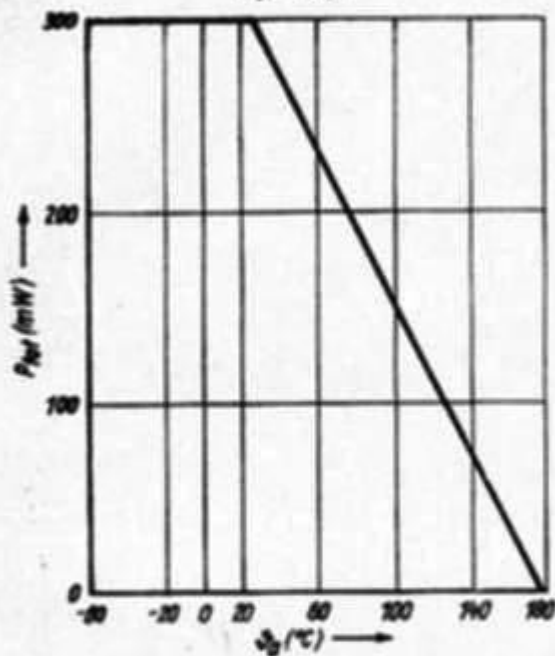


$$I_C = f(U_{CE})$$

$$I_B = \text{Parameter}$$

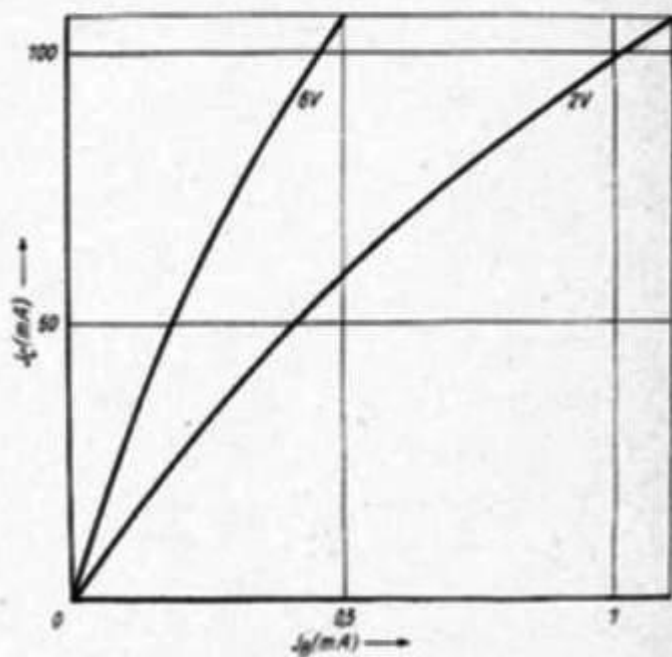
freitragende Montage

$$P_{\text{tot}} = f(\vartheta_B)$$

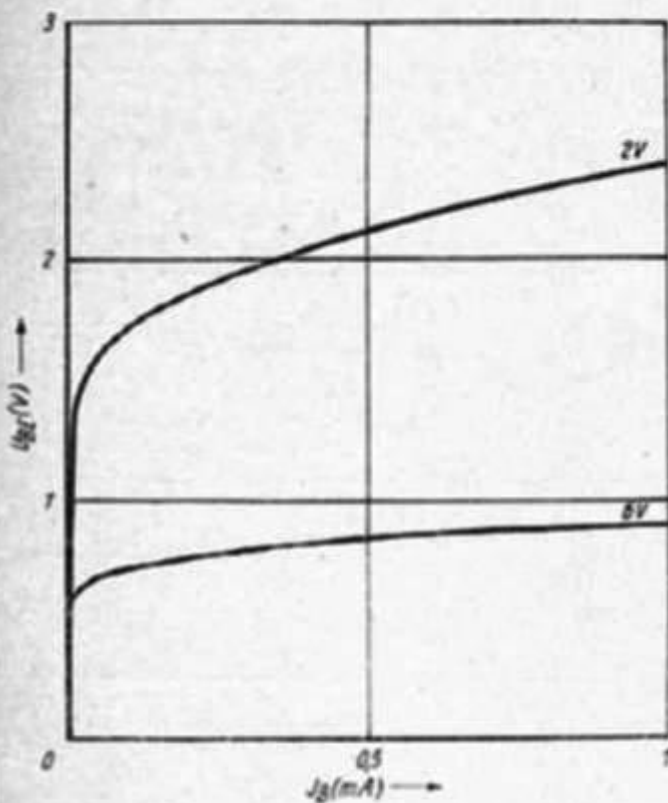


$$I_C = f(I_B)$$

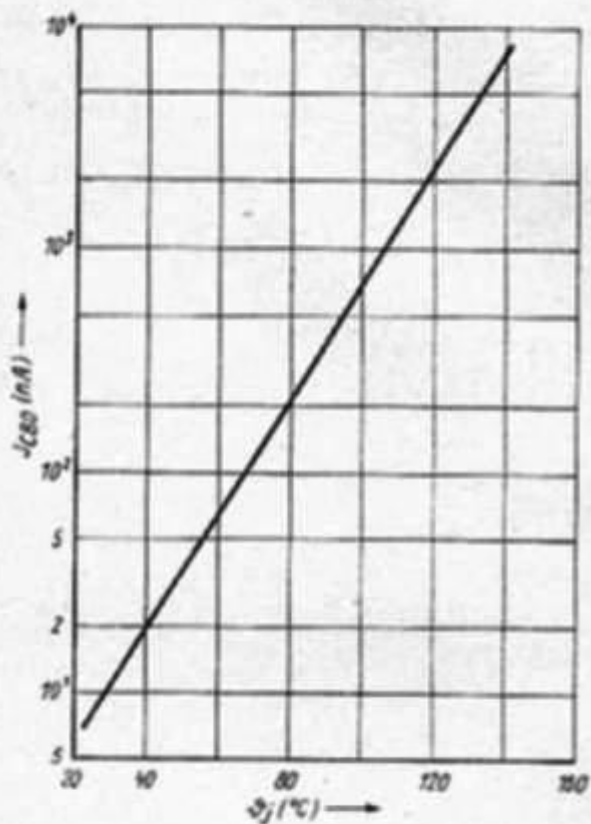
$$U_{CE} = \text{Parameter}$$



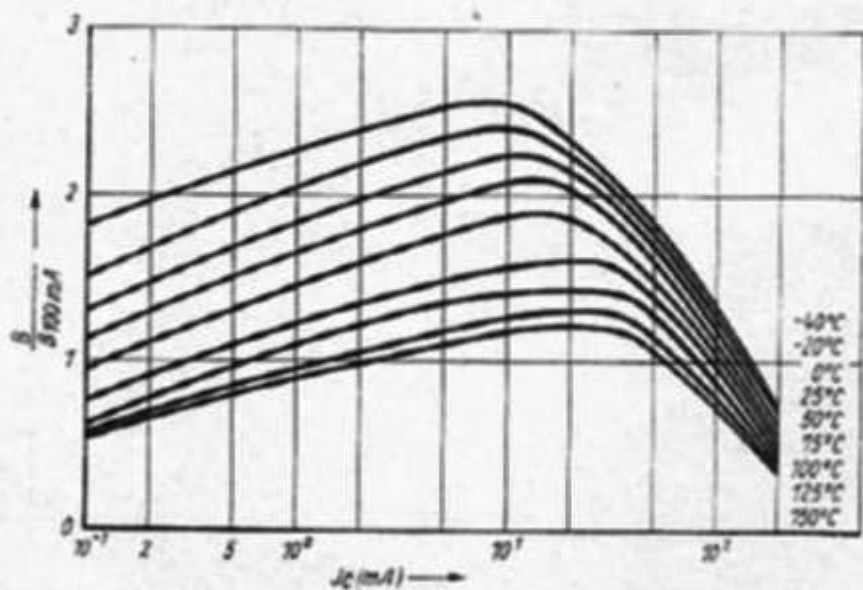
$U_{BE} = f(I_B)$   
 $U_{CE} = \text{Parameter}$



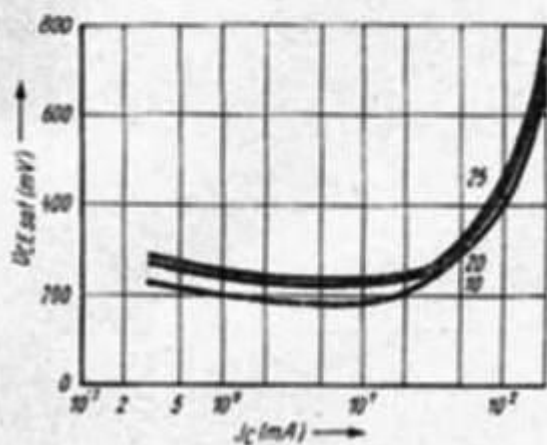
$I_{CBO} = f(\vartheta_J)$   
 $U_{CB} = 20V$



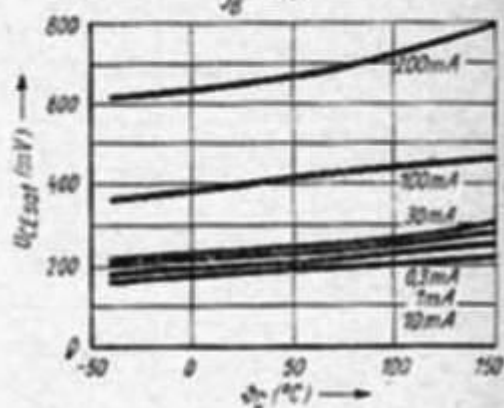
$\beta = f(I_C)$   
 $U_{CE} = 0.7V$   
 $\vartheta_C = \text{Parameter}$



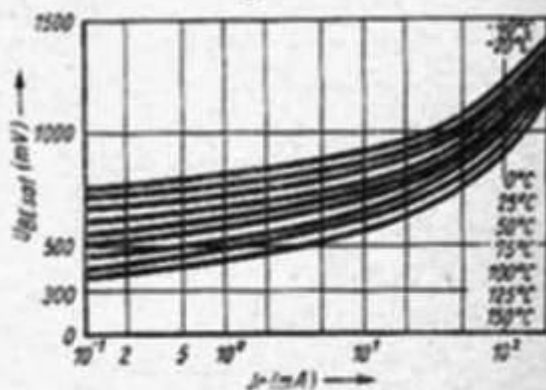
$$U_{CE sat} = f(I_C)$$

 $\frac{I_C}{I_B} = \text{Parameter}$ 
 $\vartheta_C = 25^\circ\text{C}$ 


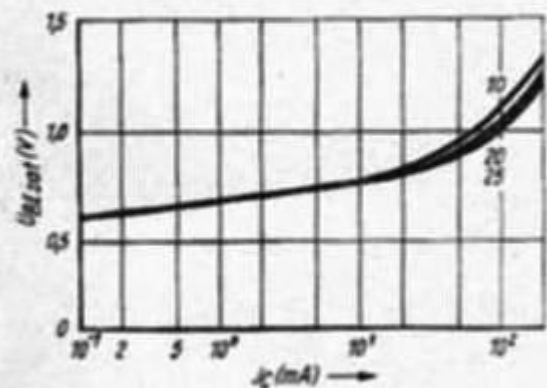
$$U_{CE sat} = f(\vartheta_C)$$

 $I_C = \text{Parameter}$ 
 $\frac{I_C}{I_B} = 10$ 


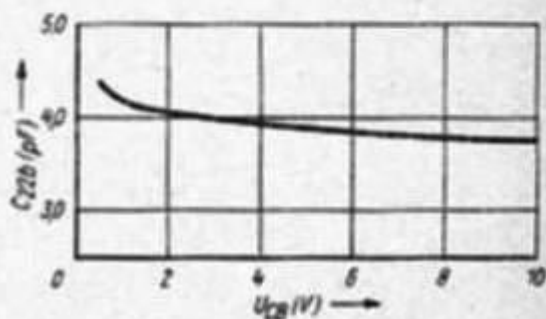
$$U_{BE sat} = f(I_C)$$

 $\vartheta_C = \text{Parameter}$ 
 $\frac{I_C}{I_B} = 10$ 


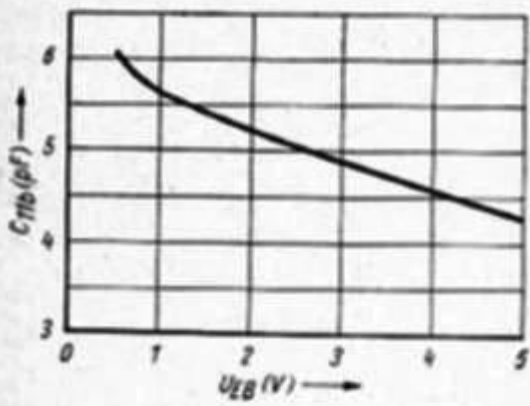
$$U_{BE sat} = f(I_C)$$

 $\frac{I_C}{I_B} = \text{Parameter}$ 
 $\vartheta_C = 25^\circ\text{C}$ 


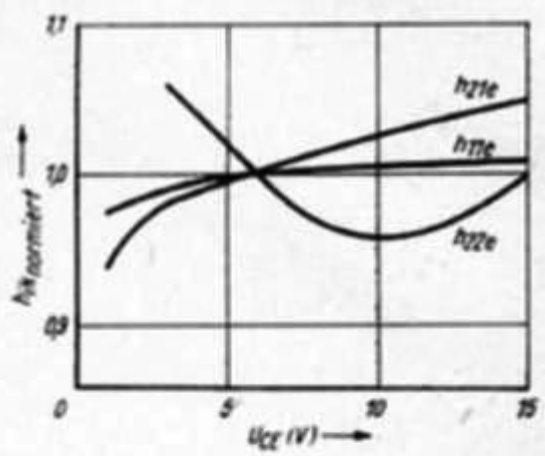
$$C_{22b} = f(U_{CB})$$

 $f = 270\text{Hz}$ 


$C_{T10} = f(U_{EB})$   
 $f = 2\text{MHz}$

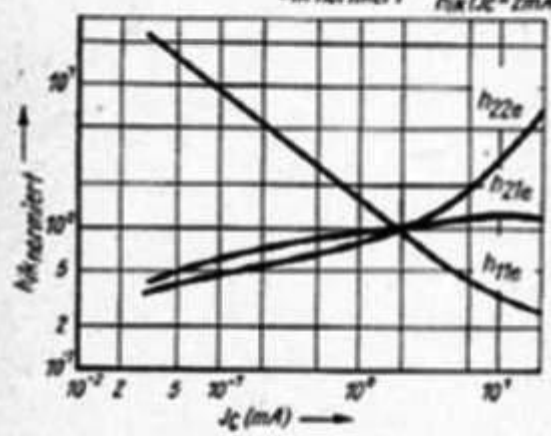


$h$ -Parameter (normiert) =  $f(U_{CE})$   
 bei  $I_C = 2\text{mA}$ ,  $f = 1\text{kHz}$   
 $h_{ik}$  normiert =  $\frac{h_{ik}(U_{CE})}{h_{ik}(U_{CE} = 6\text{V})}$

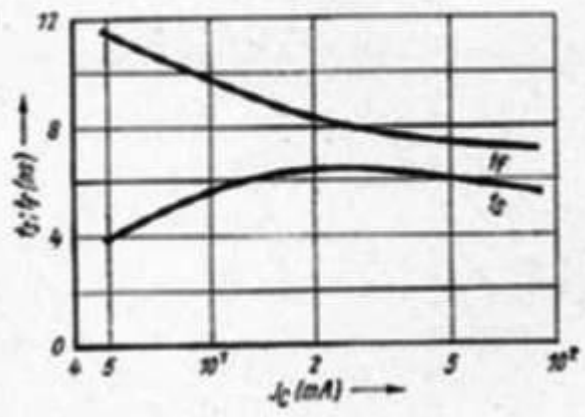


$h$ -Parameter (normiert) =  $f(I_C)$  bei  $U_{CE} = 6\text{V}$   
 $f = 1\text{kHz}$

$h_{ik}$  normiert =  $\frac{h_{ik}(I_C)}{h_{ik}(I_C = 2\text{mA})}$

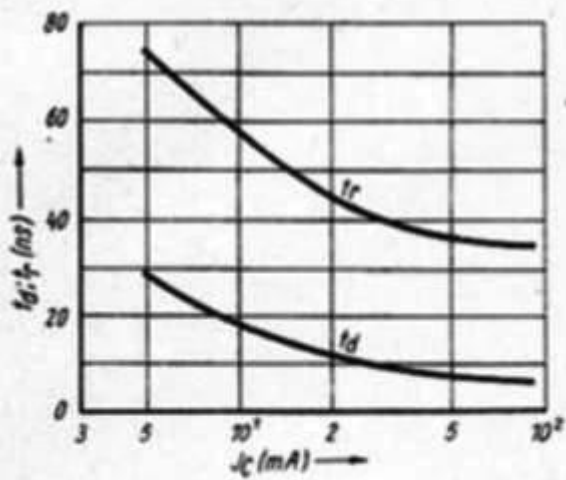


$t_2: t_1 = f(I_C)$   
 bei  $U_B = 10\text{V}$   
 $I_C = 10 \cdot 10^{-1} = 10 \cdot 10^{-2}$   
 $R_C = R_B$

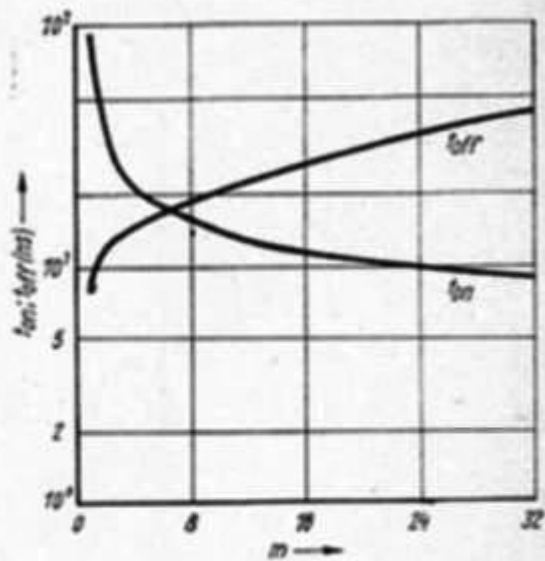




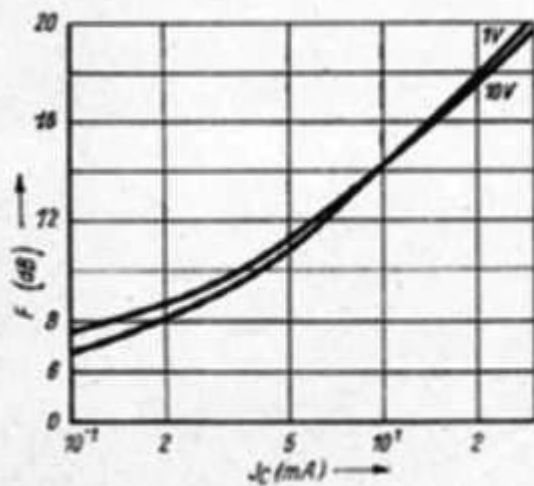
$t_d; t_r = f(I_C)$   
 bei  $U_B = 10V$   
 $I_C = 10 \mu A \dots 10 mA$   
 $R_C = R_B$



$t_{on}; t_{off} = f(m)$   
 bei  $I_C = 10 mA$   
 $R_C = 270 \Omega$



$F = f(I_C)$   
 bei  $R_B = 500 \Omega$   
 $U_{CE}$  = Parameter  
 $f = 1 kHz$



$t_{on}, t_{off} = f(m)$   
bei  $J_C = 10 \text{ mA}$   
 $R_L = 270 \Omega$

