

Netzröhre für GW-Heizung
indirekt geheizt
Serien- oder Parallelspeisung

TELEFUNKEN

ECH 81

DC-AC-Heating
indirectly heated
connected in parallel or series

Regelbare Heptode mit Triode
Remote cutoff heptode with triode

U_f	6,3	V
I_f	300	mA

Normierte Anheizzeit · Normalize heating-up time

Meßwerte · Measuring values

Triode

U_a	100	V
U_g	0	V
I_a	13,5	mA
S	3,7	mA
μ	22	

Heptode

U_a	160	V
U_{g3}	0	V
U_{g2g4}	100	V
U_{g1}	-0,5	V
I_a	11	mA
I_{g2+g4}	7	mA
S	4,5	mA/V
$\mu_{g2/g1}$	25	

Betriebswerte · Typical operation

Triode als Oszillator

Triode as oscillator

U_b	250	V
R_a	33	k Ω
R_{g1g3}	47	k Ω
I_{gT+g3}	200	μ A
I_a	4,5	mA
S_{eff}	0,65	mA/V



Betriebswerte · Typical operation

Heptode als Mischer · Heptode as mixer

Trioden-System: $U_b = 250 \text{ V}$, $R_a = 33 \text{ k}\Omega$, $U_{osz \text{ eff}} = 8 \text{ V}$

U_b	250		V
R_{av}	8,2		k Ω
R_{g2g4}	22		k Ω
R_{gTg3}	47		k Ω
I_{gT+g3}	200		μA
U_{g1}	ca. -0,5 ¹⁾	ca. -28	V
U_a	ca. 225	ca. 240	V
U_{g2g4}	ca. 78	ca. 235	V
I_a	3,3		mA
I_{g2+g4}	7,8		mA
S_c	1100	11	$\mu\text{A/V}$
R_{ic}	0,8	> 3	M Ω
r_{aeq}	30		k Ω

Heptode als HF- oder ZF-Verstärker

Heptode as RF- or IF-amplifier

U_b	250		V
R_{av}	8,2		k Ω
U_{g3}	0		V
R_{g2g4}	22		k Ω
U_{g1}	ca. -0,5 ¹⁾	ca. -35	V
U_a	ca. 160	ca. 248	V
U_{g2g4}	ca. 96	ca. 245	V
I_a	11		
I_{g2+g4}	7		
S	4,5	0,045	mA/V
R_i	0,24	> 10	M Ω
$\mu_{g2/g1}$	25		
r_{aeq}	4,5		k Ω

¹⁾ U_{g1} nur durch $R_{g1} = 1 \text{ M}\Omega$ erzeugt · U_{g1} produced by voltage drop across $R_{g1} = 1 \text{ M}\Omega$ only



Nennwert-Grenzdaten · Design centre ratings

Triode			Heptode		
U_{a0}	550	V	U_{a0}	550	V
U_a	250	V	U_a	300	V
N_a	0,8	W	N_a	2	W
I_k	6,5	mA	U_{g2g40}	550	V
R_g	3	M Ω	$U_{g2g4}^1)$	125	V
$-U_g (I_g = +0,3 \mu A)$	1,3	V	$U_{g2g4} (I_a < 1 \text{ mA})$	300	V
$U_{f/k}$	± 100	V	$N_{g2 + g4}$	0,8	W
$R_{f/k}$	20	k Ω	I_k	18	mA
			R_{g1}	3	M Ω
			$R_{g3}^2)$	3	M Ω
			$-U_{g1} (I_{g1} = +0,3 \mu A)$	1,3	V
			$-U_{g3} (I_{g3} = +0,3 \mu A)$	1,3	V
			$U_{f/k}$	± 100	V
			$R_{f/k}$	20	k Ω

1) unregulated · unregulated

2) Wenn in AM/FM-Empfängern die Verbindungen zu der Röhre während des Betriebes umgeschaltet werden und g_3 nicht mittels eines ohmischen Widerstandes mit g_T verbunden ist, beträgt $R_{g3} \text{ max.} = 20 \text{ k}\Omega$.

If the leads to the tube are switched over in AM/FM receivers during operation and g_3 is not connected to g_T by means of an ohmic resistor, then R_{g3} amounts to max. 20 k Ω .

Kapazitäten · Capacitances

Triode			Heptode		
C_e	2,6	pF	C_e	4,8	pF
C_a	2,1	pF	C_a	7,9	pF
$C_{g/a}$	1	pF	$C_{g1/a}$	< 0,006	pF
$C_{g/f}$	< 0,02	pF	$C_{g1/g3}$	< 0,3	pF
			$C_{g1/f}$	< 0,17	pF
			C_{g3}	6	pF
			$C_{g3/f}$	< 0,06	pF

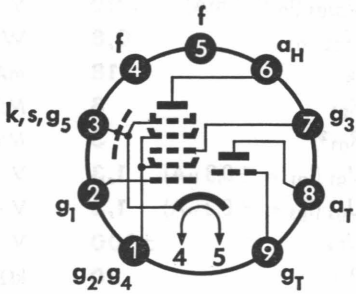
zwischen Heptode und Triode

between heptode and triode

$C_{aH/aT}$	0,20	pF
$C_{aH/gT}$	< 0,09	pF
$C_{aH/gT + g3}$	< 0,35	pF
$C_{g1/aT}$	< 0,06	pF
$C_{g1/gT}$	< 0,17	pF
$C_{g1/gT + g3}$	< 0,45	pF



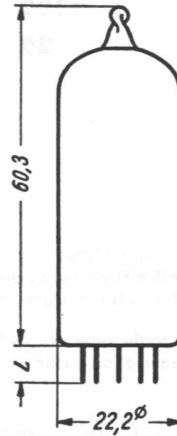
Sockelschaltbild
Base connection



Pico 9 - Noval

max. Abmessungen
max. dimensions

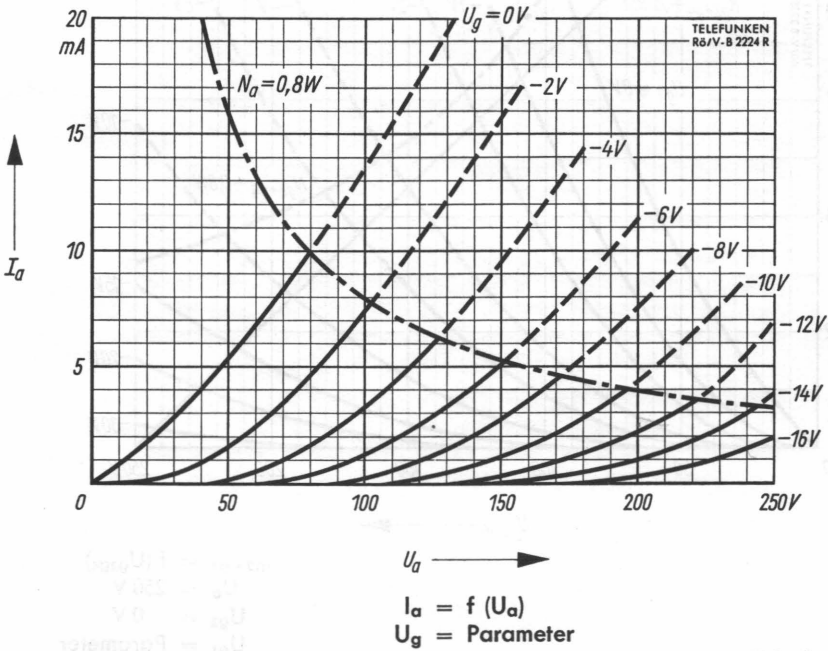
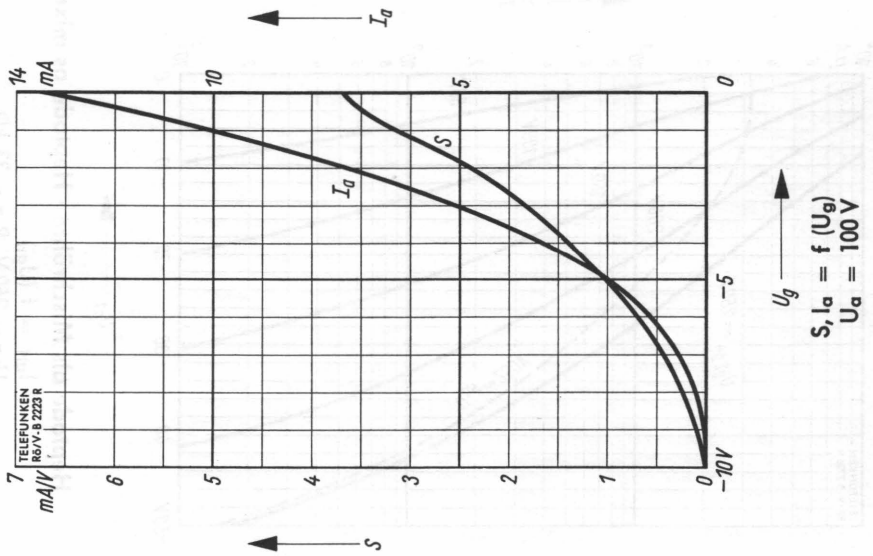
DIN 41 539, Nenngröße 50, Form A



Gewicht · Weight
max. 18 g

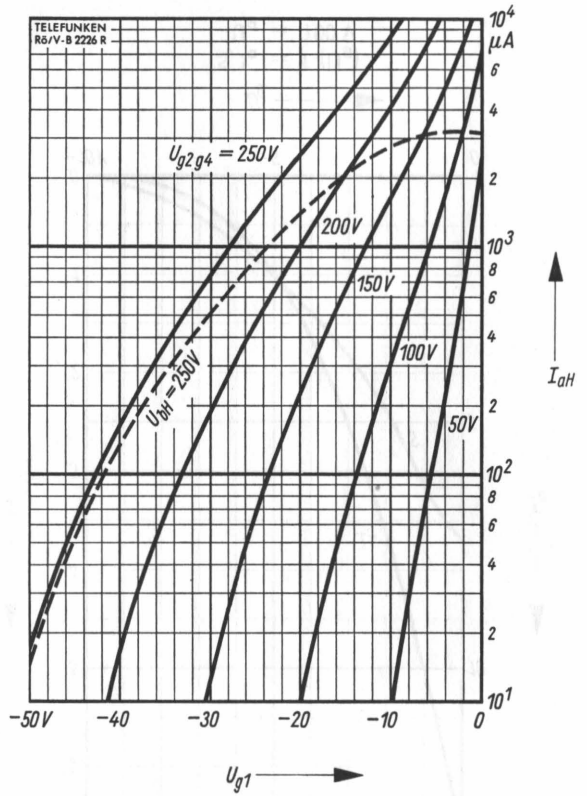
Wenn notwendig, muß gegen Herausfallen der Röhre aus der Fassung Vorsorge getroffen werden.
Special precautions must be taken to prevent the tube from becoming dislodged.





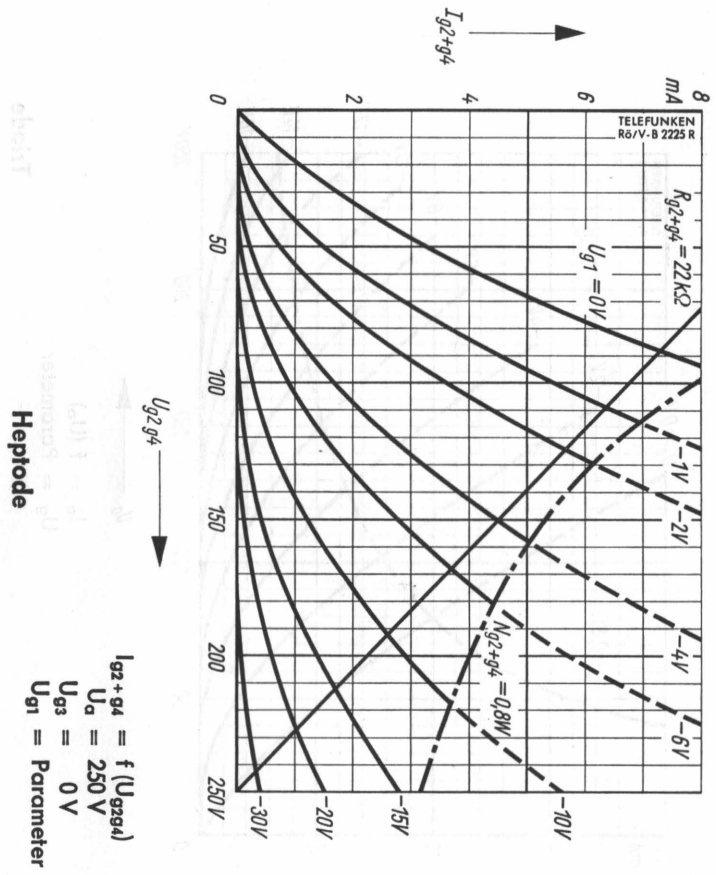
Triode





Heptode als Mischröhre · Heptode as mixer

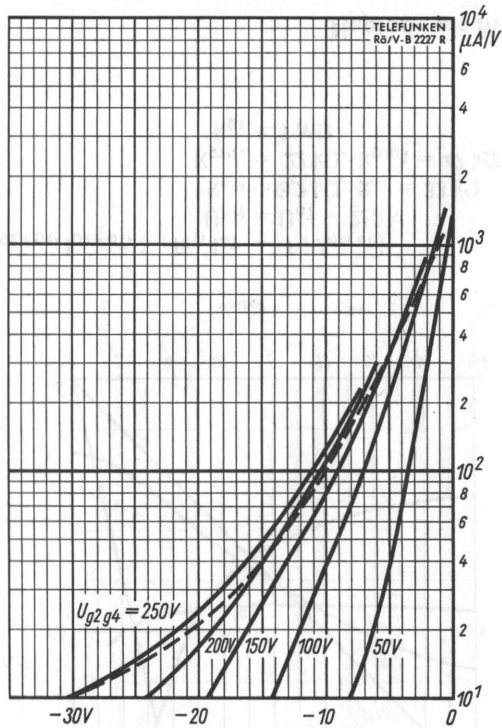
- $I_{aH} = f(U_{g1})$
- $U_{bT} = 250 \text{ V}, R_{aT} = 33 \text{ k}\Omega,$
- $R_{g3gT} = 47 \text{ k}\Omega, I_{g3+gT} = 200 \text{ }\mu\text{A}$
- $U_{aH} = 250 \text{ V}, U_{g2g4} = \text{Parameter}$
- - - $U_{bH} = 250 \text{ V}, R_a = 8,2 \text{ k}\Omega, R_{g2g4} = 22 \text{ k}\Omega$



- $I_{g2+g4} = f(U_{g2g4})$
- $U_a = 250 \text{ V}$
- $U_{g3} = 0 \text{ V}$
- $U_{g1} = \text{Parameter}$



Heptode



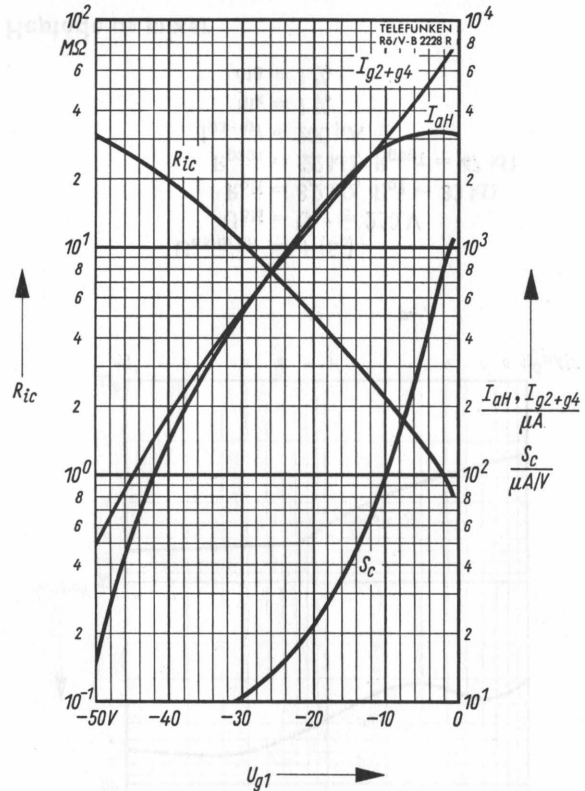
$$S_c = f(U_{g1})$$

$$U_{bT} = 250V, R_{aT} = 33k\Omega,$$

$$R_{g3gT} = 47k\Omega, I_{g3+gT} = 200\mu A$$

— $U_a = 250V, U_{g2g4} = \text{Parameter}$

- - - $U_{bH} = 250V, R_a = 8,2k\Omega, R_{g2g4} = 22k\Omega$



$$I_{aH}, I_{g2+g4}, S_c, R_{ic} = f(U_{g1})$$

$$U_{bH} = U_{bT} = 250V$$

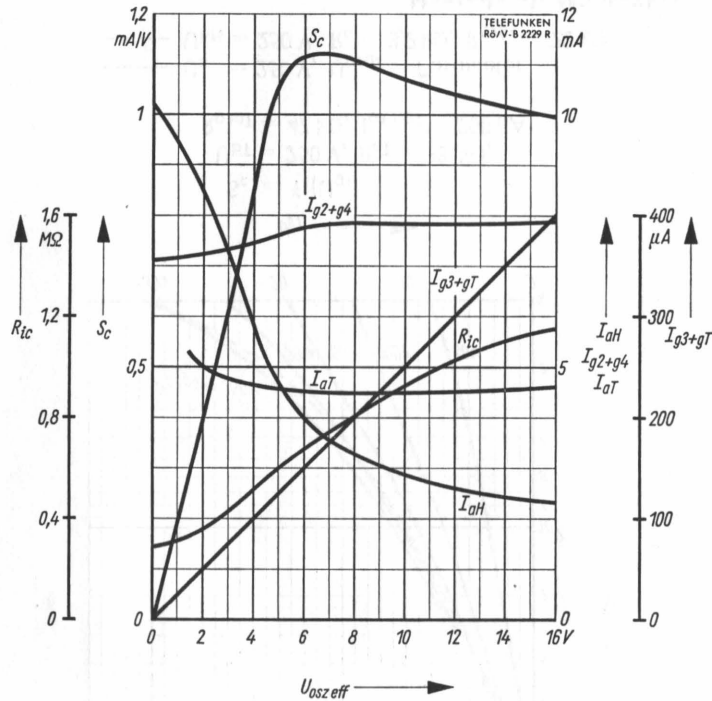
$$R_{aH} = 8,2k\Omega, R_{aT} = 33k\Omega$$

$$R_{g3gT} = 47k\Omega$$

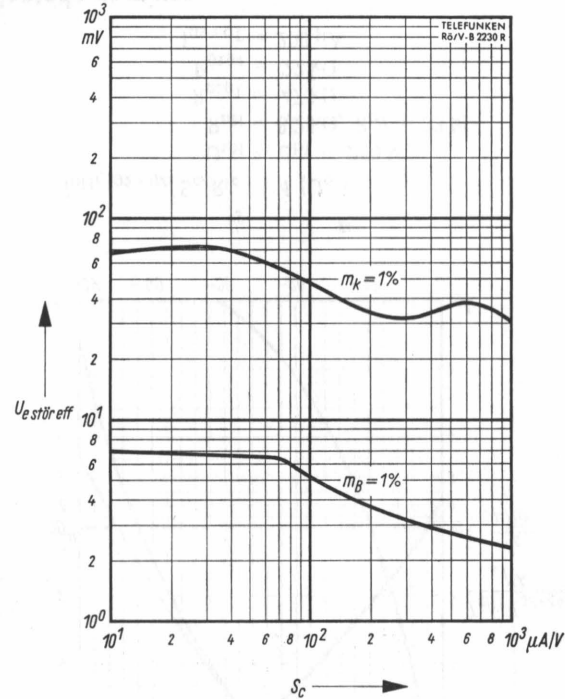
$$R_{g2g4} = 22k\Omega$$

$$I_{g3+gT} = 200\mu A$$

Heptode als Mischröhre · Heptode as mixer

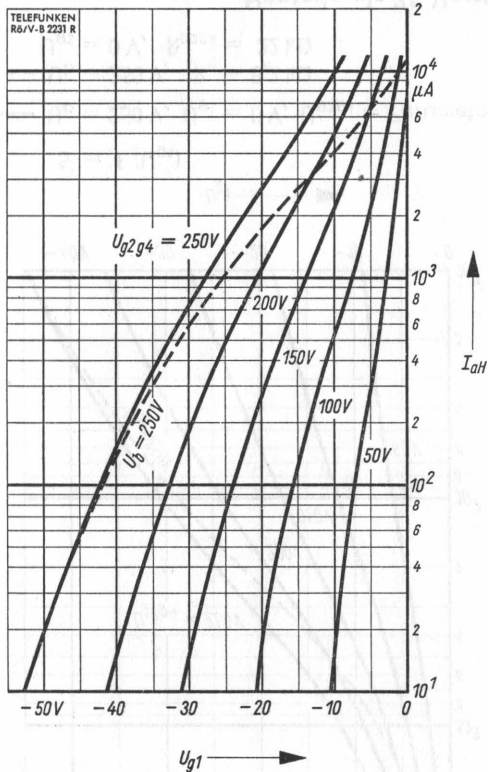


$I_{0H}, I_{g2+g4}, I_{g3+gT}, S_c, R_{ic}, I_{0T} = f(U_{0sreff})$
 $U_{bH} = U_{bT} = 250 \text{ V}$
 $R_{aH} = 8,2 \text{ k}\Omega, R_{aT} = 33 \text{ k}\Omega$
 $R_{g2g4} = 22 \text{ k}\Omega, R_{g3gT} = 47 \text{ k}\Omega$
 $R_{g1} = 1 \text{ M}\Omega$

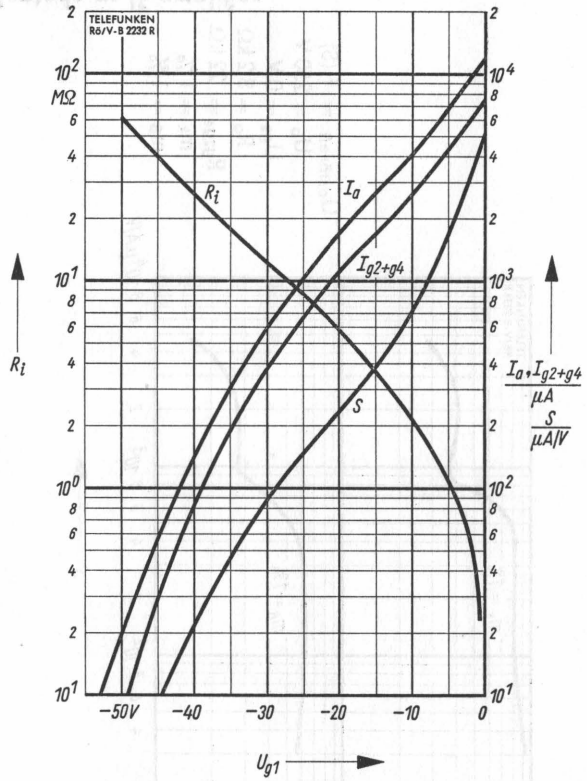


$U_{0stoeff} = f(S_c)$
 $U_{bH} = U_{bT} = 250 \text{ V}$
 $R_{aH} = 8,2 \text{ k}\Omega, R_{aT} = 33 \text{ k}\Omega$
 $R_{g2g4} = 22 \text{ k}\Omega, R_{g3gT} = 47 \text{ k}\Omega$
 $I_{g3+gT} = 200 \text{ }\mu\text{A}$
 $m_k = 1 \%$
 $m_B = 1 \%$

Heptode als Mischröhre · Heptode as mixer

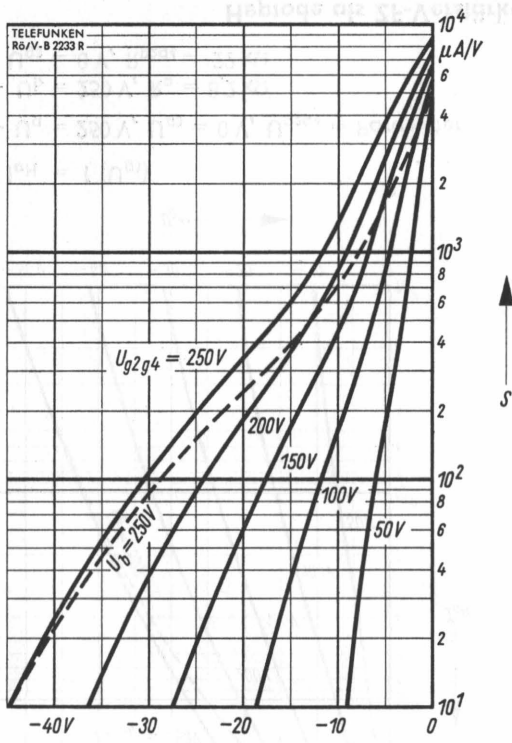


$I_{aH} = f(U_{g1})$
 — $U_a = 250\text{ V}, U_{g3} = 0\text{ V}, U_{g2g4} = \text{Parameter}$
 - - - $U_b = 250\text{ V}, R_a = 8,2\text{ k}\Omega$
 $U_{g3} = 0\text{ V}, R_{g2g4} = 22\text{ k}\Omega$



$I_a, I_{g2+g4}, S, R_i = f(U_{g1})$
 $U_b = 250\text{ V}$
 $U_{g3} = 0\text{ V}$
 $R_a = 8,2\text{ k}\Omega$
 $R_{g2g4} = 22\text{ k}\Omega$

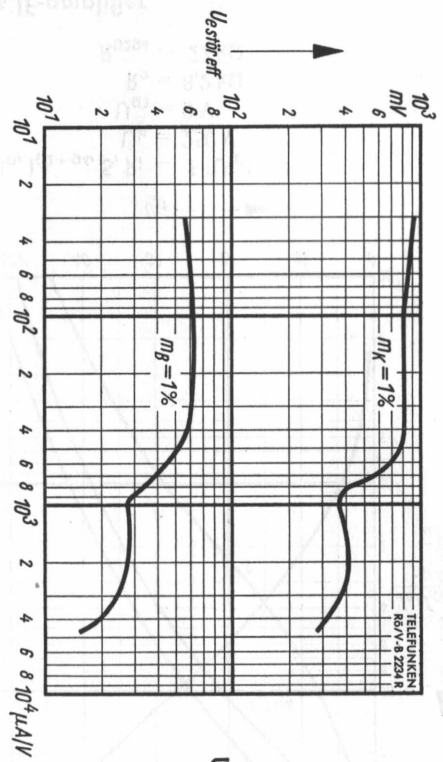
Heptode als ZF-Verstärker · Heptode as IF-amplifier



$S = f(U_{g1})$

— $U_a = 250\text{ V}, U_{g3} = 0\text{ V}, U_{g2g4} = \text{Parameter}$
 - - - $U_b = 250\text{ V}, R_a = 8,2\text{ k}\Omega$
 $U_{g3} = 0\text{ V}, R_{g2g4} = 22\text{ k}\Omega$

Heptode als ZF-Verstärker · Heptode as IF-amplifier



$U_{\text{stör,eff}} = f(S)$
 $U_b = 250\text{ V}$
 $U_{g3} = 0\text{ V}$
 $R_a = 8,2\text{ k}\Omega$
 $R_{g2g4} = 22\text{ k}\Omega$
 $m_k = 1\%$
 $m_B = 1\%$

TELEFUNKEN
R6/V-B 2234 R