

Netzröhre für GW-Heizung
Indirekt geheizt
Parallelspeisung
DC-AC-Heating
Indirectly heated
connected in parallel

TELEFUNKEN

5894
QQE 06/40

Doppel-Tetrode
Twin-tetrode

Doppel-Tetrode mit innerer Neutralisation für HF-Verstärker, Oszillatoren, Frequenzvervielfacher und Modulatoren.

Twin-tetrode with internal neutralization for RF-amplifier, oscillators, frequency multipliers and modulators.

U_f	6,3	12,6	V
I_f	1,8	0,9	A

Oxyd-Kathode · Oxide-coated cathode

Meßwerte · Measuring values

je System bei $I_a = 30 \text{ mA}$

S	4,5	mA/V
$\mu_{g2/g1}$	8,2	

Leistungstabelle · Table of power output

	Telegraphie, C-Betrieb Telegraphy, class C		Anoden-Schirmgitter-Modulation, C-Betrieb Anode-grid 2-modulation, class C		SSB-Verstärker, B-Betrieb SSB, class B	
f	U_a	N	U_a	N	U_a	N_{sp}
30 MHz					750 V	74 W
60 MHz			600 V	71 W		
200 MHz	600 V	90 W				
250 MHz	750 V	85 W	600 V	64 W		
430 MHz	520 V	66 W				
500 MHz	500 V	60 W				

	Frequenz-Vervielfacher, C-Betrieb Frequency multiplier, class C		Modulator, B-Betrieb Modulator, class B	
f	U_a	N	U_a	N
50/150 MHz	500 V	20 W	600 V	86 W
	400 V	18 W	450 V	60 W
75/225 MHz	400 V	12 W	300 V	37 W



HF-Verstärker, Telegraphie C-Betrieb

RF-amplifier, telegraphy class C

System I und II in Gegentakt

System I and II in push-pull

Betriebswerte · Typical operation

	CCS				ICAS	
f	200	250	430	500	250	MHz
U _a	600	750	520	500	750	V
U _{g2}	250	250	250	250	250	V
U _{g1}	-80	-80	-80	—	-80	V
R _{g1}	—	—	—	20	—	kΩ
U _{g1lsp/g1llsp}	200	250	—	—	260	V
I _a	2×100	2×80	2×100	2×100	2×90	mA
I _{g2}	16	17	18	20	14	mA
I _{g1}	2×2,5	2×1,5	2×2,8	2×3	2×1,7	mA
N _a	2×60	2×60	2×52	2×50	2×67,5	W
Q _a	2×15	2×17,5	2×19	2×20	2×19,5	W
Q _{g2}	4	4,25	4,5	5	3,5	W
N	90	85	66	60	96	W
η	75	71	64	60	71	%

Grenzwerte · Maximum ratings

f ≤ 250 MHz

	CCS	ICAS			CCS	ICAS	
U _a	750	750	V	I _{g1}	2×5	2×5	mA
N _a	2×60	2×75	W	R _{g1}	50	50	kΩ
Q _a	2×20	2×22,5	W	U _{f/k}	100	100	V
I _a	2×110	2×120	mA	f = 500 MHz			
U _{g2}	300	300	V	U _a	600	600	V
Q _{g2}	7	8	W	N _a	2×50	2×60	W
U _{g1}	-175	-175	V				



Frequenzverdreifacher, C-Betrieb · Frequency tripler, class C

System I und II in Gegentakt

System I and II in push-pull

Betriebswerte · Typical operation

f	50/150	50/150	75/225	MHz
U_a	500	400	400	V
U_{g2}	250	250	250	V
U_{g1}	-150	-150	-150	V
$U_{g1\text{Isp}/g1\text{IIsp}}$	360	360	360	V
N_e	1,2	1	0,6	W
I_a	2×60	2×73	2×65	mA
I_{g2}	10	16	20	mA
I_{g1}	2×3	2×2,5	2×1,5	mA
N_a	2×30	2×29	2×26	W
Q_a	2×20	2×20	2×20	W
Q_{g2}	2,5	4	5	W
N	20	18	12	W
η	33	31	23	%

Grenzwerte · Maximum ratings

$f \leq 250 \text{ MHz}$

	CCS			CCS	
U_a	750	V	I_{g1}	2×5	mA
N_a	2×60	W	R_{g1}	50	k Ω
Q_a	2×20	W	$U_{f/k}$	100	V
I_a	2×110	mA	$f = 500 \text{ MHz}$		
U_{g2}	300	V	U_a	600	V
Q_{g2}	7	W	N_a	2×50	W
U_{g1}	-175	V			



HF-Einseitenbandverstärker, B-Betrieb

Single sideband amplifier, class B

$$I_{g1} = 0$$

System I und II parallel geschaltet

System I and II connected in parallel

Betriebswerte · Typical operation

Einzelton · Single sound $f = 30 \text{ MHz}$

U_a	750		V
U_{g2}	280		V
$U_{g1}^{1)}$	-30		V
R_L	2,86		k Ω
U_{g1sp}	0	30	V
I_a	40	150	mA
I_{g2}	0	25	mA
N_a	30	112,5	W
Q_a	30	38,5	W
Q_{g2}	0	7	W
$N_{sp}^{2)}$	0	74	W

Grenzwerte · Maximum ratings

$f \leq 250 \text{ MHz}$

U_a	750	V
Q_a	2 × 20	W
I_a	2 × 110	mA
U_{g2}	300	V
Q_{g2}	7	W
U_{g1}	-175	V

1) Für $I_a = 40 \text{ mA}$ einstellen · adjust for $I_a = 40 \text{ mA}$

2) Leistung beim Scheitelwert der Hüllkurve · power at peak value of envelope power



Anoden- und Schirmgittermodulation, C-Betrieb

Anode and grid 2 modulation, class C

System I und II in Gegentakt

System I and II in push-pull

Betriebswerte · Typical operation

	CCS		ICAS		
f	60	250	60	250	MHz
U _a	600	600	600	600	V
U _{g2}	250	250	250	250	V
U _{g1}	-80	-80	-80	-80	V
U _{g1 sp}	105	130	105	130	V
N _a	2×45	2×45	2×50	2×50	W
I _a	2×75	2×75	2×83	2×83	mA
I _{g2}	20	18	16	16	mA
I _{g1}	2×3,8	2×1,6	2×4	2×1,7	mA
Q _a	2×9,5	2×13	2×10,5	2×14,5	W
Q _{g2}	5	4,5	4	4	W
N	71	64	79	71	W
η	79	71	79	71	%
m	100	100	100	100	%
U _{g2 sp}	90	90	90	90	V
N _{mod}	45	45	50	50	W

Grenzwerte · Maximum ratings

	CCS	ICAS	
f ≤ 250 MHz			
U _a	600	600	V
N _a	2×45	2×50	W
Q _a	2×14	2×15	W
I _a	2×92	2×100	mA
U _{g2}	300	300	V
Q _{g2} ¹⁾	7	8	W
Q _{g2} ²⁾	4,6	5,2	W
U _{g1}	-175	-175	V
I _{g1}	2×5	2×5	mA
R _{g1} ³⁾	25	25	kΩ
U _{f/k}	100	100	V
f = 500 MHz			
U _a	480	480	V
N _a	2×33,5	2×40	W

¹⁾ Schirmgitter über Drosselspule moduliert · Screen grid modulated via choke coil

²⁾ Für alle anderen Modulationsarten · For all other types of modulation

³⁾ je Röhre; je System max. 50 kΩ · per tube; per section max. 50 kΩ

NF-Verstärker in B-Betrieb, Modulator

AF-amplifier class B, modulator

System I und II in Gegentakt • System I and II push-pull

Betriebswerte • Typical operation

$$I_{g1} > 0$$

U_a	600		450²⁾		300	V
U_{g2}	250		250		250	V
$U_{g1}^{1)}$	-25		-25		-25	V
R_{aa}	8		6		4	k Ω
$U_{g1sp/g1lsp}$	0	78	0	76	0	75 V
N_e	0	$2 \times 0,1$	0	$2 \times 0,1$	0	$2 \times 0,1$ W
I_a	2×25	2×100	2×25	2×97	2×25	2×94 mA
I_{g2}	1,2	26	1,9	28	2,8	28 mA
I_{g1}	0	$2 \times 2,6$	0	$2 \times 2,6$	0	$2 \times 2,6$ mA
N_a	2×15	2×60	$2 \times 11,2$	$2 \times 43,5$	$2 \times 7,5$	$2 \times 28,2$ W
Q_a	2×15	2×17	$2 \times 11,2$	$2 \times 13,5$	$2 \times 7,5$	$2 \times 9,7$ W
Q_{g2}	0,3	6,5	0,5	7	0,7	7 W
N	0	86	0	60	0	37 W
η	—	71,5	—	69	—	65,5 %
k_{ges}	—	5	—	5	—	5 %

Grenzwerte • Maximum ratings

U_a	600	V
N_a	2×60	W
Q_a	2×20	W
I_a	2×110	mA
I_{g1}	2×5	mA
U_{g2}	300	V
Q_{g2}	7	W
R_{g1}	50	k Ω
$U_{f/k}$	100	V

1) Es wird empfohlen, die Gittervorspannung jedes Systems einzeln einzustellen.
It is recommended to adjust the grid bias of each section separately.

2) Betriebskennlinien für diese Einstellungen stehen auf Anforderung zur Verfügung.
On request characteristic curves for tube operation will be supplied to facilitate adjustments.



NF-Verstärker in B-Betrieb, Modulator

AF-amplifier class B, modulator

System I und II in Gegentakt · System I and II push-pull

Betriebswerte · Typical operation

$$I_{g1} = 0$$

U_a	600		450²⁾		300	V
U_{g2}	250		250		250	V
$U_{g1}^{1)}$	-27,5		-27,5		-26	V
R_{aa}	12,5		10		6,5	kΩ
$U_{g1isp/g1lisp}$	0	55	0	55	0	52 V
I_a	2×20	2×62	2×20	2×58	2×20	2×56 mA
I_{g2}	0,9	23	1,4	27	2,2	28 mA
N_a	2×12	2×37	2×9	2×26	2×6	2×16,8 W
Q_a	2×12	2×12	2×9	2×8,5	2×6	2×5,6 W
Q_{g2}	0,2	5,8	0,4	6,7	0,6	7 W
N	0	50	0	35	0	22,5 W
η	—	67,5	—	67,5	—	67 %
k_{ges}	—	2,4	—	3,1	—	2,9 %

Grenzwerte · Maximum ratings

U_a	600	V
N_a	2×60	W
Q_a	2×20	W
I_a	2×110	mA
U_{g2}	300	V
Q_{g2}	7	W
R_{g1}	50	kΩ
$U_{f/k}$	100	V

¹⁾ Es wird empfohlen, die Gittervorspannung jedes Systems einzeln einzustellen.
 It is recommended to adjust the grid bias of each section separately.

²⁾ Betriebskennlinien für diese Einstellungen stehen auf Anforderung zur Verfügung.
 On request characteristic curves for tube operation will be supplied to facilitate adjustments.

Impulsmodulator · Pulse modulator

System I und II parallel geschaltet · System I and II connected in parallel

Betriebswerte · Typical operation

t_{pulse}	0,1	1	10	1000	μs
f_{pulse}	1000	1250	500	1	Hz
U_a	6	6	5	2,5	kV
U_{g2}	850	800	800	800	V
U_{g1}	-250	-200	-200	-150	V
$U_{g1\text{pulse}}$	400	360	200	160	V
R_a	0,83	0,7	4,9	3,85	k Ω
$I_a\text{ pulse}$	6	5	1	0,6	A
I_a	0,6	6,25	5	0,6	mA

Grenzwerte · Maximum ratings

U_a	7	7	7	kV
U_{g2}	850	850	850	V
U_{g1}	-200	-200	-200	V
Q_a	20	20	20	W
Q_{g2}	3	3	3	W
$I_a\text{ pulse}^1)$	6	5	2,2	A
$I_{g2\text{ pulse}}^1)$	2	2	0,7	A
$I_{g1\text{ pulse}}^1)$	2	2	0,7	A
$t_{\text{pulse}}^1)$	0,1	1	10	μs
$V_T^1)$	0,001	0,001	0,001	

¹⁾ Die Spitzenströme sind absolute Maximalwerte, Impulsdauer t_{pulse} und Tastverhältnis V_T sind Maximalwerte für den betreffenden Spitzenstrom.

The peak currents are absolute maximum ratings, pulse duration t_{pulse} and keying ratio V_T are maximum ratings for the peak current concerned.



Impulsmodulierter HF-Verstärker · Pulse-modulated RF amplifier

System I und II parallel geschaltet · System I and II connected in parallel

Betriebswerte · Typical operation

 Oszillator mit impulsförmiger Speisespannung
 Oscillator with interrupted (pulsed) supply voltage

 Impulsmodulierter HF-Verstärker
 Pulse-modulated RF amplifier

f	420	MHz	f	200	0,2	MHz
t _{pulse}	3000	µs	t _{pulse}	3	1000	µs
f _{pulse}	50	Hz	f _{pulse}	1200	1	Hz
U _{a pulse}	1000	V	U _a	3	3	kV
U _{g2 pulse}	250	V	U _{g2}	500	500	V
R _{g1}	3,3	kΩ	U _{g1}	-330	-330	V
U _{g1 sp}	150	V	U _{g1 sp}	280	150	V
I _{a pulse}	300	mA	U _{g1 pulse}	230	230	V
I _a	60	mA	I _{a pulse}	800	300	mA
I _{g2 pulse}	36	mA	I _a	2,9	0,3	mA
I _{g2}	5	mA	I _{g2 pulse}	350	80	mA
N _{pulse}	165	W	I _{g2}	1,4	0,08	mA
			N _{pulse}	1600	600	W

Grenzwerte · Maximum ratings

U _a	3,5	3,5	3,5	3,5	1,2	kV
U _{g2}	650	650	650	650	300	V
U _{g1}	-400	-400	-400	-400	-200	V
Q _a	20	20	20	30	30	W
Q _{g2}	3	3	3	3	6	W
Q _{g1}	1	1	1	1	2	W
I _{a pulse} ¹⁾	8	3,5	2,5	1,3	1	A
t _{pulse} ¹⁾	1	5	10	100	1000	µs
V _T ¹⁾	0,001	0,001	0,001	0,001	0,001	

¹⁾ Die Spitzenströme sind absolute Maximalwerte, Impulsdauer t_{pulse} und Tastverhältnis V_T sind Maximalwerte für den betreffenden Spitzenstrom.

The peak currents are absolute maximum ratings, pulse duration t_{pulse} and keying ratio V_T are maximum ratings for the peak current concerned.

Kapazitäten · Capacitances

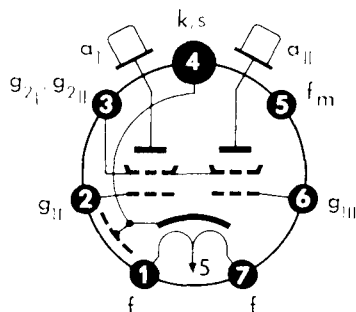
ein System · one system

in Gegentaktschaltung · push-pull circuit

c _e	10,5	pF
c _a	3,2	pF
c _{a/g1}	< 0,08	pF

c _e	6,7	pF
c _a	2,1	pF

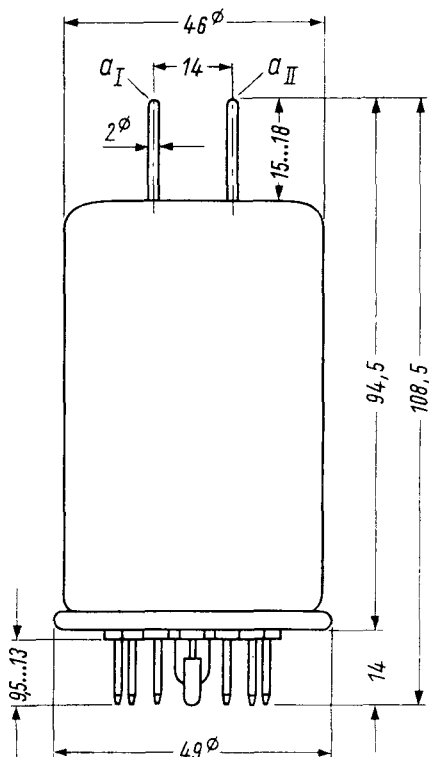
Sockelschaltung
Base connections



Septar

Sockel · Base	(E 7-21)
Fassung	Lager-Nr. 30 239
Socket	stock-no. 30 239
Kühlklemmen	Lager-Nr. 30 566
Cooling clips	stock-no. 30 566

max. Abmessungen
max. dimensions



Gewicht · Weight
max. 155 g

Kühlung durch Strahlung · Cooling by radiation

Temperatur des Kolbens und der Anodenanschlüsse max. 200 °C

Temperature of envelope and anode terminals max. 200 °C

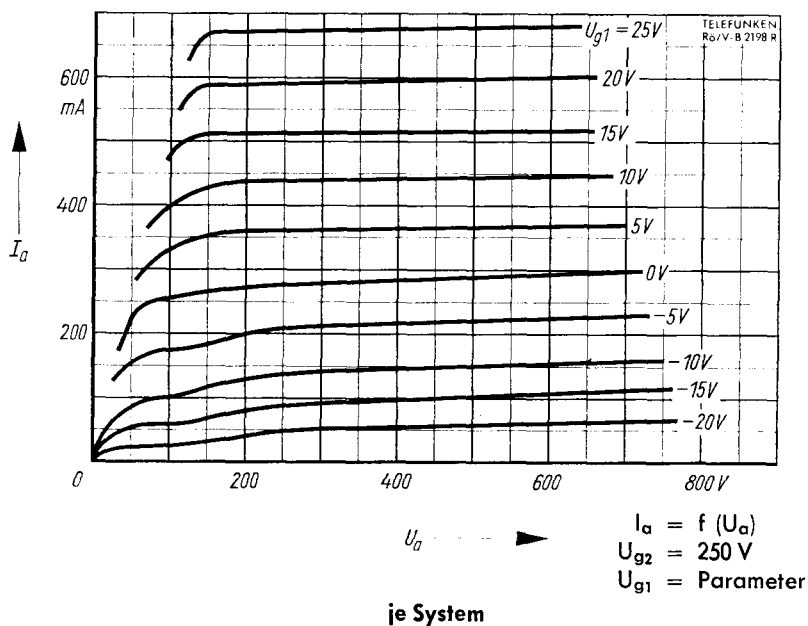
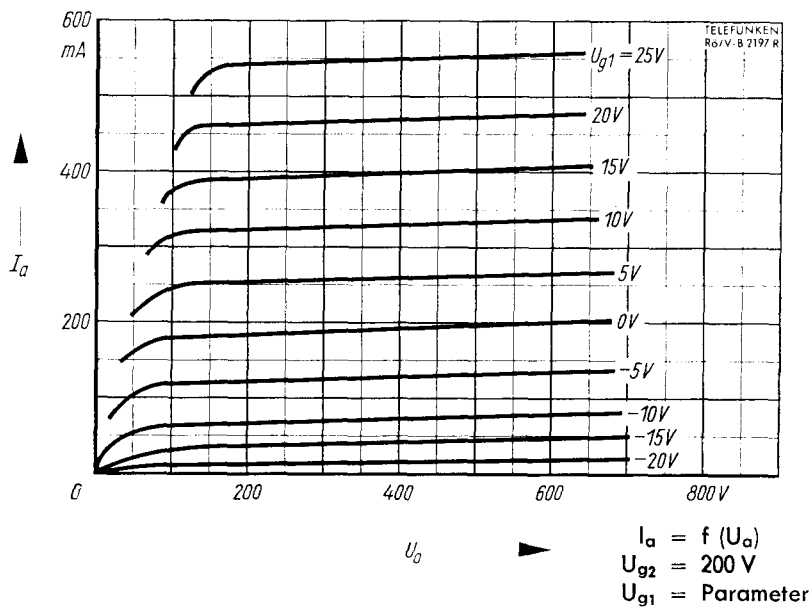
Temperatur der Sockelstifte max. 180 °C · Max. pin temperature 180 °C

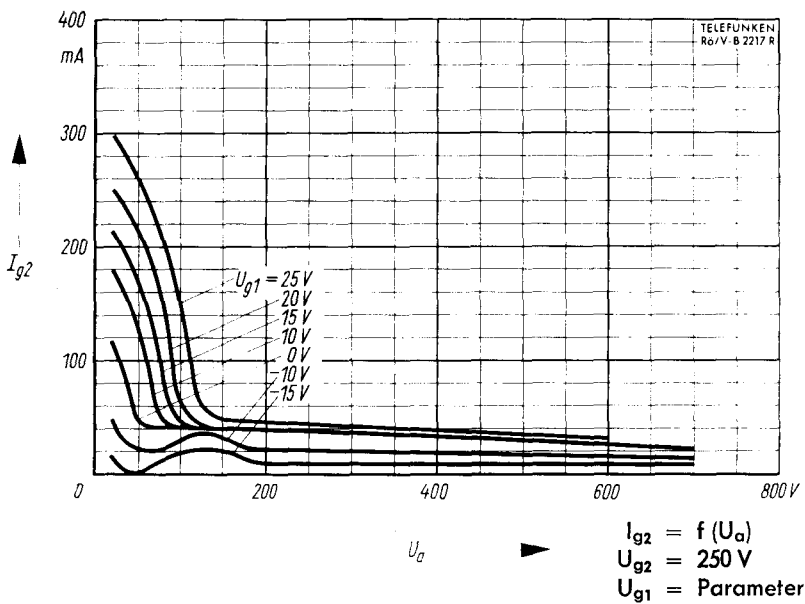
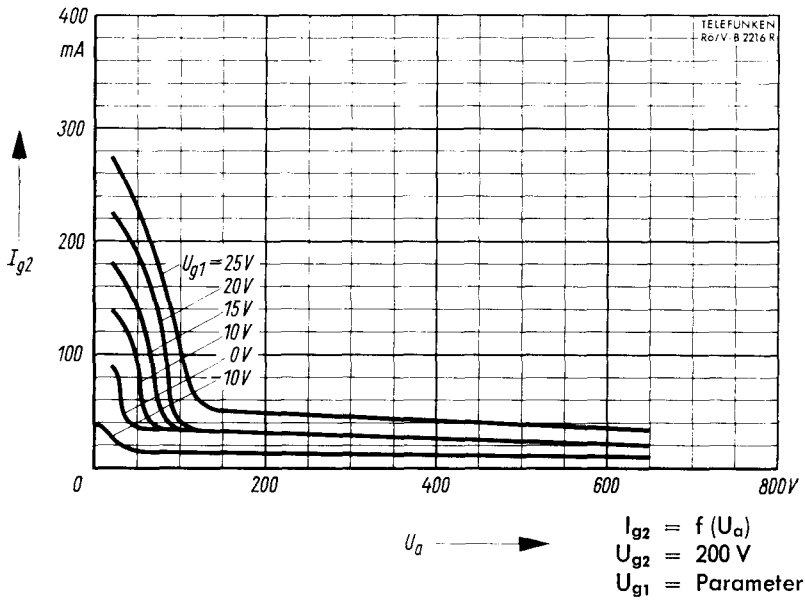
Wenn die Röhre bei einer Frequenz > 150 MHz benutzt wird, kann ein schwacher Luftstrom auf den Kolben und die Anodenanschlüsse erforderlich werden.

If the tube is operated at a frequency in excess of 150 Mc/s, a weak current of air directed at the envelope and anode terminals may be necessary.

Einbau: Senkrecht, Sockel oben oder unten.
Waagrecht, Anodenanschlüsse in einer waagerechten Ebene.

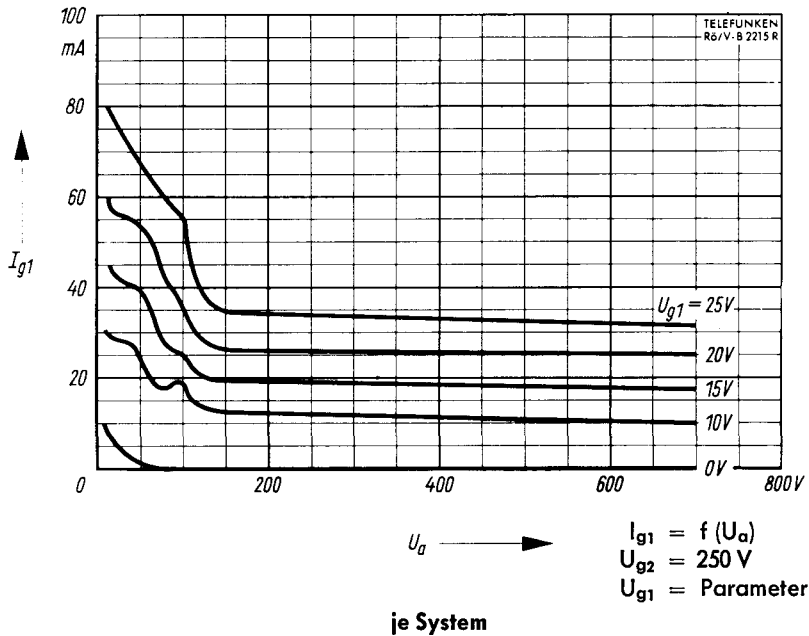
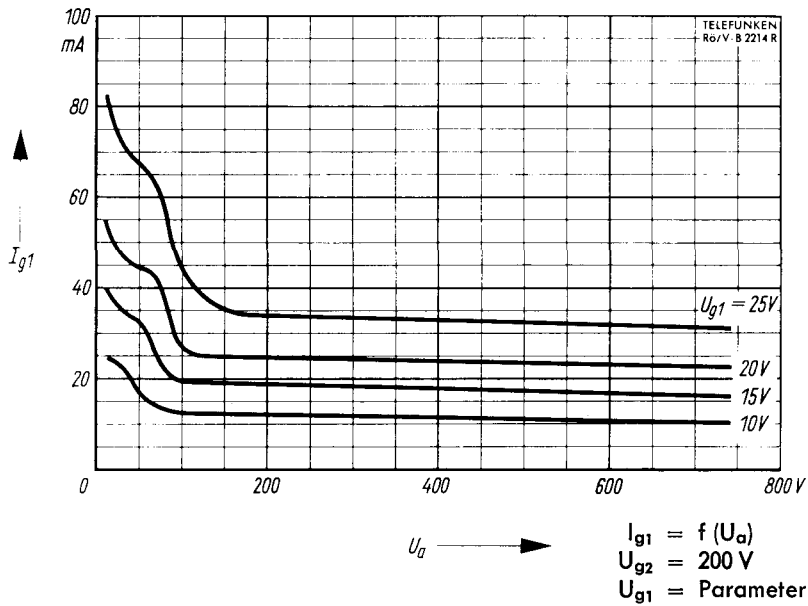
Mounting position: Vertical, base to top or bottom.
Horizontal, anode terminals in a horizontal plane.

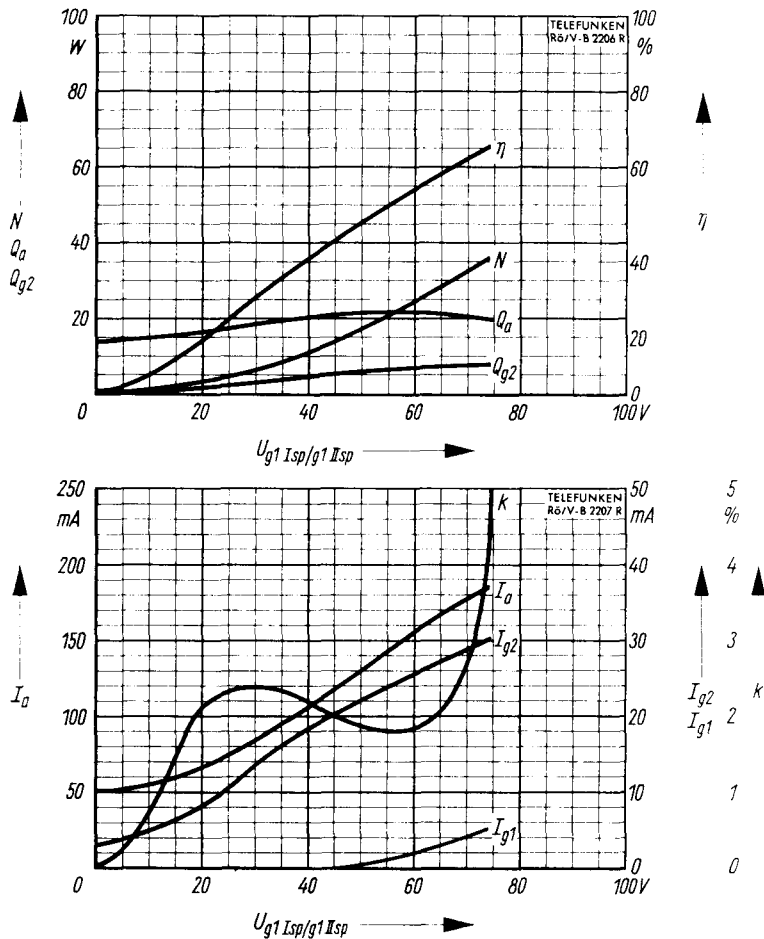




je System







NF-Verstärker in B-Betrieb, Modulator · ÄF amplifier class B, modulator
System I und II in Gegentakt · System I and II in push-pull

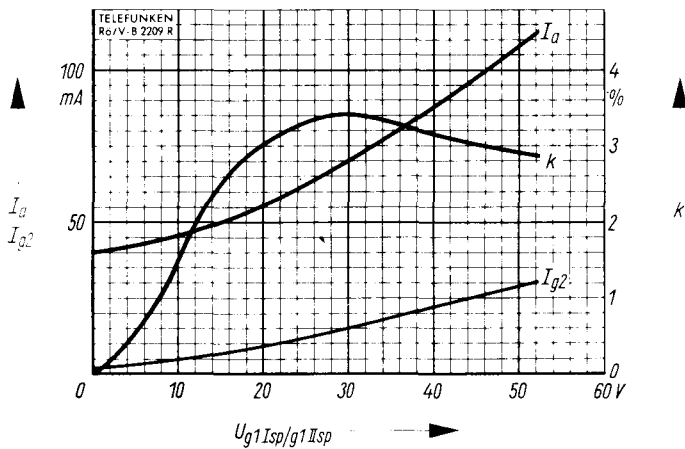
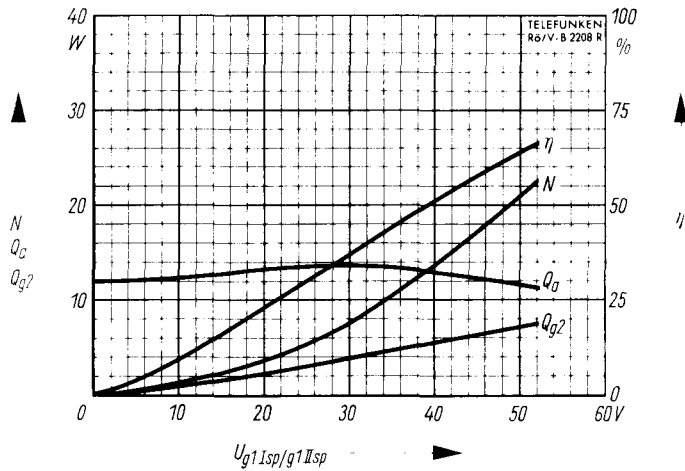
$$N, Q_a, Q_{g2}, I_a, I_{g2}, I_{g1}, k, \eta = f(U_{g1} I_{sp} / g_1 I_{sp})$$

$$U_a = 300 \text{ V}$$

$$U_{g2} = 250 \text{ V}$$

$$U_{g1} = -25 \text{ V}$$

$$R_{aa} = 4 \text{ k}\Omega$$



NF-Verstärker in B-Betrieb, Modulator • AF amplifier class B, modulator
System I und II in Gegentakt • System I and II in push-pull

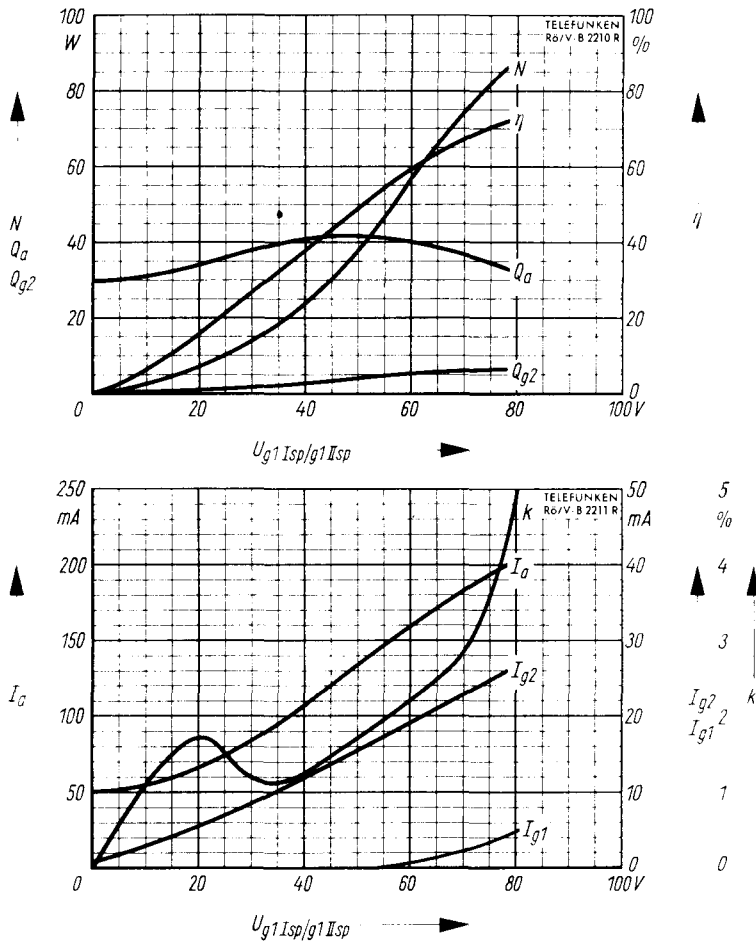
$$N, Q_a, Q_{g2}, I_a, I_{g2}, k, \eta = f(U_{g1Isp}/g1IIsp)$$

$$U_a = 300 \text{ V}$$

$$U_{g2} = 250 \text{ V}$$

$$U_{g1} = -26 \text{ V}$$

$$R_{aa} = 6,5 \text{ k}\Omega$$



NF-Verstärker in B-Betrieb, Modulator · AF amplifier class B, modulator

System I und II in Gegentakt · System I and II in push-pull

$$N, Q_a, Q_{g2}, I_a, I_{g2}, I_{g1}, k, \eta = f(U_{g1} I_{sp}/g_1 I_{sp})$$

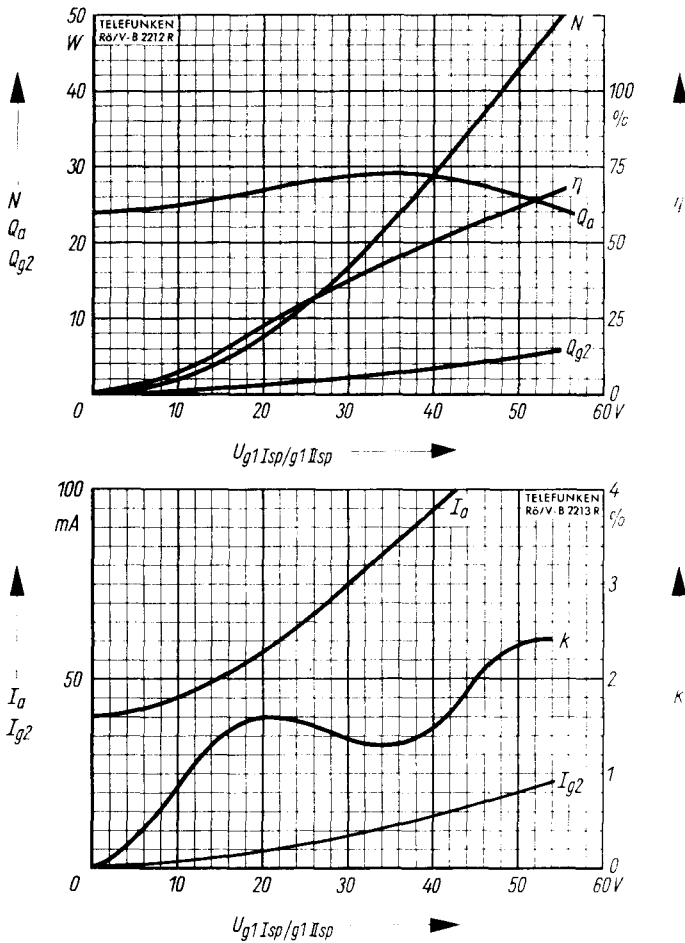
$$U_a = 600 \text{ V}$$

$$U_{g2} = 250 \text{ V}$$

$$U_{g1} = -25 \text{ V}$$

$$R_{aa} = 8 \text{ k}\Omega$$





NF-Verstärker in B-Betrieb, Modulator · AF amplifier class B, modulator
 System I und II in Gegentakt · System I and II in push-pull

$$N, Q_{g1}, Q_{g2}, I_a, I_{g2}, K, \eta = f(U_{g1})$$

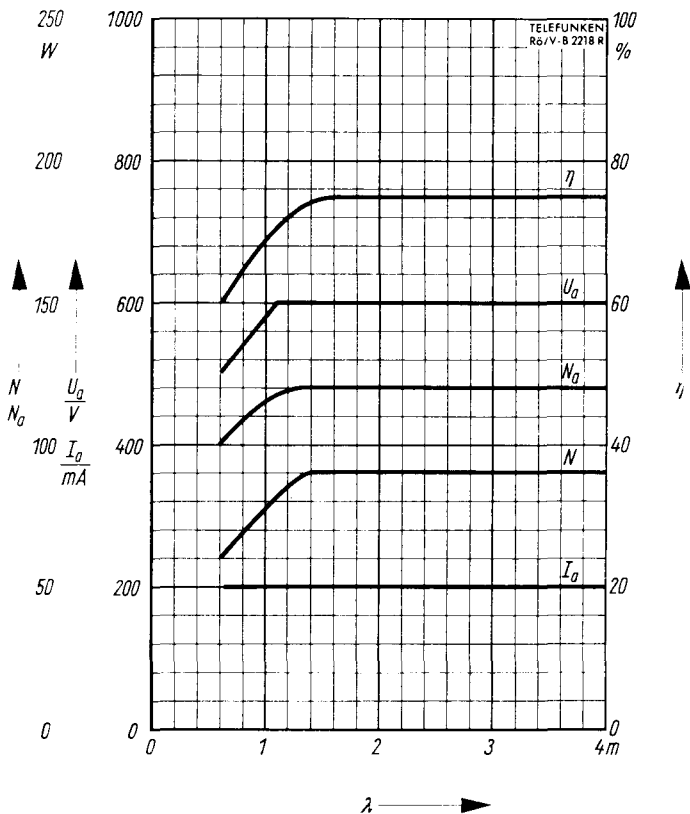
$$U_a = 600 \text{ V}$$

$$U_{g2} = 250 \text{ V}$$

$$U_{g1} = -27,5 \text{ V}$$

$$R_{aa} = 12,5 \text{ k}\Omega$$





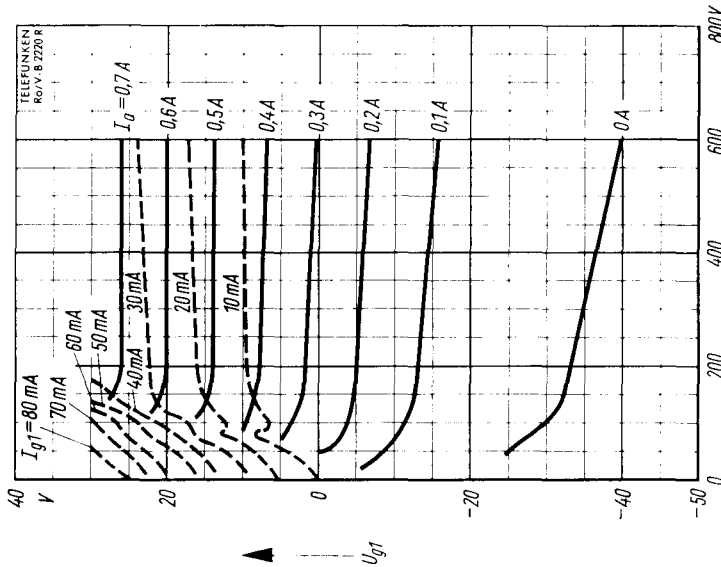
HF-Verstärker, Telegraphie C-Betrieb • RF amplifier, telegraphy class C

System I und II in Gegentakt • System I and II in push-pull

$$N, N_a, U_a, I_a, \eta = f(\lambda)$$

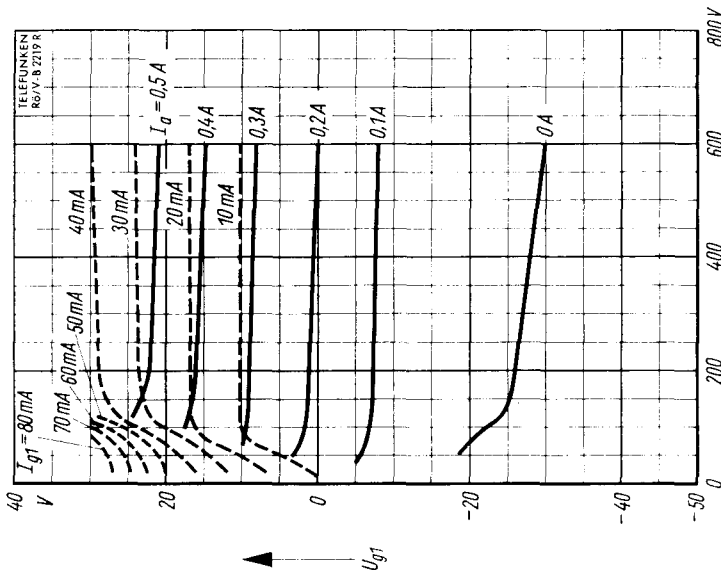
$$U_{g2} = 250 \text{ V}$$





$U_{g1} = f(U_a)$
 $U_{g2} = 250 V$

— I_a - - - I_{g1}
ie System



$U_{g1} = f(U_a)$
 $U_{g2} = 200 V$

