TRIODE-HEPTODE

Triode-heptode. Heptode section intended for use as mixer R.F.- or I.F. amplifier. Triode section intended for use as oscillator in A.M./F.M. receivers.

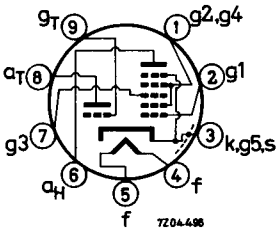
QUICK REFERENCE DATA			
Triode section			
Anode current	I_a	13.5	mA
Transconductance	S	3.7	mA/V
Amplification factor	μ	22	-
Heptode section			
Anode current	I_a	9.8	mA
Transconductance	S	4.3	mA/V
Amplification factor	$\mu_{g_2g_1}$	25	-

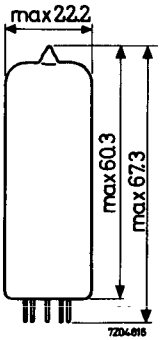
HEATING: Indirect by A.C. or D.C.; series supply

Heater current	I_f	100	mA
Heater voltage	V_f	19	V

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Noval





CAPACITANCES

Triode section

Grid to all except anode	$C_{g(a)}$	2.6	pF
Anode to all except grid	$C_{a(g)}$	2.1	pF
Anode to grid	C_{ag}	1.0	pF
Grid to heater	C_{gf}	max. 0.02	pF

Heptode section

Grid No.1 to all except anode	$C_{g_1(a)}$	4.8	pF
Anode to all except grid No.1	$C_{a(g_1)}$	7.9	pF
Anode to grid No.1	C_{ag_1}	max.0.006	pF
Grid No.1 to heater	C_{g_1f}	max. 0.17	pF
Grid No.3 to all	C_{g_3}	6	pF
Grid No.1 to grid No.3	$C_{g_1g_3}$	max. 0.3	pF
Grid No.3 to heater	C_{g_3f}	max. 0.06	pF

Between heptode and triode sections

Anode heptode to anode triode	$C_{a_Ha_T}$	0.20	pF
Anode heptode to grid triode	$C_{a_Hg_T}$	max. 0.09	pF
Grid No.1 heptode to anode triode	$C_{g_1Ha_T}$	max. 0.06	pF
Grid No.1 heptode to grid triode	$C_{g_1Hg_T}$	max. 0.17	pF
Grid No.1 heptode to grid triode + grid No.3	C_{g_1H/g_Tg_3}	max. 0.45	pF
Anode heptode to grid triode + grid No.3	C_{a_H/g_Tg_3}	max. 0.35	pF

TYPICAL CHARACTERISTICS

Triode section

Anode voltage	V_a	100	V
Grid voltage	V_g	0	V
Anode current	I_a	13.5	mA
Transconductance	S	3.7	mA/V
Amplification factor	μ	22	-

Heptode section

Anode voltage	V_a	160	V
Grid No.3 voltage	V_{g_3}	0	V
Grids No.2 and 4 voltage	$V_{g_{2+4}}$	90	V
Grid No.1 current	I_{g_1}	0.5	μA
Grid No.1 voltage	V_{g_1}	-0.5	V
Anode current	I_a	9.8	mA
Grids No.2 and 4 current	$I_{g_{2+4}}$	6.1	mA
Transconductance	S	4.3	mA/V
Amplification factor	$\mu_{g_2g_1}$	25	-

OPERATING CHARACTERISTICS

Heptode section as mixer

Supply voltage	V_b	100		170		200		V
Anode resistor	R_a	0		0		0		Ω
Grids No.2 and 4 resistor	$R_{g_{2+4}}$	10		10		10		kΩ
Grid triode + grid No.3 resistor	$R_{g_T+g_3}$	47		47		47		kΩ
Grid triode + grid No.3 current	$I_{g_T+g_3}$	115		200		230		μA
Grid No.1 current	I_{g_1}	0.5	–	0.5	–	0.5	–	μA 1)
Grid No.1 voltage	V_{g_1}	−0.5	−12	−0.5	−19	−0.5	−22	V
Anode voltage	V_a	100	–	170	–	200	–	V
Grids No.2 and 4 voltage	$V_{g_{2+4}}$	56	–	88	–	100	–	V
Anode current	I_a	2.0	–	3.3	–	4.1	–	mA
Grids No.2 and 4 current	$I_{g_{2+4}}$	4.4	–	8.2	–	10	–	mA
Conversion conductance	S_c	850	8.5	1100	11	1200	12	μA/V
Internal resistance	R_i	0.75	min.3	0.8	min.3	0.85	min.3	MΩ
Equivalent noise resistance	R_{eq}	33	–	30	–	32	–	kΩ

1) Grid current bias obtained with R_{g_1} = 1 MΩ and with zero volts a.g.c. voltage; resulting grid No.1 voltage: −0.5 V.

OPERATING CHARACTERISTICS (continued)

Heptode section as R.F. or I.F. amplifier

Supply voltage	V_b	100		170		200		V
Anode resistor	R_a	0		0		3.9		kΩ
Grids No.2 and 4 resistor	$R_{g_{2+4}}$	18		18		18		kΩ
Grid No.3 voltage	V_{g_3}	0		0		0		V
Grid No.1 current	I_{g_1}	0.5	–	0.5	–	0.5	–	μA [1]
Grid No.1 voltage	V_{g_1}	−0.5	−15.7	−0.5	−26	−0.5	−30	V
Anode voltage	V_a	100	–	170	–	162	–	V
Grids No.2 and 4 voltage	$V_{g_{2+4}}$	52	–	80	–	90	–	V
Anode current	I_a	4.1	–	8.0	–	9.8	–	mA
Grids No.2 and 4 current	$I_{g_{2+4}}$	2.7	–	5.0	–	6.1	–	mA
Transconductance	S	2900	29	3900	39	4300	43	μA/V
Internal resistance	R_i	0.45	min.10	0.4	min.10	0.35	min.10	MΩ
Amplification factor	$\mu_{g_2g_1}$	24	–	25	–	25	–	-
Equivalent noise resistance	R_{eq}	4.0	–	4.0	–	4.3	–	kΩ

Triode section as oscillator

Supply voltage	V_b	100	170	200	V
Anode resistor	R_a	15	15	15	kΩ
Grid triode + grid No.3 resistor	$R_{g_T+g_3}$	47	47	47	kΩ
Grid triode + grid No.3 current	$I_{g_T+g_3}$	115	200	230	μA
Anode current	I_a	2.5	4.5	5.4	mA
Effective transconductance	S_{eff}	0.58	0.65	0.65	mA/V

[1]) Grid current bias obtained with R_{g_1} = 1 MΩ and with zero volts a.g.c. voltage; resulting grid No.1 vol age: −0.5 V.

LIMITING VALUES (Design centre rating system)

Heptode section

Anode voltage	V_{a_o}	max. 550	V
	V_a	max. 250	V
Anode dissipation	W_a	max. 1.8	W
Grids No.2 and 4 voltage	$V_{g_{2+4_o}}$	max. 550	V
	$V_{g_{2+4}}$	max. 125	V
Grids No.2 and 4 voltage (I_a max. 1 mA)	$V_{g_{2+4}}$	max. 250	V
Grids No.2 and 4 dissipation	$W_{g_{2+4}}$	max. 1	W
Cathode current	I_k	max. 18	mA
Grid No.1 resistor	R_{g_1}	max. 3	MΩ
Grid No.3 resistor	R_{g_3}	max. 20	kΩ
Grid No.3 resistor grid No.3 directly connected to grid triode	R_{g_3}	max. 3	MΩ
Cathode to heater voltage	V_{kf}	max. 100	V

Triode section

Anode voltage	V_{a_o}	max. 550	V
	V_a	max. 250	V
Anode dissipation	W_a	max. 0.8	W
Cathode current	I_k	max. 6.5	mA
Grid resistor	R_g	max. 3	MΩ
Cathode to heater voltage	V_{kf}	max. 100	V

PHILIPS

Data handbook

Electronic components and materials

UCH81

page	sheet	date
1	1	1969.01
2	2	1969.01
3	3	1969.01
4	4	1969.01
5	5	1969.01
6	6	1969.01
7	FP	1999.07.29