

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 -

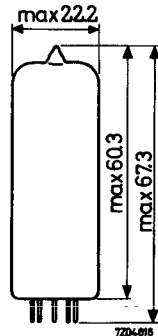
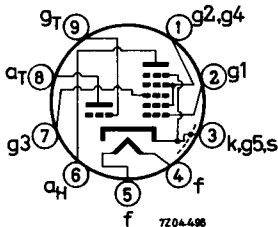
HEATING: Indirect by A.C. or D.C.; series supply

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_{aH^aT}	0.20 pF
Anode heptode to grid triode	C_{aHgT}	max. 0.09 pF
Grid No.1 heptode to anode triode	$C_{g_1H^aT}$	max. 0.06 pF
Grid No.1 heptode to grid triode	C_{g_1HgT}	max. 0.17 pF
Grid No.1 heptode to grid triode + grid No.3	C_{g_1H/gTg_3}	max. 0.45 pF
Anode heptode to grid triode + grid No.3	C_{aH/gTg_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 μ A
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	$k\Omega$
Grid triode + grid No.3 resistor	$R_{g_{T+g_3}}$	47	47	47	$k\Omega$
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	$\mu A/V$
Internal resistance	R_i	0.75 min.3	0.8 min.3	0.85 min.3	$M\Omega$
Equivalent noise resistance	R_{eq}	33 -	30 -	32 -	$k\Omega$

¹⁾ Grid current bias obtained with $R_{g_1} = 1 M\Omega$ 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	k Ω			
Grids No.2 and 4 resistor	$R_{g_{2+4}}$	18	18	18	k Ω			
Grid No.3 voltage	V_{g_3}	0	0	0	V			
Grid No.1 current	I_{g_1}	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	$\mu A/V$
Internal resistance	R_i	0.45	min.10	0.4	min.10	0.35	min.10	M Ω
Amplification factor	$\mu_{g_2g_1}$	24	-	25	-	25	-	-
Equivalent noise resistance	R_{eq}	4.0	-	4.0	-	4.3	-	k Ω

Triode section as oscillator

Supply voltage	V_b	100	170	200	V
Anode resistor	R_a	15	15	15	k Ω
Grid triode + grid No.3 resistor	$R_{g_T+g_3}$	47	47	47	k Ω
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 $R_{g_1} = 1 \text{ M}\Omega$ and with zero volts a.g.c. voltage; resulting grid No.1 voltage: -0.5 V .

LIMITING VALUES (Design centre rating system)Heptode section

Anode voltage	V_{a_0}	max. 550 V
	V_a	max. 250 V
Anode dissipation	W_a	max. 1.8 W
Grids No.2 and 4 voltage	$V_{g_{2+4_0}}$	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 M Ω
Grid No.3 resistor	R_{g_3}	max. 20 k Ω
Grid No.3 resistor grid No.3 directly connected to grid triode	R_{g_3}	max. 3 M Ω
Cathode to heater voltage	V_{kf}	max. 100 V

Triode section

Anode voltage	V_{a_0}	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 M Ω
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