

## 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

<u>Triode section</u>		
Anode current	$I_a$	13.5 mA
Transconductance	$S$	3.7 mA/V
Amplification factor	$\mu$	22 -
<u>Heptode section</u>		
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

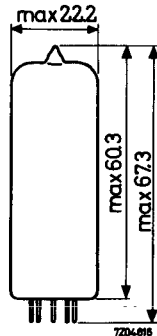
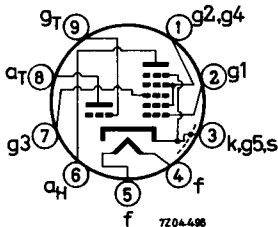
Heater voltage

$V_f$  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	$\mu$	22 -

Heptode section

Anode voltage	$V_a$	160 V
Grid No.3 voltage	$V_{g3}$	0 V
Grids No.2 and 4 voltage	$V_{g2+4}$	90 V
Grid No.1 current	$I_{g1}$	0.5 $\mu$ A
Grid No.1 voltage	$V_{g1}$	-0.5 V
Anode current	$I_a$	9.8 mA
Grids No.2 and 4 current	$I_{g2+4}$	6.1 mA
Transconductance	S	4.3 mA/V
Amplification factor	$\mu_{g2g1}$	25 -

## OPERATING CHARACTERISTICS

## Heptode section as mixer

Supply voltage	$V_b$	100	170	200	V			
Anode resistor	$R_a$	0	0	0	$\Omega$			
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	$\mu A$			
Grid No.1 current	$I_{g_1}$	0.5	-	0.5	-	$\mu A$ <sup>1)</sup>		
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	-	$k\Omega$

<sup>1)</sup> 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 $\Omega$			
Grids No.2 and 4 resistor	$R_{g_{2+4}}$	18	18	18	k $\Omega$			
Grid No.3 voltage	$V_{g_3}$	0	0	0	V			
Grid No.1 current	$I_{g_1}$	0.5	-	0.5	-	$\mu A$ <sup>1)</sup>		
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 $\Omega$
Amplification factor	$\mu_{g_2g_1}$	24	-	25	-	25	-	-
Equivalent noise resistance	$R_{eq}$	4.0	-	4.0	-	4.3	-	k $\Omega$

Triode section as oscillator

Supply voltage	$V_b$	100	170	200	V
Anode resistor	$R_a$	15	15	15	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	$\mu A$
Anode current	$I_a$	2.5	4.5	5.4	mA
Effective transconductance	$S_{eff}$	0.58	0.65	0.65	mA/V

<sup>1)</sup> 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.

**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 $\Omega$
Grid No.3 resistor	$R_{g_3}$	max. 20 k $\Omega$
Grid No.3 resistor grid No.3 directly connected to grid triode	$R_{g_3}$	max. 3 M $\Omega$
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 $\Omega$
Cathode to heater voltage	$V_{kf}$	max. 100 V

# PHILIPS

Data handbook



Electronic  
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## UCH81

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