

TRIODE-OUTPUT PENTODE

The triode section is intended for use as A.F. amplifier.

The pentode section is intended for use as A.F. power amplifier.

QUICK REFERENCE DATA

Triode section

Anode current	I_a	3.5	mA
Transconductance	S	2.2	mA/V
Amplification factor	μ	70	-

Pentode section

Anode current	I_a	41	mA
Transconductance	S	7.5	mA/V
Amplification factor	μ_{g2g1}	9.5	-
Output power	W_o	3.3	W

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

Heater current

I_f 100 mA

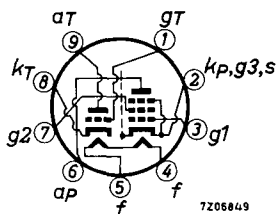
Heater voltage

V_f 50 V

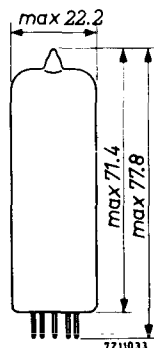
DIMENSIONS AND CONNECTIONS

Base: Noval

Dimensions in mm



7205849



CAPACITANCESTriode section

Anode to all except grid	$C_{a(g)}$	4.3	pF
Grid to all except anode	$C_{g(a)}$	2.7	pF
Anode to grid	C_{ag}	4.4	pF
Grid to heater	C_{gf}	max. 0.02	pF

Pentode section

Anode to all except grid No. 1	$C_{a(g_1)}$	8.0	pF
Grid No. 1 to all except anode	$C_{g_1(a)}$	9.3	pF
Anode to grid No. 1	C_{ag_1}	max. 0.3	pF
Grid No. 1 to heater	C_{g_1f}	max. 0.3	pF

Between triode and pentode sections

Anode triode to grid No. 1 pentode	$C_{aTg_{1P}}$	max. 0.02	pF
Grid triode to anode pentode	C_{gTap}	max. 0.02	pF
Grid triode to grid No. 1 pentode	$C_{gTg_{1P}}$	max. 0.025	pF
Anode triode to anode pentode	C_{aTap}	max. 0.25	pF

TYPICAL CHARACTERISTICSTriode section

Anode voltage	V_a	100	V
Grid voltage	V_g	0	V
Anode current	I_a	3.5	mA
Transconductance	S	2.2	mA/V
Amplification factor	μ	70	-

Pentode section

Anode voltage	V_a	170	V
Grid No. 2 voltage	V_{g_2}	170	V
Grid No. 1 voltage	V_{g_1}	-11.5	V
Anode current	I_a	41	mA
Grid No. 2 current	I_{g_2}	9	mA
Transconductance	S	7.5	mA/V
Amplification factor	$\mu_{g_2g_1}$	9.5	-
Internal resistance	R_i	16	k Ω

OPERATING CHARACTERISTICS

Triode section as A.F. amplifier

A) Signal source resistance	R_S	0.22	$M\Omega$
Grid resistor	R_g	3	$M\Omega$
Grid resistor of next stage	R_g'	0.68	$M\Omega$
Supply voltage	V_b	170	100 V
Cathode resistor	R_k	2.7	2.7 $k\Omega$
Anode resistor	R_a	220	220 $k\Omega$
Anode current	I_a	0.43	0.23 mA
Voltage gain	V_o/V_i ¹⁾	51	47 -
Max. output voltage	$V_{o\max}$	25	15 V_{RMS}
Distortion	d_{tot} ²⁾	2.3	4.0 %
B) Signal source resistance	R_S	0.22	$M\Omega$
Grid resistor	R_g	22	$M\Omega$
Grid resistor of next stage	R_g	0.68	$M\Omega$
Supply voltage	V_b	170	170 100 100 V
Cathode resistor	R_k	0	0 0 0 Ω
Anode resistor	R_a	100	220 100 220 $k\Omega$
Anode current	I_a	0.86	0.50 0.37 0.22 mA
Voltage gain	V_o/V_i ¹⁾	49	53 42 46 -
Max. output voltage	$V_{o\max}$	19	20 8 9 V_{RMS}
Distortion	d_{tot}	1.4 ³⁾	1.4 ³⁾ 1.3 ²⁾ 1.5 ²⁾ %

Microphony and hum

The triode section can be used without special precautions against microphony and hum in circuits in which an input voltage of minimum 10 mV_{RMS} is required for an output of 50 mW of the output stage, Z_g ($f = 50\text{ Hz}$) = $0.25\text{ M}\Omega$ and without A.C. voltage between pin 4 and cathode.

¹⁾ Measured at small input voltage.

²⁾ At lower output voltages the distortion is proportionally lower.

³⁾ At lower output voltages down to 5 V_{RMS} the distortion is approximately constant. At values below 5 V_{RMS} the distortion is approximately proportional to V_o .

OPERATING CHARACTERISTICS

Pentode sectionClass A (Measured with V_k constant)

Supply voltage	$V_{ba} = V_{bg_2}$	100	170	V
Cathode resistor	R_k	170	200	Ω
Load resistance	$R_{a \sim}$	3.0	3.25	$k\Omega$
Grid No.1 driving voltage	V_i	0 0.7 3.75	0 0.61 5.9	V_{RMS}
Anode current	I_a	26 - 27	42 - 44	mA
Grid No.2 current	I_{g_2}	5.8 - 8.6	9.2 - 15.5	mA
Output power	W_o	0 0.05 1.0	0 0.05 3.2	W
Distortion	d_{tot}	- - 10	- - 10	%

Supply voltage	$V_{ba} = V_{bg_2}$	200	V
Grid No.2 series resistor (non-decoupled)	R_{g_2}	470	Ω
Cathode resistor	R_k	330	Ω
Load resistance	$R_{a \sim}$	4.5	$k\Omega$
Grid No.1 driving voltage	V_i	0 0.66 6.7	V_{RMS}
Anode current	I_a	35 - 37	mA
Grid No.2 current	I_{g_2}	7.8 - 13.3	mA
Output power	W_o	0 0.05 3.3	W
Distortion	d_{tot}	- - 10	%

LIMITING VALUES (Design centre rating system)Triode section

Anode voltage	V_{a0}	max.	550	V
	V_a	max.	250	V
Anode dissipation	W_a	max.	1	W
Cathode current	I_k	max.	15	mA
Grid resistor				
for fixed bias	R_g	max.	1	$M\Omega$
for automatic bias	R_g	max.	3	$M\Omega$
Grid impedance at 50 Hz	Z_g	max.	0.5	$M\Omega$
Cathode to heater voltage	V_{kf}	max.	200	V

Pentode section

Anode voltage	V_{a0}	max.	550	V
	V_a	max.	250	V
Grid No.2 voltage	V_{g20}	max.	550	V
	V_{g2}	max.	250	V
Anode dissipation	W_a	max.	7	W
Grid No.2 dissipation				
average	W_{g2}	max.	2	W
peak	W_{g2p}	max.	3.2	W
Cathode current	I_k	max.	50	mA
Grid No.1 resistor				
for fixed bias	R_{g1}	max.	1	$M\Omega$
for automatic bias	R_{g1}	max.	2	$M\Omega$
Cathode to heater voltage	V_{kf}	max.	200	V

PHILIPS

Data handbook



**Electronic
components
and materials**

UCL82

page	sheet	date
1	1	1969.12
2	2	1969.01
3	3	1969.12
4	4	1969.01
5	5	1969.01
6	FP	1999.07.29