

## A.F. DOUBLE TRIODE

Double triode intended for use as A.F. amplifier.

QUICK REFERENCE DATA (each unit)		
Anode current	$I_a$	10.5 mA
Transconductance	$S$	2.2 mA/V
Amplification factor	$\mu$	17 -

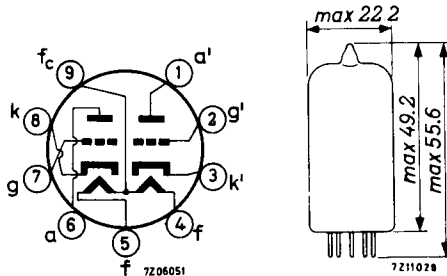
**HEATING:** Indirect by A.C. or D.C.; series or parallel supply

Heater voltage	$V_f$	6.3	12.6	V
Heater current	$I_f$	300	150	mA
		pins 9-(4+5)		pins 4-5

### DIMENSIONS AND CONNECTIONS

Dimensions in mm

Base: Noval



### REMARK

With  $V_f$  applied to pins 4+5 and 9 and the centre tap of the heater transformer connected to earth, the more favourable triode section of the tube with regard to hum is the section connected to pins 6, 7 and 8.

## CAPACITANCES

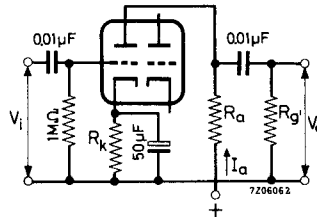
Grid to all except anode	$C_{g(a)}$		1.8	pF
	$C_{g'(a')}$		1.8	pF
Anode to all except grid	$C_{a(g)}$		0.37	pF
	$C_{a'(g')}$		0.25	pF
Anode to grid	$C_{ag}$		1.5	pF
	$C_{a'g'}$		1.5	pF
Grid to heater	$C_{gf}$	max.	0.135	pF
	$C_{g'f}$	max.	0.135	pF
Anode to anode	$C_{aa'}$	max.	1.1	pF
Anode to grid other unit	$C_{ag'}$	max.	0.11	pF
Grid to anode other unit	$C_{ga'}$	max.	0.06	pF
Grid to grid	$C_{gg'}$	max.	0.010	pF

## TYPICAL CHARACTERISTICS

Anode voltage	$V_a$	100	250	V
Grid voltage	$V_g$	0	-8.5	V
Anode current	$I_a$	11.8	10.5	mA
Transconductance	$S$	3.1	2.2	mA/V
Amplification factor	$\mu$	19.5	17	-
Internal resistance	$R_i$	6.25	7.7	k $\Omega$

**OPERATING CHARACTERISTICS**

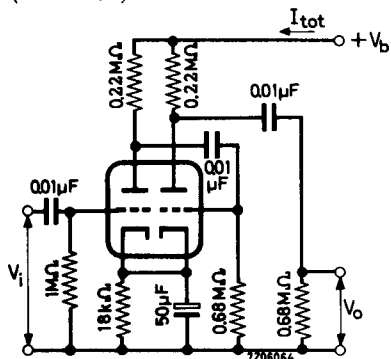
As A.F. amplifier, one unit



Supply voltage	$V_b$	100	150	200	250	300	350	400	V
Anode resistor	$R_a$	47	47	47	47	47	47	47	k $\Omega$
Grid resistor next stage	$R_{g'}$	150	150	150	150	150	150	150	k $\Omega$
Cathode resistor	$R_k$	1.2	1.2	1.2	1.2	1.2	1.2	1.2	k $\Omega$
Anode current	$I_a$	1.20	1.82	2.41	3.02	3.65	4.30	5.00	mA
Voltage gain	$V_o/V_i$	13.5	13.5	13.5	13.5	13.5	13.5	13.5	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	11	18	26	34	43	51	59	$V_{RMS}$
Total distortion	$d_{tot}$	5.6	6.1	6.3	6.4	6.5	6.6	6.7	%
Supply voltage	$V_b$	100	150	200	250	300	350	400	V
Anode resistor	$R_a$	100	100	100	100	100	100	100	k $\Omega$
Grid resistor next stage	$R_{g'}$	330	330	330	330	330	330	330	k $\Omega$
Cathode resistor	$R_k$	2.2	2.2	2.2	2.2	2.2	2.2	2.2	k $\Omega$
Anode current	$I_a$	0.66	0.98	1.30	1.63	1.97	2.30	2.62	mA
Voltage gain	$V_o/V_i$	14	14	14	14	14	14	14	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	10	17	25	32	41	49	57	$V_{RMS}$
Total distortion	$d_{tot}$	4.8	5.6	5.8	5.9	6.0	6.1	6.2	%
Supply voltage	$V_b$	100	150	200	250	300	350	400	V
Anode resistor	$R_a$	220	220	220	220	220	220	220	k $\Omega$
Grid resistor next stage	$R_{g'}$	680	680	680	680	680	680	680	k $\Omega$
Cathode resistor	$R_k$	3.9	3.9	3.9	3.9	3.9	3.9	3.9	k $\Omega$
Anode current	$I_a$	0.33	0.50	0.66	0.82	0.98	1.16	1.31	mA
Voltage gain	$V_o/V_i$	14.5	14.5	14.5	14.5	14.5	14.5	14.5	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	8	15	22	28	36	43	50	$V_{RMS}$
Total distortion	$d_{tot}$	4.0	4.4	4.7	4.8	4.9	5.0	5.1	%

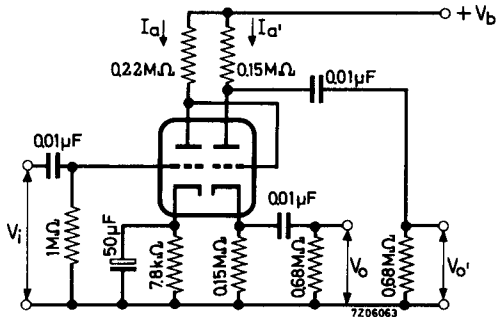
OPERATING CHARACTERISTICS (continued)

Two sections in cascade



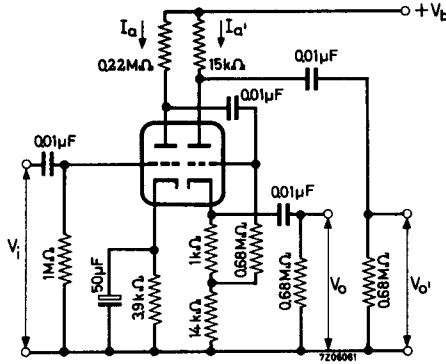
Supply voltage	$V_b$	250	350	V
Total current	$I_{tot}$	1.66	2.33	mA
Voltage gain	$V_o/V_i$	178	178	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	15	25	VRMS
Total distortion	$d_{tot}$	2	2	%

As phase inverter



Supply voltage	$V_b$	250	350	V
Anode current	$I_a$	0.70	1.00	mA
Anode current	$I_{a'}$	0.68	0.93	mA
Voltage gain	$V_o/V_i$	11	11	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	15	24	VRMS
Total distortion	$d_{tot}$	1	1	%

OPERATING CHARACTERISTICS (continued)



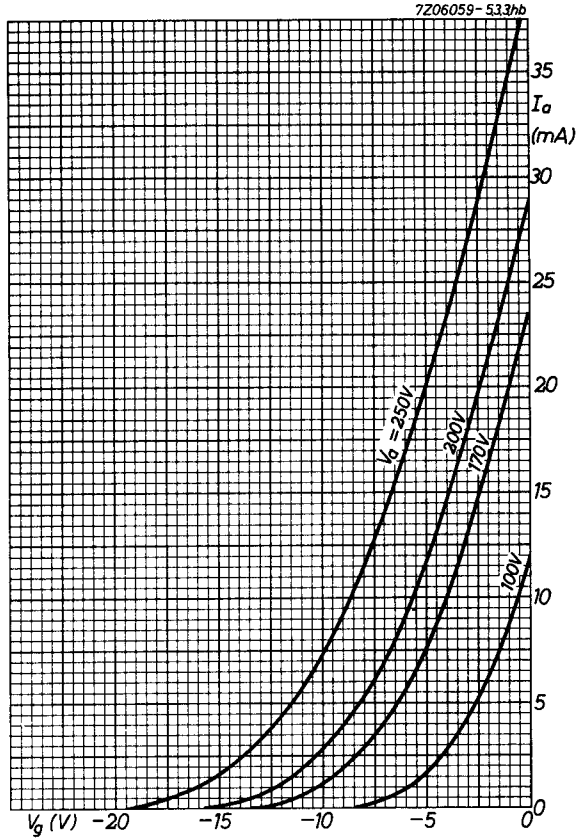
Supply voltage	$V_b$	250	350	V
Anode current	$I_a$	0.82	1.16	mA
Anode current	$I_{a'}$	4.5	6.3	mA
Voltage gain	$V_o/V_i$	11	11	-
Output voltage ( $I_g = 0.3 \mu A$ )	$V_o$	13	20	$V_{RMS}$
Total distortion	$d_{tot}$	1.5	1.5	%

**LIMITING VALUES** (Design centre rating system) (each unit)

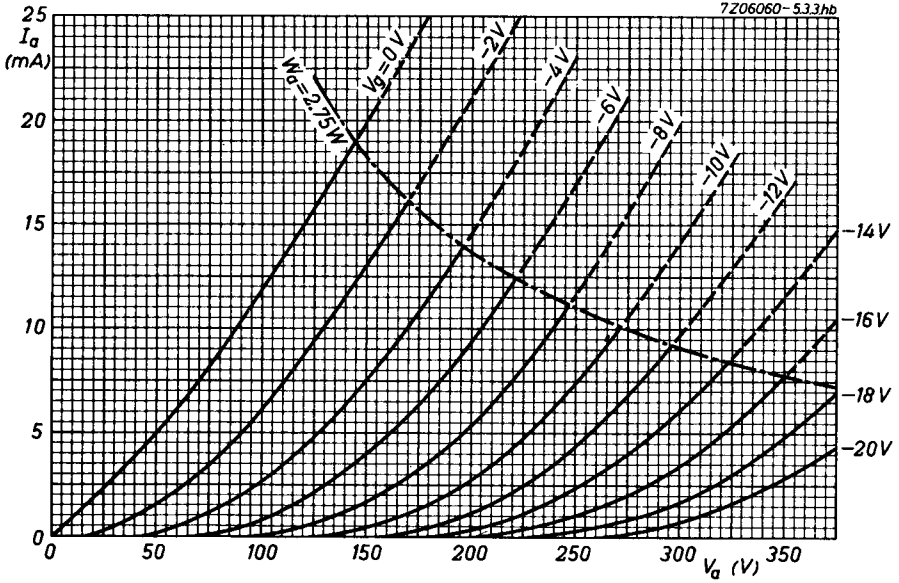
Anode voltage	$V_{a0}$	max.	550	V
	$V_a$	max.	300	V
Anode dissipation	$W_a$	max.	2.75	W
Cathode current	$I_k$	max.	20	mA
Grid voltage , peak	$-V_g$	max.	100	V
	$-V_{gp}$	max.	250	V
Grid resistor (automatic bias)	$R_g$	max.	1	$M\Omega$
Cathode to heater voltage	$V_{kf}$	max.	180	V
Cathode to heater circuit resistance in phase splitting circuits	$R_{kf}$	max.	150	$k\Omega$

**REMARK**

This tube can be used without precautions against microphony in equipment in which  $V_i \geq 10$  mV for an output of 50 mW of the output tube (or  $V_i \geq 100$  mV for 5 W output) provided that the average acceleration of the tube is not greater than indicated in the section "Microphonic effect" of the "Application Directions". When the centre tap of the heater transformer has been earthed,  $R_{gk} \leq 0.3$  M $\Omega$  and  $R_k$  is sufficiently decoupled, the disturbance level for hum and noise will then be better than 60 dB below 100 mV.



7206060-533hb





# PHILIPS

Data handbook



Electronic  
components  
and materials

## ECC82

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