

FRAME AND A.F. OUTPUT PENTODE

Pentode intended for use as frame output tube in television receivers and as A.F. power amplifier.

QUICK REFERENCE DATA

Anode peak voltage	V_{ap}	max.	2 kV
Cathode current	I_k	max.	100 mA
Output power	W_o		5.3 W

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

Heater voltage

V_f 6.3 V

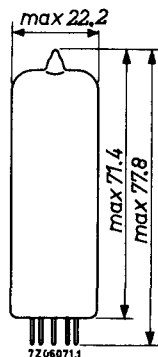
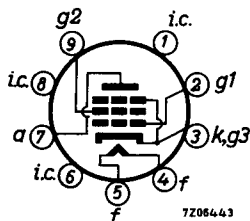
Heater current

I_f 760 mA

DIMENSIONS AND CONNECTIONS

Base: Noval

Dimensions in mm



CAPACITANCES

Anode to all except grid No.1

$C_{a(g_1)}$ 6.8 pF

Grid No.1 to all except anode

$C_{g_1(a)}$ 13 pF

Anode to grid No.1

C_{ag_1} max. 0.6 pF

Grid No.1 to heater

C_{g_1f} max. 0.25 pF

OPTIMUM PEAK ANODE CURRENT IN FRAME OUTPUT OPERATION

The circuit should be designed so that the peak anode current does not exceed:

145 mA at $V_a = 60$ V, $V_{g2} = 170$ V, $V_f = 6.3$ V

190 mA at $V_a = 70$ V, $V_{g2} = 200$ V, $V_f = 6.3$ V

220 mA at $V_a = 80$ V, $V_{g2} = 220$ V, $V_f = 6.3$ V

The minimum available value of the peak anode current at end of life and $V_f = 5.7$ V is:

125 mA at $V_a = 60$ V, $V_{g2} = 170$ V

160 mA at $V_a = 70$ V, $V_{g2} = 200$ V

185 mA at $V_a = 80$ V, $V_{g2} = 220$ V

OPERATING CHARACTERISTICS

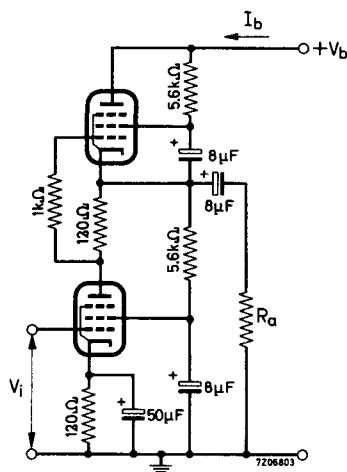
A.F. power amplifier, class A (Measured with V_k constant)

Supply voltage	V_b	200	V
Grid No.2 series resistor (non decoupled)	R_{g2}	470	Ω
Cathode resistor	R_k	215	Ω
Load resistance	$R_{a\sim}$	2.5	k Ω
Grid No.1 driving voltage	V_i	0 0.52 7.0	V_{RMS}
Anode current	I_a	65 - 64	mA
Grid No.2 current	I_{g2}	3.2 - 11.4	mA
Output power	W_o	0 0.05 5.3	W
Distortion	d_{tot}	- - 10	%

A.F. power amplifier, class AB, two tubes in push-pull

Anode supply voltage	V_{ba}	250	V
Grid No.2 supply voltage	V_{bg2}	200	V
Common cathode resistor	R_k	150	Ω
Load resistance	$R_{aa\sim}$	5.5	k Ω
Grid No.1 driving voltage	V_i	0 0.37 13.0	V_{RMS}
Anode current	I_a	2x50 - 2x55	mA
Grid No.2 current	I_{g2}	2x2.0 - 2x13	mA
Output power	W_o	0 0.05 18.5	W
Distortion	d_{tot}	- - 4.5	%

OPERATING CHARACTERISTICS (continued)

A.F. power amplifier, single ended push-pull

a) Single tone input signal

Supply voltage	V_b	300	V
Load resistance	$R_{a\sim}$	1	k Ω
Grid No.1 driving voltage	V_i	0 0.41 5.4	V_{RMS}
Supply current	I_b	66 - 64	mA
Output power	W_o	0 0.05 4.5	W
Distortion	d_{tot}	- - 9.3	%

b) Double tone input signal

Supply voltage	V_b	300	V
Load resistance	$R_{a\sim}$	1	k Ω
Grid No.1 driving voltage	V_i	0 2.7	$V_{RMS}^1)$
Supply current	I_b	66 64	mA
Output power	W_o	0 5.5	W
Distortion	d_{tot}	- 8.5	%

¹⁾ Value of each tone separately.

REMARK

Single tone data are obtained with a pure sinusoidal input voltage. However such an input voltage is in general not representative for the reproduction of music and speech, since a purely sinusoidal tone seldom occurs.

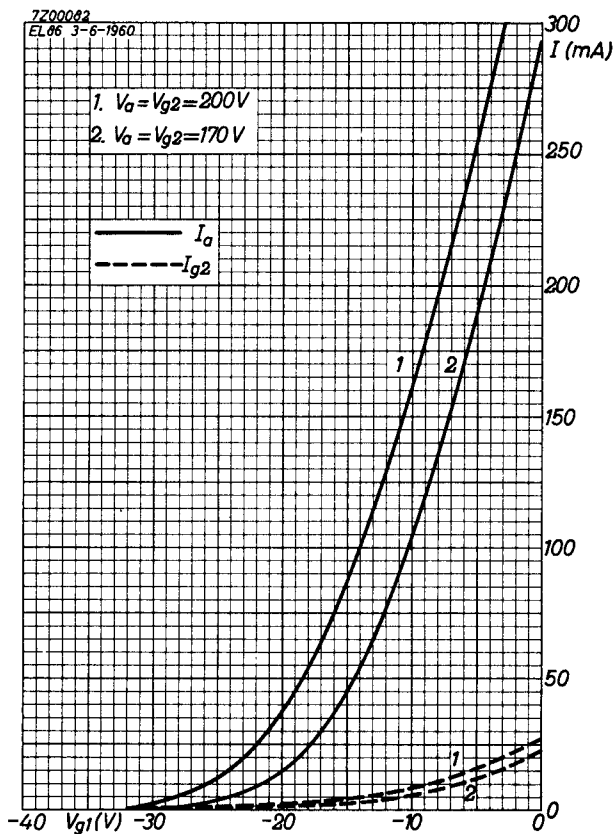
The double tone data are obtained with two sinusoidal signals of different frequencies but of the same amplitude. This appears to be far better in agreement with practice. In the case of full drive with two sinusoidal signals different in frequency but having the same amplitude, the output power is half the value obtained at full drive with a single sinusoidal input voltage of twice this amplitude. To make comparison possible the obtained output power with double tone has therefore been multiplied by 2.

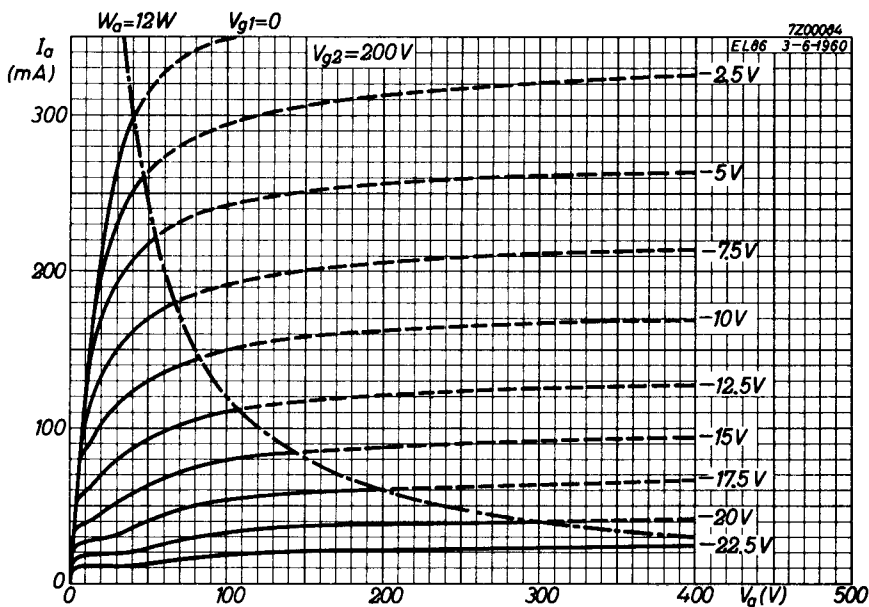
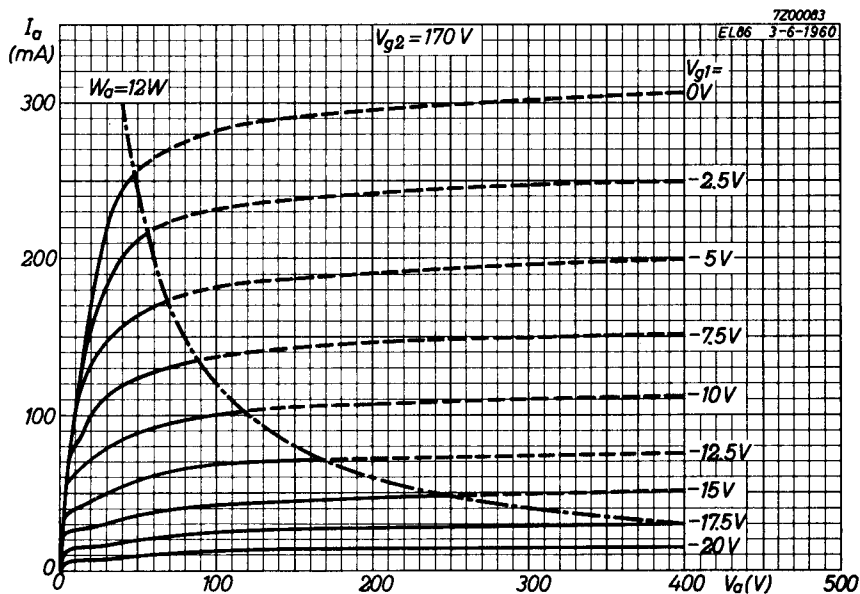
LIMITING VALUES (Design centre rating system)

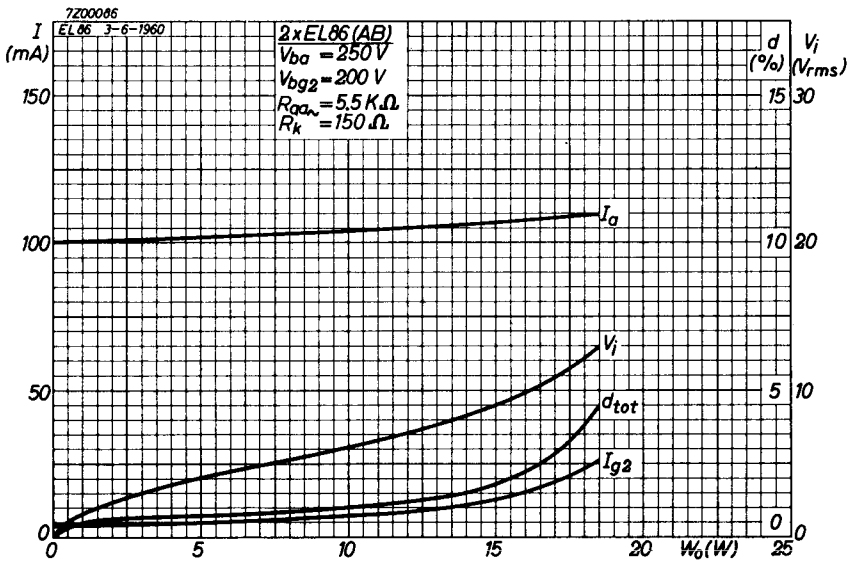
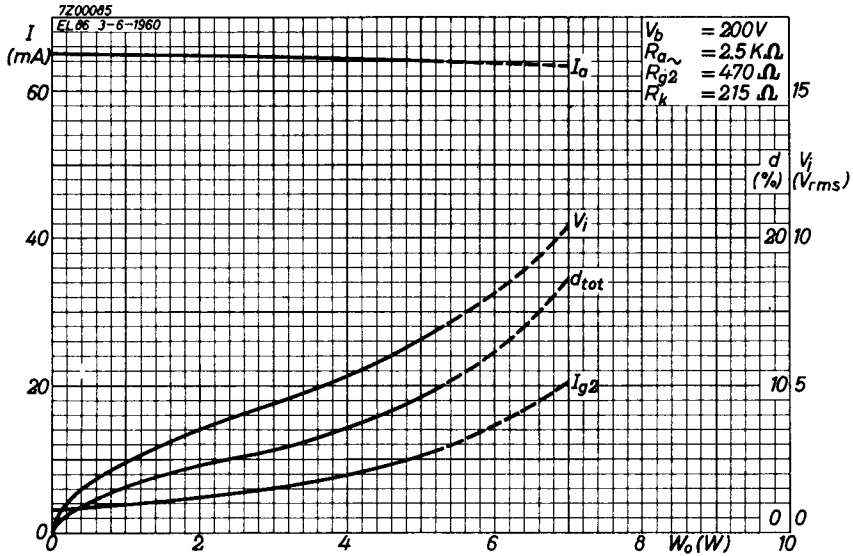
Anode voltage	V_{a0}	max.	550 V
	V_a	max.	250 V
Anode peak voltage	V_{ap}	max.	2 kV ¹⁾
Grid No.2 voltage	V_{g20}	max.	550 V
	V_{g2}	max.	250 V
Anode dissipation	W_a	max.	12 W ²⁾
Grid No.2 dissipation:			
average	W_{g2}	max.	1.75 W
peak	W_{g2p}	max.	6 W
Cathode current	I_k	max.	100 mA
Grid No.1 resistor:			
automatic bias	R_{g1}	max.	1 M Ω
frame output application with automatic bias	R_{g1}	max.	2 M Ω
Cathode to heater voltage	V_{kf}	max.	200 V

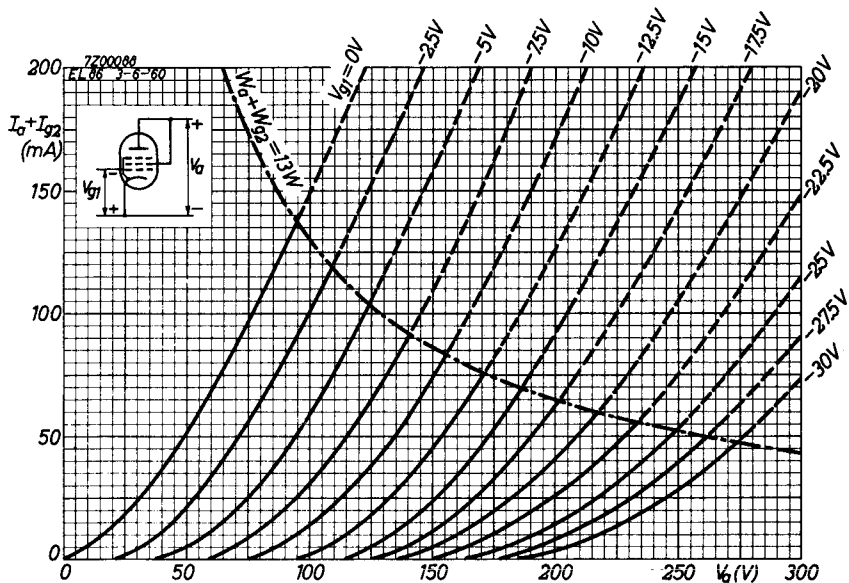
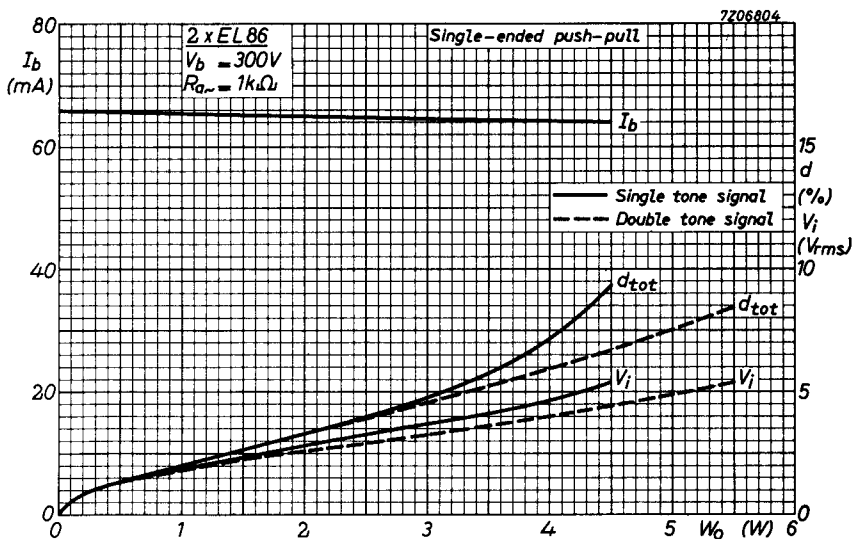
¹⁾ Valid for application in frame output circuits where the max. pulse duration is 4% of a cycle with a max. of 0.8 ms.

²⁾ For frame output application $W_a = \text{max. } 10 \text{ W}$.









PHILIPS

Data handbook



**Electronic
components
and materials**

EL86

page	sheet	date
1	1	1969.01
2	2	1969.01
3	3	1969.01
4	4	1969.01
5	5	1969.01
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8	8	1969.01
9	FP	1999.03.19