



EL84

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EL84 is A.F. Output
Pentode



Quick reference data

- Anode current $I_a=48\text{mA}$
- Transconductance $S=11,3\text{mA/V}$
- Amplification $\mu_{g2g1}=19$
- Output power $W_o=6\text{W}$

Heating

Indirect by AC or DC; parallel supply.

Heater voltage	V_f	6,3	(V)
Heater current	I_f	760	(mA)

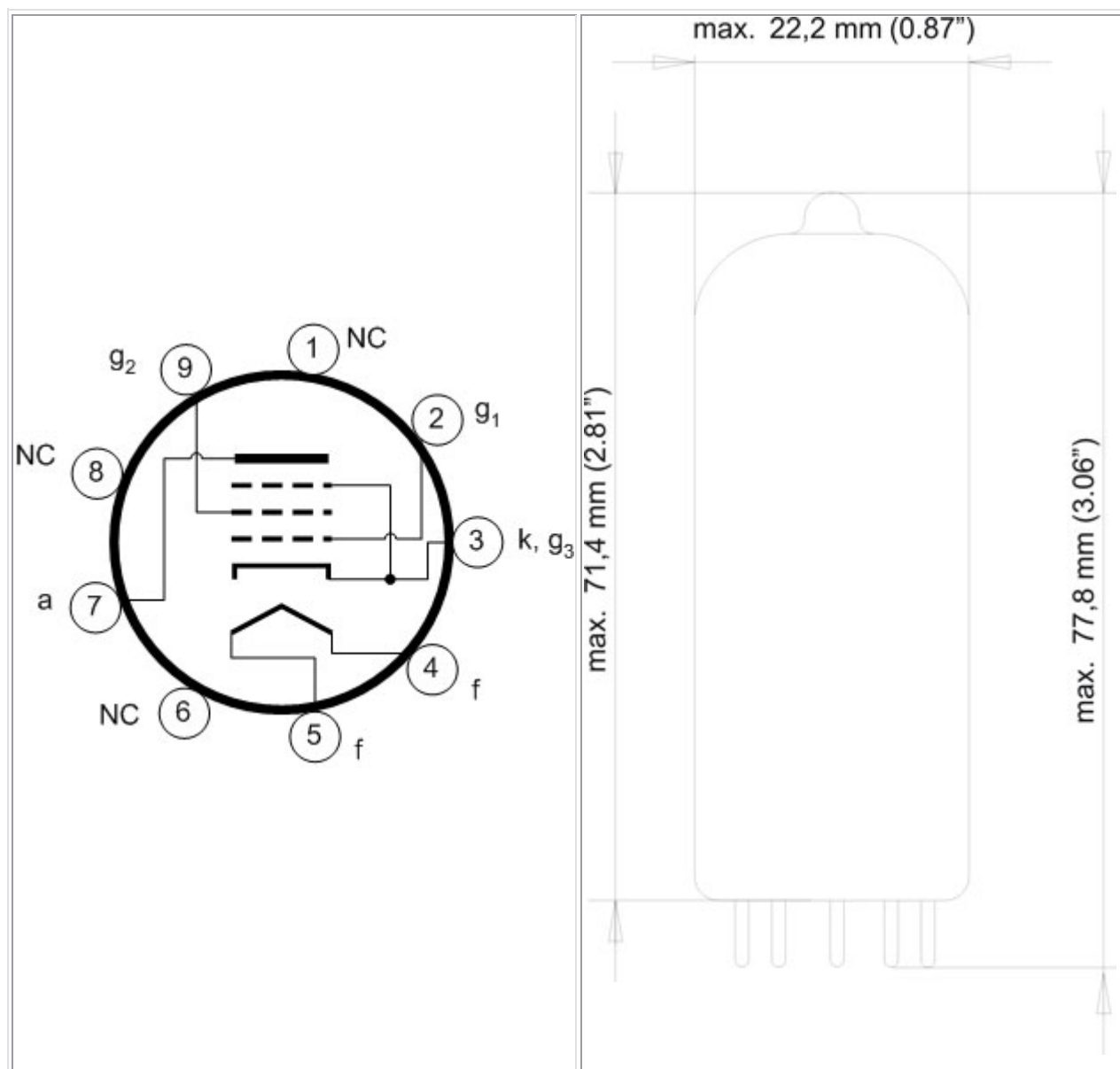
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Dimensions and connections

Base: Noval



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Operating characteristics

❖ Class A

Anode voltage	V_a	250					(V)
Grid No. 2 voltage	V_{g2}	250					(V)
Grid No. 1 voltage	V_{g1}	-7,3					(V)
Cathode resistor	R_k	135					(Ω)
Load resistance	R_a	5,2					(k Ω)
Grid No. 1 driving voltage	V_i	0	0,3	3,4	4,3	4,7	(V _{RMS})
Anode current	I_a	48			49,5	49,2	(mA)
Grid No. 2 current	I_{g2}	5,5			10,8	11,6	(mA)
Transconductance	S	11,3					(mA/V)
Amplification	μ_{g2g1}	19					
Internal resistance	R_i	38					(k Ω)
Output power	W_o	0	0,05	4,5	5,7	6	(W)
Distortion	total	d_{tot}			6,8	10	(%)
	second harmonic	d_2			3	2	(%)
	third harmonic	d_3			5,8	9,5	(%)

Anode voltage	V_a	250					(V)
Grid No. 2 voltage	V_{g2}	250					(V)
Grid No. 1 voltage	V_{g1}	-7,3					(V)
Cathode resistor	R_k	135					(Ω)
Load resistance	R_a	4,5					(k Ω)
Grid No. 1 driving voltage	V_i	0	0,3	3,5	4,4	4,8	(V _{RMS})

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Anode current	I_a	48			50,6	50,5	(mA)
Grid No. 2 current	I_{g2}	5,5			10	11	(mA)
Transconductance	S	11,3					(mA/V)
Amplification	μ_{g2g1}	19					
Internal resistance	R_i	38					(k Ω)
Output power	W_o	0	0,05	4,5	5,7	6	(W)
Distortion	total	d_{tot}			7,5	10	(%)
	second harmonic	d_2			5,7	5	(%)
	third harmonic	d_3			4,5	8	(%)

Anode voltage	V_a	250				(V)
Grid No. 2 voltage	V_{g2}	250				(V)
Grid No. 1 voltage	V_{g1}	-8,4				(V)
Cathode resistor	R_k	210				(Ω)
Load resistance	R_a	7				(k Ω)
Grid No. 1 driving voltage	V_i	0	0,3	3,5	5,5	(V _{RMS})
Anode current	I_a	36		36,8	36	(mA)
Grid No. 2 current	I_{g2}	4,1		8,5	14,6	(mA)
Transconductance	S	10				(mA/V)
Amplification	μ_{g2g1}	19				
Internal resistance	R_i	40				(k Ω)
Output power	W_o	0	0,05	4,2	5,6	(W)
Distortion	total	d_{tot}			10	(%)
	second harmonic	d_2			1,7	(%)
	third harmonic	d_3			8,7	(%)

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Anode voltage	V_a	250				(V)
Grid No. 2 voltage	V_{g2}	210				(V)
Grid No. 1 voltage	V_{g1}	-6,4				(V)
Cathode resistor	R_k	160				(Ω)
Load resistance	R_a	7				(k Ω)
Grid No. 1 driving voltage	V_i	0	0,3	3,4	3,8	(V _{RMS})
Anode current	I_a	36		36,6	36,5	(mA)
Grid No. 2 current	I_{g2}	3,9		7,3	8	(mA)
Transconductance	S	10,4				(mA/V)
Amplification	μ_{g2g1}	19				
Internal resistance	R_i	40				(k Ω)
Output power	W_o	0	0,05	4,3	4,7	(W)
Distortion	total	d_{tot}			10	(%)
	second harmonic	d_2			1,8	(%)
	third harmonic	d_3			9,3	(%)

Notes:

1. Grid No. 2 driving voltage measured with fixed bias
2. Distortion at $I_{g1}=+0,3\mu A$

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❖ **Class B, two tubes in push-pull**

Anode voltage	V _a	250		300		(V)
Grid No. 2 voltage	V _{g2}	210		300		(V)
Grid No. 1 voltage	V _{g1}	-11,6		-14,7		(V)
Load resistance	R _{aa}	8		8		(kΩ)
Grid No. 1 driving voltage	V _i	0	8	0	10	(V _{RMS})
Anode current	I _a	2×10	2×37,5	2×7,5	2×46	(mA)
Grid No. 2 current	I _{g2}	2×1,1	2×7,5	2×0,8	2×11	(mA)
Output power	W _o	0	11	0	17	(W)
Distortion	d _{tot}		3		4	(%)

❖ **Class AB, two tubes in push-pull**

Anode voltage	V _a	250		300		(V)
Grid No. 2 voltage	V _{g2}	210		300		(V)
Common cathode resistor	R _k	130		130		(Ω)
Load resistance	R _{aa}	8		8		(kΩ)
Grid No. 1 driving voltage	V _i	0	8	0	10	(V _{RMS})
Anode current	I _a	2×31	2×37,5	2×36	2×46	(mA)

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Grid No. 2 current	I_{g2}	2×3,5	2×7,5	2×4	2×11	(mA)
Output power	W_o	0	11	0	17	(W)
Distortion	d_{tot}		3		4	(%)

Operating characteristics in triode connection (g_2 connected to a)

❖ **Class A**

Anode voltage	V_a	250			(V)
Cathode resistor	R_k	270			(Ω)
Load resistance	R_a	3,5			(k Ω)
Grid No. 1 driving voltage	V_i	0	1	6,7	(V_{RMS})
Anode current	I_a	34		36	(mA)
Output power	W_o		0,05	1,95	(W)
Distortion	d_{tot}			9	(%)

❖ **Class AB, two tubes in push-pull**

Anode voltage	V_a	250		300		(V)
Common cathode resistor	R_k	270		270		(Ω)
Load resistance	R_{aa}	10		10		(k Ω)
Grid No. 1 driving voltage	V_i	0	8,3	0	10	(V_{RMS})
Anode current	I_a	2×20	2×21,7	2×24	2×26	(mA)
Output power	W_o	0	3,4	0	5,2	(W)

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Distortion	d_{tot}		2,5		2,5	(%)
Grid No. 1 driving voltage for $W_o=50mW$	V_i		0,95		0,9	(V_{RMS})

Limiting - maximal values (design center rating system)

Anode voltage		V _{ao}	550	(V)
		V _a	300*	
Anode dissipation		W _a	12*	(W)
Grid No. 2 voltage		V _{g2o}	550	(V)
		V _{g2}	300*	
Grid No. 2 dissipation		W _{g2}	2	(W)
		W _{g2p}	4	
Grid No. 1 voltage		V _{g1}	-100	(V)
Cathode current		I _k	65	(mA)
Grid No. 1 resistor	automatic bias	R _{g1}	1	(MΩ)
	fixed bias		0,3	
Cathode to heater voltage		V _{kf}	100	(V)

*When the heater and positive voltages are obtained from a storage battery by means of vibrator, the max. values of V_a and V_{g2} are 250V and that of W_a is 9W.