

Please note that the links in the PEARL logotype above are "live" and can be used to direct your web browser to our site or to open an e-mail message window addressed to ourselves.

To view our item listings on eBay, [click here](#).

To see the feedback we have left for our customers, [click here](#).

This document has been prepared as a public service . Any and all trademarks and logotypes used herein are the property of their owners.

It is our intent to provide this document in accordance with the stipulations with respect to "fair use" as delineated in Copyrights - Chapter 1: Subject Matter and Scope of Copyright; Sec. 107. Limitations on exclusive rights: Fair Use.

Public access to copy of this document is provided on the website of Cornell Law School (<http://www4.law.cornell.edu/uscode/17/107.html>) and in part is reproduced below:

#### Sec. 107. - Limitations on exclusive rights: Fair Use

Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include:

- 1 - the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
- 2 - the nature of the copyrighted work;
- 3 - the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- 4 - the effect of the use upon the potential market for or value of the copyrighted work.

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors



The 6Э5П output high-frequency tetrode of improved reliability is designed for broadband amplification of hf voltage and power.

The 6Э5П output high-frequency tetrodes are miniature devices enclosed in glass bulb and provided with nine rigid leads and an indirectly heated oxide-coated cathode.

The 6Э5П output high-frequency tetrodes are resistant to ambient temperature from  $-60$  to  $+85^{\circ}\text{C}$  and relative humidity of 95 to 98% at  $+40^{\circ}\text{C}$ , as well as to mechanical loads: linear loads up to 100 g, vibration loads up to 10 g, multiple impact loads up to 75 g and single impact loads up to 500 g.

Maximum weight: 20 gr.

Service life guarantee: 5000 hr.

#### ELECTRICAL CHARACTERISTICS

$U_h$	6,3 V	$R_k$ <sup>1</sup>	30 $\Omega$	$S$	$30,5 \pm 6,5 \text{ mA/V}$
$I_h$	$600 \pm 40 \text{ mA}$	$I_a$	$43 \pm 10 \text{ mA}$	$R_i$	$8 \text{ k}\Omega$
$U_a$	150 V	$I_{az}$ <sup>2</sup>	$\leqslant 10 \mu\text{A}$	$R_{eqv}$	350 $\Omega$
$U_{g2}$	150 V	$I_{g2}$	$\leqslant 14 \text{ mA}$	$U^3$	120 mV

1) For self-bias.

2) At  $U_a = 250 \text{ V}$ ,  $U_{g2} = 250 \text{ V}$ ,  $U_{g1} = -12 \text{ V}$ .

3) Vibration noise, at  $f = 50 \text{ Hz}$  and acceleration 6 g.

#### INTERELECTRODE CAPACITANCES

$C_{q1k}$	$15 \pm 2 \text{ pF}$
$C_{g1a}$	$\leqslant 0,065 \text{ pF}$
$C_{ak}$	$2,55^{+0,25}_{-0,3} \text{ pF}$
$C_{kh}$	$\leqslant 13,5 \text{ pF}$

#### MAXIMUM AND MINIMUM PERMISSIBLE RATINGS

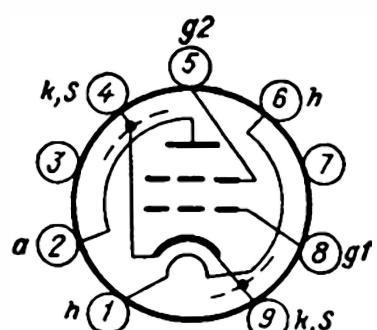
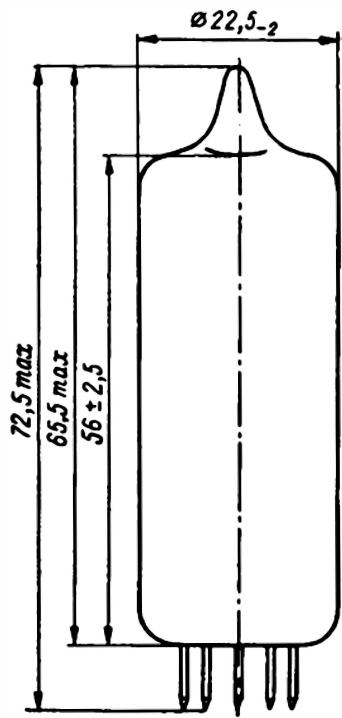
	Max	Min		Max
$U_h$	7 V	5,7 V	$P_a$	8,3 W
$U_a$	250 V		$P_{g2}$	2,3 W
$U_a$ <sup>1</sup>	500 V		$I_k$	100 mA
$U_{g2}$	250 V		$U_{kh}$	$\pm 150$ V
$U_{g2}$ <sup>1,2</sup>	500 V		$R_{g1}$	0,5 M $\Omega$
$U_{g1}$	-100 V		$T_{bulb}$	210° C

1) With the tube cutoff.

2) At  $I_a \leqslant 5 \mu\text{A}$ .

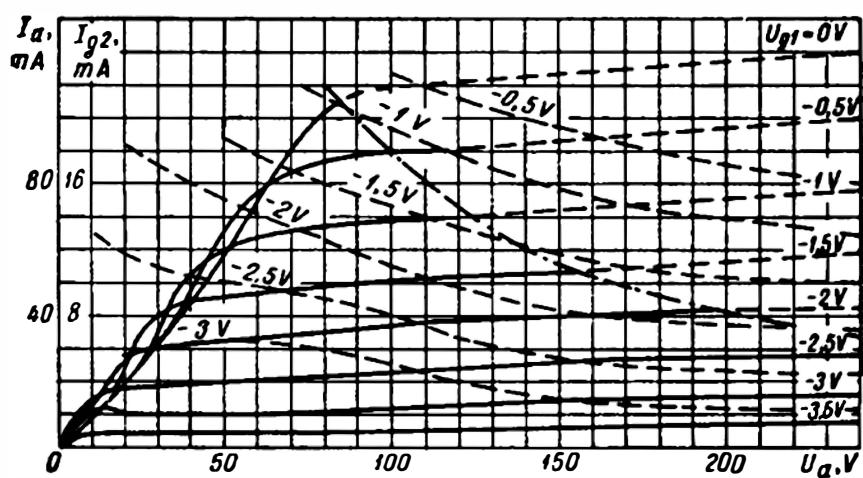
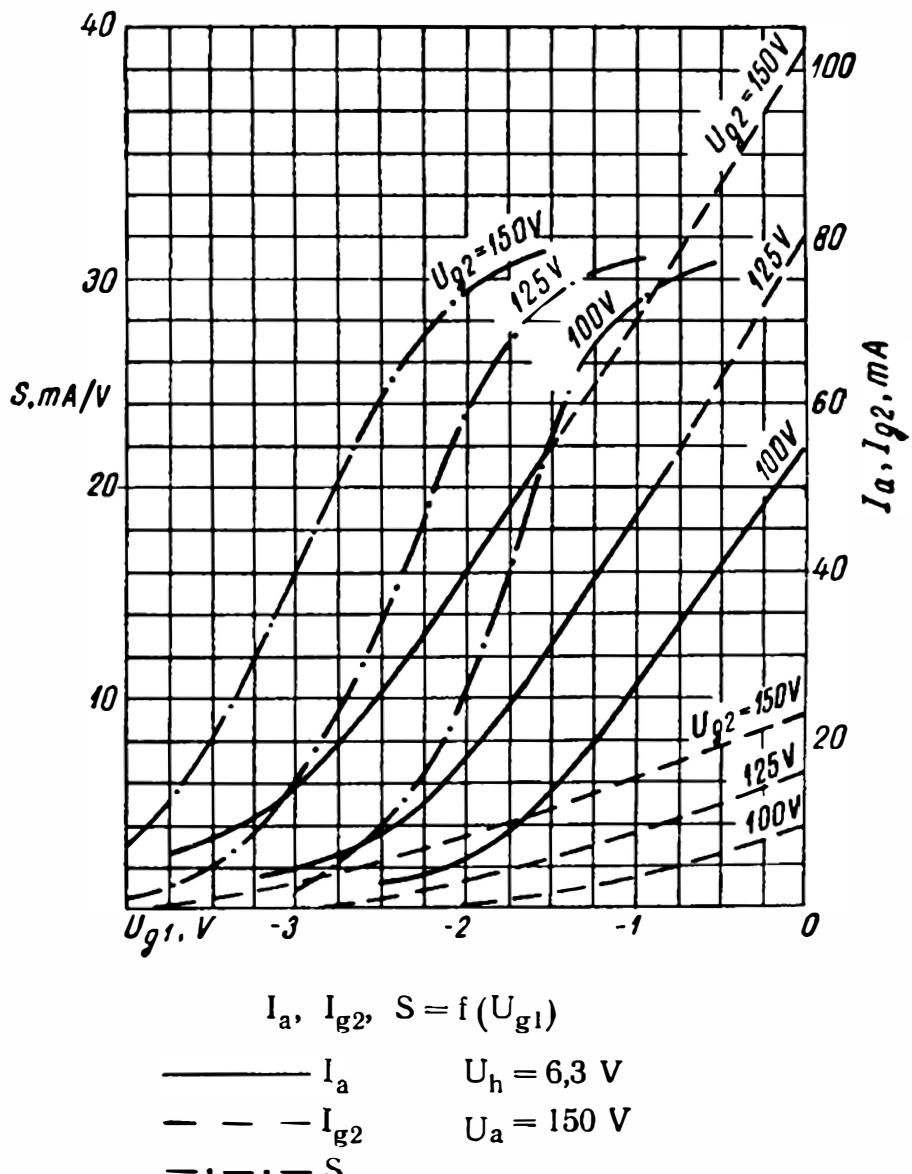
# 6Э5П

Output high-frequency tetrode of improved reliability



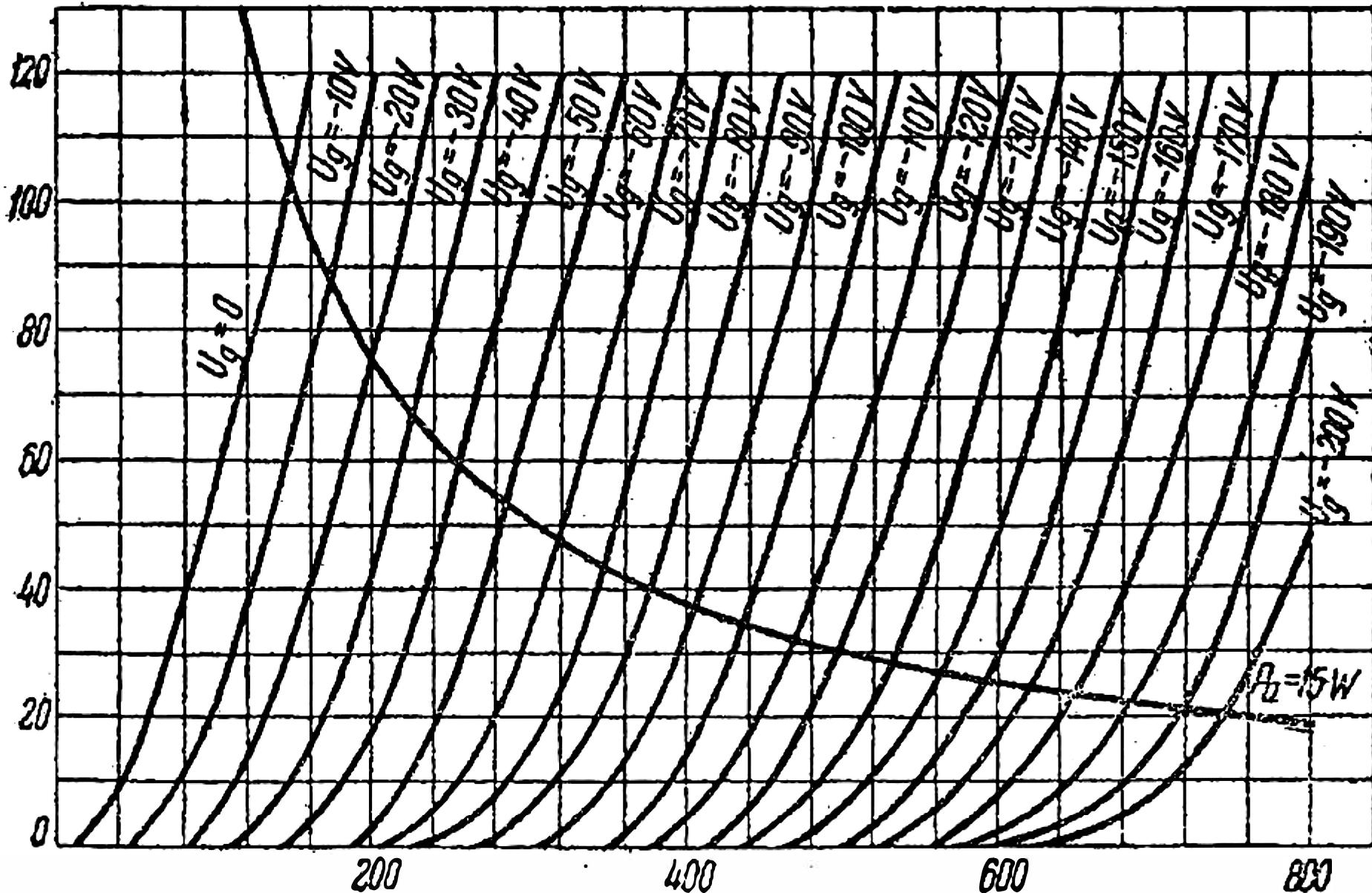
$I_a, I_{g2} = f(U_a)$

— — —  $I_a$        $U_h = 6,3 \text{ V}$   
 — - - -  $I_{g2}$        $U_{g2} = 150 \text{ V}$   
 - · - · -  $P_{a \max}$



# 6Э5П

Output high-frequency tetrode of improved reliability



# 635П-И

## PULSE TETRODE

### GENERAL

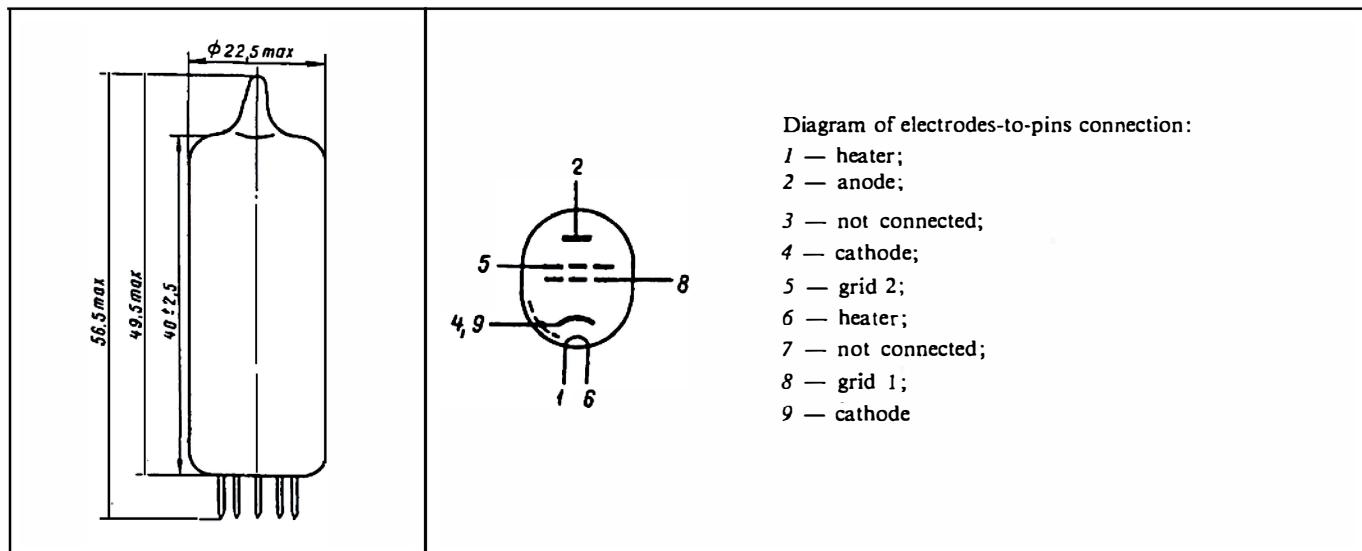
The 635П-И pulse tetrode has been designed to amplify high-frequency voltage under pulse-operation conditions.

Cathode: indirectly heated, oxide-coated.

Mass: at most 20 g.

### SERVICE CONDITIONS

Vibration: at frequencies from 10 to 600 Hz with acceleration up to 10 g. Ambient temperature: from -60 to +90 °C. Relative humidity: up to 98% at up to 40 °C. Ambient pressure: at least 18 mm Hg.



### SPECIFICATION

#### Electrical Parameters

##### Voltage, V:

heater	.....	6.1
anode	.....	150
grid 2	.....	150
anode current cutoff, at anode and grid 2 voltage 250 V and anode current 70 $\mu\text{A}$ , at most	.....	-12
grid 1 current cutoff, at most	.....	-1.5

##### Current, mA:

heater	.....	$700 \pm 40$
anode	.....	$\geq 35$
grid 2	.....	$\leq 18$

Resistance in cathode circuit for automatic bias, Ohm 30

Internal resistance, MOhm ..... 0.01

Equivalent resistance of internal noise, kOhm ..... 0.35

Transconductance, mA/V .....  $\leq 24$

Emission pulse current, at pulse voltage 150 V, pulse repetition frequency 50 Hz and pulse duration 1-2  $\mu\text{s}$ , A .....  $\geq 6$

Emission pulse current under the same conditions as above and at heater voltage 5.7 V, A .....  $\geq 3$

Figure of merit, mA/V  $\cdot$  pF ..... 1.5

##### Capacitance, pF:

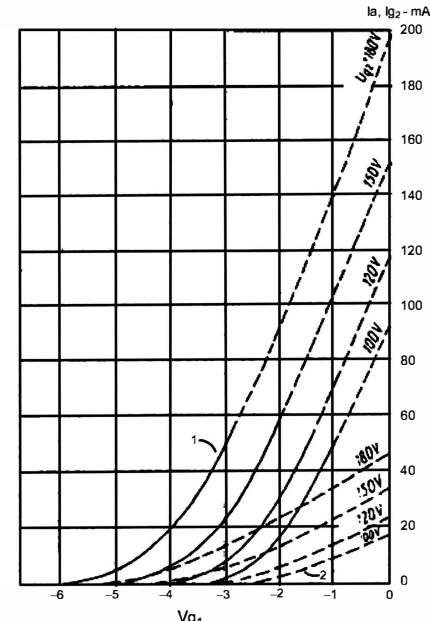
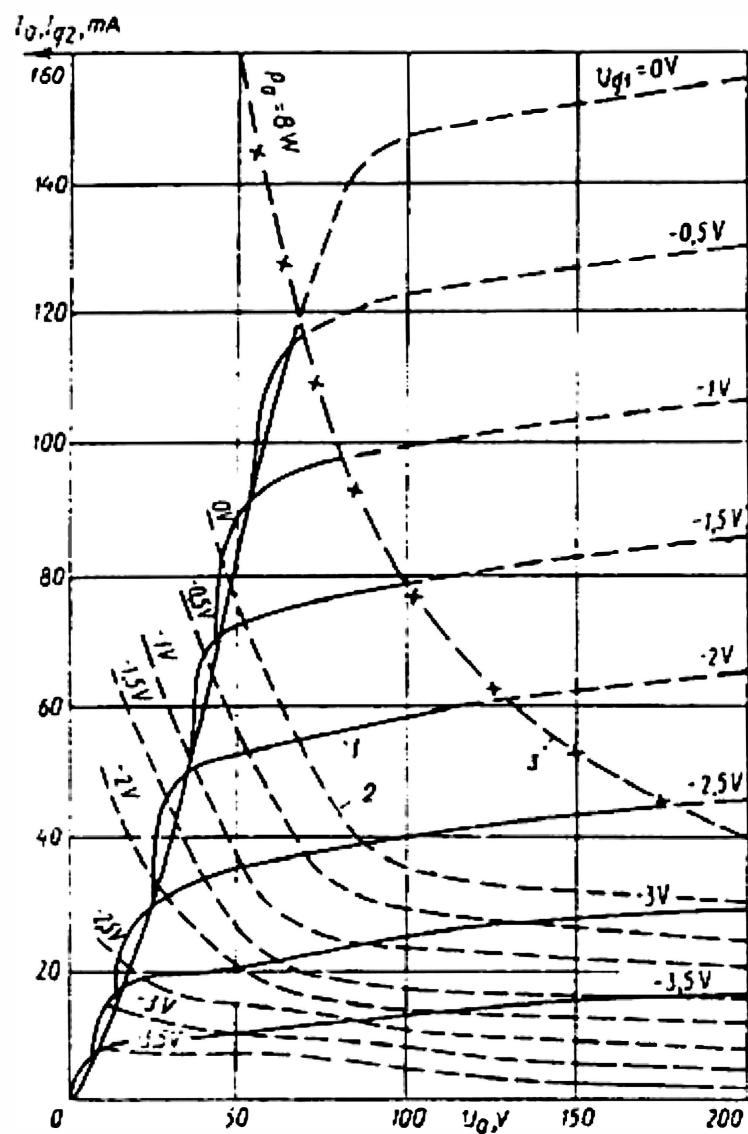
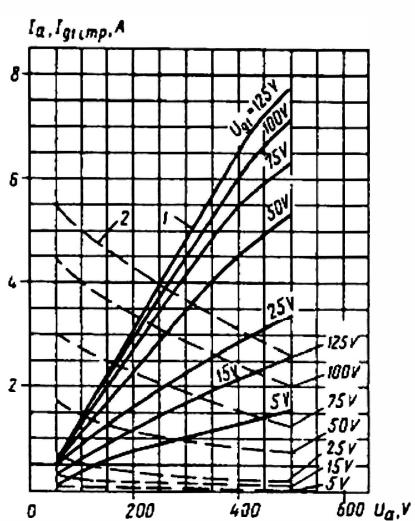
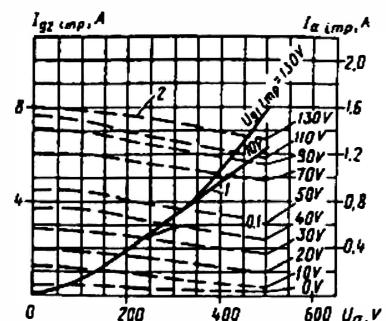
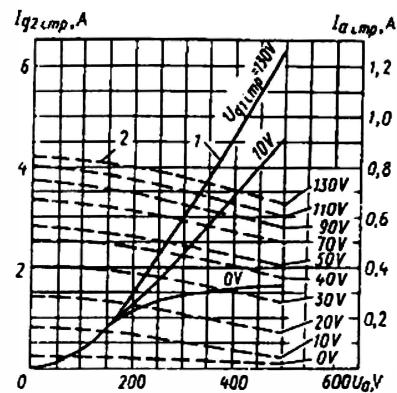
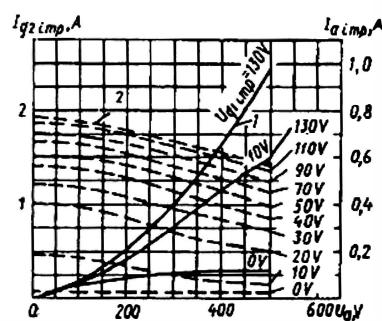
input	.....	$15 \pm 2$
output	.....	$2.5 - 0.3$
transfer	.....	$\leq 0.075$
cathode-to-heater	.....	$\leq 13.5$

##### Electrical parameters over 5000 operating hours:

emission pulse current, A	.....	$\geq 6$
emission pulse current at heater undervoltage, A	.....	$\geq 3$
anode current cutoff voltage, V, at most	.....	-12

#### Limit Values of Operating Conditions

	Maximum	Minimum
Voltage, V:		
heater	.....	7
anode	.....	250
anode in cut-off valve, at cathode		
current at most 5 $\mu\text{A}$	.....	470
grid 2	.....	250
grid 2 in cut-off valve, at cathode		
current at most 5 $\mu\text{A}$	.....	470
grid 1	.....	-100
between cathode and heater:		
with heater at positive potential	100	
with heater at negative potential	150	
Current, A:		
cathode	.....	$100 \cdot 10^{-3}$
cathode (pulse)	.....	9
Sum of power dissipated at anode and grid 2, W	.....	3
Power dissipation at grid 2, W	....	2
Resistance in grid 1 circuit, MOhm	0.5	



Averaged characteristics:  
1 — Anode current; 2 —  $g_2$  current  
 $U_h = 6.3 \text{ V}$ ,  $U_a = 150 \text{ V}$

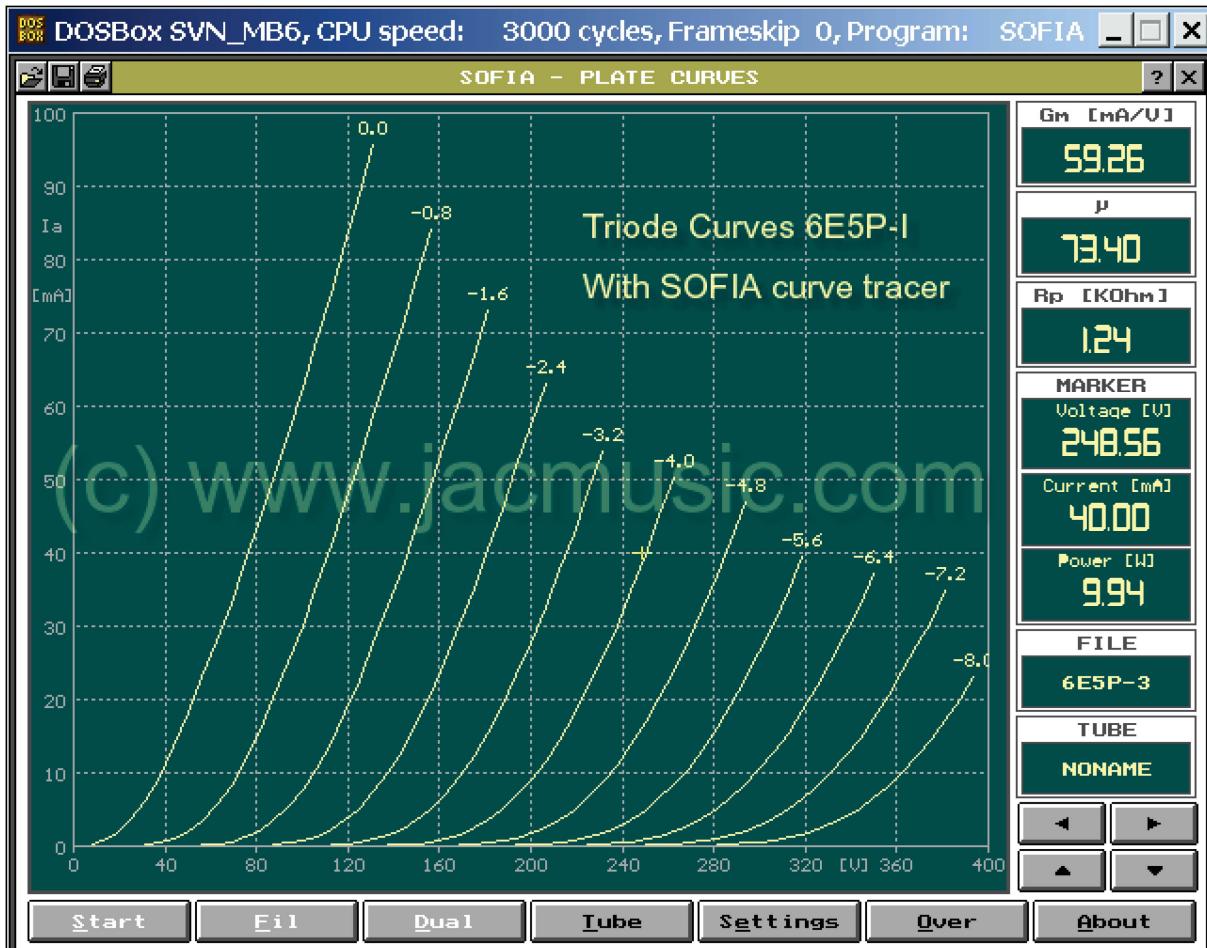
# 6E6P-1 Triode curves made with SOFIA curve tracer.

Jac van de Walle, 2016. April 24.

© 2016 [www.jacmusic.com](http://www.jacmusic.com). You can publish this document on a website, if you do not edit it, or change anything to it.

If you need a secret tip... here it is! 6E5P-1 is a tetrode, but I list it here as triode, because that is the normal use at the moment. This is the most linear tube I have ever seen. Data Sheets can be found at [www.4tubes.com](http://www.4tubes.com) under "Manufacturer Scans".

This tube has a fully flat (surface) cathode. Which is technically ideal for the curves, this was known before. Only such a cathode radiates a lot of heat to the anode, and the tube would get a terrible dissipation problem, a grid emission problem, and grid wires will sag over time by the intense heat. Particularly with miniature tubes this becomes a problem, because internal distance is small, wheras for big size tubes this technology would makes no sense as the tube would become irrational due to crazy heater dissipation. Yet, for the 6E5P-1 it was done, overcoming the problems nicely. To get the cathode heat out, they used a very wide anode distance, and then it works. To get the grid precision, and make it stable, they used a GOLD plated frame grid, made of two sections. (One section would be too large). There is the largest frame grid in this tube, I have ever seen. Some military stock rooms are selling those for crap prices to dealers, because they do NOT KNOW what they have here, and market price is driven by this stupidity, which will sure not last for ever. They cost just a few Euro, as long as supply lasts, but they are real jewels. Triode Gain is high, at amazing linearity. A fantastic driver, or head phone tube, and you can get a few Watt out of it, single ended. Anode voltage just normal, like 250V or so. When I have time, I take one apart and post pictures here, so you can see the curious anode shape, and the double section frame grid.

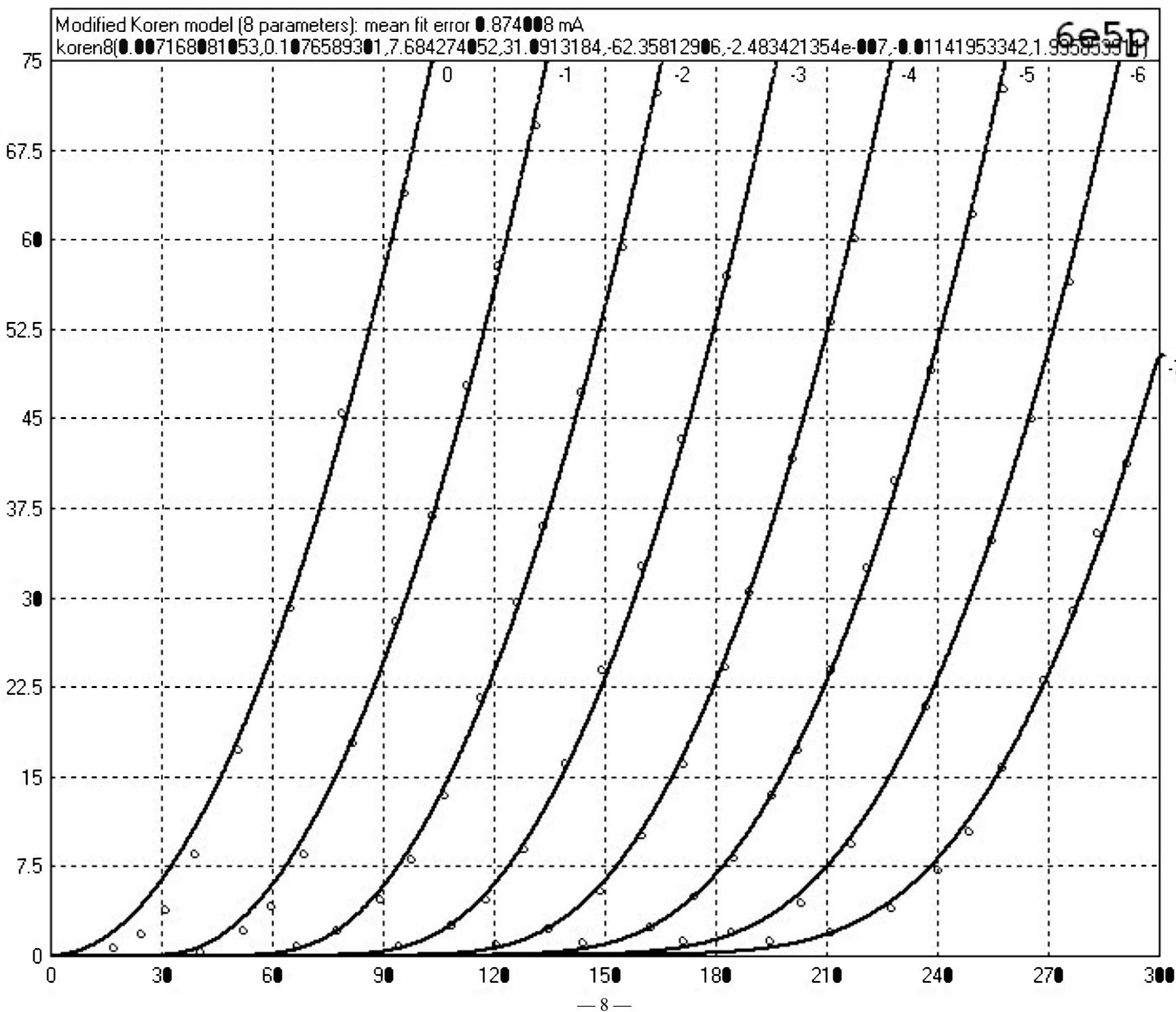


Look in the above picture at 248V, 40mA. When you look carefully, you see a small marker "+" sign there. With the free Sofia software, you can move this marker over the curves, and read the tube characteristics from every operating point to you like. The result comes in the boxes on the right. So it was done here for those values as you can see. Gain at the outer edge of the curve chart is becomes not precise, as the software needs to estimate how the curves proceed. So below you find some more precise results, measured more in the center of the chart.

#### 6E5P-1 Triode Mode Data

Ua (V)	Ia (mA)	Gain	Rp (Ohms)
150	45	47	1120
200	30	50	1340
350	15	53	2120





Note the very large, two-point mounted ring getter and the large area of "flash" seen within the top half of the tube's envelope. This is indication of the high level of evacuation needed for good sonic performance.

Note also the flat anode structures and the flat-wound frame grid structures. These essentially define the tube's extraordinarily linear  $g_1$ -to- $g_2$  transfer curves. In turn, that linearity makes the 6E5P a prime candidate for screen feedback (i.e. ultra-linear) operation.

