Rogers Electronic Tubes & Components

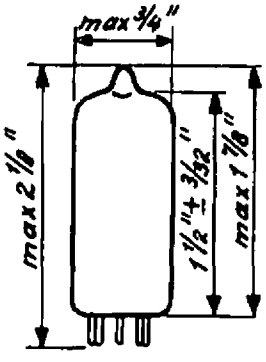
6 ES 6

Description: Pentode with variable transconductance for use as R.F. amplifier, I.F. amplifier or mixer in carradio sets, to be operated directly from a storage battery

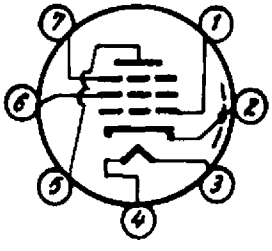
Mechanical data

Cathode	coated unipotential
Base	E 7-1
Bulb	T 5 1/2
Outline	5 - 2
Basing designation	7 EN
Mounting position	any

TUBE OUTLINE



BOTTOM VIEW OF BASE



BASE PIN No.	ELEMENT
1	Grid No. 1
2	Cathode, internal shield
3	Heater
4	Heater
5	Plate
6	Grid No. 2
7	Grid No. 3

Heater data

Heater voltage	6.3 volts
Heater current	300 mamps

Direct interelectrode capacitances

Grid No. 1 to all other elements except plate	6.5 μμF
Plate to all other elements except grid No. 1	4.0 μμF
Plate to grid No. 1	0.015 μμF
Grid No. 1 to grid No. 2	3.0 μμF

from JEDEC release #2382, Feb. 9, 1959

Maximum ratings (design center values)

Plate voltage	50 volts max.
Plate dissipation	0.5 watt max.
Grid No. 2 voltage	50 volts max.
Grid No. 2 dissipation	0.5 watt max.
Grid No. 3 voltage	50 volts max.
Cathode current	15 mamps max.
Grid No. 1 circuit resistance	22 megohm max
Grid No. 3 circuit resistance	5 megohm max
Voltage between cathode and heater	50 volts max.

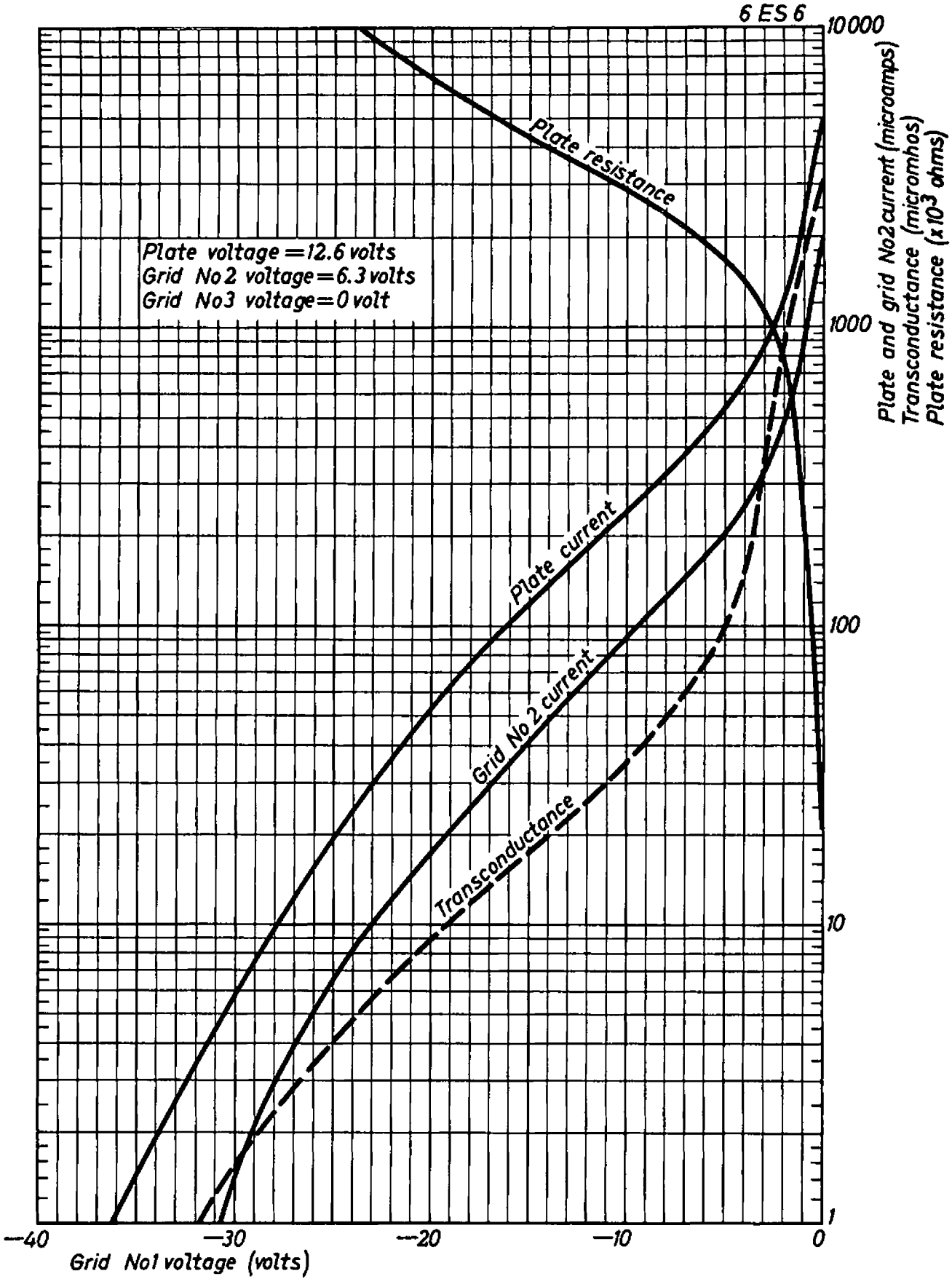
Operating characteristics as R.F. or I.F. amplifier

Plate voltage	25	12.6	6.3	12.6	6.3	volts
Grid No. 2 voltage	6.3	6.3	3.2	3.2	1.6	volts
Grid No. 3 voltage	0	0	0	0	0	volt
Grid No. 1 bias [1])	-0.7	-0.7	-0.7	-0.7	-0.7	volt
Plate current	3.3	3	1	1	0.4	mamps
Grid No. 2 current	0.95	1.1	0.4	0.35	0.15	mamps
Transconductance	2100	1900	1000	1100	500	micromhos
Transconductance reduced to 1/10 at grid No.1 bias of	-3.5	-3.5	-2.5	-2.5	-2.5	volts
Transconductance reduced to 1/20 at grid No.1 bias of	-5	-5	-4	-4	-3.5	volts
Plate resistance	0.05	0.15	0.07	0.2	0.2	megohm
Equivalent noise resistance	5000	5500	8000	7000	15000	ohms

Operating characteristics as mixer (R.F. voltage applied to grid No. 1, oscillator voltage applied to grid No. 3)

Plate voltage	25	12.6	6.3	volts
Grid No. 2 voltage	6.3	6.3	3.2	volts
Grid No. 3 resistance	0.1	0.1	0.1	megohm
Oscillator voltage	10	10	5	volts (rms)
Grid No. 1 bias [1])				
Plate current	1.8	1.3	0.45	mamps
Grid No. 2 current	1.5	1.7	0.6	mamps
Conversion conductance	600	550	300	micromhos
Conversion conductance reduced to 1/10 at grid No. 1 bias of	-3	-3.5	-2.5	volts
Conversion conductance reduced to 1/20 at grid No. 1 bias of	-4	-5	-3.5	volts
Plate resistance	50000	25000	30000	ohms
Equivalent noise resistance	40000	40000	55000	ohms

[1]) Grid No. 1 bias obtained by grid current biasing with grid No. 1 resistor of 10 megohms


6 ES 6
Plate resistance
Plate voltage = 12.6 volts
Grid No 2 voltage = 6.3 volts
Grid No 3 voltage = 0 volt
Plate current
Grid No 2 current
Transconductance
10000
1000
100
10
1
Plate and grid No2 current (microamps)
Transconductance (micromhos)
Plate resistance (x10³ ohms)
−40
−30
−20
−10
0
Grid No1 voltage (volts)

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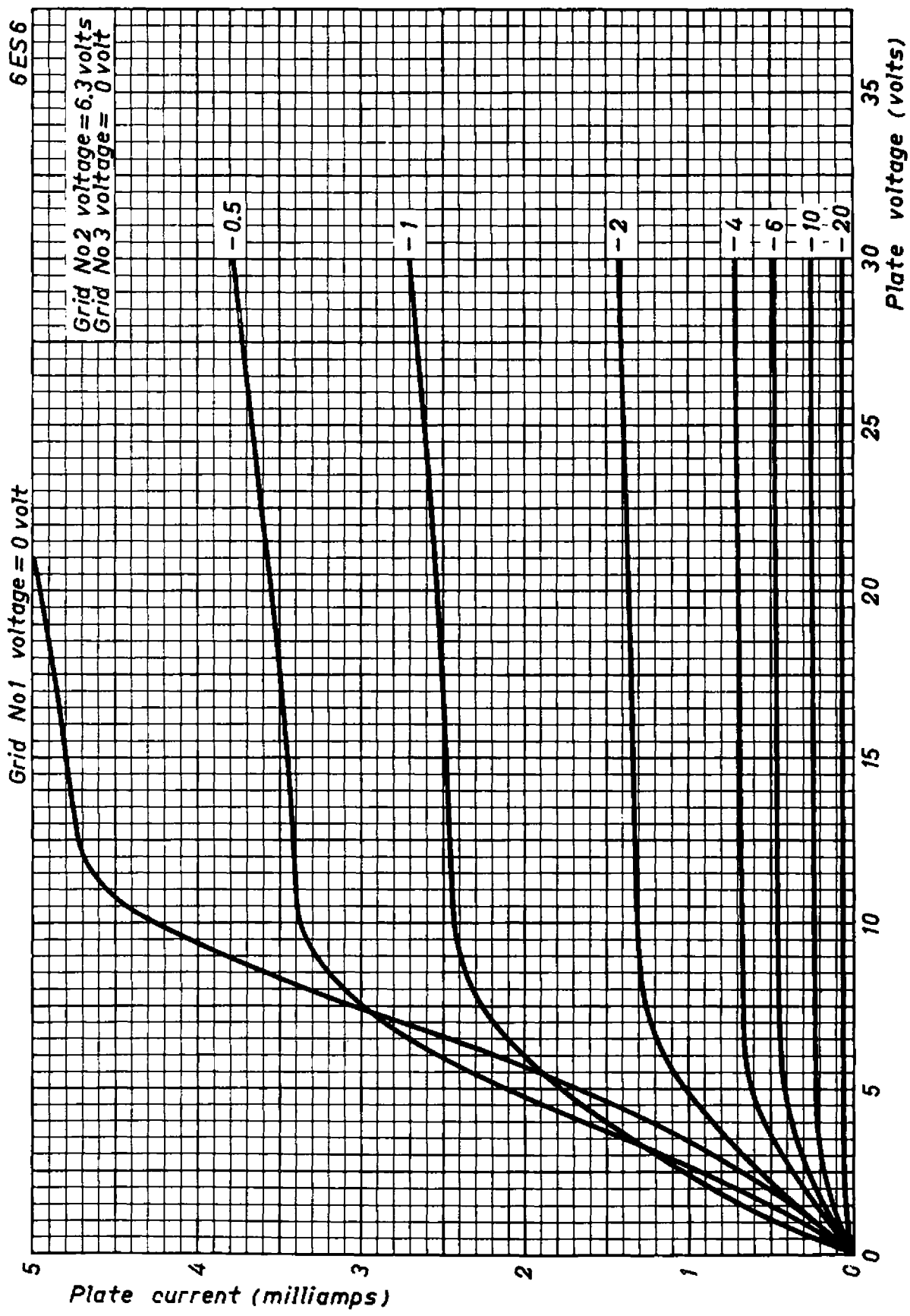
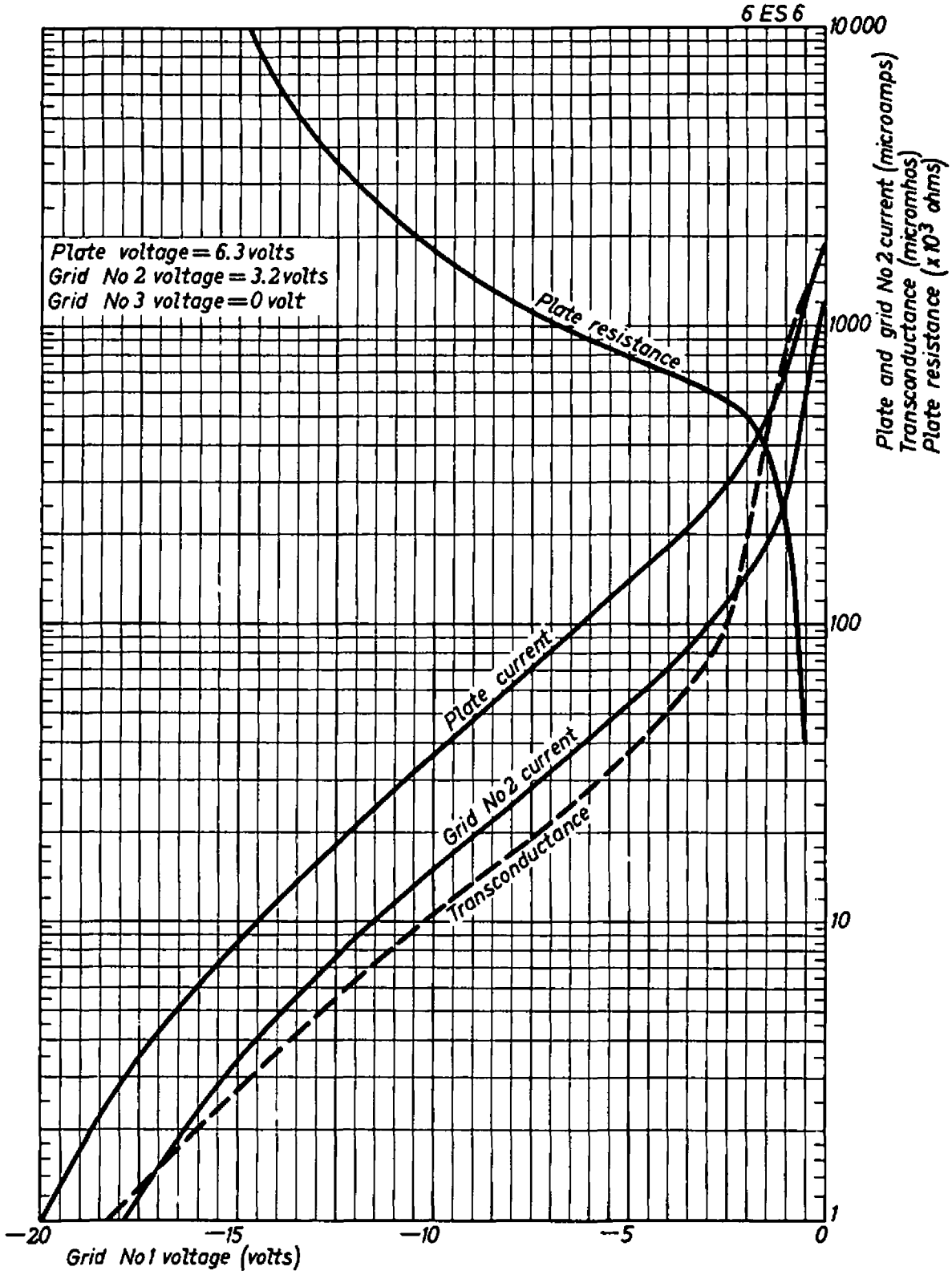
A


6ES6
Grid No2 voltage=6.3 volts
Grid No3 voltage= 0 volt
Grid No1 voltage = 0 volt
-0.5
-1
-2
-4
-6
-10
-20
Plate current (milliamps)
Plate voltage (volts)
0
1
2
3
4
5
0
5
10
15
20
25
30
35

B


6 ES 6
Plate voltage = 6.3 volts
Grid No 2 voltage = 3.2 volts
Grid No 3 voltage = 0 volt
Plate resistance
Plate current
Grid No 2 current
Transconductance
10000
1000
100
10
1
Plate and grid No 2 current (microamps)
Transconductance (micromhos)
Plate resistance (x 10³ ohms)
−20
−15
−10
−5
0
Grid No 1 voltage (volts)

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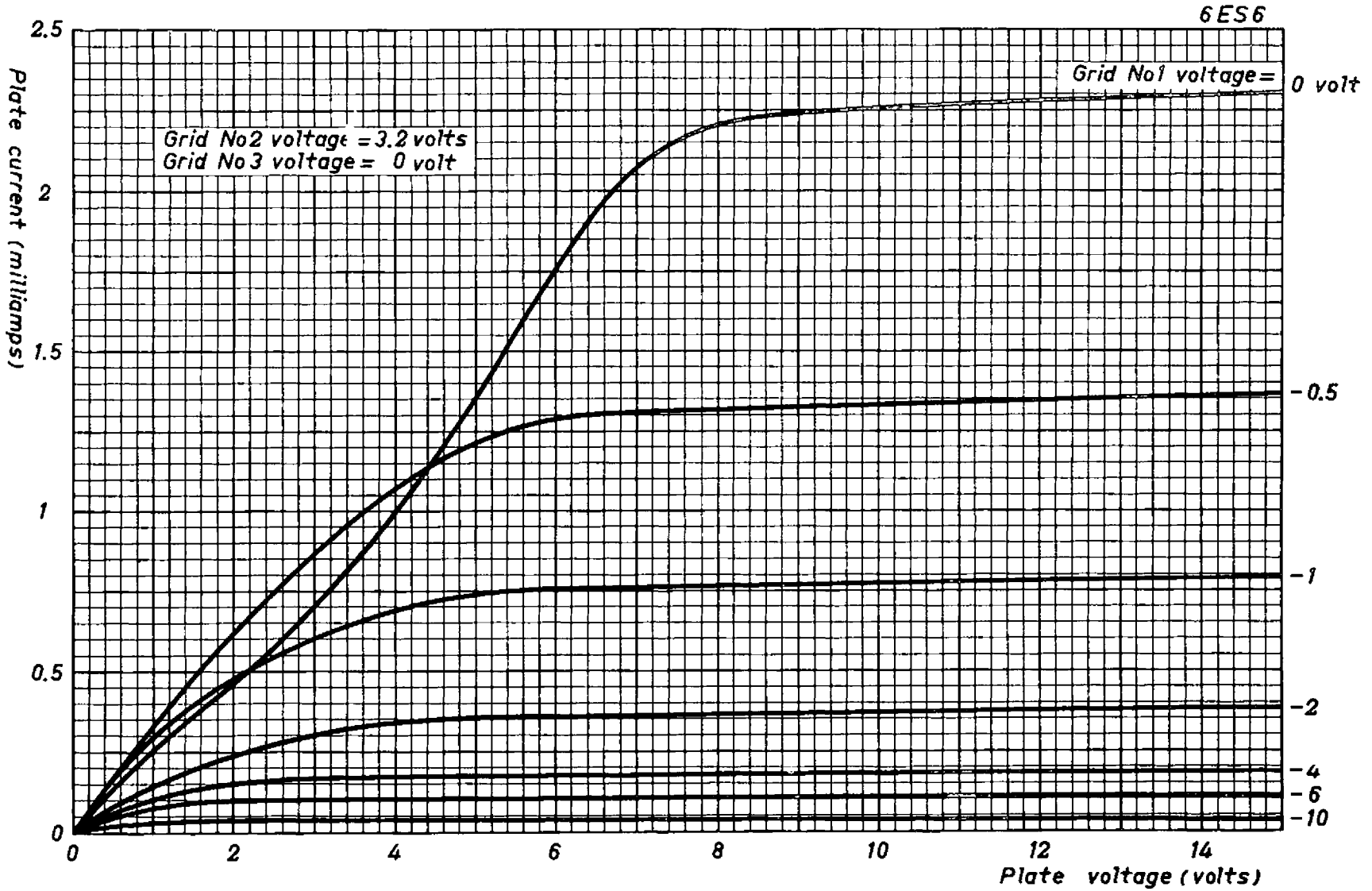
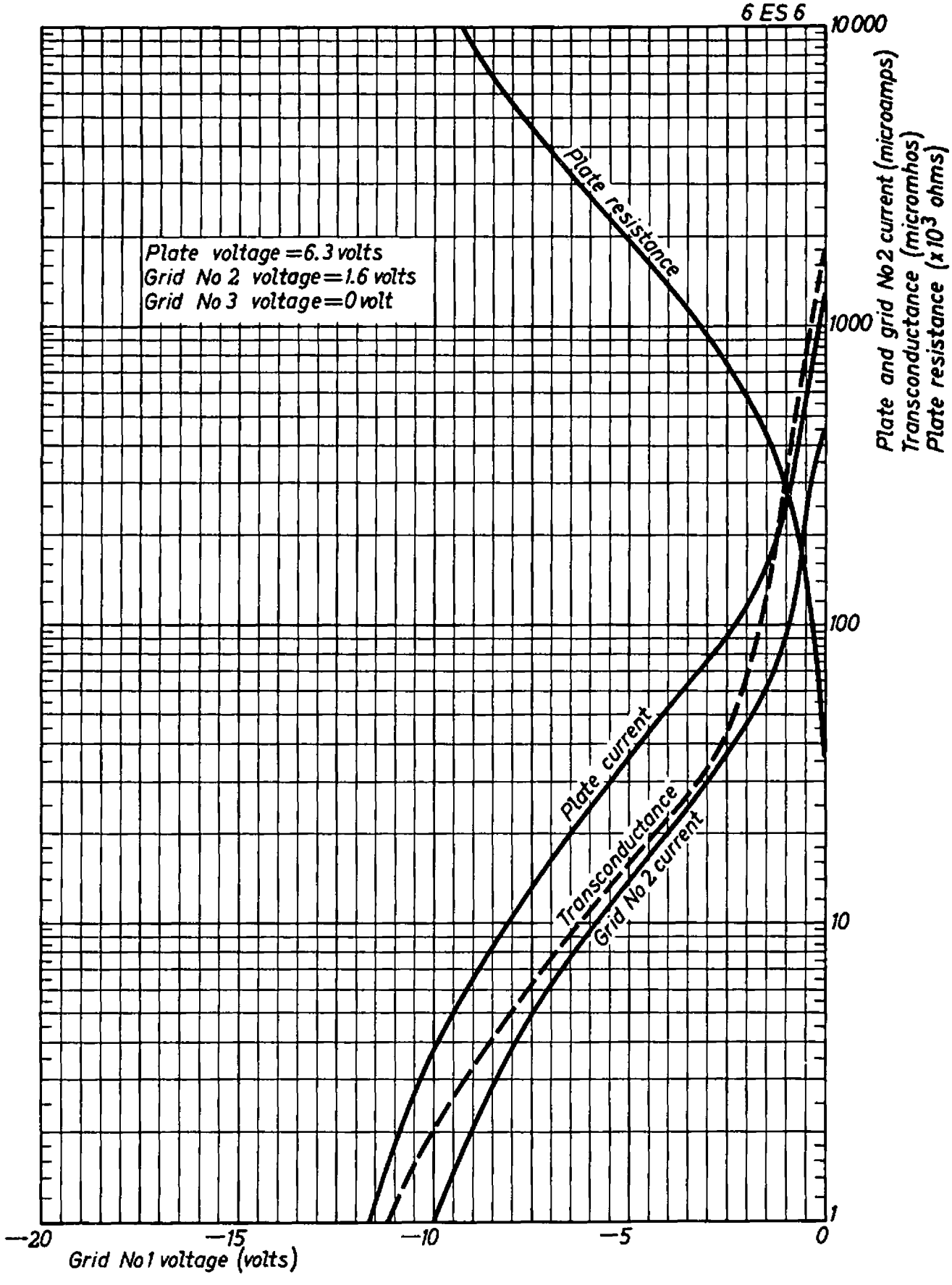

6ES6
Grid No1 voltage = 0 volt
-0.5
-1
-2
-4
-6
-10
Grid No2 voltage = 3.2 volts
Grid No3 voltage = 0 volt
Plate current (milliamps)
2.5
2
1.5
1
0.5
0
0
2
4
6
8
10
12
14
Plate voltage (volts)

D


6 ES 6
Plate voltage = 6.3 volts
Grid No 2 voltage = 1.6 volts
Grid No 3 voltage = 0 volt
Plate resistance
Plate current
Transconductance
Grid No 2 current
10000
1000
100
10
1
Plate and grid No 2 current (microamps)
Transconductance (micromhos)
Plate resistance (x10^3 ohms)
−20
−15
−10
−5
0
Grid No 1 voltage (volts)

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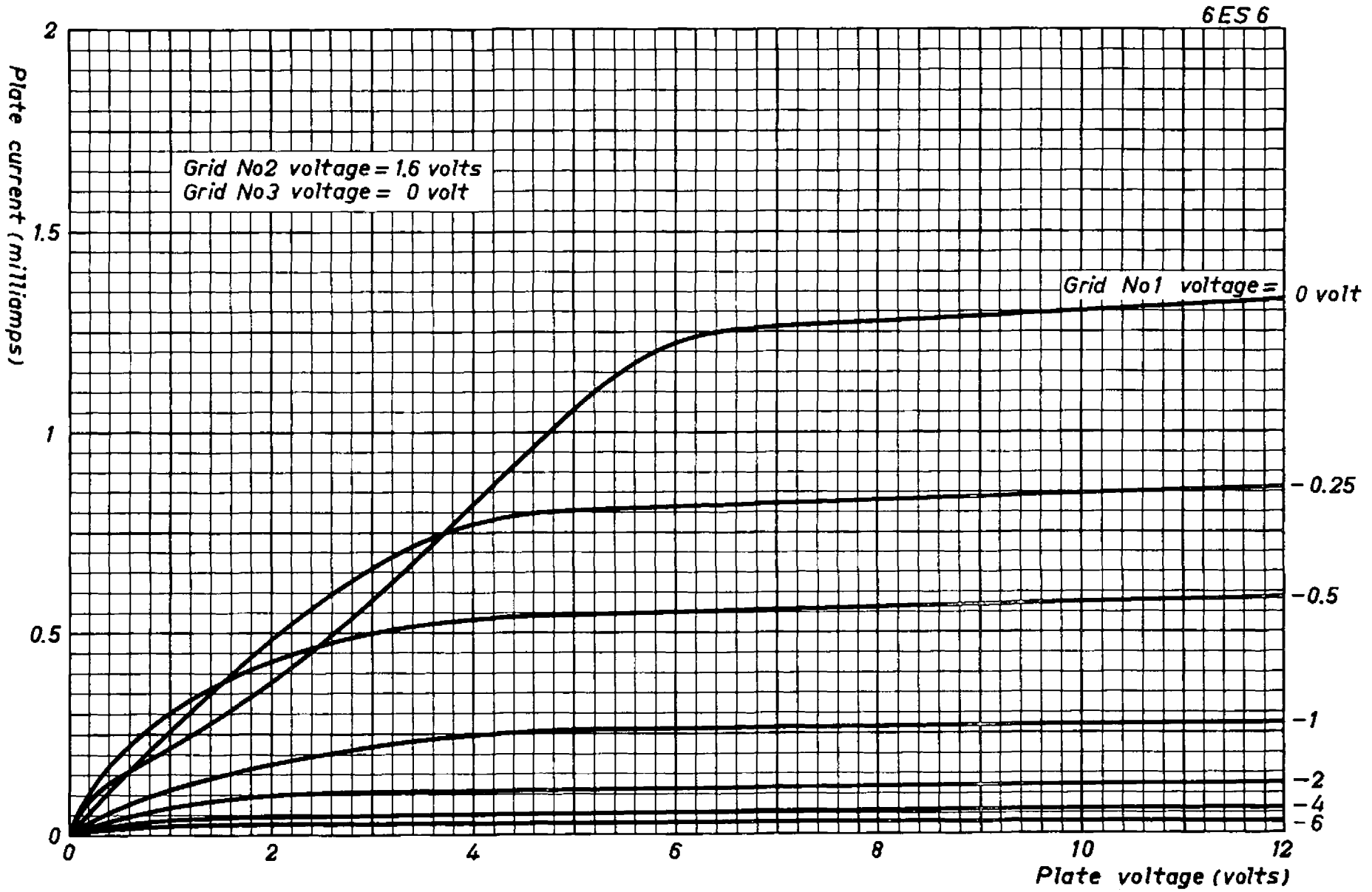
E


6ES6
Grid No2 voltage = 1.6 volts
Grid No3 voltage = 0 volt
Grid No1 voltage =
0 volt
-0.25
-0.5
-1
-2
-4
-6
Plate current (milliamps)
2
1.5
1
0.5
0
0
2
4
6
8
10
12
Plate voltage (volts)

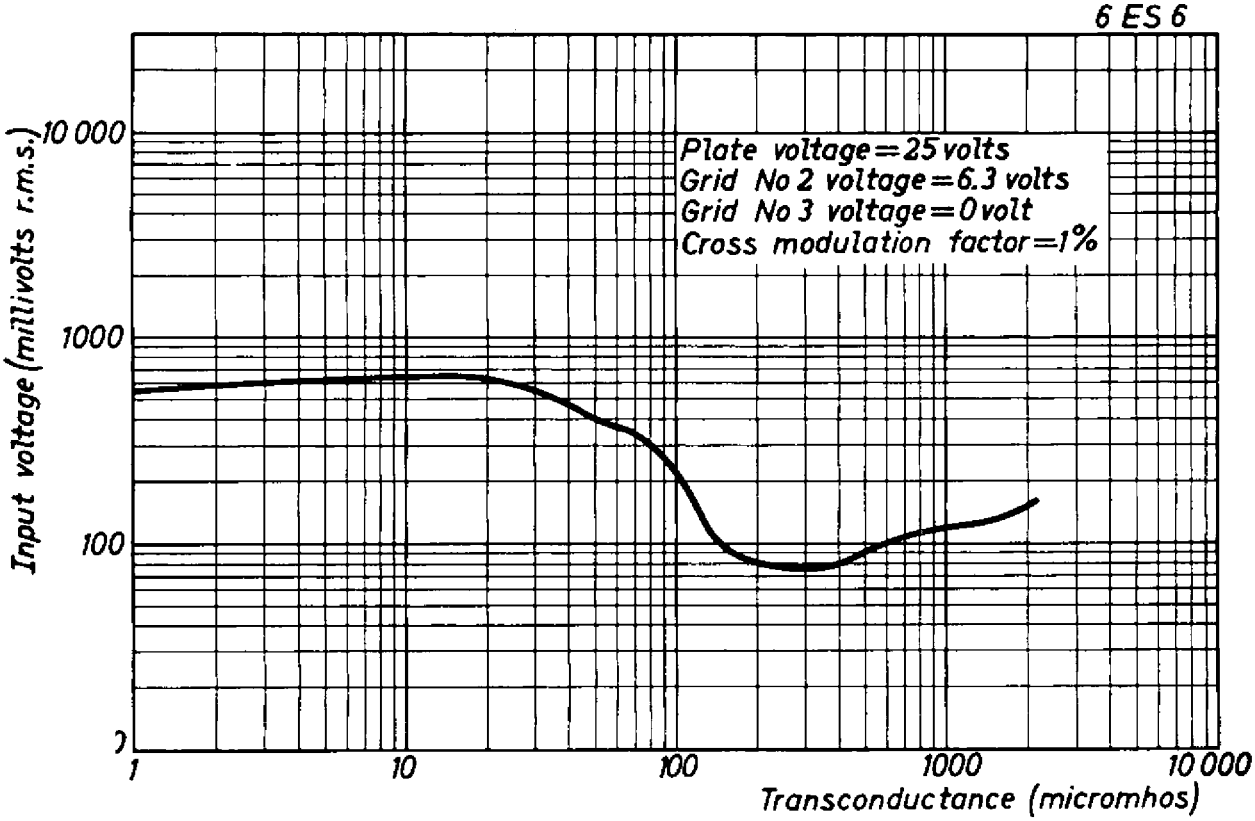


Plate voltage = 25 volts
Grid No 2 voltage = 6.3 volts
Grid No 3 voltage = 0 volt
Cross modulation factor = 1%
Input voltage (millivolts r.m.s.)
10 000
1000
100
1
10
100
1000
10 000
Transconductance (micromhos)

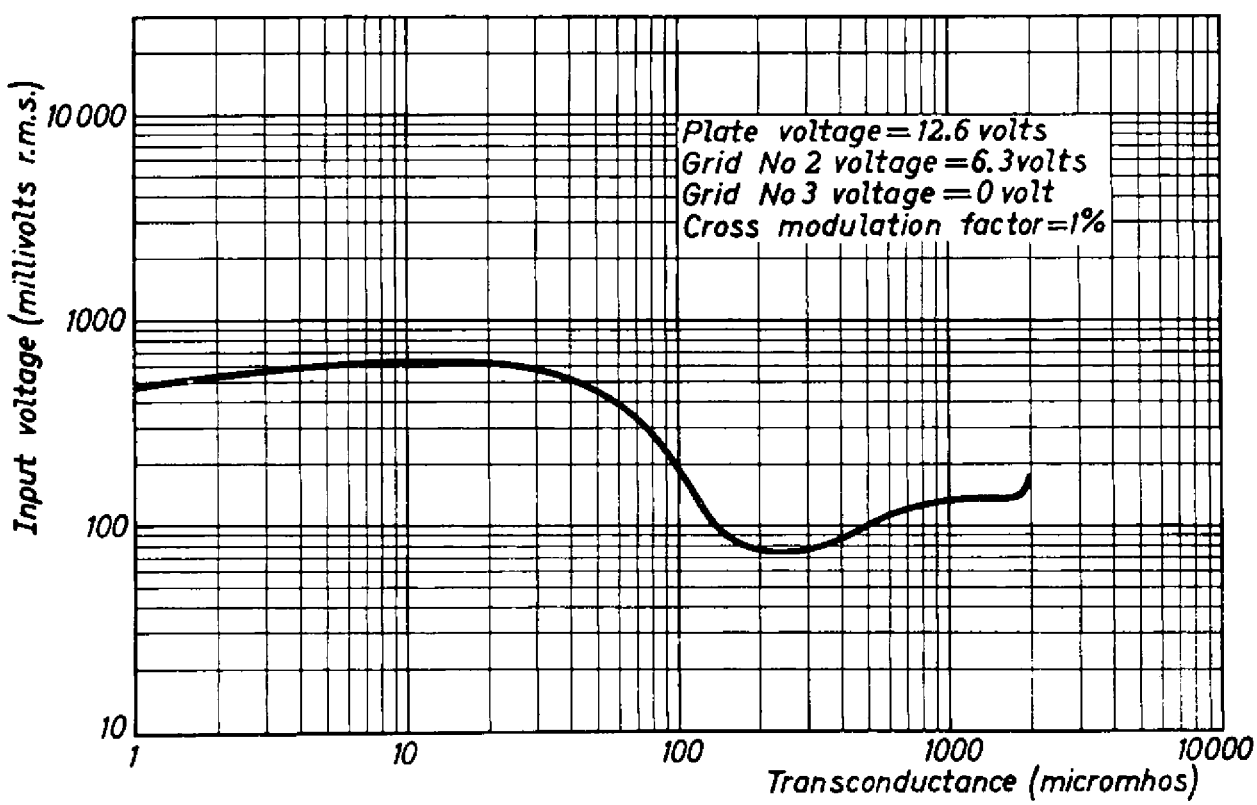


Plate voltage = 12.6 volts
Grid No 2 voltage = 6.3 volts
Grid No 3 voltage = 0 volt
Cross modulation factor = 1%
Input voltage (millivolts r.m.s.)
10 000
1000
100
10
1
10
100
1000
10000
Transconductance (micromhos)

6ES6

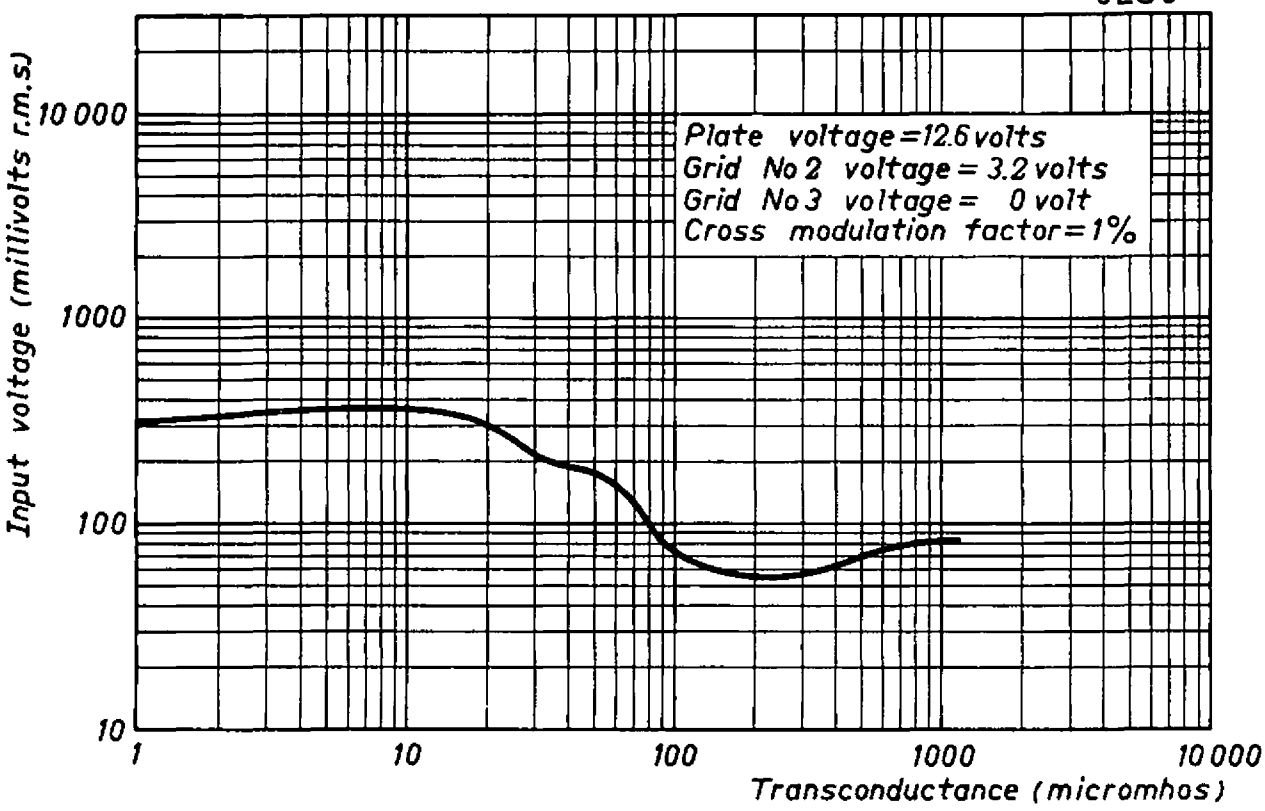


Plate voltage = 12.6 volts
Grid No 2 voltage = 3.2 volts
Grid No 3 voltage = 0 volt
Cross modulation factor = 1%
Input voltage (millivolts r.m.s)
10 000
1000
100
10
1
10
100
1000
10 000
Transconductance (micromhos)

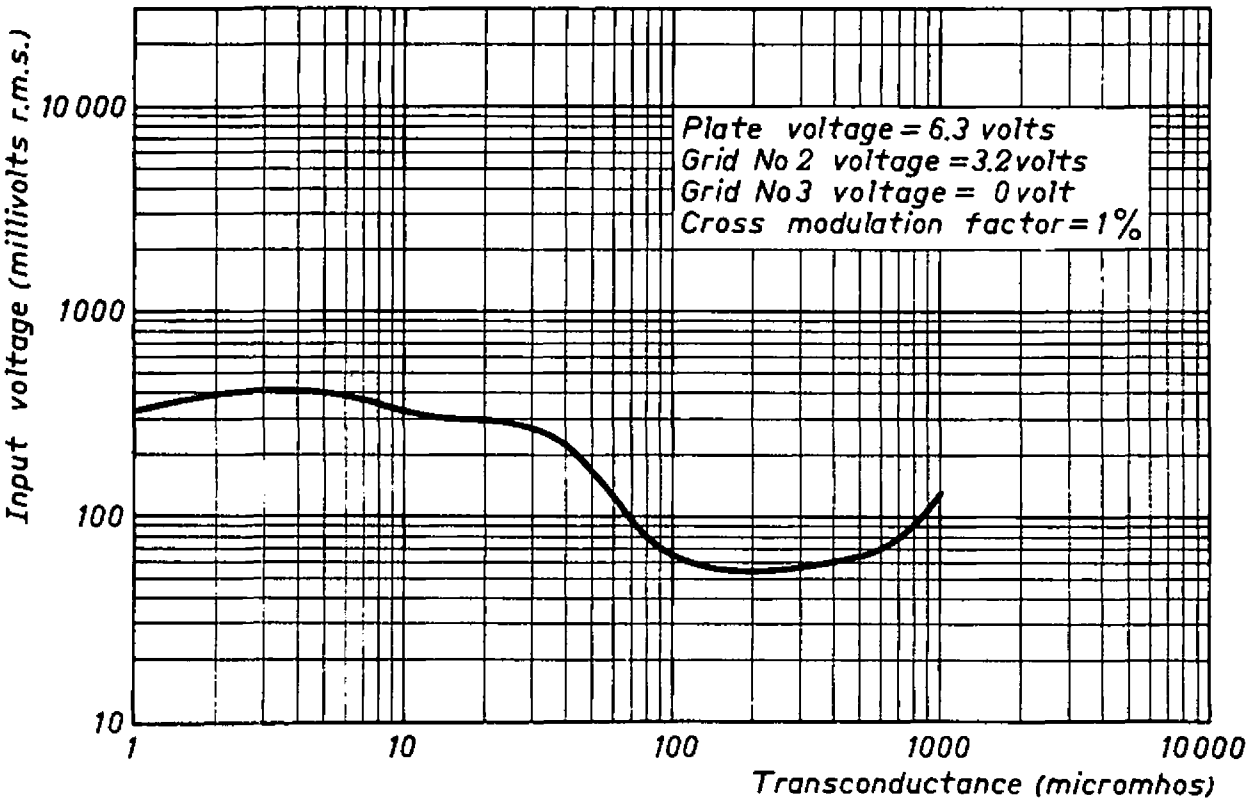
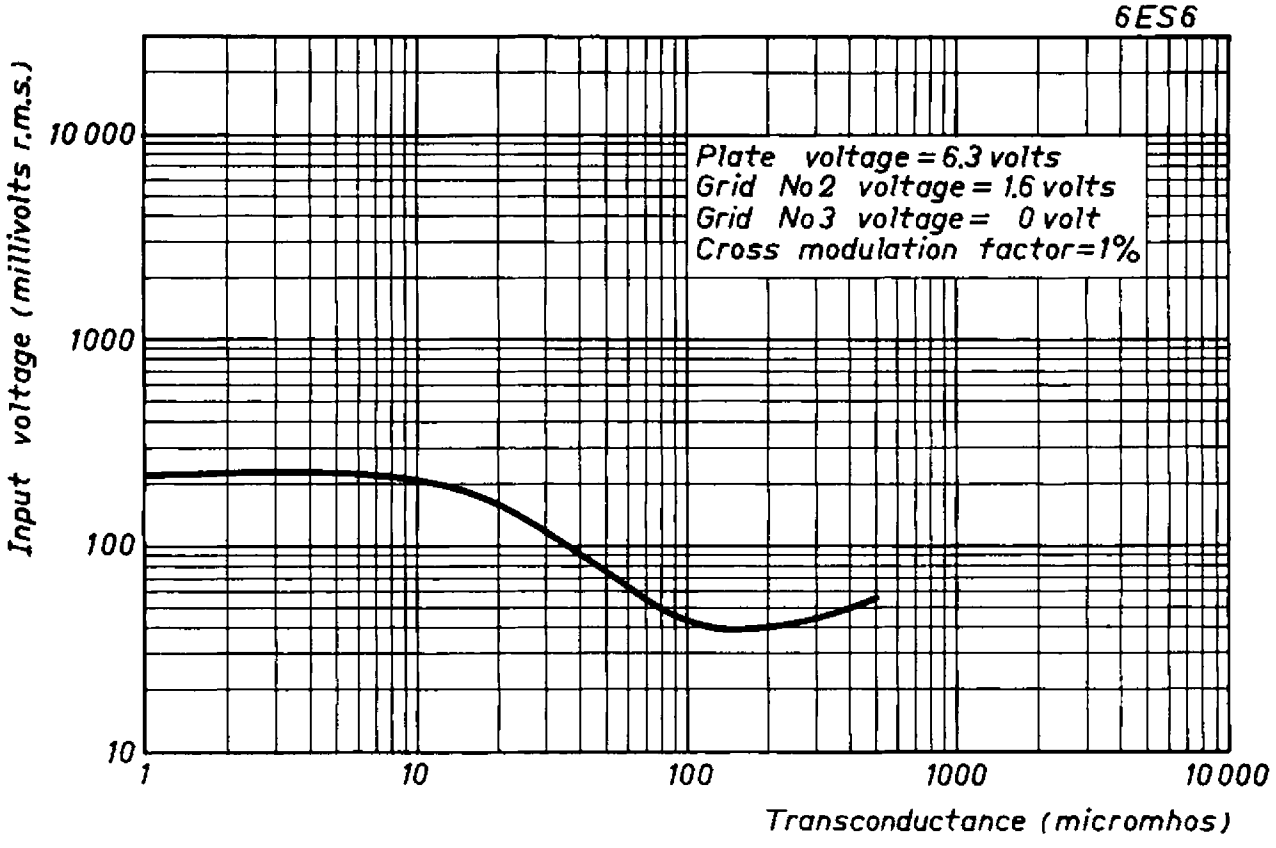
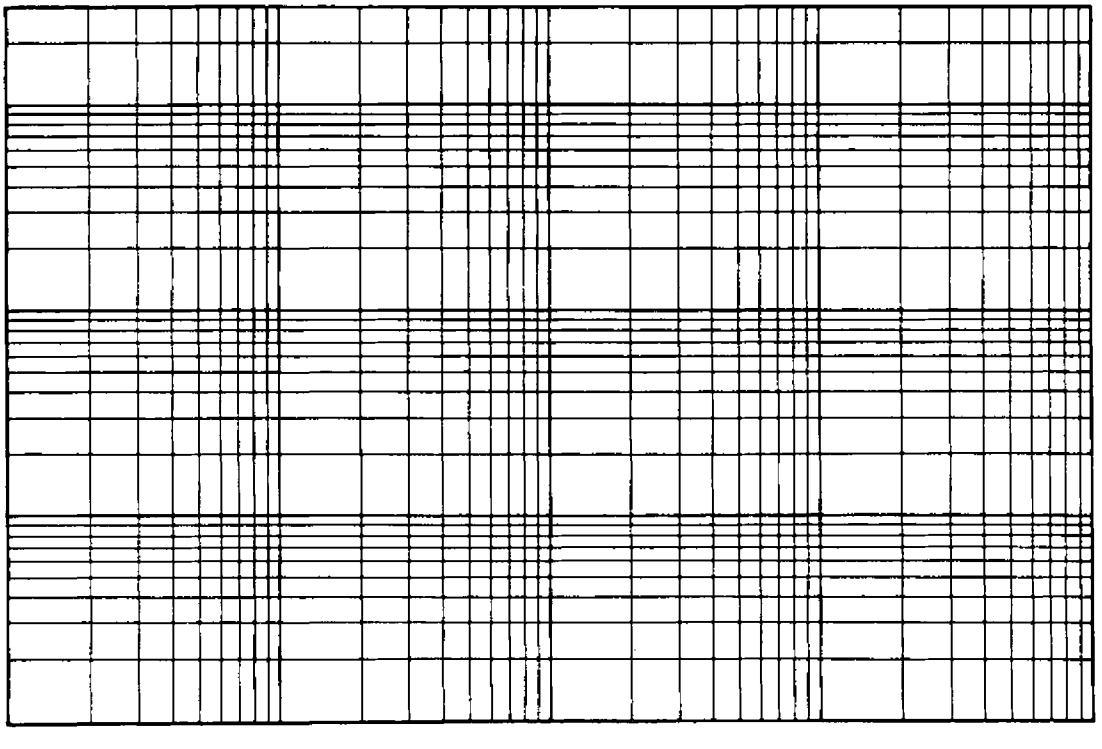


Plate voltage = 6.3 volts
Grid No 2 voltage = 3.2 volts
Grid No 3 voltage = 0 volt
Cross modulation factor = 1%
Input voltage (millivolts r.m.s.)
10 000
1000
100
10
1
10
100
1000
10 000
Transconductance (micromhos)


6ES6
Plate voltage = 6.3 volts
Grid No 2 voltage = 1.6 volts
Grid No 3 voltage = 0 volt
Cross modulation factor = 1%
Input voltage (millivolts r.m.s.)
10 000
1000
100
10
1
10
100
1000
10 000
Transconductance (micromhos)



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