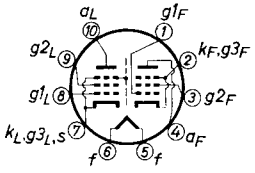
DOUBLE PENTODE FOR USE IN TELEVISION RECEIVERS

Double pentode for use as video output tube and as sync separator, A.G.C. amplifier or I.F. sound amplifier

HEATING: indirect, series supply

Heater voltage V_f = 17 V

Heater current I_f = 0.3 A



Base : DECAL (Dimensions in mm)

CAPACITANCES Measured without external shield

		L section	F section
Anode to all other elements except grid No.1	C_a	= 7 pF	= 11 pF
Grid No.1 to all other elements except anode	C_{g_1}	= 12 pF	= 10 pF
Anode to grid No.1	C_{ag_1}	= 0.095 pF	= 0.14 pF
Grid No.1 to heater	C_{g_1f}		< 0.10 pF

7Z2 2233

CAPACITANCES Measured without external shield (Continued)

Between the two pentode sections

Anode L section to anode F section	Ca_La_F	< 0.15 pF
Grid No.1 L section to grid No.1 F section	Cg_1Lg_1F	< 0.01 pF
Anode L section to grid No.1 F section	Ca_Lg_1F	< 0.10 pF
Grid No.1 L section to anode F section	Cg_1La_F	< 0.005 pF

TYPICAL CHARACTERISTICS

Output pentode (L section)

Anode voltage	V_a	=	170 V
Grid No.2 voltage	V_{g_2}	=	170 V
Grid No.1 voltage	V_{g_1}	=	−2.6 V
Anode current	I_a	=	30 mA
Grid No.2 current	I_{g_2}	=	6.5 mA
Mutual conductance	S	=	21 mA/V
Internal resistance	R_i	=	40 kΩ
Amplification factor of grid No.2 with respect to grid No.1	$\mu_{g_2g_1}$	=	38

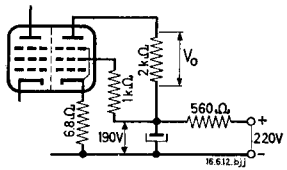
Amplifier pentode (F section)

Anode voltage	V_a	=	150 V
Grid No.2 voltage	V_{g_2}	=	150 V
Grid No.1 voltage	V_{g_1}	=	−2.3 V
Anode current	I_a	=	10 mA
Grid No.2 current	I_{g_2}	=	3.0 mA
Mutual conductance	S	=	8.5 mA/V
Internal resistance	R_i	=	160 kΩ
Amplification factor of grid No.2 with respect to grid No.1	$\mu_{g_2g_1}$	=	35

7Z2 2234

OPERATING CHARACTERISTICS

Output pentode (L section)



Input voltage (peak to peak)	V_{ip-p}	= 3.6 V
Output voltage (peak to peak)	V_{op-p}	= 100 V

Amplifier pentode (F section)

		Sync Separator	A.G.C. amplifier	I.F. amplifier
V_b	=	220 V		
R_a	=	50 kΩ		
V_a	=		150 V	150 V
V_{g_2}	=	75 V	60 V	150 V
R_{g_1}	=	1 MΩ		
V_{g_1}	=	−2.7 V	−1.3 V	−2.3 V
I_a	=	0.1 mA	1 mA	10 mA
S	=	0.25 mA/V	2.5 mA/V	8.5 mA/V

7Z2 2235

LIMITING VALUES (Design centre limits)

Output pentode (L section)

Anode voltage in cold condition	V_{a_o}	= max. 550 V
Anode voltage	V_a	= max. 250 V
Anode dissipation	W_a	= max. 5 W
Grid No.2 voltage in cold condition	$V_{g_{2o}}$	= max. 550 V
Grid No.2 voltage	V_{g_2}	= max. 250 V
Grid No.2 dissipation	W_{g_2}	= max. 2.5 W [1]
Grid No.1 circuit resistance	R_{g_1}	= max. 1 MΩ
Cathode current	I_k	= max. 60 mA [2]
Heater to cathode voltage	V_{kf}	= max. 200 V

Amplifier pentode (F section)

Anode voltage in cold condition	V_{a_o}	= max. 550 V
Anode voltage	V_a	= max. 250 V
Anode dissipation	W_a	= max. 1.5 W
Grid No.2 voltage in cold condition	$V_{g_{2o}}$	= max. 550 V
Grid No.2 voltage	V_{g_2}	= max. 250 V
Grid No.2 dissipation	W_{g_2}	= max. 0.5 W
Grid No.1 circuit resistance	R_{g_1}	= max. 1 MΩ
Cathode current	I_k	= max. 15 mA
Heater to cathode voltage	V_{kf}	= max. 200 V

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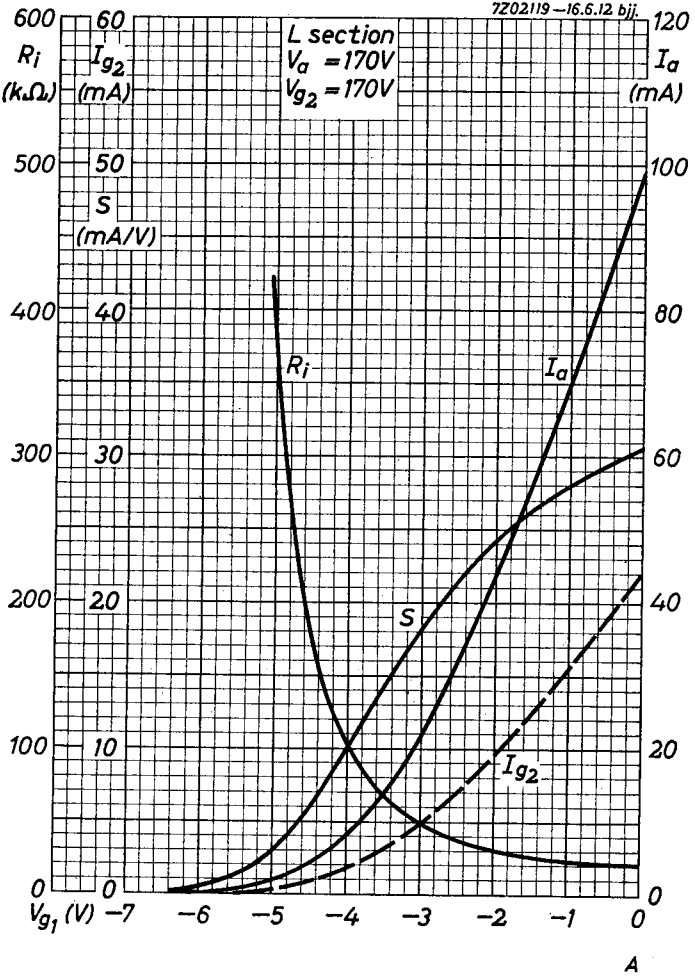
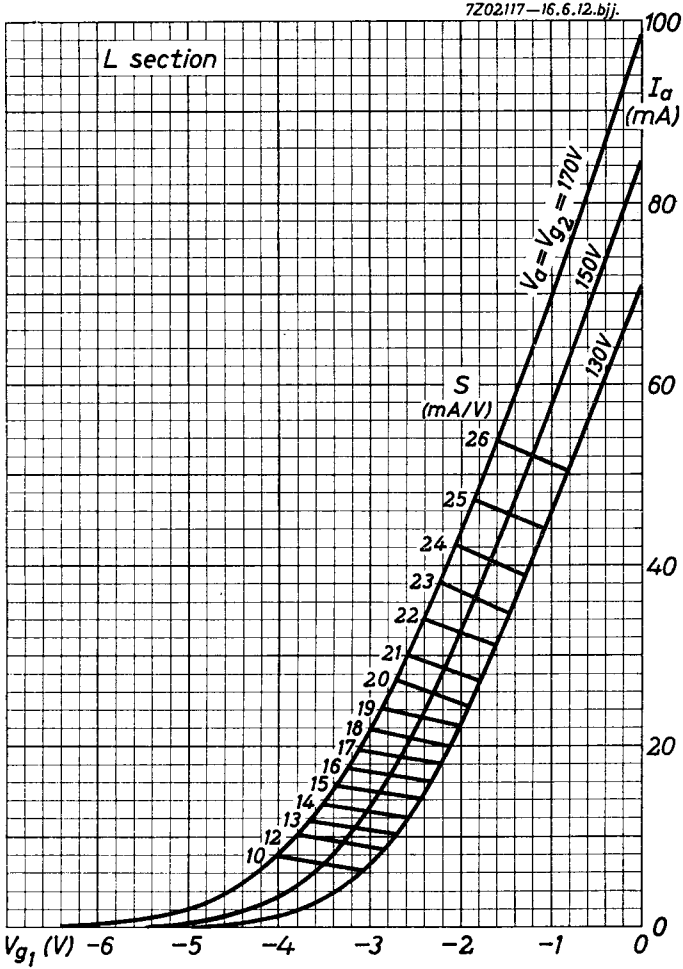
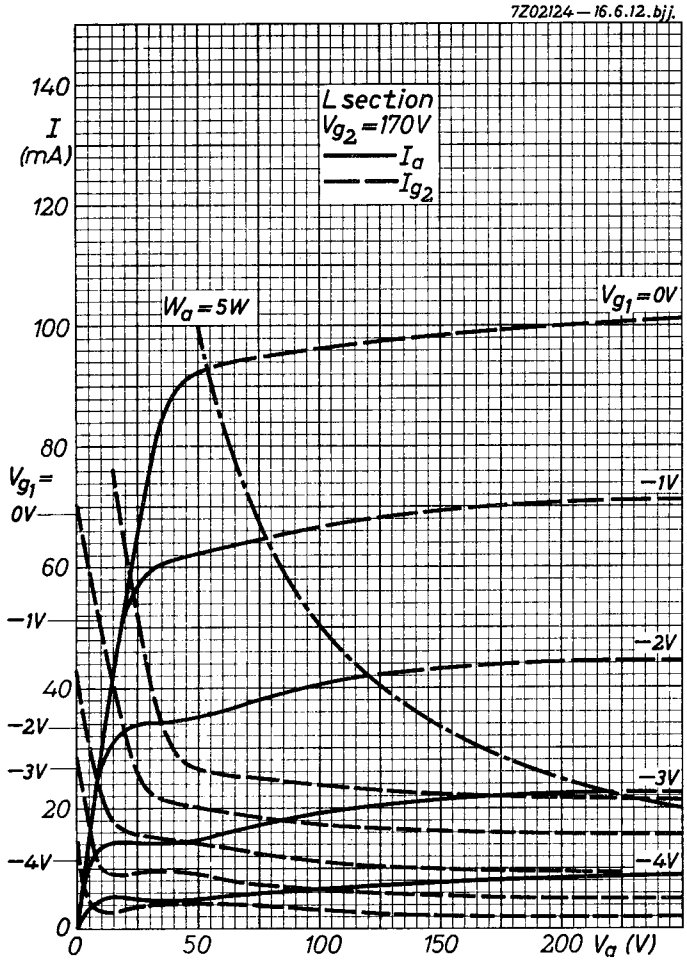
1) During short periods W_{g_2} = max. 3.2 W

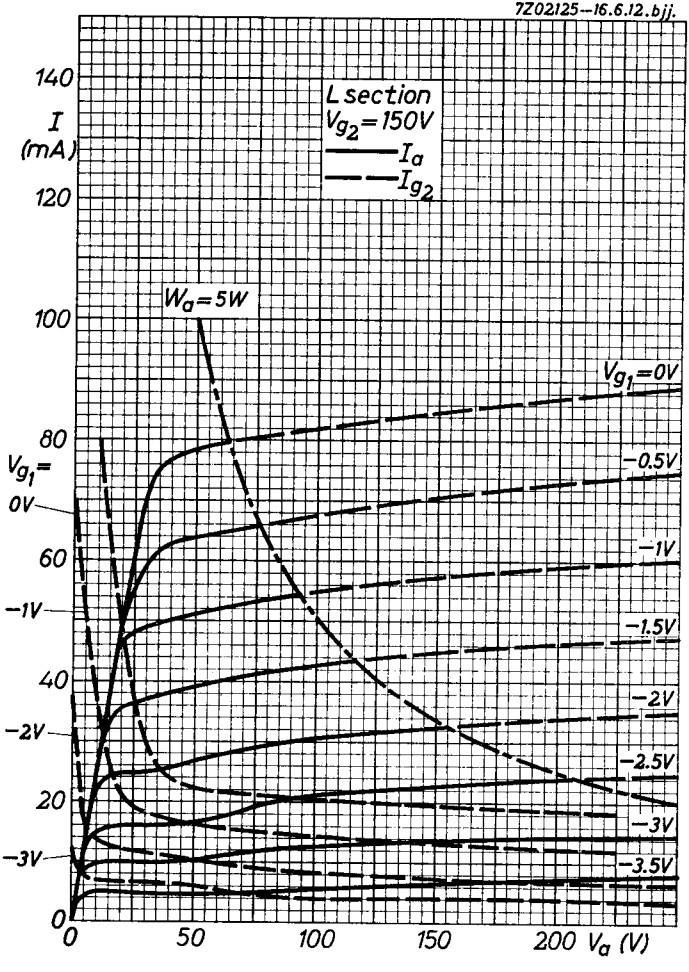
2) During short periods I_k = max. 85 mA

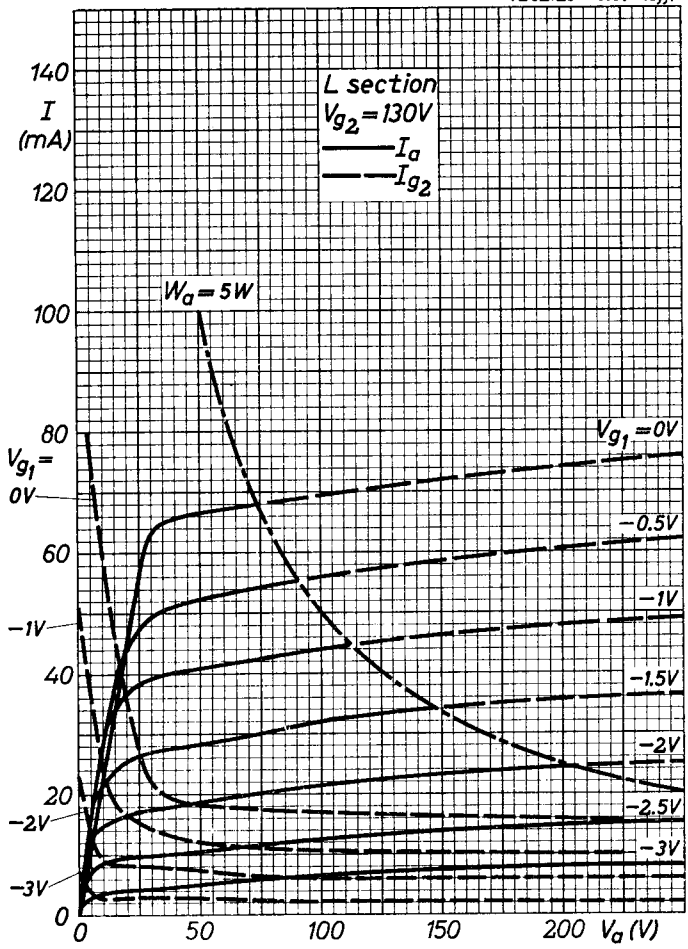
7Z2 2236

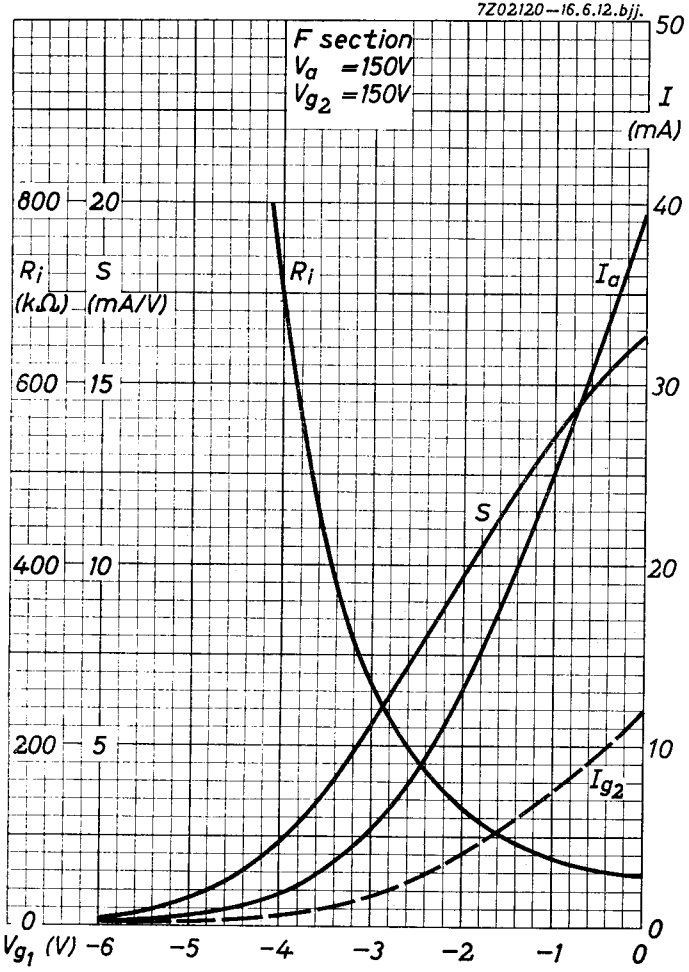

7Z02119—16.6.12 bij.
L section
V_a = 170V
V_{g_2} = 170V
R_i (kΩ)
I_{g_2} (mA)
S (mA/V)
I_a (mA)
600
500
400
300
200
100
0
60
50
40
30
20
10
0
120
100
80
60
40
20
0
R_i
I_a
S
I_{g_2}
V_{g_1} (V) −7 −6 −5 −4 −3 −2 −1 0
A

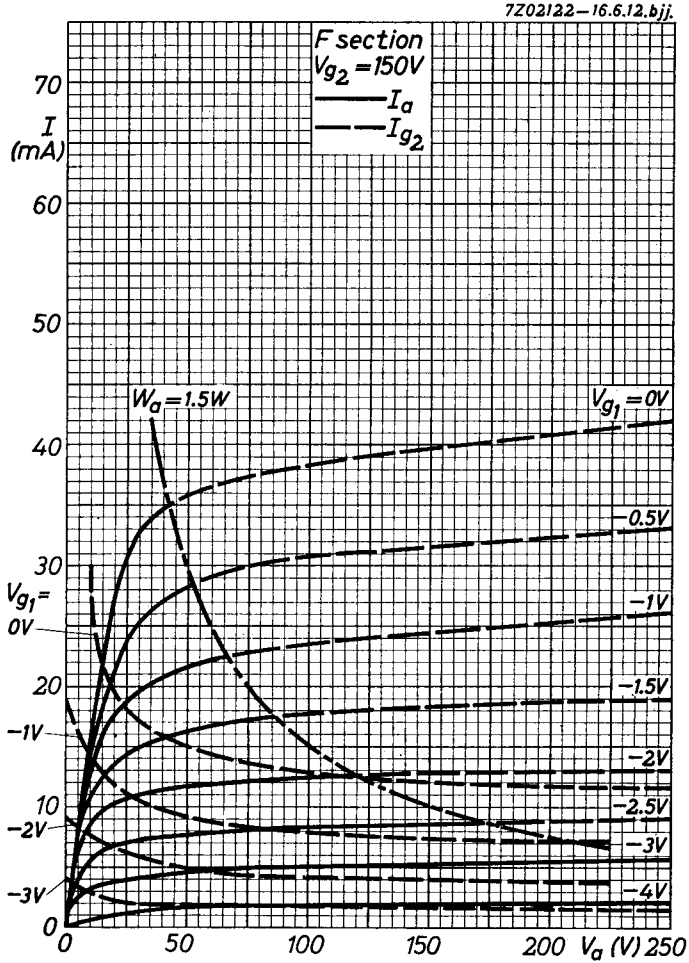

7Z02117—16.6.12.bjj.
L section
I_a (mA)
100
80
60
40
20
0
$V_a = V_{g2}$ = 170V
150V
130V
S (mA/V)
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
10
V_{g1} (V) −6 −5 −4 −3 −2 −1 0

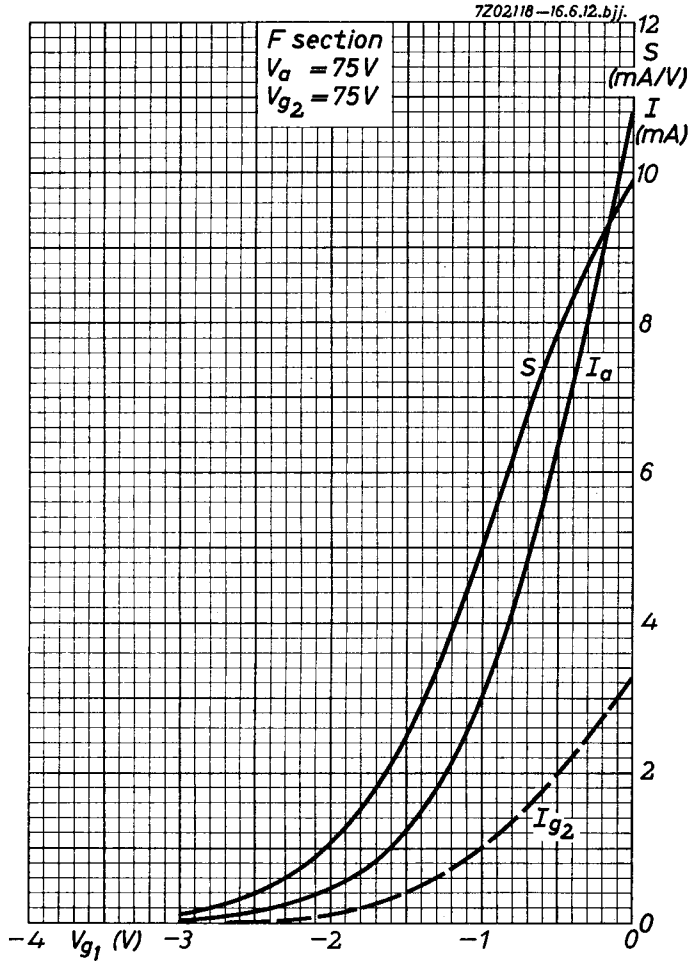

7Z02124 — 16.6.12.bjj.
L section
V_{g_2} = 170V
I_a
I_{g_2}
I (mA)
140
120
100
80
60
40
20
0
W_a = 5W
V_{g_1} = 0V
−1V
−2V
−3V
−4V
V_{g_1} =
0V
−1V
−2V
−3V
−4V
0
50
100
150
200
V_a (V)

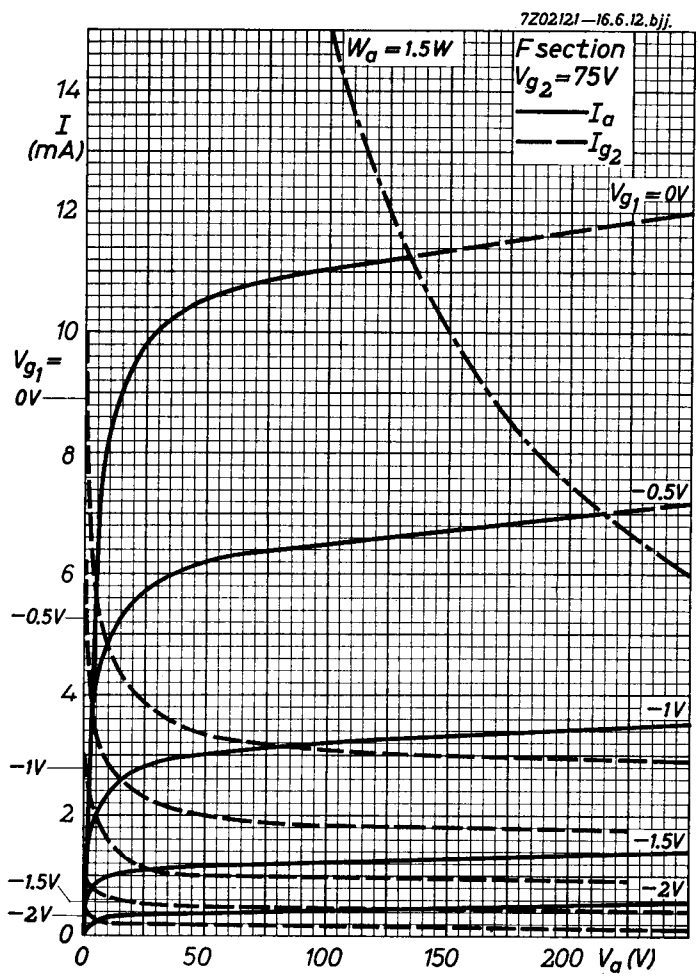

7Z02125—16.6.12.bjj.
L section
V_{g_2}=150V
I_a
I_{g_2}
W_a=5W
V_{g_1}=0V
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V
−3.5V
V_{g_1}=
0V
−1V
−2V
−3V
I (mA)
140
120
100
80
60
40
20
0
0
50
100
150
200 V_a (V)


7Z02123-16.6.12.bjj.
L section
V_{g_2} = 130V
I_a
I_{g_2}
W_a = 5W
V_{g_1} = 0V
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V
I (mA)
140
120
100
80
60
40
20
0
0
50
100
150
200
V_a (V)


7Z02120—16.6.12.bjj.
F section
V_a =150V
V_{g_2} =150V
I
(mA)
50
40
30
20
10
0
R_i
(kΩ)
S
(mA/V)
800
600
400
200
0
20
15
10
5
R_i
I_a
S
I_{g_2}
V_{g_1} (V) −6 −5 −4 −3 −2 −1 0


7Z02122—16.6.12.bjj.
F section
V_{g_2} = 150V
——— I_a
— — I_{g_2}
I (mA)
70
60
50
40
30
20
10
0
W_a = 1.5W
V_{g_1} = 0V
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V
−4V
V_{g_1} = 0V
−1V
−2V
−3V
0
50
100
150
200
V_a (V) 250


7Z02118—16.6.12.bjj.
F section
V_a = 75V
V_{g_2} = 75V
S
(mA/V)
I
(mA)
12
10
8
6
4
2
0
S
I_a
I_{g_2}
−4
V_{g_1} (V)
−3
−2
−1
0


7Z02121—16.6.12.bjj.
$W_a = 1.5W$
F section
$V_{g_2} = 75V$
I_a
I_{g_2}
I (mA)
$V_{g_1} = 0V$
V_{g_1} = 0V
−0.5V
−1V
−1.5V
−2V
V_a (V)
0
50
100
150
200

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page	sheet	date
1	1	1964.02.02
2	2	1964.02.02
3	3	1964.02.02
4	4	1964.02.02
5	A	1964.02.02
6	B	1964.02.02
7	C	1964.02.02
8	D	1964.02.02
9	E	1964.02.02
10	F	1964.02.02
11	G	1964.02.02
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14	FP	2000.05.06