TRIODE PENTODE

Triode pentode with separate cathodes intended for use as frequency changer in television receivers.

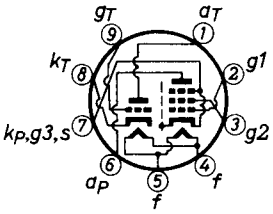
QUICK REFERENCE DATA			
Triode section			
Anode current	I_a	14	mA
Transconductance	S	5	mA/V
Amplification factor	μ	20	-
Pentode section			
Anode current	I_a	10	mA
Transconductance	S	6.2	mA/V
Amplification factor	$\mu_{g_2g_1}$	47	-

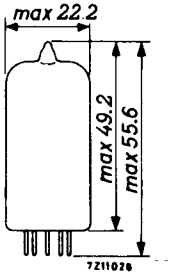
HEATING: Indirect by A.C. or D.C.; series supply

Heater current	I_f	300	mA
Heater voltage	V_f	9	V

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Noval





CAPACITANCES

Triode section (numbers denote pin number)

Anode to all except grid (1-4+5+7+8)	$C_{a(g)}$	1.8	pF
Grid to all except anode (9-4+5+7+8)	$C_{g(a)}$	2.5	pF
Anode to grid	C_{ag}	1.5	pF

Pentode section

Anode to all except grid No.1	$C_{a(g_1)}$	3.4	pF
Grid No.1 to all except anode	$C_{g_1(a)}$	5.2	pF
Anode to grid No.1	C_{ag_1}	max. 0.025	pF

Between triode and pentode sections

Anode triode to grid No.1 pentode	$C_{a_Tg_{1P}}$	max. 0.16	pF
Grid triode to anode pentode	$C_{g_Ta_P}$	max. 0.02	pF
Anode triode to anode pentode	$C_{a_Ta_P}$	max. 0.07	pF

TYPICAL CHARACTERISTICS

Triode section

Anode voltage	V_a	100	V
Grid voltage	V_g	−2	V
Anode current	I_a	14	mA
Transconductance	S	5	mA/V
Amplification factor	μ	20	–

Pentode section

Anode voltage	V_a	170	V
Grid No.2 voltage	V_{g_2}	170	V
Grid No.1 voltage	V_{g_1}	−2	V
Anode current	I_a	10	mA
Grid No.2 current	I_{g_2}	2.8	mA
Transconductance	S	6.2	mA/V
Amplification factor	$\mu_{g_2g_1}$	47	–
Internal resistance	R_i	0.4	MΩ
Grid No.1 impedance (Frequency 50 MHz)	r_{g_1}	10	kΩ
Equivalent noise resistance	R_{eq}	1.5	kΩ

OPERATING CONDITIONS

As frequency changer (It is recommended to employ the triode in a Colpitts type of circuit and not in a Hartley type)

Anode voltage	V_a	170	170	V
Grid No.2 voltage	V_{g_2}	170	170	V
Grid No.1 resistor	R_{g_1}	0.1	0.1	MΩ
Cathode resistor	R_k	330	820	Ω
Oscillator voltage	V_{osc}	3.5	3.5	V_{RMS}
Anode current	I_a	6.5	5.2	mA
Grid No.2 current	I_{g_2}	2.0	1.5	mA
Grid No.1 current	I_{g_1}	20	0	μA
Conversion conductance	S_c	2.2	2.1	mA/V
Internal resistance	R_i	800	870	kΩ

Frame output application (Optimum peak cathode current of the triode section)

To allow for tube spread, for deterioration during life and for emission drop at underheating the equipment should be so designed that it still operates satisfactorily with a peak cathode current of 100 mA (max. pulse duration 4 % of a cycle, but maximum 0.8 ms). The amplitude of the peak current occurring with new tubes should be limited automatically to this max. value of 100 mA. (E.g. by non-bypassed resistances in the grid lead.)

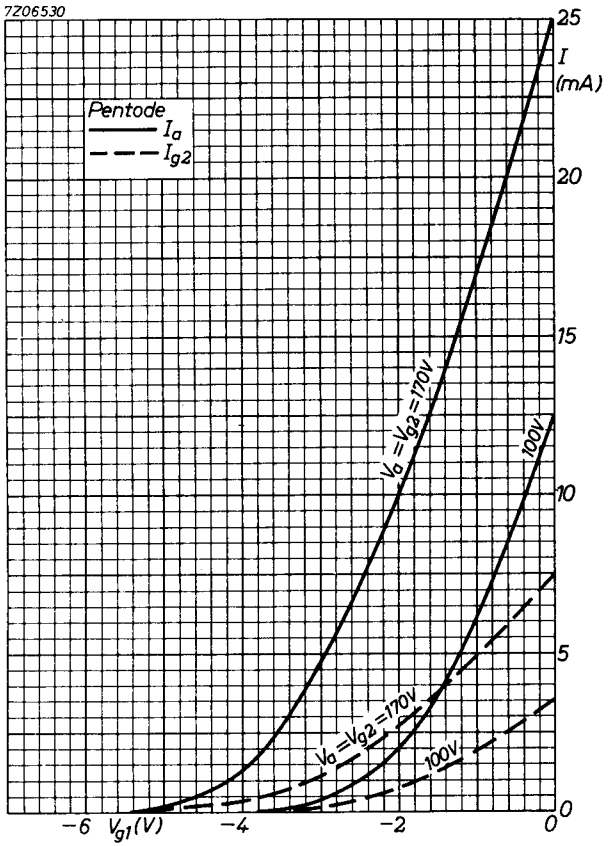
LIMITING VALUES (Design centre rating system)

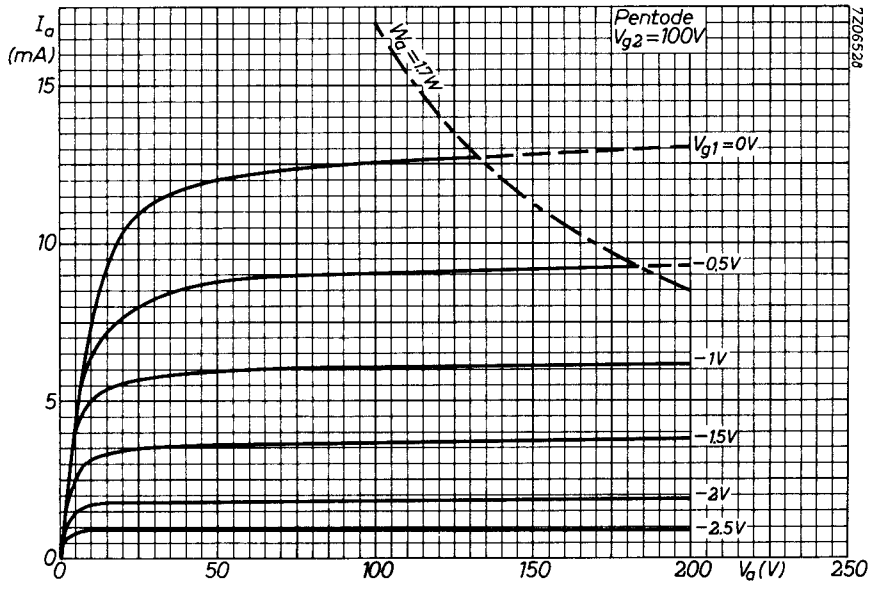
Triode section

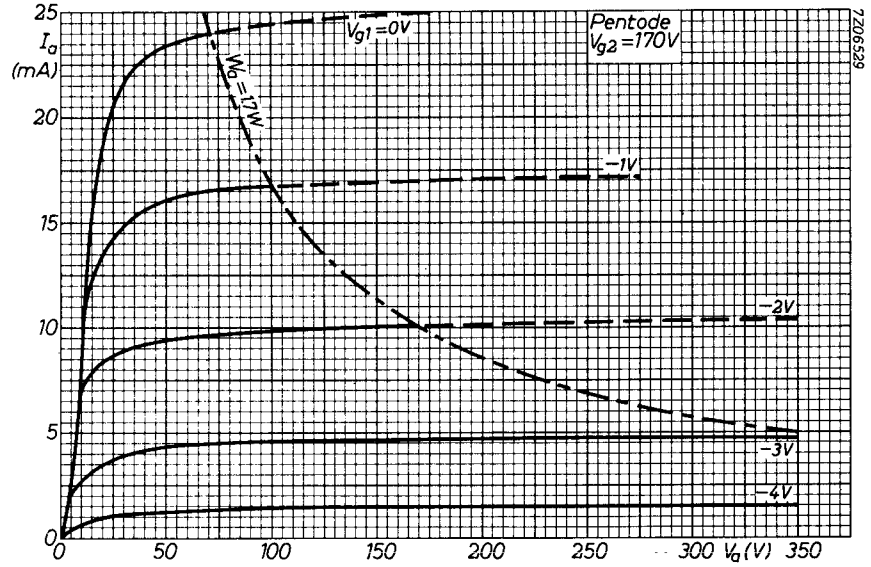
Anode voltage	V_{a_o}	max.	550	V
	V_a	max.	250	V
Anode dissipation	W_a	max.	1.5	W
Cathode current				
average	I_k	max.	14	mA
peak	I_{k_p}	see under "frame output applications"		
Grid resistor	R_g	max.	0.5	MΩ
Cathode to heater voltage				
cathode neg	V_{kf}	max.	100	V
cathode pos	V_{kf}	max.	200	V
	D.C. component	max.	120	V

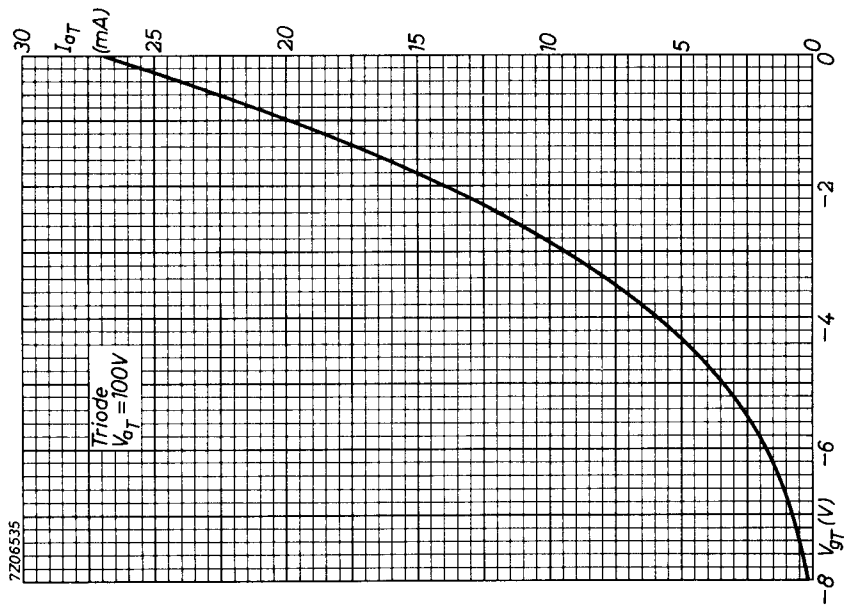
Pentode section

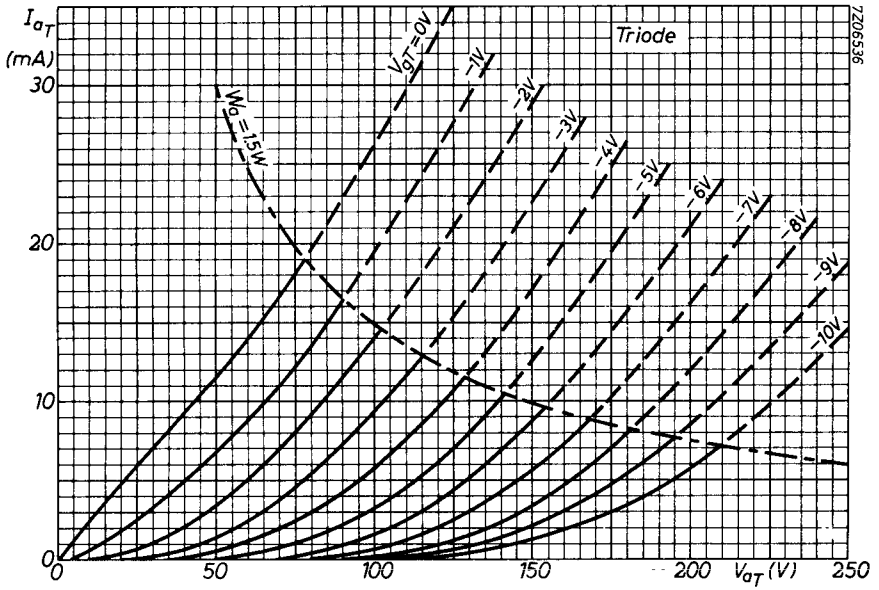
Anode voltage	V_{a_o}	max.	550	V
	V_a	max.	250	V
Grid No.2 voltage	$V_{g_{2_o}}$	max.	550	V
I_k = 14 mA	V_{g_2}	max.	175	V
I_k = max. 10 mA	V_{g_2}	max.	200	V
Anode dissipation	W_a	max.	1.7	W
Grid No.2 dissipation				
at W_a = min. 1.2 W	W_{g_2}	max.	0.5	W
at W_a = max. 1.2 W	W_{g_2}	max.	0.75	W
Cathode current	I_k	max.	14	mA
Grid resistor				
fixed bias	R_{g_1}	max.	0.5	MΩ
automatic bias	R_{g_1}	max.	1	MΩ
Cathode to heater voltage				
cathode neg	V_{kf}	max.	100	V
cathode pos	V_{kf}	max.	200	V
	D.C. component	max.	120	V

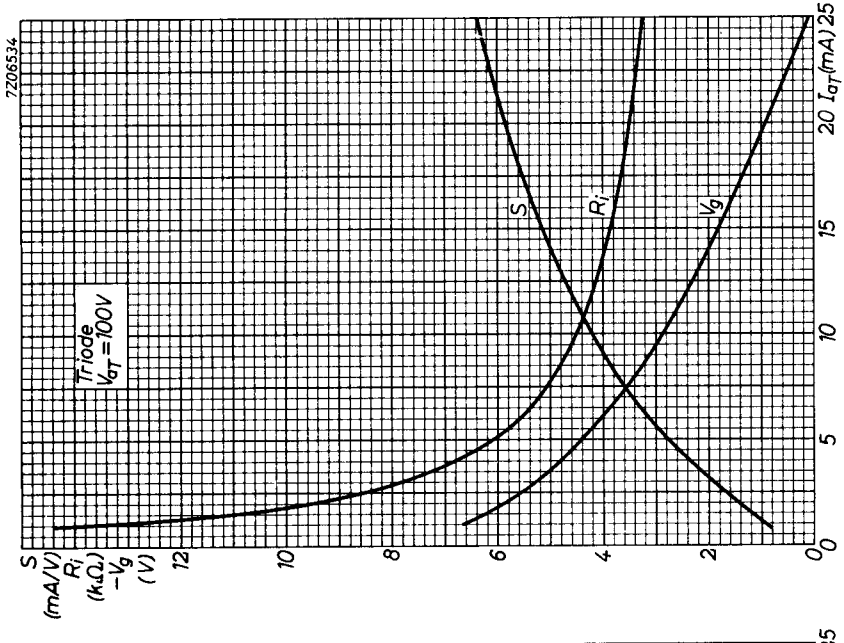

7206530
Pentode
I_a
I_{g2}
25
I
(mA)
20
15
10
5
0
$V_a = V_{g2} = 170V$
100V
$V_a = V_{g2} = 170V$
100V
−6
V_{g1}(V)
−4
−2
0

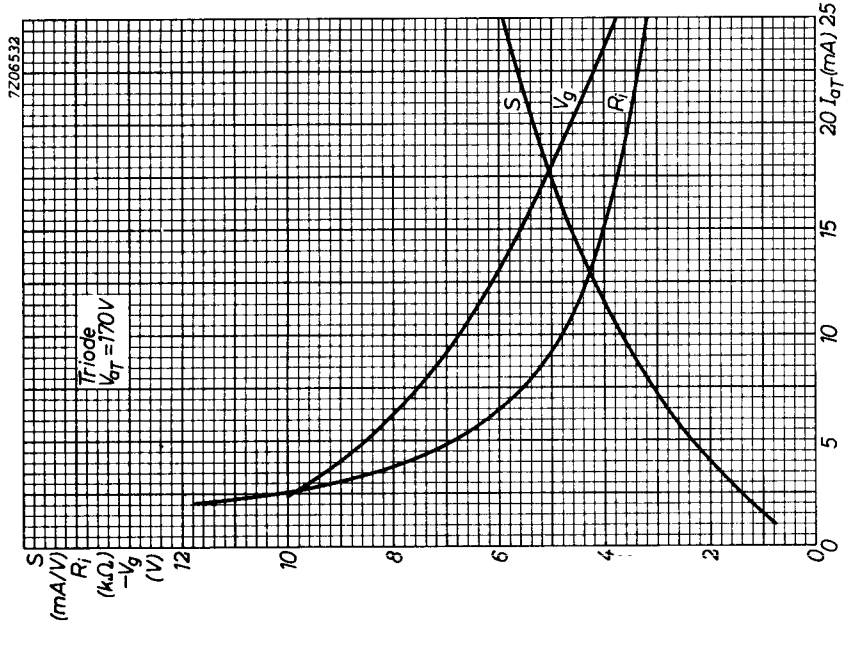

Pentode
V_{g2}=100V
7Z09528
I_a (mA)
W_a=1.7W
V_{g1}=0V
−0.5V
−1V
−1.5V
−2V
−2.5V
0
5
10
15
0
50
100
150
200
V_a(V)
250

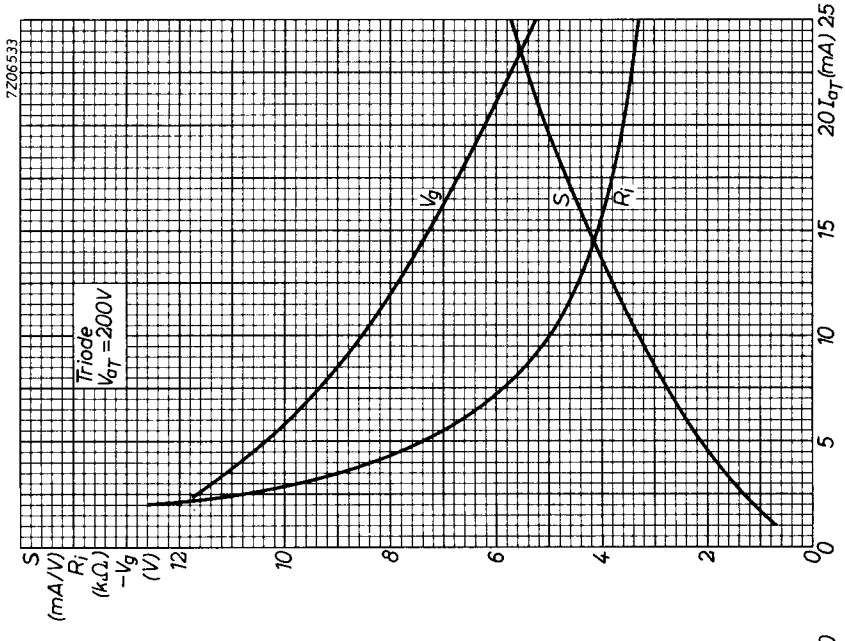

Pentode
V_{g2}=170V
7Z09529
I_a (mA)
V_{g1}=0V
W_a=1.7W
−1V
−2V
−3V
−4V
0
5
10
15
20
25
0
50
100
150
200
250
300
V_a(V)
350

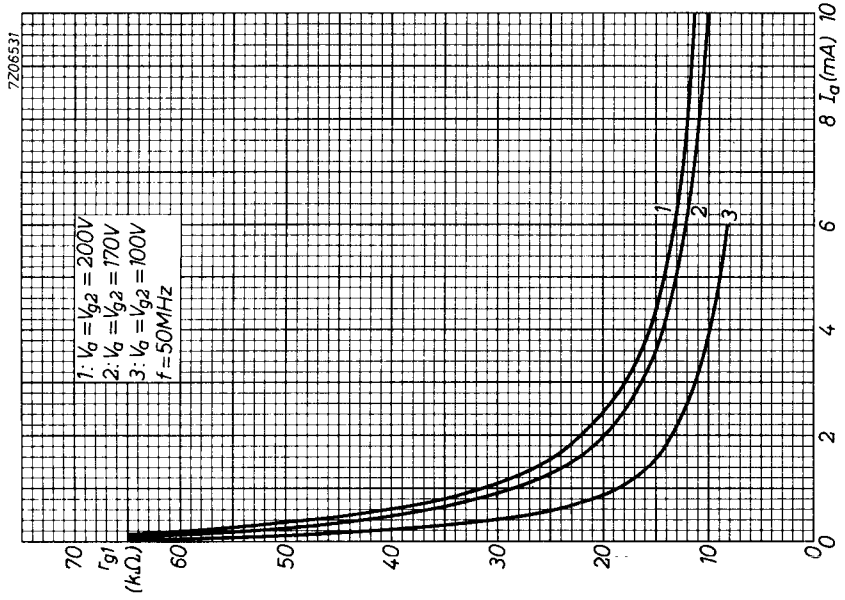

I_{aT} (mA)
30
25
20
15
10
5
0
Triode
V_{aT}=100V
7206535
-2
-4
-6
-8
V_{gT} (V)

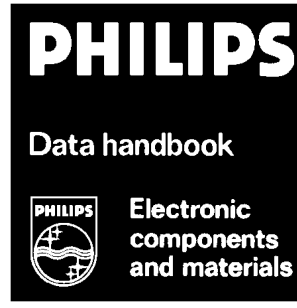

I_{aT}
(mA)
30
20
10
0
Triode
7206536
V_{gT}=0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
-8V
-9V
-10V
W_a=15W
0
50
100
150
200
V_{aT} (V)
250


7206534
Triode
V_{aT} = 100V
S
(mA/V)
R_i
(kΩ)
$-V_g$
(V)
12
10
8
6
4
2
0
0
5
10
15
20
I_{aT}(mA) 25
S
R_i
V_g


7206532
Triode
V_{aT} = 170V
S
(mA/V)
R_i
(kΩ)
$-V_g$
(V)
12
10
8
6
4
2
0
0
5
10
15
20
I_{aT}(mA) 25
S
V_g
R_i


7206533
Triode
V_{aT} = 200V
S (mA/V)
R_i (kΩ)
$-V_g$ (V)
V_g
S
R_i
I_{aT} (mA)


7206531
1: $V_a = V_{g2}$ = 200V
2: $V_a = V_{g2}$ = 170V
3: $V_a = V_{g2}$ = 100V
f = 50MHz
r_{g1} (kΩ)
I_a (mA)
1
2
3



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