

TRIODE PENTODE

PCL82

Combined triode and output pentode with separate cathodes for use in television receivers with the triode as an a.f. amplifier or frame blocking oscillator and the pentode as frame or audio output valve.

HEATER

Suitable for series operation, a.c. or d.c.

I_h	300	mA
V_h	16	V

CAPACITANCES (measured without an external shield)

C_{at-g1p}	<20	mpF
C_{gt-ap}	<20	mpF
C_{gt-g1p}	<25	mpF
C_{at-ap}	<250	mpF

Pentode section

C_{in}	9.3	pF
C_{out}	8.0	pF
C_{a-g1}	<300	mpF
C_{g1-h}	<300	mpF

Triode section

C_{a-k+h}	4.3	pF ←
C_{g-k+h}	2.7	pF
C_{a-g}	4.0	pF
C_{g-h}	<20	mpF

CHARACTERISTICS

Pentode section

V_a	170	200	V
V_{g2}	170	200	V
I_a	41	35	mA
I_{g2}	9.0	8.0	mA ←
V_{g1}	-11.5	-16	V
g_m	7.5	6.4	mA/V
r_a	16	20	kΩ
μ_{g1-g2}	9.5	9.5	

Triode section

V_a	100	V
I_a	3.5	mA
V_g	0	V
g_m	2.2	mA/V ←
r_a	32	kΩ ←
μ	70	

PENTODE SECTION AS FRAME OUTPUT VALVE

See nomogram on page C1 and notes on page D4.

TRIODE SECTION AS A.F. AMPLIFIER

Measured using grid current bias. $R_g = 10M\Omega$

V_b	R_a	I_a	R_{source}	$\frac{V_{out}^*}{V_{in}}$	$V_{out(r.m.s.)}^\dagger$	$R_{gl}^\ddagger$
(V)	(k Ω)	(mA)	(k Ω)		(V)	(k Ω)
200	47	1.83	0	41	23	150
170	47	1.40	0	39	18.3	150
150	47	1.18	0	38	14.8	150
100	47	0.60	0	34	6.7	150
200	47	1.83	220	31	25.5	150
170	47	1.40	220	30	20.5	150
150	47	1.18	220	29	17.1	150
100	47	0.60	220	27	9.0	150
200	100	1.08	0	51	28.5	330
170	100	0.83	0	50	22	330
150	100	0.72	0	49	18.2	330
100	100	0.38	0	44	8.7	330
200	100	1.08	220	39	33	330
170	100	0.83	220	38	26.5	330
150	100	0.72	220	37	22	330
100	100	0.38	220	34	12.2	330
200	220	0.60	0	58	30.5	680
170	220	0.47	0	56	24	680
150	220	0.40	0	55	20	680
100	220	0.23	0	50	10.3	680
200	220	0.60	220	44	38.5	680
170	220	0.47	220	42	31	680
150	220	0.40	220	41	26	680
100	220	0.23	220	38	14.9	680

* V_{out}/V_{in} measured with an input voltage of 100mV.

† V_{out} measured for $D_{tot} = 5\%$.

‡Grid resistor of following valve.

MICROPHONY

The triode section can be used without special precautions against microphony and hum in circuits in which the input voltage is $\geq 10mV$ for an output of 50mW from the output stage. The a.c. voltage between pin 4 and triode cathode should not exceed 6.3V.



PENTODE SECTION AS AUDIO OUTPUT VALVE

Single valve class 'A'

V_{a-k}	170	170	200	200	V
V_{g2-k}	170	170	200	200	V
R_k	450	230	650	380	Ω
R_a	7.0	3.9	9.0	5.6	$k\Omega$
$I_{a(o)}$	25	41	22	35	mA
$I_{g2(o)}$	4.8	8.0	4.3	7.0	mA
$V_{in(r.m.s.)} (P_{out} = 50mW)$	660	590	690	600	mV
$V_{in(r.m.s.)}$	5.3	6.0	5.7	6.6	V
P_{out}	2.0	3.3	2.0	3.5	W
D_{tot}	9.2	10	8.5	10	%

* P_{out} and D_{tot} are measured at fixed bias and therefore represent the power output available during the reproduction of speech and music. When a sustained sine wave is applied to the control grid, the bias voltage developed across the cathode resistor will readjust itself as a result of the increased anode and screen-grid currents. This will result in a reduction in P_{out} of approximately 10%.

LIMITING VALUES

Pentode section

$V_{a(b)}$ max.	550	V
V_a max.	250	V
* $+V_{a(pk)}$ max.	2.5	kV
$-V_{a(pk)}$ max.	500	V
p_a max. (audio applications)	7.0	W
p_a max. (frame output)	5.0	W
$V_{g2(b)}$ max.	550	V
V_{g2} max.	250	V
p_{g2} max.	2.2	W ←
I_k max.	50	mA
R_{g1-k} max.	1.0	$M\Omega$
V_{h-k} max.	200	V
R_{h-k} max.	20	$k\Omega$

*Maximum pulse duration is 4% of one cycle with a maximum of 800 μ s

Triode section

V_a max.	250	V
* $+V_{a(pk)}$ max.	600	V
p_a max.	1.0	W
I_k max.	15	mA
* $I_{k(pk)}$ max.	200	mA
R_{g-k} max.	1.0	$M\Omega$
Z_{g-k} max. ($f = 50c/s$)	500	$k\Omega$
V_{h-k} max.	200	V
R_{h-k} max.	20	$k\Omega$

*Maximum pulse duration = 200 μ s

PEAK ANODE CURRENT NOMOGRAM

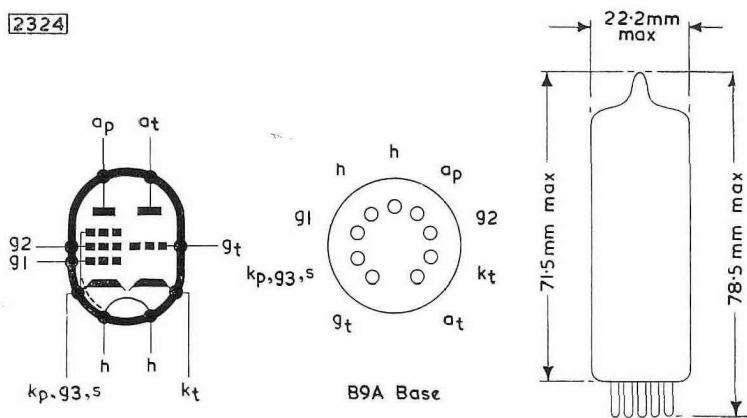
The nomogram shown on the following page gives directly the values of peak anode current and corresponding values of anode voltage at end of scan for various values of screen-grid voltage.

No indication of anode and screen-grid dissipation limits is given in the nomogram: these must be checked independently.

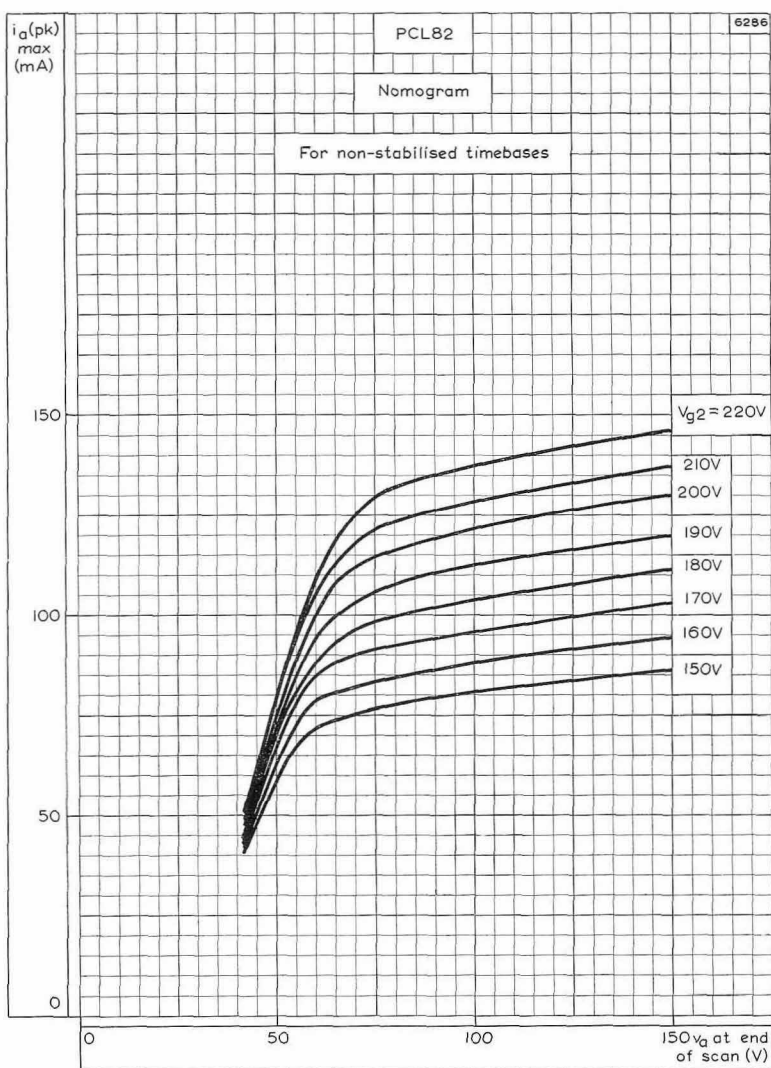
Example

Suppose the screen-grid voltage is 170V. From the nomogram, the optimum working conditions at $V_{g2} = 170V$ are $i_{a(pk)} = 90mA$, and v_a at end of scan = 70V.

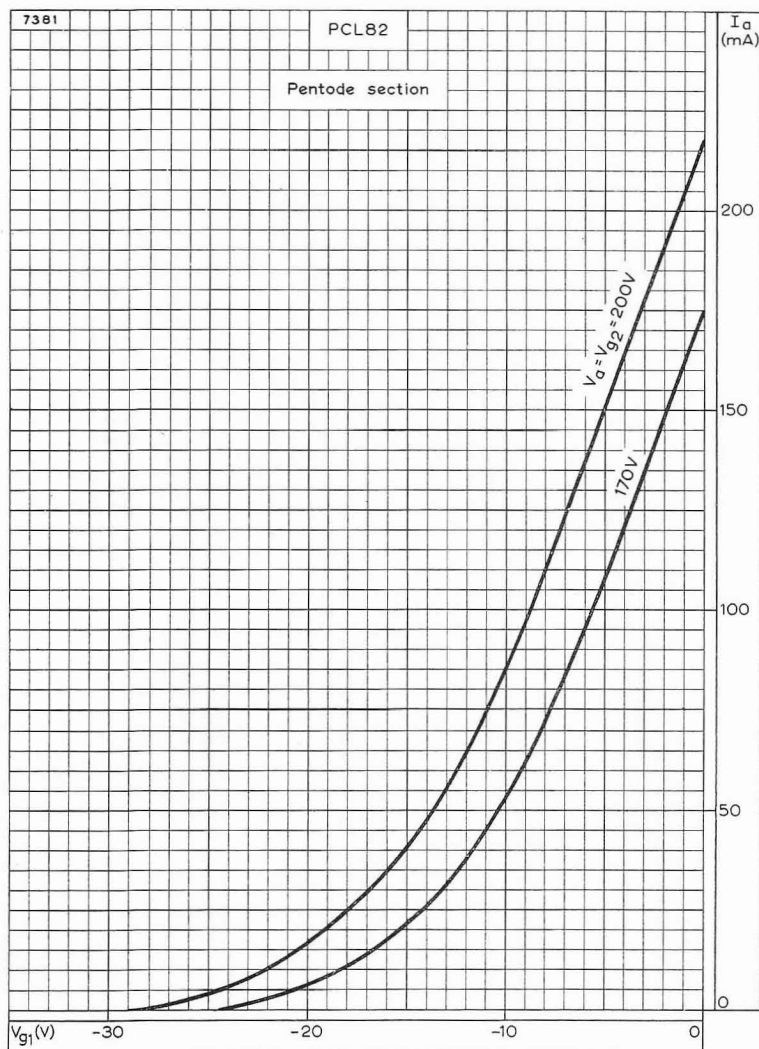
2324



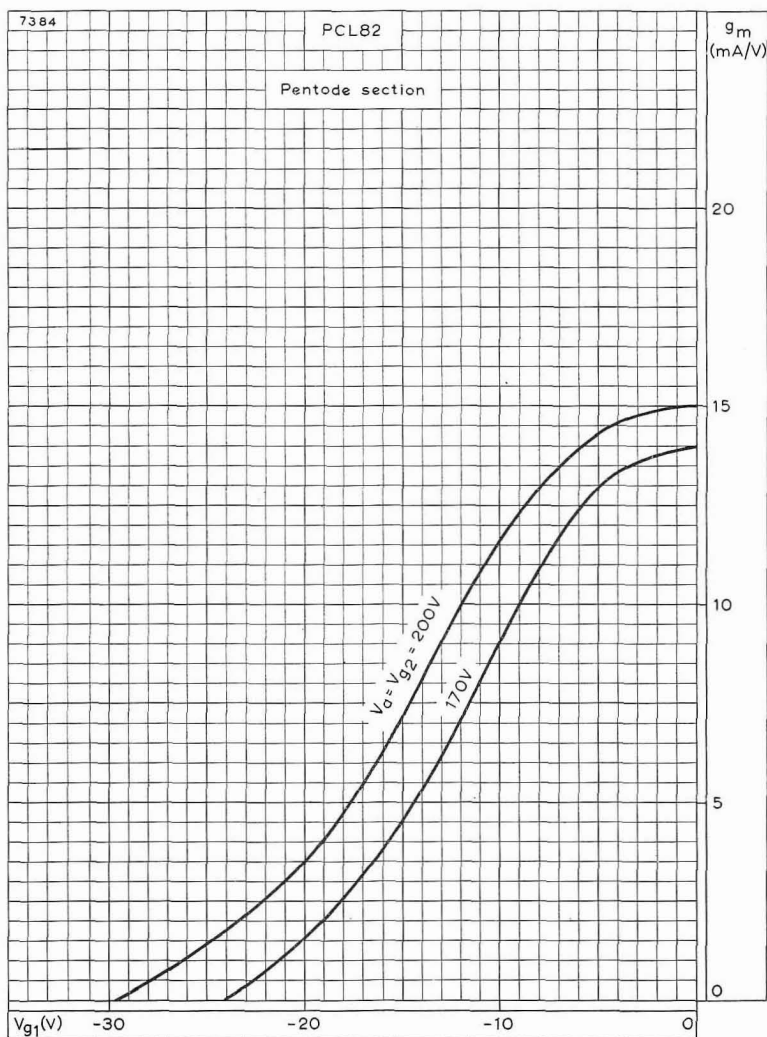
B9A Base



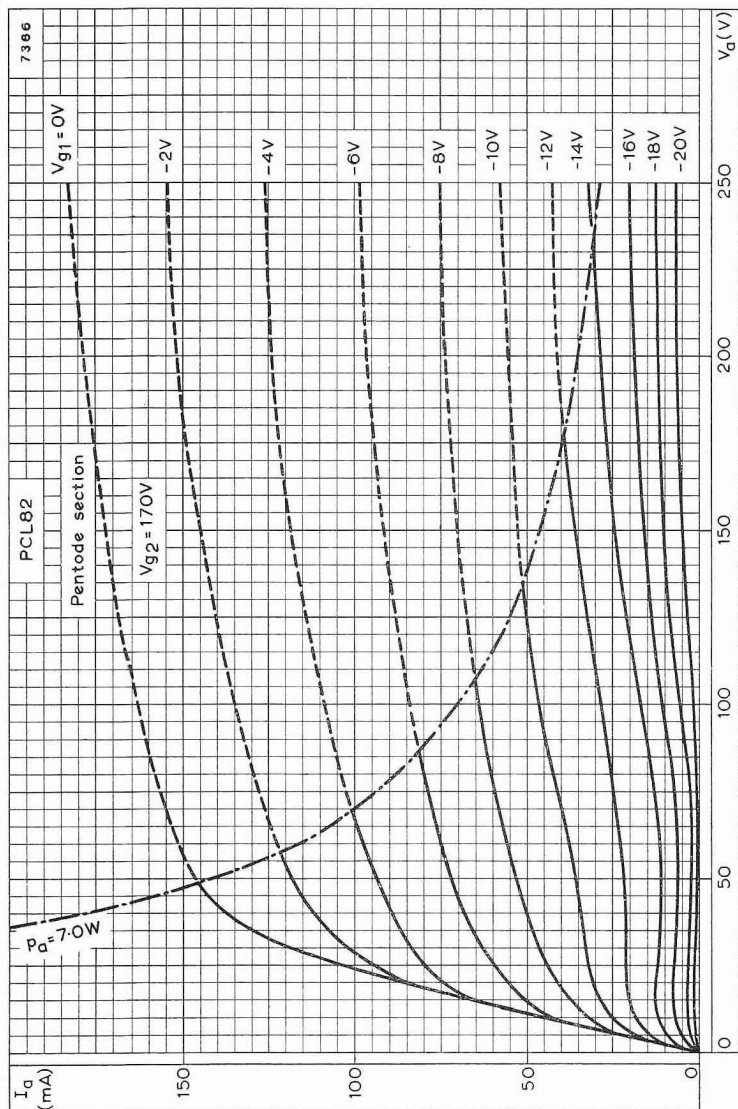
PEAK ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE
AT THE END OF SCAN



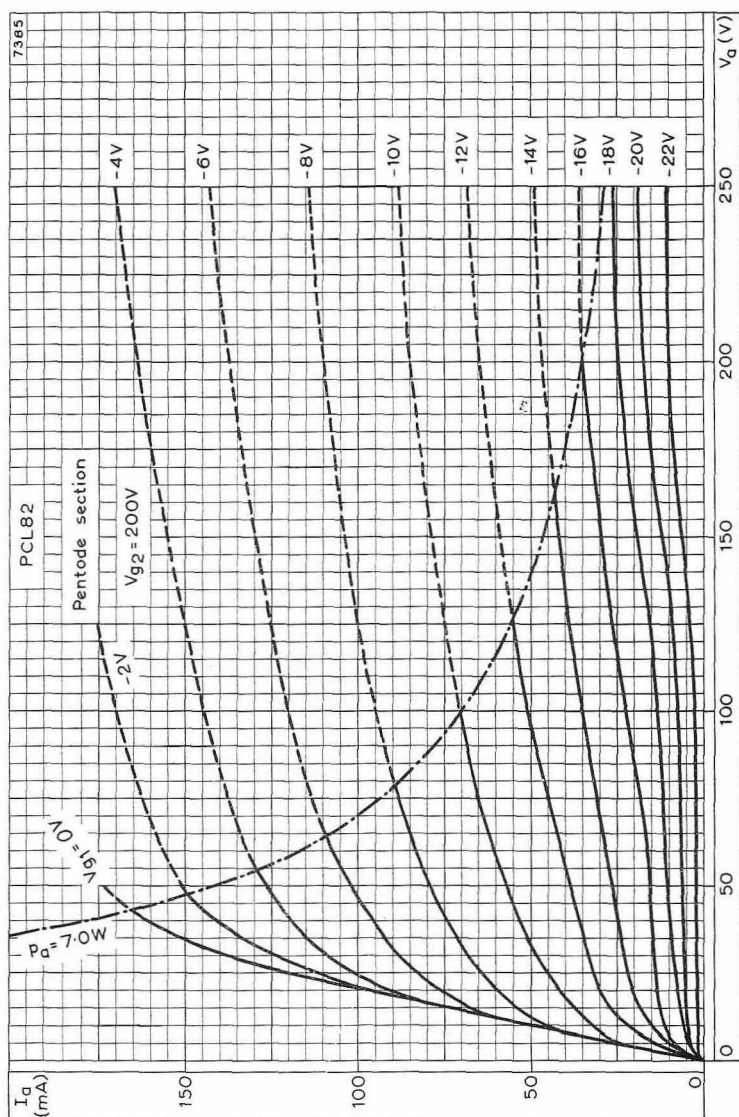
ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH ANODE AND SCREEN-GRID VOLTAGES AS PARAMETER. PENTODE SECTION



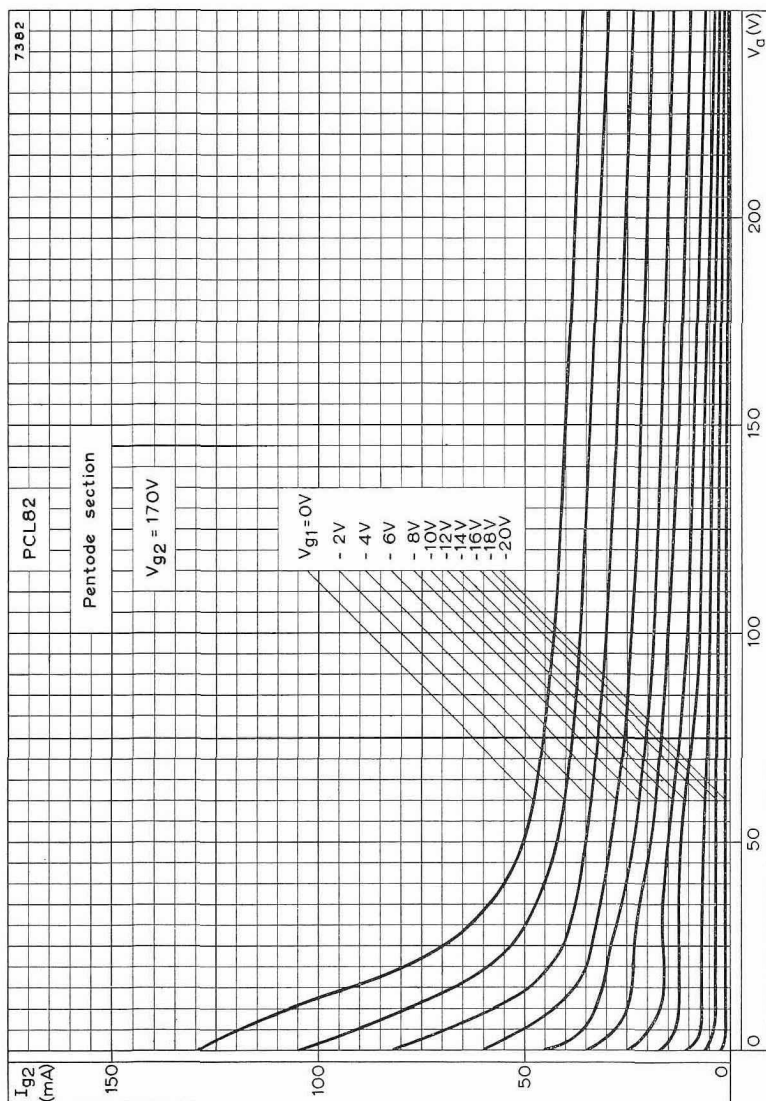
MUTUAL CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH ANODE AND SCREEN-GRID VOLTAGES AS PARAMETER. PENTODE SECTION



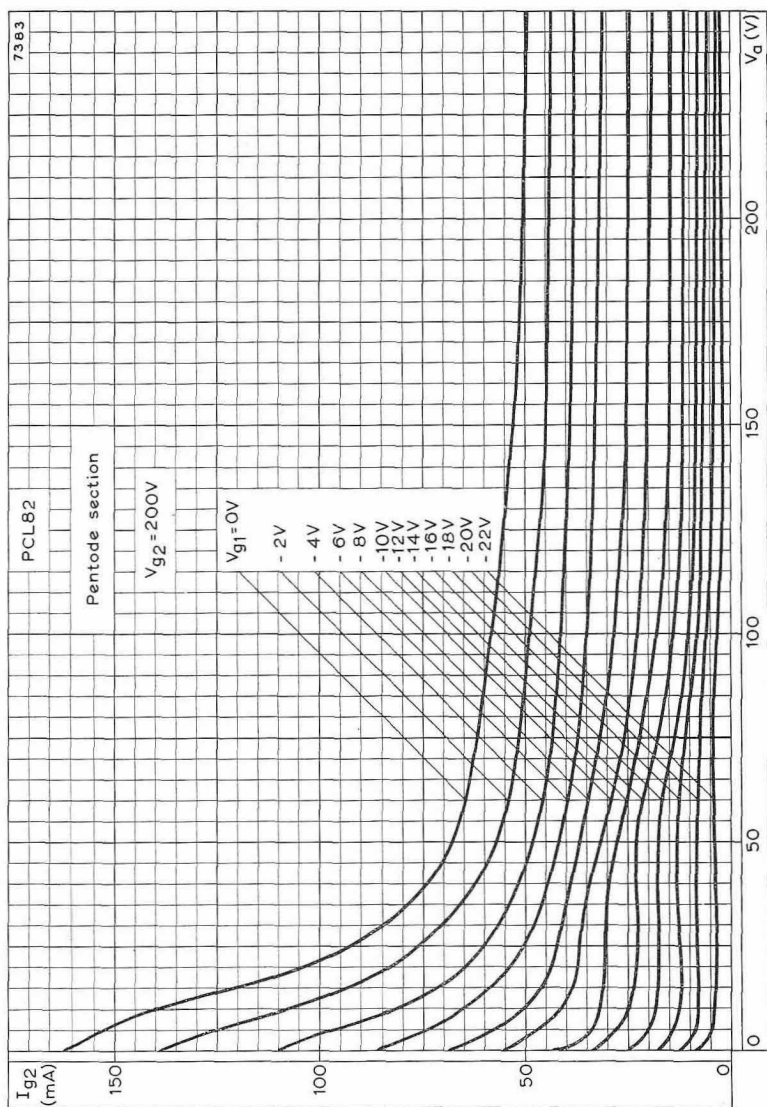
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. PENTODE SECTION. $V_{g2} = 170V$



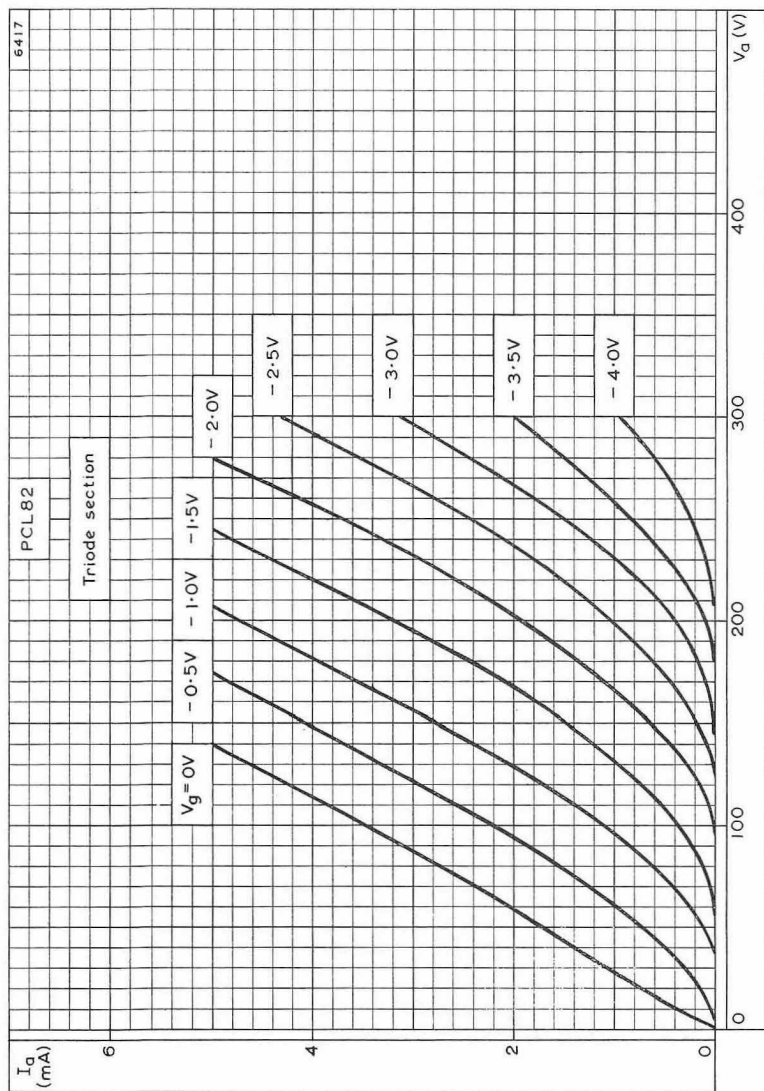
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. PENTODE SECTION. $V_{g2} = 200V$



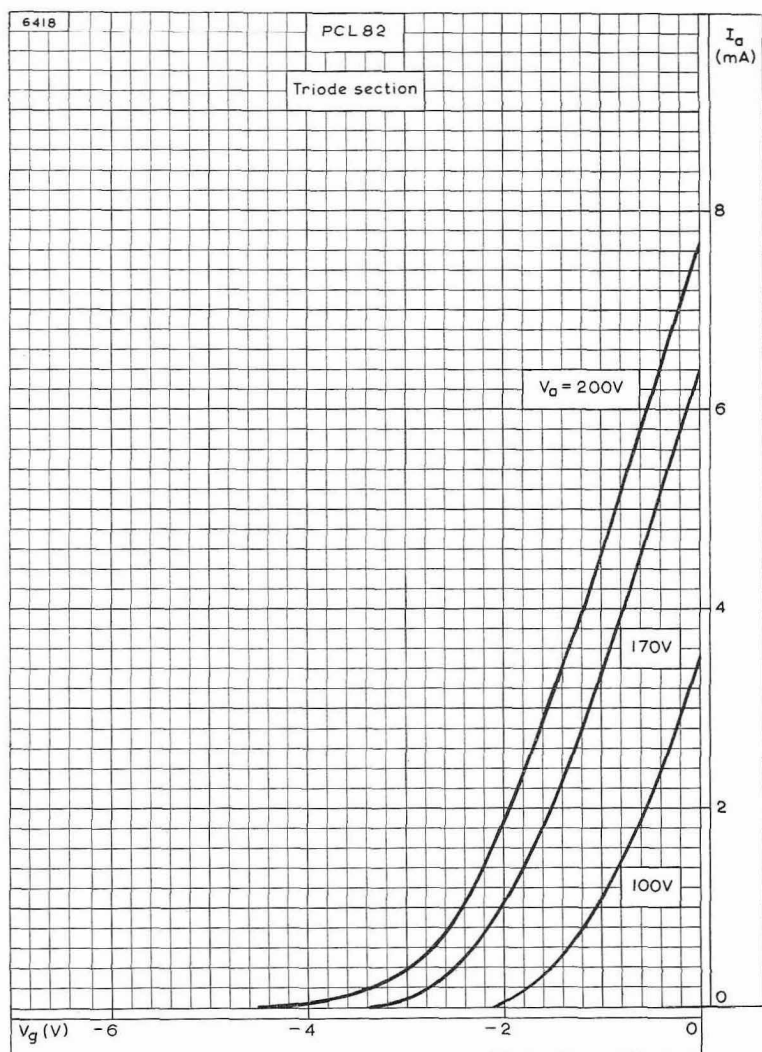
SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. PENTODE SECTION. $V_{g2} = 170V$



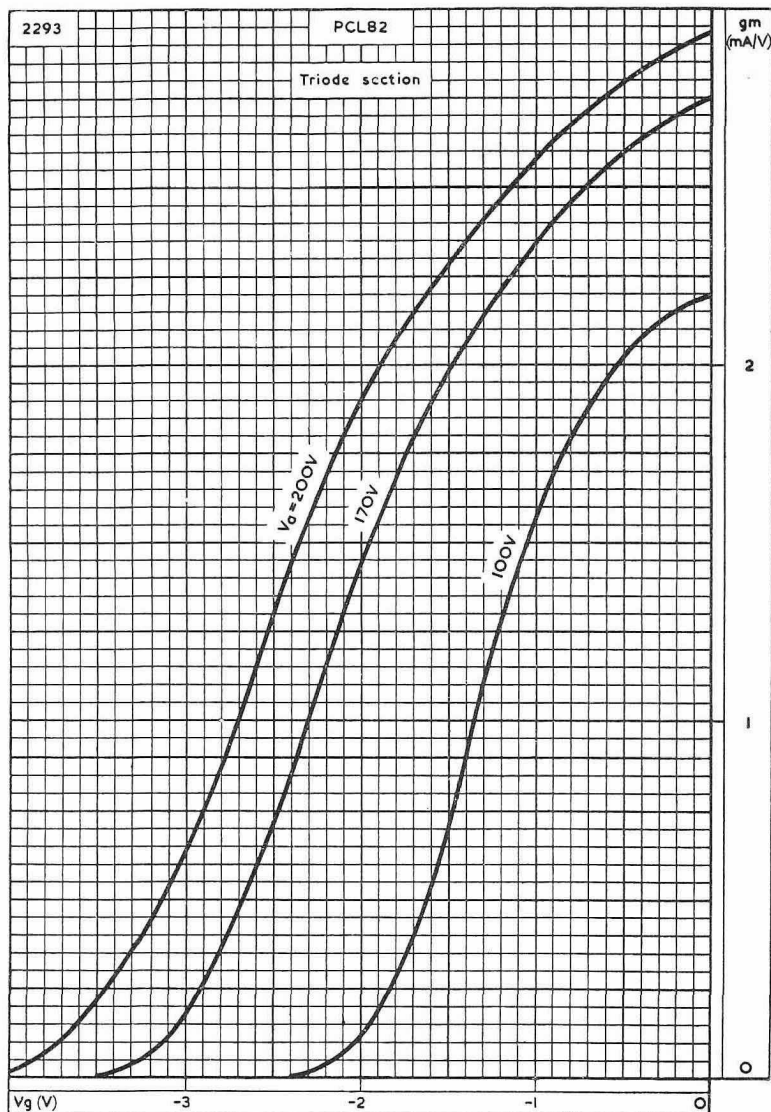
SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. PENTODE SECTION. $V_{g2} = 200V$



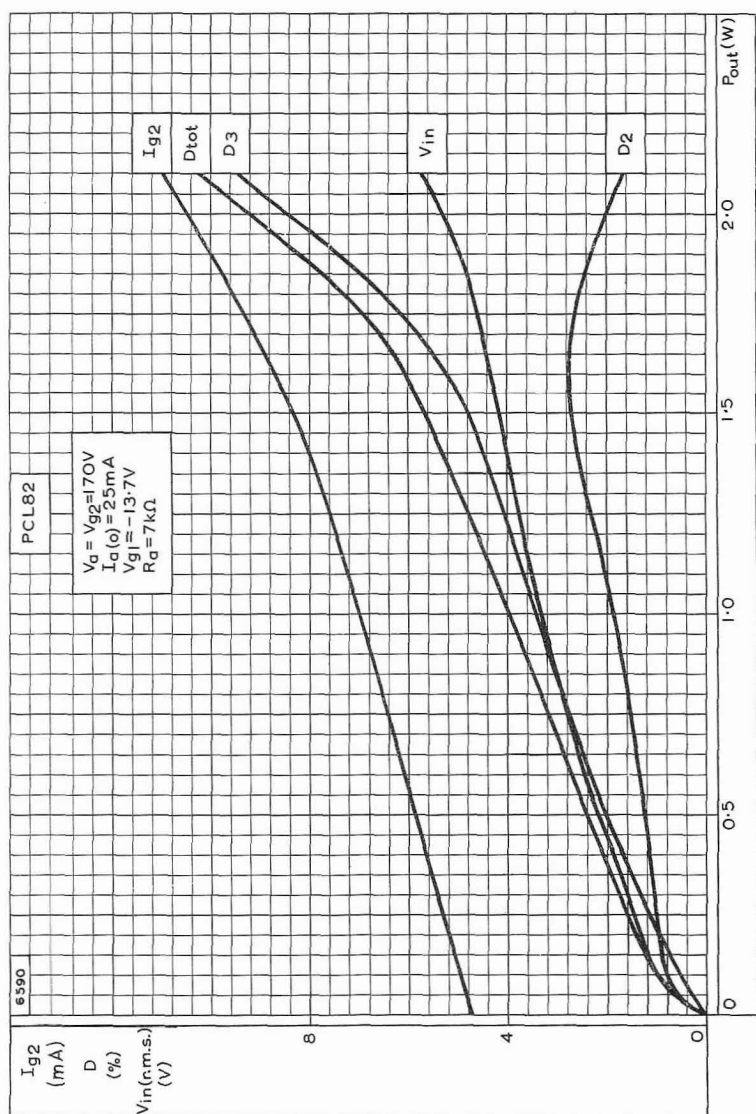
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE.
TRIODE SECTION



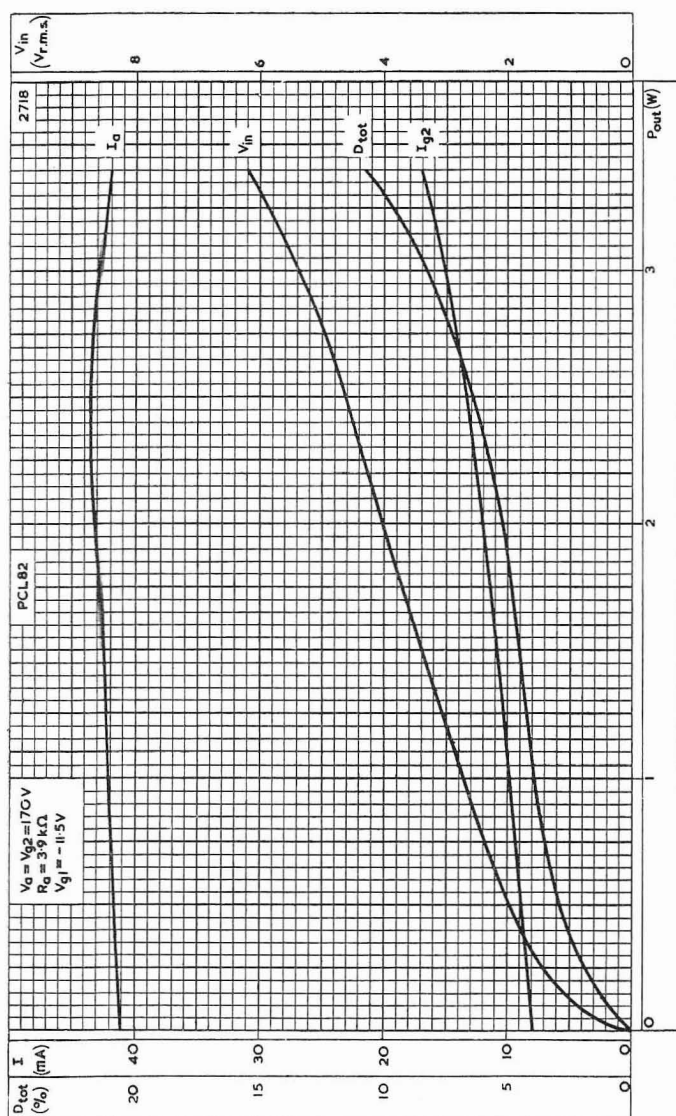
ANODE CURRENT PLOTTED AGAINST GRID VOLTAGE.
TRIODE SECTION



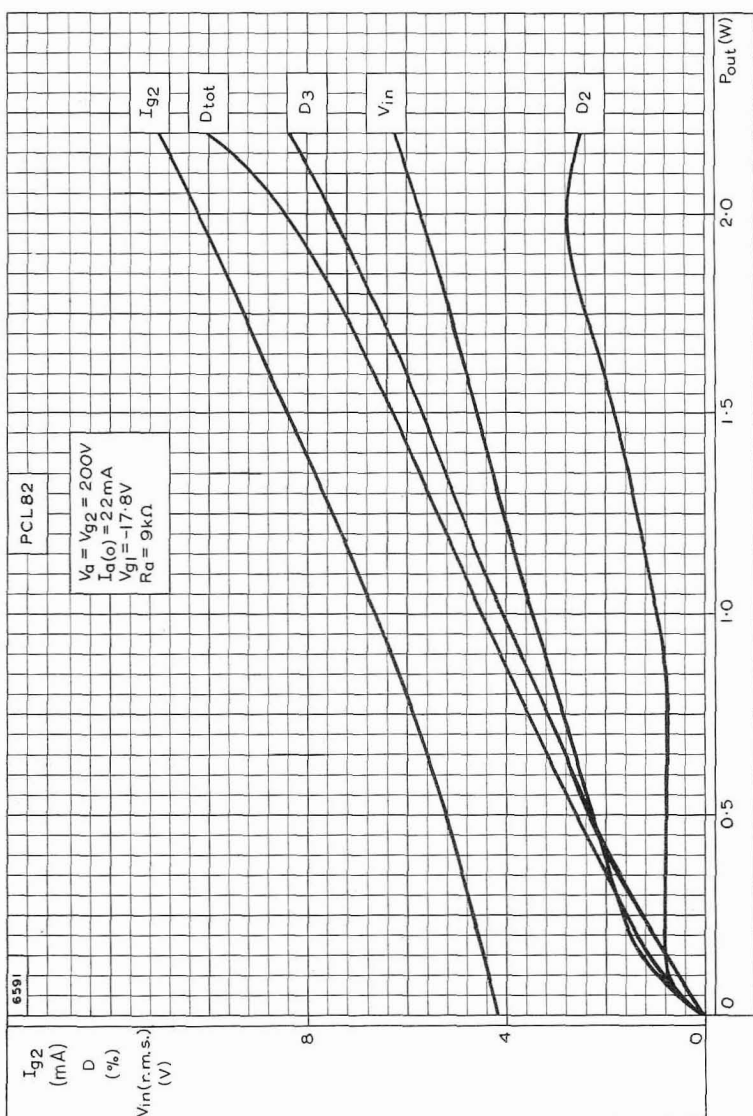
MUTUAL CONDUCTANCE PLOTTED AGAINST GRID VOLTAGE,
TRIODE SECTION



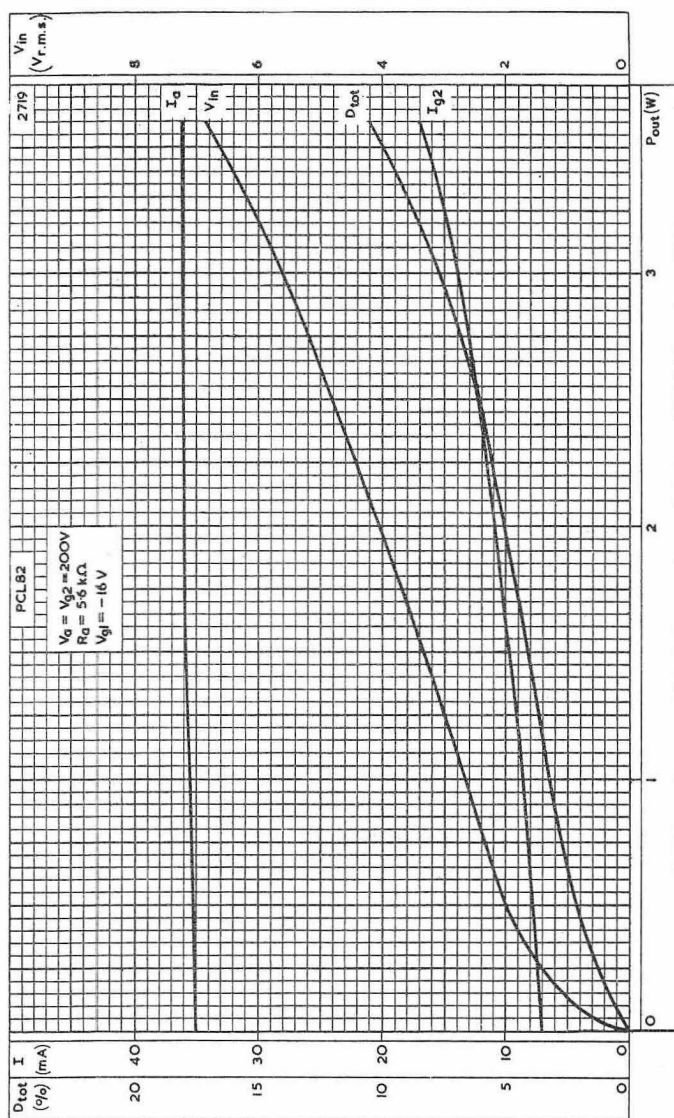
PERFORMANCE OF PENTODE SECTION AS CLASS 'A' AMPLIFIER WITH FIXED BIAS. $V_a = 170V$, $R_a = 7k\Omega$



PERFORMANCE OF PENTODE SECTION AS CLASS 'A' AMPLIFIER WITH FIXED BIAS. $V_a = 170V$, $R_a = 3.9k\Omega$



PERFORMANCE OF PENTODE SECTION AS CLASS 'A' AMPLIFIER WITH FIXED BIAS. $V_a = 200V$, $R_a = 9k\Omega$

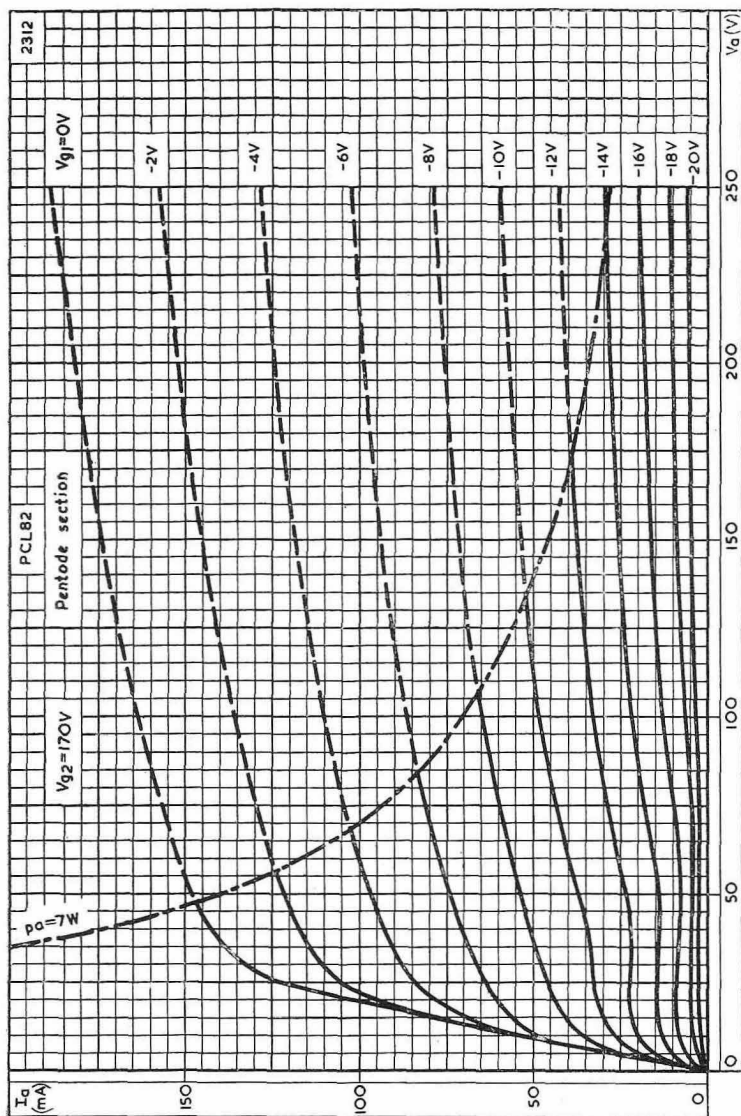


PERFORMANCE OF PENTODE SECTION AS CLASS 'A' AMPLIFIER WITH FIXED BIAS. $V_a = 200V$, $R_a = 5.6k\Omega$

TRIODE PENTODE

PCL82

Combined triode and output pentode with separate cathodes for use in television receivers with the triode as an a.f. amplifier or frame blocking oscillator and the pentode as frame or audio output valve.

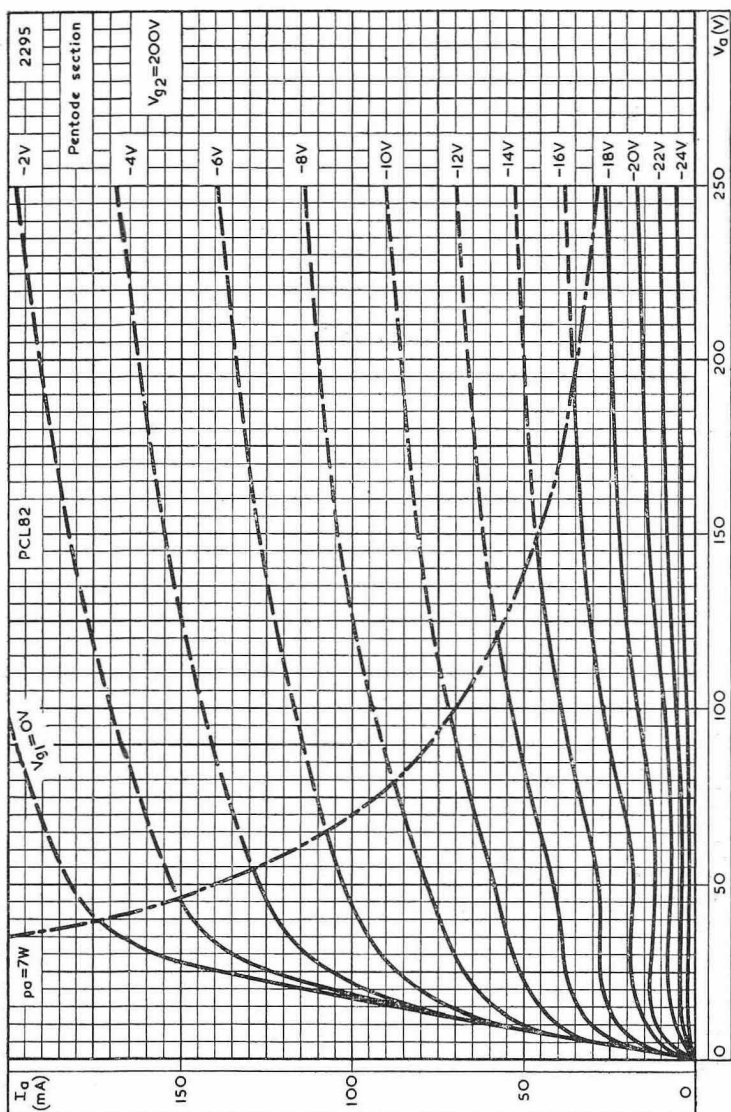


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE $V_{g2} = 170V$

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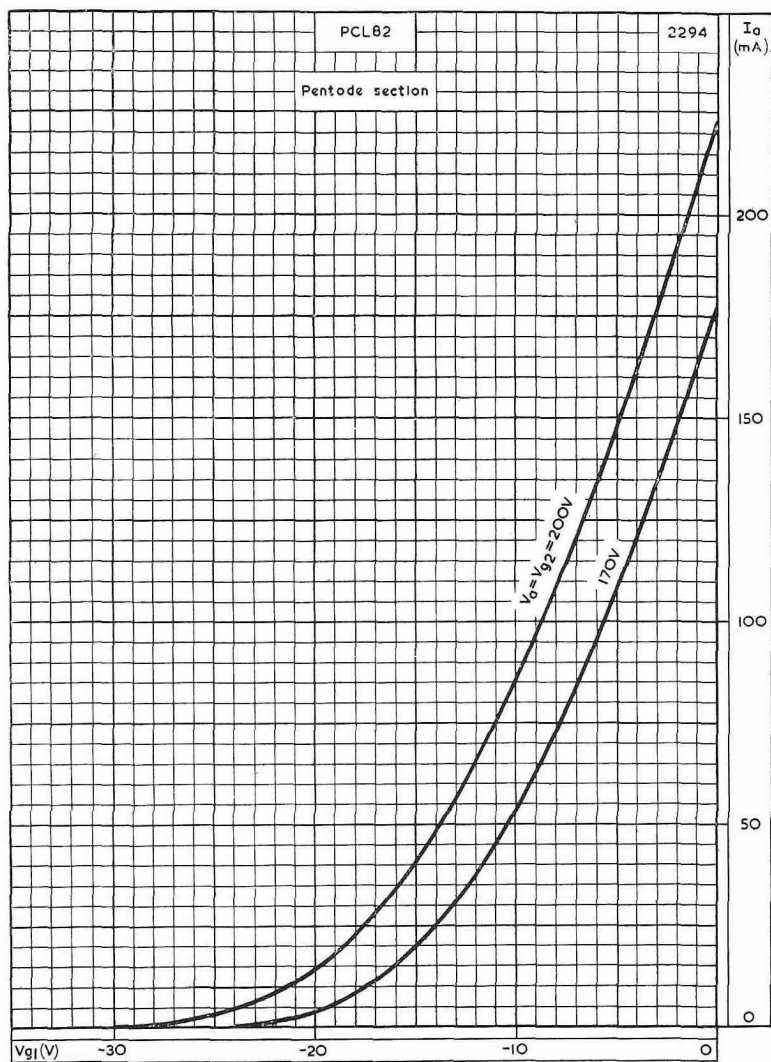


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE $V_{g2} = 200V$

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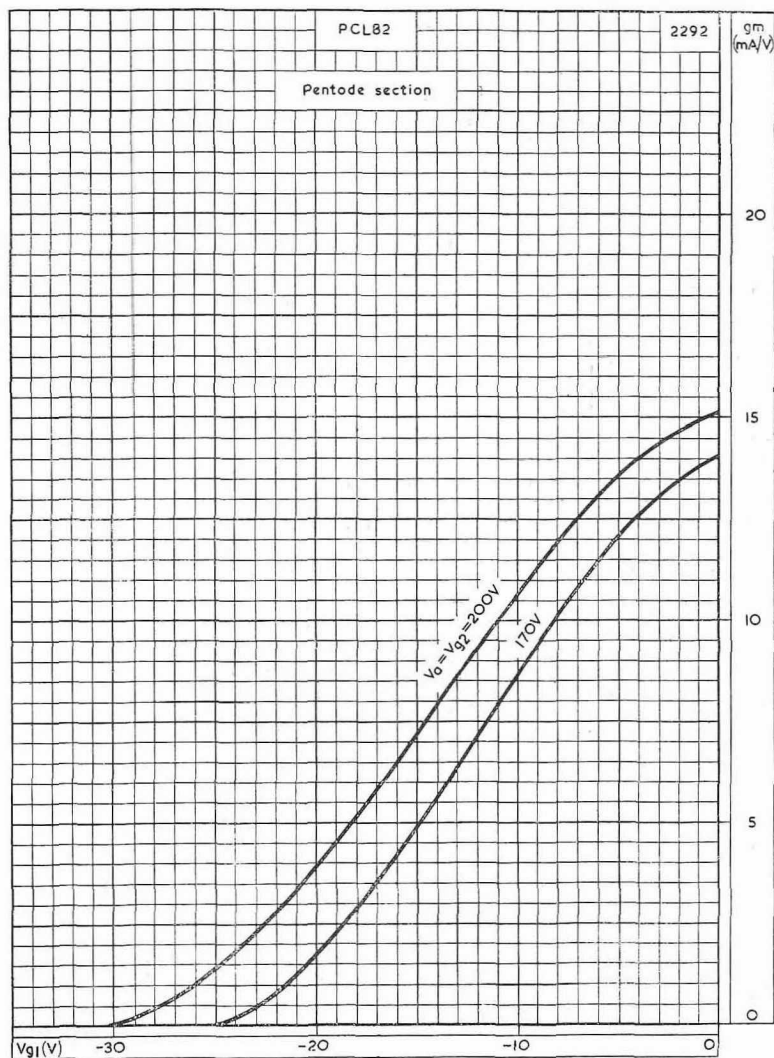


ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE

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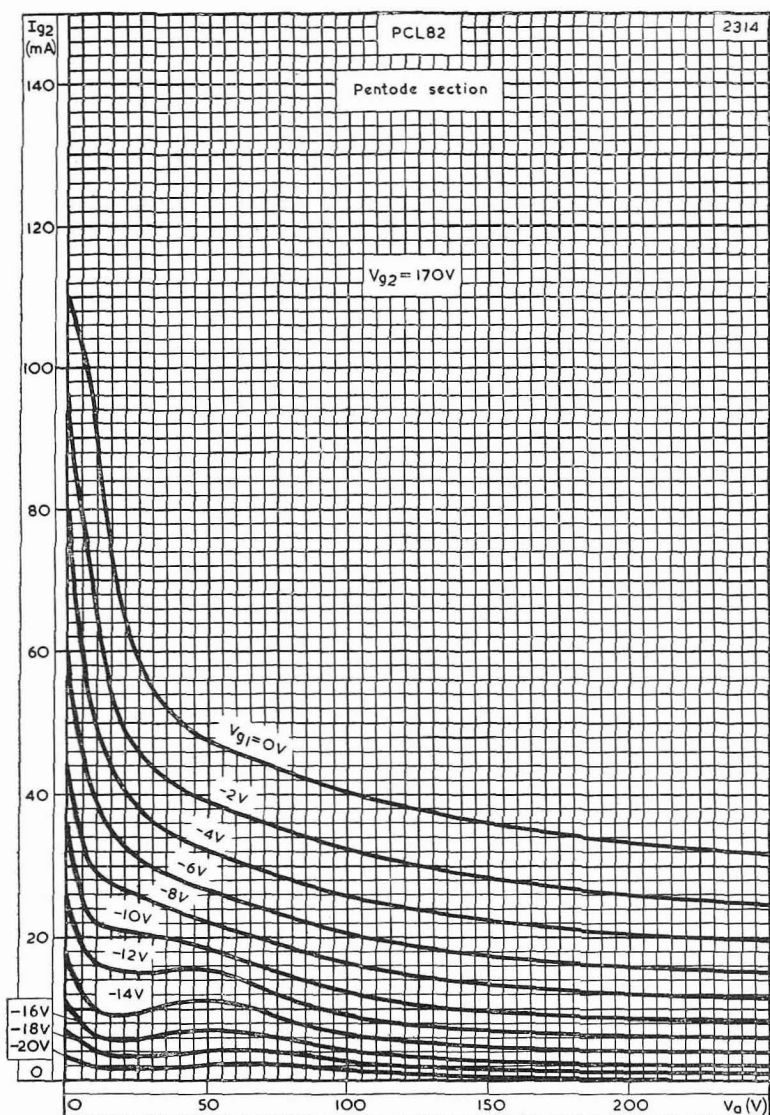


MUTUAL CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE

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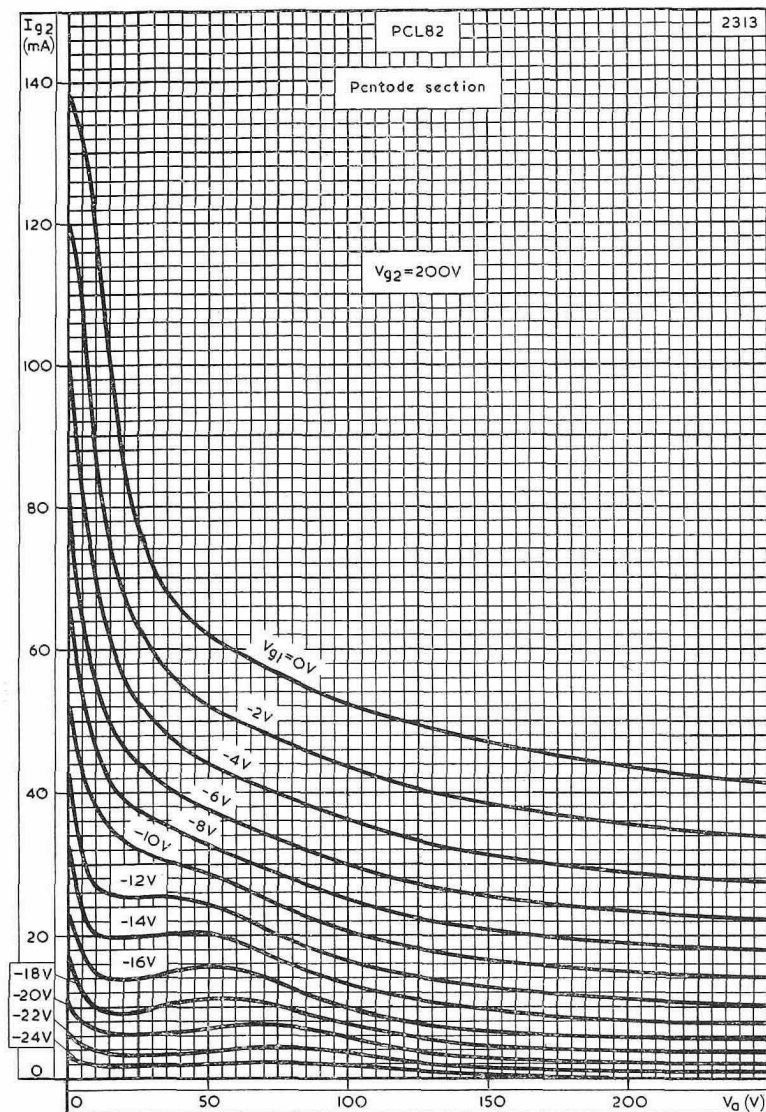


SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE $V_{g2} = 170V$

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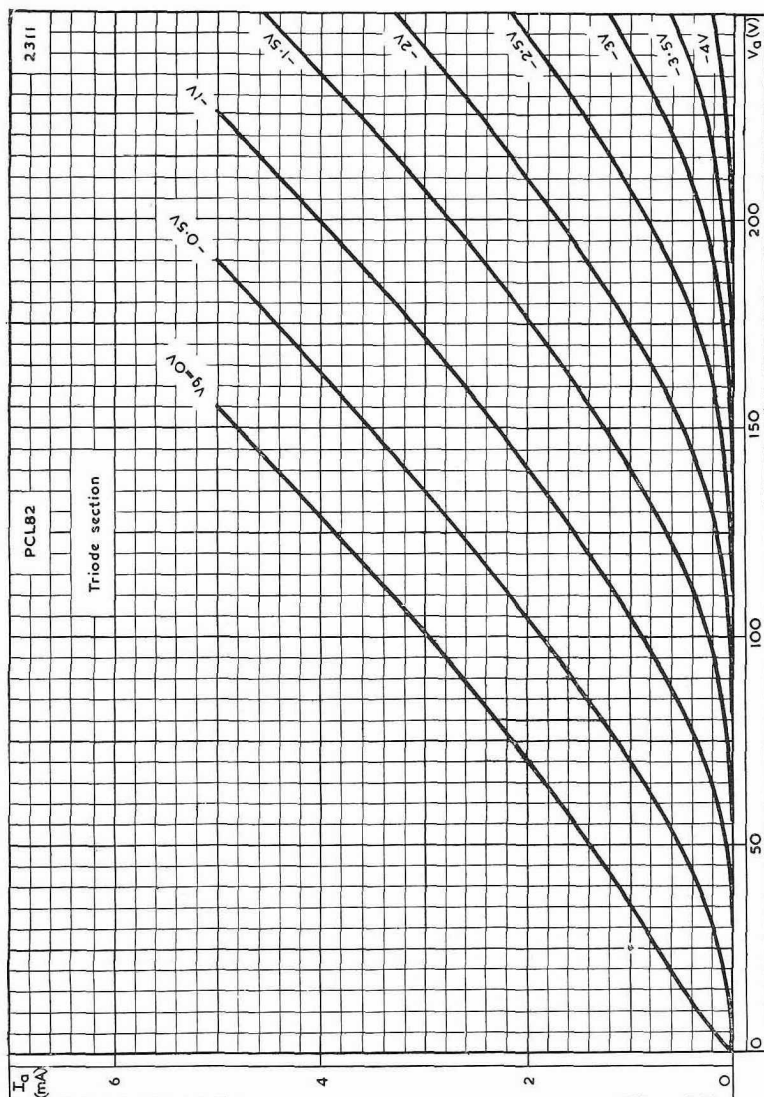


SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE $V_{g2} = 200V$

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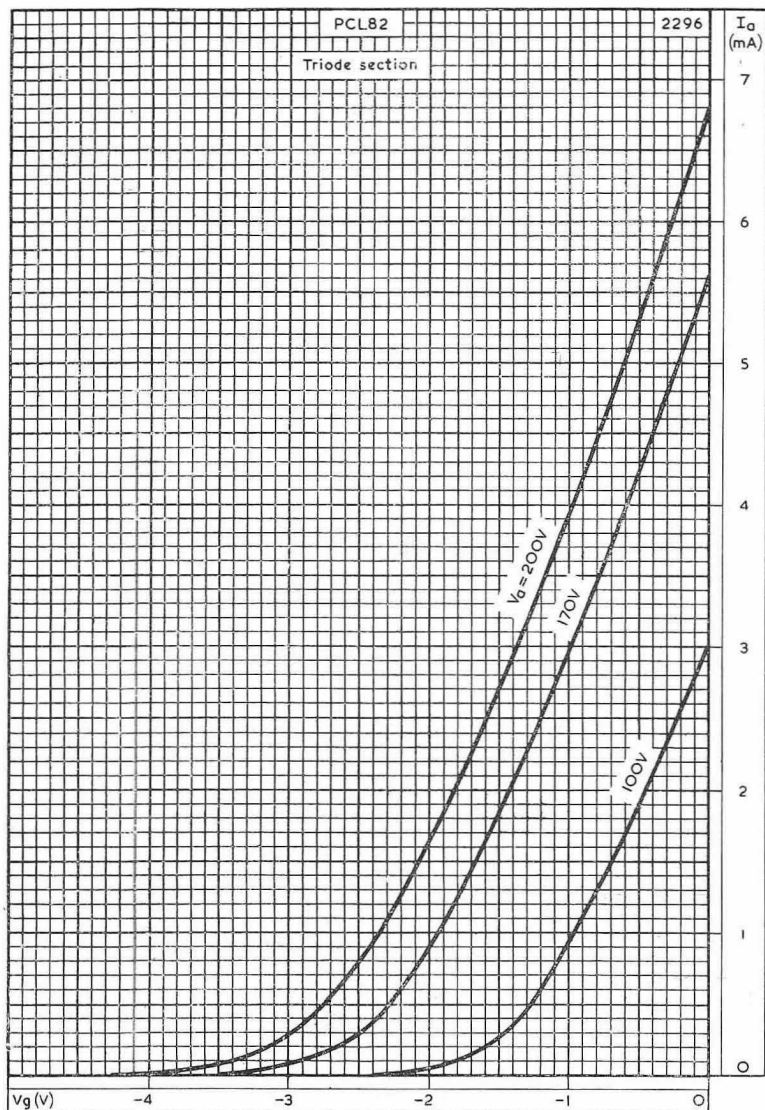


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE

PCL82

TRIODE PENTODE

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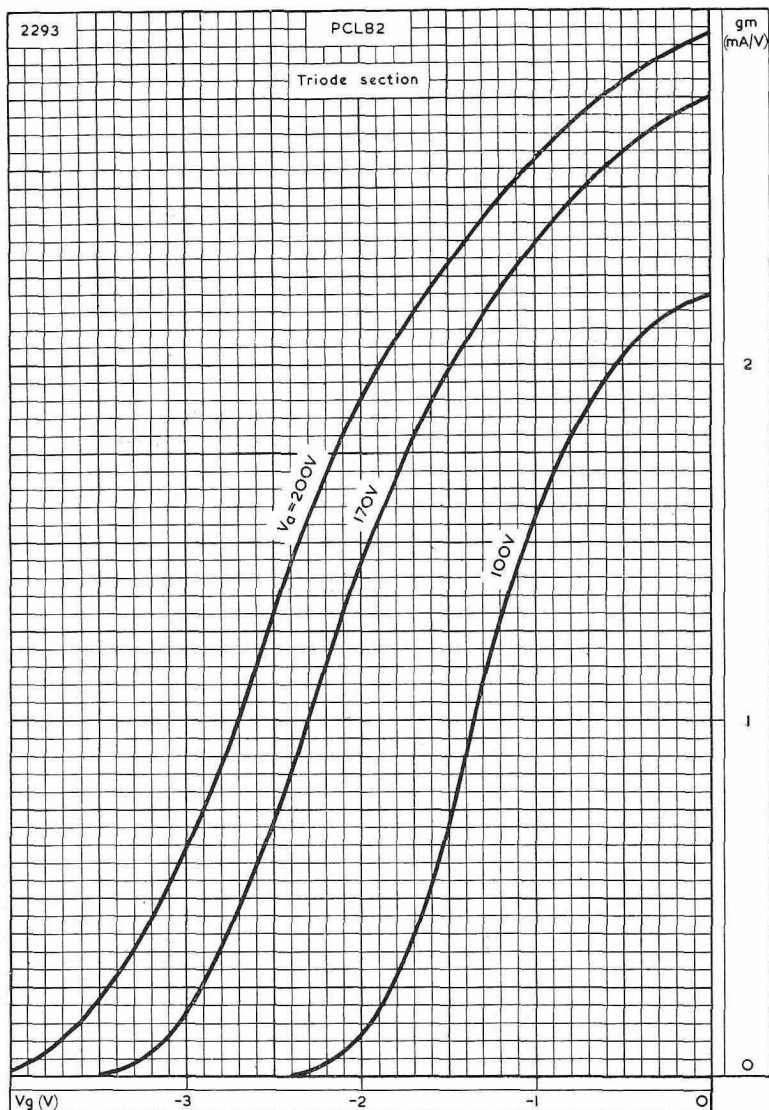
ANODE CURRENT PLOTTED AGAINST GRID VOLTAGE



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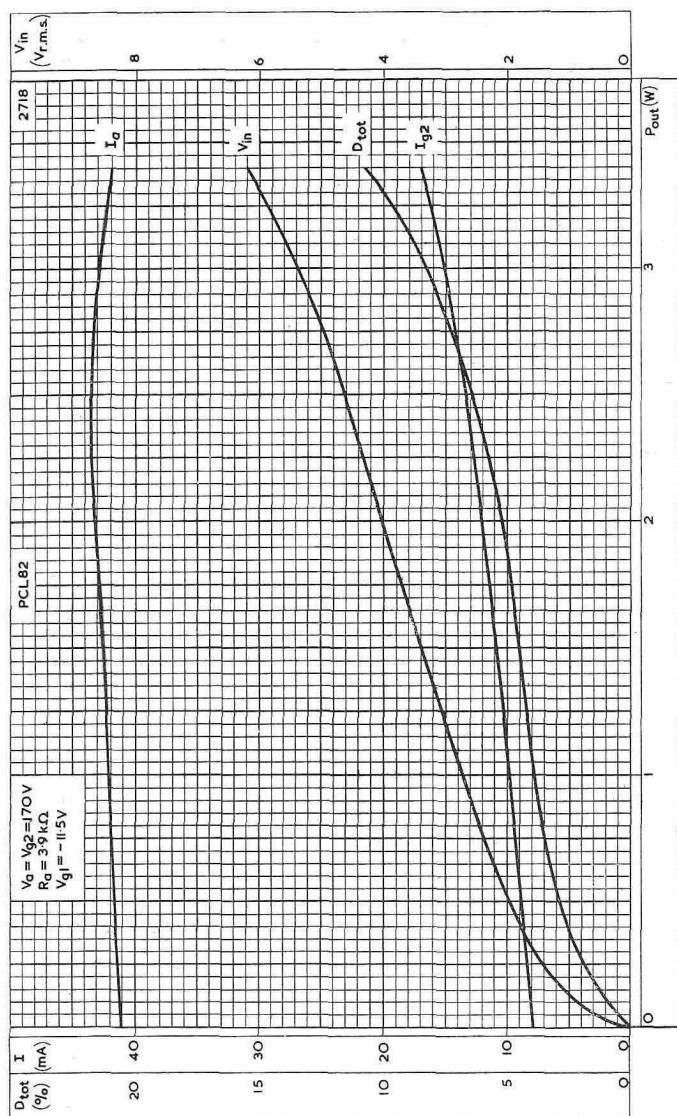


MUTUAL CONDUCTANCE PLOTTED AGAINST GRID VOLTAGE

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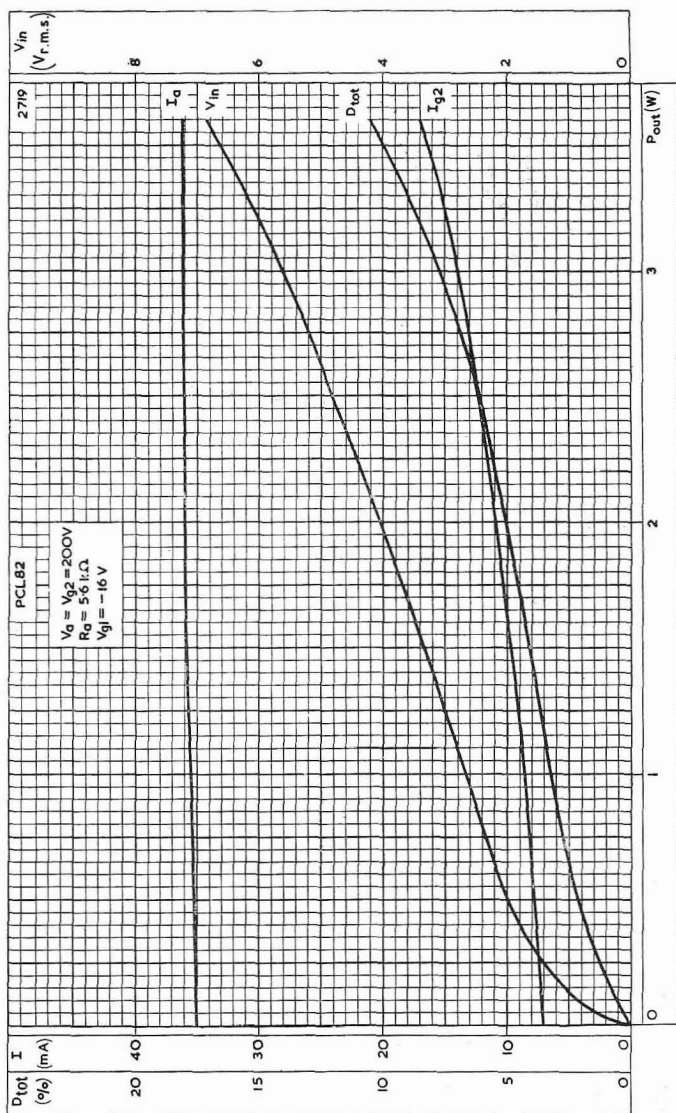


PERFORMANCE OF PENTODE SECTION AS CLASS "A" AMPLIFIER WITH
FIXED BIAS $V_{bi}=170V$

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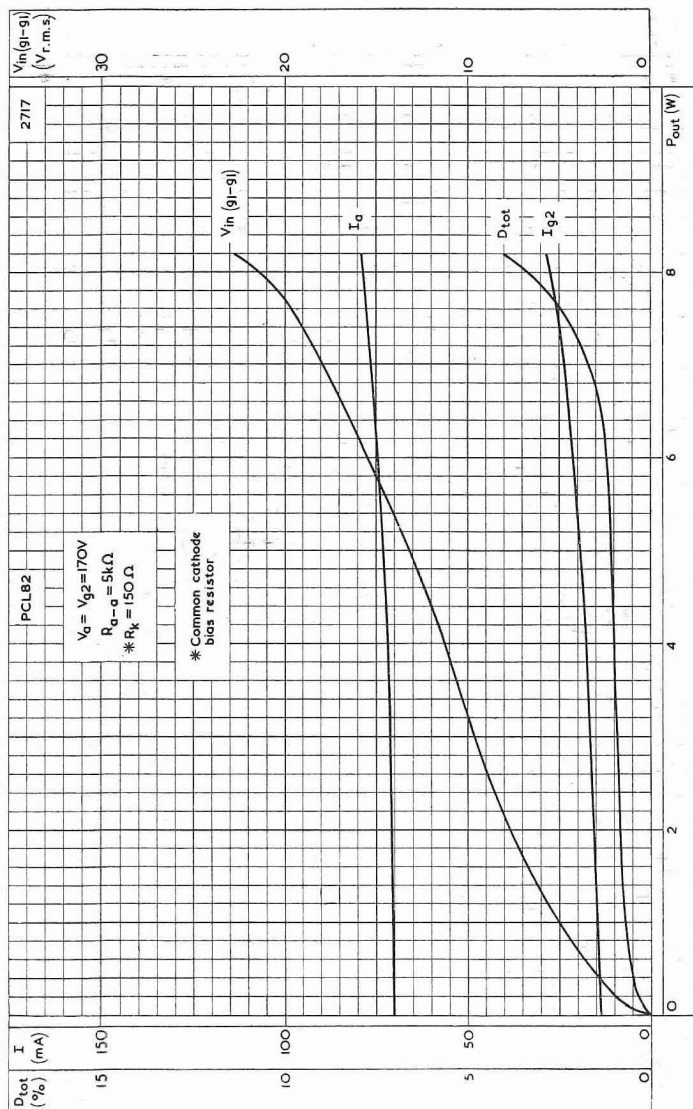


PERFORMANCE OF PENTODE SECTION AS CLASS "A" AMPLIFIER WITH FIXED BIAS $V_a=200V$

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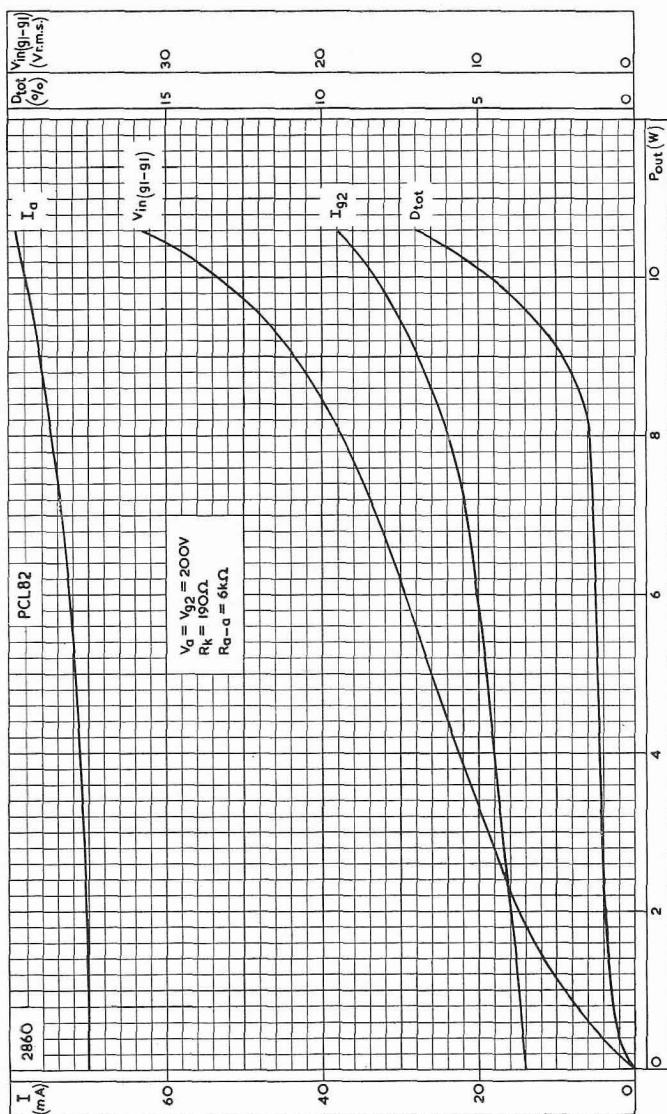


PERFORMANCE OF PCL82 IN PUSH-PULL $V_a=170V$

TRIODE PENTODE

PCL82

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PERFORMANCE OF PCL82 IN PUSH-PULL $V_a = 200V$

