Pentode *Type ACPT8*

HF POWER AMPLIFIER AND OSCILLATOR

General. A transmitting pentode fitted with a thoriated tungsten filament and a copper anode which is cooled by means of a radiator.

The valve is designed to give a large output at high frequencies, having a permissible anode dissipation of 750 W and giving useful output down to 9 metres. With forced air cooling the anode dissipation may be increased to 1·1 kW. At this rating the volume of air required is 10 cu. ft. per minute at a pressure equal to 3-in. head of water.

In view of the low suppressor volts required for anode current cut-off, this valve is very suitable for suppressor modulation.

The screen and control grids are aligned, giving high overall efficiency.

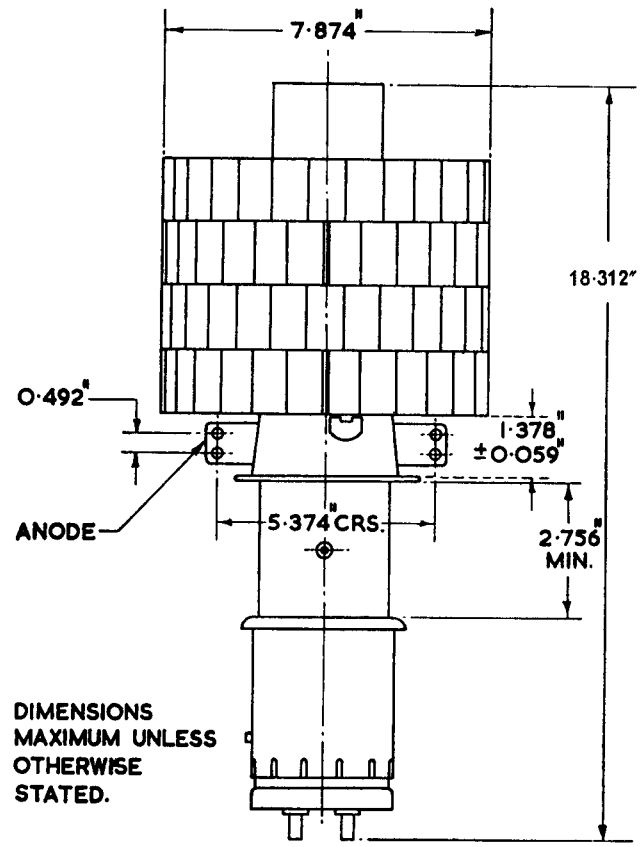
The figures quoted for maximum permissible ratings are only applicable for use at wavelengths down to 15 metres. At shorter wavelengths the maximum permissible anode voltage and input must be reduced to the following percentage of the quoted figures:

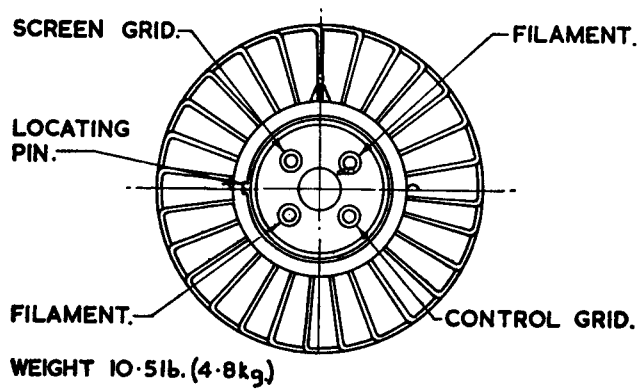
For operation down to 13 metres	85%
For operation down to 11·5 metres	70%
For operation down to 10·5 metres	60%
For operation down to 9·5 metres	50%

APPROXIMATE DATA

V_f	11	V
I_f	16	A
g_m* (taken at Va 4,500, V_{g2} 800, p_a 750 W)	6·5	mA/V
g_m* (taken at $\frac{1}{2}$ $I_{e\ pk}$)	10	mA/V
$I^*_{e\ (pk)}$	4·25	A
$c_{a\text{-}gl}$	0·1	pF
c_{in}	65	pF
c_{out}	26	pF

* No attempt must be made to measure these figures statically.





WEIGHT 10·5 lb. (4·8 kg)

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Chelmsford, Essex, England. Telephone: Chelmsford 3221. *Telex:* 1953. *Telegrams: Expanse Chelmsford Telex*

(1) HF POWER AMPLIFIER AND OSCILLATOR CLASS C TELEGRAPHY

(Unmodulated, one valve, key down conditions)

Maximum permissible ratings

V_a	4,500	V	
I_a	600	mA	
P_{in}	V_{g3} +80 V	2·5	kW
	V_{g3} 0 V	2·2	kW
I_{g1}	100	mA	
V_{g2}	800	V	
p_{g2}	100	W	
p_a	750	W	

Typical Operation

V_a	4,500	4,500	3,500	2,500	V
I_a	550	475	380	330	mA
V_{g2}	800	500	500	500	V
I_{g2}	120	180	160	160	mA
p_{g2}	96	90	80	80	W
V_{g3}	+80	0	0	0	V
V_{g1}	−250	−200	−200	−200	V
I_{g1}	60	90	80	80	mA
$R_{g1\text{-}k}$	4,000	2,200	2,500	2,500	Ω
$v_{g1\ (pk)}$	400	400	350	350	V
P_{dr} (b)	40	50	40	40	W
Z_a	3,600	4,000	4,000	3,200	Ω
p_a	700	650	380	275	W
P_{out}	1,800	1,500	950	550	W

(2) HF POWER AMPLIFIER CLASS C

(Grid modulated, one valve, carrier conditions, permissible modulation 100%*)*

Maximum permissible ratings

V_a	4,500	V
I_a	300	mA
P_{in}	1·15	kW
I_{g1}	100	mA
V_{g2}	800	V
p_{g2}	100	W
p_a	750	W

Typical Operation

V_a	4,500	3,500	V
I_a	225	210	mA
V_{g2}	800	800	V
I_{g2}	20	20	mA
p_{g2}	16	16	W
V_{g3}	0	0	V
V_{g1}	−160	−155	V
I_{g1}	5	5	mA
$v_{g1\ (pk)}$	185	170	V
P_{dr} (b) (c)	10	10	W
$v_{pk\ (mod)}$ (d)	80	80	V
P_{mod} (d)	2·5	2·5	W
$Z_{a\ (mod)}$	2,500	2,500	Ω
Z_a	4,500	4,000	Ω
p_a	650	500	W
P_{out}	350	240	W

(3) HF POWER AMPLIFIER CLASS C

(Anode modulated, one valve, carrier conditions, permissible modulation 100%*)*

Maximum permissible ratings

V_a	3,500	V
I_a	350	mA
P_{in}	1·2	kW
I_{g1}	100	mA
V_{g2}	800	V
p_{g2}	100	W
p_a	500	W

Typical Operation

V_a	3,500	2,500	V
I_a	300	265	mA
V_{g2}	500	500	V
R_{g2}	30,000	20,000	Ω
I_{g2}	90	95	mA
p_{g2}	45	47·5	W
V_{g3}	0	0	V
V_{g1}	−100	−90	V
I_{g1} (b)	48	45	mA
$v_{g1\ (pk)}$	190	190	V
P_{dr} (b)	14	14	W
P_{mod} (d)	680	400	W
$Z_{a\ (mod)}$	9,000	8,000	Ω
Z_a	5,500	4,500	Ω
p_a	350	190	W
P_{out}	700	450	W

(4) HF POWER AMPLIFIER

(Suppressor modulated, one valve, carrier conditions, permissible modulation 100%)

Maximum permissible ratings

V_a	4,500	V
I_a	250	mA
P_{in}	1·12	kW
I_{g1}	100	mA
V_{g2}	800	V
p_{g2}	100	W
p_a	750	W

Typical Operation

V_a	4,500	4,500	V
I_a	200	200	mA
V_{g2}	500	(a)	V
I_{g2}	180	120	mA
p_{g2}	90	90	W
V_{g3}	−160	−135	V
V_{g1}	−120	−120	V
I_{g1} (b)	95	45	mA
$v_{g1\ (pk)}$	250	230	V
P_{dr} (b)	30	15	W
$v_{pk\ (mod)}$ (d)	160	135	V
P_{mod} (d)	Negligible	Negligible	
Z_a	5,500	5,500	Ω
p_a	600	580	W
P_{out}	300	320	W

(5) HF POWER AMPLIFIER CLASS B TELEPHONY

(One valve, carrier conditions, permissible modulation 100%)

Maximum permissible ratings

V_a	4,500	V
I_a	300	mA
P_{in}	1·1	kW
V_{g2}	800	V
p_{g2}	100	W
p_a	750	W

Typical Operation

V_a	4,500	3,500	V
I_a	240	240	mA
V_{g2}	800	800	V
I_{g2}	20	20	mA
p_{g2}	16	16	W
V_{g3}	0	0	V
V_{g1}	−85	−85	V
I_{g1} (b)	1	1·5	mA
$v_{g1\ (pk)}$	85	85	V
P_{dr} (b) (c)	5	6	W
Z_a	4,750	4,000	Ω
p_a	740	580	W
P_{out}	340	250	W

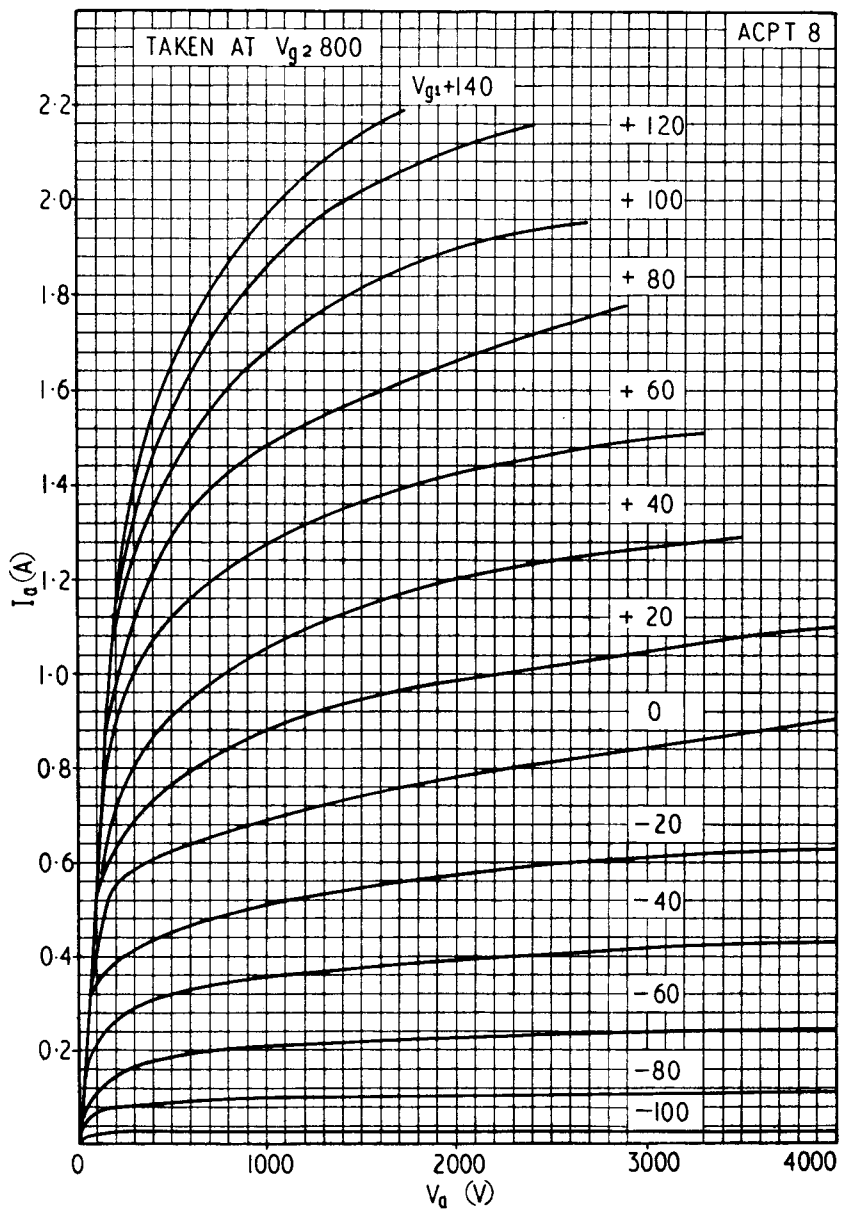
NOTES

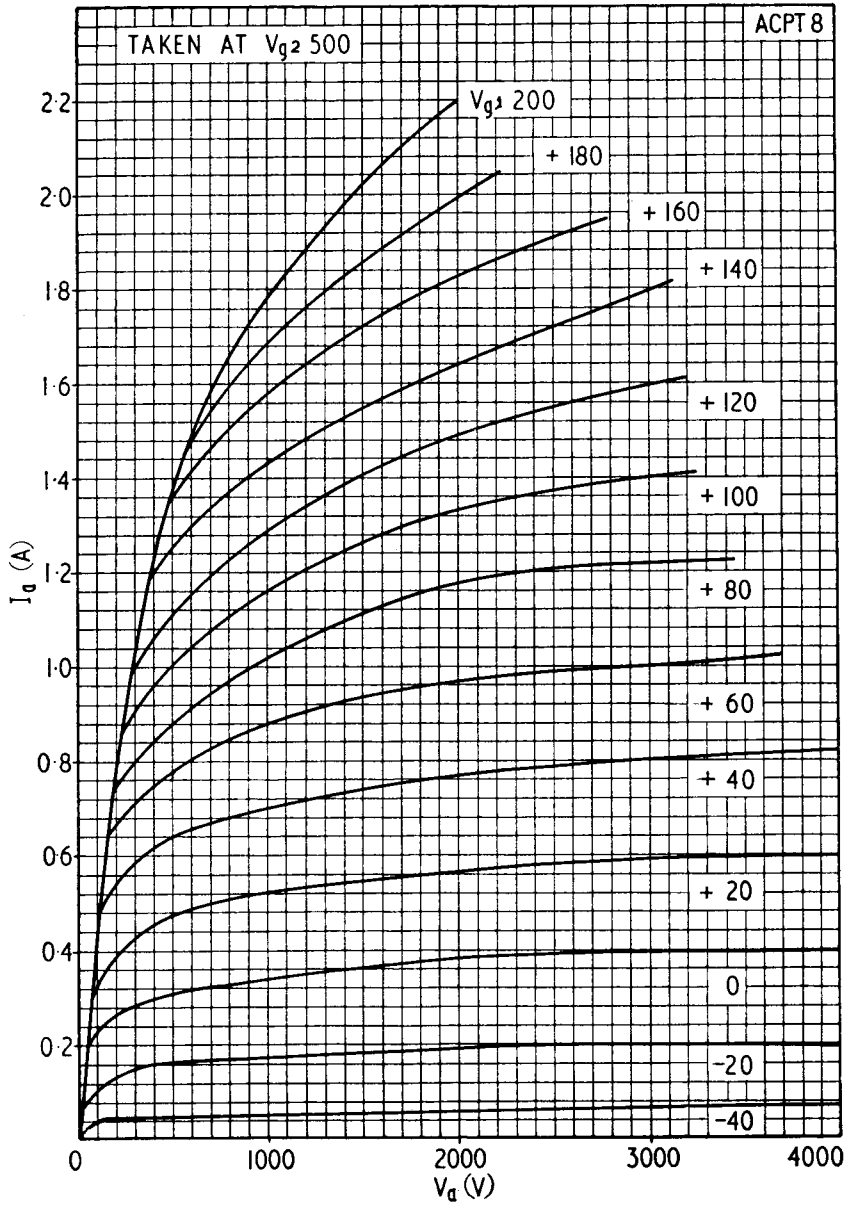
(a) Screen voltage obtained by means of a dropping resistance of 30,000 Ω from anode HT supply.

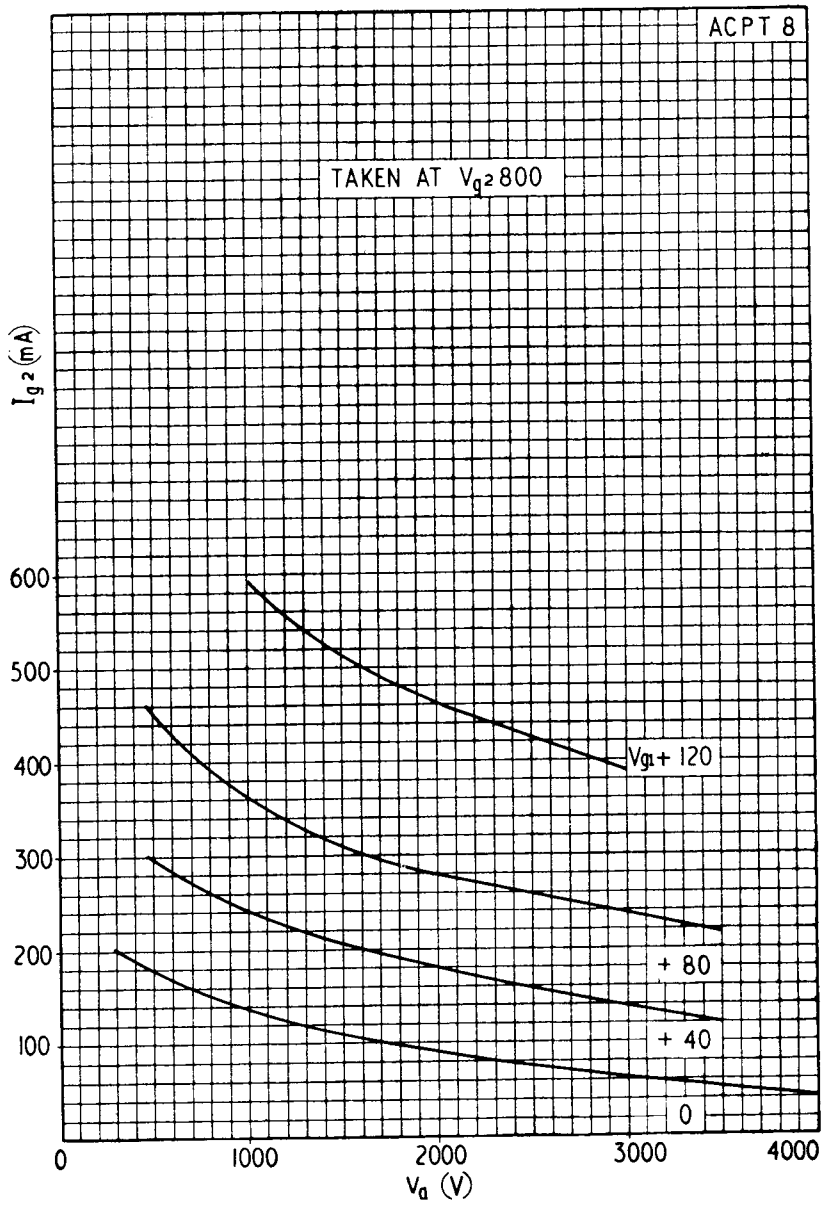
(b) Subject to wide variation. The figures are approximate only.

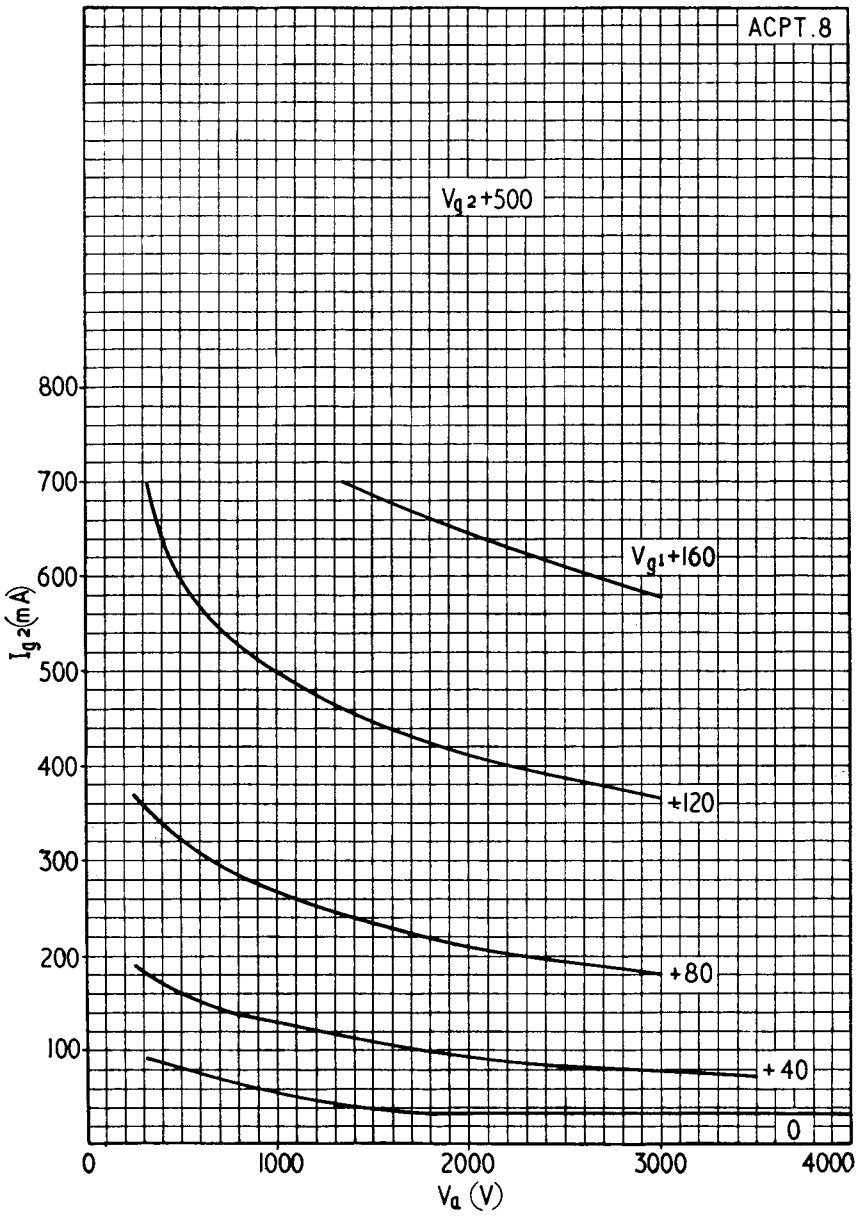
(c) At crest of audio cycle with 100% modulation.

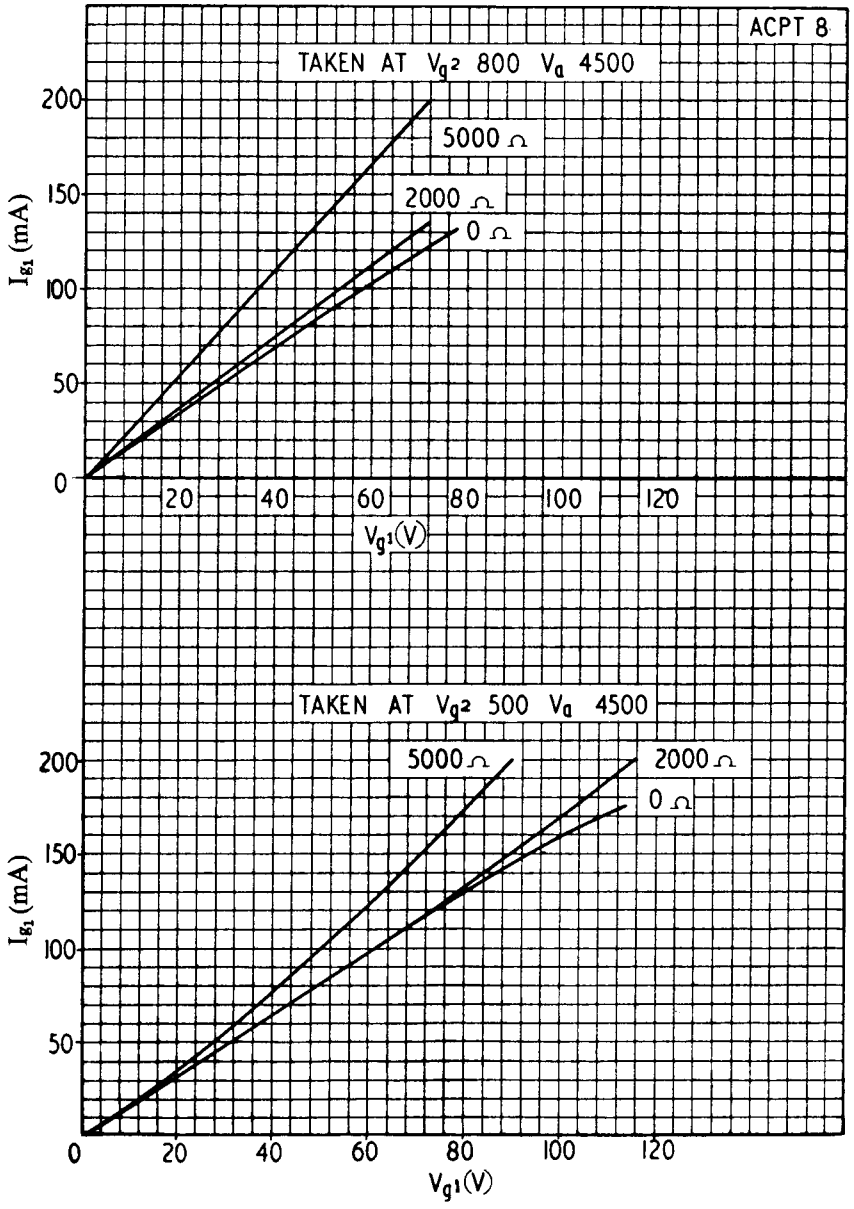
(d) 100% modulation.

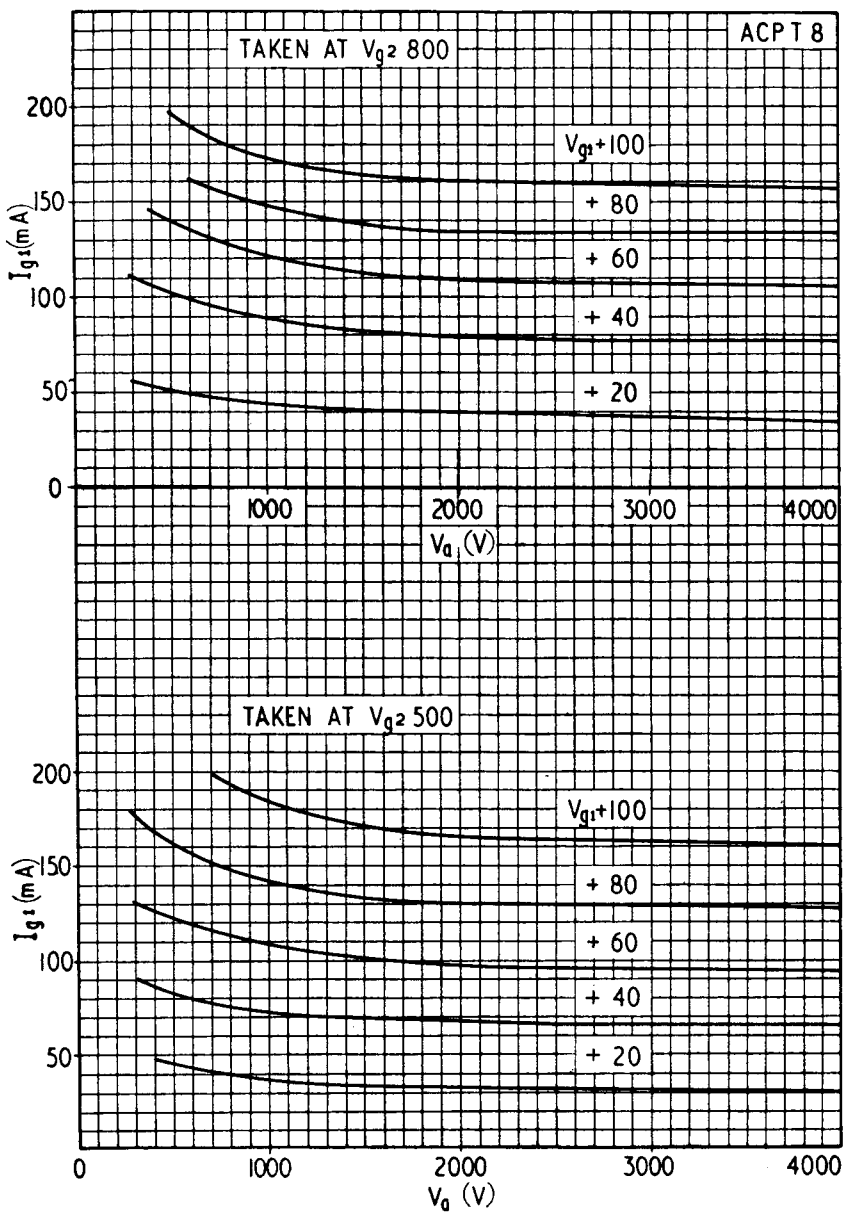

TAKEN AT V_{g2} 800
ACPT 8
V_{g1} +140
+ 120
+ 100
+ 80
+ 60
+ 40
+ 20
0
-20
-40
-60
-80
-100
2·2
2·0
1·8
1·6
1·4
1·2
1·0
0·8
0·6
0·4
0·2
I_a (A)
0
1000
2000
3000
4000
V_a (V)

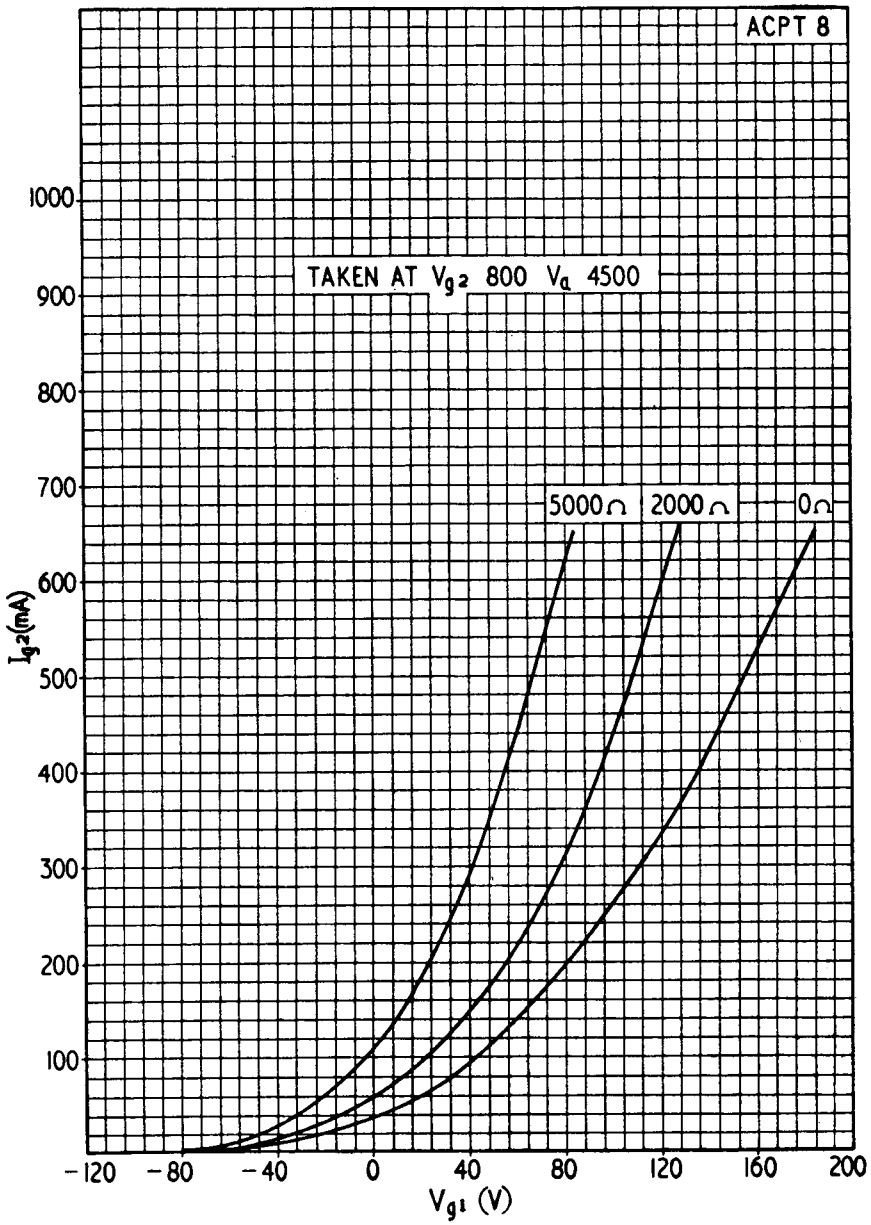

TAKEN AT V_{g2} 500
ACPT 8
V_{g1} 200
+ 180
+ 160
+ 140
+ 120
+ 100
+ 80
+ 60
+ 40
+ 20
0
-20
-40
2·2
2·0
1·8
1·6
1·4
1·2
1·0
0·8
0·6
0·4
0·2
I_a (A)
0
1000
2000
3000
4000
V_a (V)

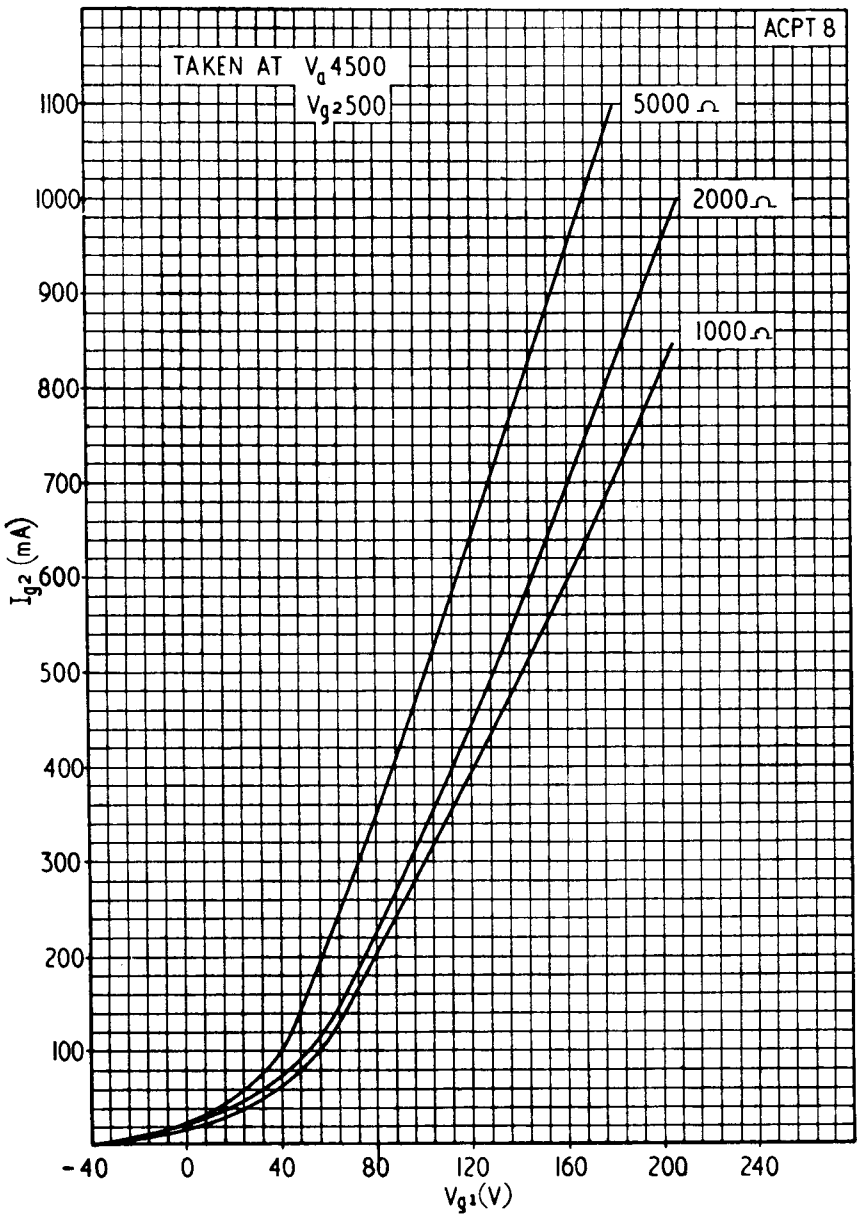

ACPT 8
TAKEN AT V_{g2} 800
I_{g2} (mA)
600
500
400
300
200
100
0
1000
2000
3000
4000
V_a (V)
V_{g1} + 120
+ 80
+ 40
0

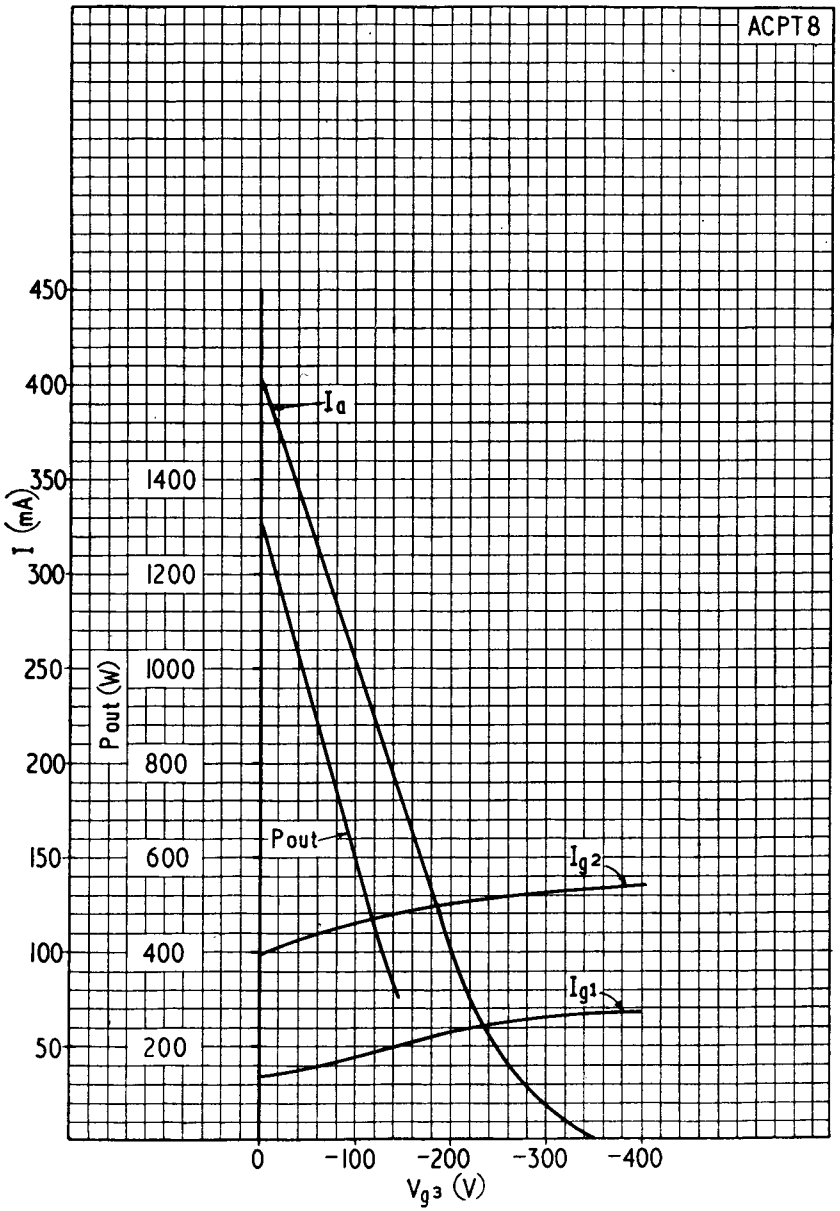

ACPT.8
V_{g2} +500
I_{g2} (mA)
800
700
600
500
400
300
200
100
0
1000
2000
3000
4000
V_a (V)
V_{g1} +160
+120
+80
+40
0


ACPT 8
TAKEN AT V_{g2} 800 V_a 4500
5000 Ω
2000 Ω
0 Ω
I_{g1} (mA)
200
150
100
50
0
20
40
60
80
100
120
V_{g1}(V)
TAKEN AT V_{g2} 500 V_a 4500
5000 Ω
2000 Ω
0 Ω
I_{g1} (mA)
200
150
100
50
0
20
40
60
80
100
120
V_{g1}(V)

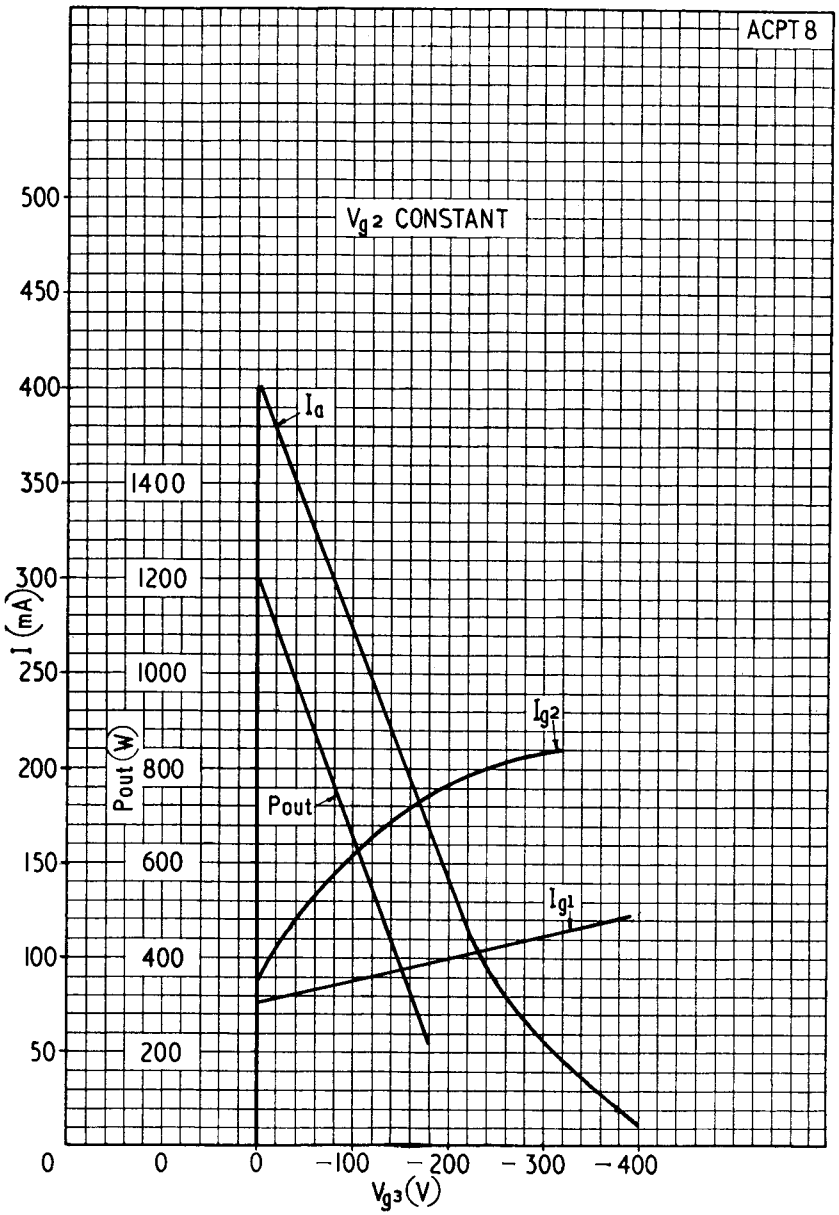

ACPT 8
TAKEN AT V_{g2} 800
V_{g1}+100
+ 80
+ 60
+ 40
+ 20
I_{g1}(mA)
200
150
100
50
0
1000
2000
3000
4000
V_a (V)
TAKEN AT V_{g2} 500
V_{g1}+100
+ 80
+ 60
+ 40
+ 20
I_{g1} (mA)
200
150
100
50
0
1000
2000
3000
4000
V_a (V)


ACPT 8
TAKEN AT V_{g2} 800 V_a 4500
5000 Ω
2000 Ω
0 Ω
I_{g2}(mA)
1000
900
800
700
600
500
400
300
200
100
-120
-80
-40
0
40
80
120
160
200
V_{g1} (V)

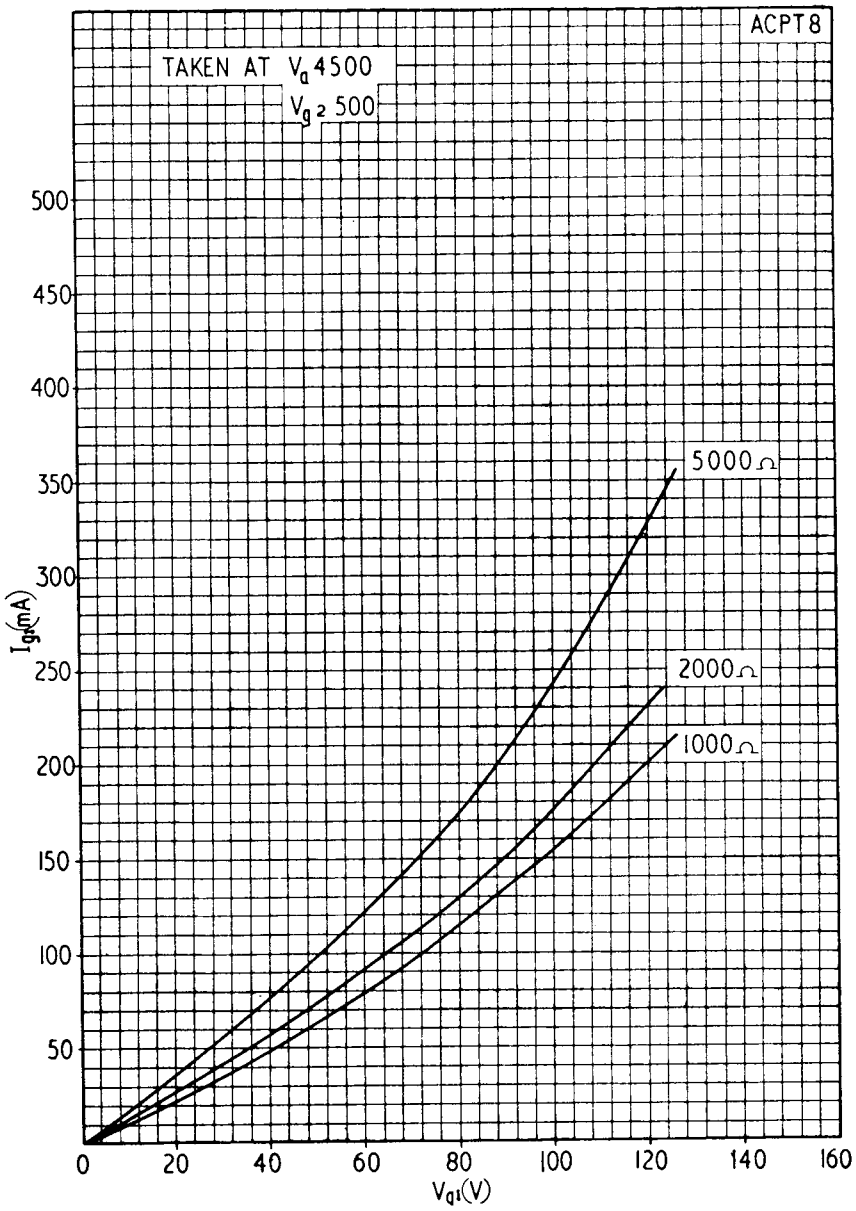

ACPT 8
TAKEN AT V_a 4500
V_{g2} 500
5000 Ω
2000 Ω
1000 Ω
I_{g2} (mA)
1100
1000
900
800
700
600
500
400
300
200
100
-40
0
40
80
120
160
200
240
V_{g1}(V)

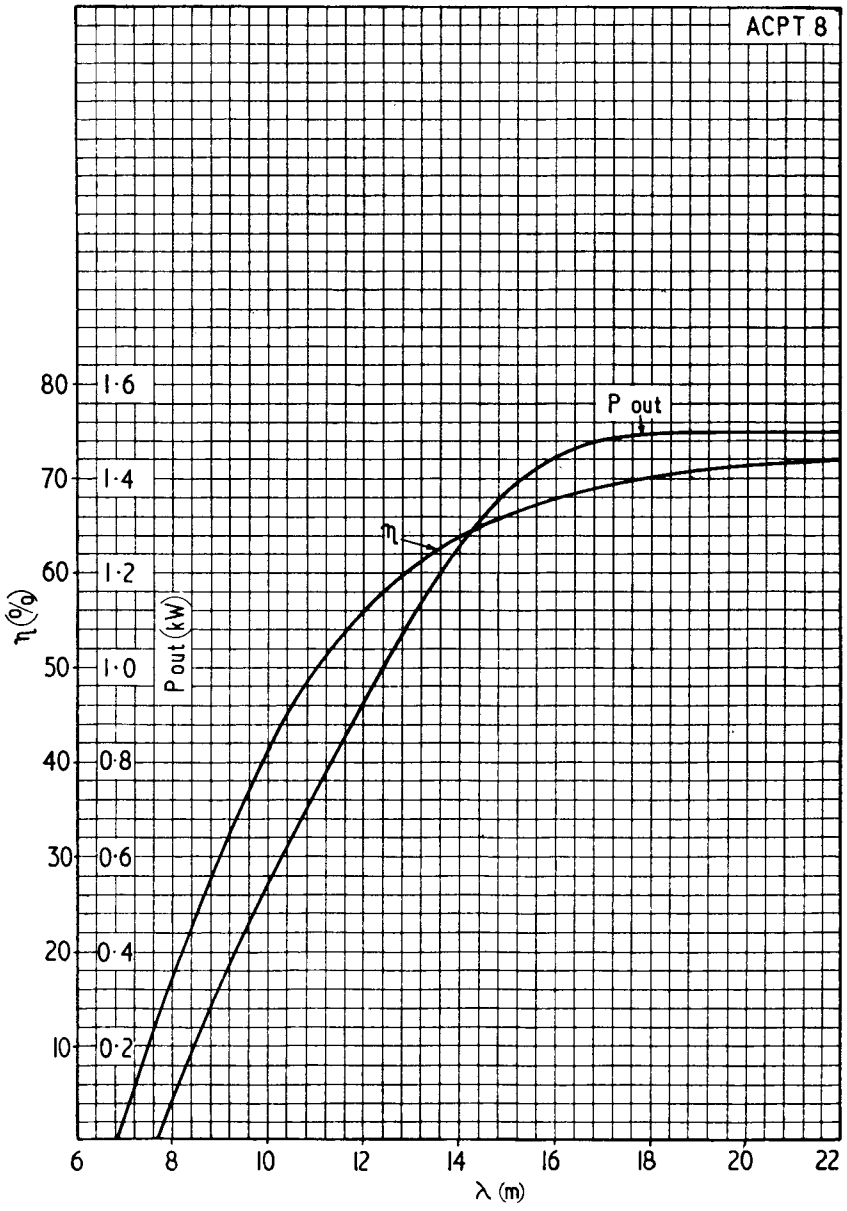


Taken at V_a 4,500, V_{g_1} −120, $v_{g_{1(pk)}}$ 230, V_{g_2} via 30k Ω resistor.



Taken at V_a 4,500, V_{g_1} −120, $v_{g_{1(pk)}}$ 250, V_{g_2} constant.


ACPT 8
TAKEN AT V_a 4500
V_{g2} 500
5000Ω
2000Ω
1000Ω
I_{g1}(mA)
500
450
400
350
300
250
200
150
100
50
0
20
40
60
80
100
120
140
160
V_{g1}(V)


ACPT 8
P out
η
η(%)
P out (kW)
80
70
60
50
40
30
20
10
1·6
1·4
1·2
1·0
0·8
0·6
0·4
0·2
6
8
10
12
14
16
18
20
22
λ (m)

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