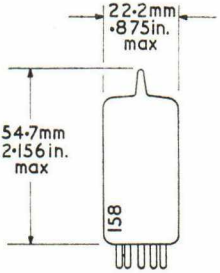
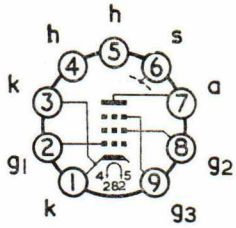


VARIABLE-MU R.F. PENTODE



B9A Base

GENERAL

This valve is a variable-mu frame grid R.F. pentode for use as an A.G.C. controlled, high gain I.F. amplifier in A.C. or A.C./D.C. television receivers.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·3	A

RATINGS

Maximum Anode Dissipation	$P_{a(max)}$	2·5	W
Maximum Screen Grid Dissipation	$P_{g2(max)}$	0·65	W
Maximum Anode Voltage	$V_{a(max)}$	250	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	250	V
Maximum Heater to Cathode Voltage (R.M.S.)	$V_{h-k(r.m.s.)max}$	150	V
Maximum Control Grid to Cathode Resistance	$R_{g1-k(max)}$	1	MΩ

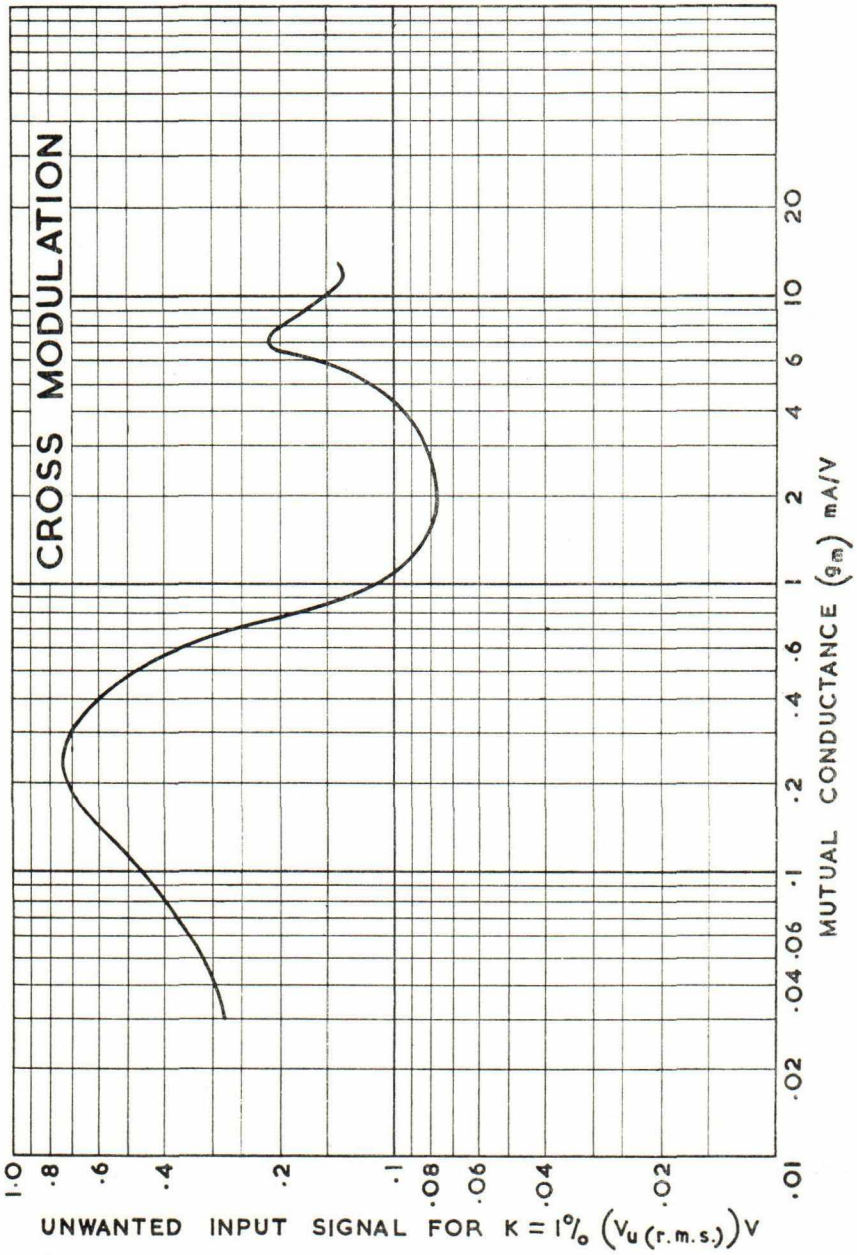
INTER-ELECTRODE CAPACITANCES

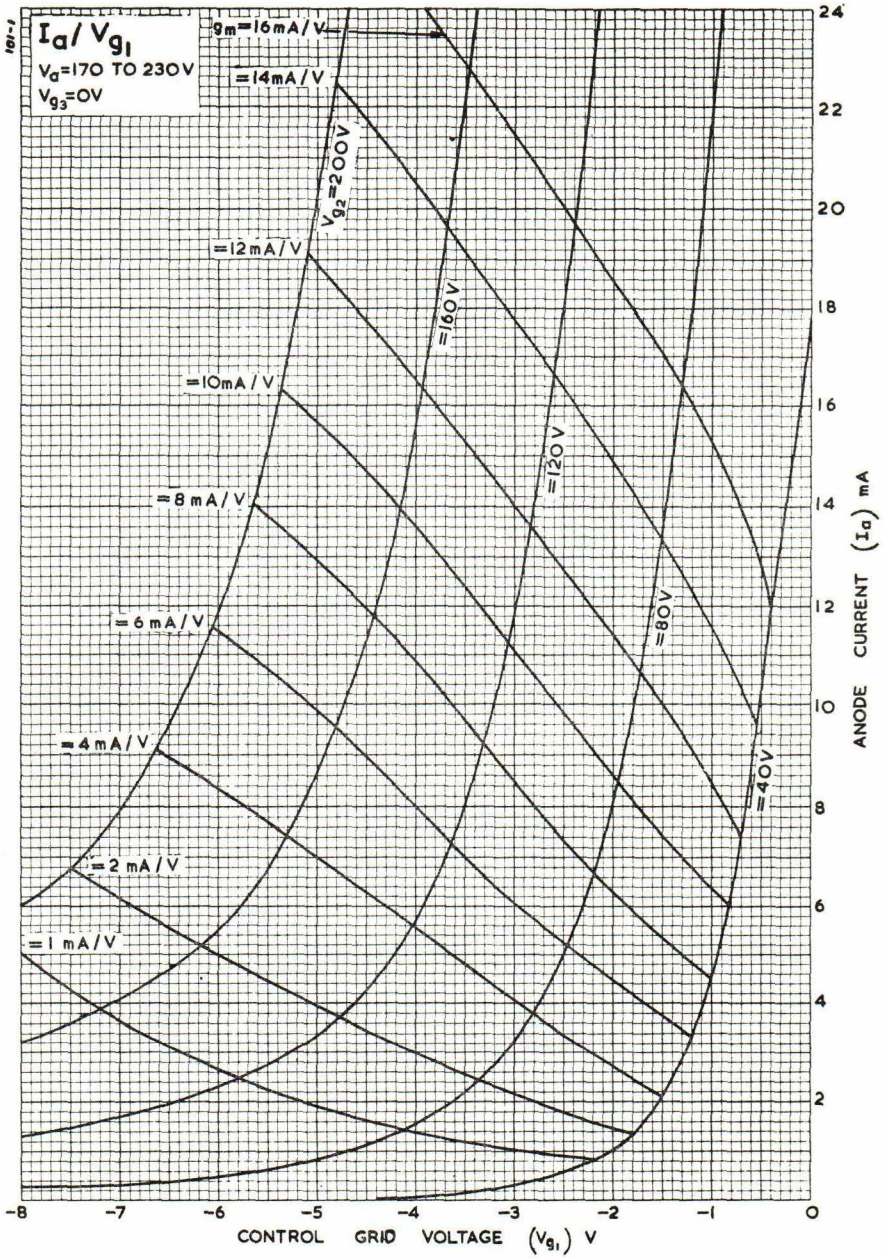
		*	†	‡	
Input	C_{in}	9·5	9·9	11·0	pF
Output	C_{out}	3·0	3·4	3·5	pF
Grid 1 to Anode	C_{g1-a}	<0·0055	<0·0065	<0·0075	pF
Grid 1 to Grid 2	C_{g1-g2}	2·8	2·8	2·8	pF

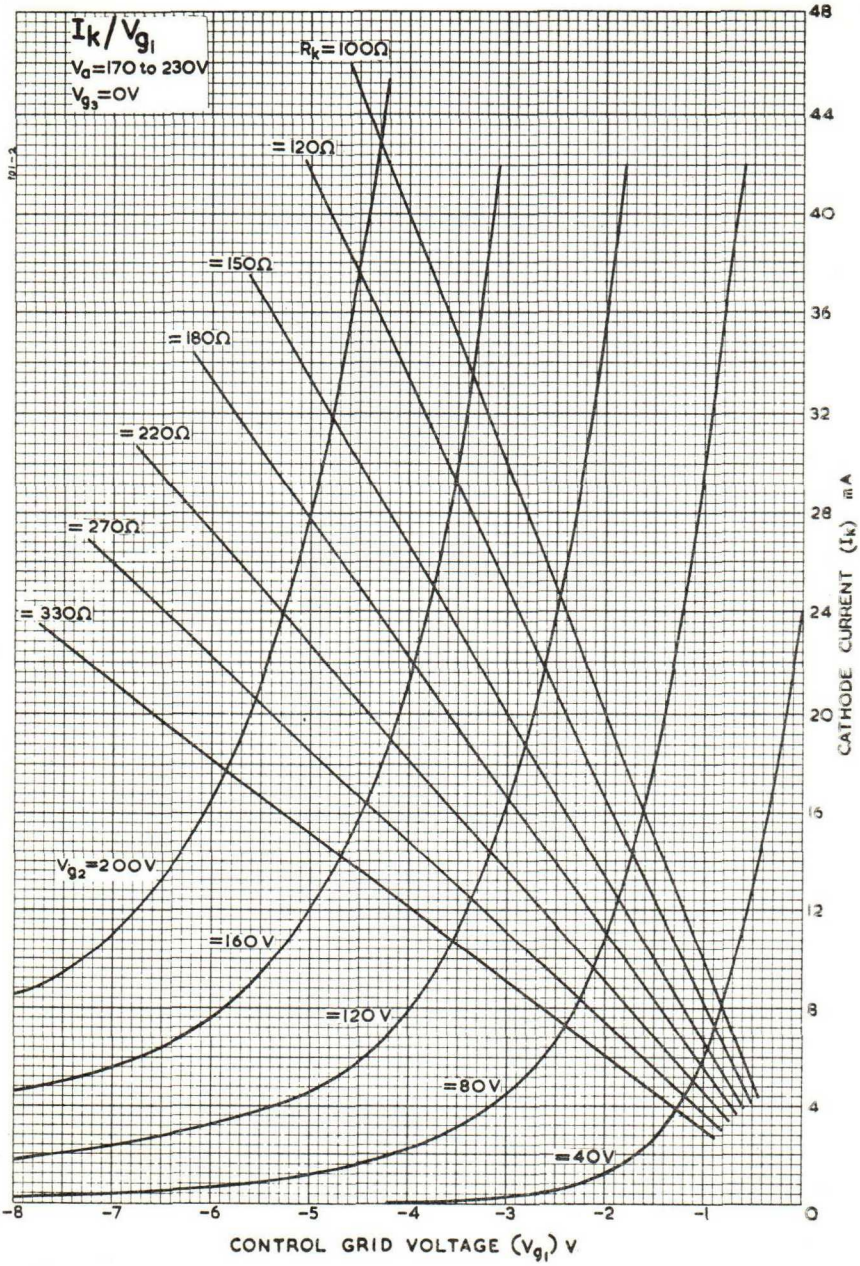
* In fully shielded socket without can.
† With holder capacitance balanced out. (Holder as below.)
‡ Total capacitance including B9A ceramic holder without skirt or radial shield. (Plessey holder type CP180900/1.)

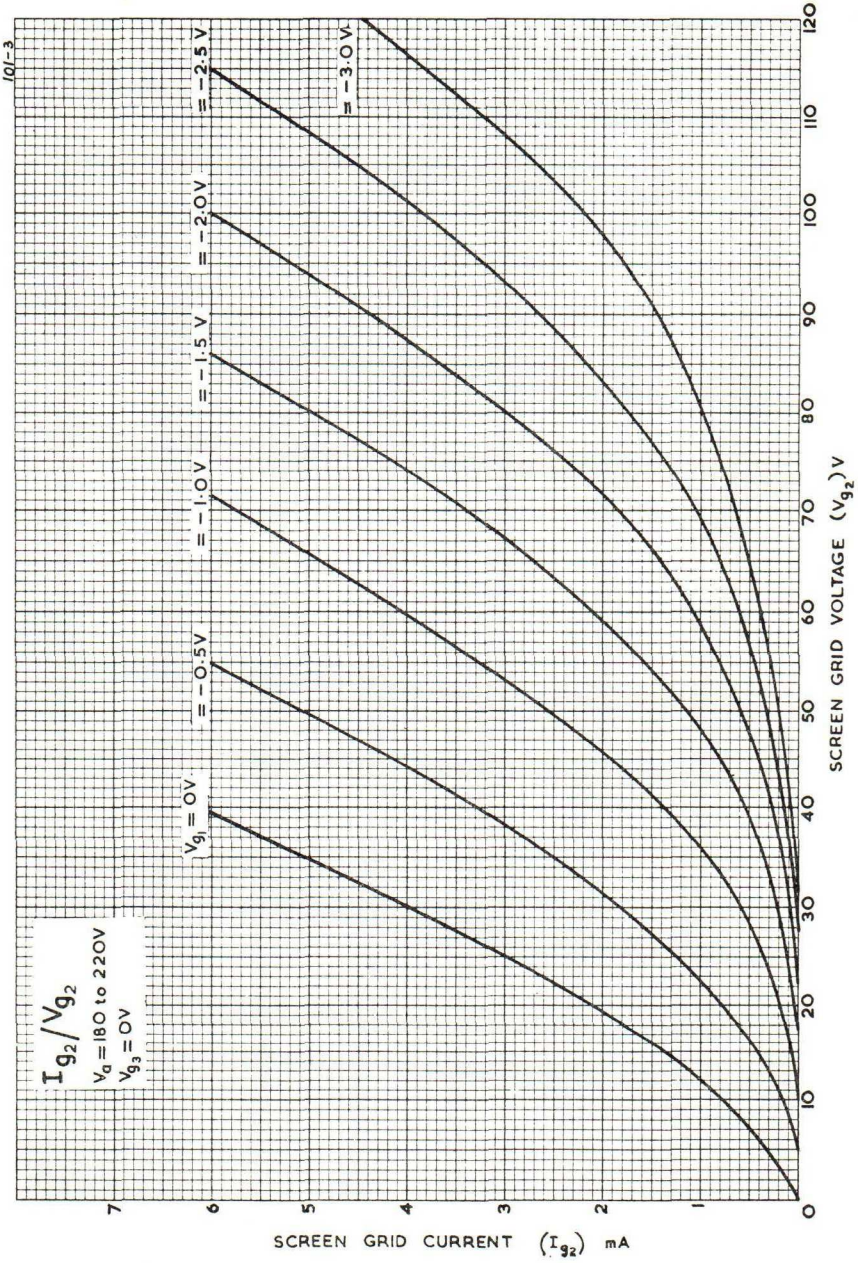
CHARACTERISTICS AND TYPICAL OPERATION

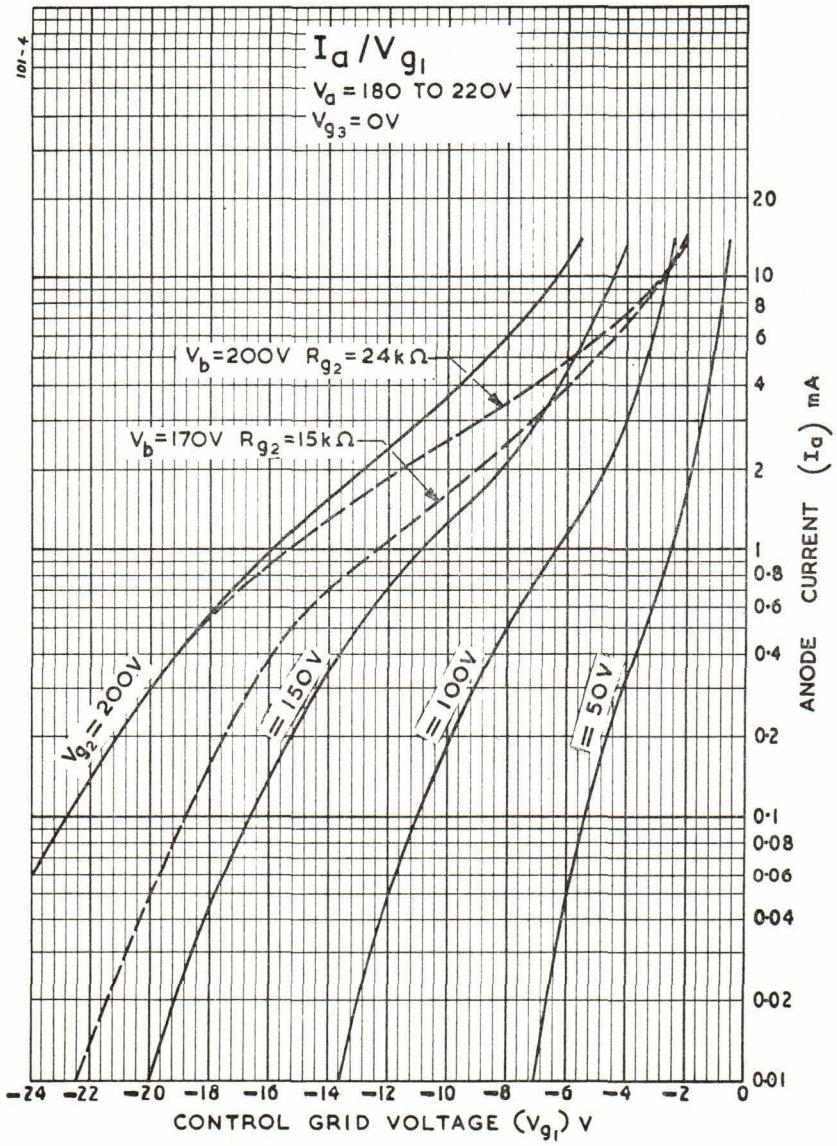
Supply Voltage	V_b	—	—	—	200	V
Anode Voltage	V_a	170	200	230	188	V
Screen Grid Voltage	V_{g2}	90	90	90	92	V
Screen Grid Resistance	R_{g2}	—	—	—	24	kΩ
Self Bias Resistance	R_k	—	—	—	120	Ω
Grid Bias Voltage	V_{g1}	−1·8	−2·0	−2·1	—	V
Anode Current	I_a	14	12	10·5	12	mA
Screen Grid Current	I_{g2}	5·3	4·5	3·6	4·5	mA
Mutual Conductance	g_m	14	12·5	10·6	12·5	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	350	500	650	—	kΩ
Valve Input Resistance at 40 Mc/s	r_{g1}	11·6	13	15·3	—	kΩ
Equivalent Grid Noise Resistance at 40 Mc/s	R_{eq}	—	490	—	—	Ω
Grid Voltage for $g_m/10$	$V_{g1}(g_m/10)$	—	—	—	−5·5	V
Grid Voltage for $g_m/100$	$V_{g1}(g_m/100)$	—	—	—	−19	V

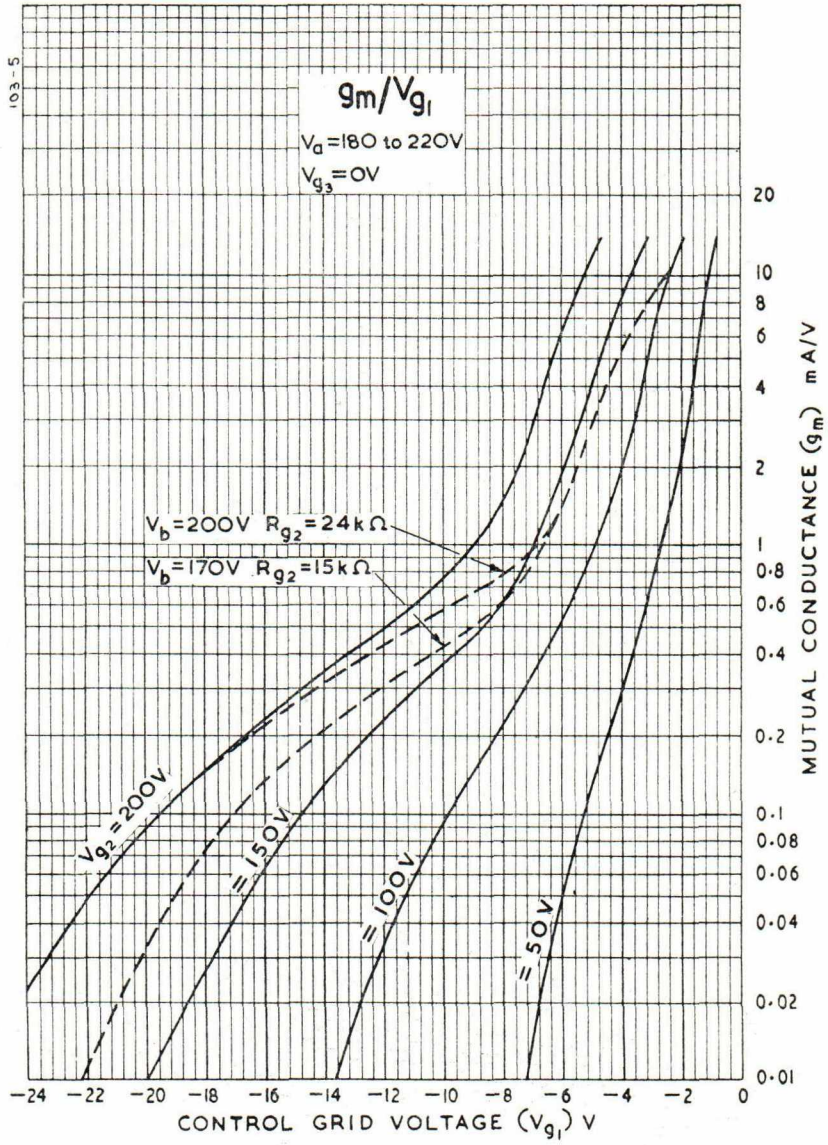

CROSS MODULATION
MUTUAL CONDUCTANCE (g_m) mA/V
.01
.02
.04
.06
.1
.2
.4
.6
1
2
4
6
10
20
UNWANTED INPUT SIGNAL FOR K = 1% (V_u (r.m.s.))V
1.0
.8
.6
.4
.2
.1
.08
.06
.04
.02

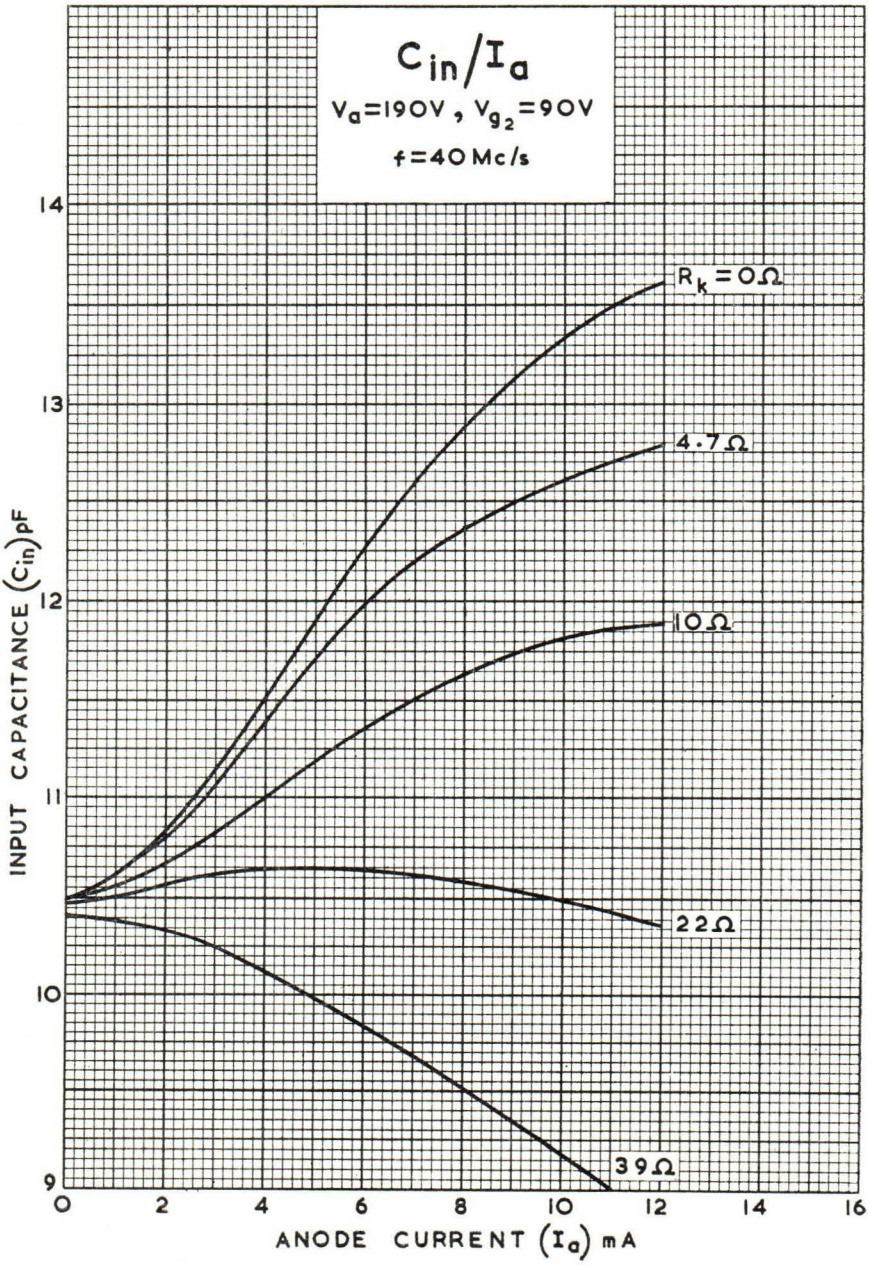

I_a / V_{g_1}
V_a=170 TO 230V
V_{g_3}=0V
g_m=16mA/V
=14mA/V
=12mA/V
=10mA/V
=8mA/V
=6mA/V
=4mA/V
=2mA/V
=1mA/V
V_{g_2}=200V
=160V
=120V
=80V
=40V
24
22
20
18
16
14
12
10
8
6
4
2
0
-8
-7
-6
-5
-4
-3
-2
-1
ANODE CURRENT (I_a) mA
CONTROL GRID VOLTAGE (V_{g_1}) V

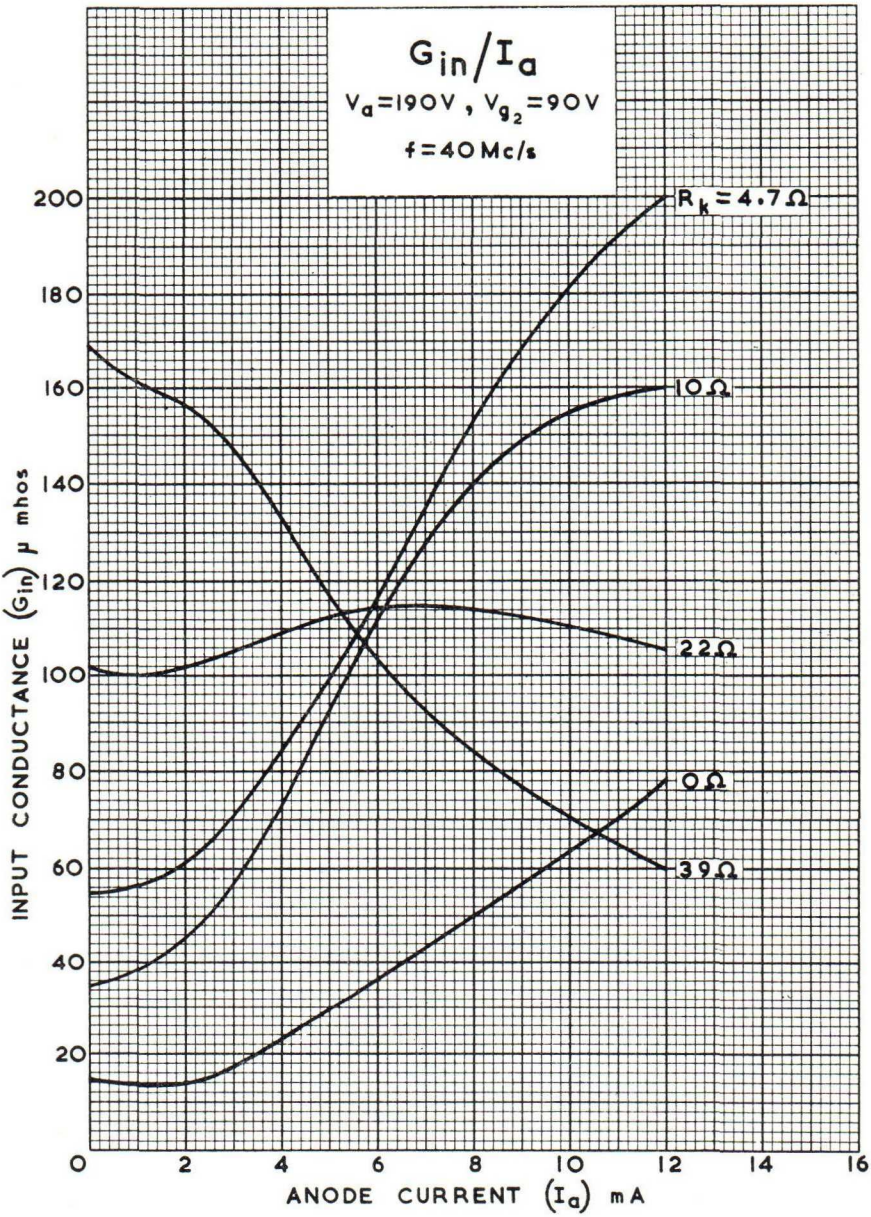

I_k/V_{g_1}
V_a=170 to 230V
V_{g_3}=0V
R_k=100Ω
=120Ω
=150Ω
=180Ω
=220Ω
=270Ω
=330Ω
V_{g_2}=200V
=160V
=120V
=80V
=40V
CATHODE CURRENT (I_k) mA
CONTROL GRID VOLTAGE (V_{g_1}) V
-8
-7
-6
-5
-4
-3
-2
-1
0
4
8
12
16
20
24
28
32
36
40
44
48


101-3
I_{g_2}/V_{g_2}
V_a = 180 to 220V
V_{g_3} = 0V
V_{g_1} = 0V
= −0·5V
= −1·0V
= −1·5V
= −2·0V
= −2·5V
= −3·0V
SCREEN GRID VOLTAGE (V_{g_2}) V
SCREEN GRID CURRENT (I_{g_2}) mA
0
10
20
30
40
50
60
70
80
90
100
110
120
1
2
3
4
5
6
7


101-4
I_a/V_{g_1}
V_a = 180 TO 220V
V_{g_3} = 0V
V_b=200V R_{g_2}=24kΩ
V_b=170V R_{g_2}=15kΩ
V_{g_2} = 200V
= 150V
= 100V
= 50V
20
10
8
6
4
2
1
0·8
0·6
0·4
0·2
0·1
0·08
0·06
0·04
0·02
0·01
ANODE CURRENT (I_a) mA
−24 −22 −20 −18 −16 −14 −12 −10 −8 −6 −4 −2 0
CONTROL GRID VOLTAGE (V_{g_1}) V


103-5
gm/Vg1
Va=180 to 220V
Vg3=0V
Vb=200V Rg2=24kΩ
Vb=170V Rg2=15kΩ
Vg2=200V
=150V
=100V
=50V
20
10
8
6
4
2
1
0·8
0·6
0·4
0·2
0·1
0·08
0·06
0·04
0·02
0·01
MUTUAL CONDUCTANCE (gm) mA/V
−24 −22 −20 −18 −16 −14 −12 −10 −8 −6 −4 −2 0
CONTROL GRID VOLTAGE (Vg1) V


C_{in}/I_a
V_a=190V , V_{g_2}=90V
f=40 Mc/s
R_k = 0Ω
4.7Ω
10Ω
22Ω
39Ω
INPUT CAPACITANCE (C_{in}) pF
ANODE CURRENT (I_a) mA
9
10
11
12
13
14
0
2
4
6
8
10
12
14
16


Gin/Ia
Va=190V , Vg2=90V
f=40Mc/s
Rk=4.7Ω
10Ω
22Ω
0Ω
39Ω
INPUT CONDUCTANCE (Gin) μ mhos
200
180
160
140
120
100
80
60
40
20
0
2
4
6
8
10
12
14
16
ANODE CURRENT (Ia) mA