BRIMAR Design Data

Volume Received.....20th October, 1961

Amendment No.	Date of Issue	Date filed in Volume
2	February, 1962	March, 1962
3	30th April, 1962	May, 1962
4	20th June, 1962	July, 1962
5	September, 1962	25th Oct. 1962
6	April, 1963	2nd May 1963
7	S eptember 1963	2nd October, 1963
8	December, 1963	17th January 1964
9	May 1964	26th May 1964
10.	November 1964.	February, 1965.
11.	October 1966.	November 1966.
BHV12.	December, 1967.	20th February, 1968.
BHV13.	October, 1968.	11th December, 1969.
BHV14.	November, 1969.	11th December, 1969.
BHV15.	January. 1971.	7th January, 1971.

BRIMAR

DESIGN DATA HANDBOOK

U.K. EDITION

Volume 1

AMERICAN TYPES

TYPES STARTING WITH NUMBERS

Receiving & Industrial Valves
Special Quality Valves

No Data Service is provided for this Handbook

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Head Office, Publicity Department and
SALES DEPARTMENTS

THORN RADIO VALVES AND TUBES LIMITED
MOLLISON AVENUE, BRIMSDOWN, ENFIELD,
MIDDLESEX, EN3 7NS

Telephone : 01-804 1201
International Telex : 23953 (Tarvat Brimsdwn)

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Title Card Issue 5

BRIMAR

DESIGN DATA HANDBOOK

U.K. EDITION

Volume 1 American type valves

Volume 2 European type valves
Teletubes

VALVES and TELETUBES

Volume 3 General Information
Phosphor Screens
Graticules, Gauges
Bases, Caps
Oscilloscope tubes

Volume 4 Radar tubes
Data Display and Monitor tubes
Miscellaneous tubes
Maintenance types

INDUSTRIAL CATHODE RAY TUBES

Volumes 1 and 2 or Volumes 3 and 4 are sold as separate pairs, but single volumes are not available

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1972 CLASSIFICATION: VOLUME 1

The 1972 Classification List is given below indicating whether types are current (C) or maintenance (M). The list may also be used to check the contents and filing order of the data sheets in volume 1. Some maintenance valve types are given in the Abridged Data tables at the end of the valve section in Volume 2 and such types are marked with an asterisk in the Cross Reference Index.

0A2	(M)	6X4	(M)
0B2	(M)	8D8	(M)
2D21	(M)	12AT6	(M)
5R4GY	(M)	12AT7	(C)
5U4G	(M)	12AU7	(C)
5V4G	(M)	12AX7	(C)
5Z4G	(M)	12BA6	(M)
6AK5	(M)	12BH7	(M)
6AK6	(M)	13D8	(M)
6AL5	(M)	13D9	(M)
6AM4	(M)	35W4	(M)
6AM6	(M)	807	(M)
6AQ5	(M)	5726	(M)
6AS7G	(M)	5749	(M)
6AT6	(M)	5750	(M)
6AU6	(M)	5763	(M)
6BA6	(M)	5965	(M)
6BE6	(M)	6057	(M)
6BH6	(M)	6058	(M)
6BJ6	(M)	6059	(M)
6BQ7A	(M)	6060	(M)
6BR7	(M)	6061	(M)
6BS7	(M)	6062	(M)
6BW6	(M)	6064	(M)
6BW7	(M)	6067	(M)
6C4	(M)	6080	(M)
6CH6	(M)	6132	(M)
6CL6	(M)	6146	(C)
6L6G/6L6GA	(M)	6158	(M)
6V6GT	(M)	6870	(M)

Design Data Handbook

U.K. EDITION

Cross Reference Index Volumes 1 & 2

USE OF THE CROSS REFERENCE INDEX

This index has two functions:-

(1) to locate data within the volumes and sections of the Design Data Handbook. These are indicated by a figure and letter code in the columns headed "Vol. & Section". The code is as follows:

VOLUME 1	1V	RECEIVING AND INDUSTRIAL VALVES SECTION
	1S	SPECIAL QUALITY VALVES SECTION
	1T	CURRENT TELETUBES SECTION
VOLUME 2	2V	MAINTENANCE VALVES SECTION
	2S	MAINTENANCE SPECIAL QUALITY VALVES SECTION
	2T	MAINTENANCE TELETUBES SECTION

(2) to give a complete cross reference between CV, Pro Electron, American and Brimar type numbers.

The cross reference index should be used to find the filing number when searching for data on types having CV, Pro Electron and American type numbers.

Index	Vol. & Section	Filed under Type No.	Equivalent Types	
0A2	2V	0A2	CV1832	150C2
0A3	2V	VR75/30	CV3798	
0B2	2V	0B2	CV1833	108C1
0C3	2V	VR105/30	CV686	
0D3	2V	VR150/30	CV216	150C3
1AB6	2V*	DK96		
1AJ5	2V*	DAF96		
1AJ4	2V*	DF96		
1BQ2	1V	DY802		
1R5	2V*	1R5	CV782	DK91
1S2	1V	DY86/87	DY86	
1S2A	1V	DY86/87	DY87	
1S5	2V*	1S5	CV784	DAF91
1T4	2V*	1T4	CV785	DF91
1X2B	2V*	R19	CV5427	
2D21	2V	2D21	CV797	EN91
2J2	2V	R20	KY80	
3C4	2V*	DL96		
3S4	2V*	3S4	CV484	CV820
			CV2370	DL92
3V4	2V*	3V4	CV2983	DL94
4CM4	2V	PC86		
4DL4	2V	PC88		
4FY5	1V	PC97		
4HA5	2V	PC900		
5AR4	2V	GZ34	CV1377	
5R4GY	2V	5R4GY	CV717	
5U4G	2V	5U4G	CV575	GZ31
5V4G	2V	5V4G	CV729	
5Y3GT	2V*	5Y3GT	CV1856	
5Z4G	2V	5Z4G	CV1863	GZ30
6AB8	2V*	6AB8	ECL80	
6AJ8	2V	ECH81	CV2128	
6AK5	2V	6AK5	CV850	EF95
6AK6	2V	6AK6	CV1762	
6AK8	2V	EABC80		
6AL5	2V	6AL5	CV140	EB91
6AM4	2V	6AM4	CV5073	
6AM5	2V*	6AM5	CV136	EL91
6AM6	1V	6AM6	CV138	EF91
			8D3	

* Included in Abridged Characteristics sheets.

Index	Vol. & Section	Filed under Type No.	Equivalent Types		Index	Vol. & Section	Filed under Type No.	Equivalent Types	
6AQ5	2V	6AQ5	CV1862	EL90	6S2	1V	EY86/87	CV2966	EY86
6AQ8	2V	ECC85			6S2A	1V	EY86/87	EY87	
6AS7G	2V	6AS7G			6SL7GT	2V*	6SL7GT	CV1985	
6AT6	2V	6AT6	CV452	EBC90	6SN7GT	2V*	6SN7GT	CV1988	ECC32
6AU6	2V	6AU6	CV2524	EF94	6U8	2V	ECF82	CV5065	
6BA6	1V	6BA6	CV454	EF93	6V4	2V	EZ80	CV1535	
6BD7A	2V*	EBC81			6V6G	2V*	6V6G	CV509	
6BE6	2V	6BE6	CV453	EK90	6V6GT	2V	6V6GT	CV511	
6BH6	2V	6BH6	CV3908		6X2	2V*	R12	CV426	EY51
6BJ6	2V	6BJ6	CV3909		6X4	2V	6X4	CV493	EZ90
6BK8	2V	EF86	CV2901	6267	6X5GT	2V*	6X5GT	CV574	EZ35
6BM8	2V	ECL82			7AN7	2V	PCC84	CV5192	
6BQ5	1V	EL84	CV2975		7B7	2V*	7B7	CV522	
6BQ7A	2V	6BQ7A	CV5365		7ES8	2V	PCC189		
6BR7	2V	6BR7	CV2135		7FC7	2V	PCC89		
6BR8	2V	6BR8			7GV7	1V	PCF805		
6BS7	2V	6BS7	CV5086		7S7	2V*	7S7		
6BW6	1V	6BW6	CV2136		8D3	1V	6AM6	CV138	EF91
6BW7	2V	6BW7	CV5817		8D8	2V	8D8		
6BX6	1V	EF80	CV1376		8GJ7	2V	PCF801		
6BY7	2V	EF85	CV1375		8HG8	2V	PCF86		
6C4	2V	6C4	CV133	EC90	9A8	1V	PCF80		
6CA4	2V	EZ81	CV5072		9JW8	2V	PCF802		
6CA7	2V	EL34	CV1741		9U8	2V	PCF82		
6CD6G	2V	6CD6G	CV5729		12AE6	2V	12AE6		
6CF8	2V	EF86	6267		12AT6	2V	12AT6	HBC90	
6CH6	2V	6CH6	CV2127	EL821	12AT7	1V	12AT7	CV455	ECC81
6CL6	2V	6CL6	CV5041		12AU7	1V	12AU7	CV491	ECC82
6CS6	2V	EH90			12AX7	1V	12AX7	CV492	ECC83
6CU7	2V*	ECH42	CV3888		12BA6	2V	12BA6	CV1928	HF93
6CW7	2V	ECC84	CV5281		12BH7	2V	12BH7	CV5042	
6DA6	2V	EF89	CV5156		13D3	2V	13D3	CV2212	
6DC8	2V	EBF89			13D8	2V	13D8		
6DJ8	1V	ECC88	CV5358		13D9	2V	13D9		
6DX8	1V	ECL84			14GW8	1V	PCL86		
6EH7	1V	EF183	CV5831		15A6	2V	PL83		
6EJ7	1V	EF184	CV5810		15CW5	2V	PL84		
6ES8	2V	ECC189	CV5331		15DQ8	1V	PCL84		
6GA8	1V	ECC804	CV5264		16A5	2V*	PL82		
6GW8	1V	ECL86			16A8	1V	PCL82		
6HU6	1V	EM87			16Y9	1V	PFL200		
6JX8	2V	ECH84			17CVP4	2T	C17AA	AW43-88	
6L6G	2V	6L6G	CV1947		17Z3	1V	PY800	PY81	
6L6GA	2V	6L6G	CV2817		18D3	2V	ECF804	CV5948	
6N8	2V*	EBF80			18GV8	1V	PCL805	PCL85	

* Included in Abridged Characteristics sheets.

Index	Vol. & Section	Filed under Type No.	Equivalent Types		
19D8	2V	UCH81			
19FL8	2V	UBF89			
19Y3	2V*	PY82			
21A6	2V	PL81	CV5077		
23DGP4	2T	A59-13W	C23/10AP		
23DHP4	2T	A59-13W	C23/10AP		
25E5	1V	PL36			
27GB5	2V	PL500			
30AE3	1V	PY88			
35L6GT	2V*	35L6GT	CV562		
35W4	2V	35W4	HY90		
38A3	1V	UY85			
45B5	1V	UL84			
50BM8	2V	UCL82			
50CD6G	2V*	50CD6G			
108C1	2V	0B2	CV1833		
150C2	2V	0A2	CV1832		
150C3	2V	VR150/30	CV216	0D3	
807	2V	807	CV124		
5726	2S	5726	CV4007	M8212	
5749	2S	5749	CV4009		
5750	2S	5750	CV4012		
5763	1V	5763	CV2129		
5965	2S	5965	CV5843		
6057	2S	6057	CV4004	M8137	
6058	2S	6058	CV4025	M8079	
6059	2S	6059	CV4006		
6060	2S	6060	CV4024	M8162	
6061	2S	6061	CV4043		
6062	1S	6062	CV4039	M8096	
6064	1S	6064	CV4014	M8083	
6065	2S	6065	CV4015	M8161	
6067	2S	6067	CV4003	M8136	
6080	2V	6080	CV2984	ECC230	
6100	2S	6100	CV4058	M8080	
6132	2S	6132	CV4055		
6146	1V	6146	CV3523		
6158	2S	6158	CV4068		
6267	2V	EF86			
6870	2S	6870	CV5121		
6922	1S	E88CC	CV2492		
A47-13W	2T	A47-13W	C19/10AP		
A47-25W	2T	A47-25W			
A59-13W	2T	A59-13W	C23/10AP	23DGP4	
			23DHP4	A59-16W	
A59-16W	2T	A59-13W			
A59-25W	1T	A59-25W			
AW43-80Z	2T	C17SM			
AW43-88	2T	C17AA	17CVP4		
AW47-90	2T	C19AK	C19/7A		
AW47-91	2T	AW47-91	C19/10A		
AW53-88	2T	C21AA	C21/7A		
AW59-90	2T	C23AK	C23/7A		
C17AA	2T	C17AA	AW43-88	17CVP4	
C17AF	2T	C17AF			
C17SM	2T	C17SM	AW43-80Z		
C19/7A	2T	C19AK	AW47-90		
C19/10A	2T	AW47-91			
C19/10AP	2T	A47-13W			
C19AH	2T	C19AH			
C19AK	2T	C19AK	AW47-90	C19/7A	
C21/7A	2T	C21AA	AW53-88		
C21AA	2T	C21AA	AW53-88	C21/7A	
C21AF	2T	C21AF			
C23/7A	2T	C23AK	AW59-90		
C23/10AP	2T	A59-13W	23DGP4	23DHP4	
C23AG	2T	C23AG			
C23AK	2T	C23AK	AW59-90	C23/7A	
CV133	2V	6C4	EC90		
CV136	2V*	6AM5	EL91		
CV138	1V	6AM6	EF91	8D3	
CV140	2V	6AL5	EB91		
CV452	2V	6AT6	EBC90		
CV454	1V	6BA6	EF93		
CV455	1V	12AT7	ECC81		
CV491	1V	12AU7	ECC82		
CV492	1V	12AX7	ECC83		
CV493	2V	6X4	EZ90		
CV511	2V	6V6GT			
CV717	2V	5R4GY			
CV729	2V	5V4G			
CV782	2V*	1R5	DK91		
CV850	2V	6AK5	EF95		
CV1376	1V	EF80	6BX6		
CV1535	2V	EZ80	6V4		
CV1762	2V	6AK6			
CV1856	2V*	5Y3GT			
CV1862	2V	6AQ5	EL90		
CV1863	2V	5Z4G	GZ30		
CV1947	2V	6L6G			

* Included in Abridged Characteristics sheets.

Index	Vol. & Section	Filed under Type No.	Equivalent Types	
CV1988	2V*	6SN7GT		
CV2127	2V	6CH6	EL821	
CV2129	1V	5763		
CV2135	2V	6BR7		
CV2136	1V	6BW6		
CV2212	2V	13D3		
CV2492	1S	E88CC	6922	
CV2524	2V	6AU6	EF94	
CV2966	1V	EY86/87	EY86	6S2
CV2975	1V	EL84	6BQ5	
CV3523	1V	6146		
CV3908	2V	6BH6		
CV3909	2V	6BJ6		
CV4002	1S	6064	F/6064	M8140
CV4003	2S	6067	M8136	
CV4004	2S	6057	M8137	
CV4006	2S	6059		
CV4007	2S	5726	M8212	
CV4009	2S	5749		
CV4012	2S	5750		
CV4014	1S	6064	M8083	
CV4024	2S	6060	M8162	
CV4025	2S	6058	M8079	
CV4033	2S	6060	F/6060	M8144
CV4034	2S	6067	F/6067	M8149
CV4035	2S	6057	F/6057	M8214
CV4039	1S	6062	M8096	
CV4043	2S	6061		
CV4045	2S	6061	F/6061	
CV4049	2S	5726	F/5726	M8237
CV4055	2S	6132		
CV4056	2S	6132	F/6132	
CV4058	2S	6100	M8080	
CV4068	2S	6158		
CV4069	2S	6158	F/6158	
CV5042	2V	12BH7		
CV5065	2V	ECF82	6U8	
CV5072	2V	EZ81	6CA4	
CV5073	2V	6AM4		
CV5086	2V	6BS7		
CV5121	2S	6870		
CV5215	2V	ECF80		
CV5264	1V	ECC804	6GA8	
CV5358	1V	ECC88	6DJ8	
CV5365	2V	6BQ7A		
CV5810	1V	EF184	6EJ7	
CV5817	2V	6BW7		
CV5843	2S	5965		
CV5948	2V	ECF804	18D3	
DAF91	2V*	DAF91	CV784	1S5
DAF96	2V*	DAF96	1AH5	
DF91	2V*	DF91	CV785	1T4
DF96	2V*	DF96	1AJ4	
DK91	2V*	DK91	CV782	1R5
DK96	2V*	DK96	1AB6	
DL92	2V*	DL92	CV484	CV820
			CV2370	3S4
DL94	2V*	DL94	CV2983	3V4
DL96	2V*	DL96	3C4	
DY86	1V	DY86/87	1S2	
DY87	1V	DY86/87	1S2A	
DY802	1V	DY802	1BQ2	
E88CC	1S	E88CC	CV2492	6922
EABC80	2V	EABC80	6AK8	
EB91	2V	6AL5	CV140	
EBC81	2V*	EBC81	6BD7A	
EBC90	2V	6AT6	CV452	
EBF80	2V*	EBF80	6N8	
EBF89	2V	EBF89	6DC8	
EC90	2V	6C4	CV133	
ECC32	2V*	6SN7GT	CV181	
ECC81	1V	12AT7	CV455	
ECC82	1V	12AU7	CV491	
ECC83	1V	12AX7	CV492	
ECC84	2V	ECC84	CV5281	6CW7
ECC85	2V	ECC85	6AQ8	
ECC88	1V	ECC88	CV5358	6DJ8
ECC189	2V	ECC189	CV5331	6ES8
ECC230	2V	6080	CV2984	
ECC804	1V	ECC804	CV5264	6GA8
ECC807	1V	ECC807		
ECF80	2V	ECF80	CV5215	
ECF82	2V	ECF82	CV5065	6U8
ECF804	2V	ECF804	CV5948	18D3
ECH42	2V*	ECH42	CV3888	6CU7
ECH81	2V	ECH81	CV2128	6AJ8
ECH84	2V	ECH84	6JX8	
ECL80	2V*	ECL80	6AB8	
ECL82	2V	ECL82	6BM8	
ECL84	1V	ECL84	6DX8	

* Included in Abridged Characteristics sheets.

Index	Vol. & Sec- tion	Filed under Type No.	Equivalent Types		
ECL86	1V	ECL86	6GW8		
EF80	1V	EF80	CV1376	6BX6	
EF85	2V	EF85	CV1375	6BY7	
EF86	2V	EF86	6CF8	6267	
EF89	2V	EF89	CV5156	6DA6	
EF91	1V	6AM6	CV138	8D3	
EF93	1V	6BA6	CV454		
EF94	2V	6AU6	CV2524		
EF95	2V	6AK5	CV850		
EF183	1V	EF183	CV5831	6EH7	
EF184	1V	EF184	CV5810	6EJ7	
EH90	2V	EH90	6CS6		
EK90	2V	6BE6	CV453		
EL34	2V	EL34	CV1741	6CA7	
EL84	1V	EL84	CV2975	6BQ5	
EL90	2V	6AQ5	CV1862		
EL91	2V*	6AM5	CV136		
EL506	1V	EL506			
EL821	2V	6CH6	CV2127		
EM87	1V	EM87	6HU6		
EN91	2V	2D21	CV797		
EY51	2V*	EY51	CV426	6X2	
			R12		
EY83	2V	EY83			
EY86	1V	EY86/87	CV2966	6S2	
EY87	1V	EY86/87	6S2A		
EZ35	2V*	EZ35	CV574	6X5GT	
EZ80	2V	EZ80	CV1535	6V4	
EZ81	2V	EZ81	CV5072	6CA4	
EZ90	2V	6X4	CV493		
F/5726	2S	5726	CV4049	M8237	
F/6057	2S	6057	CV4035	M8214	
F/6060	2S	6060	CV4033	M8144	
F/6061	2S	6061	CV4045		
F/6062	1S	6062			
F/6064	1S	6064	CV4002	M8140	
F/6067	2S	6067	CV4034	M8149	
F/6132	2S	6132	CV4056		
F/6158	2S	6158	CV4069		
GZ30	2V	5Z4G	CV1863		
GZ31	2V	5U4G	CV575		
GZ34	2V	GZ34	CV1377	5AR4	
HBC90	2V	12AT6			
HF93	2V	12BA6	CV1928		
HY90	2V	HY90			
KY80	2V	R20	2J2		
M8079	2S	6058	CV4025		
M8080	2S	6100	CV4058		
M8083	1S	6064	CV4014		
M8096	1S	6062	CV4039		
M8136	2S	6067	CV4003		
M8137	2S	6057	CV4004		
M8140	1S	6064	CV4002	F/6064	
M8144	2S	6060	CV4033	F/6060	
M8149	2S	6067	CV4034	F/6067	
M8161	2S	6065	CV4015		
M8162	2S	6060	CV4024		
M8212	2S	5726	CV4007		
M8214	2S	6057	CV4035	F/6057	
M8237	2S	5726	CV4049	F/5726	
PC86	2V	PC86	4CM4		
PC88	2V	PC88	4DL4		
PC97	1V	PC97	4FY5		
PC900	2V	PC900	4HA5		
PCC84	2V	PCC84	CV5192	7AN7	
PCC89	2V	PCC89	7FC7		
PCC189	2V	PCC189	7ES8		
PCE82	2V	PCE82			
PCF80	1V	PCF80	9A8		
PCF82	2V	PCF82	9U8		
PCF86	2V	PCF86	8HG8		
PCF801	2V	PCF801	8GJ7		
PCF802	2V	PCF802	9JW8		
PCF805	1V	PCF805	7GV7		
PCF806	2V	PCF806			
PCL82	1V	PCL82	16A8		
PCL83	2V	PCL83	CV5144		
PCL84	1V	PCL84	15DQ8		
PCL85	1V	PCL805	18GV8		
PCL86	1V	PCL86	14GW8		
PCL805	1V	PCL805			
PFL200	1V	PFL200	16Y9		
PL36	1V	PL36	25E5		
PL81	2V	PL81	CV5077	21A6	
PL81A	1V	PL81A			
PL82	2V*	PL82	16A5		
PL83	2V	PL83	15A6		
PL84	2V	PL84	15CW5		
PL302	1V	PL302			
PL500	2V	PL500	27GB5		

* Included in Abridged Characteristics sheets.

Index	Vol. & Section	Filed under Type No.	Equivalent Types	
PL504	1V	PL504		
PY32	2V*	PY32		
PY33	2V	PY33		
PY81	1V	PY800	17Z3	
PY82	2V*	PY82	19Y3	
PY83	2V	PY83		
PY88	1V	PY88	30AE3	
PY800	1V	PY800		
PY801	1V	PY801		
R12	2V*	R12	CV426 6X2	EY51
R19	2V*	R19	CV5427	1X2B
R20	2V	R20	KY80	2J2
UABC80	2V	UABC80		
UBC81	2V*	UBC81		
UBF89	2V	UBF89	19FL8	
UCC85	2V	UCC85		
UCH81	2V	UCH81	19D8	
UCL82	2V	UCL82	50BM8	
UCL83	2V	UCL83		
UF89	2V	UF89		
UL84	1V	UL84	45B5	
UY85	1V	UY85	38A3	
VR75/30	2V	VR75/30	CV3798	0A3
VR105/30	2V	VR105/30	CV686	0C3
VR150/30	2V	VR150/30	CV216	0D3

* Included in Abridged Characteristics sheets.

Note:

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TYPE DESIGNATION CODE FOR RADIO AND TELEVISION RECEIVING VALVES

BRIMAR

1 3 D 8

First number indicates the construction	Letter indicates the heater rating	Serial number
1 Half Wave Rectifiers **2** Diodes, Single **3** Triodes, Output **4** Triodes, High-mu **5** Tetrodes, Straight **6** Tetrodes, Vari-mu **7** Pentodes, Power and Video **8** Pentodes, R.F. Straight **9** Pentodes, R.F. Vari-mu **10** Diodes, Double **11** Triodes with Double Diode **12** Pentodes A.F. with Double Diode **13** Triodes Double, High-mu **14** Triodes Double, Class B Output **15** Heptodes **16** Triodes Output, D.C. Coupled **17** Pentodes R.F. with Double Diode **18** Pentodes with Triode **20** Hexode/Heptode with Triode	**A** 3·6 to 4·4V Indirectly Heated **B** 2V Directly Heated **C** Directly Heated other than 2 or 4V **D** All other heater ratings Indirectly Heated other than 4V	Serial numbers are allocated in chronological order as new valve types are introduced

THORN — A E I RADIO VALVES & TUBES LTD.

Nomenclature for

RADIO AND TELEVISION RECEIVING VALVES

This type designation code relates to valves designed for use primarily in reproducing and recording equipment for domestic applications such as: radio and television receiving sets—record players, tape recorders and audio amplifiers—home cinema projectors—hearing aids—and similar equipment.

In some instances valve types in this category may also have professional applications.

The Pro-Electron type nomenclature consists of two or more letters followed by a three-figure serial number. These symbols give information concerning the heater or filament rating, the principal uses of the valve and the type of base according to the following code:—

The first letter indicates the filament or heater rating, i.e.

Letter	*Filament or Heater Rating*	*Operation*
D	⩽1·4 V	Series or Parallel Supply
E	6·3 V	Series or Parallel Supply
G	Miscellaneous	
H	0·15A	Series Supply
P	0·3 A	Series Supply
U	0·1 A	Series Supply
X	0·6 A	Series Supply

The following letters have formerly also been used A(4V), B(0·18A), C(0·2A), F(12·6V), K(2V), V(50mA), and Y(450mA). G was formerly exclusively used for indicating a 5V heater.

The second and subsequent letters indicate the construction and/or application of the valve, i.e.

A	Diode (excluding rectifier)
B	Double diode with common cathode (excluding rectifier)
C	Triode (excluding power output triode)
D	Power output triode
E	Tetrode (excluding power and output tetrode)
F	Pentode (excluding power output pentode)
L	Power output tetrode or power output pentode
H	Hexode or heptode (of the hexode type)
K	Octode or heptode (of the octode type)
M	Tuning indicator
Y	Half-wave rectifier
Z	Full-wave rectifier

Note: Two or three of the above letters may be combined as required and are placed in alphabetical order.

The first figure indicates the type of base, i.e.

1	Miscellaneous
2	Miniature 10 pin (JEDEC E10–61) B10B
3	International octal (I.E.C. 67–I–5a)
5	Magnoval (JEDEC E9–23) B9D and Novar (JEDEC E9–75)*
8	Noval (I.E.C. 67–I–12a) B9A
9	Miniature 7 pin (I.E.C. 67–I–10a) B7G

Note: The remaining first figures and the figure 5 have formerly been used for other base types, e.g. 6 and 7 for subminiature bases.

*Serial numbers for novar based value types are from 520 upwards.

The remaining two figures are a serial number

Formerly one figure serial numbers have been used.

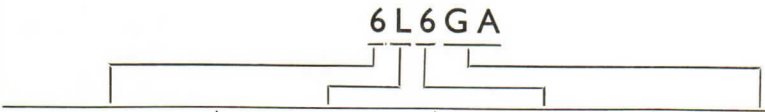
Note: The following classification is also used for tetrodes and pentodes (excluding power output types):—

Even number indicates a sharp cut-off charactertisic.
Odd number indicates a variable-mu characteristic.

THORN — AEI RADIO VALVES & TUBES LTD.

TYPE DESIGNATION CODE FOR RADIO AND TELEVISION RECEIVING VALVES

AMERICAN



Filament or Heater Voltage	Serial Letter(s)	Electrode Structure	Suffix Letter(s)
0 = Cold Cathode **I** ⩽1·6V **2** = 1·6 to 2·6V **3** = 2·6 to 3·6V and so on (Centre tapped heaters are coded in series)	Letters in sequence starting with **A** but excluding **I, P** and **O**. When all the single letters of a group are exhausted the system recommences at **AB.** Identical letter combinations are not used. Single ended a.c. range has a first letter **S** while the second letter may be that of the nearest equivalent in the double ended range, e.g., **6SK7** is the nearest single ended equivalent to type **6K7**.	Figure indicates the number of "**useful elements**" **brought out to an external connection.** An octal-based glass tube having n useful elements exclusive of those connected to Pin No. 1 shall be counted as having n+1 useful elements. Elements connected to terminals marked IC do not count as "useful elements". Combinations of elements connected to the same terminal count as one element, e.g., **3** Directly Heated Triode (Non octal) **4** Indirectly Heated Triode (Non octal) **5** Indirectly Heated Triode (octal) **6** Tetrode or Pentode with internally connected Suppressor **8** Triode Hexode	The suffix after the hyphen denotes distinguishing features. Octal-based glass types are **G** or **GT** when the smaller parallel sided **T9** bulb is used. **M** = Metal Coated Glass Envelope **X** = "Low Loss" Base **Y** = "Intermediate Loss" Base **W** = Military Type **A, B, C, D, E** and **F** indicate a later and modified version which can be substituted for any previous version but not *vice versa*.

GENERAL OPERATIONAL RECOMMENDATIONS

The following notes have been compiled to assist equipment designers in determining satisfactory operating conditions for the valves in their equipment. The recommendations below are based largely on the British Standard Code of Practice CP1005 : 1962 entitled "The Use of Electronic Valves", to which the user is referred for fuller information. The recommendations are necessarily of a general nature and should be interpreted accordingly. Where specific recommendations are published in the data relating to a particular valve, these should always be followed.

RATINGS

Ratings may be defined as values which establish either limiting capabilities or limiting conditions for an electron device. They are determined for specified values of environment and operation, and may be stated in any suitable terms. Limiting conditions may be either maxima or minima.

Ratings cannot be considered as barriers on one side of which satisfactory operation is obtained, while on the other side immediate failure will occur. The expectation of life decreases continuously as the maximum ratings are approached, particularly with respect to bulb temperature. Exceeding the rating accelerates this decline. With a few exceptions the more conservative the use of the valve with respect to limiting ratings, the greater is the life expectancy and reliability.

Unless otherwise stated, ratings given are in accordance with the design centre rating system. The absolute maximum rating system may be used in certain circumstances.

DESIGN CENTRE RATINGS

Design centre ratings are limiting values of operating and environmental conditions applicable to a bogey electron device of a specified type as defined by its published data, which should not be exceeded under normal conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device in average applications, taking responsibility for the effect of normal changes in operating condition due to rated supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all electron devices in the equipment.

The equipment manufacturer should design so that initially no design-centre value for the intended service is exceeded with a bogey electron device in equipment operating at the stated normal supply voltage.

N.B.—A bogey electron device is an electron device whose characteristics have the published nominal values for the type. A bogey electron device for any particular application can be obtained by considering only those characteristics which are directly related to the application.

ABSOLUTE MAXIMUM RATINGS

Absolute maximum ratings are limiting values of operating and environmental conditions applicable to any electron device of a specified type as defined by its published data, which should not be exceeded under the worst probable conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking no responsibility for the effect of equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the device under consideration and of all other electron devices in the equipment.

The equipment manufacturers should design so that initially and throughout life no absolute-maximum value for the intended service is exceeded with any device under the worst probable operating condition of supply voltage variation, equipment component variation, equipment control adjustment, load variations, signal variation, environmental conditions, and variations in characteristics of the device under consideration and of all other electron devices in the equipment.

HEATER AND FILAMENT SUPPLIES

Valves are designed to operate with a specified heater or filament voltage or current, and will give optimum life and performance when operated under the specified conditions. Deliberate over- or under-running of heaters or filaments to obtain apparently desirable characteristics is to be deprecated.

Valves operated in parallel from a transformer will give satisfactory operation if the voltages on the heaters or filaments are within ± 5 per cent of the rated value when the mains supply voltage is at its declared value, provided that the mains voltage does not deviate from this value by more than ± 10 per cent.

In the case of valve heaters connected in series with a controlling resistance, the current should be within ± 2½ per cent of the rated value at the declared mains supply voltage, and with valves having nominal heater voltage drop, provided that the mains voltage does not vary by more than ± 10 per cent from its nominal value.

Car radio valves are designed to give satisfactory performance over the range of voltages encountered in operation from a battery of lead-acid cells connected to a charger. The normal range of variation is from 1·8 to 2·5 volts per cell, with short-term fluctuations up to 2·7 volts per cell.

1·4 volt battery valves are designed for a mean voltage of 1·3 volts, which is the approximate mean voltage of a dry cell over its useful life. These valves will operate satisfactorily over the range 1·1 to 1·5 volts. If they are operated with their filaments connected in series, the anode and screen currents will return to the negative HT terminal through the filament chain, and in general the current in each filament will be different unless the appropriate filaments are shunted by a suitable resistor to by-pass the additional current. It is recommended that this practice be followed to equalise the voltage drops across the filaments.

Where variations of heater or filament supplies outside the recommended limits cannot be avoided, it will usually be necessary to apply reduced ratings to the valves.

HEATER TO CATHODE INSULATION

An unnecessarily high voltage between the heater and cathode should always be avoided.

The maximum value of heater to cathode voltage is normally quoted on individual data sheets and applies to that side of the heater where the heater to cathode voltage is greater.

The insulation resistance between heater and cathode should not be included in R.F. circuits where frequency stability or preservation of waveform is important or in A.F. circuits followed by high gain.

Transformer windings supplying heaters should not be left "floating". Where no D.C. connection between the winding and the cathode exists, a resistor of the order of 100 kΩ should be connected between the heater and the cathode.

A valve should not be rendered inoperative by opening the cathode circuit unless there is a resistor not exceeding 250 kΩ connected between heater and cathode.

CATHODE CIRCUIT

Valves should not be operated without a D.C. connection between cathode and each electrode.

Valves should not run for long periods with the cathode hot, but with no cathode emission, unless it is specified in the data that the valve is suitable for this class of service.

CONTROL-GRID CIRCUIT

The resistance between the control grid and cathode should be kept as low as possible, and published data should be consulted for limiting values. For most small receiving valves, unless otherwise specified, the resistance should not exceed 1 MΩ with auto-bias, and 0·5 MΩ with fixed bias. Certain types of small receiving valves, such as some R.F. amplifiers, may employ values up to 3·5 MΩ with auto-bias. In general the value used with receiving valves having anode dissipation in excess of 10 watts should not be greater than 0·5 MΩ with auto-bias, and 0·1 MΩ with fixed bias, unless otherwise specified. If the resistance is common to more than one control grid circuit its value should be reduced proportionately.

Valves should not be used in applications which result in appreciable grid current unless such conditions are specified in the published data.

When valves are operated at low values of grid bias, grid current will flow, damping the input circuit, unless the bias exceeds the contact potential, which will vary somewhat with individual samples and with life.

It is undesirable that grid bias should be provided solely by grid rectification, unless the circuit is designed so as to prevent damage to the valve in the event of loss of drive.

Valves having very high values of mutual conductance are sensitive to small variations of grid bias and auto-bias should be used in preference to fixed bias. The stability of D.C. operating conditions may be increased by using a positive bias on the grid, in conjunction with a suitably increased value of cathode bias resistor.

SCREEN-GRID CIRCUIT

The source resistance of the screen voltage supply should be kept as low as practicable, and for most applications a potential divider network, or other voltage source having good regulation, is preferred to a series resistor. This is particularly applicable to pentodes having aligned grids, and to unaligned tetrodes, where the screen current is subject to relatively wide variation with operating conditions and between individual valves. In the case of pentodes with unaligned grids the variation is smaller, and series resistors may be used.

Where variable grid bias is applied to control gain the use of a high impedance supply to the screen will result in the lengthening of the grid base.

At low anode voltages the screen current tends to increase greatly, and care is required to avoid exceeding the screen dissipation. The anode voltage should not be removed while the screen is energised.

SUPPRESSOR-GRID CIRCUIT

The suppressor grid should normally be connected to the cathode, although in certain applications connection to the negative end of the cathode bias resistor or to the A.G.C. line is permissible. If negative bias is applied to the suppressor, care is required to ensure that the screen dissipation is not exceeded. Unless the published data includes suppressor grid characteristics it is unwise to place any reliance on the uniformity of this parameter. Resistance in series with the suppressor grid should be avoided, unless conditions involving the use of such resistance are specified in the published data.

Valves should not be operated in conditions which result in appreciable suppressor grid current, unless such operation is indicated in the published data. Where pentodes are connected as triodes the suppressor grid should be connected to the cathode, unless otherwise specified.

MOUNTING AND VENTILATION

The mounting position of most modern indirectly heated valves is unrestricted but it is preferable that valves should be mounted vertically, with base downwards. If directly heated types are mounted horizontally, the plane of the filament should be vertical. Similarly for certain indirectly heated valves having a high mutual conductance, when mounted horizontally the plane of the major axis of the control grid should be vertical. If valves are to be subjected to continuous vibration means should be employed to damp out such vibration by the use of a cushioned valveholder mounting. Due attention should be paid to the effect of the mounting position on ventilation and cooling.

Care should be taken to avoid damaging the pins of glass based valves. If bending has occurred, the pins should be straightened in a pin-straightener before the valve is inserted in a socket. The connecting wires to valveholders having floating contacts should be as flexible as possible, and wiring jigs should be employed while the connections are being made.

Where valves are used with printed circuits the design of the sockets should be such as to ensure that after assembly the insertion and withdrawal forces are within the limits encountered with normal chassis mounting sockets. These limits are defined in British Standard BS448.

The use of spare socket contacts as wiring supports is not recommended, and on no account should any connection be made to pins marked I.C.

Flying lead valves are usually secured in position by the envelope. Any clamps used for this purpose should be of high thermal capacity and conductivity and should make intimate contact with the envelope over as large an area as possible. Well-designed clamps of this type may substantially improve the cooling of the valve with consequent increase of life expectancy and reliability. The leads of valves of this type should not be bent sharply close to the glass, and care is required in making soldered connections to avoid overheating the seals. In the case of miniature and sub-miniature types, the wire should not be soldered closer than 3 mm to the glass, and a thermal shunt between the point of soldering and the glass seal should be employed during the operation.

The presence of strong electromagnetic or electrostatic fields is liable to affect the performance of valves, which should be positioned or screened so as to avoid such effects.

Ventilation and layout of equipment should be such as to ensure a safe bulb temperature under all conditions. Unless otherwise specified the maximum temperature of the hottest part of the bulb under operating conditions should not exceed by more than 20°C the temperature which would be obtained if the valve were operated at its maximum rating in conditions of free air circulation at an ambient temperature of 20°C.

To allow free radiation of heat from a valve, surrounding surfaces should not be polished and should be as cool as possible. The inner and outer surfaces of screening cans should be matt blackened, and adequate ventilation holes should be provided at the top and bottom.

The use of screening cans which are not in thermal contact with the envelope may seriously interfere with the cooling of the valve, and the use of screening cans of high thermal capacity and conductivity in intimate thermal contact with the envelope is to be preferred, particularly with valves which tend to approach the limiting bulb temperature. The thermal capacity of screening cans is usually increased by the use of the chassis as a "heat sink", and careful consideration must be given to the question of cooling where no metallic chassis exists, as in the case of equipment using printed circuits.

Valves should not be mounted adjacent to components running at very high temperatures.

MICROPHONY

Small variations of electrode spacing cause corresponding variations in the output of the valve, and it is necessary to ensure that little or no vibration reaches the valve. Such vibrations may reach the valve by way of the valve socket, and it should be remembered that microphonic trouble may originate in the frequency changer or I.F. stages through audio microphonic modulation of signal or I.F. carrier.

In addition it is recommended that:

(*a*) The position of the valve in relation to the source of vibration should be so chosen that microphony effects will be at a minimum.

(*b*) The chassis should not be rigidly fixed to the cabinet containing the loudspeaker but should be mounted on rubber bushes. Alternatively the loudspeaker may be mechanically insulated from the chassis with rubber bushes.

(*c*) If trouble is experienced it may be reduced by the use of sprung holders for the valves which are followed by the largest degree of amplification.

HUM

For a minimum hum level in high gain amplifiers the earth connection to the heaters should be connected to the centre tap on the heater winding.

A small leakage current between the heater and cathode will set up a voltage across the cathode bias resistor which will feed a hum voltage into the grid circuit. If the heater is made positive with respect to the cathode this form of hum may be substantially reduced.

CROSS COUPLING

A certain amount of cross coupling may exist between the sections of multi-unit valves, and it should not be assumed that such valves will give satisfactory performance in applications other than those specified, even if the characteristics of the individual units are satisfactory for the proposed application.

NOTES ON CROSS-MODULATION CURVES

Introduction

Cross-modulation in a receiver is defined as: The modulating of a wanted signal by the modulation of an unwanted signal on a different carrier frequency, arising from the interaction of the radio frequency signals in non-linear circuits of the receiver preceding the detector.

Cross-modulation information is given in this handbook for valve types which are designed for A.G.C. operation.

Method of Measurement

Two signals are applied in series to the signal grid of the valve under test. One is the wanted signal, of amplitude V_w and frequency f_w, and the other is the unwanted, or interfering, signal, of amplitude V_u and frequency f_u sufficiently far removed from f_w to prevent any spurious responses at the frequency f_w (or the I.F. in the case of frequency-changers).

The valve under test is followed by an H.F. amplifier tunable to f_w (or the I.F.), then by a detector, and finally by an L.F. amplifier and L.F. a.c. voltmeter. The gain of the amplifiers is variable. The L.F. may also be reduced by a resistance attenuator.

(i) The wanted signal is modulated to a depth of m per cent and the gain of the following amplifiers adjusted to give an L.F. output voltage V, with an n : 1 attenuator in circuit.

Let amplification of valve under test + following stages (excluding attenuator)* = A.

$$\text{L.F. output } V = \frac{m\ V_w\ A}{100\ n}$$

(ii) Modulation to a depth of m per cent is now transferred from the wanted to the unwanted signal, and the n : 1 attenuator is removed while the gain A is kept constant. Unwanted signal level V_u is adjusted to give the same value of V as in (i), resulting in the wanted signal at the output of the valve under test being modulated to a depth of m_u per cent.

$$\text{Hence } V = \frac{m_u\ V_w\ A}{100}$$

$$\text{and since } V = \frac{m\ V_w\ A}{100\ n}$$

$$\text{then } \frac{m_u}{m} = \frac{1}{n} = K$$

K is known as the Cross-Modulation Factor.

Normally K = 0·01 (i.e. 1 per cent) is taken as the accepted tolerance level for cross-modulation and the handbook curves are drawn on this basis. In general, measurements are made with a wanted signal V_w = 0·1 V R.M.S. and modulation m = 30 per cent.

* "A" will be the product of the H.F. and L.F. amplifications and rectification efficiency.

NOTES ON POWER OUTPUT AND DISTORTION CURVES

Introduction

It is generally agreed that the distortion heard when listening to a sound reproducing system is due to spurious tones produced by intermodulation between two or more frequencies of the original sound, rather than harmonics of those frequencies. The intermodulation takes place at some point in the system where the input/output characteristic is non-linear.

If the system includes devices for which the non-linearity of the input/output characteristic varies with frequency, it is preferable to measure the non-linearity in terms of intermodulation products.

If, however, the characteristic of the device under consideration is independent of frequency over the audio range, the non-linearity may be described in terms of harmonic responses produced when a pure sine wave input is applied. Under these conditions, knowing the harmonic responses, it would be possible to calculate the intermodulation products, and vice versa.

Thermionic valves are devices which come into this category, and it is usual to measure their characteristics for non-linearity in terms of percentages of the harmonics produced.

The even harmonics describe the asymmetry of the device characteristic about its working point. The odd harmonics describe the non-linearity which would remain if the asymmetry were removed. In general, the minimum requirement would be to state the maximum percentage 2nd and 3rd harmonic produced over the power range.

Measurement and Presentation of Power Output and Distortion Data

Power output and distortion curves are plotted against anode load resistance for various values of grid input swing.

Unless otherwise stated, these curves are taken with fixed D.C. supply voltages the load resistance being by-passed to D.C. by means of a low resistance high inductance choke, so that the stated voltage is maintained at the anode. The bias arrangement, which is always stated, can be fixed control grid voltage or cathode self bias.

To facilitate selection of the best operating conditions, harmonic distortion contour lines for both 5 per cent and 7 per cent of 2nd and 3rd harmonic are inserted. These contours pass through the points on the power curves where constant percentages of harmonic distortion are encountered.

In order not to exceed the stated percentage harmonic, the grid input swing and anode load resistance must be so adjusted or controlled that the operating point remains within the boundaries of the appropriate harmonic contours.

Design Considerations

The amount of distortion which may be tolerated depends to some extent on the class of equipment which is being considered. For example, it would be uneconomic to design a battery portable to give, over its range of output power, the low level of distortion that would be expected from an expensive high fidelity mains equipment.

The average domestic mains receiver or television set employs a single tetrode or pentode output valve, and listening tests have shown that, from receivers of this class, the audible distortion produced on peaks is not excessive if the non-linearity of the characteristic is such that the measured 3rd harmonic does not exceed 5 per cent to 7 per cent at

maximum input swing. Generally speaking, for a given degree of audible distortion at a particular sound level, the asymmetry of the characteristic may be such that the measured 2nd harmonic is about twice the 3rd harmonic. However, for the single tetrode output stage, the shape of the harmonic versus power output characteristic is such that, whereas the percentage 3rd harmonic remains low over much of the power range and then rises steeply, the percentage 2nd harmonic remains fairly constant over much of the power range and may even fall before the peak power is reached. Since the percentage 2nd harmonic may remain near its maximum value at power levels well below the maximum, it is usual to adopt the same numerical value for percentage 2nd and percentage 3rd harmonic (not twice as much 2nd as 3rd) when selecting the load resistance and specifying the maximum power output.

The handbook curves show the power output which would be delivered into a resistive load connected across the primary of the output transformer (assumed loss-less). In practice, the loudspeaker load becomes reactive at the higher audio frequencies and the impedance rises. This can be largely compensated by the addition of a suitable series resistance capacitance circuit across the transformer primary. At the lower frequencies, the impedance again rises, up to the frequency of electro-mechanical resonance. Some compensation can be provided by a suitable choice of transformer primary inductance; but a more satisfactory method is to apply a suitable degree of negative feed-back taken from the high potential side of the speech coil.

It should be remembered that measurements made under fixed g_1 bias conditions may, for the same distortion, give 10 per cent to 15 per cent higher power than with cathode bias. In the latter case due to the cathode current increase with signal, the valve is biased further back, with consequent increase of 2nd harmonic distortion.

Base Connection Symbols

Symbols used in this Manual are based on British Standard Specification No. 1409.

ELECTRODE SYMBOLS

a = anode.
a′, a″ etc., = anode 1, anode 2 etc.
bp = beam plates.
g = grid.
g_1, g_2 etc. = grid 1, grid 2 etc.
h = heater
f = filament.
k = cathode.
t = fluorescent target.
s = internal shield.
M = external metallizing.

VALVE SYMBOLS

The following symbols are used to distinguish between two or more sections in the same valve :—

d = diode. h = hexode or heptode. p = pentode.
q = tetrode. r = rectifier. t = triode.

Example g_{2h} = 2nd grid of the hexode section.

The following symbols are used to distinguish between similar electrodes in two or more sections in the same valve.

Example :

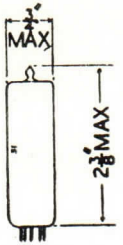
a′ = anode of Section 1 g_1' = grid 1 of Section 1
a″ = ,, ,, ,, 2 g_1'' = ,, 1 ,, ,, 2

OTHER SYMBOLS

*IC = internal connection. NP = no pin. SC = side contact.
NC = no connection. J = jumper. TC = top contact.

*Pin marked IC—in no circumstances should this pin be employed. The valve maker is at liberty to make any internal connection to pins so labelled.

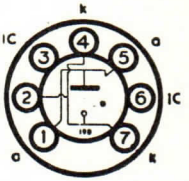
RECEIVING AND
INDUSTRIAL VALVES



Current Equipment Type

TYPE **0A2**

MINIATURE VOLTAGE REGULATOR



B7G Base

CHARACTERISTICS

Maximum striking voltage	180 volts
Minimum applied supply voltage	185 volts
Maximum stabilising voltage at 30 mA	165 volts
Minimum stabilising voltage at 5 mA	142 volts
Nominal stabilising voltage	150 volts
D.C. operating current	5 to 30 mA
Maximum peak current (10 seconds max.)	75 mA
Nominal regulation, 5 to 30 mA	1 volt
Maximum regulation, 5 to 30 mA	6 volts
Nominal drift in stabilising voltage (100 to 1 000 hours) ...	2.9 volts
Temperature coefficient, −20 to +90°C	±10 mV/°C
Ambient temperature range	−55 to +90°C

Type OA2 is a commercial equivalent to the CV1832.

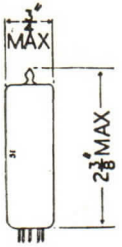
NOTE.—With suitable socket connections the internal connection between pins 1 and 5 acts as a switch to open the load circuit when the valve is removed.

Not less than the quoted minimum supply voltage should be provided to ensure starting during life.

Sufficient resistance must always be kept in series with this type to limit the current to 30 mA under steady state conditions. As stated, during the initial warming up period a maximum current of 75 mA is permissible providing that a period of several minutes duration of operation at normal current follows.

If the associated circuit has a capacitor in shunt with this valve it should be limited to 0.1 μF. A larger value may cause oscillation and thus give unstable regulation.

Operation with reversed polarity will damage this valve.

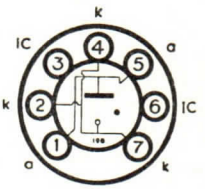


Current Equipment Type

TYPE **OB2**

MINIATURE

VOLTAGE REGULATOR



B7G Base

CHARACTERISTICS

Maximum striking voltage	127 volts
Minimum applied supply voltage	133 volts
Maximum stabilising voltage at 30 mA	112 volts
Minimum stabilising voltage at 5 mA	105 volts
Nominal stabilising voltage	108 volts
D.C. operating current	5 to 30 mA
Maximum peak current (10 seconds max.)	75 mA
Nominal regulation, 5 to 30 mA	1.5 volts
Maximum regulation, 5 to 30 mA	3.5 volts
Nominal drift in stabilising voltage (100 to 1 000 hours) ...	1.4 volts
Temperature coefficient, −20 to +90°C	±5 mV/°C
Ambient temperature range	−55 to +90 °C

Type OB2 is a commercial equivalent to the CV1833.

NOTE.—With suitable socket connections the internal connection between pins 1 and 5 acts as a switch to open the load circuit when the valve is removed.

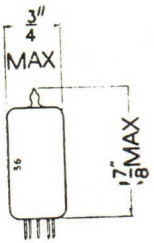
Not less than the quoted minimum supply voltage should be provided to ensure starting during life.

Sufficient resistance must always be kept in series with this type to limit the current to 30 mA under steady state conditions. As stated, during the initial warming up period a maximum current of 75 mA is permissible providing that a period of several minutes duration of operation at normal current follows.

If the associated circuit has a capacitor in shunt with this valve it should be limited to 0.1 μF. A larger value may cause oscillation and thus give unstable regulation.

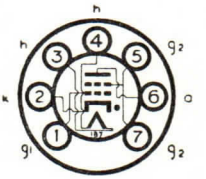
Operation with reversed polarity will damage this valve.

Current Equipment Type



B7G Base

TYPE 2D21
MINIATURE HOT CATHODE GAS FILLED THYRATRON



RATINGS

Heater Voltage	6.3 volts
Heater Current	0.6 amp.
Cathode Heating Time	10 secs. min.
Peak Forward Anode Voltage	650 volts max.
Peak Inverse Voltage	1,300 volts max.
Peak Screen Grid Voltage before Conduction	–100 volts max.
†Average Screen Grid Voltage during Conduction	–10 volts max.
Peak Control Grid Voltage before Conduction	–100 volts max.
Peak Cathode Current	0.5 amp. max.
†Average Cathode Current	0.1 amp. max.
Surge Current (Duration 0.1 sec. max.)	10 amps. max.
†Average Screen Current	0.01 amp. max.
†Average Control Grid Current	0.01 amp. max.
Grid Circuit Resistance	10 MΩ max.
Peak Heater-Cathode Voltage, Heater Negative	100 volts max.
Peak Heater-Cathode Voltage, Heater Positive	25 volts max.
Ambient Temperature Range	–75°C. to 90°C.

† *Averaged over any interval of 30 seconds.*

OPERATING CHARACTERISTICS

Voltage Drop	8 volts approx.
Control Grid Control Ratio ($Rg_1 = 0\,\Omega$)	250 approx.
Screen Grid Control Ratio ($Rg_2 = 0\,\Omega$)	1,000 approx.

RELAY SERVICE

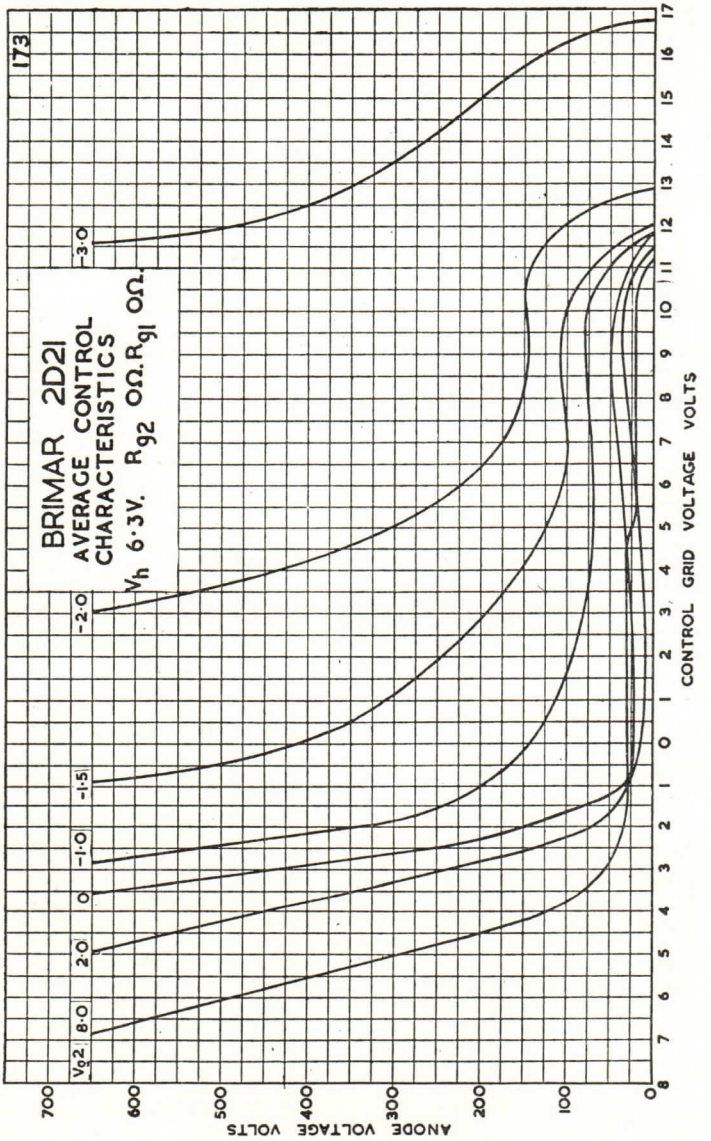
Anode Voltage	117	460	volts R.M.S.
Direct Screen Grid Voltage	0	0	volts
Control Grid Voltage (180° out of phase with Va)	5	—	volts R.M.S.
Direct Control Grid Voltage	—	–6	volts
Control Grid Signal Voltage	5	6	volts peak
Control Grid Circuit Resistance	1.0	1.0	MΩ
*Anode Circuit Resistance	1.2	2.0	kΩ

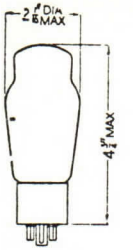
* *Anode circuit resistance, including the valve load, must be sufficient to prevent the cathode current from exceeding the valve ratings.*

INTER-ELECTRODE CAPACITANCES

Grid to Anode	0.026 pF	Output	1.6 pF
Input	2.4 pF		

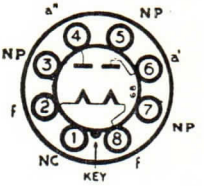
Type 2D21 is a commercial equivalent to the CV797.





Current Equipment Type

TYPE **5R4GY**
(OCTAL BASE)
FULL-WAVE RECTIFIER



The BRIMAR type 5R4GY is a directly heated full wave rectifier for use in A.C. mains equipment where a large output is required.

Filament Voltage	5.0 volts	Filament Current	2.0 amps.

RATINGS

Peak Inverse Voltage	2,800 volts max.
Peak Current (each Anode)	650 mA max.
Peak Surge Current	2.5 amps. max.
Anode Supply Voltage	—see Rating Chart I
D.C. Output Current	—see Rating Chart I

CHARACTERISTICS AS FULL-WAVE RECTIFIER

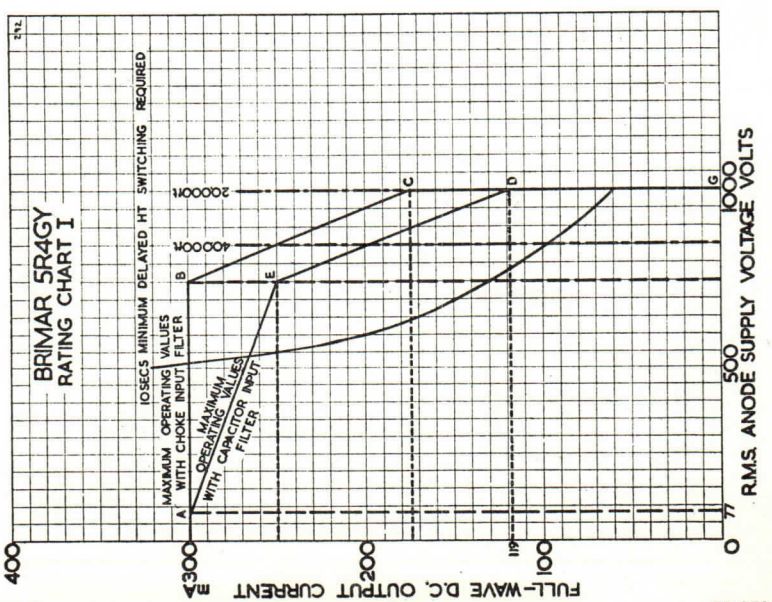
CAPACITOR INPUT‡		CHOKE INPUT	
R.M.S. Input per Anode ...	750 volts	R.M.S. Input per Anode ...	1,000 volts
Rectified Current	250 mA	Rectified Current	175 mA
D.C. Output Voltage... ...	620 volts	D.C. Output Voltage... ...	870 volts
Supply Impedance per Anode	505 Ω	Minimum Filter Input Choke†	5 Henries
Reservoir capacitor	8 μF		

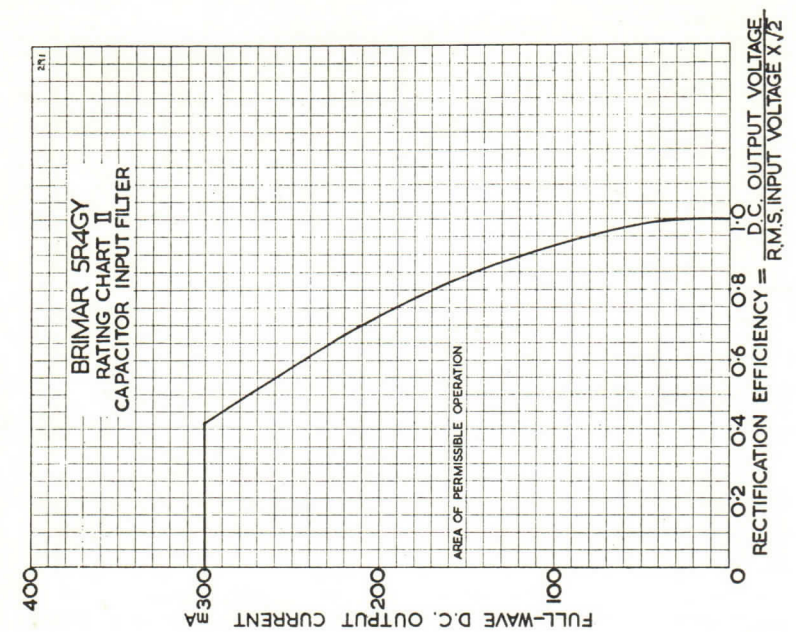
† *Limiting value at* 170 *mA. For operating currents less than* 170 *mA refer to curve.*

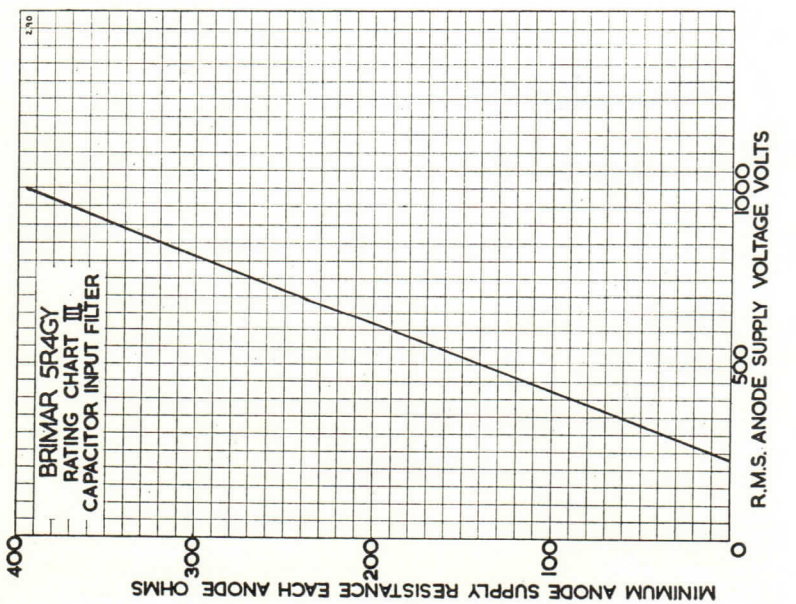
‡ *Delayed switching of approx.* 10 *seconds MUST BE EMPLOYED when the following ratings are exceeded with Capacitor Input Filter.*

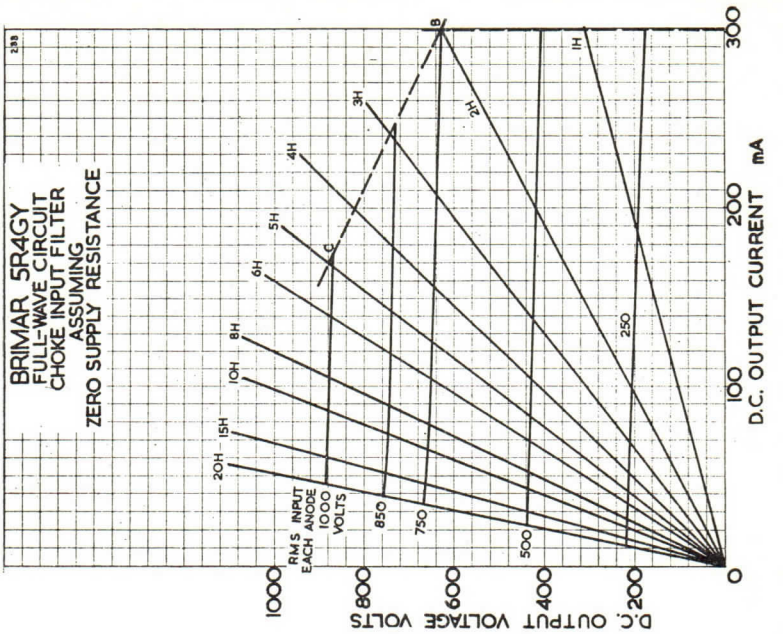
550 *volts R.M.S. at* 250 *mA D.C.*
600 *volts R.M.S. at* 200 *mA D.C.*
650 *volts R.M.S. at* 175 *mA D.C.*
700 *volts R.M.S. at* 150 *mA D.C.*
800 *volts R.M.S. at* 115 *mA D.C.*
900 *volts R.M.S. at* 75 *mA D.C.*

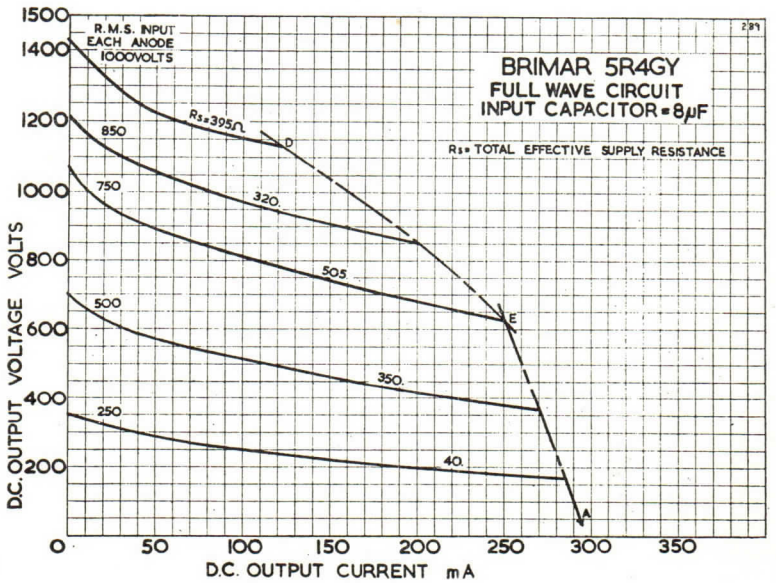
For notes on use of rating charts, refer to " Valve Ratings " section.

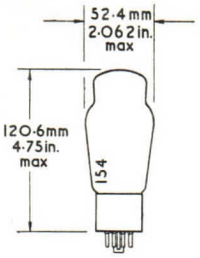



BRIMAR 5R4GY
RATING CHART II
CAPACITOR INPUT FILTER
AREA OF PERMISSIBLE OPERATION
FULL-WAVE D.C. OUTPUT CURRENT mA
400
300
200
100
0
0·2
0·4
0·6
0·8
1·0
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X √2

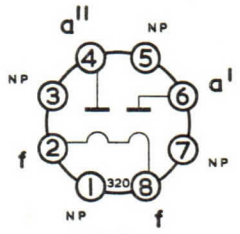

BRIMAR 5R4GY
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE EACH ANODE OHMS
400
300
200
100
0
500
1000
R.M.S. ANODE SUPPLY VOLTAGE VOLTS







FULL-WAVE RECTIFIER



I.O. Base

Filament Voltage	V_f	5	V
Filament Current	I_f	3	A

RATINGS

Maximum Peak Inverse Voltage	P.I.V.$_{(max)}$	1,550	V
Maximum Peak Current (each Anode)	$i_{a(pk)max}$	675	mA
Maximum Surge Current (each Anode)	$i_{a(sur)max}$	2·25	A
Maximum Anode Supply Voltage	$V_{a(b)max}$	See Rating Chart 1	
D.C. Output Current	$I_{out(max)}$	See Rating Chart 1	

CHARACTERISTICS AS A FULL-WAVE RECTIFIER

Capacitor Input

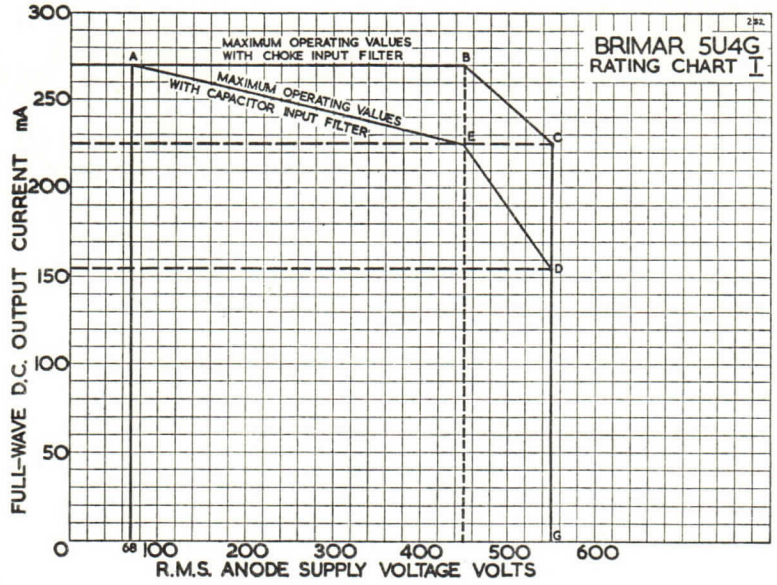
R.M.S. Input per Anode	$V_{in(r.m.s.)}$	450	V
Rectified Current	I_{out}	225	mA
D.C. Output Voltage	V_{out}	430	V
Minimum Anode Supply Resistance (each Anode)	$R_{lim.(min)}$	145	Ω
Reservoir Capacitor	C	16	μF

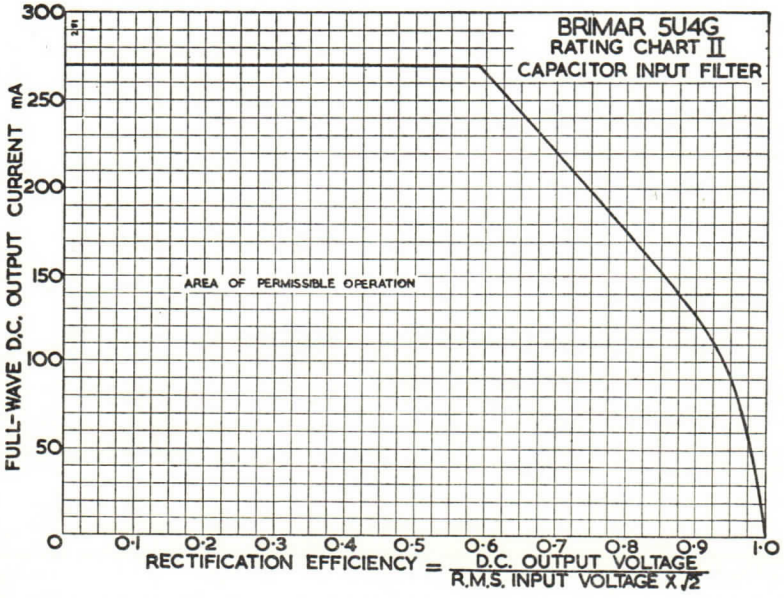
Choke Input

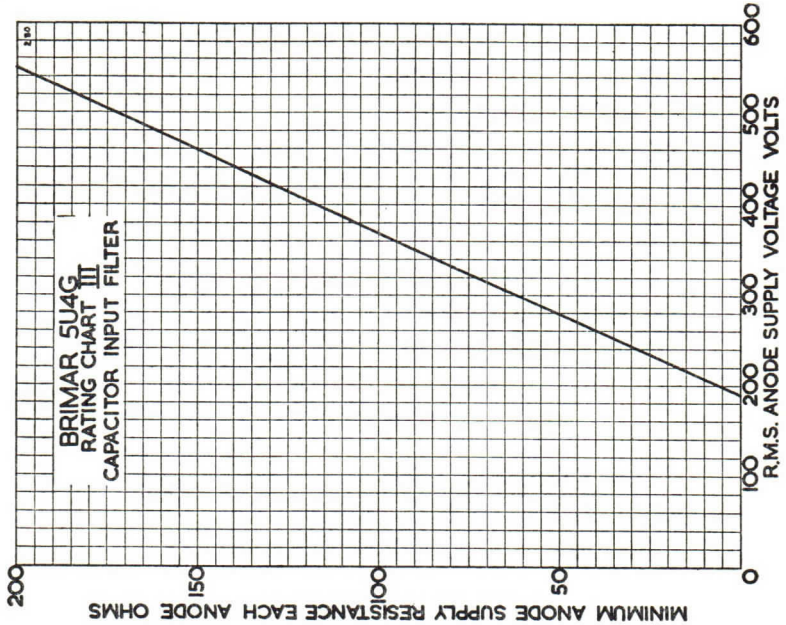
R.M.S. Input per Anode	$V_{in(r.m.s.)}$	550	V
Rectified Current	I_{out}	225	mA
D.C. Output Voltage	V_{out}	460	V
Minimum Filter Input Choke*	L	2	H

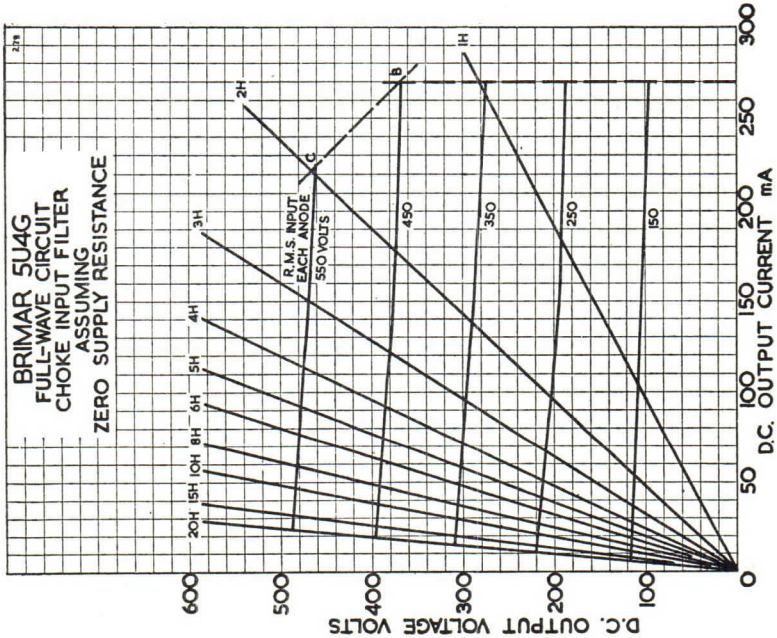
* Limiting value at 220mA. For operating currents less than 220mA refer to curve.

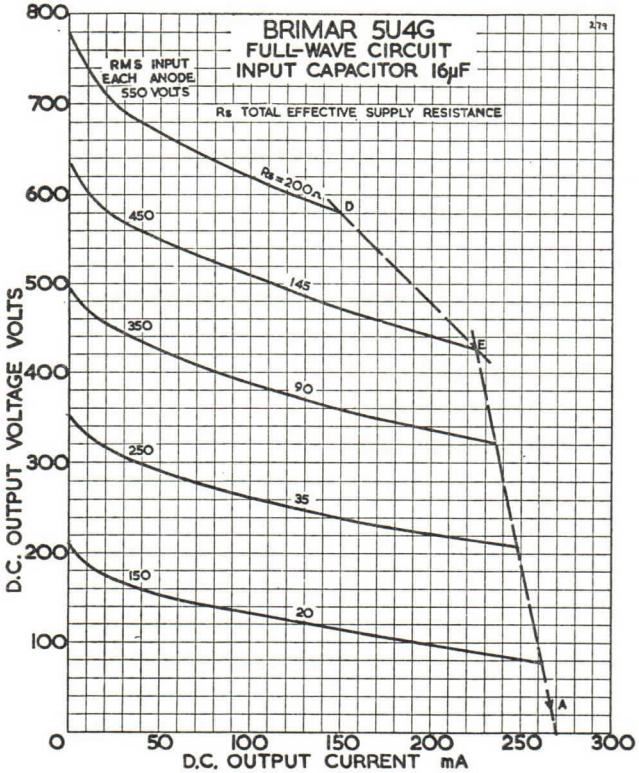
THORN—AEI RADIO VALVES & TUBES LTD.

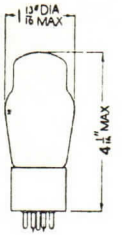

BRIMAR 5U4G
RATING CHART I
MAXIMUM OPERATING VALUES WITH CHOKE INPUT FILTER
MAXIMUM OPERATING VALUES WITH CAPACITOR INPUT FILTER
A
B
C
D
E
G
FULL-WAVE D.C. OUTPUT CURRENT mA
300
250
200
150
100
50
0
68
100
200
300
400
500
600
R.M.S. ANODE SUPPLY VOLTAGE VOLTS


BRIMAR 5U4G
RATING CHART II
CAPACITOR INPUT FILTER
AREA OF PERMISSIBLE OPERATION
FULL-WAVE D.C. OUTPUT CURRENT mA
300
250
200
150
100
50
0
0·1
0·2
0·3
0·4
0·5
0·6
0·7
0·8
0·9
1·0
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X √2


BRIMAR 5U4G
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE EACH ANODE OHMS
R.M.S. ANODE SUPPLY VOLTAGE VOLTS
0
50
100
150
200
100
200
300
400
500
600


BRIMAR 5U4G
FULL-WAVE CIRCUIT
CHOKE INPUT FILTER
ASSUMING
ZERO SUPPLY RESISTANCE
D.C. OUTPUT VOLTAGE VOLTS
D.C. OUTPUT CURRENT mA
R.M.S. INPUT EACH ANODE 550 VOLTS
1H
2H
3H
4H
5H
6H
8H
10H
15H
20H
450
350
250
150
0
50
100
150
200
250
300
100
200
300
400
500
600


BRIMAR 5U4G
FULL-WAVE CIRCUIT
INPUT CAPACITOR 16μF
279
RMS INPUT EACH ANODE 550 VOLTS
Rs TOTAL EFFECTIVE SUPPLY RESISTANCE
Rs=200Ω
450
145
350
90
250
35
150
20
D
E
A
D.C. OUTPUT VOLTAGE VOLTS
D.C. OUTPUT CURRENT mA
800
700
600
500
400
300
200
100
0
50
100
150
200
250
300

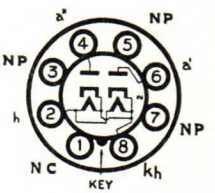


Current Equipment Type

TYPE 5V4G

(OCTAL BASE)

FULL-WAVE RECTIFIER



Filament Voltage ... ... 5.0 volts Filament Current ... ... 2.0 amps.

RATINGS

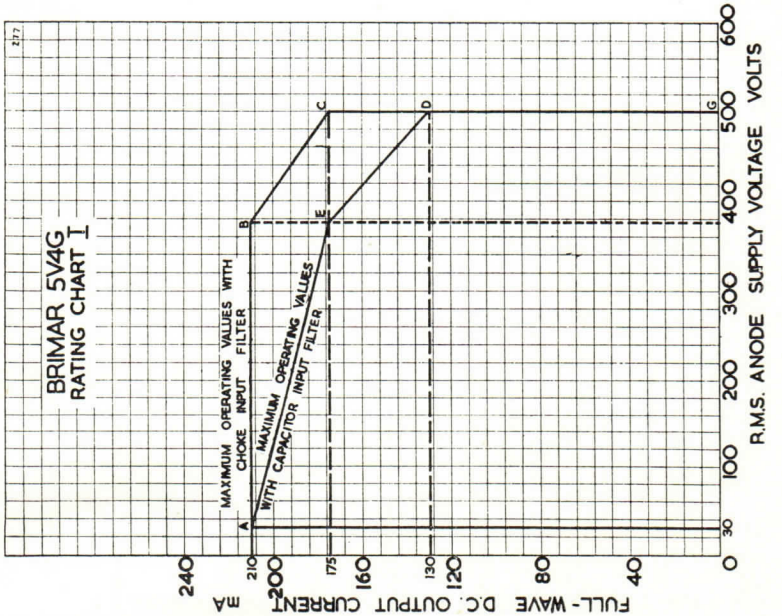
Peak Inverse Voltage	1,400 volts max.
Peak Current (each Anode)	525 mA max.
Peak Surge Current	1.75 amps. max.
Anode Supply Voltage	—see Rating Chart I
D.C. Output Current	—see Rating Chart I

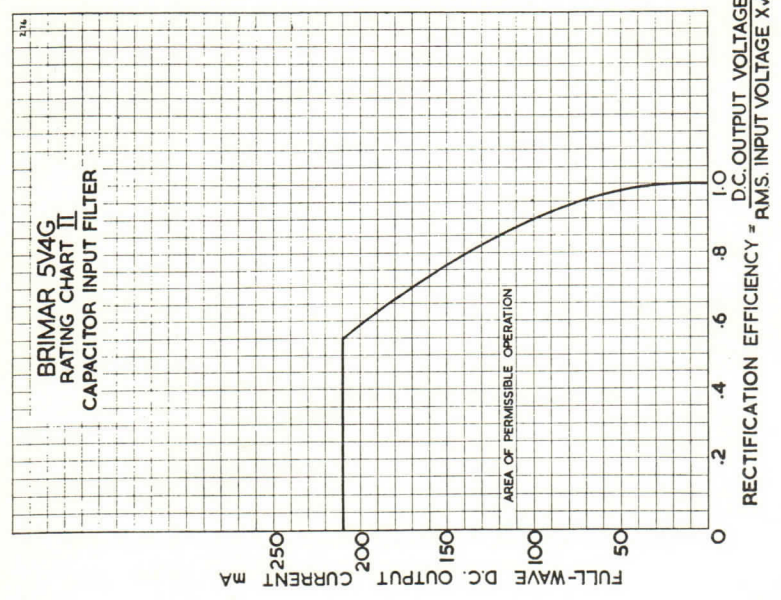
CHARACTERISTICS AS A FULL-WAVE RECTIFIER

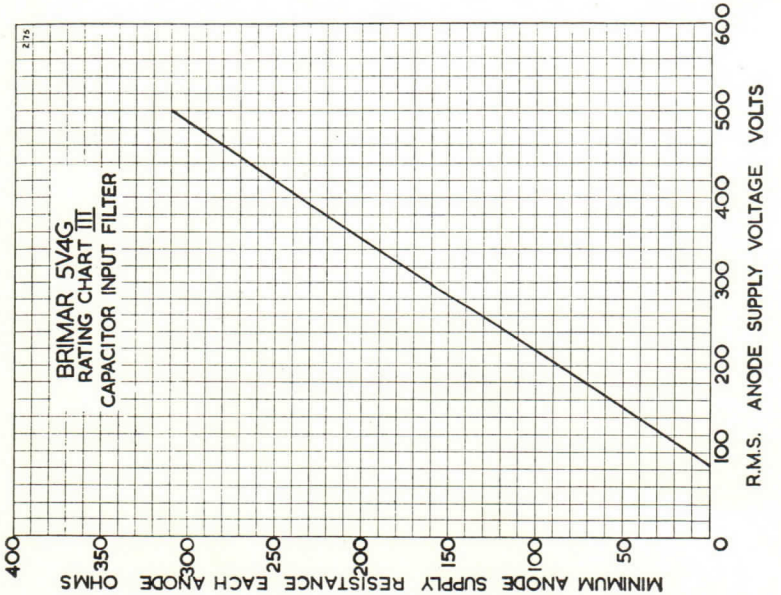
CAPACITOR INPUT		CHOKE INPUT	
R.M.S. Input per Anode ...	375 volts	R.M.S. Input per Anode ...	500 volts
Rectified Current	175 mA	Rectified Current	175 mA
D.C. Output Voltage... ...	360 volts	D.C. Output Voltage... ...	320 volts
Supply Impedance per Anode	250 Ω	Minimum Filter Input Choke†	3 Henries
Reservoir Capacitor	16 μF		

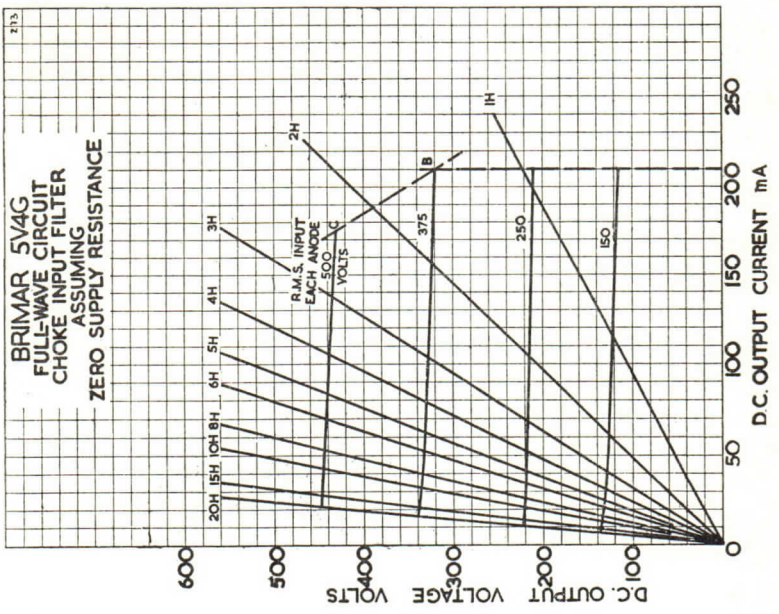
† *Limiting value at 140 mA. For operating currents less than 140 mA, refer to curve.*

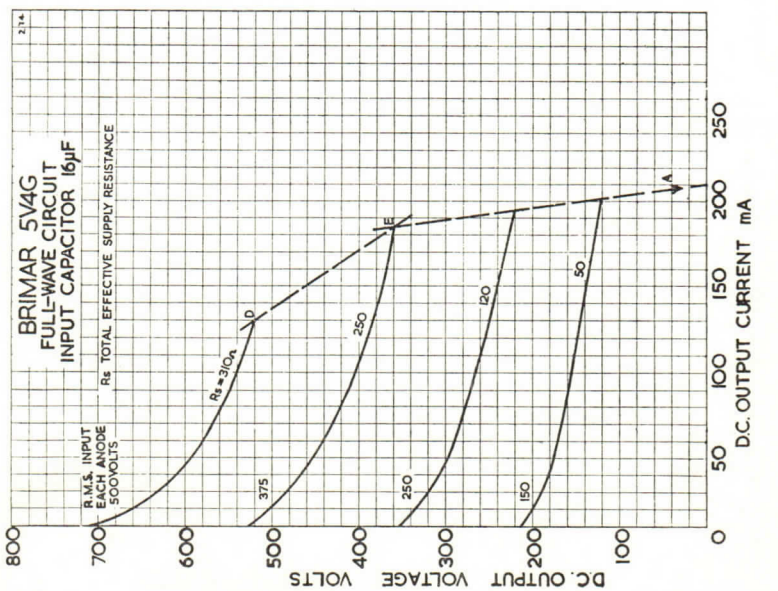
For notes on use of rating charts, refer to " Valve Ratings " section.

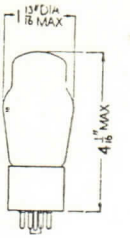



BRIMAR 5V4G
RATING CHART II
CAPACITOR INPUT FILTER
AREA OF PERMISSIBLE OPERATION
FULL-WAVE D.C. OUTPUT CURRENT mA
0
50
100
150
200
250
.2
.4
.6
.8
1.0
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X √2


BRIMAR 5V4G
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE EACH ANODE OHMS
0
50
100
150
200
250
300
350
400
R.M.S. ANODE SUPPLY VOLTAGE VOLTS
100
200
300
400
500
600

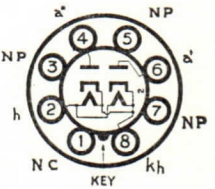






Current Equipment Type

TYPE **5Z4G**
(OCTAL BASE)
FULL-WAVE RECTIFIER



Filament Voltage ... ... 5.0 volts Filament Current ... ... 2.0 amps.

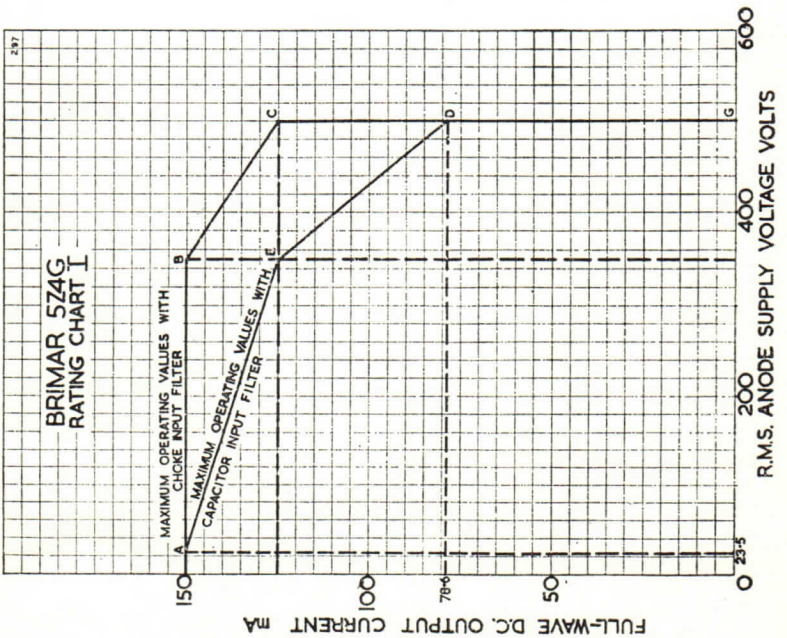
RATINGS

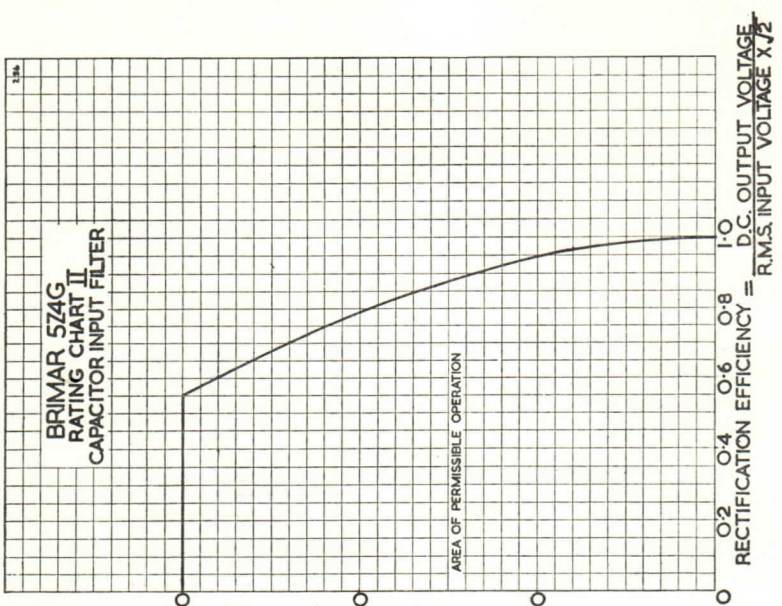
Peak Inverse Voltage	1,400 volts max.
Peak Current (each Anode)	375 mA max.
Peak Surge Current	1.25 amps. max.
Anode Supply Voltage	—see Rating Chart I
D.C. Output Current	—see Rating Chart I

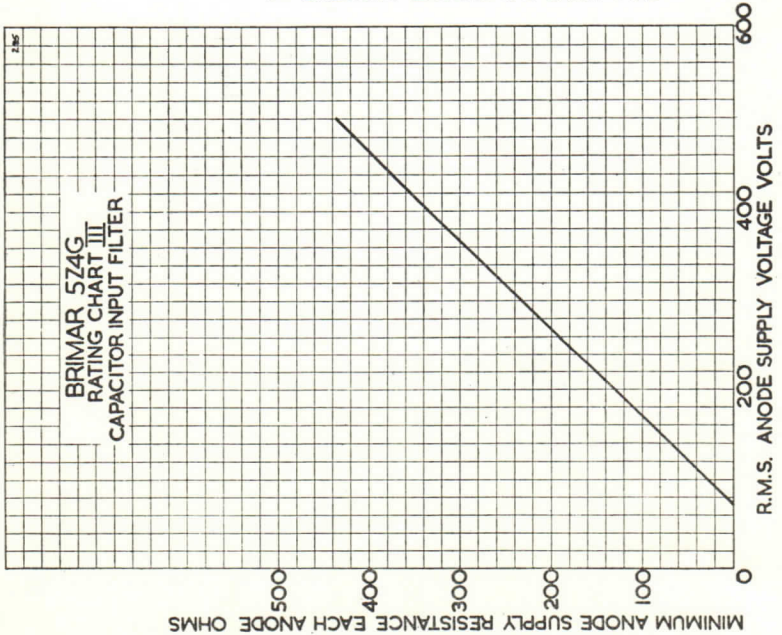
CHARACTERISTICS AS A FULL-WAVE RECTIFIER

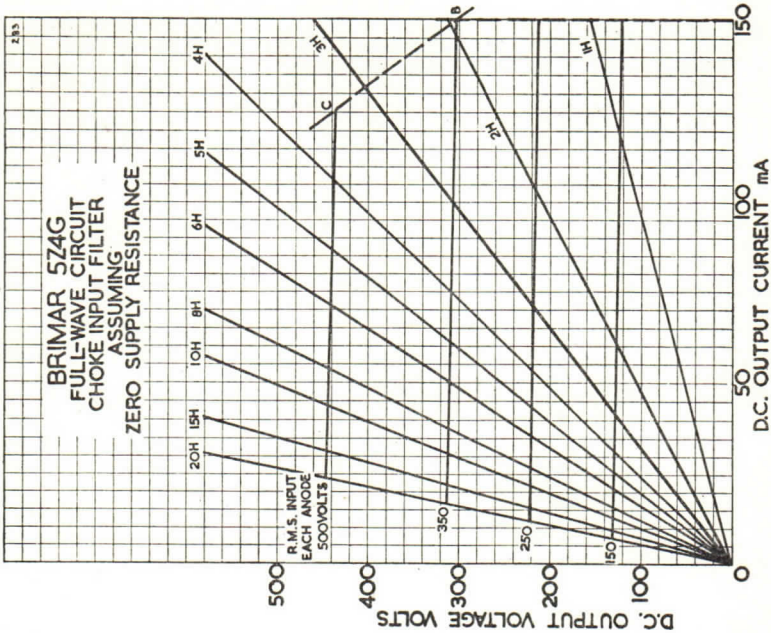
CAPACITOR INPUT		CHOKE INPUT	
R.M.S. Input per Anode ...	350 volts	R.M.S. Input per Anode ...	500 volts
Rectified Current	125 mA	Rectified Current	125 mA
D.C. Output Voltage... ...	340 volts	D.C. Output Voltage... ...	435 volts
Supply Impedance per Anode	300 Ω	Minimum Filter Input Choke†	4 Henries
Reservoir Capacitor	16 μF		

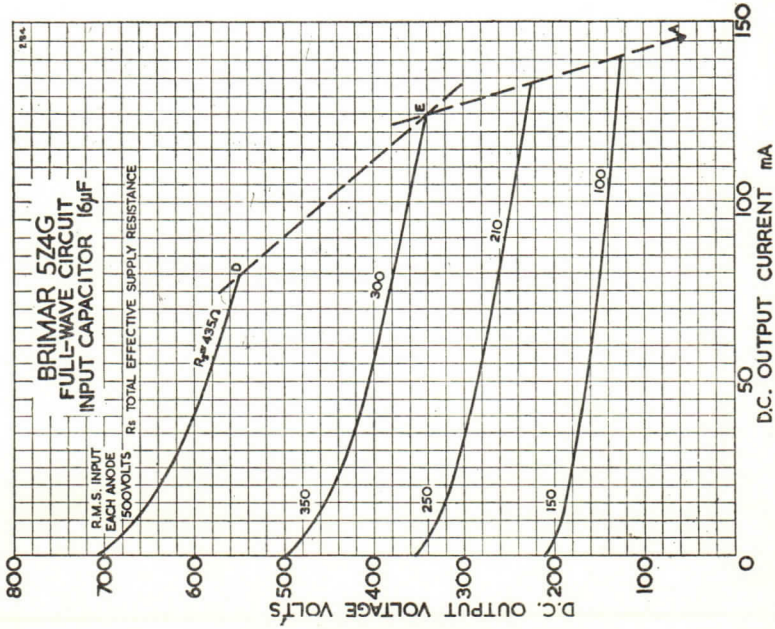
† *Limiting value at* 105 *mA. For operating currents less than* 105 *mA, refer to curve.*
For notes on use of rating charts, refer to "Valve Ratings" section.

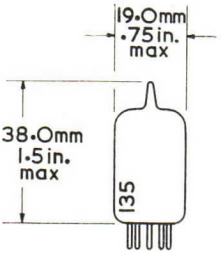



BRIMAR 5Z4G
RATING CHART II
CAPACITOR INPUT FILTER
AREA OF PERMISSIBLE OPERATION
FULL-WAVE D.C. OUTPUT CURRENT mA
150
100
50
0
0·2
0·4
0·6
0·8
1·0
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X √2

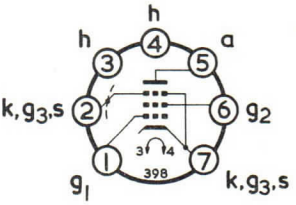

BRIMAR 5Z4G
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE EACH ANODE OHMS
500
400
300
200
100
0
200
400
600
R.M.S. ANODE SUPPLY VOLTAGE VOLTS







SHARP CUT-OFF V.H.F. PENTODE



B7G Base

GENERAL

This low noise, high slope pentode is primarily intended for use as an R.F. or I.F. amplifier.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·175	A

RATINGS

Maximum Anode Dissipation	$P_{a(max)}$	1·7	W
Maximum Screen Grid Dissipation	$P_{g_2(max)}$	0·5	W
Maximum Anode Voltage	$V_{a(max)}$	180	V
Maximum Screen Grid Voltage ($I_{g_2} = 0$)	$V_{g_2(b)max}$	180	V
Maximum Screen Grid Voltage	$V_{g_2(max)}$	90	V
Maximum Peak Heater to Cathode Voltage	$V_{h\text{-}k(pk)max}$	120	V
Maximum Cathode Current	$I_{k(max)}$	18	mA

INTER-ELECTRODE CAPACITANCES*

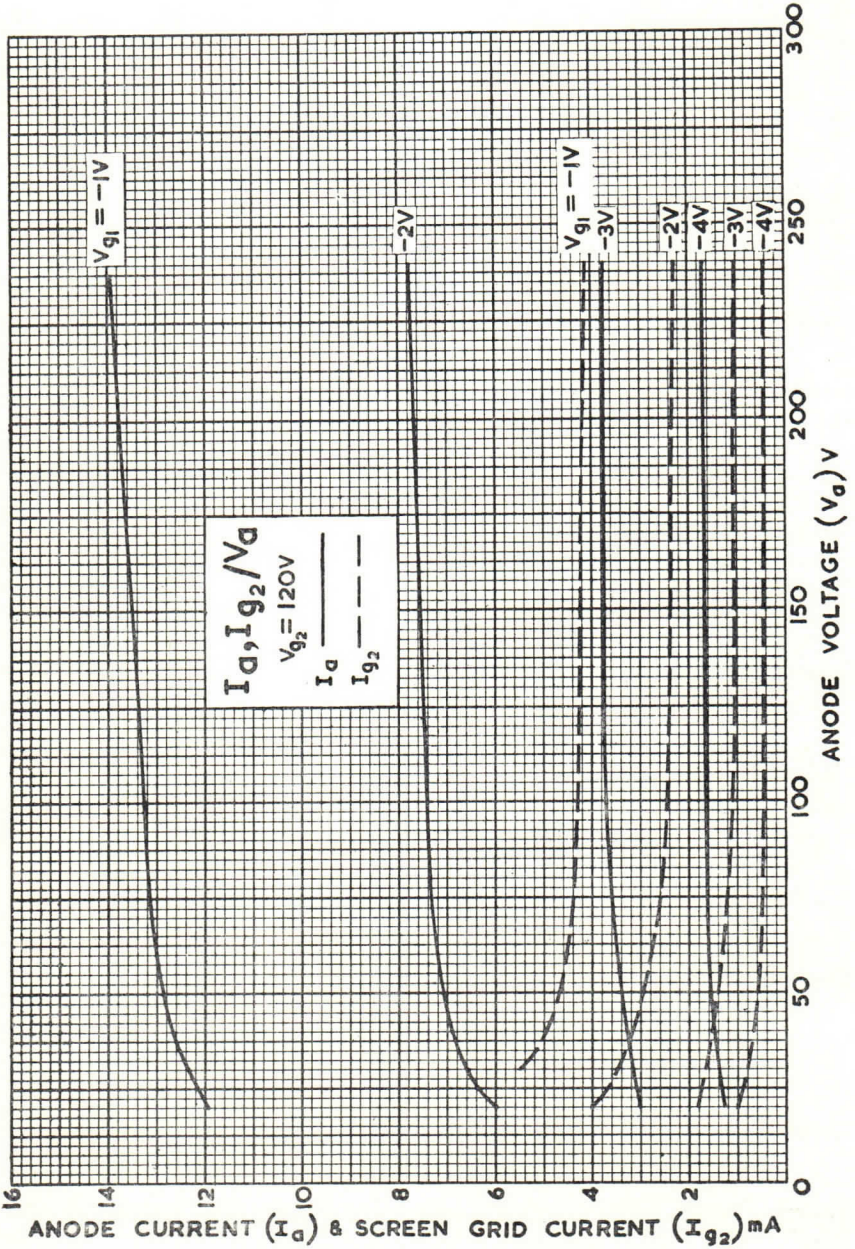
Input	C_{in}	4·0	pF
Output	C_{out}	2·1	pF
Anode to Control Grid	$C_{a\text{-}g_1}$	<0·03	pF

* Measured without an external shield.

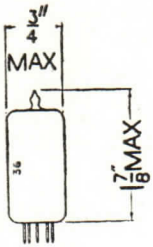
CHARACTERISTICS

Anode Voltage	V_a	120	180	V
Screen Grid Voltage	V_{g_2}	120	120	V
Anode Current	I_a	7·5	7·7	mA
Screen Grid Current	I_{g_2}	2·5	2·4	mA
Cathode Bias Resistance	R_k	180	180	Ω
Mutual Conductance	g_m	5·0	5·1	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$) (approx)	r_a	0·3	0·5	MΩ
Control Grid Voltage for I_a=10μA (approx)	$V_{g_1(Ia=10\mu A)}$	−8·5	−8·5	V

THORN—AEI RADIO VALVES & TUBES LTD.


Ia, Ig2/Va
Vg2 = 120V
Ia
Ig2
Vg1 = -1V
-2V
-3V
-4V
ANODE VOLTAGE (Va) V
0
50
100
150
200
250
300
16
14
12
10
8
6
4
2
ANODE CURRENT (Ia) & SCREEN GRID CURRENT (Ig2) mA

Current Equipment Type

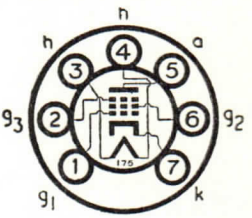


B7G Base

TYPE 6AK6

MINIATURE

POWER PENTODE



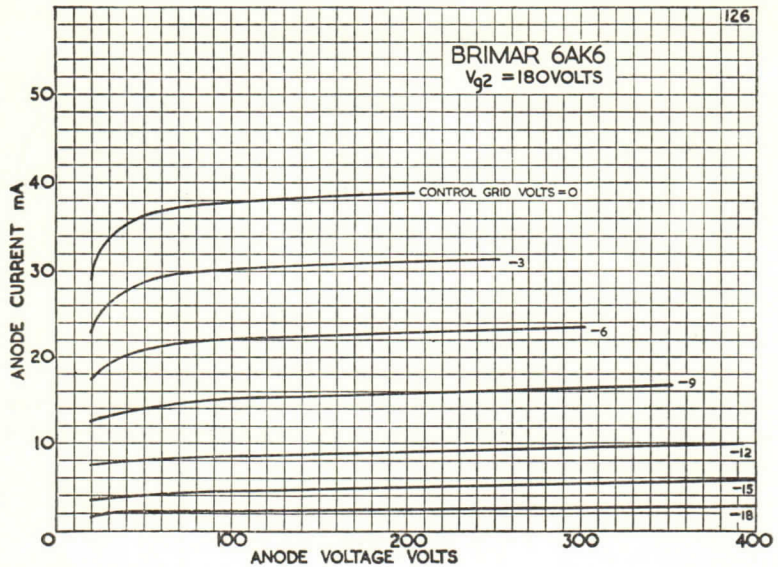
The BRIMAR type 6AK6 is a miniature output pentode with low heater consumption suitable for use in both AC and AC/DC equipment. It is particularly suitable where power economy and small physical size are of prime importance.

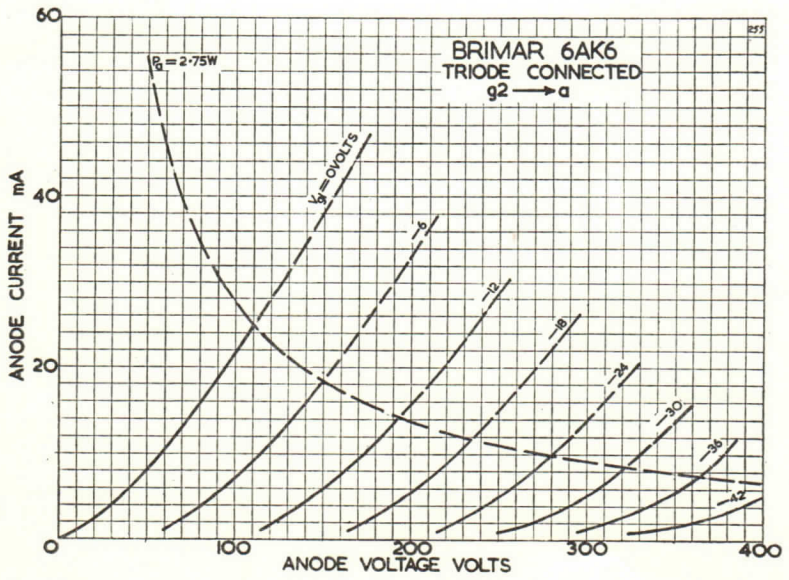
RATINGS

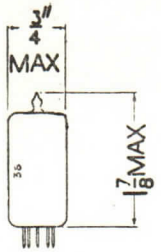
Heater Voltage	6.3 volts
Heater Current	0.15 amp.
Anode Voltage	275 volts max.
Anode Dissipation	2.75 watts max.
Screen (g_2) Voltage	250 volts max.
Screen Dissipation	0.75 watts max.
D.C. Cathode Current	21 mA max.

OPERATING CHARACTERISTICS (CLASS A)

Anode Voltage	180 volts
Anode Current	15 mA
Screen Voltage	180 volts
Screen Current	2.5 mA
Control Grid (g_1) Voltage	—9 volts
Cathode Bias Resistor	520 ohms
Anode Impedance...	200,000 ohms
Mutual Conductance	2.3 mA/V
Inner Amplification Factor ($\mu_{g1, g2}$)	10.5
Optimum Load	10,000 ohms
Power Output	1.1 watts
Harmonic Distortion	10 per cent.



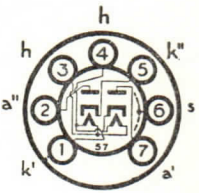




Current Equipment Type

TYPE 6AL5

MINIATURE DOUBLE DIODE



RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Peak Inverse Voltage	420 volts max.
Peak Anode Current (each Anode)	54 mA max.
Resonant Frequency (each Section)	700 Mc/s approx.

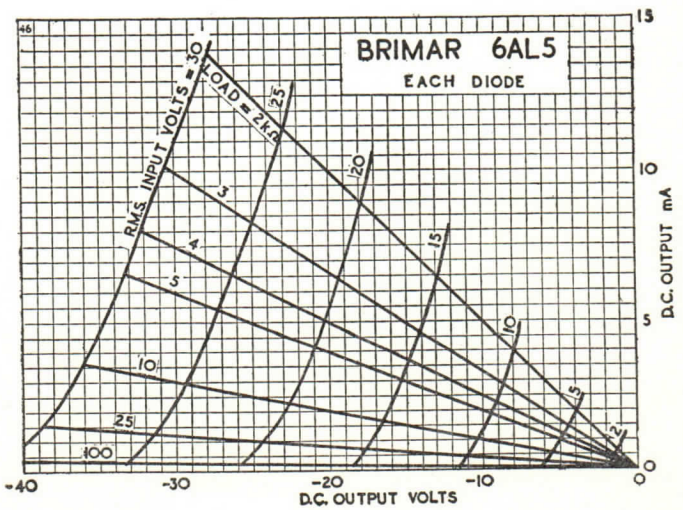
OPERATION AS HALF-WAVE RECTIFIER

R.M.S. Input per Anode	150 volts max.
Supply Impedance per Anode	300 ohms min.
Rectified Current per Anode	9 mA max.

INTER-ELECTRODE CAPACITANCES

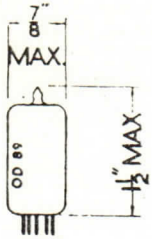
Diode 1 to Cathode 1 and Heater	3.2 pF
Diode 2 to Cathode 2 and Heater	3.2 pF
Cathode 1 to Diode 1 and Heater	3.6 pF
Cathode 2 to Diode 2 and Heater	3.6 pF
Diode 1 to Diode 2	0.026 pF max.

For additional curves refer to type 5726.

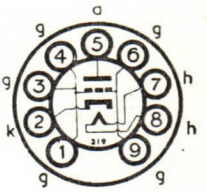


Type 6AL5 is a commercial equivalent to the CV140.

Current Equipment Type



TYPE 6AM4
MINIATURE GROUNDED GRID AMPLIFIER TRIODE



The BRIMAR 6AM4 is a miniature B9A based triode suitable for grounded grid amplifier or mixer use in the frequency range 470 to 890 Mc/s.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.225 amp.
Anode Voltage	200 volts max.
Anode Dissipation	2.0 watts
Positive D.C. Grid Voltage	0 volts max
Heater-Cathode Potential—Heater Positive	80 volts max.
Heater Negative	80 volts max.*

* 250 *volts max. under cut-off conditions in cascode type circuits with direct coupled drive.*

OPERATING CHARACTERISTICS

Anode Voltage	200 volts
Cathode Bias Resistor	100 ohms
Anode Current	10 mA
Mutual Conductance	9.8 mA/V
Anode Impedance	8,700 ohms
Amplification Factor	85
Grid Voltage for $1_a = 10\mu A$	—6.5 volts

NOTE: Fixed bias operation is not recommended.

CHARACTERISTICS AS A MIXER†

Anode Voltage	125 volts
Cathode Bias Resistor	220 ohms
Peak Heterodyne Voltage	1.6 volts
Anode Current	3.7 mA
Conversion Conductance	2.55 mA/V

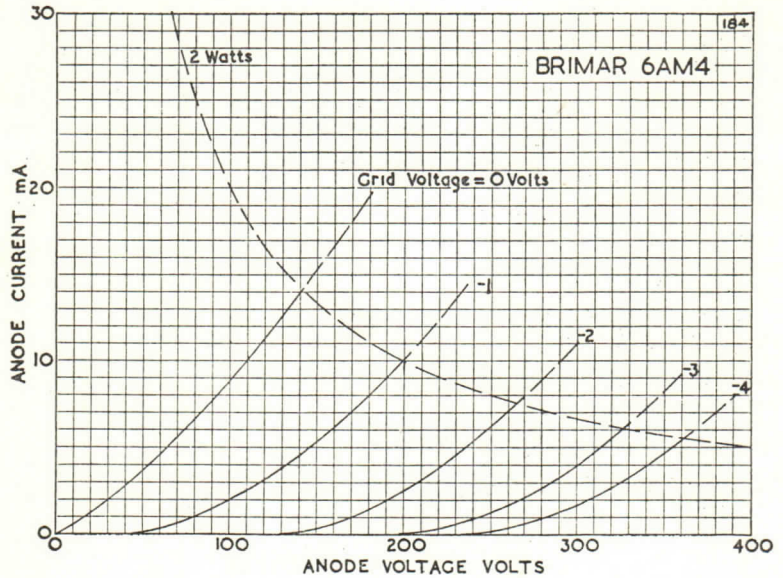
† *Based on low-frequency measurements. Optimum conditions at operating frequencies may be somewhat different.*

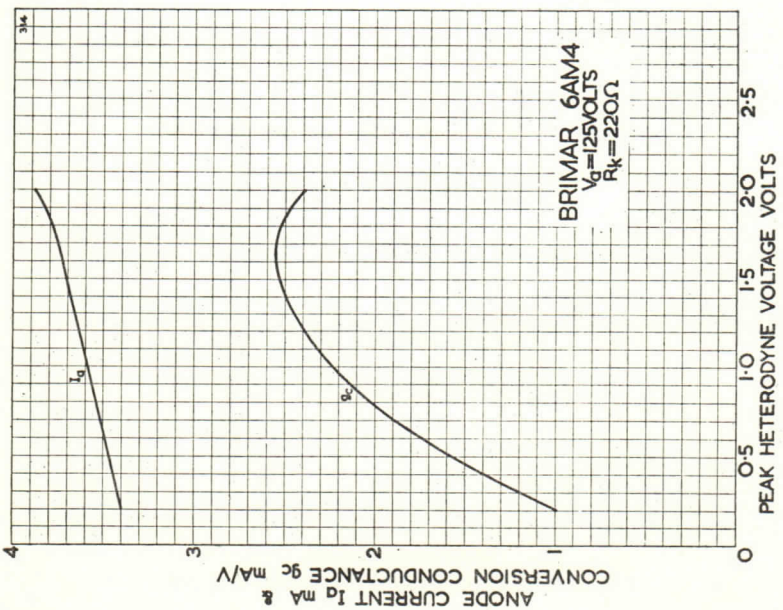
INTER-ELECTRODE CAPACITANCES

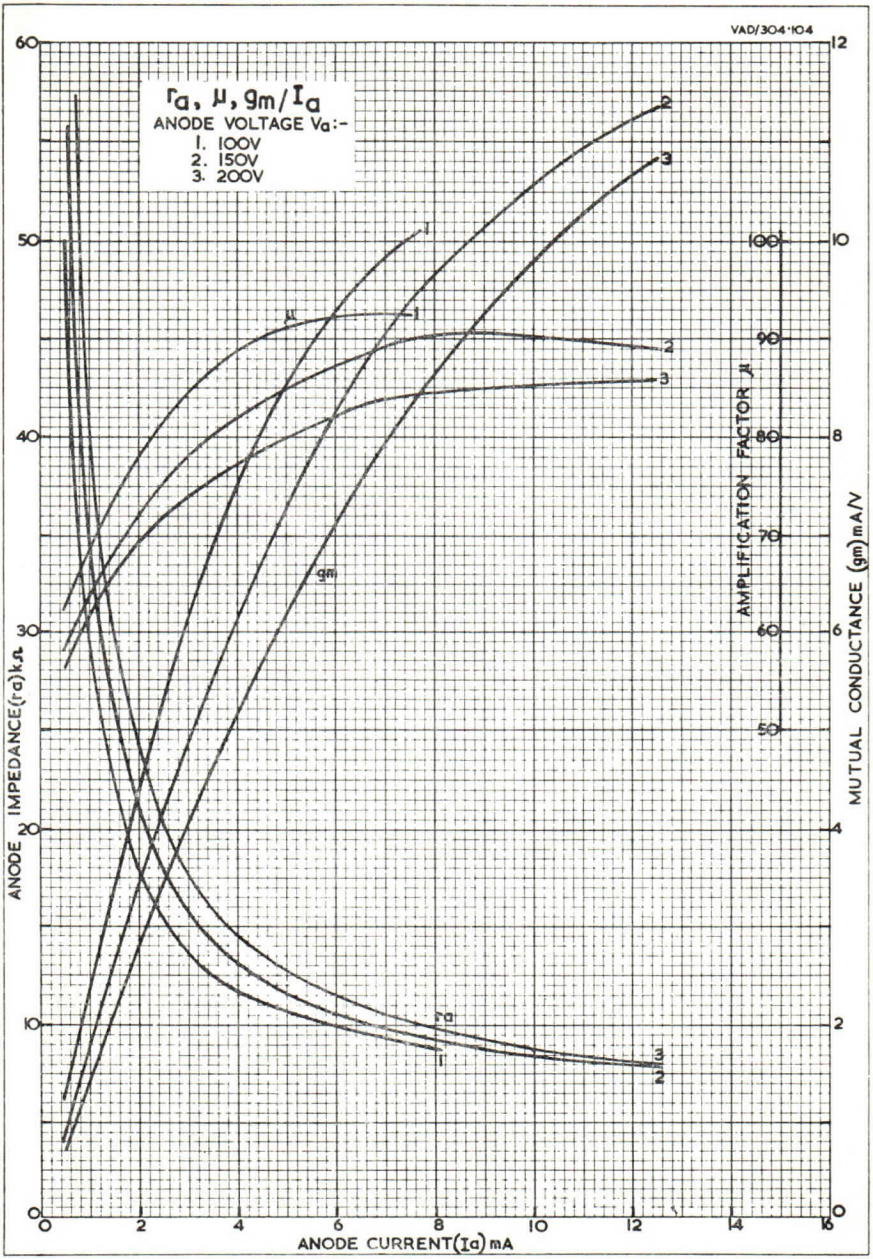
	With external screen *	Without external screen
Anode to Cathode	0.16	0.16 pF
Cathode to Grid plus Heater	4.6	4.4 pF
Anode to Grid plus Heater	2.8	2.4 pF
Heater to Cathode	1.8	1.8 pF

* *Connected to Grid.*

Type 6AM4 *is a commercial equivalent to the* CV5073.






VAD/304·104
ra, μ, gm/Ia
ANODE VOLTAGE Va:-
1. 100V
2. 150V
3. 200V
ANODE IMPEDANCE(ra)kΩ
AMPLIFICATION FACTOR μ
MUTUAL CONDUCTANCE (gm)mA/V
ANODE CURRENT(Ia)mA
0
2
4
6
8
10
12
14
16
20
30
40
50
60
70
80
90
100

TYPICAL U.H.F. OPERATION

The following information is intended for general guidance in circuit design:

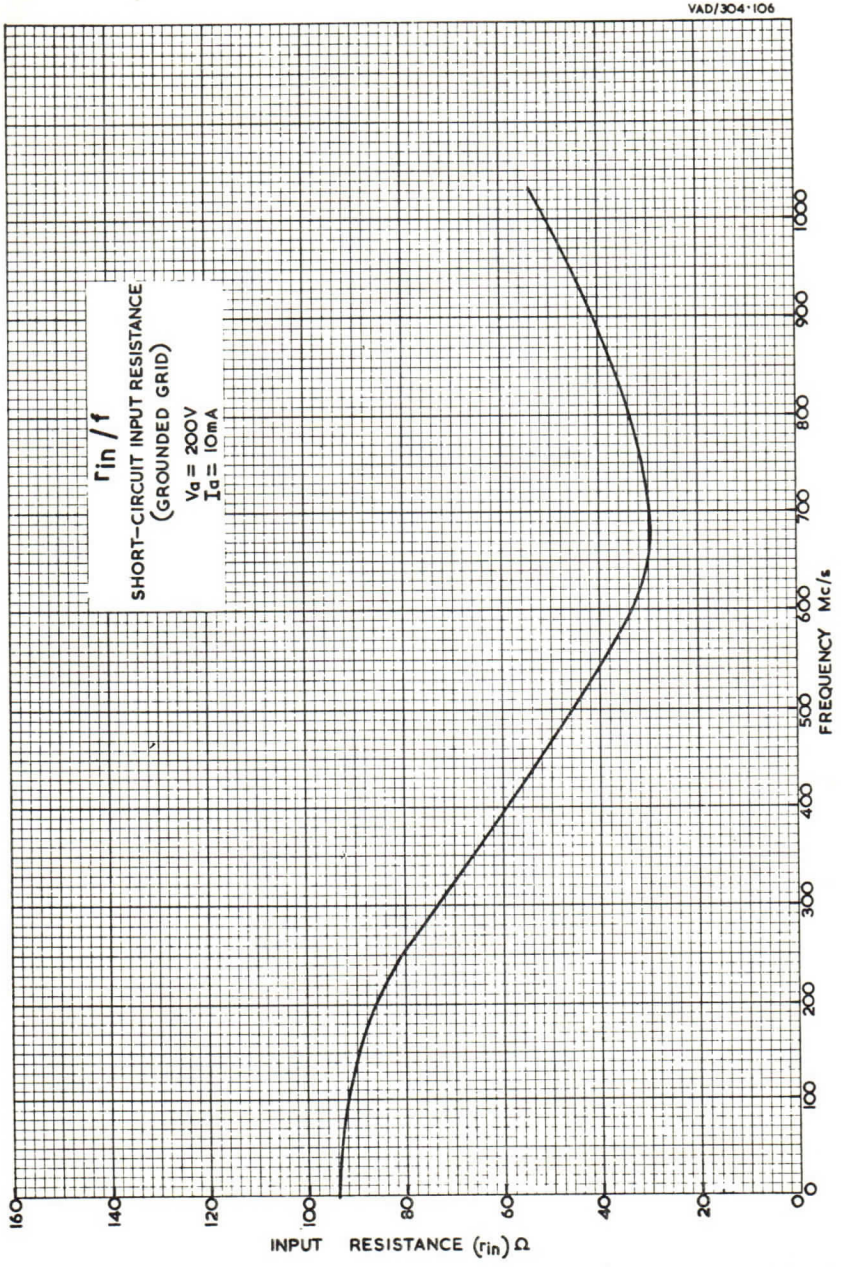
GENERAL

The 6AM4 is particularly suited for U.H.F. grounded grid operation, having five separate grid pins which enable a low impedance earth connection to be made, thus providing good isolation between the input and output circuits. Low impedance earth connections are desirable for stable operation and a suitable earthing ring is illustrated in drawing VAD/304.112.

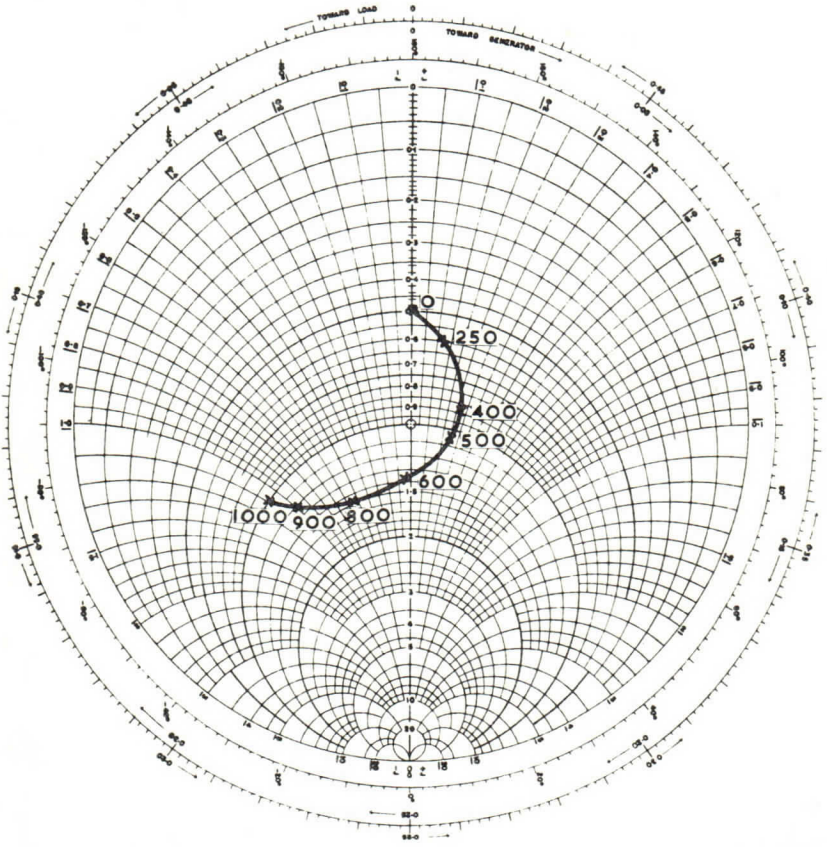
Input resistance and admittance variations versus frequency with the output capacitively short-circuited, are shown in curves VAD/304.106 and VAD/304.108 and it is evident that a series resonance exists at 600 Mc/s which results in an extremely high input conductance and a discontinuous input susceptance. This resonance is due mainly to the series combination of cathode to grid capacity and cathode lead inductance. The equivalent input circuit for a grounded grid triode under short-circuited output conditions is shown in drawing VAD/304.113, and it is evident that at lower frequencies the input resistance is approximately equal to the reciprocal of the mutual conductance. Internal resonance can effect the stability of operation, in so far that wide variations in performance will be experienced from valve to valve when operating at frequencies approaching this resonant frequency. Because of feedback paths existing within the valve between the anode, grid and cathode, the presence of an anode load, such as a tuned circuit, considerably affects the input admittance. These effects are not readily calculable, but the curve VAD/304.109 shows how the input admittance varies over a typical bandwidth when the valve is operating as a U.H.F. amplifier.

Transit time effects also form an integral part of the input admittance, but in the case of the 6AM4, the resistive component is approximately 1,000 ohms at 1,000 Mc/s and is appreciably shunted by the resistive part of the internal and external valve impedances at U.H.F.

Noise factor is a major consideration in U.H.F. amplifiers and is dependent mainly on the operating conditions and frequency of operation. Near zero bias the noise factor is increased due to initial velocity electrons and contact potential grid current, and at high bias voltages there is an increase in ionic grid current and circuit impedances. The choice of optimum operating conditions is limited, therefore, to an operating point in the region of −1 to −1·5 volts bias. Curve VAD/304.110 shows the variation of noise factor with frequency of operation.

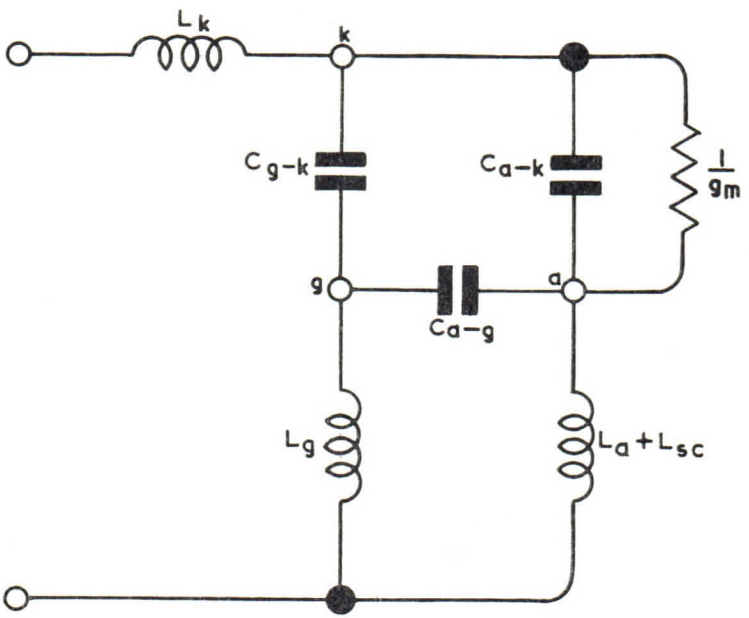

VAD/304·106
rin / f
SHORT-CIRCUIT INPUT RESISTANCE
(GROUNDED GRID)
Va = 200V
Ia = 10mA
FREQUENCY Mc/s
0
100
200
300
400
500
600
700
800
900
1000
INPUT RESISTANCE (rin) Ω
160
140
120
100
80
60
40
20
0

304.108



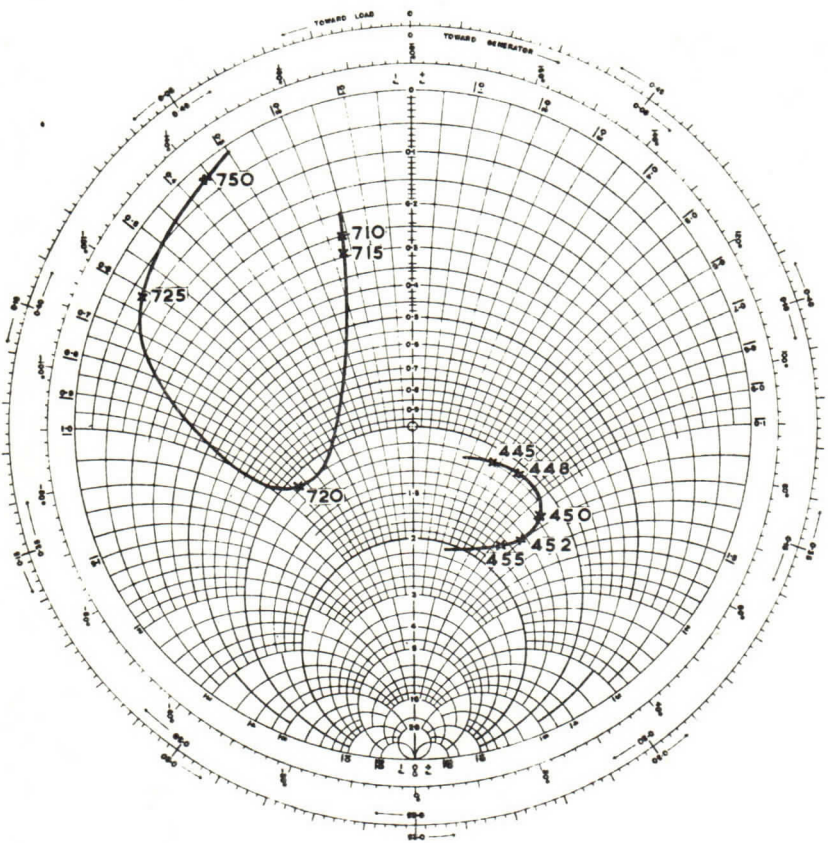
SHORT CIRCUIT INPUT ADMITTANCE (NORMALISED 20mmho)/FREQUENCY (Mc/s)
GROUNDED GRID OPERATION
V_a = 200V R_k = 220Ω

VAD/304·113



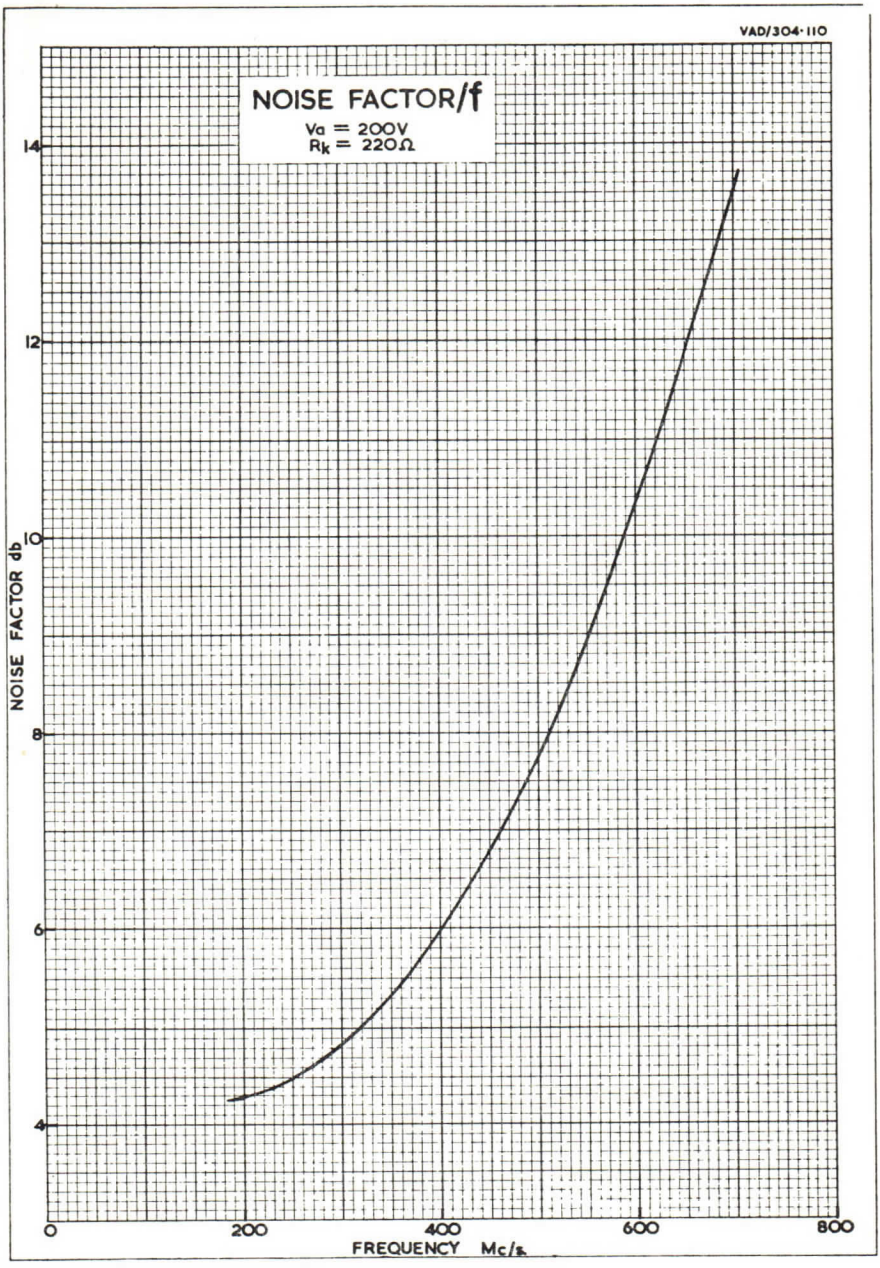
EQUIVALENT CIRCUIT OF SHORT-CIRCUITED GROUNDED-GRID AMPLIFIER.

304.109



VARIATION OF INPUT ADMITTANCE (NORMALISED 20 mmho) WITH FREQUENCY (Mc/s)
ANODE CIRCUIT TUNED TO 450 Mc/s AND 720 Mc/s

$V_a = 200V$ $R_k = 220\Omega$


VAD/304·110
NOISE FACTOR/f
Va = 200V
Rk = 220Ω
NOISE FACTOR db
14
12
10
8
6
4
0
200
400
600
800
FREQUENCY Mc/s

GROUNDED GRID AMPLIFIER OPERATION

A typical circuit is shown in drawing VAD/304.111. The input circuit is tuned with the 4·5 pF trimmer and the coupling between stages is a conventional Pi type tuned by the 3–8 pF trimmer. The R.F. chokes consist of 10 turns of 22 s.w.g. enamelled copper wire wound on an $\frac{1}{8}$ in diameter former.

An R.F. stage gain of 15–20 db can be achieved with this circuit.

TYPICAL OPERATING CONDITIONS—AMPLIFIER

Anode Voltage	V_a	200	V
Anode Current	I_a	7·2	mA
Cathode Resistor	R_k	220	Ω
Noise Factor at 450 Mc/s		6·8	db
Noise Factor at 750 Mc/s		13·5	db
Gain at 450 Mc/s		15	db
Gain at 750 Mc/s		8	db

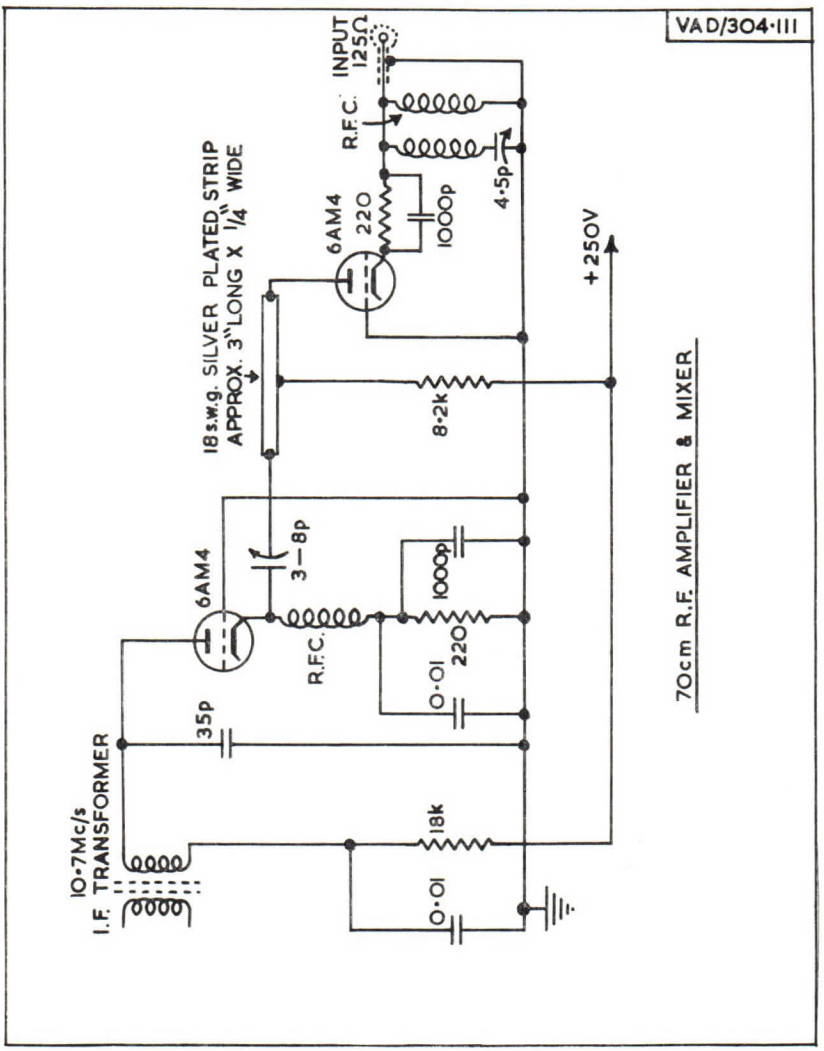
MIXER OPERATION

A typical U.H.F. mixer circuit is shown in drawing VAD/304.111. The oscillator injection is not shown, but this can be accomplished by either inductive coupling into the input cathode line or by capacitive coupling to the cathode. In both cases the loading effect of the oscillator circuit should not be allowed to damp the signal input circuit.

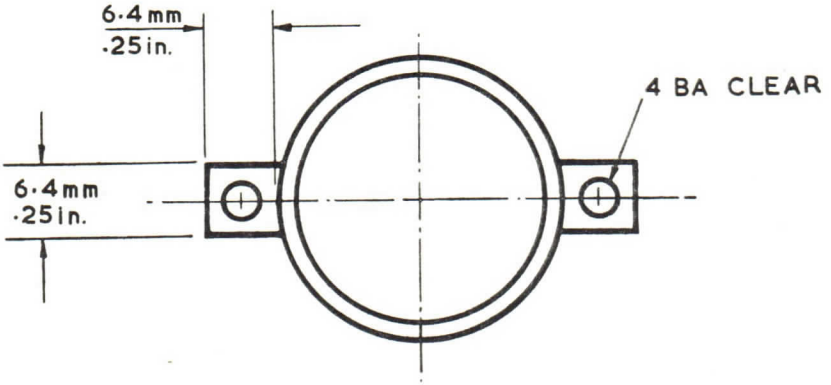
The 6AM4 can also be used as a self-oscillating mixer and with careful design, stability approaching that of a separate oscillator can be achieved.

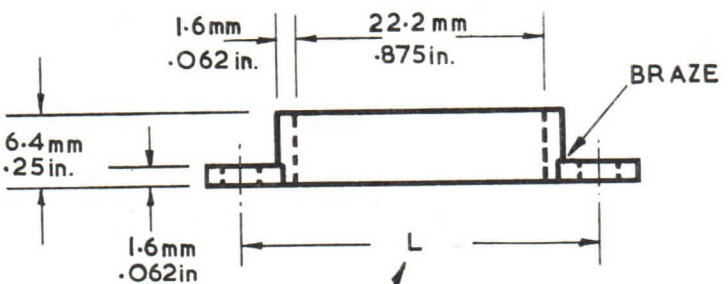
TYPICAL OPERATING CONDITIONS—MIXER

Anode Supply Voltage	$V_{a(b)}$	250	V
Anode Load Resistor	R_a	18	kΩ
Cathode Resistor	R_k	220	Ω
Anode Current	I_a	5·8	mA
Peak Heterodyne Volts	$V_{het(pk)}$	2·0	V


VAD/304·111
INPUT 125Ω
R.F.C.
4·5p
6AM4
220
1000p
+250V
18s.w.g. SILVER PLATED STRIP
APPROX. 3"LONG X 1/4" WIDE
8·2k
6AM4
3—8p
1000p
R.F.C.
0·01
220
35p
10·7Mc/s
I.F. TRANSFORMER
18k
0·01
70cm R.F. AMPLIFIER & MIXER

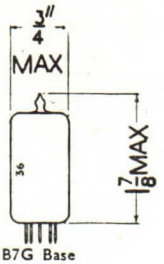
EARTHING RING FOR 6AM4





DIMENSION TO SUIT FIXING HOLES OF VALVEHOLDER USED

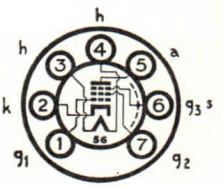
MATERIAL:– BRASS
FINISH:– SILVER PLATE



Current Equipment Type

TYPE 6AM6

MINIATURE HIGH SLOPE R.F. PENTODE



The BRIMAR 6AM6 is an indirectly heated high slope R.F. pentode suitable for a wide variety of applications. It may be used as an R.F., I.F. or video amplifier, as a limiter, or as a frequency changer at frequencies up to 100 Mc/s in conjunction with a suitable oscillator.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	275 volts max.
Anode Dissipation	2.5 watts max.
Screen (g_2) Voltage	275 volts max.
Screen Dissipation	0.8 watts max.
Heater to Cathode Potential	150 volts max.

OPERATING CHARACTERISTICS

[Suppressor Grid (g_3) connected to Cathode]

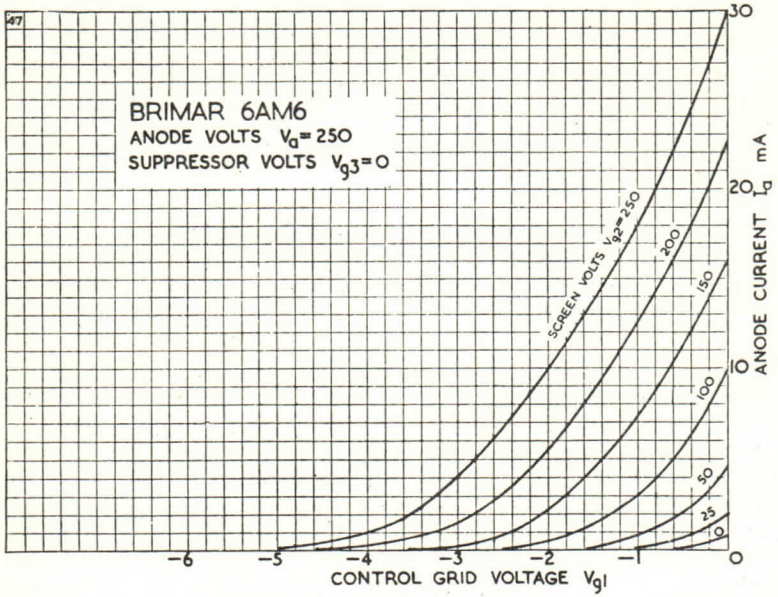
Anode Voltage	200	250	volts
Anode Current	9.0	10.0	mA
Screen Voltage	200	250	volts
Screen Current	2.25	2.6	mA
Control Grid (g_1) Voltage	–1.5	–2.0	volts
Cathode Bias Resistor	135	160	ohms
Anode Impedance (approx.)	0.8	1.0	meg.
Mutual Conductance	7.5	7.5	mA/V
Input Resistance at 45 Mc/s.	7,000	8,200	ohms
Control Grid Voltage (For Cathode Current cut-off)	–4.5	–5.5	volts
Working Input Capacity	10.4	10.1	pF
Change in Input Capacity (g_1 biased to cut-off)	2.3	2.0	pF
Inner Amplification Factor ($\mu_{g1, g2}$)	70	70	

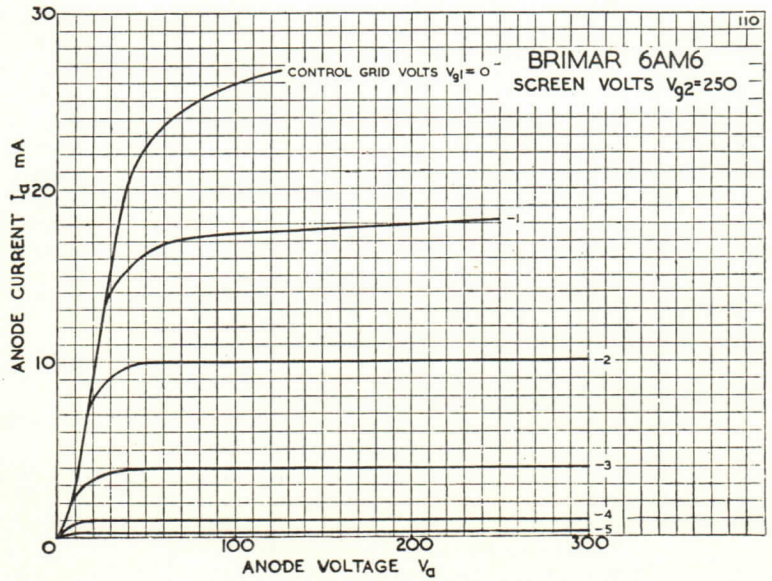
INTER-ELECTRODE CAPACITANCES *

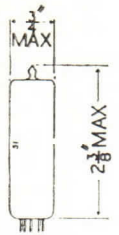
Input	7.5 pF
Output	3.2 pF
Control Grid to Anode	0.01 pF

** With close fitting shield connected to Cathode.*

Type 6AM6 is a commercial equivalent of the CV138.



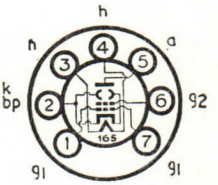




B7G Base

Current Equipment Type

TYPE **6AQ5**
MINIATURE OUTPUT BEAM TETRODE



RATINGS

Heater Voltage	6.3 volts
Heater Current	0.45 amp.
Anode Voltage	250 volts max.
Anode Dissipation	12 watts max.
Screen (g_2) Voltage	250 volts max.
Screen Dissipation	2.0 watts max.
Heater-Cathode Potential	250 volts max.
D.C. Cathode Current	65 mA max.

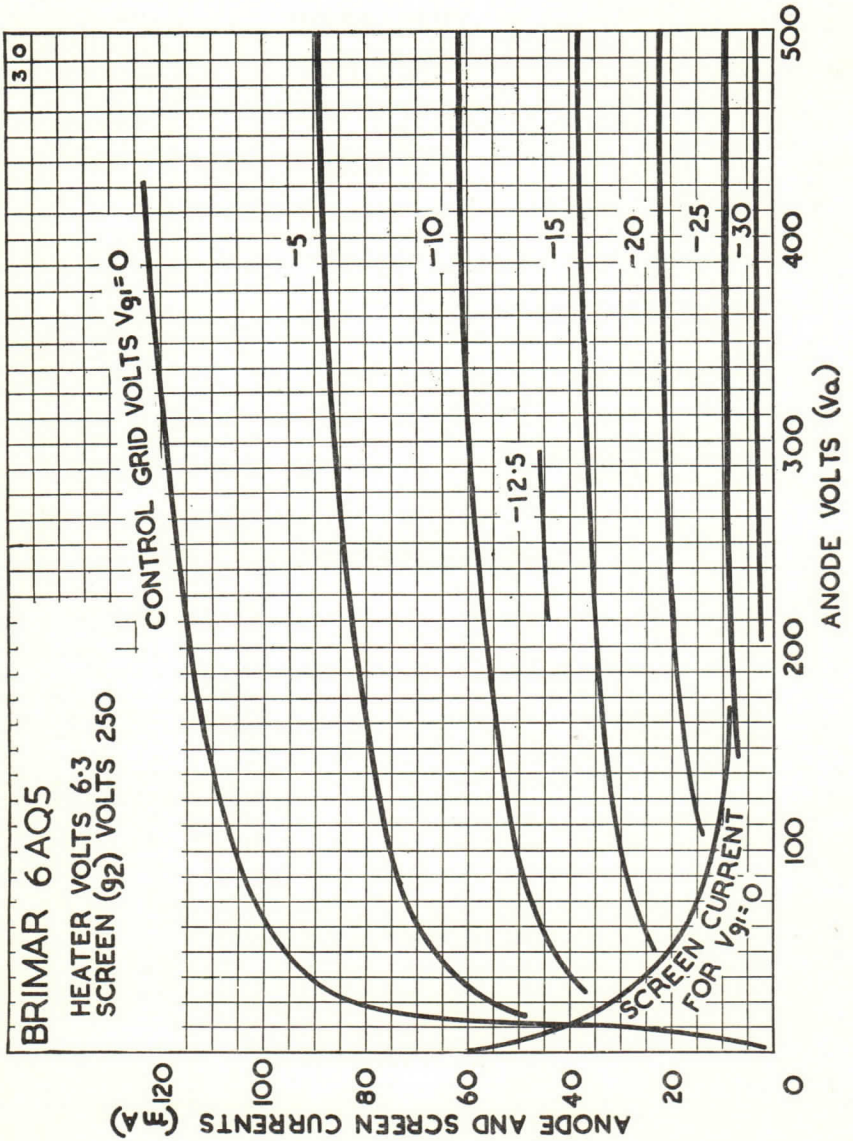
OPERATING CHARACTERISTICS

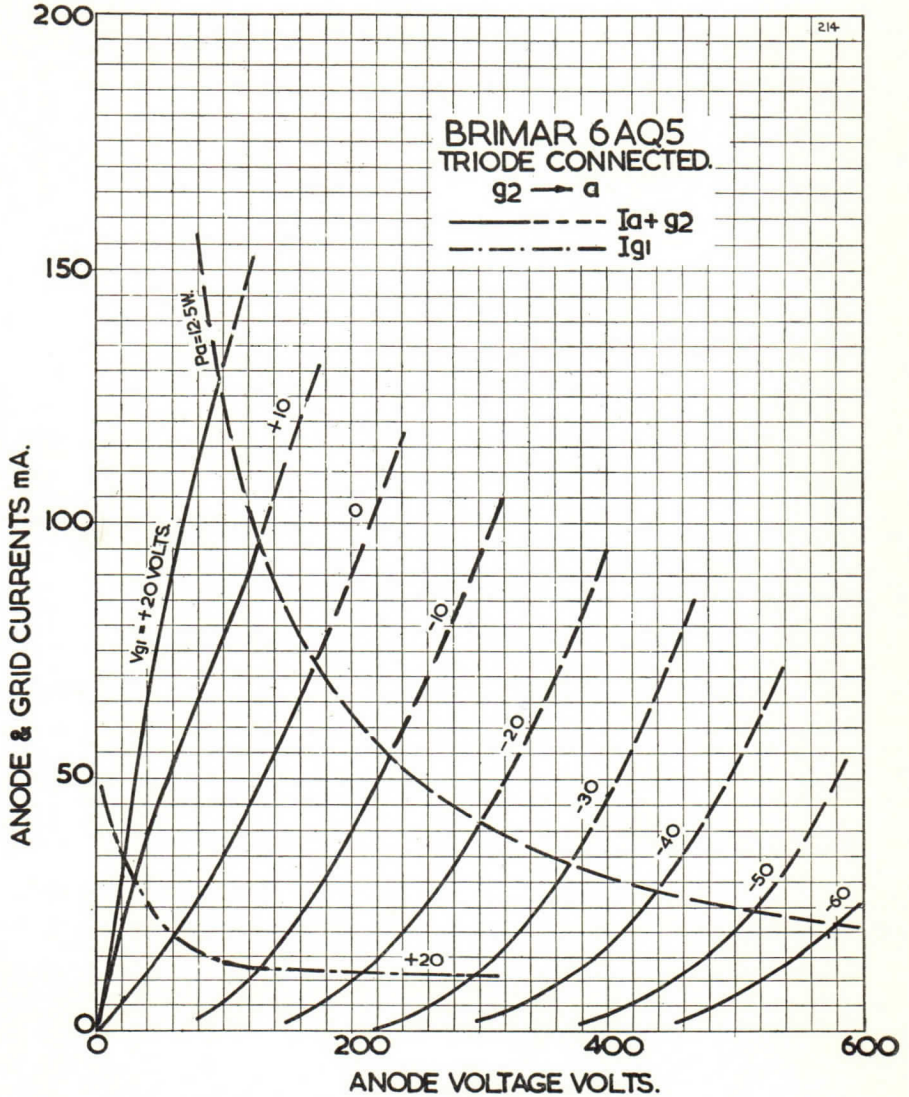
Anode Voltage	180	250 volts
Anode Current	29	45 mA
Screen Voltage	180	250 volts
Screen Current	3.0	4.5 mA
Control Grid (g_1) Voltage	—8.5	—12.5 volts
Cathode Bias Resistor	270	240 ohms
Anode Impedance	58,000	52,000 ohms
Mutual Conductance	3.7	4.1 mA/V
Inner Amp. Factor ($\mu g_1, g_2$)	10	10
Optimum Load	5,500	5,000 ohms
Power Output	2.0	4.5 watts
Harmonic Distortion	8.0	8.0 per cent.

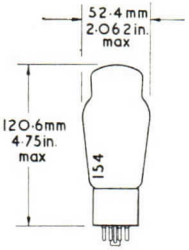
INTER-ELECTRODE CAPACITANCES *

Input	7.6 pF
Output	6.0 pF
Control Grid to Anode	0.35 pF

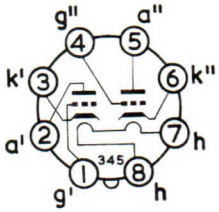
* *With no external shield.*


BRIMAR 6AQ5
HEATER VOLTS 6·3
SCREEN (g2) VOLTS 250
CONTROL GRID VOLTS Vg1=0
-5
-10
-12·5
-15
-20
-25
-30
SCREEN CURRENT FOR Vg1=0
ANODE AND SCREEN CURRENTS (mA)
0
20
40
60
80
100
120
ANODE VOLTS (Va)
100
200
300
400
500





DOUBLE TRIODE SERIES REGULATOR



I.O. Base

GENERAL

This low μ double triode with separate cathodes may be used as a series regulator valve or in servo applications.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	2·5	A

RATINGS—Each Section

Maximum Anode Dissipation	$P_{a(max)}$	13	W
Maximum Anode Supply Voltage	$V_{a(b)max}$	550	V
Maximum Anode Voltage	$V_{a(max)}$	250	V
Maximum Peak Heater to Cathode Voltage	$v_{h-k(pk)max}$	300	V
Maximum Cathode Current	$I_{k(max)}$	125	mA
Maximum Grid Circuit Resistance	$R_{g(max)}$		
Cathode Bias		1·0	MΩ
Fixed Bias		Not recommended	

INTER-ELECTRODE CAPACITANCES

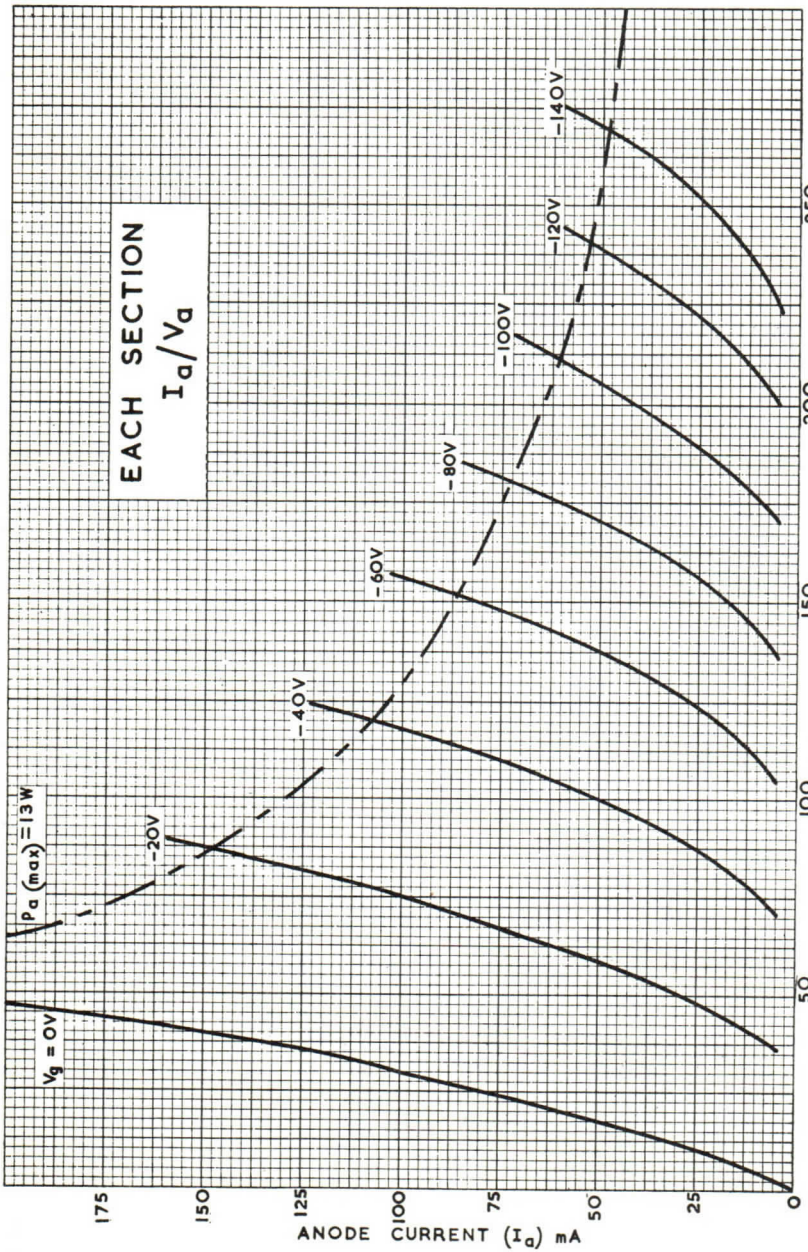
Anode to Grid (Each section)	c_{a-g}	10·5	pF
Grid to Heater and Cathode (Each section)	$c_{g-h,k}$	6·8	pF
Anode to Heater and Cathode (Each section)	$c_{a-h,k}$	2·3	pF
Heater to Cathode (Each section)	c_{h-k}	11	pF
Anode′ to Anode″	$c_{a'-a''}$	1·65	pF
Grid′ to Grid″	$c_{g'-g''}$	0·7	pF

OPERATING CHARACTERISTICS—Each Section

Anode Supply Voltage	$V_{a(b)}$	135	V
Anode Voltage	V_a	approx. 104	V
Anode Current	I_a	125	mA
Cathode Bias Resistance*	R_k	250	Ω
Mutual Conductance	g_m	7·0	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	approx. 280	Ω
Amplification Factor	μ	2·0	

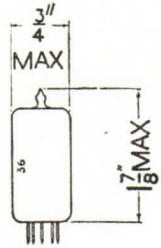
* Operation with fixed bias not recommended.

The 6AS7G is the commercial version of the CV2523.

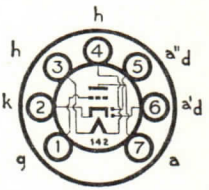

EACH SECTION
I_a/V_a
P_a (max) = 13 W
V_g = 0V
-20V
-40V
-60V
-80V
-100V
-120V
-140V
ANODE CURRENT (I_a) mA
175
150
125
100
75
50
25
0
ANODE VOLTAGE (V_a) V
250
200
150
100
50

Current Equipment Type

TYPE **6AT6**
MINIATURE
DOUBLE DIODE
TRIODE



B7G Base



RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	300 volts max.
Diode Current	1.0 mA max.

OPERATING CHARACTERISTICS

Anode Voltage	250 volts
Anode Current	1.0 mA
Grid Voltage	−3 volts
Anode Impedance	58 000 ohms
Mutual Conductance	1.2 mA/V
Amplification Factor	70

OPERATION AS RESISTANCE COUPLED AMPLIFIER

Anode Supply Voltage	100	250	250 volts
Anode Load Resistor	0.5	0.25	0.25 meg.
Grid Resistor	1.0	1.0	1.0 meg.
Cathode Bias Resistor	9 000	3 000	0 ohms
Peak Output	16	43	40 volts
*Stage Gain	33	42	42
*Harmonic Distortion	2	1	5 per cent.

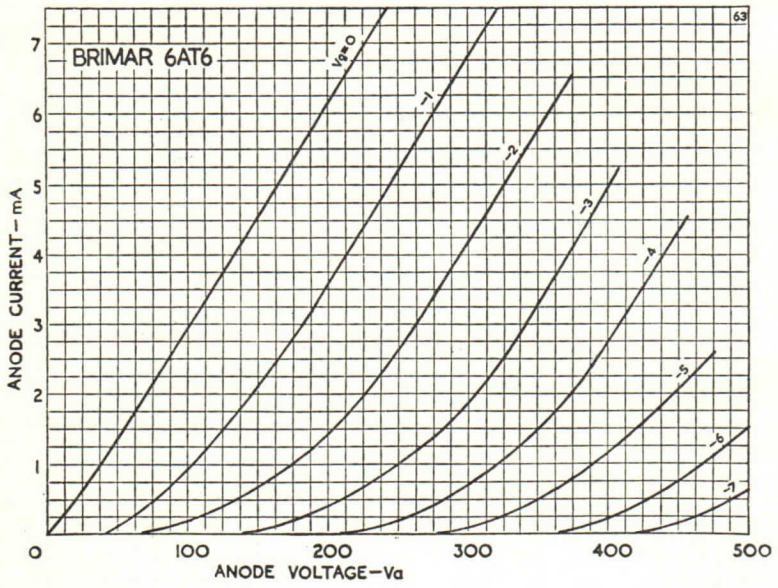
** Figures are for 12 volts peak output*

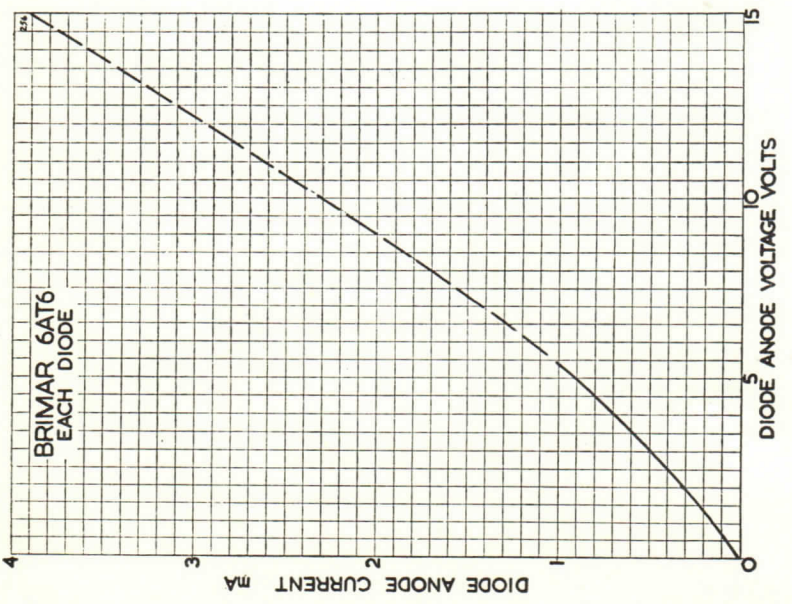
INTER-ELECTRODE CAPACITANCES*

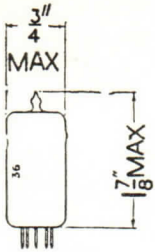
Grid to Cathode	2.3 pF
Anode to Cathode	1.1 pF
Grid to Anode	2.1 pF
Diode Anode (a″d) to Grid	0.025 pF max.

** With no external shield.*

Type 6AT6 *is a commercial equivalent of the* CV452.







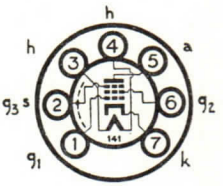
B7G Base

Current Equipment Type

TYPE 6AU6

HIGH SLOPE

R.F. PENTODE



Type 6AU6 is a sharp cut-off pentode suitable for use as R.F. or A.F. amplifier, limiter or sync. separator.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	300 volts max.
Anode Dissipation	3.0 watts max.
Screen (g_2) Supply Voltage	300 volts
Screen (g_2) Voltage	150 volts max.
Screen Dissipation	0.65 watts max.

OPERATING CHARACTERISTICS

[Suppressor Grid (g_3) connected to Cathode]

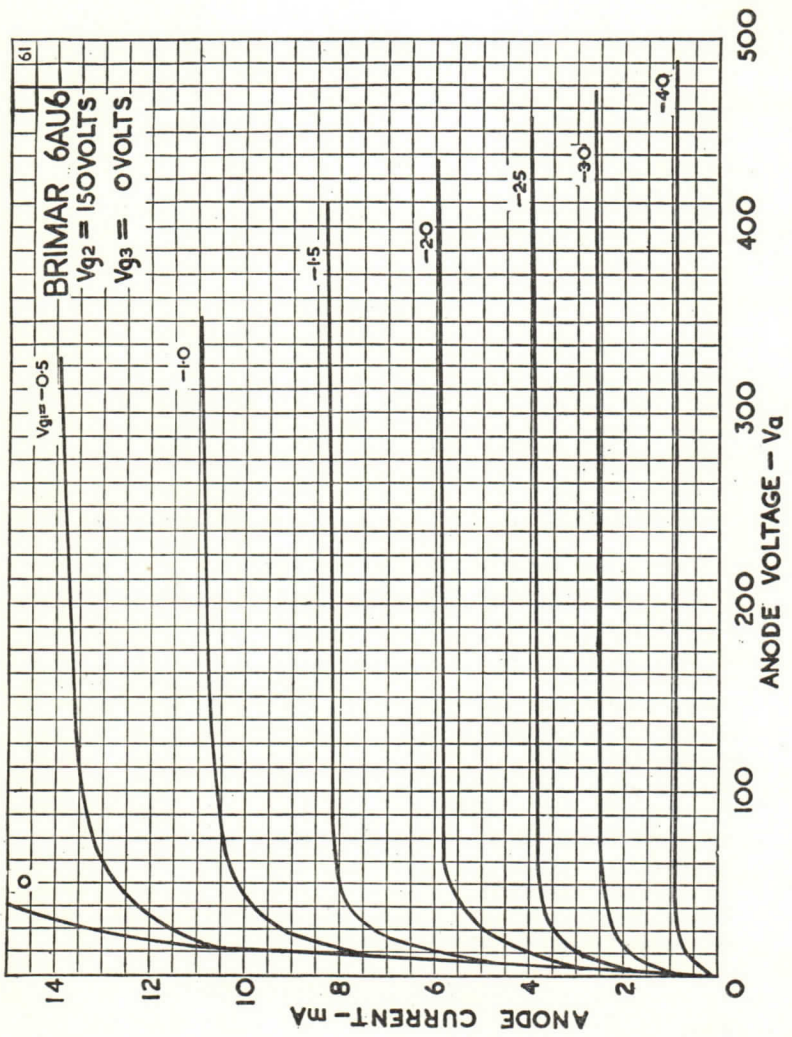
Anode Voltage	250	250	100	volts
Anode Current	10.8	7.6	5.2	mA
Screen Voltage	150	125	100	volts
Screen Current	4.3	3.0	2.0	mA
Control Grid (g_1) Voltage	—1	—1	—1	volts
Cathode Bias Resistor	68	100	140	ohms
Anode Impedance...	1.0	1.5	0.5	meg.
Mutual Conductance	5.2	4.4	3.9	mA/V
Inner Amplification Factor ($\mu_{g1, g2}$) ...	41	41	41	
Input Impedance (50 Mc/s)	3,500	—	—	ohms
Input Impedance (90 Mc/s)	900	—	—	ohms
Control Grid Voltage ... ... (For Anode Current Cut-off).	—6.2	—5.2	—4.2	volts

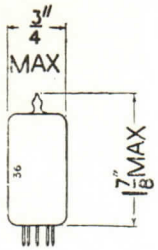
INTER-ELECTRODE CAPACITANCES *

Input	5.5 pF
Output	5.0 pF
Grid to Anode	0.0035 pF max.

* *With no external shield.*

Type 6AU6 *is a commercial equivalent to the* CV2524.

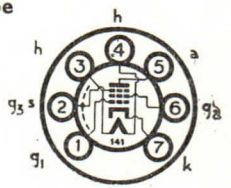




B7G Base

Current Equipment Type

TYPE 6BA6
HIGH SLOPE VARI-MU R.F. PENTODE



RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	300 volts max.
Anode Dissipation	3.0 watts max.
Screen (g_2) Supply Voltage	300 volts max.
Screen Voltage	125 volts max.
Screen Dissipation	0.6 watt max.

OPERATING CHARACTERISTICS

[Suppressor Grid (g_3) connected to Cathode]

Anode Voltage	100	250	250	volts
Anode Current	10.8	11.0	11.0	mA
Screen Voltage	100	100	—	volts
Series Screen Resistor	—	—	33,000	ohms
Screen Current	4.4	4.2	4.2	mA
Control Grid (g_1) Voltage	−1	−1	−1	volts
Cathode Bias Resistor	68	68	68	ohms
Anode Impedance	0.25	1.5	1.5	meg.
Mutual Conductance	4.3	4.4	4.4	mA/V
Input Impedance (45 Mc/s)	4,500	4,500	4,500	ohms
Input Impedance (90 Mc/s)	900	900	900	ohms
Control Grid Voltage	−21	−21	−51	volts

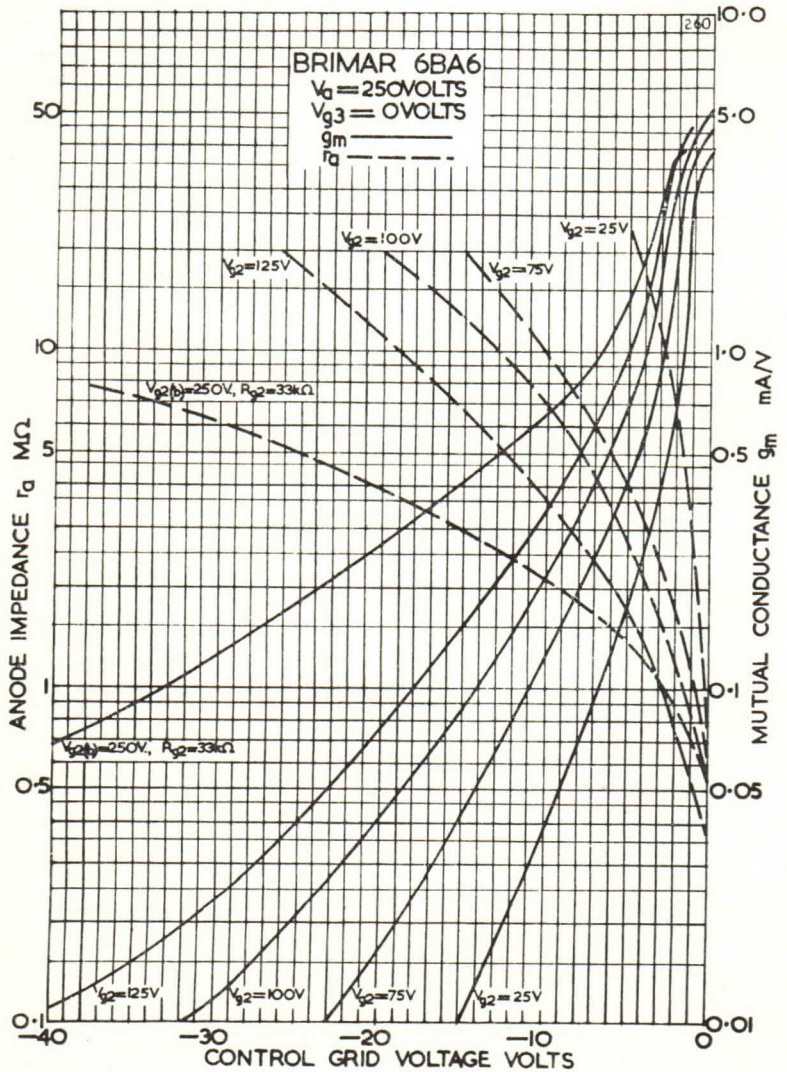
(For Mutual Conductance of 0.005 mA/V).

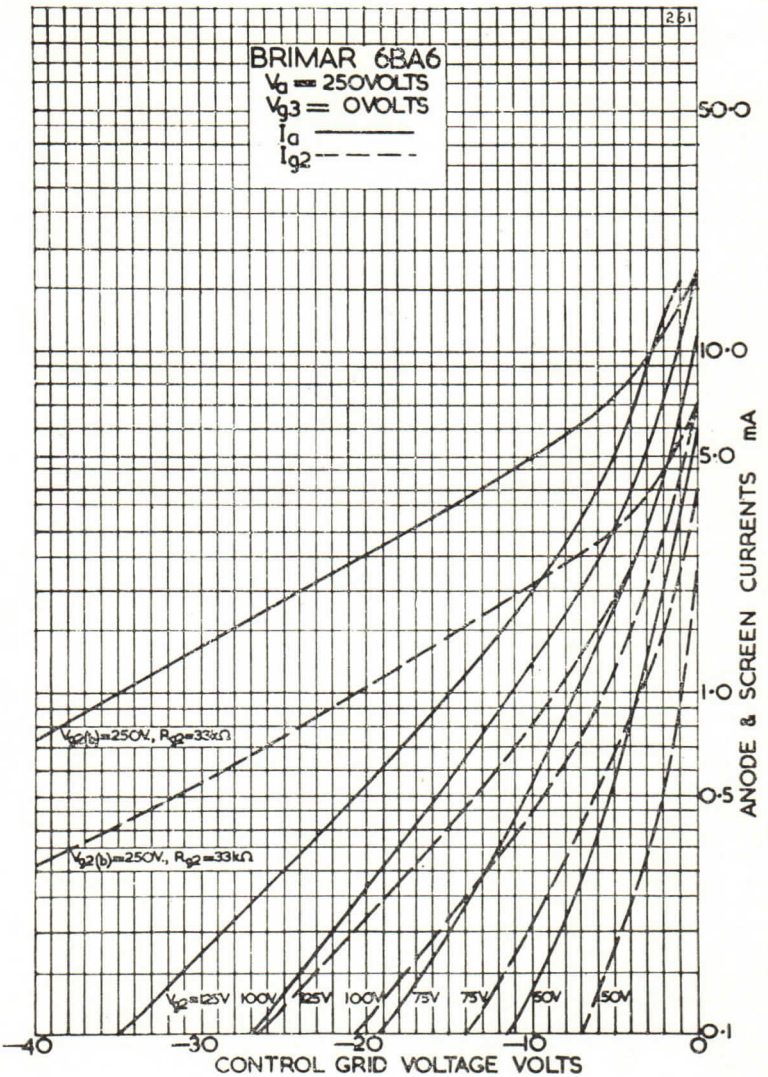
INTER-ELECTRODE CAPACITANCES *

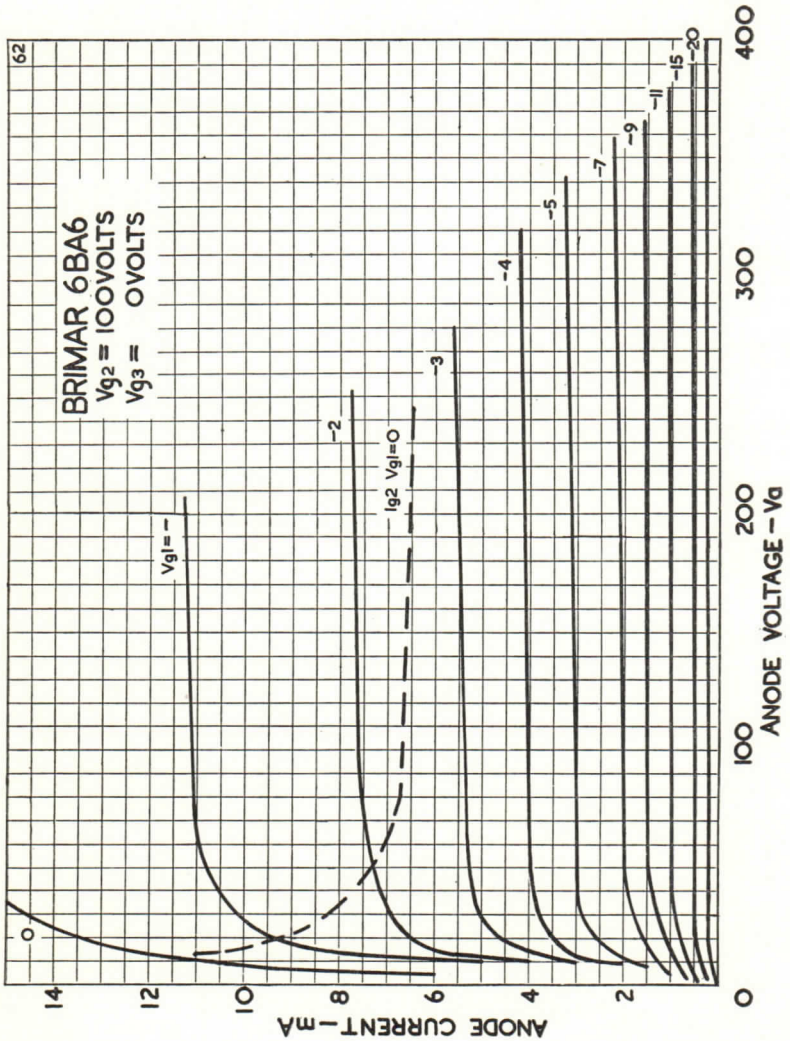
Input	5.5 pF
Output	5.0 pF
Grid to Anode	0.0035 pF max.

* *With no external shield.*

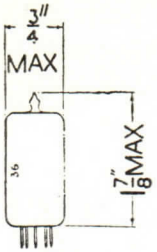
Type 6BA6 is a commercial equivalent of the CV454.


BRIMAR 6BA6
V_a = 250VOLTS
V_{g3} = OVOLTS
gm
ra
260
V_{g2}=125V
V_{g2}=100V
V_{g2}=75V
V_{g2}=25V
$V_{g2(b)}$=250V, R_{g2}=33kΩ
$V_{g2(b)}$=250V, R_{g2}=33kΩ
ANODE IMPEDANCE r_a MΩ
MUTUAL CONDUCTANCE g_m mA/V
50
10
5
1
0·5
0·1
10·0
5·0
1·0
0·5
0·1
0·05
0·01
−40
−30
−20
−10
0
CONTROL GRID VOLTAGE VOLTS


2.61
BRIMAR 6BA6
V_a = 250VOLTS
V_{g3} = OVOLTS
I_a
I_{g2}
50·0
10·0
5·0
1·0
0·5
0·1
ANODE & SCREEN CURRENTS mA
$V_{g2(b)}$=250V., R_{g2}=33kΩ
$V_{g2(b)}$=250V., R_{g2}=33kΩ
V_{g2}=125V 100V 125V 100V 75V 75V 50V 50V
-40
-30
-20
-10
0
CONTROL GRID VOLTAGE VOLTS

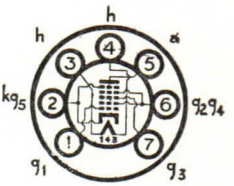


Current Equipment Type



B7G Base

TYPE 6BE6 MINIATURE HEPTODE FREQUENCY CHANGER



Owing to its specialized structure, type 6BE6 may be employed as a self-oscillating frequency changer at frequencies exceeding 60 Mc/s, with excellent frequency stability.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	300 volts max.
Anode Dissipation	1.0 watt max.
Screen (g_2, g_4) Voltage	100 volts max.
Screen Dissipation	1.0 watt max.
Total Cathode Current	14 mA max.

OPERATING CHARACTERISTICS (SEPARATE EXCITATION)

Anode Voltage	250 volts
Anode Current	3.0 mA
Screen Voltage	100 volts
Screen Current	7.1 mA
Control Grid (g_3) Voltage	–1.5 volts
Anode Impedance	1.0 meg.
Oscillator Grid (g_1) Current	0.5 mA
Oscillator Grid Resistor	20,000 ohms
Oscillator Mutual Conductance	7.25 mA/V
Conversion Conductance	0.475mA/V†
Control Grid Voltage	–30 volts

(For Conversion Conductance of 0.005 mA/V).

† *When used with self excitation this value depends on the position of the cathode tap up the coil.*

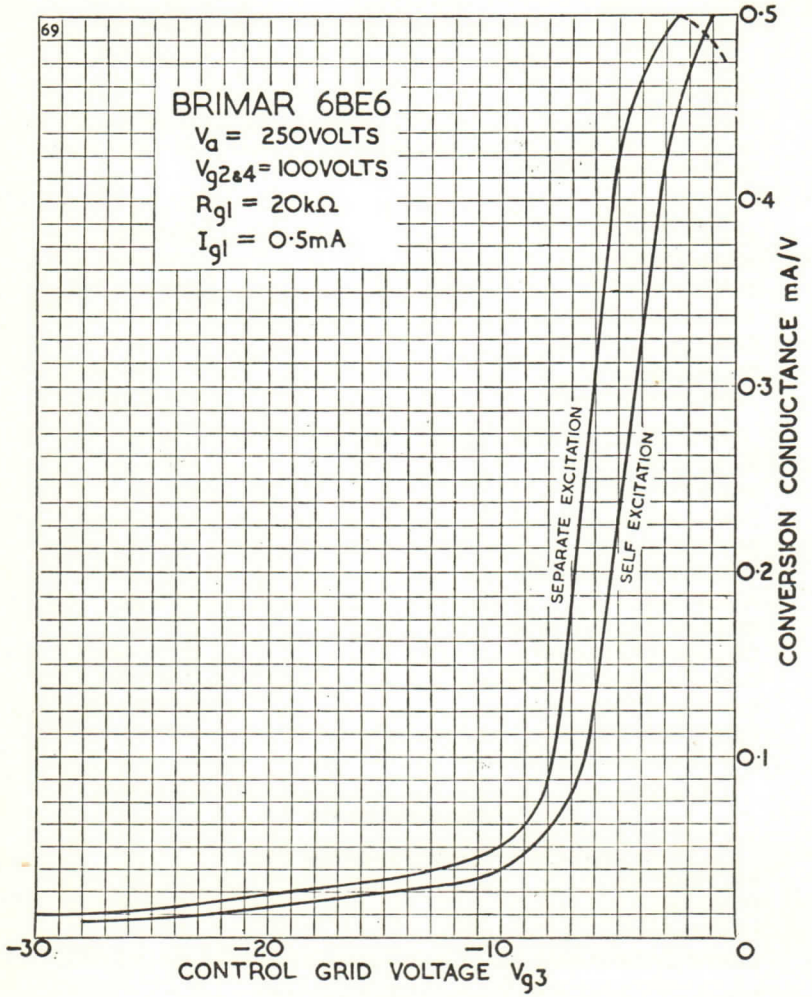
INTER-ELECTRODE CAPACITANCES *

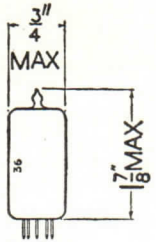
R.F. Input	7.2 pF
I.F. Output	8.6 pF
Oscillator Input	5.5 pF
Control Grid to Anode	0.3 pF max.

* *Measured with no external shield.*

Note : The characteristics shown with separate excitation approximate closely to those obtained with self excitation and zero bias.

Type 6BE6 *is a commercial equivalent of the* CV453.

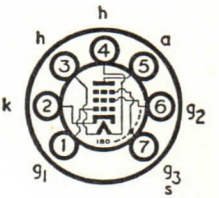




B7G Base

Current Equipment Type

TYPE **6BH6**
MINIATURE HIGH SLOPE R.F. PENTODE



The BRIMAR 6BH6 is a medium slope, sharp cut-off R.F. pentode designed for use in car radio and mobile equipment where economy of heater current is important.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Anode Dissipation	3.0 watts max.
Screen (g_2) Voltage	150 volts max.
Screen Dissipation	0.5 watt max.

OPERATING CHARACTERISTICS
(Suppressor Grid (g_3) connected to Cathode)

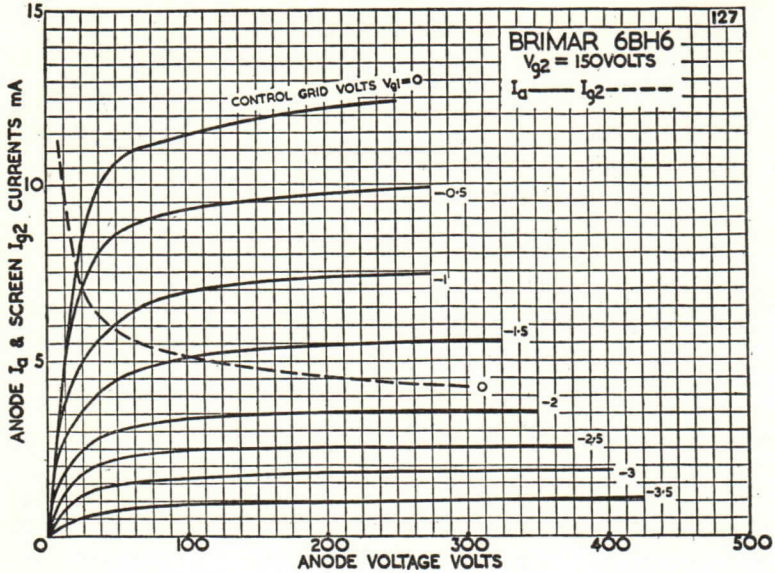
Anode Voltage	100	250	250	volts
Anode Current	3.6	7.4	7.4	mA
Screen Voltage	100	150	—	volts
Series Screen Resistor	—	—	33	kΩ
Screen Current	1.4	2.9	2.9	mA
Control Grid (g_1) Voltage	—1	—1	—1	volts
Cathode Bias Resistor	200	100	100	ohms
Anode Impedance	0.7	1.4	1.4	MΩ
Mutual Conductance	3.4	4.6	4.6	mA/V
Input Impedance at 50 Mc/s	—	6,000	6,000	ohms
Input Impedance at 90 Mc/s	—	3,000	3,000	ohms
Control Grid Voltage for Ia = 10μA	−5	−7.7	—	volts

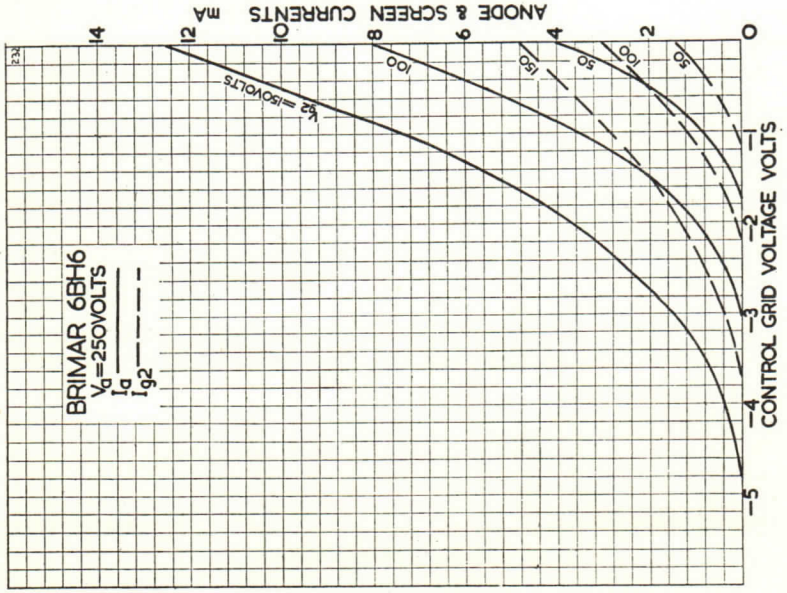
INTER-ELECTRODE CAPACITANCES *

Input	5.4 pF
Output	4.4 pF
Grid to Anode	0.0035 pF max.

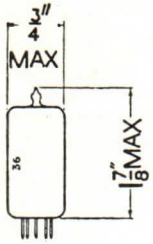
* *With no external shield.*

Type 6BH6 is a commercial equivalent to the CV3908.



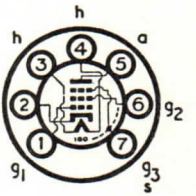


Current Equipment Type



B7G Base

TYPE 6BJ6
MINIATURE VARI-MU R.F. PENTODE



The BRIMAR 6BJ6 is a medium slope variable-mu R.F. pentode designed for use in domestic radio equipment. It is particularly useful for car radio and mobile equipment where economy of heater current is important.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Anode Dissipation	3.0 watts max.
Screen (g_2) Voltage	125 volts max.
Screen Dissipation	0.6 watts max.

OPERATING CHARACTERISTICS

(Suppressor Grid (g_3) connected to Cathode)

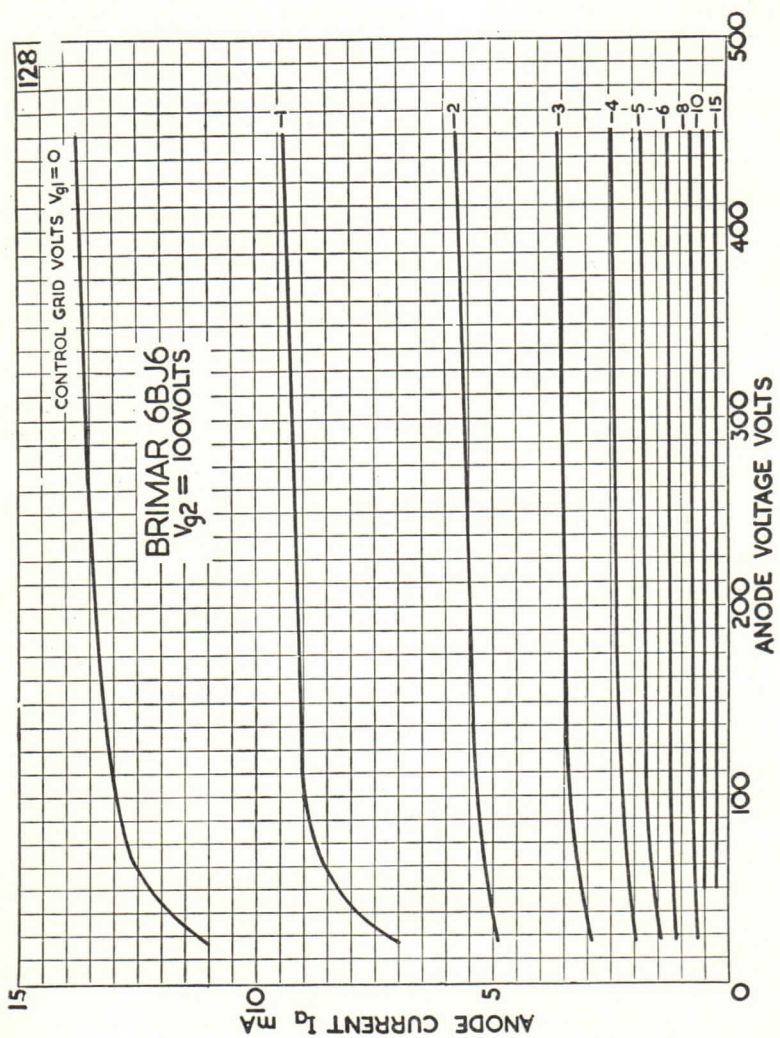
Anode Voltage	100	250	250	volts
Anode Current	9.0	9.2	9.2	mA
Screen Voltage	100	100	—	volts
Series Screen Resistor	—	—	47	kΩ
Screen Current	3.5	3.3	3.3	mA
Control Grid (g_1) Voltage	—1	—1	—1	volts
Cathode Bias Resistor	82	82	82	ohms
Anode Impedance	0.25	1.3	1.3	MΩ
Mutual Conductance	3.65	3.80	3.80	mA/V
Input Impedance at 50 Mc/s	—	7,500	7,500	ohms
Input Impedance at 90 Mc/s	—	4,200	4,200	ohms
Control Grid Voltage (for gm 0.015 mA/V)	—20	—20	—	volts

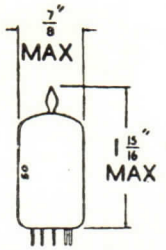
INTER-ELECTRODE CAPACITANCES *

Input	4.5 pF
Output	5.5 pF
Grid to Anode	0.0035 pF max.

* *With no external shield.*

Type 6BJ6 *is a commercial equivalent to the* CV3909.

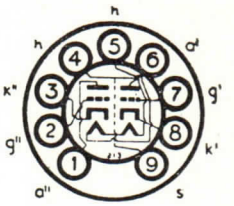




B9A (Noval) Base

Current Equipment Type

TYPE 6BQ7A MINIATURE HIGH SLOPE DOUBLE TRIODE



The BRIMAR 6BQ7A consists of two separate high slope triode units designed for use mainly in VHF cascode amplifiers, but since the internal screen is brought out to a separate base pin the two triode sections may be used independently or in push-pull.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.4 amp.
Anode Voltage ($I_a = 0$)	300 volts max.
Anode Voltage	250 volts max.
Anode Dissipation (per section)	2 watts max.
Cathode Current (per section)	20 mA max.
Heater-Cathode Voltage, Heater negative with respect to Cathode	200 volts max.†
Heater-Cathode Voltage, Heater positive with respect to Cathode	200 volts max.
Grid circuit resistance (using cathode bias)	500 k ohms max.

† *Under cut-off conditions in cascode circuits this may be 300 V.*

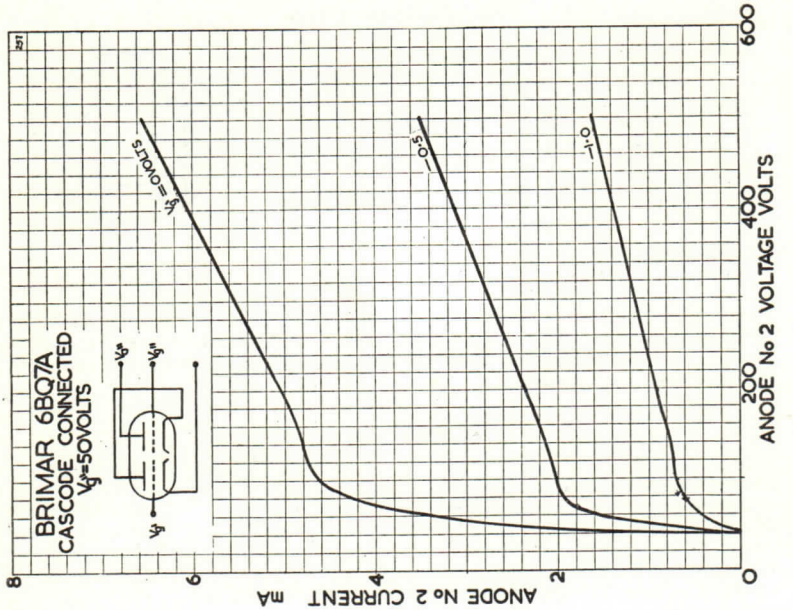
OPERATING CHARACTERISTICS

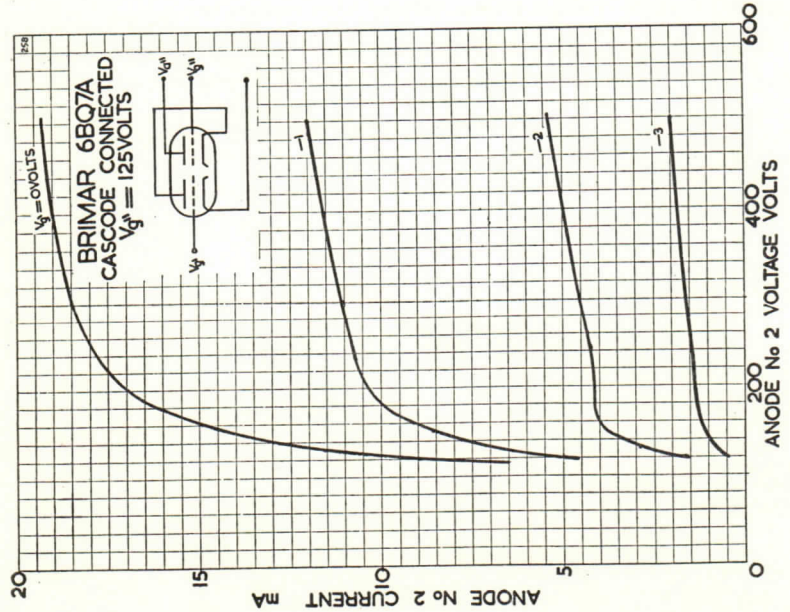
Anode Voltage	150 volts
Cathode Bias Resistor	220 ohms
Anode Current	9 mA
Mutual Conductance	6.4 mA/V
Amplification Factor	39
Anode Resistance	6,100 ohms
Control Grid Voltage for $I_a = 10\ \mu A$	−10 volts

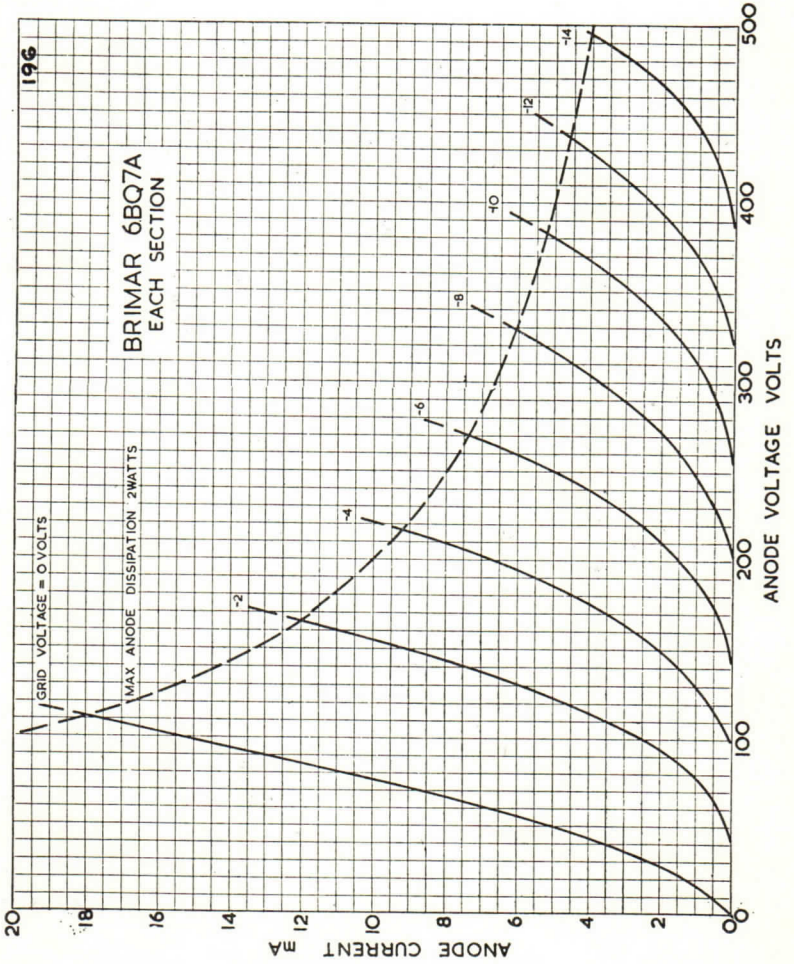
INTER-ELECTRODE CAPACITANCES *

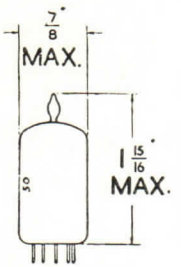
	Triode 1		Triode 2
Grid to Anode	1.15		1.15 pF
Input	2.85		— pF
Input (grounded Grid)	—		4.95 pF
Output	1.35		— pF
Output (grounded Grid)	—		2.27 pF
Anode to Cathode	0.15		0.15 pF max.
Heater to Cathode	2.65		2.70 pF
Anode ′ to Anode ″		0.010	pF max.
Anode ″ to Anode ′ plus Grid ′		0.024	pF max.

* *Measured with external shield.*


BRIMAR 6BQ7A
CASCODE CONNECTED
Vg1=50VOLTS
Vg2=0VOLTS
-0·5
-1·0
ANODE No 2 CURRENT mA
ANODE No 2 VOLTAGE VOLTS
0
2
4
6
8
200
400
600


BRIMAR 6BQ7A
CASCODE CONNECTED
Vg1 = 125VOLTS
Vg2=0VOLTS
-1
-2
-3
ANODE No 2 CURRENT mA
ANODE No 2 VOLTAGE VOLTS
0
5
10
15
20
200
400
600

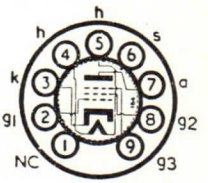




B9A (Noval) Base

Current Equipment Type

TYPE **6BR7**
MINIATURE
LOW MICROPHONY
AMPLIFIER PENTODE



The BRIMAR type 6BR7 has been specially designed for use in the early stages of high gain A.F. amplifiers. Its thorough screening and rigid construction ensure low microphony and greatly reduced hum compared with existing types.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Anode Dissipation	0.75 watt max.
Screen (g_2) Voltage	125 volts max.
Screen Dissipation	0.3 watt max.

OPERATING CHARACTERISTICS

(g_3 connected to Cathode)

Anode Voltage	100	250	volts
Anode Current	2.0	2.1	mA
Screen Voltage	100	100	volts
Screen Current	0.7	0.6	mA
Control Grid (g_1) Voltage	−3	−3	volts
Anode Impedance	1.5	2.3	meg.
Mutual Conductance	1.1	1.25	mA/V

OPERATION AS RESISTANCE COUPLED AMPLIFIER

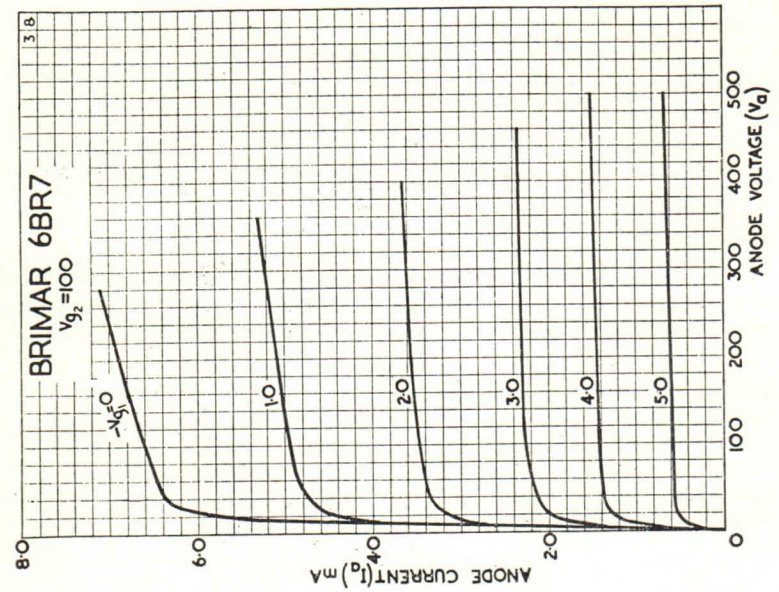
Anode and Screen Supply Voltage	100	200	300	volts
Anode Load Resistor	0.25	0.25	0.25	meg.
Screen Series Resistor	1.0	1.0	1.2	meg.
Cathode Bias Resistor	2,500	1,500	1,200	ohms
Peak Output	35	70	100	volts
Voltage gain	90	120	140	—

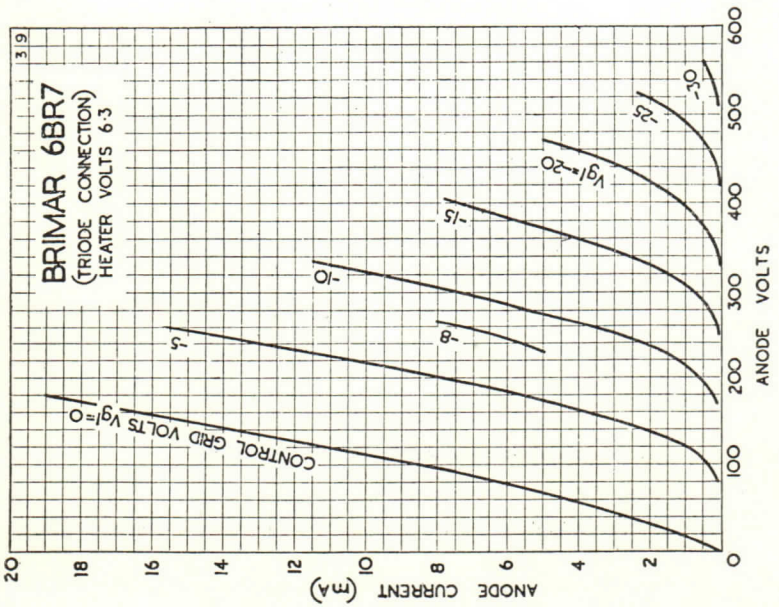
INTER-ELECTRODE CAPACITANCES

Input	4.0 pF
Output	4.0 pF
Control Grid to Anode	0.01 pF max.

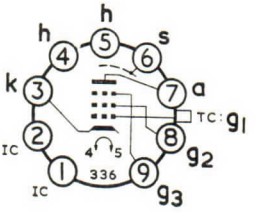
When connected as a triode (g_3 to Cathode, g_2 to Anode), type 6BR7 has similar characteristics to those of type 6C5G.

Type 6BR7 *is a commercial equivalent of the* CV2135.





LOW MICROPHONY AMPLIFIER PENTODE



B9A Base, CTI Cap

GENERAL

This valve is a screened pentode intended for use where low A.F. noise, microphony and hum are required, as in early stages of high gain A.F. amplifiers. The control grid is brought out to a top cap to reduce stray pick-up in the valve. Used under suitable conditions this valve will operate satisfactorily at input levels as low as 10μV on its grid.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·15	A

RATINGS

PENTODE CONNECTED

Maximum Anode Voltage	$V_{a(max)}$	300*	500†	V
Maximum Screen Voltage	$V_{g2(max)}$	125*	300†	V
Maximum Anode Dissipation	$P_{a(max)}$	0·75		W
Maximum Screen Dissipation	$P_{g2(max)}$	0·3		W

TRIODE CONNECTED

Maximum Anode Voltage	$V_{a(max)}$	250		V
Maximum Anode Dissipation	$P_{a(max)}$	1·75		W

* At I_a = 5·8mA.
† At I_a = 0mA, I_{g_2} = 0mA.

INTER-ELECTRODE CAPACITANCES

PENTODE CONNECTED

Input	C_{in}	4	pF
Output	C_{out}	4	pF
Control Grid to Anode	$C_{g1\text{-}a}$	0·01	pF

TRIODE CONNECTED

Input	C_{in}	3	pF
Output	C_{out}	6·7	pF
Control Grid to Anode	$C_{g\text{-}a}$	1·1	pF

THORN—AEI RADIO VALVES & TUBES LTD.

TYPICAL OPERATION

PENTODE CONNECTED (g_3 connected to k)				
Anode Voltage	V_a	100	250	V
Screen Grid Voltage	V_{g2}	100	100	V
Control Grid Voltage	V_{g1}	−3	−3	V
Cathode Bias Resistor	R_k	1·1	1·1	kΩ
Anode Current	I_a	2	2·1	mA
Screen Current	I_{g2}	0·7	0·6	mA
Anode Resistance ($\delta v_a/\delta i_a$)	r_a	1·5	2·4	MΩ
Mutual Conductance	g_m	1·1	1·25	mA/V
Inner Amplification Factor	$\mu_{g1\text{-}g2}$	20	20	
Control Grid Voltage for $g_m/100$ at $V_{g1} = -3V$	V_{g1}	−8	−9	V
Equivalent Noise Resistance	R_{eq}	10·25	7·25	kΩ

TRIODE CONNECTED (g_2 connected to a, g_3 connected to k)			
Anode Voltage	V_a	250	V
Control Grid Voltage	V_{g1}	−8	V
Anode Current	I_a	6·5	mA
Mutual Conductance	g_m	1·72	mA/V
Anode Resistance ($\delta v_a/\delta i_a$)	r_a	11·6	kΩ
Amplification Factor	μ	20	

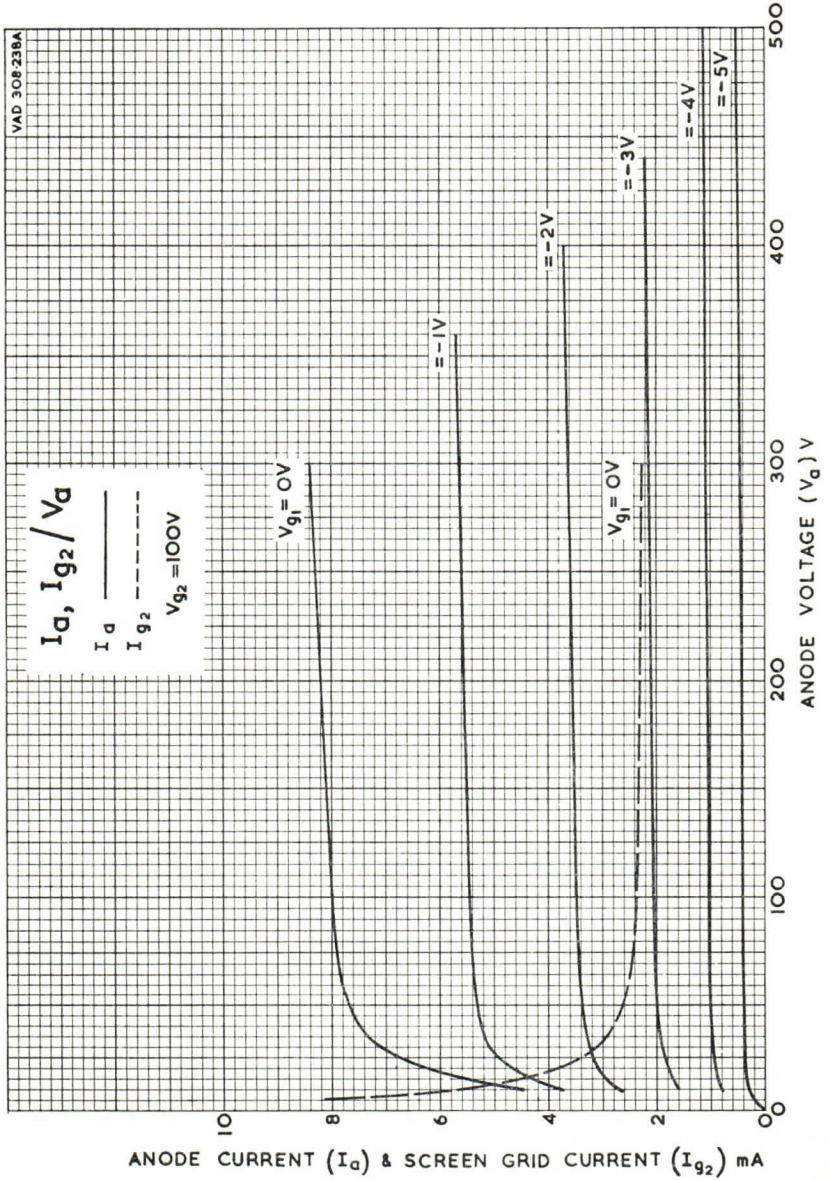
OPERATION AS A RESISTANCE CAPACITY COUPLED A.F. AMPLIFIER

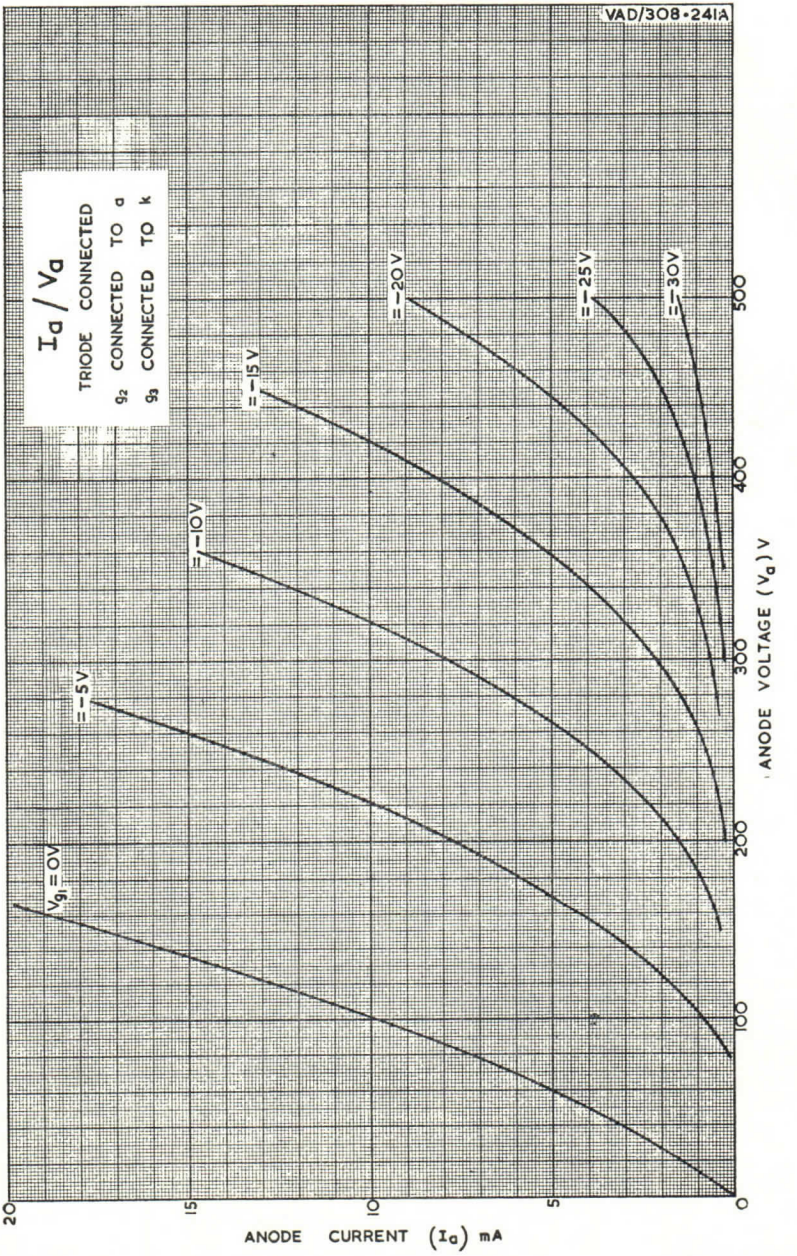
In the tables below are given typical operating conditions under various conditions of anode load and supply voltage which yield an output with approximately 5 per cent distortion.

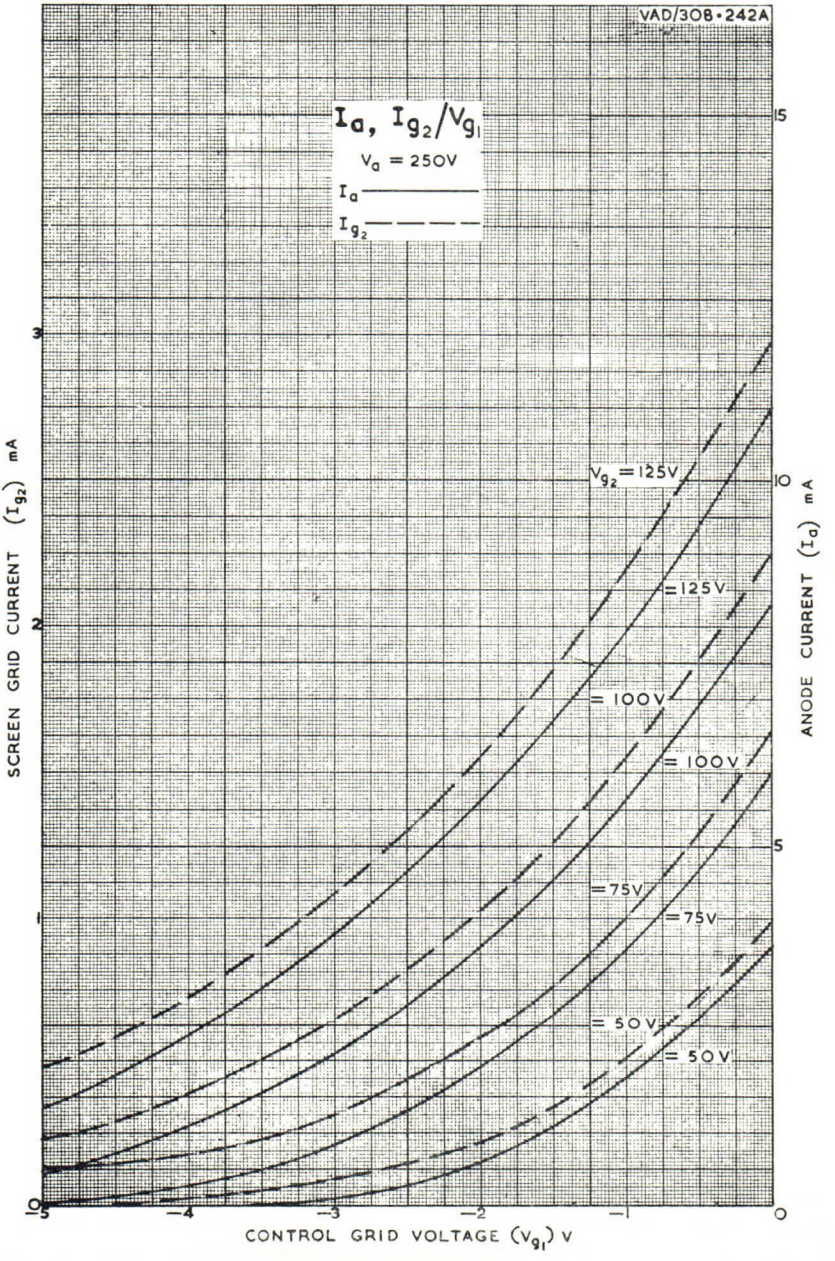
This valve may be used as a low μ triode resistance capacity coupled amplifier where the requirements for low hum and noise outweigh these for high gain.

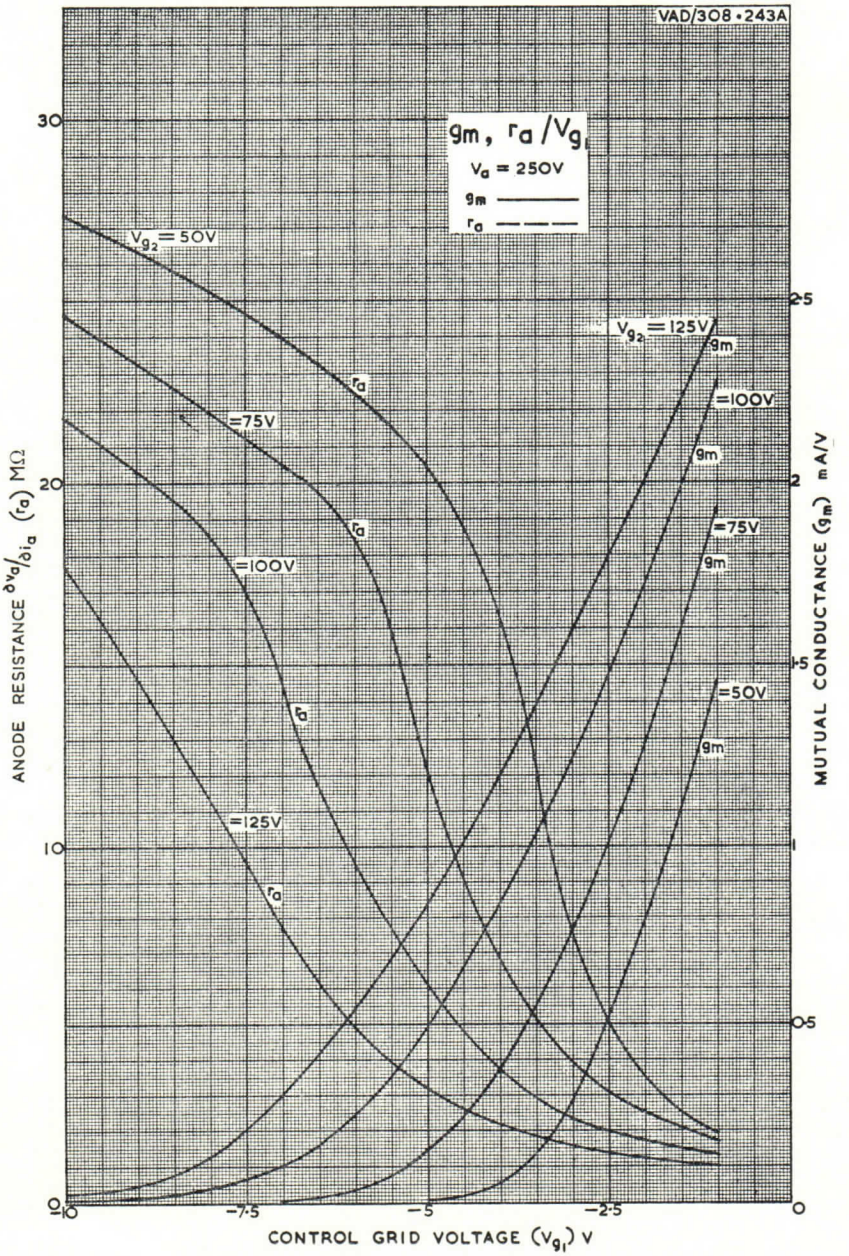
PENTODE CONNECTED								
Anode Supply Voltage	$V_{a(b)}$	100	100	100	300	300	300	V
Anode Load Resistor	R_a	100	220	470	100	220	470	kΩ
Cathode Bias Resistor	R_k	1·3	3·3	5·6	0·56	1·5	2·2	kΩ
Screen Grid Series Resistor	R_{g2}	0·47	1·5	2·8	0·47	1·5	2·8	MΩ
Succeeding Stage Grid Resistor	R_g	1	1	1	1	1	1	MΩ
Peak Output Voltage	$v_{out(pk)}$	21	28	31	70	92	100	V
Voltage Gain		65	80	140	104	124	185	

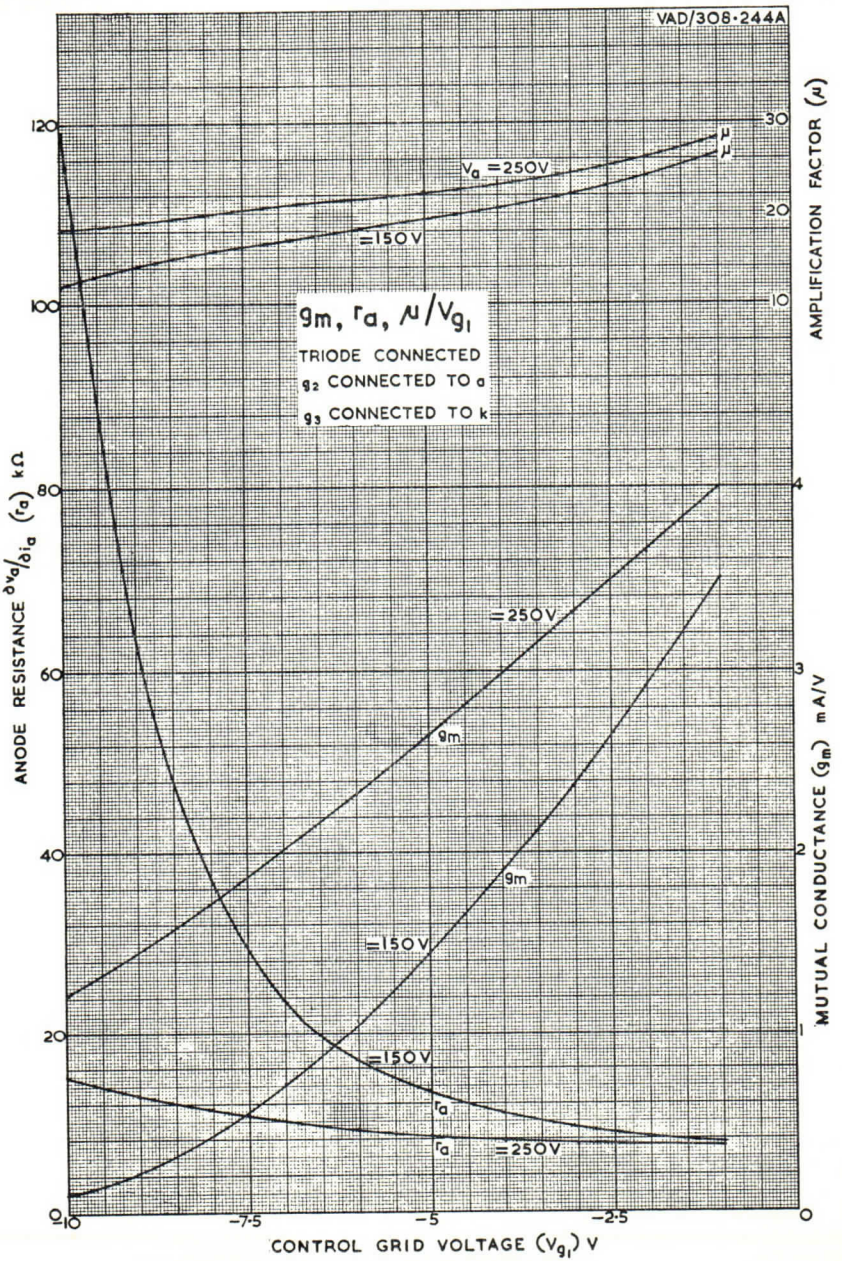
TRIODE CONNECTED								
Anode Voltage	$V_{a(b)}$	100	100	100	300	300	300	V
Anode Load Resistor	R_a	100	220	470	100	220	470	kΩ
Cathode Bias Resistor	R_k	7·5	14·5	20	6	14	18·6	kΩ
Succeeding Stage Grid Resistor	R_g	0·5	1	1	0·5	1	1	MΩ
Peak Output Voltage	$v_{out(pk)}$	22	26	28	88	96	105	V
Stage Gain		12	13	14	13	14	14	

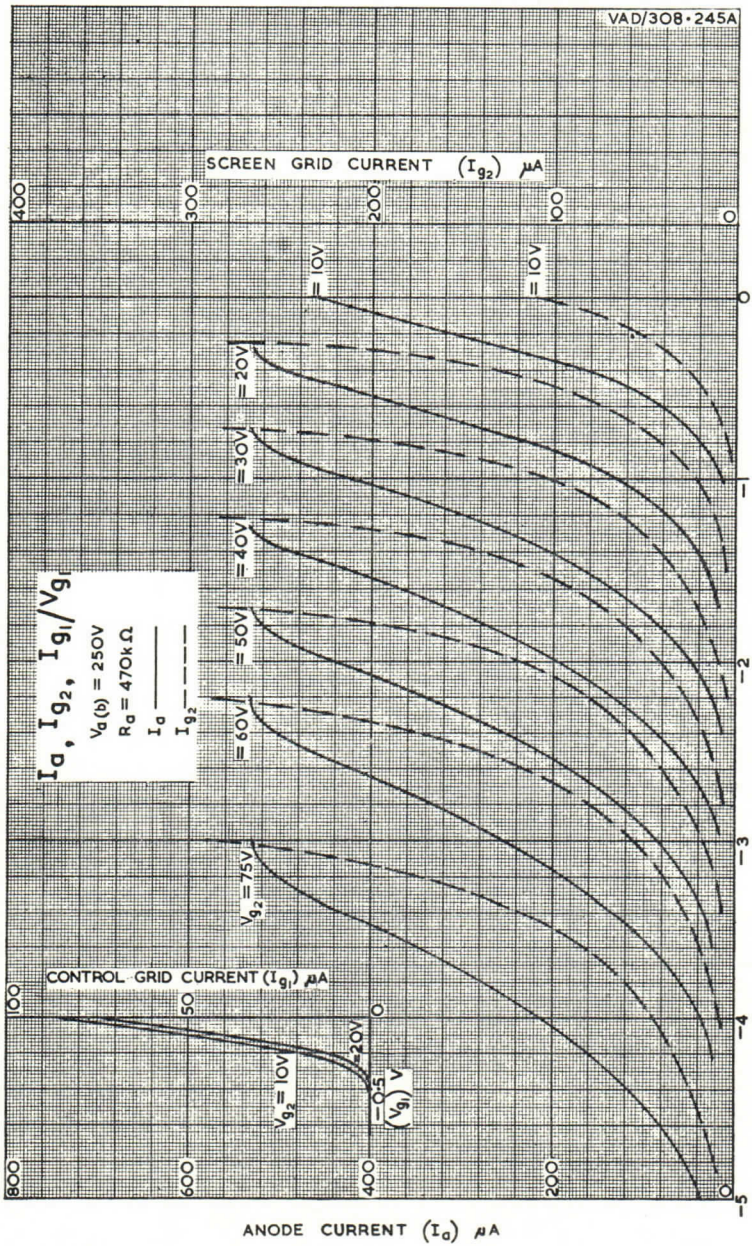

VAD 308-238A
$I_a, I_{g_2} / V_a$
I_a
I_{g_2}
V_{g_2} = 100V
V_{g_1} = 0V
= -1V
= -2V
V_{g_1} = 0V
= -3V
= -4V
= -5V
ANODE VOLTAGE (V_a) V
0
100
200
300
400
500
ANODE CURRENT (I_a) & SCREEN GRID CURRENT (I_{g_2}) mA
10
8
6
4
2
0

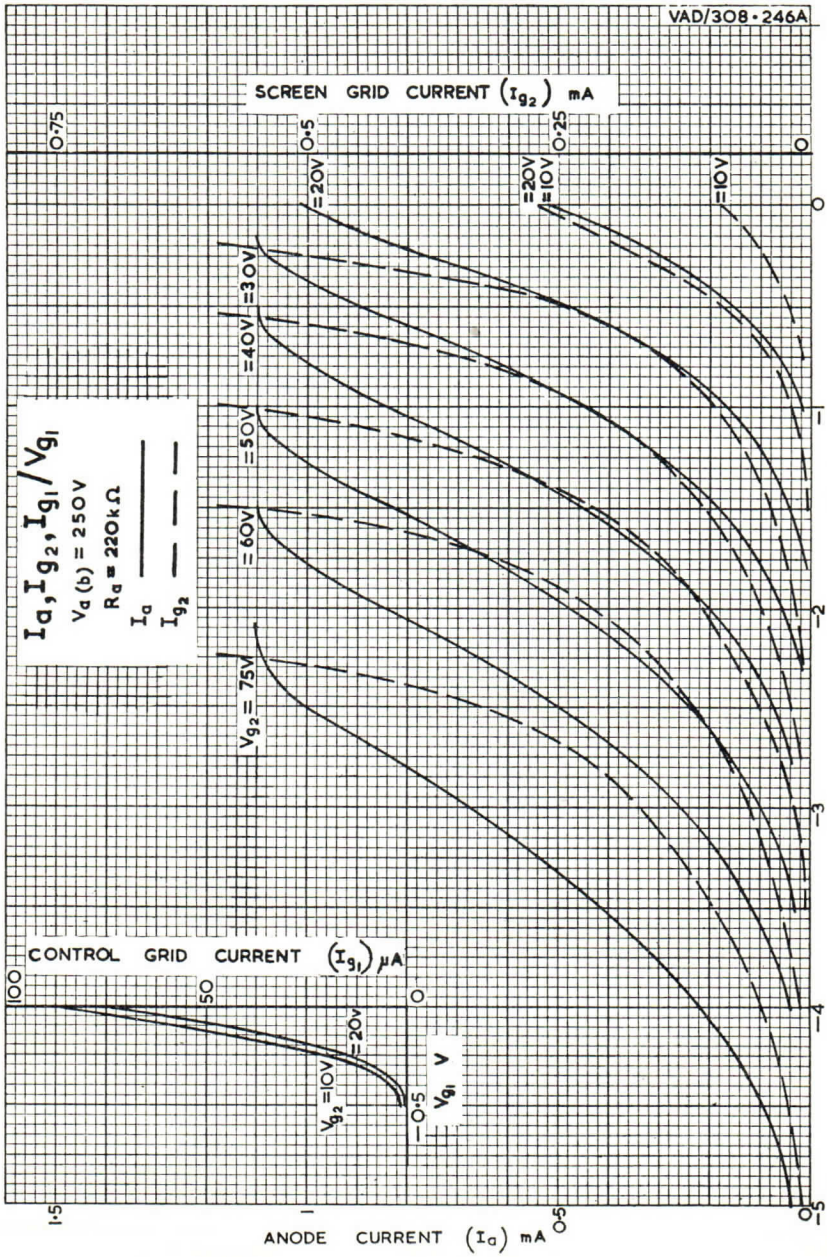

VAD/308-241A
I_a / V_a
TRIODE CONNECTED
g_2 CONNECTED TO a
g_3 CONNECTED TO k
$V_{g1} = 0V$
$= -5V$
$= -10V$
$= -15V$
$= -20V$
$= -25V$
$= -30V$
ANODE VOLTAGE (V_a) V
0
100
200
300
400
500
ANODE CURRENT (I_a) mA
0
5
10
15
20

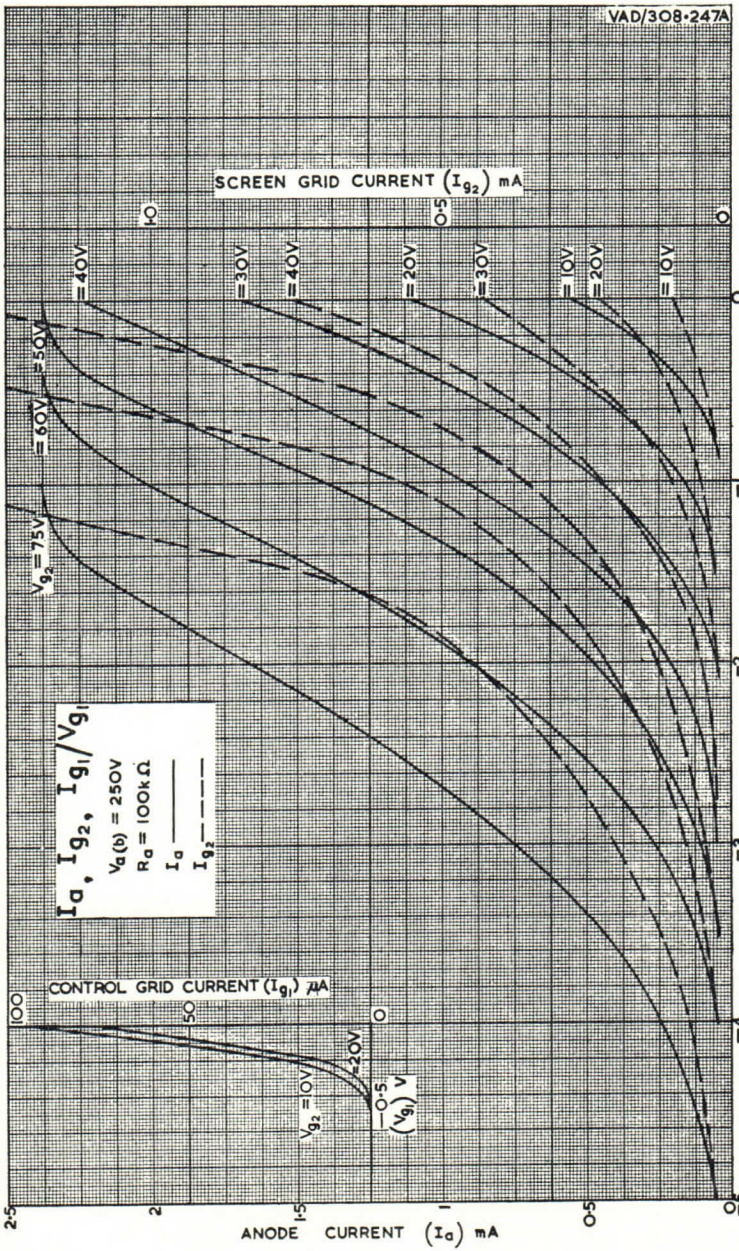

VAD/308•242A
Ia, Ig2/Vg1
Va = 250V
Ia
Ig2
Vg2 = 125V
= 125V
= 100V
= 100V
= 75V
= 75V
= 50V
= 50V
SCREEN GRID CURRENT (Ig2) mA
ANODE CURRENT (Ia) mA
CONTROL GRID VOLTAGE (Vg1) V
0
1
2
3
5
10
15
−5
−4
−3
−2
−1
0

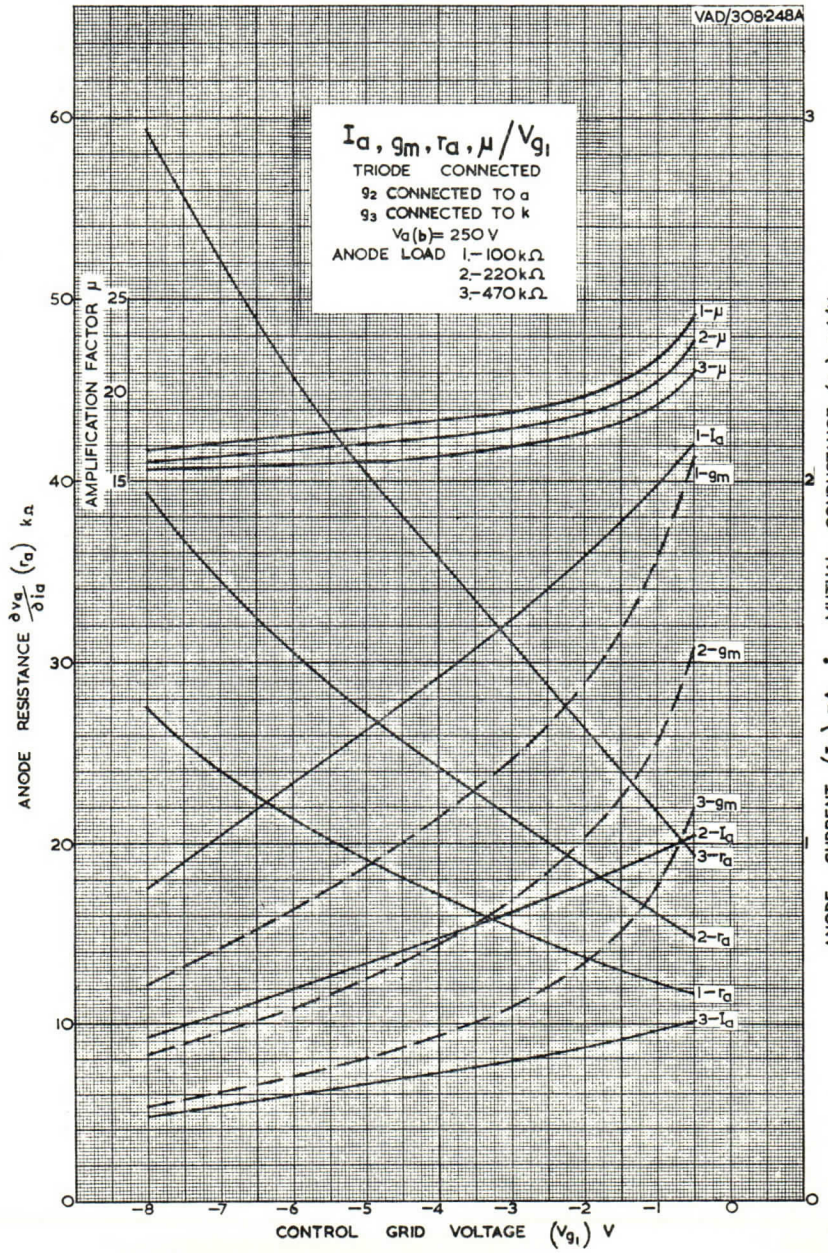

VAD/308·243A
gm, ra /Vg1
Va = 250V
gm
ra
Vg2 = 50V
Vg2 = 125V
=75V
=100V
=125V
=100V
=75V
=50V
ra
gm
ANODE RESISTANCE ∂Va/∂Ia (ra) MΩ
MUTUAL CONDUCTANCE (gm) mA/V
CONTROL GRID VOLTAGE (Vg1) V
30
20
10
0
2·5
2
1·5
1
0·5
0
-10
-7·5
-5
-2·5

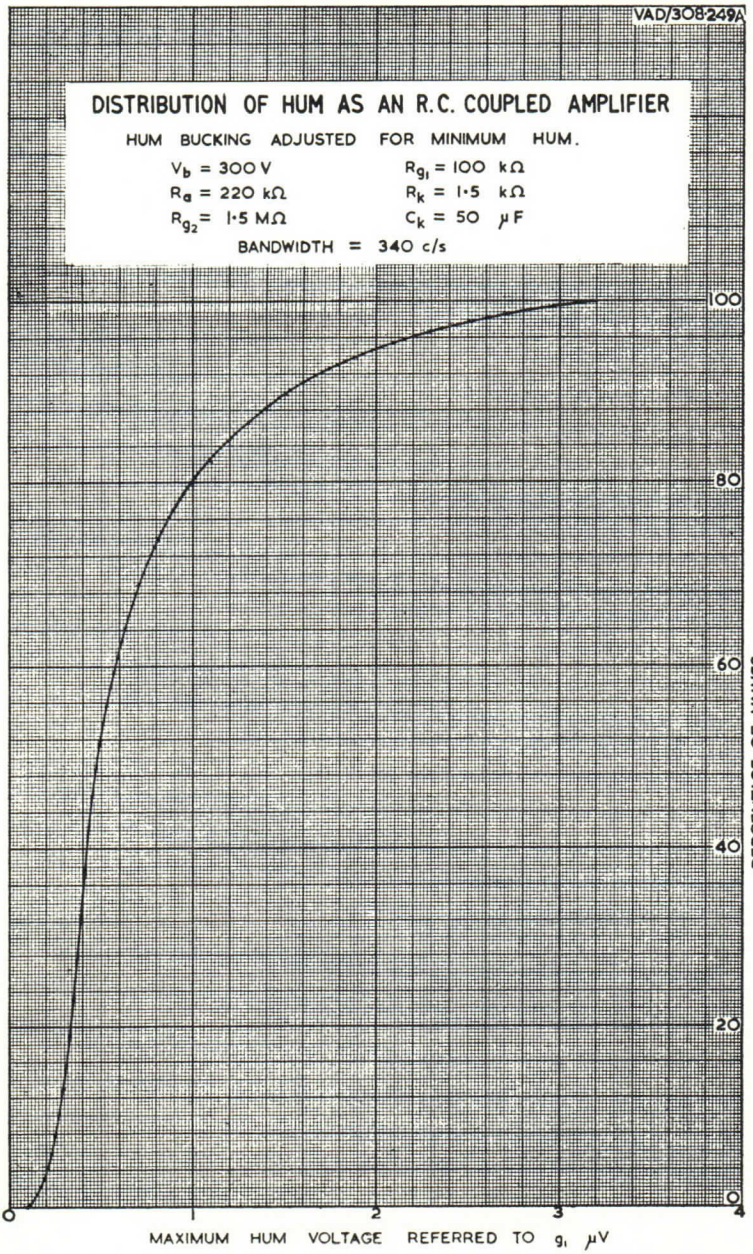

VAD/308·244A
gm, ra, μ/Vg1
TRIODE CONNECTED
g2 CONNECTED TO a
g3 CONNECTED TO k
Va =250V
=150V
μ
μ
gm
gm
=250V
=150V
=150V
ra
ra
=250V
ANODE RESISTANCE δVa/δia (ra) kΩ
AMPLIFICATION FACTOR (μ)
MUTUAL CONDUCTANCE (gm) mA/V
CONTROL GRID VOLTAGE (Vg1) V
120
100
80
60
40
20
0
30
20
10
4
3
2
1
0
-10
-7·5
-5
-2·5


VAD/308·245A
SCREEN GRID CURRENT (I_{g_2}) μA
400
300
200
100
0
= 10V
= 10V
= 20V
= 30V
= 40V
= 50V
= 60V
V_{g_2} = 75V
I_a, I_{g_2}, I_{g_1}/V_{g_1}
$V_{a(b)}$ = 250V
R_a = 470kΩ
I_a ——
I_{g_2} – – –
CONTROL GRID CURRENT (I_{g_1}) μA
100
50
0
V_{g_2} = 10V
= 20V
= 0.5 (V_{g_1}) V
800
600
400
200
0
0
−1
−2
−3
−4
−5
CONTROL GRID VOLTAGE (V_{g_1}) V
ANODE CURRENT (I_a) μA


VAD/308·246A
SCREEN GRID CURRENT (I_{g_2}) mA
0·75
0·5
0·25
0
=20V
=10V
=20V
=10V
=40V
=30V
=50V
=60V
V_{g_2} = 75V
$I_a, I_{g_2}, I_{g_1} / V_{g_1}$
V_a (b) = 250 V
R_a = 220kΩ
I_a
I_{g_2}
CONTROL GRID CURRENT (I_{g_1}) μA
100
50
0
V_{g_2} =10V
=20V
−0·5
V_{g_1} V
1·5
0·5
ANODE CURRENT (I_a) mA
0
−1
−2
−3
−4
−5
CONTROL GRID VOLTAGE (V_{g_1}) V


VAD/308-247A
SCREEN GRID CURRENT (I_{g_2}) mA
10
0·5
0
= 40V
= 30V
= 40V
= 20V
= 30V
= 10V
= 20V
= 10V
= 50V
= 60V
V_{g_2} = 75V
I_a, I_{g_2}, I_{g_1}/V_{g_1}
$V_{a(b)}$ = 250V
R_a = 100kΩ
I_a ——
I_{g_2} — — —
CONTROL GRID CURRENT (I_{g_1}) μA
100
50
0
V_{g_2} = 10V
-2·0V
-0·5
(V_{g_1}) V
2·5
2
1·5
1
0·5
0
ANODE CURRENT (I_a) mA
0
-1
-2
-3
-4
CONTROL GRID VOLTAGE (V_{g_1}) V


VAD/308-248A
I_a, g_m, r_a, μ / V_{g1}
TRIODE CONNECTED
g_2 CONNECTED TO a
g_3 CONNECTED TO k
$V_a(b)$ = 250 V
ANODE LOAD 1.–100kΩ
2.–220kΩ
3.–470kΩ
1–μ
2–μ
3–μ
1–I_a
1–g_m
2–g_m
3–g_m
2–I_a
3–r_a
2–r_a
1–r_a
3–I_a
AMPLIFICATION FACTOR μ
ANODE RESISTANCE $\frac{\partial v_a}{\partial i_a}$ (r_a) kΩ
MUTUAL CONDUCTANCE (g_m) mA/V
ANODE CURRENT (I_a) mA
CONTROL GRID VOLTAGE (V_{g1}) V
60
50
40
30
20
10
0
25
20
15
3
2
1
0
−8
−7
−6
−5
−4
−3
−2
−1
0


VAD/308-249A
DISTRIBUTION OF HUM AS AN R.C. COUPLED AMPLIFIER
HUM BUCKING ADJUSTED FOR MINIMUM HUM.
V_b = 300 V
R_a = 220 kΩ
R_{g_2} = 1·5 MΩ
R_{g_1} = 100 kΩ
R_k = 1·5 kΩ
C_k = 50 μF
BANDWIDTH = 340 c/s
100
80
60
40
20
0
PERCENTAGE OF VALVES
0
1
2
3
4
MAXIMUM HUM VOLTAGE REFERRED TO g_1 μV

ELECTROMETER APPLICATIONS

The 6BS7, because of its specialised construction, may be operated with grid currents of less than 5pA (i.e. 5×10^{-12}A). To obtain this very low figure a special circuit and special precautions are necessary.

It should be noted that a proportion only of 6BS7 valves have grid currents of less than 5pA; the rest exceed this value and are unsuitable for electrometer applications. These grid current levels quoted are for a cathode current of 5μA. In the recommended region of operation, which is about $-2{\cdot}5$ to -3V, the grid current is approximately proportional to cathode current. Lower grid currents and increased gain may be obtained near the "crossover" point, normally about -1V bias, where the grid current changes from negative to positive. This point may change with ageing and cause a relatively large increase of grid current as the grid current, grid voltage characteristic is very steep at this point.

If electrometer use is intended, this should be stated at the time of ordering.

SPECIAL PRECAUTIONS

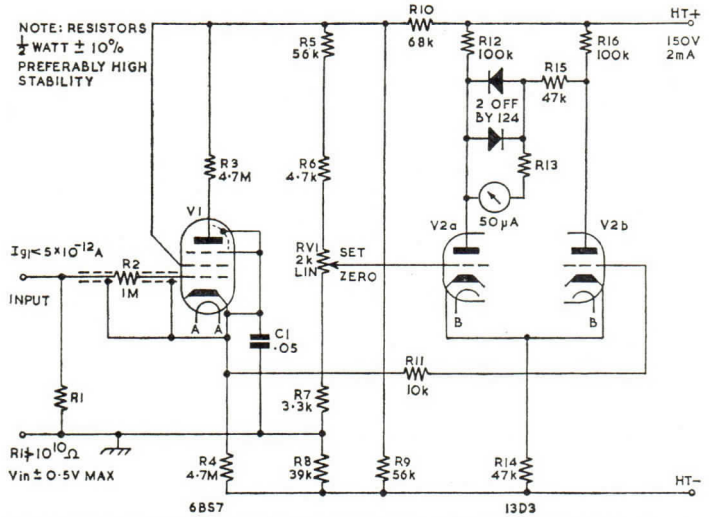
To obtain the lowest possible grid currents and minimum drift the following precautions should be observed.

1. A stabilised H.T. voltage should be used and applied not less than one minute after the heater voltage.
2. The heater voltage of the 6BS7 should be stabilised to within $\pm 0{\cdot}05$ per cent.
3. The voltage developed across R_1 should not exceed 0·5V. (See Fig. 1.)
4. The valves must be operated in total darkness.
5. The bulbs must be perfectly clean.
6. The instrument should be screened from stray electrostatic fields.
7. At least one hour must be allowed for the valves to stabilise for short term measurements. At least 200 hours must be allowed for long term measurements.

CIRCUIT AND TYPICAL OPERATION

A suitable electrometer circuit using the 6BS7 and an associated D.C. amplifier is shown in figure 1. The power supplies may be obtained using the circuit shown in figure 2. Results using these circuits are as follows:

	Short Term Measurements	Long Term Measurements	
6BS7 heater voltage	5·0	5·0	V
Stabilisation period	1·0	200	h
Resistance R_1	5×10^9	5×10^9	Ω
Input current	25	25	pA
Output current	12	12	μA
Typical output meter zero drift			
(*a*) Five minute period	0·05	0·05	μA
(*b*) Twenty-four hour period	—	1·2	μA



RI3 CHOSEN TO GIVE ADEQUATE METER PROTECTION WITHOUT CRAMPING SCALE
TYPICALLY 2·7kΩ WITH 120mV MOVEMENT

0093A

FIG.1. ELECTROMETER CIRCUIT USING 6BS7 AND 13D3

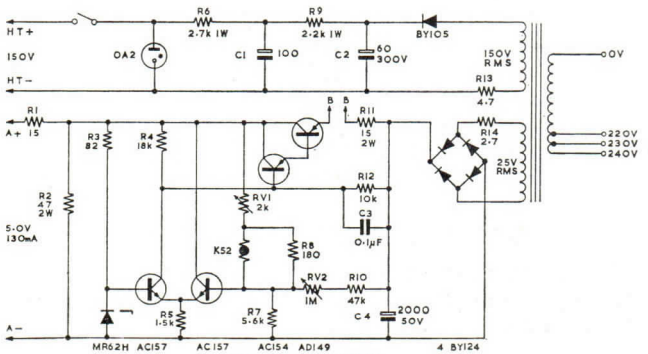


FIG. 2. POWER SUPPLY

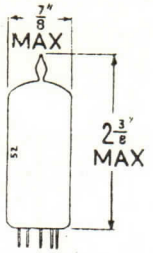
0153A

Notes

1. RV1 set for 5·0 volts at output.
2. RV2 set to give minimum change of output voltage for ±10 per cent change in supply voltage.
3. Unless stated, all resistors ½ watt ± 10% preferably high stability.
4. Temperature compensation has been introduced by using a thermistor (e.g. STC type K52). In practice it may be necessary to match the characteristics of this thermistor and the zener diode to get optimum results.

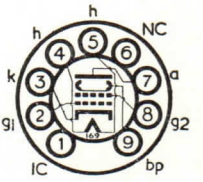
Warning.

1. If the heater supply is operated whilst the 6BS7 is disconnected the zener diode will exceed its rating.
2. Connections BB must be made to pins 4 and 5 on the 13D3 base.



Current Equipment Type

TYPE **6BW6** MINIATURE OUTPUT BEAM TETRODE



The BRIMAR type 6BW6 is a B9A (Noval) based output beam tetrode, the characteristics and ratings of which are identical to those of the 6V6G/GT. It is suitable for R.F. application up to frequencies of the order of 150 Mc/s.

Heater Voltage ...	6.3 volts
Heater Current	0.45 amp.

RATINGS

Anode Voltage ...	315 volts max.
Anode Dissipation	12 watts max.
Screen Voltage ...	285 volts max.
Screen Dissipation	2.0 watts max.
Hot Spot Bulb Temperature	250° C. max.
D.C. Cathode Current	65 mA max.

OPERATING CHARACTERISTICS

	Single Valve Class A		Push-Pull Class AB1 (2 valves)	
Anode Voltage ...	180	250	285	volts
Anode Current (Zero Signal) ...	29	47	70	mA
Anode Current (Max. Signal) ...	—	—	78.5	mA
Screen Voltage ...	180	250	285	volts
Screen Current (Zero Signal) ...	3.0	5	4.0	mA
Screen Current (Max. Signal) ...	—	—	10	mA
Cathode Bias Resistor ...	250	240	260	ohms
Anode Impedance ...	58000	52000	—	ohms
Mutual Conductance ...	3.7	4.1	—	mA/V
Optimum Load ...	5500	5000	8000	ohms
Power Output ...	1.7	4.5	12	watts
Harmonic Distortion ...	7.5	8	1	per cent.

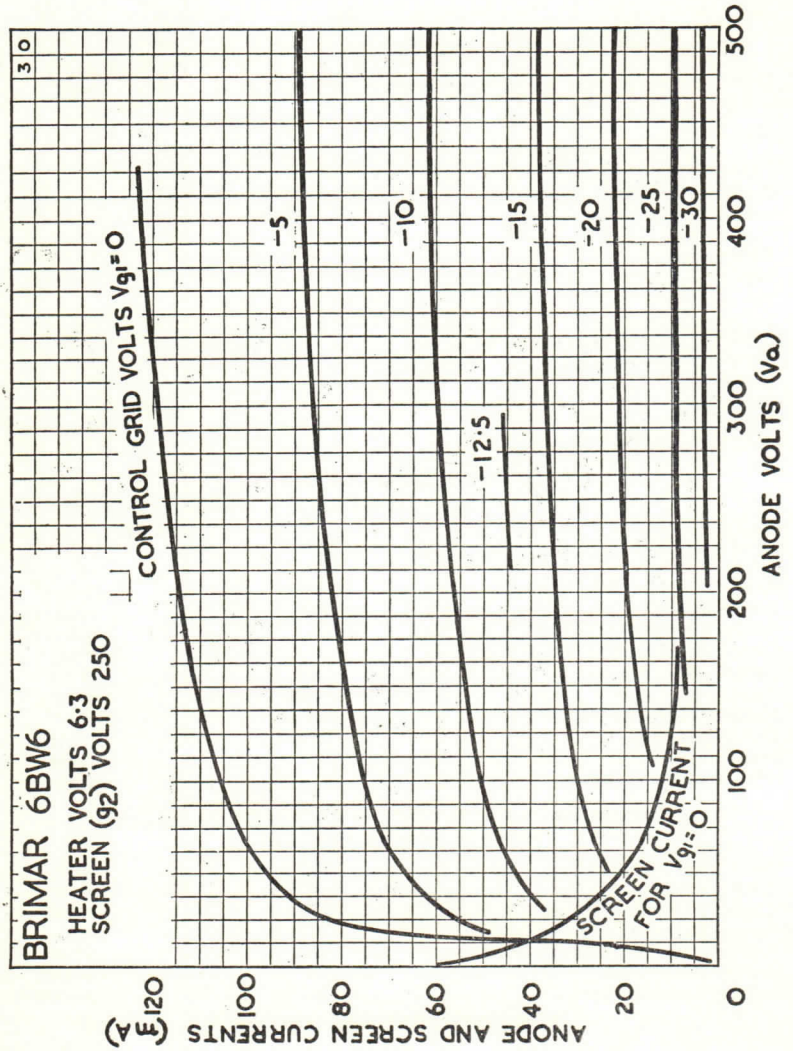
OPERATION AS A TRIODE (Anode and Screen Strapped)
CLASS A PUSH-PULL (2 valves)

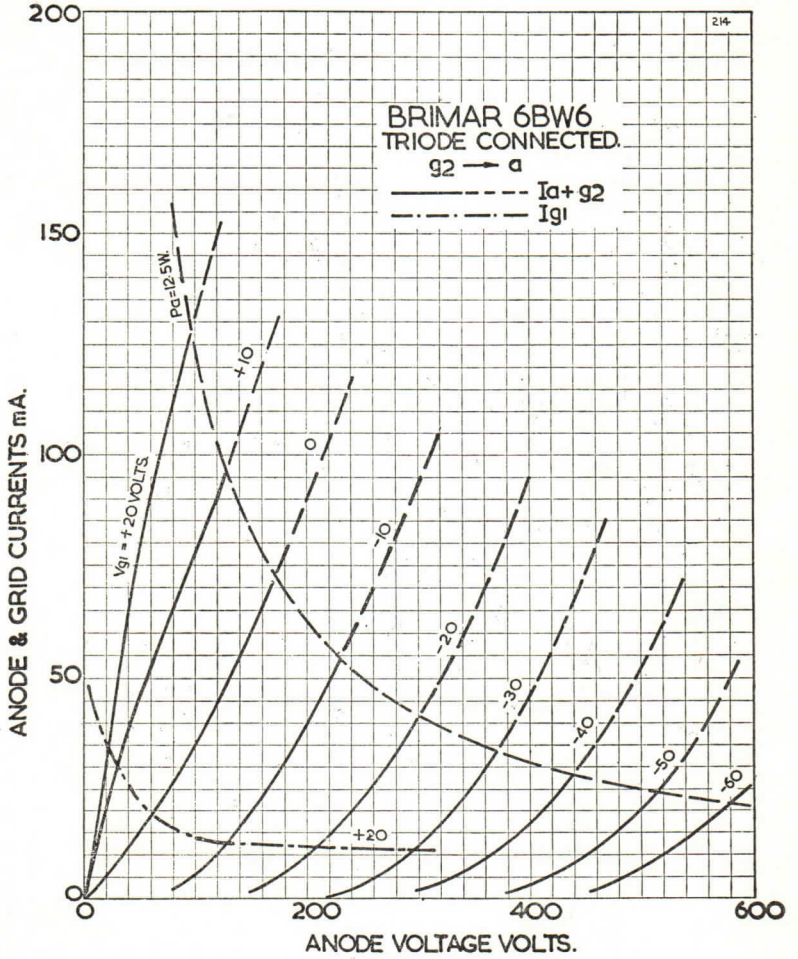
Anode Voltage ...	250	285	volts
Grid Voltage ...	—13.5	—19	volts
Cathode Bias Resistor ...	150	240	ohms
Anode Current (no signal) ...	90	78	mA
Optimum Load (anode to anode) ...	4000	4500	ohms
Power Output ...	1.7	3.1	watts
Harmonic Distortion ...	0.4	0.5	per cent.

INTER-ELECTRODE CAPACITANCES

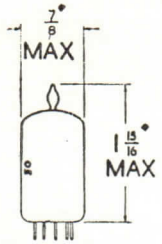
Input ...	8.5 pF
Output ...	7.5 pF
Grid to Anode ...	0.6 pF

Type 6BW6 *is a commercial equivalent of the* CV2136.


BRIMAR 6BW6
HEATER VOLTS 6·3
SCREEN (g2) VOLTS 250
CONTROL GRID VOLTS Vg1=0
-5
-10
-12·5
-15
-20
-25
-30
SCREEN CURRENT FOR Vg1=0
ANODE AND SCREEN CURRENTS (mA)
ANODE VOLTS (Va)
0
20
40
60
80
100
120
100
200
300
400
500

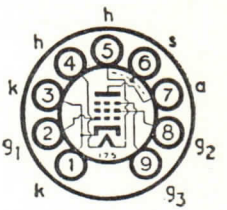


Current Equipment Type



B9A (Noval) Base

TYPE **6BW7** MINIATURE HIGH SLOPE R.F. PENTODE



The BRIMAR 6BW7 is a high slope R.F. pentode designed for use in the R.F. Frequency Changer, I.F. and Video stages of television receivers. The valve features high mutual conductance together with a high R.F. input impedance, achieved by the use of two cathode connections. Type 6BW7 will operate from a 180 or 250 volt H.T. rail, making it suitable for both AC/DC and AC operated receivers.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.3 amp.
Anode Voltage	275 volts max.
Anode Dissipation	2.75 watts max.
Screen (g_2) Voltage	275 volts max.
Screen Dissipation	1.2 watts max.

OPERATING CONDITIONS

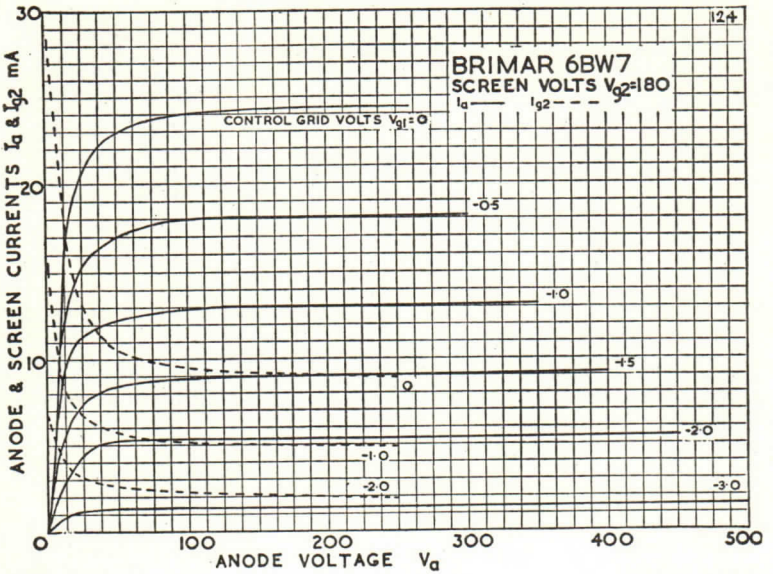
(Suppressor Grid (g_3) connected to Cathode)

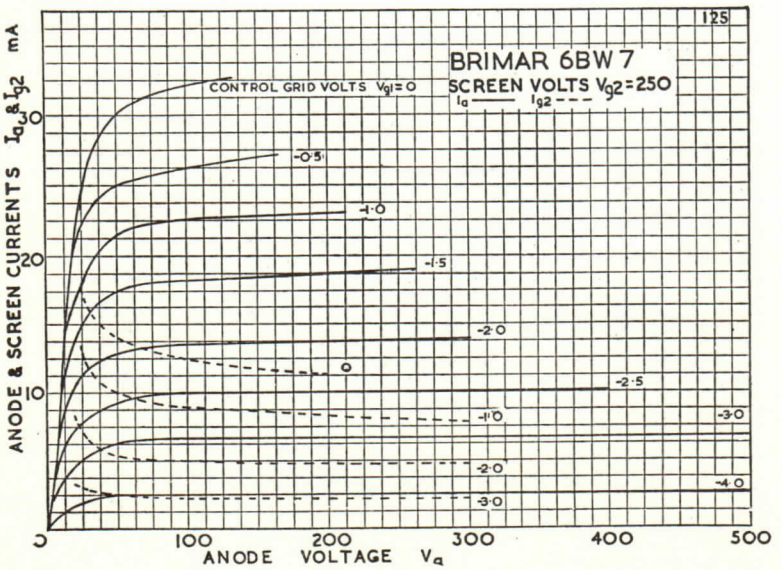
Anode Voltage	180	250 volts
Anode Current	9.5	9.5 mA
Screen Voltage	180	250 volts
Screen Current	3.5	3.5 mA
Cathode Bias Resistor	100	180 ohms
Mutual Conductance	9.3	8.5 mA/V
Anode Impedance	0.6	0.75 meg.
Input Impedance at 50 Mc/s.	14,000	16,000 ohms
Inner Amplification Factor ($\mu_{g1, g2}$)	70	70
Control Grid (g_1) Voltage for anode current cut-off	—7	—8 volts

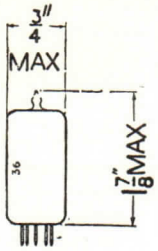
INTER-ELECTRODE CAPACITANCES *

Input	9.5 pF
Output	3.5 pF
Control Grid to Anode	0.01 pF max.

** With no external shield.*







B7G Base

Current Type

TYPE **6C4** MINIATURE H.F. POWER TRIODE

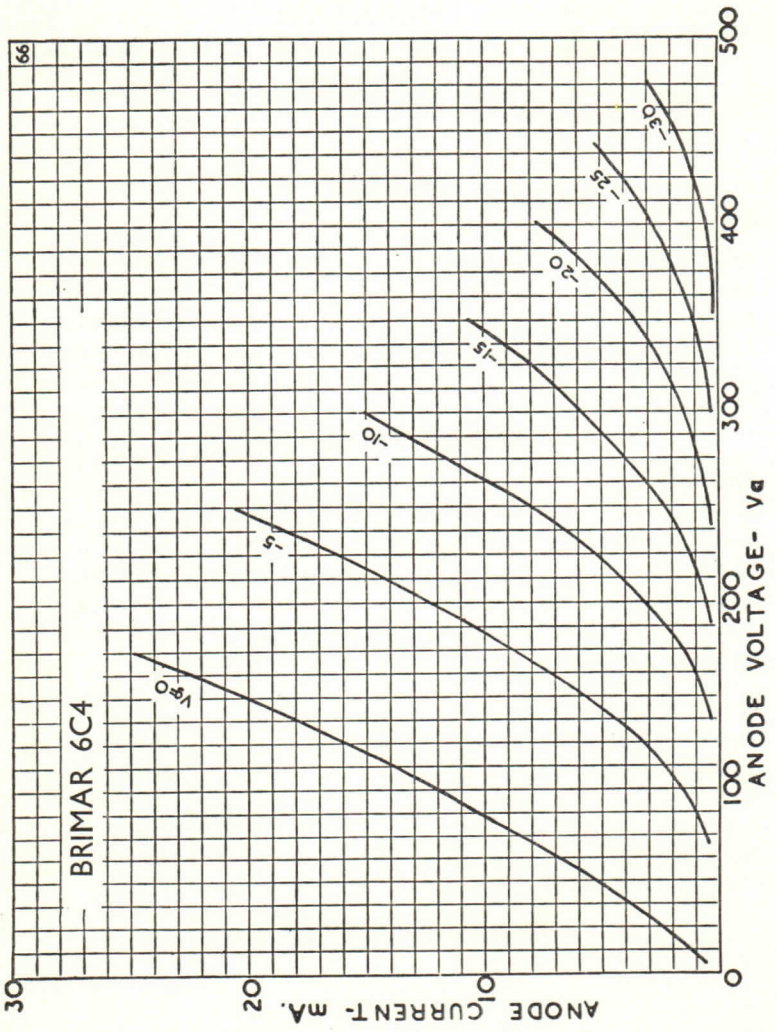
RATINGS

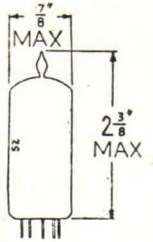
Heater Voltage	6.3 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Anode Current	25 mA max.
Anode Dissipation	3.5 watts max.
Grid Current	8.0 mA max.

OPERATING CHARACTERISTICS

Class A		
Anode Voltage	100	250 volts
Anode Current	11.8	10.5 mA
Grid Voltage	0	−8.5 volts
Anode Impedance	6,250	7,700 ohms
Mutual Conductance	3.1	2.2 mA/V
Amplification Factor	19	17
Class C Telegraphy		
Anode Voltage		300 volts
Anode Current		25 mA
Grid Voltage		−27 volts
Grid Current (D.C.)		7.0 mA
Input Power ...		0.35 watt
Output Power		5.5 watts*

** Approximately 2.5 watts at 150 Mc/s.*

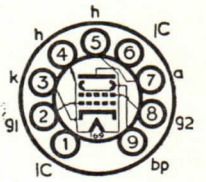




B9A (Noval) Base

Current Equipment Type

TYPE 6CH6 MINIATURE VIDEO OUTPUT PENTODE



The BRIMAR type 6CH6 is a miniature high slope pentode suitable for video amplification where more power is required than is obtainable from normal R.F. pentodes. Its high anode dissipation and current rating make it suitable for working into loads of low impedance and high self capacity.

RATINGS

Heater Voltage	6.3 volts
Heater Current	0.75 amp.
Anode Voltage	275 volts max.
Screen (g_2) Voltage	275 volts max.
Anode Dissipation	12 watts max.
Screen Dissipation	2.5 watts max.
D.C. Cathode Current	60 mA max.
Max. Peak Cathode Current (absolute)	1.5 amps.*
Max. Control Grid Circuit Resistance	0.1 meg.†

* *The duration of current flow must not exceed 2μ secs. and must not be greater than 5 per cent of the duty cycle.*

† *This value may be increased to* 220,000 *ohms if autobias is employed.*

OPERATING CHARACTERISTICS

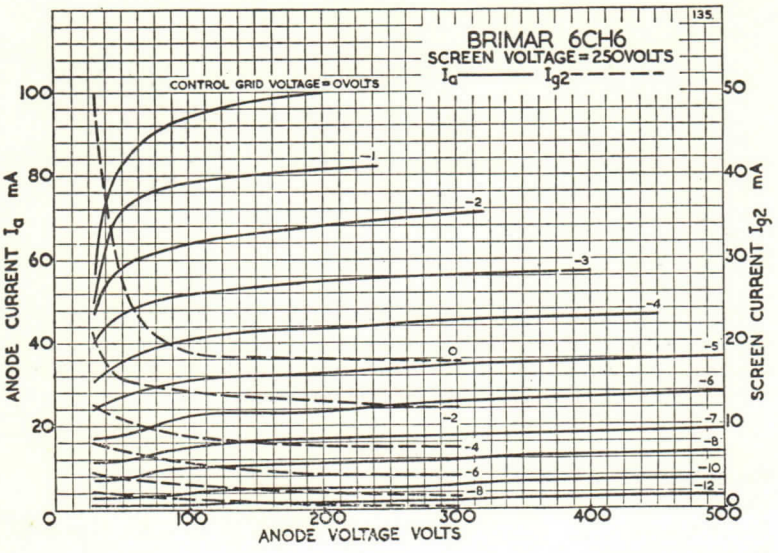
Anode Voltage	250 volts
Anode Current	40 mA
Screen Voltage	250 volts
Screen Current	6 mA
Control Grid Voltage (V_{g1})	-4.5 volts
Mutual Conductance	11 mA/V
Anode Impedance	50,000 ohms
Inner Amplification Factor ($\mu_{g1, g2}$)	26

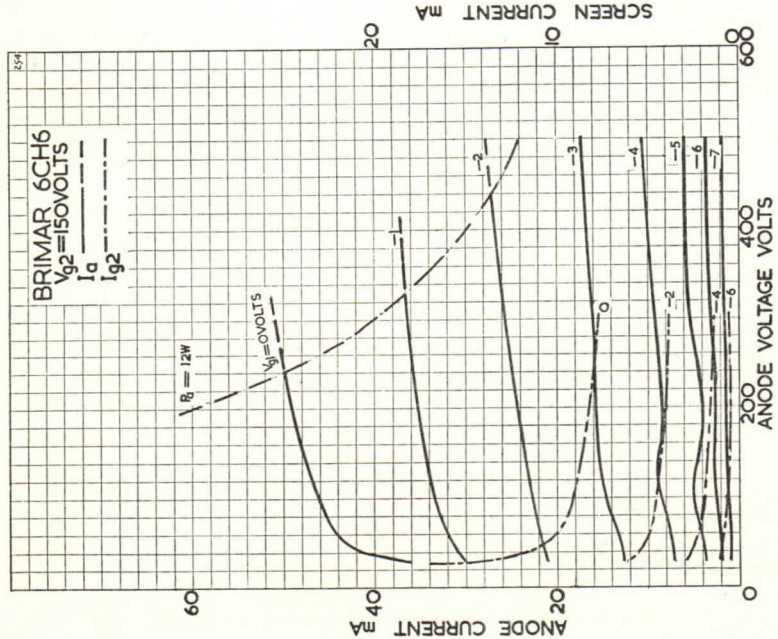
INTER-ELECTRODE CAPACITANCES **

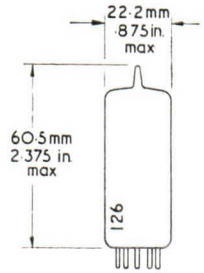
Input (C_{in})	14 pF
Output (C_{out})	5 pF
Grid to Anode ($C_{a, g1}$)	0.25 pF

** *No external shield.*

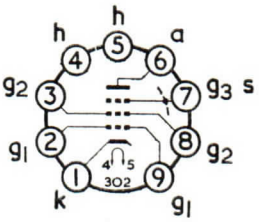
Type 6CH6 *is a commercial equivalent of the* CV2127.







VIDEO POWER PENTODE



B9A Base

GENERAL

This valve is a high mutual conductance video output pentode.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·65	A

RATINGS

Maximum Anode Dissipation	$p_{a(max)}$	7·5	W
Maximum Screen Grid Dissipation	$p_{g2(max)}$	1·7	W
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Anode Supply Voltage	$V_{a(b)max}$	300	V
Maximum Suppressor Grid Voltage	$V_{g3(max)}$	0	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	150	V
Maximum Screen Supply Voltage	$V_{g2(b)max}$	300	V
Maximum Control Grid Voltage	$V_{g1(max)}$		
Negative Bias Value		50	V
Positive Bias Value		0	V
Maximum Peak Heater to Cathode Voltage	$V_{h-k(pk)max}$	±100	V
Maximum Grid to Cathode Resistance	$R_{g1-k(max)}$		
Fixed Bias		200	kΩ
Cathode Bias		500	kΩ
Maximum Hot Spot Bulb Temperature	$T_{bulb(max)}$	200	°C

INTER-ELECTRODE CAPACITANCES (Without External Shield)

Control Grid to Anode	C_{g1-a}	0·12	pF
Input	C_{in}	11	pF
Output	C_{out}	5·5	pF

Type 6CL6 is a commercial equivalent of the CV5041.

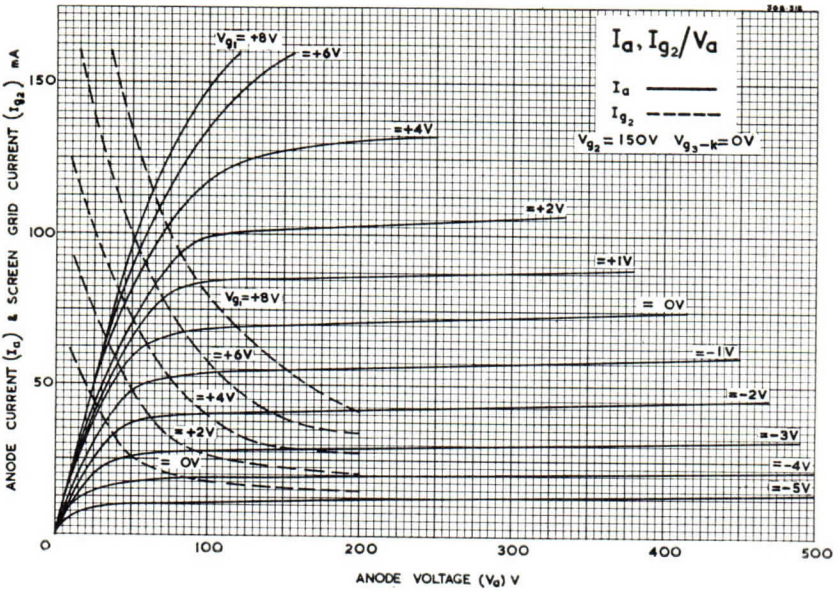
CHARACTERISTICS (Class A_1 Amplifier)

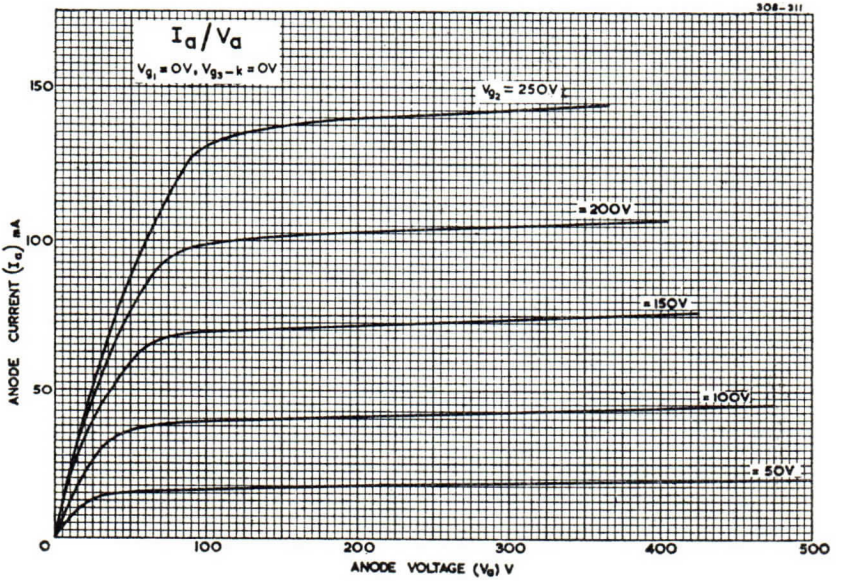
Anode Voltage	V_a	250	V
Screen Grid Voltage	V_{g2}	150	V
Control Grid Voltage	V_{g1}	−3·0	V
Peak A.F. Control Grid Signal Voltage	$v_{g1(pk)}$	3·0	V
D.C. Anode Current Zero Signal	$I_{a(sig=0)}$	30	mA
D.C. Anode Current Maximum Signal	$I_{a(max\text{-}sig)}$	31	mA
D.C. Screen Grid Current Zero Signal	$I_{g2(sig=0)}$	7·0	mA
D.C. Screen Grid Current Maximum Signal	$I_{g2(max\text{-}sig)}$	7·2	mA
Anode Resistance ($\delta v_a/\delta i_a$)	r_a	approx. 90	kΩ
Mutual Conductance	g_m	11	mA/V
Control Grid Voltage for 10 μA Anode Current	$V_{g1(Ia=10\ \mu A)}$	−14	V
Anode Load Resistor	R_a	7·5	kΩ
Total Harmonic Distortion	D_{tot}	8·0	%
Power Output Maximum Signal	$P_{out(max\text{-}sig)}$	2·8	W
Suppressor Grid to Cathode Voltage	$V_{g3\text{-}k}$	0	V

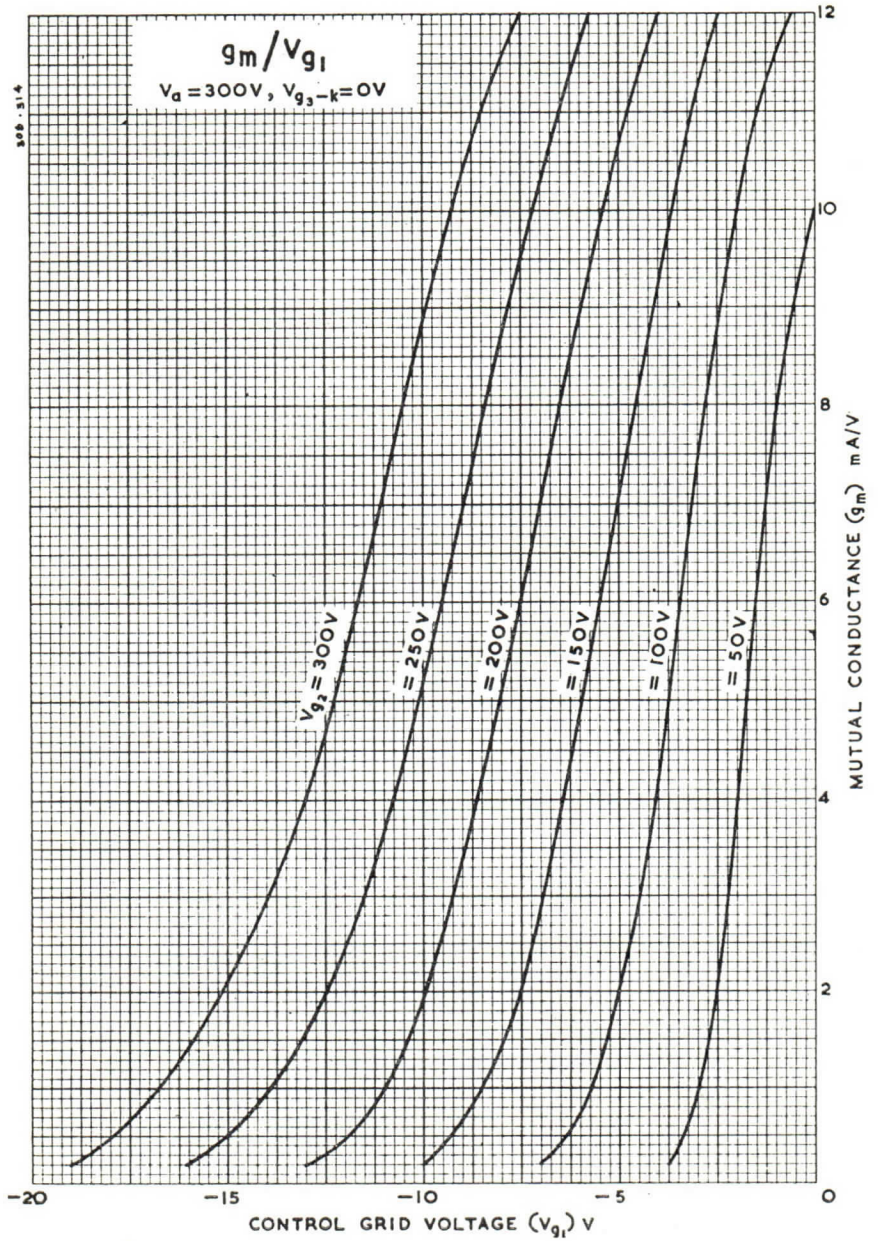
TYPICAL OPERATION

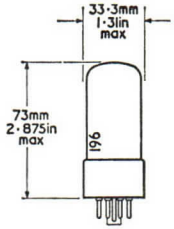
(In 4 MHz Bandwidth Video Amplifier)

Anode Supply Voltage	$V_{a(b)}$	300	V
Screen Grid Supply Voltage	$V_{g2(b)}$	300	V
Control Grid Voltage (Bias)	$V_{g1(bias)}$	−2·0	V
Control Grid Voltage (Signal) (peak to peak)	$v_{g1(sig)\ (pk\text{-}pk)}$	3·0	V
Screen Grid Resistor	R_{g2}	24	kΩ
Control Grid Resistor	R_{g1}	0·1	MΩ
Anode Load Resistor	R_a	3·9	kΩ
Anode Current Zero Signal	$I_{a(sig=0)}$	30	mA
Screen Grid Current Zero Signal	$I_{g2(sig=0)}$	7·0	mA
Voltage Output (peak to peak)	$v_{out(pk\text{-}pk)}$	132	V
Suppressor Grid to Cathode Voltage	$V_{g3\text{-}k}$	0	V

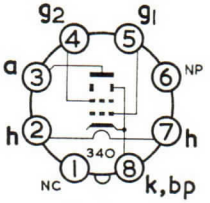

$I_a, I_{g_2}/V_a$
I_a
I_{g_2}
V_{g_2} = 150V V_{g_3-k} = 0V
V_{g_1} = +8V
=+6V
=+4V
=+2V
=+1V
= 0V
=-1V
=-2V
=-3V
=-4V
=-5V
ANODE CURRENT (I_a) & SCREEN GRID CURRENT (I_{g_2}) mA
ANODE VOLTAGE (V_a) V
0
50
100
150
200
300
400
500


I_a/V_a
V_{g_1} = 0V, V_{g_3-k} = 0V
V_{g_2} = 250V
=200V
=150V
=100V
=50V
ANODE CURRENT (I_a) mA
ANODE VOLTAGE (V_a) V
0
50
100
150
200
300
400
500


g_m/V_{g_1}
$V_a = 300V$, $V_{g_3-k} = 0V$
$V_{g_2} = 300V$
$= 250V$
$= 200V$
$= 150V$
$= 100V$
$= 50V$
MUTUAL CONDUCTANCE (g_m) mA/V
CONTROL GRID VOLTAGE (V_{g_1}) V
12
10
8
6
4
2
0
−20
−15
−10
−5



A.F. OUTPUT BEAM TETRODE



I.O. Base

Heater Voltage	V_h	6·3 V
Heater Current	I_h	0·45 A

RATINGS

Maximum Anode Dissipation	$P_{a(max)}$	12	W
Maximum Screen Grid Dissipation	$P_{g2(max)}$	2·0	W
Maximum Anode Voltage	$V_{a(max)}$	315	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	285	V

INTER-ELECTRODE CAPACITANCES*

Input	C_{in}	10·5	pF
Output	C_{out}	9·2	pF
Control Grid to Anode	$C_{g1\text{-}a}$	1·2	pF
Heater to Cathode	$C_{h\text{-}k}$	6·0	pF

* Measured without an external shield.

OPERATING CHARACTERISTICS

		1 Valve Class A		2 Valves Class AB_1 Push-Pull	
Anode Voltage	V_a	180	250	285	V
Screen Grid Voltage	V_{g2}	180	250	285	V
Control Grid Voltage	V_{g1}	−8·5	−12·5	−19	V
Quiescent Anode Current	$I_{a(o)}$	29	45	70	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	30	47	92	mA
Quiescent Screen Grid Current	$I_{g2(o)}$	3·0	4·5	4·0	mA
Screen Grid Current (maximum signal)	$I_{g2(max\ sig)}$	4·0	7·0	13·5	mA
Cathode Bias Resistance	R_k	250	240	250	Ω
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	58	52	—	kΩ
Mutual Conductance	g_m	3·7	4·1	—	mA/V
Optimum Load Resistance	R_L	5·5	5·0	8·0	kΩ
Power Output	P_{out}	2·0	4·5	14	W
Harmonic Distortion	D	8·0	8.0	3·5	%

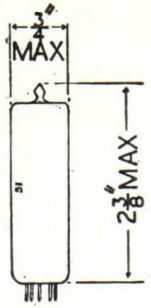
TYPICAL OPERATION (Triode Connected) Class A Push-Pull 2 Valves

Anode Voltage	V_a	<250	<285	V
Anode Current	I_a	90	78	mA
Cathode Bias Resistance	R_k	150	240	Ω
Optimum Load Resistance	R_L	4·0	4·5	kΩ
Power Output	P_{out}	1·7	3·1	W
Harmonic Distortion	D	0·4	0·5	%

Type 6V6GT is a commercial equivalent to the CV511.

THORN—AEI RADIO VALVES & TUBES LTD.

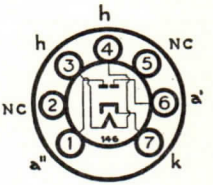
BRIMAR VALVES



B7G Base

Current Equipment Type

TYPE 6X4
MINIATURE
FULL-WAVE
RECTIFIER



Heater Voltage	6.3 volts	Heater Current	0.6 amp.

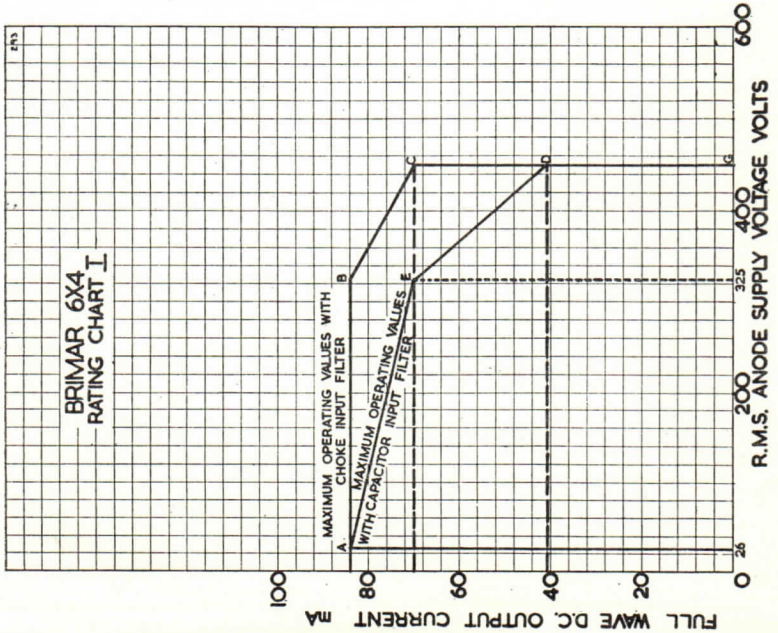
RATINGS

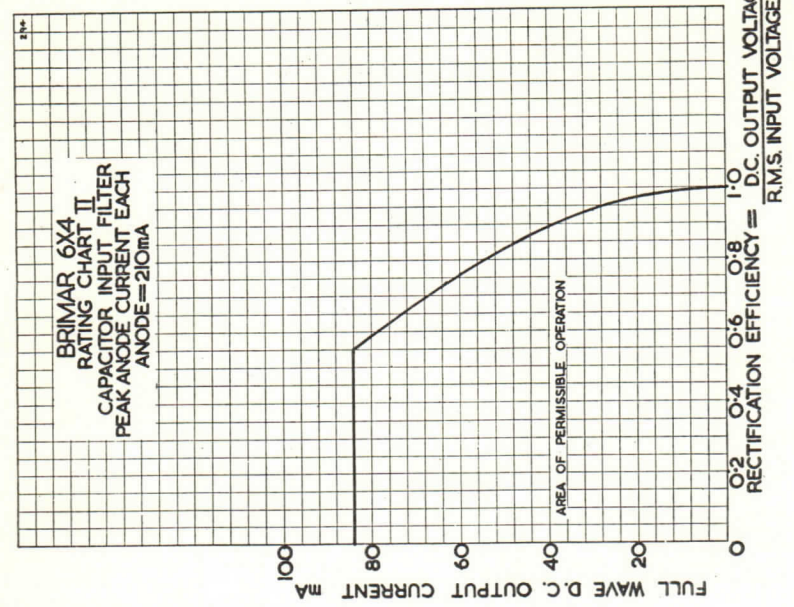
Peak Inverse Voltage	1,250 volts max.
Peak Current (each Anode)	210 mA max.
Peak Surge Current (each Anode)	750 mA max.
Anode Supply Voltage	—see Rating Chart I
D.C. Output Current	—see Rating Chart I
Peak Heater Cathode Potential	450 volts max.

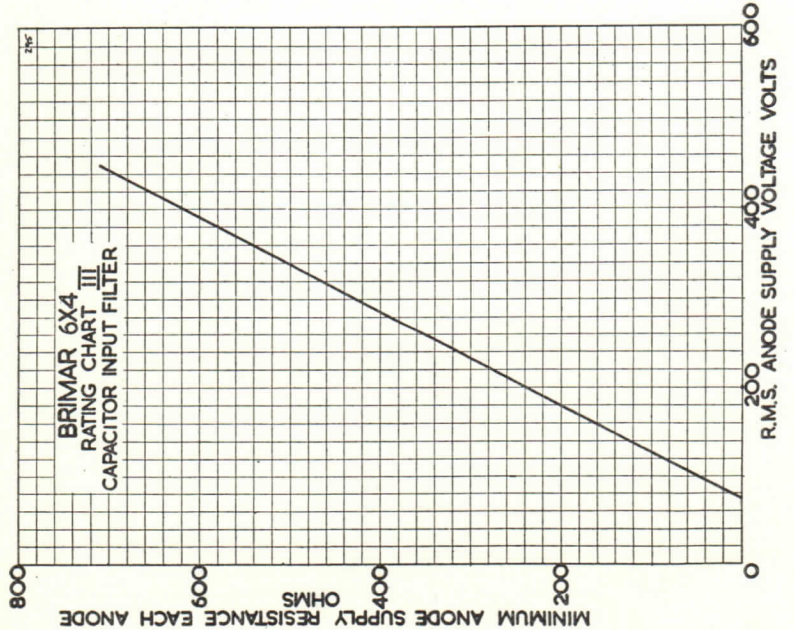
CHARACTERISTICS AS A FULL-WAVE RECTIFIER

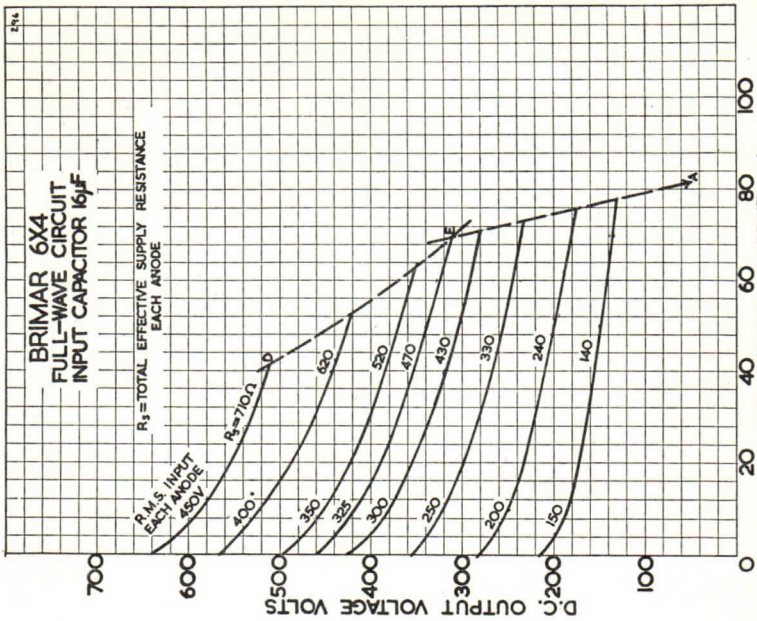
CAPACITOR INPUT		CHOKE INPUT	
R.M.S. Input per Anode ...	325 volts	R.M.S. Input per Anode ...	450 volts
Rectified Current	70 mA	Rectified Current	70 mA
D.C. Output Voltage... ...	310 volts	D.C. Output Voltage... ...	380 volts
Supply Impedance per Anode	470 Ω	Minimum Filter Input Choke†	6 Henries
Reservoir Capacitor	16 μF		

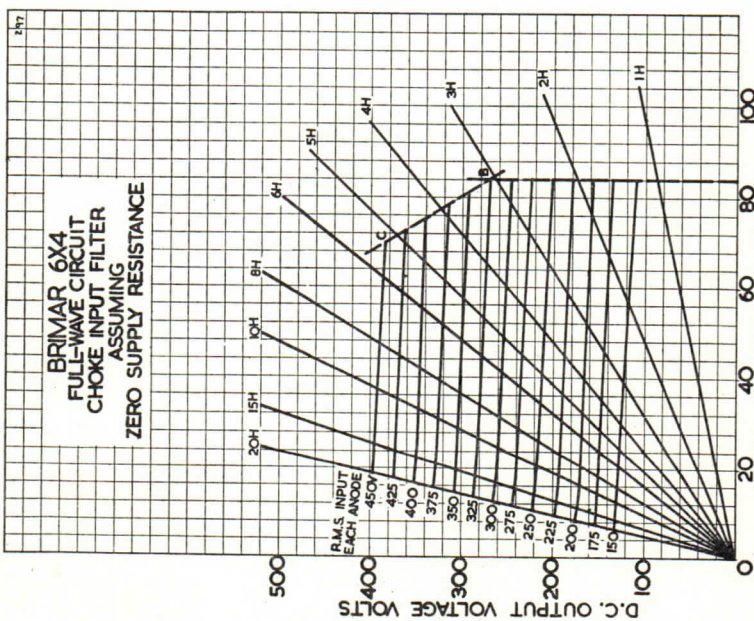
† *Limiting value at 62 mA. For operating currents less than 62 mA refer to curve.*
For notes on use of rating charts, refer to " Valve Ratings " section.



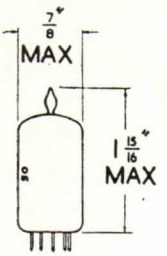

BRIMAR 6X4
RATING CHART II
CAPACITOR INPUT FILTER
PEAK ANODE CURRENT EACH ANODE = 210mA
AREA OF PERMISSIBLE OPERATION
FULL WAVE D.C. OUTPUT CURRENT mA
100
80
60
40
20
0
0·2
0·4
0·6
0·8
1·0
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X √2


BRIMAR 6X4
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE EACH ANODE OHMS
800
600
400
200
0
200
400
600
R.M.S. ANODE SUPPLY VOLTAGE VOLTS



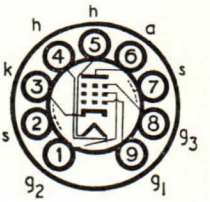


Current Equipment Type



B9A (Noval) Base

TYPE 8D8
MINIATURE
LOW MICROPHONY
AMPLIFIER PENTODE



The BRIMAR type 8D8 has been specially designed for use in the early stages of high gain A.F. amplifiers. Its thorough screening and rigid construction ensure low microphony and very low hum.

RATINGS

Heater Voltage ...	6.3 volts.
Heater Current	0.15 amp.
Anode Voltage ...	300 volts max.
Anode Dissipation	1 watt max.
Screen (g_2) Voltage	200 volts max.
Screen Dissipation	0.2 watt max.

CHARACTERISTICS
(g_3 connected to cathode)

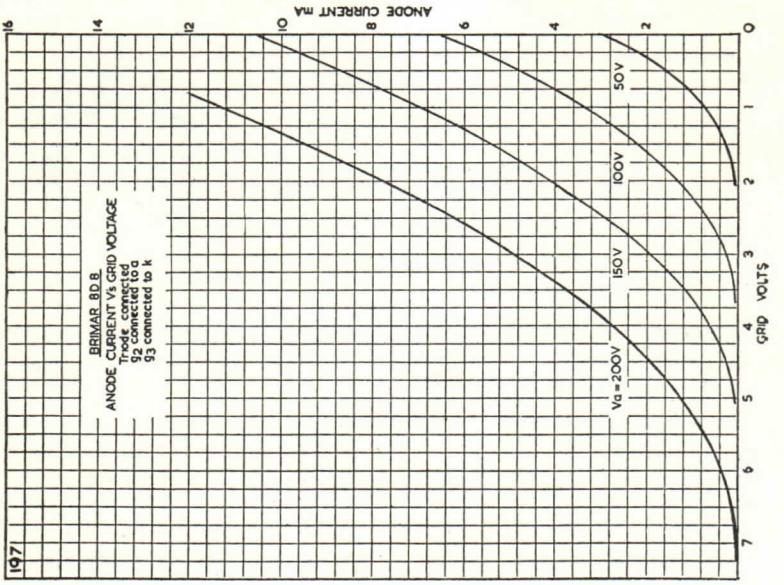
Anode Voltage ...	250 volts
Anode Current	3 mA
Screen Voltage ...	140 volts
Screen Current	0.6 mA
Control Grid (g_1) Voltage	— 2 volts
Anode Impedance	2.5 M Ω
Mutual Conductance	1.9 mA/V

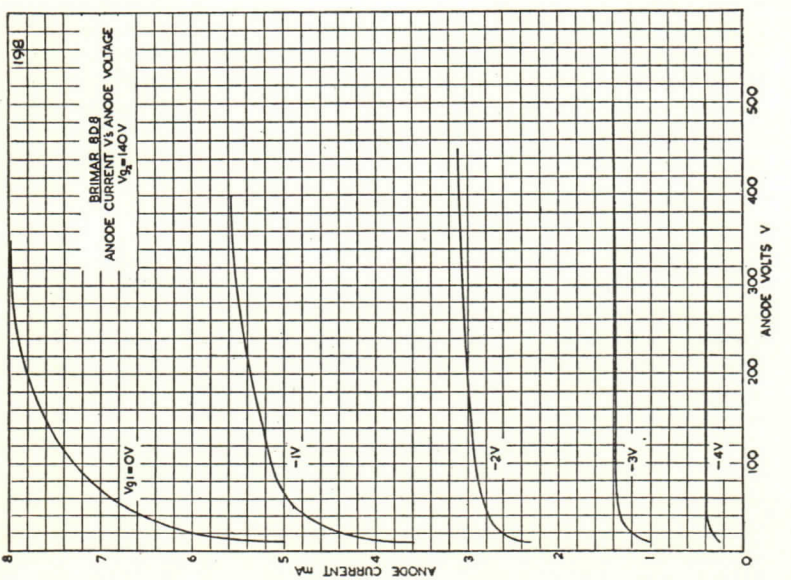
TYPICAL OPERATION AS RESISTANCE COUPLED AMPLIFIER
(g_3 connected to cathode)

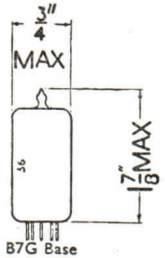
Anode and Screen Supply Voltage ...	200	250	300	400	volts
Anode Load Resistor ...	220	220	220	220	k Ω
Screen Series Resistor ...	1.0	1.0	1.0	1.0	M Ω
Cathode Bias Resistor ...	2.2	2.2	2.2	2.2	k Ω
Output Voltage (r.m.s.)	36	46	54	73	volts
Voltage Gain ...	170	180	188	200	
Following Grid Resistor	680	680	680	680	k Ω

INTER-ELECTRODE CAPACITANCES
(Pentode connected: measured without external shielding)

Input	4.0 pF
Output	3.9 pF
Control Grid to Anode	0.05 pF max.
Control Grid to Heater	0.002 pF

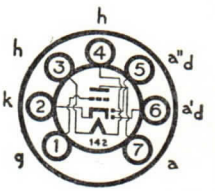






Current Equipment Type

TYPE 12AT6
MINIATURE DOUBLE DIODE TRIODE



RATINGS

Heater Voltage	12.6 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Diode Current	1.0 mA max.

OPERATING CHARACTERISTICS

Anode Voltage	250 volts
Anode Current	1.0 mA
Grid Voltage	−3 volts
Anode Impedance	58,000 ohms
Mutual Conductance	1.2 mA/V
Amplification Factor	70

OPERATION AS RESISTANCE COUPLED AMPLIFIER

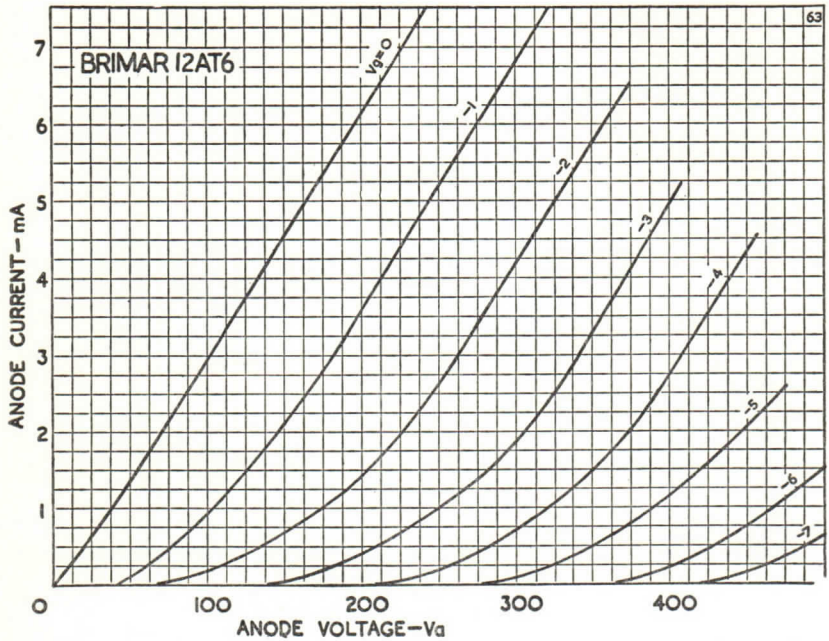
Anode Supply Voltage	100	250	250 volts
Anode Load Resistor	0.5	0.25	0.25 meg.
Grid Resistor	1.0	1.0	1.0 meg.
Cathode Bias Resistor	9,000	3,000	0 ohms
Peak Output	16	43	40 volts
*Stage Gain	33	42	42
*Harmonic Distortion	2	1	5 per cent.

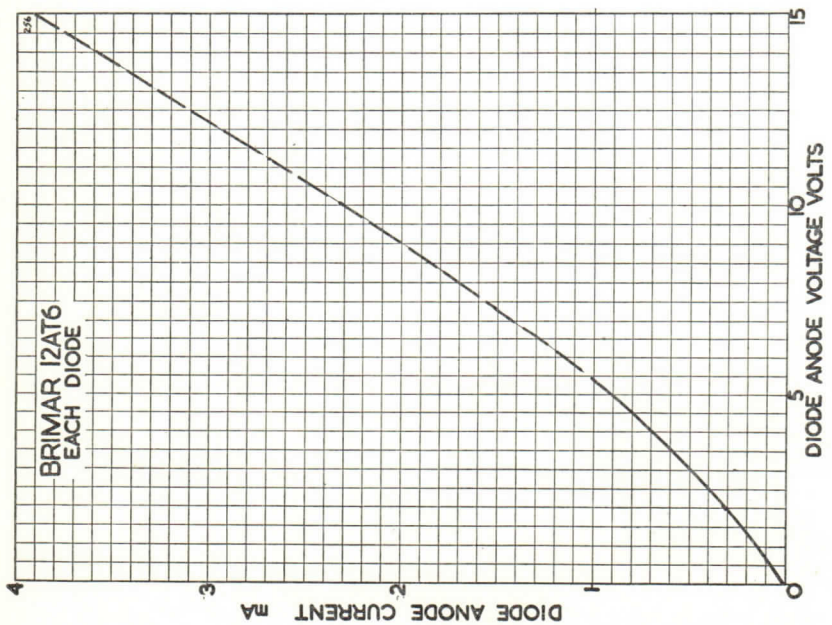
** Figures are for 12 volts peak output.*

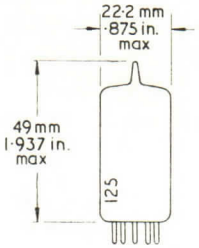
INTER-ELECTRODE CAPACITANCES *

Grid to Cathode	2.3 pF
Anode to Cathode	1.1 pF
Grid to Anode	2.1 pF
Diode Anode (a″ d) to Grid	0.025 pF max.

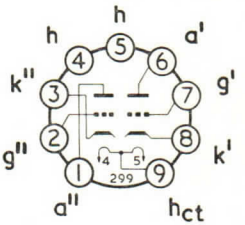
** With no external shield.*







DOUBLE TRIODE



B9A Base

GENERAL

The separate cathode connections and tapped heater features enable this valve to be used in a variety of applications.

Heater Voltage	V_h	6·3	or	12·6 V
Heater Current	I_h	0·3	or	0·15 A

RATINGS

Maximum Anode Dissipation (each section)	$P_{a(max)}$	2·5	W
Maximum Anode Voltage ($I_a=0$)	$V_{a(b)max}$	550	V
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Cathode Current (each section)	$I_{k(max)}$	20	mA

INTER-ELECTRODE CAPACITANCES *

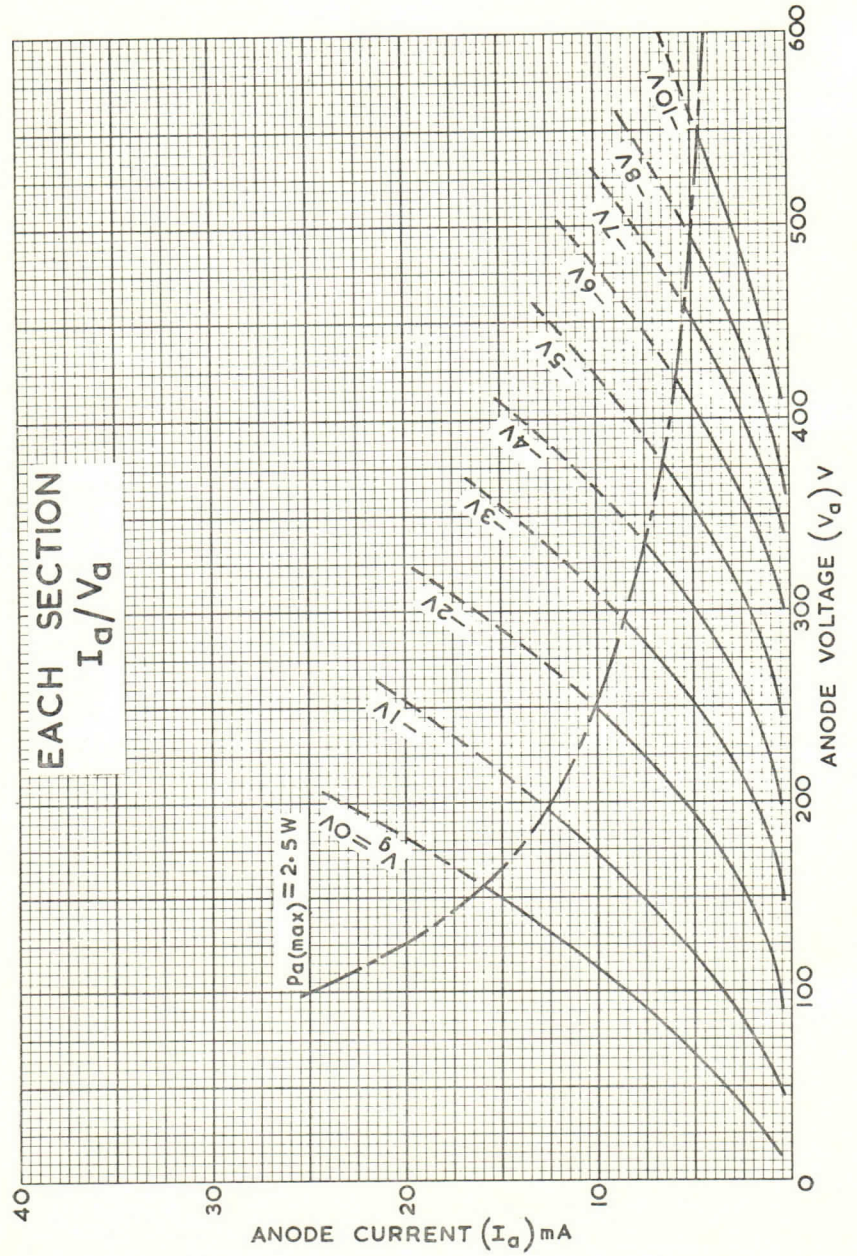
Input′	$c_{in'}$	2·5	pF
Input″	$c_{in''}$	2·5	pF
Output′	$c_{out'}$	0·4	pF
Output″	$c_{out''}$	0·4	pF
Anode′ to Grid′	$c_{a'-g'}$	1·5	pF
Anode″ to Grid″	$c_{a''-g''}$	1·5	pF
Cathode′ to Heater	$c_{k'-h}$	2·5	pF
Cathode″ to Heater	$c_{k''-h}$	2·5	pF
Grid′ to Grid″	$c_{g'-g''}$	<0·005	pF
Anode′ to Anode″	$c_{a'-a''}$	<0·4	pF

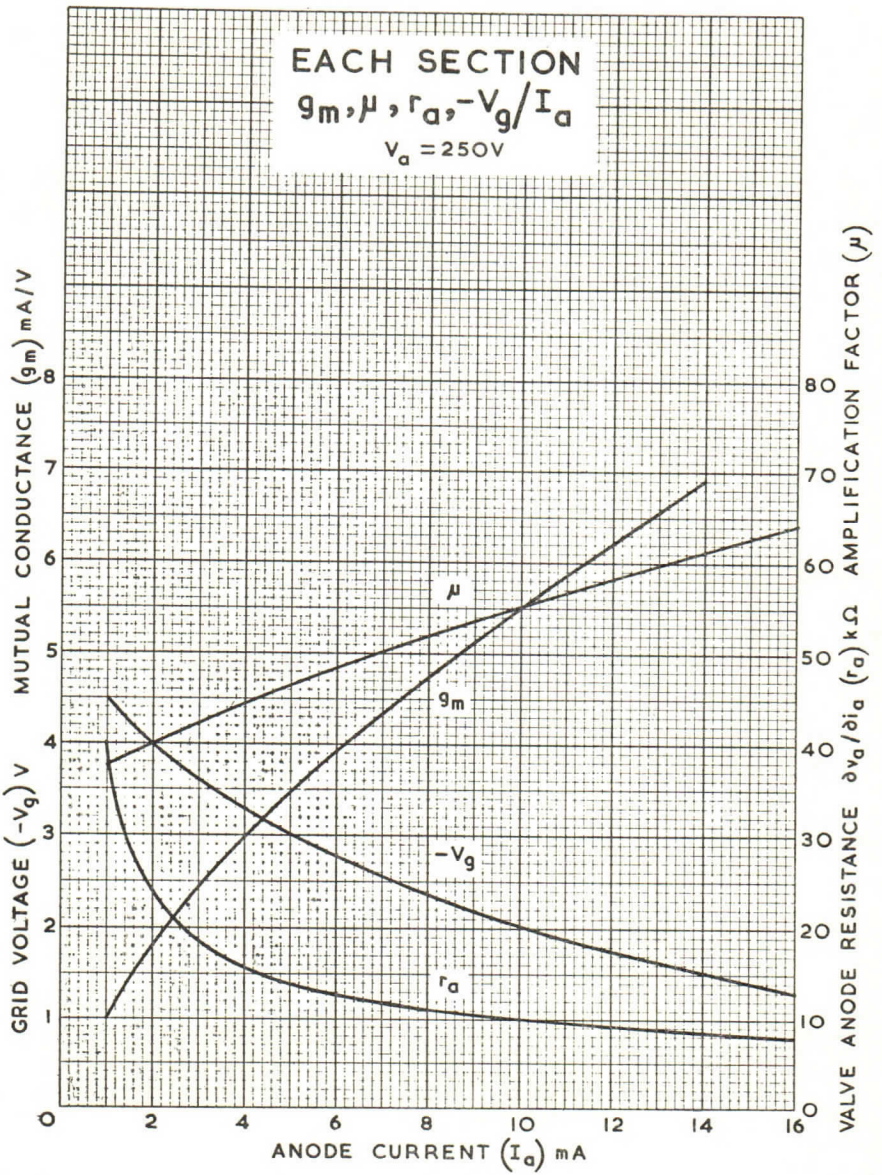
* Measured without an external shield.

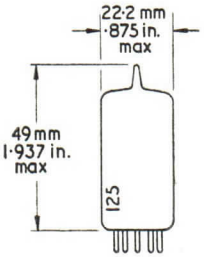
CHARACTERISTICS (Each Section—Class A)

Anode Voltage	V_a	100	180	250	V
Anode Current	I_a	3·7	11	10	mA
Grid Voltage	V_g	−1·0	−1·0	−2·0	V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	13·5	9·4	10	kΩ
Mutual Conductance	g_m	4·0	6·6	5·5	mA/V
Amplification Factor	μ	54	62	55	
Grid Voltage for Anode Current cut-off	V_g	−6·0	−8·0	−12	V

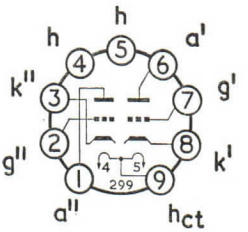
MOUNTING POSITION—Unrestricted


EACH SECTION
Ia/Va
Pa(max) = 2.5 W
Vg = 0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
-8V
-10V
ANODE VOLTAGE (Va) V
ANODE CURRENT (Ia) mA
600
500
400
300
200
100
0
40
30
20
10


EACH SECTION
$g_m, \mu, r_a, -V_g/I_a$
$V_a = 250V$
MUTUAL CONDUCTANCE (g_m) mA/V
AMPLIFICATION FACTOR (μ)
GRID VOLTAGE ($-V_g$) V
VALVE ANODE RESISTANCE $\partial v_a/\partial i_a$ (r_a) kΩ
ANODE CURRENT (I_a) mA
μ
g_m
$-V_g$
r_a
0
2
4
6
8
10
12
14
16
1
2
3
4
5
6
7
8
10
20
30
40
50
60
70
80



A.F. DOUBLE TRIODE



Base B9A

GENERAL

This general purpose double triode is intended for use as an amplifier or oscillator. Each triode unit has identical characteristics, the structures are separate and can be used for different functions or in series or in parallel on AC or AC/DC mains.

Heater Voltage	V_h	6·3	or	12·6 V
Heater Current	I_h	0·3	or	0·15 A

RATINGS (Each Section)

Maximum Anode Dissipation	$P_{a(max)}$	2·75	W
Maximum Anode Supply Voltage	$V_{a(b)max}$	550	V
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Negative Grid Voltage	$-V_{g(max)}$	150	V
Maximum Heater to Cathode Voltage	$V_{h\text{-}k(max)}$	100	V
Maximum Peak Heater to Cathode Voltage	$v_{h\text{-}k(pk)max}$	200	V
Maximum Cathode Current	$I_{k(max)}$	20	mA
Maximum Average Grid Current	$I_{g(av)max}$	5·0	mA
Maximum Grid to Cathode Resistance	$R_{g\text{-}k(max)}$		
Fixed bias		0·25	M Ω
Self bias		1·0	M Ω

INTER-ELECTRODE CAPACITANCES

		*	
Input′	$c_{in'}$	1·6	pF
Input″	$c_{in''}$	1·6	pF
Output′	$c_{out'}$	0·5	pF
Output″	$c_{out''}$	0·35	pF
Grid′ to Anode′	$c_{g'\text{-}a'}$	1·5	pF
Grid″ to Anode″	$c_{g''\text{-}a''}$	1·5	pF

* Without external shield.

THORN — A E I RADIO VALVES & TUBES LTD.

CHARACTERISTICS (Each Section)

Anode Voltage	V_a	100	250	V
Anode Current	I_a	11·8	10·5	mA
Grid Voltage	V_g	0	–8·5	V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	6·25	7·7	kΩ
Mutual Conductance	g_m	3·1	2·2	mA/V
Amplification Factor	μ	19·5	17	

When the two sections are used in cascade the section connected to pins 6, 7 and 8 should be used as the first stage for best hum performance. The heater voltage should be applied between pin 9 and pins 4 and 5 connected together and the centre tap of the heater transformer earthed.

TYPICAL OPERATION AS RESISTANCE COUPLED AMPLIFIER

Anode Supply Voltage $V_{a(b)}$=100V

Anode Load Resistance	R_a	47	47	100	100	220	220	kΩ
Grid Resistance of following valve	$R_{g'}$	0·1	0·22	0·22	0·47	0·47	1·0	MΩ
Cathode Resistance	R_k	1·8	2·0	3·8	4·7	9·5	11·5	kΩ
Peak Output Voltage	$v_{out(pk)}$	11	14	15	18	20	24	V
Voltage Amplification	V_{out}/V_{in}	11	11	11	11	11	11	

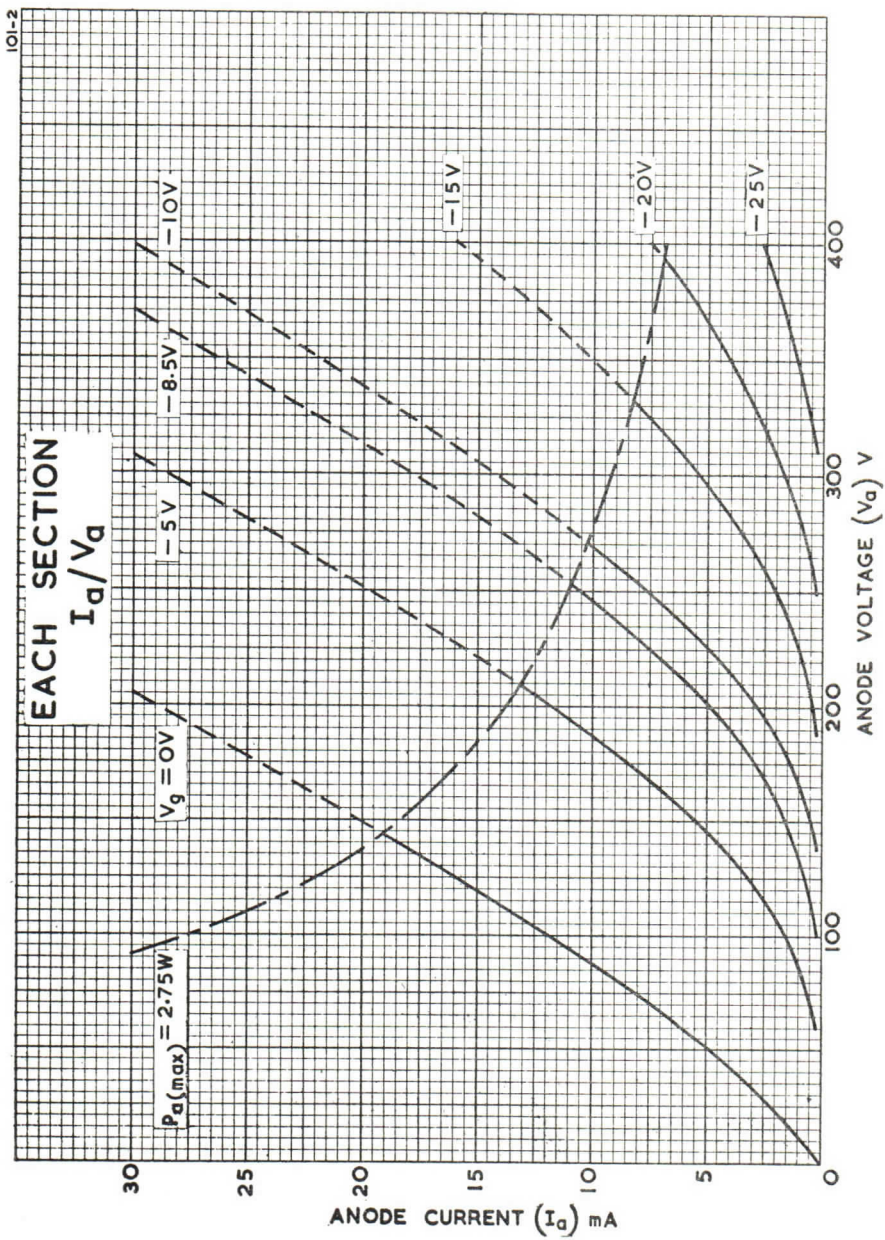
Anode Supply Voltage $V_{a(b)}$=200V

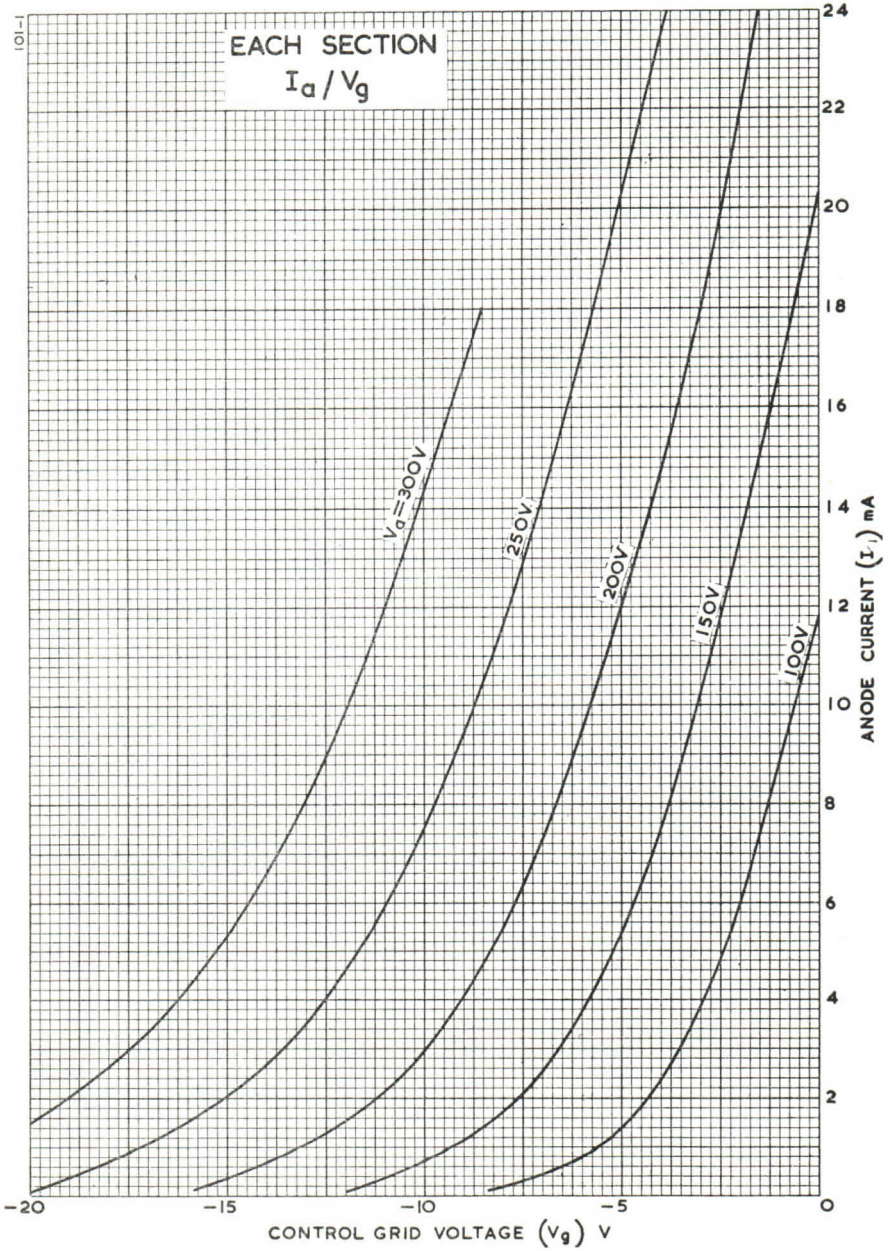
Anode Load Resistance	R_a	47	47	100	100	220	220	kΩ
Grid Resistance of following valve	$R_{g'}$	0·1	0·22	0·22	0·47	0·47	1·0	MΩ
Cathode Resistance	R_k	1·2	1·4	2·8	3·6	8·3	10	kΩ
Peak Output Voltage	$v_{out(pk)}$	26	29	33	40	44	54	V
Voltage Amplification	V_{out}/V_{in}	12	12	12	12	12	12	

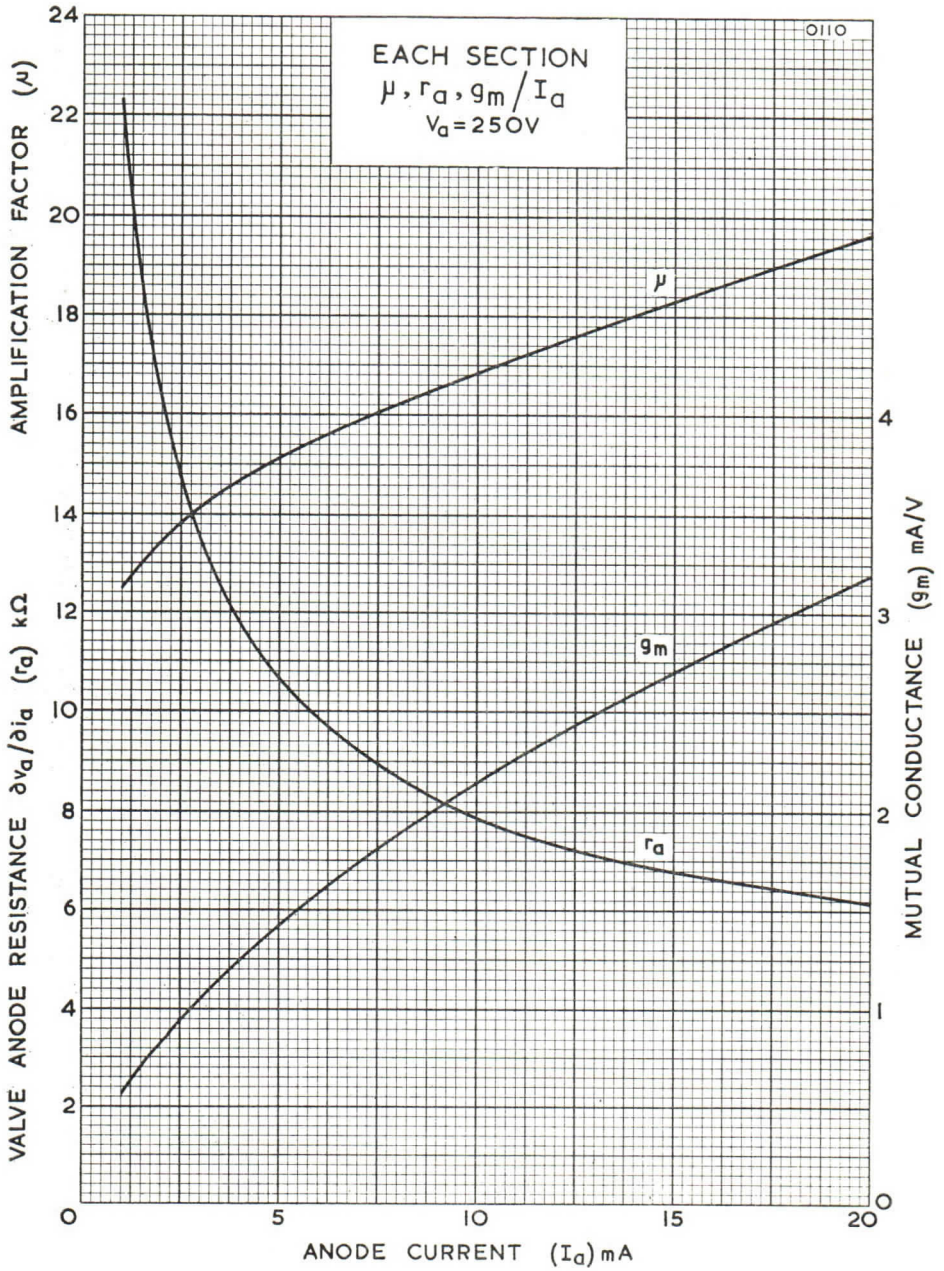
Anode Supply Voltage $V_{a(b)}$=300V

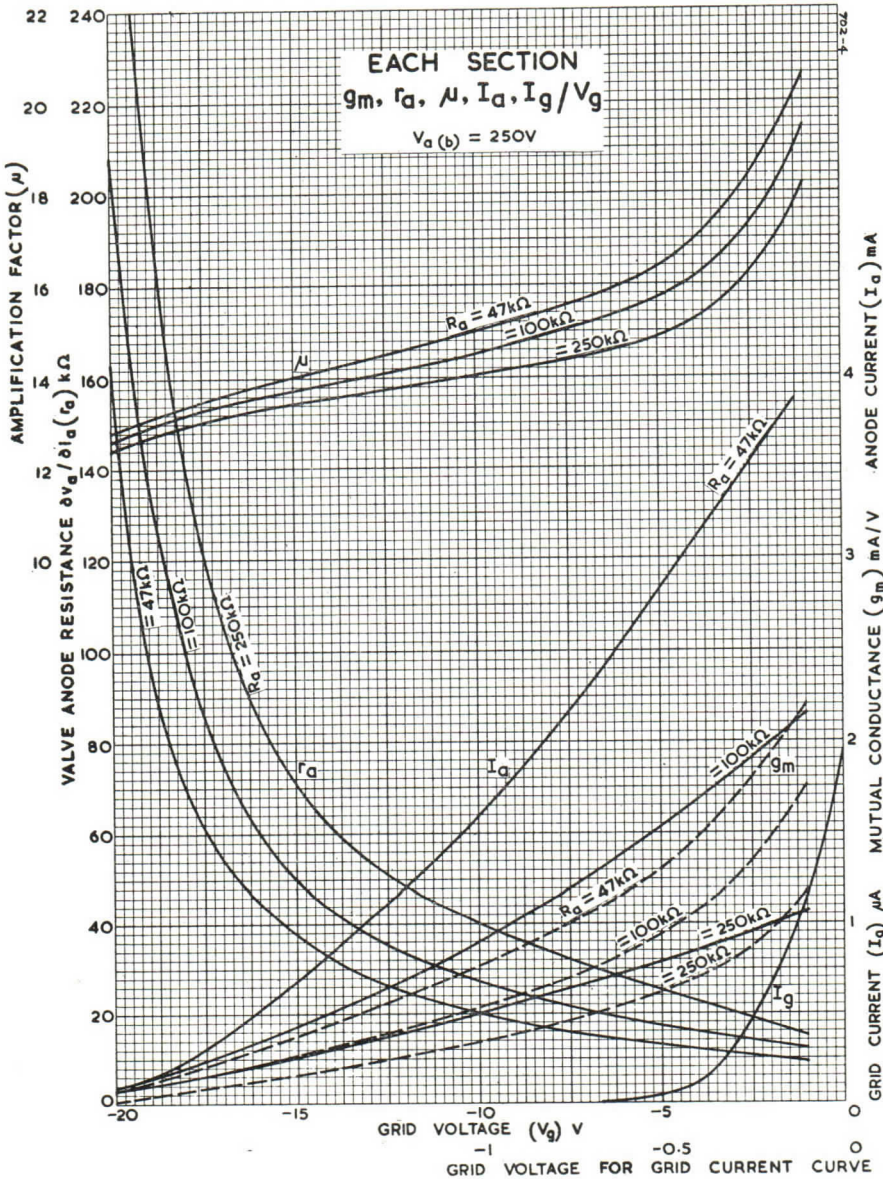
Anode Load Resistance	R_a	47	47	100	100	220	220	kΩ
Grid Resistance of following valve	$R_{g'}$	0·1	0·22	0·22	0·47	0·47	1·0	MΩ
Cathode Resistance	R_k	1·2	1·5	3·0	4·0	8·8	11	kΩ
Peak Output Voltage	$v_{out(pk)}$	52	68	68	80	82	92	V
Voltage Amplification	V_{out}/V_{in}	12	12	12	12	12	12	

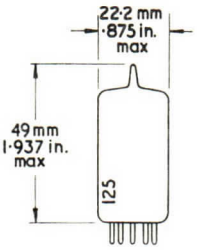
MOUNTING POSITION—Unrestricted


101-2
EACH SECTION
I_a/V_a
$P_{a(max)} = 2.75W$
$V_g = 0V$
-5V
-8.5V
-10V
-15V
-20V
-25V
ANODE VOLTAGE (V_a) V
100
200
300
400
ANODE CURRENT (I_a) mA
30
25
20
15
10
5
0

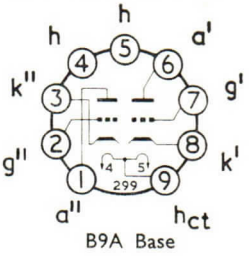

EACH SECTION
Ia / Vg
Va=300V
250V
200V
150V
100V
ANODE CURRENT (Ia) mA
CONTROL GRID VOLTAGE (Vg) V
24
22
20
18
16
14
12
10
8
6
4
2
0
−20
−15
−10
−5


EACH SECTION
μ, rₐ, gₘ / Iₐ
Vₐ = 250V
0110
μ
gₘ
rₐ
AMPLIFICATION FACTOR (μ)
VALVE ANODE RESISTANCE ∂vₐ/∂iₐ (rₐ) kΩ
MUTUAL CONDUCTANCE (gₘ) mA/V
ANODE CURRENT (Iₐ) mA
0
2
4
6
8
10
12
14
16
18
20
22
24
0
1
2
3
4
5
10
15
20


EACH SECTION
gm, ra, μ, Ia, Ig/Vg
Va (b) = 250V
AMPLIFICATION FACTOR (μ)
VALVE ANODE RESISTANCE δVa/δIa (ra) kΩ
ANODE CURRENT (Ia) mA
MUTUAL CONDUCTANCE (gm) mA/V
GRID CURRENT (Ig) μA
GRID VOLTAGE (Vg) V
GRID VOLTAGE FOR GRID CURRENT CURVE
μ
ra
Ia
gm
Ig
Ra = 47kΩ
= 100kΩ
= 250kΩ
7202-4



HIGH μ DOUBLE TRIODE



B9A Base

GENERAL

This valve is primarily intended for use as a resistance coupled amplifier or phase inverter. The heater is centre tapped and the sections may be operated in series or in parallel on A.C. or A.C./D.C. mains.

Heater Voltage	V_h	6·3	or	12·6	V
Heater Current	I_h	0·3		0·15	A

RATINGS (Each Section)

Maximum Anode Dissipation	$P_{a(max)}$	1·0	W
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Heater to Cathode Voltage (D.C. or R.M.S.)	$V_{h\text{-}k(max)}$	180	V
Maximum Cathode Current	$I_{k(max)}$	8	mA
Maximum Grid to Cathode Resistance (Fixed Bias)	$R_{g\text{-}k(max)}$	1·0	MΩ

INTER-ELECTRODE CAPACITANCES

		*	†	‡	
Input′	c_{in}'	1·6	1·8	2·6	pF
Input″	c_{in}''	1·6	1·8	2·5	pF
Output′	c_{out}'	0·33	0·48	1·3	pF
Output″	c_{out}''	0·23	0·34	1·1	pF
Anode′ to Grid′	$c_a'\text{-}g'$	1·6	1·7	2·0	pF
Anode″ to Grid″	$c_a''\text{-}g''$	1·6	1·8	2·1	pF
Anode′ to Anode″	$c_a'\text{-}a''$	0·9	0·95	0·95	pF
Grid′ to Grid″	$c_g'\text{-}g''$	0·008	0·012	0·014	pF
Anode′ to Grid″	$c_a'\text{-}g''$	<0·1	<0·1	<0·15	pF
Anode″ to Grid′	$c_a''\text{-}g'$	<0·1	<0·1	<0·15	pF
Grid′ to Heater	$c_g'\text{-}h$	0·1	0·21	0·28	pF
Grid″ to Heater	$c_g''\text{-}h$	0·08	0·18	0·23	pF

* In fully shielded socket, without can (I.E.C. Publication 100).
† With holder capacitance balanced out (Holder as below).
‡ Total capacitance including unskirted nylon phenolic B9A holder (AEI type VH19/902).

CHARACTERISTICS (Each Section)

Anode Voltage	V_a	100	250	V
Anode Current	I_a	0·5	1·2	mA
Grid Voltage	V_g	–1·0	–2·0	V
Mutual Conductance	g_m	1·25	1·6	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	80	62·5	kΩ
Amplification Factor	μ	100	100	

When the two sections are used in cascade the section connected to pins 6, 7 and 8 should be used as the first stage for best hum performance. The heater voltage should be applied between pin 9 and pins 4 and 5 connected together and the centre tap of the heater transformer earthed.

MOUNTING POSITION—Unrestricted

THORN—AEI RADIO VALVES & TUBES LTD.

TYPICAL OPERATION

Conditions as resistance coupled A.F. Amplifier.

Cathode Self Bias†															
Supply Voltage	V_b	250	300	350	400	250	300	350	400	250	300	350	400		V
Anode Load Resistance	R_a	47	47	47	47	100	100	100	100	220	220	220	220		kΩ
Cathode Self Bias Resistance	R_k	2·2	1·5	1·2	1·0	3·3	2·2	1·8	1·5	4·7	3·9	2·7	2·2		kΩ
Grid Resistance of Following Valve		150	150	150	150	330	330	330	330	680	680	680	680		kΩ
Anode Current	I_a	0·9	1·3	1·7	2·2	0·6	0·88	1·1	1·4	0·38	0·5	0·7	0·88		mA
Voltage Amplification		36	40	42	43	50	55	57	59	62	65	69	71		
R.M.S. Output Voltage for 5% total distortion*		12·5	22	31	40·5	18·5	32·5	45	59	27	38·5	60	63§		V

Grid Current Bias (R_g = 10 MΩ)																
Supply Voltage	V_b	200	250	300	350	400	200	250	300	350	400	200	250	300	350	400	V
Anode Load Resistance	R_a	47	47	47	47	47	100	100	100	100	100	220	220	220	220	220	kΩ
Grid Resistance of Following Valve		150	150	150	150	150	330	330	330	330	330	680	680	680	680	680	kΩ
Anode Current	I_a	1·2	1·7	2·2	2·8	3·5	0·8	1·1	1·4	1·7	2·1	0·4	0·6	0·8	1·0	1·2	mA
Signal source impedance Z_s = 0Ω																
Voltage Amplification for V_{in}(r.m.s.) = 100 mV		40	43	45	46	48	56	59	61	62	63	66	70	72	74	75	
R.M.S. Output Voltage for 5% total distortion		14	21	28	35	43	20	29	38	48	58	24	34	45	57	69	V
Signal source impedance Z_s = 220 kΩ																
Voltage Amplification for V_{in}(r.m.s.) = 100 mV		30	31	32	33	33	39	41	41	42	42	44	46	47	48	49	
R.M.S. Output Voltage for 5% total distortion‡		17	25	33	41	49	25	36	46	57	68	32	44	57	70	82	V

† At lower values of supply voltage grid current bias should be used.

* At lower output voltages the distortion is approximately proportional to the output voltage.

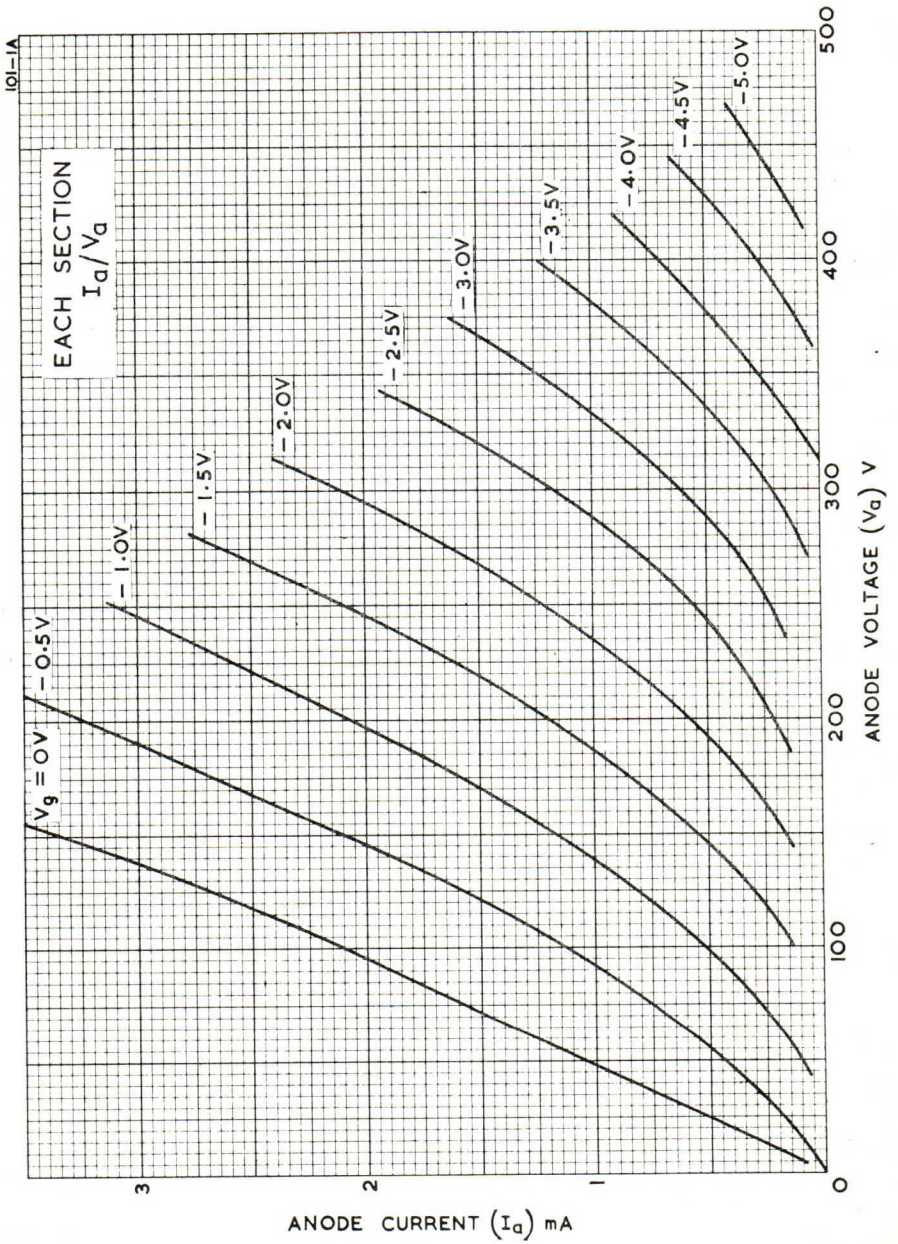
§ For start of positive grid current. Total distortion = 3·7%.

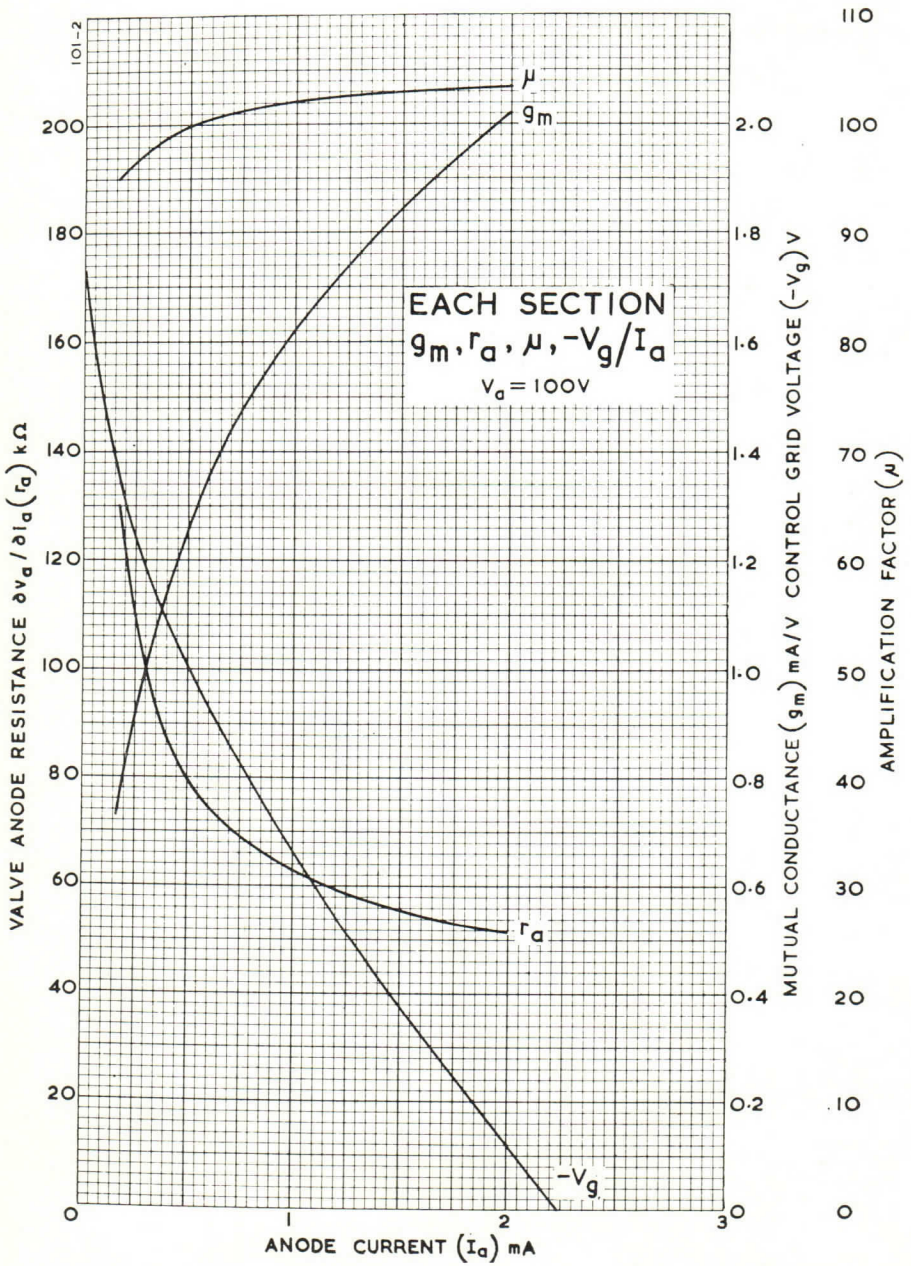
‡ When operating this valve with grid current bias and a high source impedance, the second harmonic distortion rises to a peak at quite low levels of output (about 10 V r.m.s.) and then falls with increasing drive. The third harmonic then begins to rise, and D_{tot} finally reaches 5% at a much higher output level than with zero source impedance. The maximum value of this distortion peak varies inversely with the anode load, being about 5·5% with R_a = 47 kΩ, 4·5% with R_a = 100 kΩ and 4% with R_a = 220 kΩ.

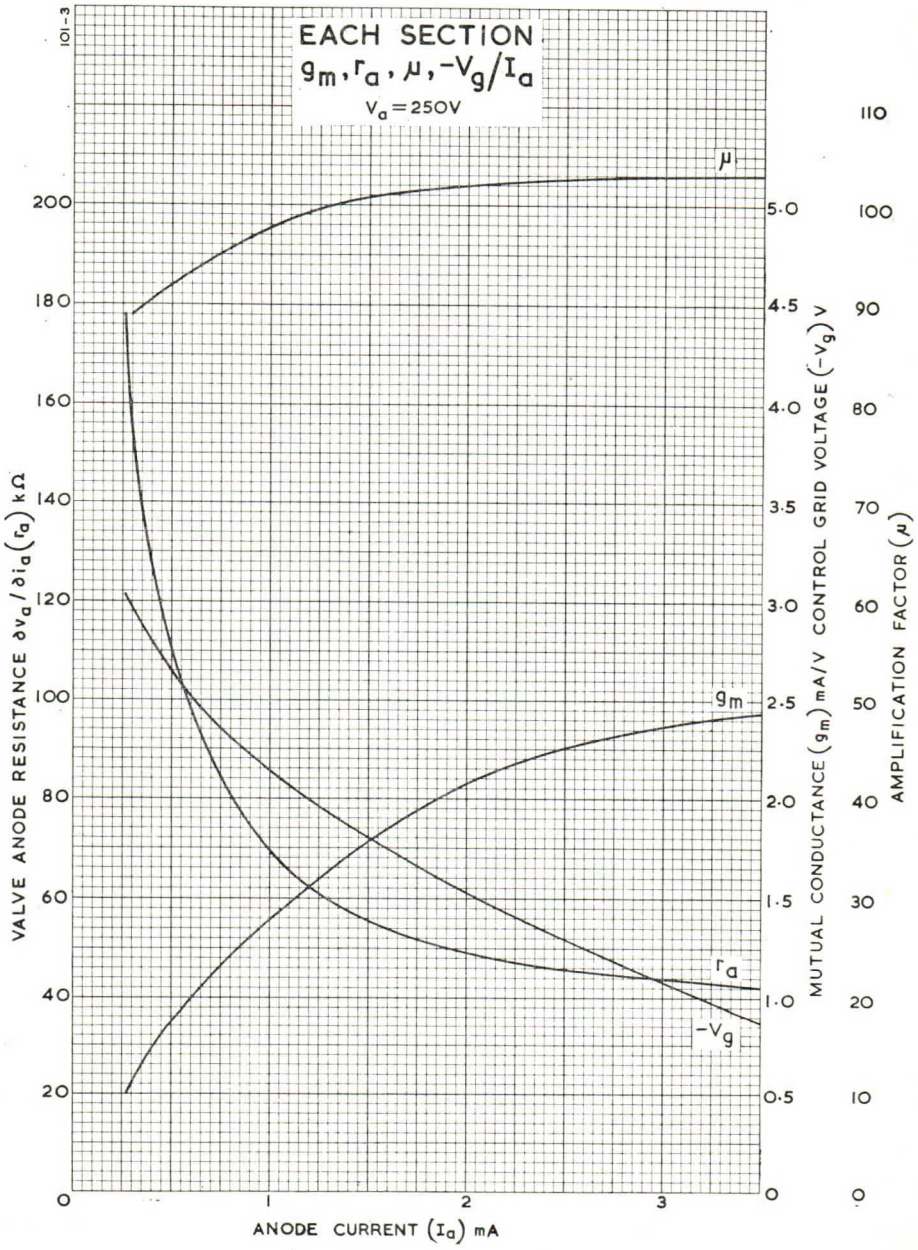
G. June, 1963

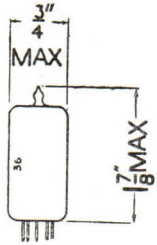
Issue 2 Page 2

BRIMAR


101-1A
EACH SECTION
I_a/V_a
V_g = 0V
-0.5V
-1.0V
-1.5V
-2.0V
-2.5V
-3.0V
-3.5V
-4.0V
-4.5V
-5.0V
0
100
200
300
400
500
ANODE VOLTAGE (V_a) V
0
1
2
3
ANODE CURRENT (I_a) mA


101-2
μ
g_m
r_a
$-V_g$
EACH SECTION
$g_m, r_a, \mu, -V_g/I_a$
$V_a = 100V$
VALVE ANODE RESISTANCE $\partial v_a / \partial i_a (r_a)$ kΩ
MUTUAL CONDUCTANCE (g_m) mA/V
CONTROL GRID VOLTAGE $(-V_g)$ V
AMPLIFICATION FACTOR (μ)
ANODE CURRENT (I_a) mA
0
20
40
60
80
100
120
140
160
180
200
0·2
0·4
0·6
0·8
1·0
1·2
1·4
1·6
1·8
2·0
10
30
50
70
90
110
1
2
3

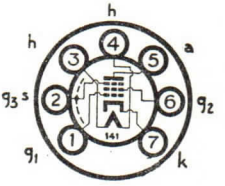

EACH SECTION
$g_m, r_a, \mu, -V_g/I_a$
$V_a = 250V$
101-3
μ
g_m
r_a
$-V_g$
VALVE ANODE RESISTANCE $\partial v_a / \partial i_a (r_a)$ kΩ
MUTUAL CONDUCTANCE (g_m) mA/V
CONTROL GRID VOLTAGE $(-V_g)$ V
AMPLIFICATION FACTOR (μ)
ANODE CURRENT (I_a) mA
0
1
2
3
20
40
60
80
100
120
140
160
180
200
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
10
20
30
40
50
60
70
80
90
100
110



B7G Base

Current Equipment Type

TYPE 12BA6
MINIATURE HIGH SLOPE VARI-MU R.F. PENTODE



RATINGS

Heater Voltage	12.6 volts
Heater Current	0.15 amp.
Anode Voltage	300 volts max.
Anode Dissipation	3.0 watts max.
Screen (g_2) Supply Voltage	300 volts max.
Screen Voltage	125 volts max.
Screen Dissipation	0.6 watt max.

OPERATING CHARACTERISTICS
(Suppressor Grid (g_3) connected to Cathode)

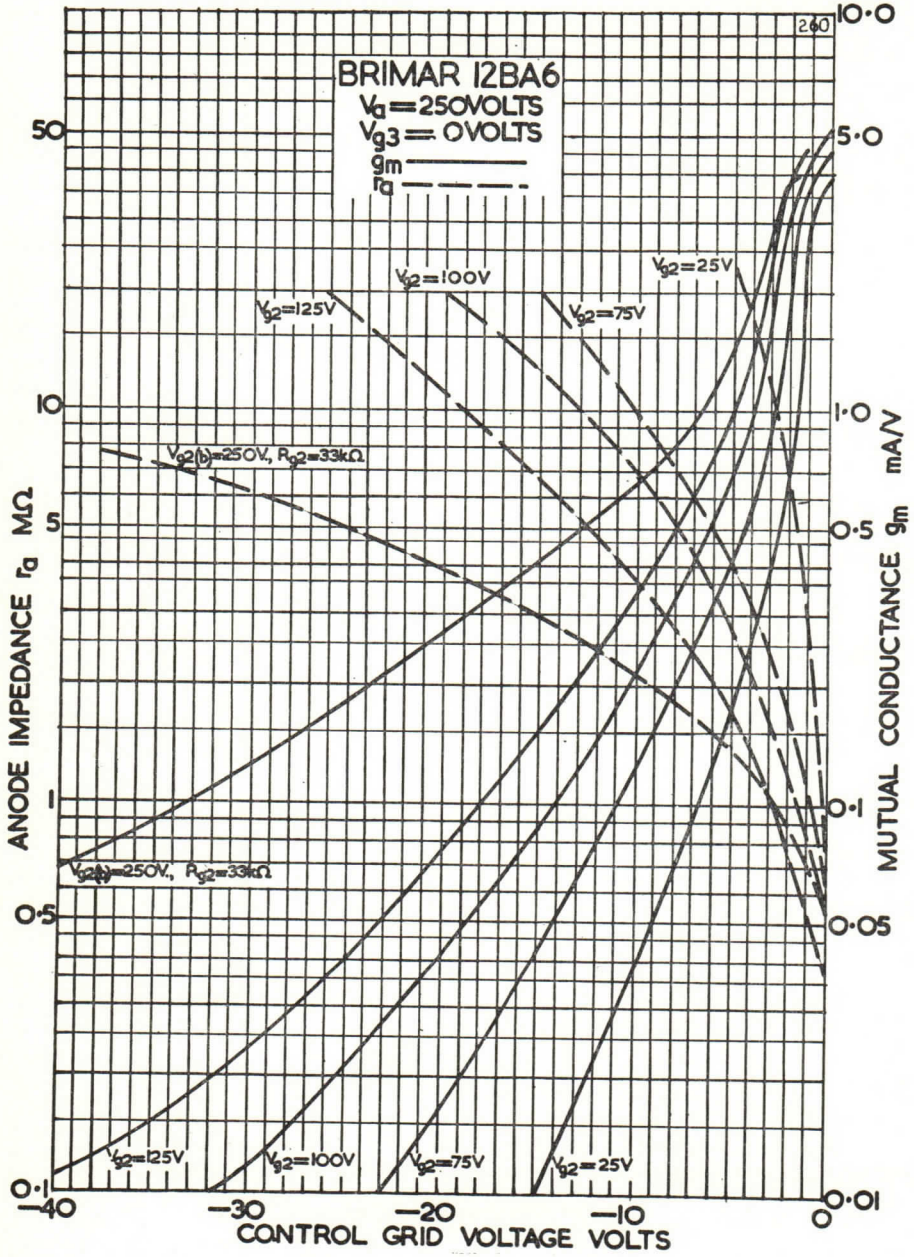
Anode Voltage	100	250	250	volts
Anode Current	10.8	11.0	11.0	mA
Screen Voltage	100	100	—	volts
Series Screen Resistor	—	—	33,000	ohms
Screen Current	4.4	4.2	4.2	mA
Control Grid (g_1) Voltage	−1	−1	−1	volts
Cathode Bias Resistor	68	68	68	ohms
Anode Impedance	0.25	1.5	1.5	meg.
Mutual Conductance	4.3	4.4	4.4	mA/V
Input Impedance (45 Mc/s)	4,500	4,500	4,500	ohms
Input Impedance (90 Mc/s)	900	900	900	ohms
Control Grid Voltage	−21	−21	−21	volts

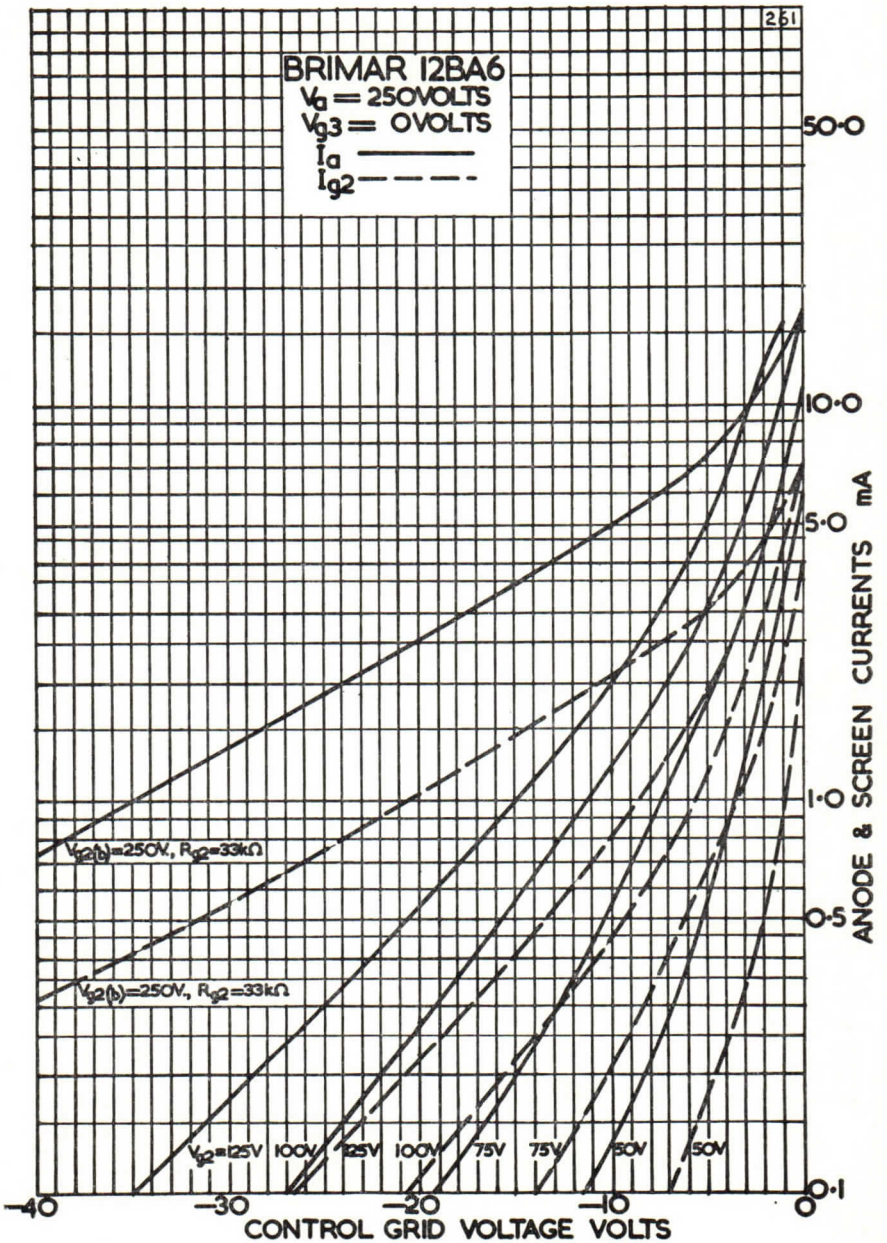
(For Mutual Conductance of 0.005 mA/V).

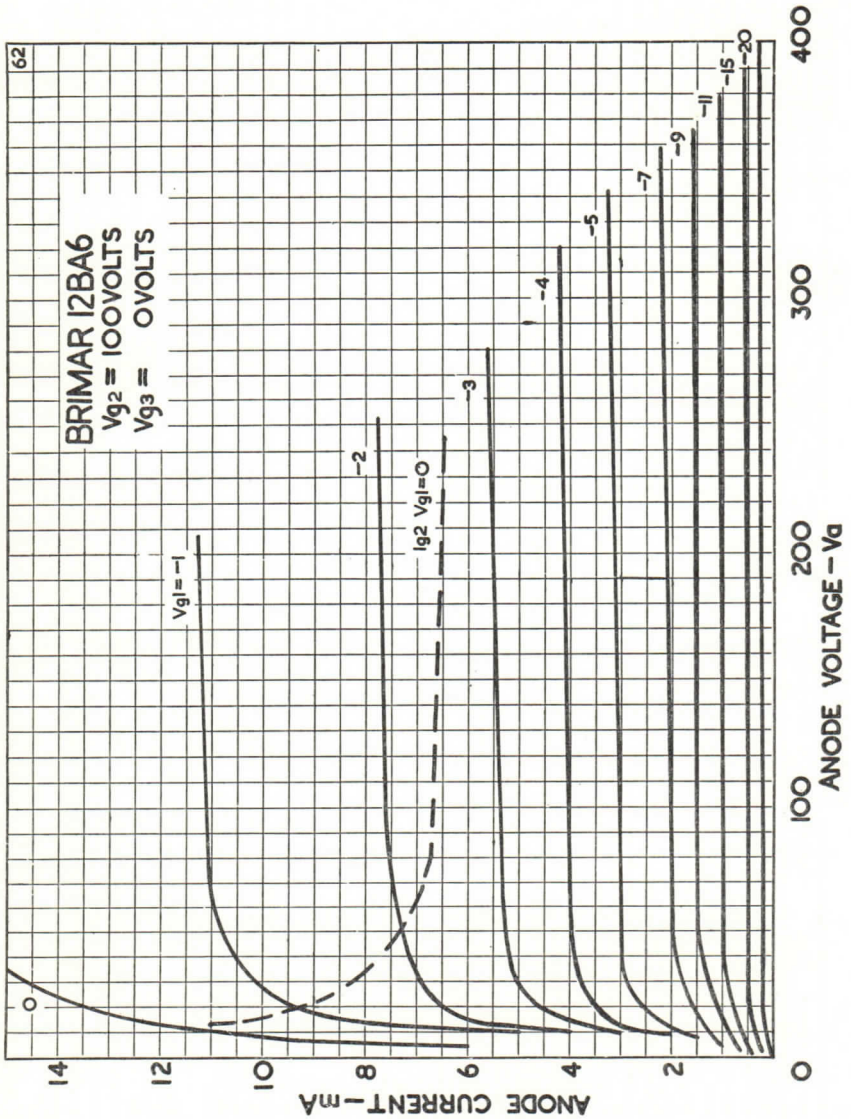
INTER-ELECTRODE CAPACITANCES *

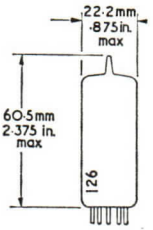
Input	5.5 pF
Output	5.0 pF
Grid to Anode	0.0035 pF max.

** With no external shield.*

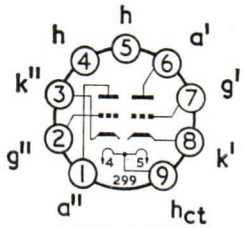

260
BRIMAR 12BA6
V_a = 250VOLTS
V_{g3} = 0VOLTS
gm
ra
V_{g2}=125V
V_{g2}=100V
V_{g2}=75V
V_{g2}=25V
$V_{g2(b)}$=250V., R_{g2}=33kΩ
$V_{g2(b)}$=250V., R_{g2}=33kΩ
ANODE IMPEDANCE r_a MΩ
MUTUAL CONDUCTANCE g_m mA/V
50
10
5
1
0·5
0·1
10·0
5·0
1·0
0·5
0·1
0·05
0·01
0
−10
−20
−30
−40
CONTROL GRID VOLTAGE VOLTS


261
BRIMAR 12BA6
V_a = 250VOLTS
V_{g3} = OVOLTS
I_a
I_{g2}
50·0
10·0
5·0
1·0
0·5
0·1
ANODE & SCREEN CURRENTS mA
$V_{g2(b)}$=250V, R_{g2}=33kΩ
$V_{g2(b)}$=250V, R_{g2}=33kΩ
V_{g2}=125V 100V 125V 100V 75V 75V 50V 50V
-40
-30
-20
-10
0
CONTROL GRID VOLTAGE VOLTS





DOUBLE TRIODE



B9A Base

GENERAL

This double triode may be used in a variety of pulse, time-base and A.F. applications.

Heater Voltage	V_h	6·3	or	12·6	V
Heater Current	I_h	0·6	or	0·3	A

RATINGS—Each Section

Maximum Anode Dissipation	$P_{a(max)}$	3·5	W
Maximum Anode Voltage	$V_{a(max)}$		
As a Field Scan Output Valve		500	V
As a Class A Amplifier		300	V
Maximum Peak Anode Voltage, Pulse Positive*	$v_{a(pk)max}$	1500	V
Maximum Peak Grid Voltage, Pulse Negative*	$-v_{g(pk)max}$	220	V
Maximum Heater to Cathode Voltage	$V_{h\text{-}k(max)}$		
D.C.		100	V
D.C. plus peak		200	V
Maximum Cathode Current	$I_{k(max)}$	20	mA
Maximum Peak Cathode Current	$i_{k(pk)max}$	70	mA

* The duty cycle must not exceed 15 per cent of the scanning cycle and its duration must not exceed 3 ms. Ratings are absolute values.

INTER-ELECTRODE CAPACITANCES†

Input (each section)	c_{in}	3·2	pF
Output′	$c_{out'}$	0·5	pF
Output″	$c_{out''}$	0·4	pF
Grid to Anode (each section)	$c_{g\text{-}a}$	2·6	pF
Anode′ to Anode″	$c_{a'\text{-}a''}$	0·8	pF

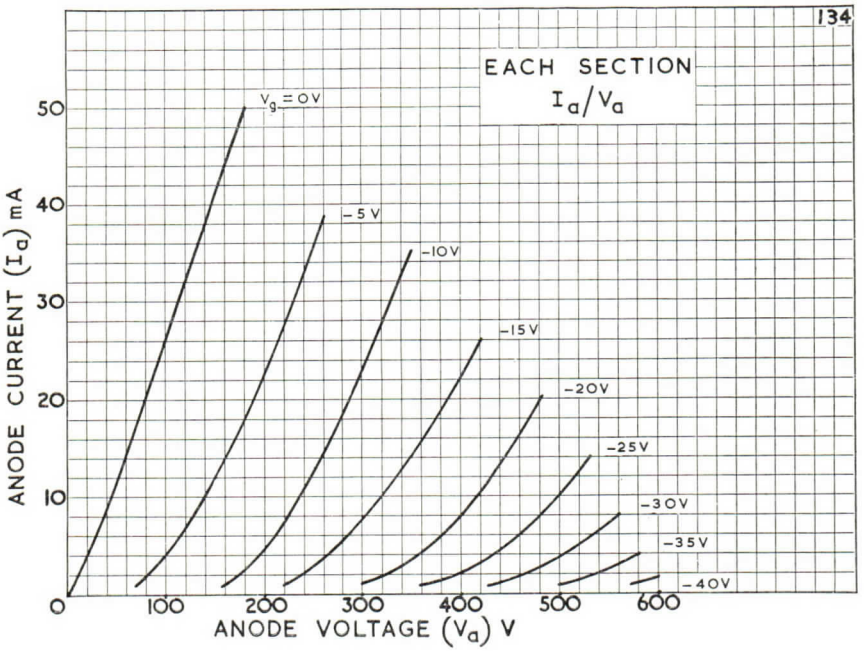
† Measured without an external shield.

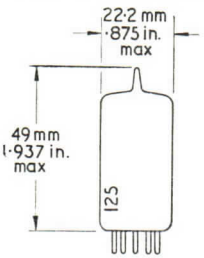
OPERATING CHARACTERISTICS—As a Class A Amplifier (Each Section)

Anode Voltage	V_a	85	250	V
Grid Voltage	V_g	0	−10·5	V
Anode Current	I_a	20	11·5	mA
Mutual Conductance	g_m	6·2	3·1	mA/V
Amplification Factor	μ	21	17	
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	3·4	5·5	kΩ
Grid Voltage for cut-off		−8·0	−20	V

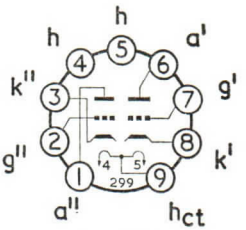
Type 12BH7 is a commercial equivalent to the CV5042.

THORN—AEI RADIO VALVES & TUBES LTD.


134
EACH SECTION
I_a/V_a
$V_g = 0V$
-5V
-10V
-15V
-20V
-25V
-30V
-35V
-40V
ANODE CURRENT (I_a) mA
0
10
20
30
40
50
100
200
300
400
500
600
ANODE VOLTAGE (V_a) V



A.F. DOUBLE TRIODE



Base B9A

GENERAL

This valve is a low-mu double triode with similar characteristics to the 12AU7 and the additional feature of improved anode current balance between sections and between valves.

Heater Voltage	V_h	6·3	or	12·6 V
Heater Current	I_h	0·3	or	0·15 A

RATINGS (Each Section)

Maximum Anode Dissipation	$P_{a(max)}$	2·75	W
Maximum Anode Supply Voltage	$V_{a(b)max}$	550	V
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Heater to Cathode Voltage	$V_{h-k(max)}$	100	V
Maximum Peak Heater to Cathode Voltage	$V_{h-k(pk)max}$	200	V
Maximum Cathode Current	$I_{k(max)}$	20	mA
Maximum Grid to Cathode Resistance	$R_{g-k(max)}$		
Fixed bias		0·25	MΩ
Self bias		1·0	MΩ

INTER-ELECTRODE CAPACITANCES*

		Section 1	*Section* 2	
Input	c_{in}	1·6	1·6	pF
Output	c_{out}	0·5	0·35	pF
Grid to Anode	c_{g-a}	1·5	1·5	pF

* Without external shield.

OPERATING CHARACTERISTICS (Each Section)

V_a=250V, V_g= −8·5V, V_h=12·6V (Series Connection)

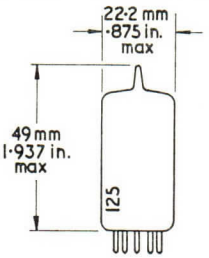
Anode Current	I_a	10·5	mA
Anode Resistance ($\delta v_a/\delta i_a$)	r_a	7·7	kΩ
Mutual Conductance	g_m	2·2	mA/V
Amplification Factor	μ	17	
Anode Current Balance Between Sections	$I_{a'}$-$I_{a'}$	$<\pm$1·5	mA

OPERATION AS RESISTANCE COUPLED AMPLIFIER

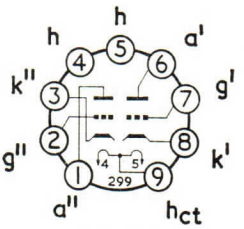
Anode Supply Voltage	$V_{a(b)}$	100	250	V
Anode Load Resistor	R_a	0·1	0·1	MΩ
Cathode Bias Resistor	R_k	3·9	2·7	kΩ
Peak Output Voltage	$v_{out(pk)}$	17	50	V
Stage Gain		11	12	—

Characteristic curves are identical to those given for the 12AU7.

THORN — A E I RADIO VALVES & TUBES LTD.



DOUBLE TRIODE



B9A Base

Heater Voltage	V_h	6·3	or	12·6 V
Heater Current	I_h	0·3	or	0·15 A

DESIGN CENTRE RATINGS—Each Section

Maximum Anode Dissipation	$P_{a(max)}$	2·5	W
Maximum Anode Voltage	$V_{a(max)}$	300	V
Maximum Anode Voltage (Zero anode current)	$V_{a(b)max}$	550	V
Maximum D.C. Cathode Current	$I_{k(max)}$	20	mA
Maximum Heater to Cathode Voltage	$V_{h\text{-}k(max)}$	±90	V

INTER-ELECTRODE CAPACITANCES*

Anode′ to Anode″	$c_{a'\text{-}a''}$	<0·33	pF
Input (Each section)	c_{in}	2·3	pF
Output (Each section)	c_{out}	0·5	pF
Anode to Grid (Each section)	$c_{a\text{-}g}$	1·6	pF

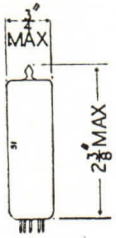
* Measured without an external shield.

CHARACTERISTICS—Each Section

Heater Voltage (Series Connection)	V_h	12·6	V
Anode Voltage	V_a	200	V
Grid Voltage	V_g	0	V
Cathode Resistance	R_k	200	Ω
Anode Current	I_a	10	mA
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	8·9	kΩ
Mutual Conductance	g_m	5·7	mA/V
Amplification Factor	μ	50	

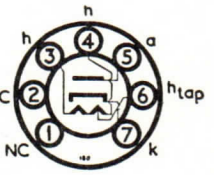
THORN—AEI RADIO VALVES & TUBES LTD.

Current Equipment Type



B7G Base

TYPE 35W4
MINIATURE
HALF WAVE RECTIFIER



Heater Current ... 0.15 amp. **Heater Voltage** ... 35 volts

RATINGS

Peak Inverse Voltage ...	330 volts max.	Peak Current	600 mA max.
Peak Surge Current ...	2 amps. max.	Anode Supply Voltage	—see Rating Chart I
D.C. Output Current†	—see Rating Chart I	Peak Heater Cathode Potential	330 volts max.

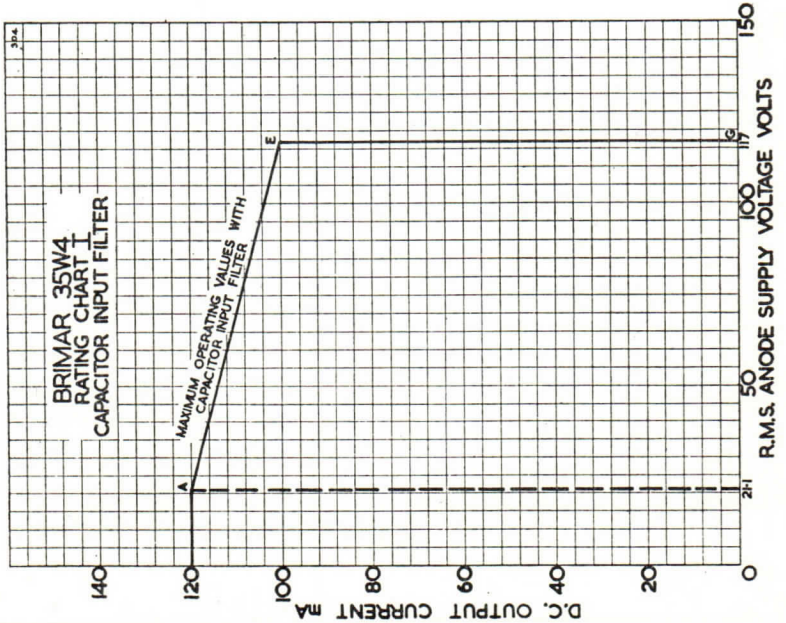
† *With a panel lamp rated at 6.3 volts, 0.15 amps. connected between pins 4 and 6 the rectified current must be limited to 60 mA with 117 volts R.M.S. input, or to 90 mA if the panel lamp is shunted by a resistor not exceeding 250 Ω.*

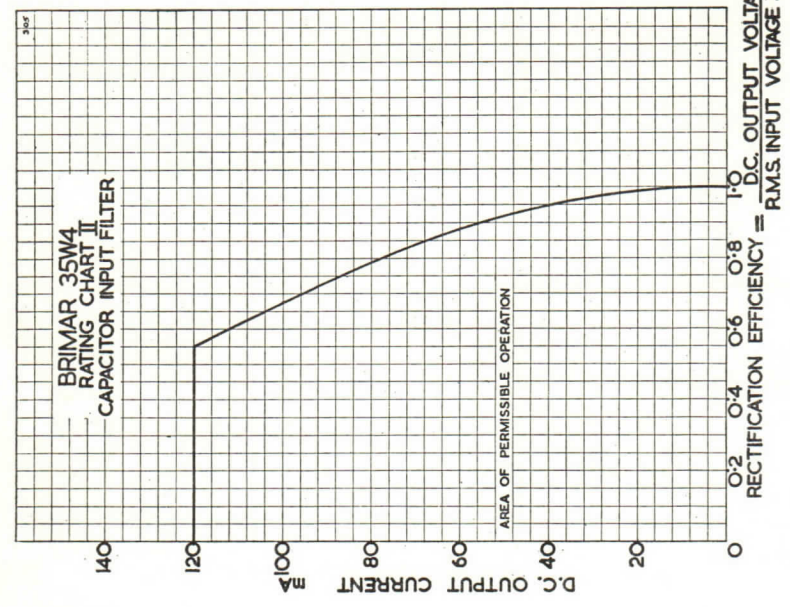
CHARACTERISTICS AS A HALF-WAVE RECTIFIER

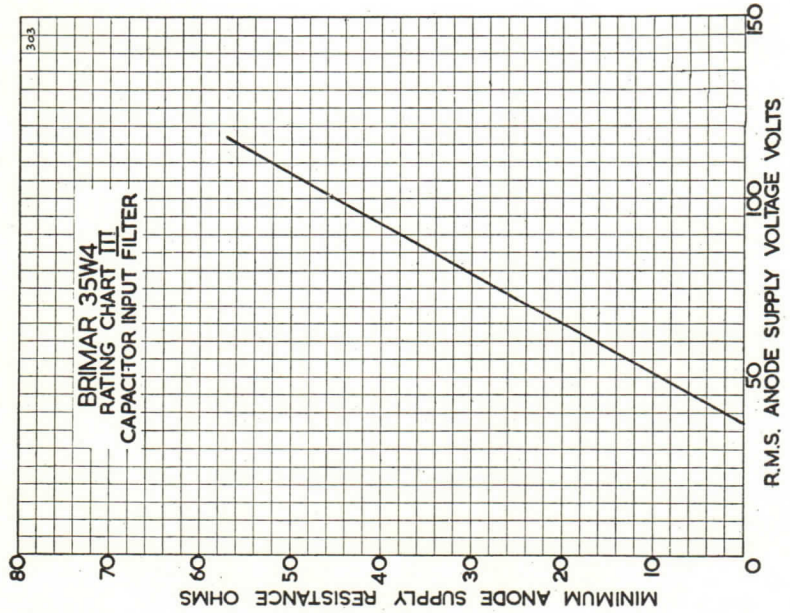
CAPACITOR INPUT

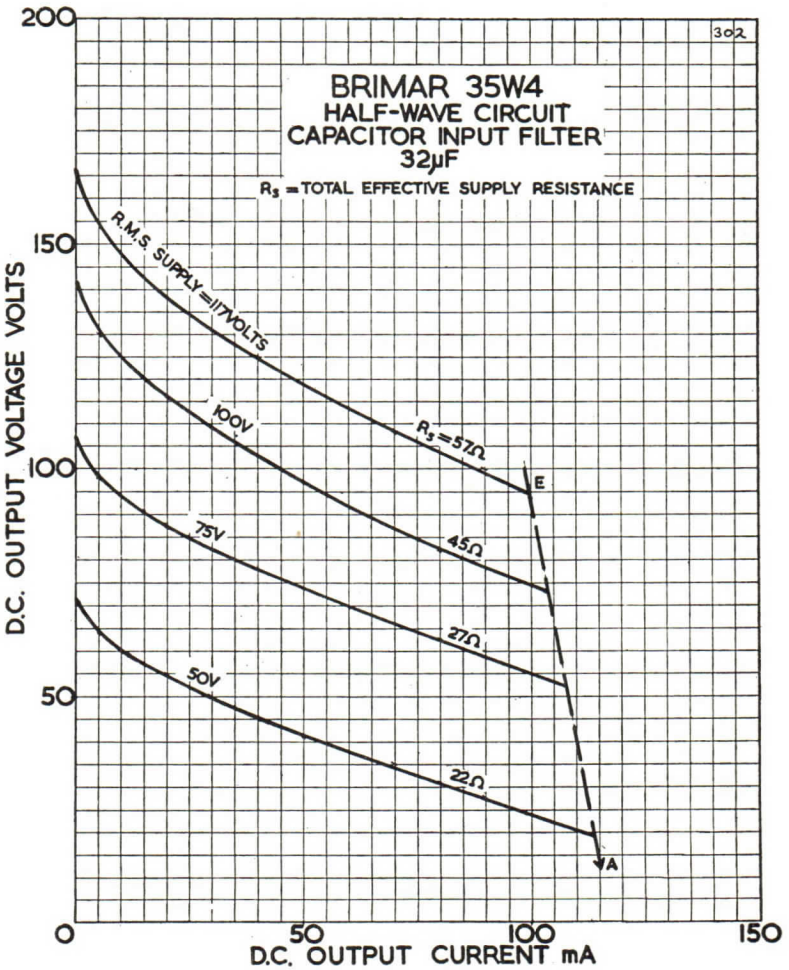
R.M.S. Input Voltage ...	117 volts	Rectified Current ...	100 mA
D.C. Output Voltage ...	95 volts	Supply Impedance ...	57 Ω
Reservoir Capacitor ...	32 μF		

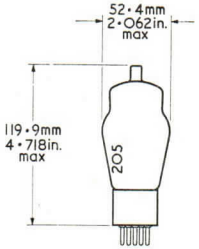
For notes on use of rating charts, refer to "Valve Ratings" section.



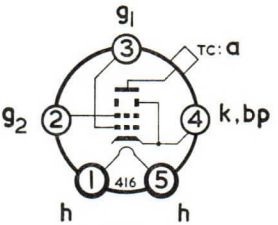

BRIMAR 35W4
RATING CHART II
CAPACITOR INPUT FILTER
AREA OF PERMISSIBLE OPERATION
D.C. OUTPUT CURRENT mA
0
20
40
60
80
100
120
140
RECTIFICATION EFFICIENCY = D.C. OUTPUT VOLTAGE / R.M.S. INPUT VOLTAGE X√2
0·2
0·4
0·6
0·8
1·0


BRIMAR 35W4
RATING CHART III
CAPACITOR INPUT FILTER
MINIMUM ANODE SUPPLY RESISTANCE OHMS
0
10
20
30
40
50
60
70
80
R.M.S. ANODE SUPPLY VOLTAGE VOLTS
0
50
100
150





OUTPUT BEAM TETRODE



UX5 Base

GENERAL

This beam tetrode is for use in the output stages of large audio equipment. The valve may be used as R.F. amplifier or frequency multiplier in transmitters. Above 60 MHz the ratings must be reduced and at 120 MHz the ratings must not exceed 50 per cent of the maximum.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·9	A

ABSOLUTE MAXIMUM RATINGS

Maximum Anode Dissipation	$p_{a(max)}$	25	W
Maximum Screen Grid Dissipation	$p_{g_2(max)}$	3·5	W
Maximum Anode Voltage	$V_{a(max)}$	600	V
Maximum Screen Grid Voltage	$V_{g_2(max)}$	300	V

OPERATING CHARACTERISTICS—Class 'A'

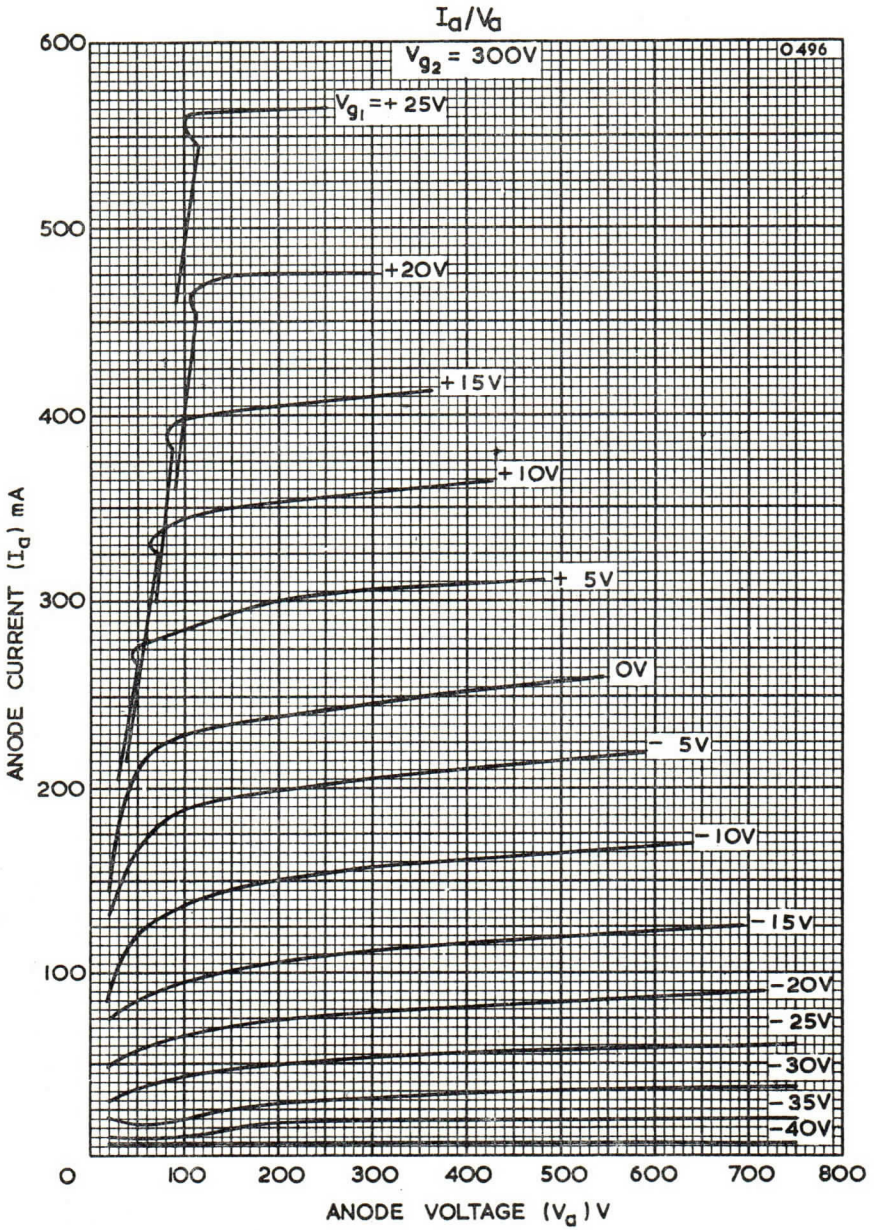
Anode Voltage	V_a	300	500	V
Screen Grid Voltage	V_{g_2}	250	200	V
Control Grid Voltage	V_{g_1}	−12·5	−14·5	V
Anode Current	I_a	83	50	mA
Screen Grid Current	I_{g_2}	8·0	1·6	mA
Cathode Bias Resistance	R_k	140	280	Ω
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	24	39	kΩ
Mutual Conductance	g_m	6·5	5·7	mA/V
Optimum Load Resistance	R_L	3·0	6·0	kΩ
Power Output	P_{out}	6·4	11·5	W
Harmonic Distortion	D	6·0	12	%

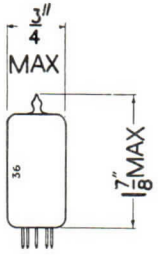
TYPICAL OPERATION—Push Pull (2 Valves)

		Class AB_1		Class AB_2†	
Anode Voltage	V_a	500	600	600	V
Screen Grid Voltage	V_{g_2}	300	300	300	V
Control Grid Voltage	V_{g_1}	—	−27·5	−30	V
Quiescent Anode Current	$I_{a(o)}$	100	80	60	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	119	150	200	mA
Quiescent Screen Grid Current	$I_{g_2(o)}$	2·5	1·5	1·5	mA
Screen Grid Current (maximum signal)	$I_{g_2(max\ sig)}$	16·5	17·5	21	mA
Cathode Bias Resistance	R_k	270	—	—	Ω
Peak Grid to Grid Input Voltage	$v_{g\text{-}g(pk)}$	72	59	78	V
Optimum Load Resistance (Anode to Anode)	$R_{a\text{-}a}$	9·0	10	6·4	kΩ
Power Output	P_{out}	32·5	47·5	80	W
Harmonic Distortion	D	2·7	2·2	3·5	%

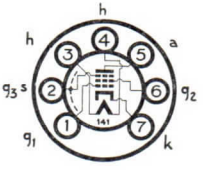
† To obtain the maximum output at low distortion, the anode and screen supply voltages must not vary more than 5 per cent nor the grid bias 3 per cent between no signal and full signal conditions.

THORN—AEI RADIO VALVES & TUBES LTD.


I_a/V_a
V_{g_2} = 300V
0496
V_{g_1} =+ 25V
+20V
+15V
+10V
+ 5V
0V
- 5V
-10V
-15V
-20V
-25V
-30V
-35V
-40V
ANODE CURRENT (I_a) mA
600
500
400
300
200
100
0
100
200
300
400
500
600
700
800
ANODE VOLTAGE (V_a) V



TYPE **5749**
TRUSTWORTHY HIGH SLOPE VARI-MU R.F. PENTODE



The BRIMAR 5749 is a trustworthy vari-Mu R.F. pentode for use in R.F. and I.F. amplifier applications.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.3	amp.
Anode Voltage	300	volts max.
Anode Dissipation	3.0	watts max.
Screen (g_2) Supply Voltage	300	volts max.
Screen Voltage	125	volts max.
Screen Dissipation	0.6	watts max.

OPERATING CHARACTERISTICS

Vh = 6.3, Va = 250, $Vg_1 = 0$, $Vg_2 = 100$, $Vg_3 = 0$, Rk = 60 ohms, Ck = 1,000 μF

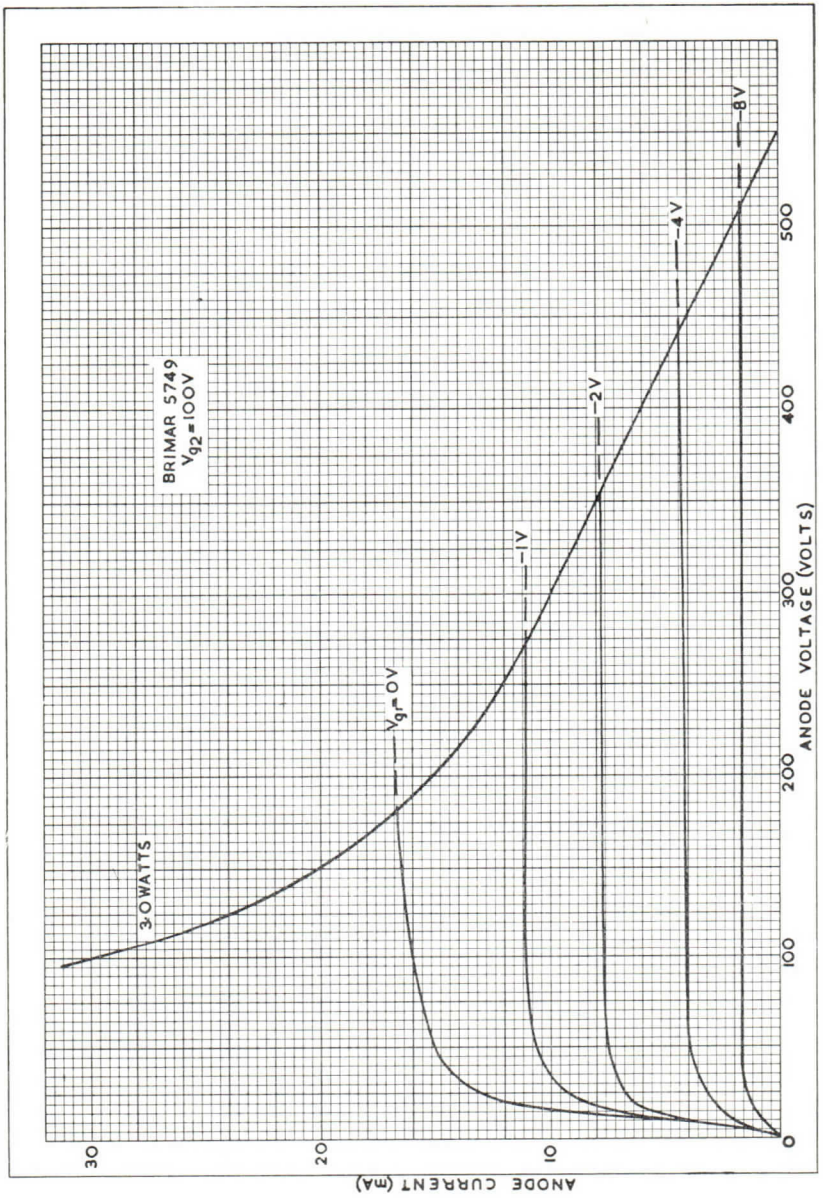
	Min.	Bogey	Max.	
Anode Current	8.5	11	13.5	mA
Screen Current	2.8	4.2	5.6	mA
Anode Impedance	—	1.0	—	MΩ
Mutual Conductance	3.6	4.4	5.2	mA/V
Input Impedance (45 Mc/s)		4,500		ohms
Input Impedance (90 Mc/s)		900		ohms
Control Grid Voltage (for Mutual Conductance of 0.005 mA/V)		−21		volts

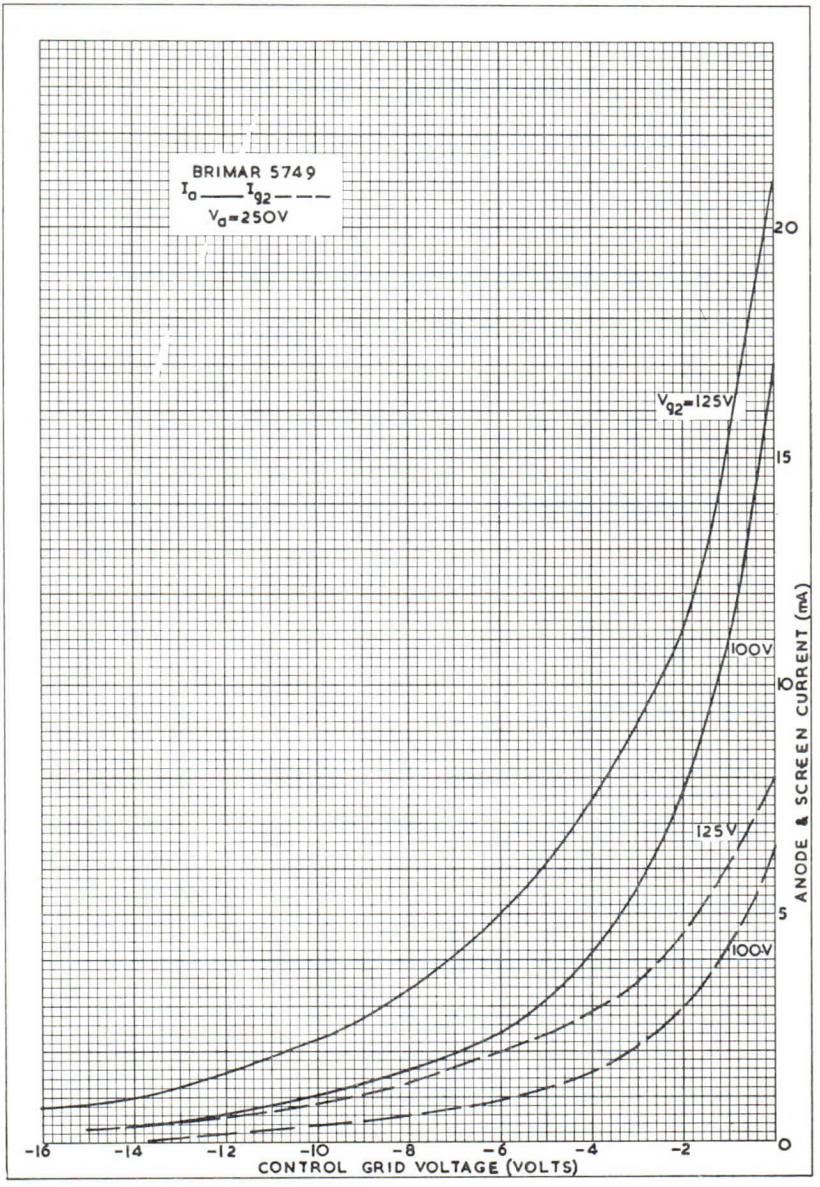
INTER-ELECTRODE CAPACITANCES*

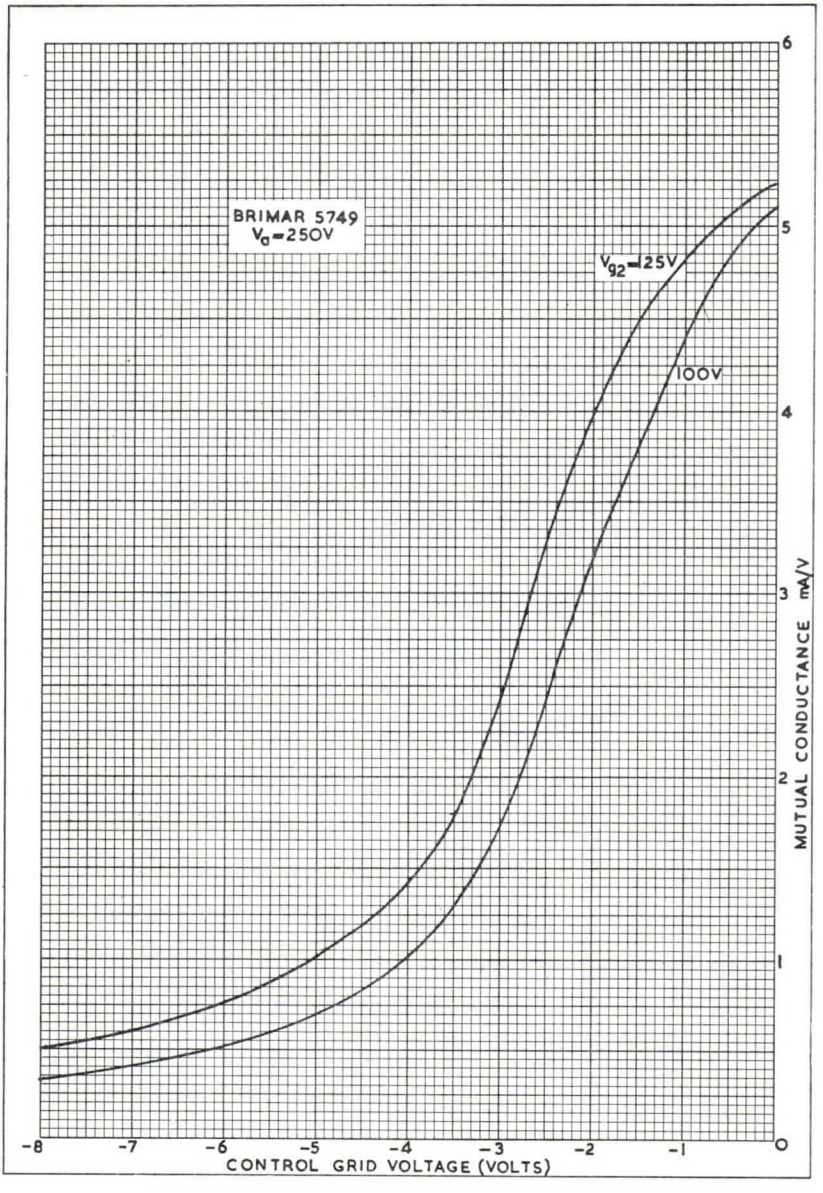
Input	5.5	pF
Output	5.0	pF
Grid to Anode	0.0035	pF

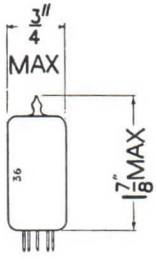
* *With no external shield.*

Type 5749 *is a commercial equivalent to the* CV4009.

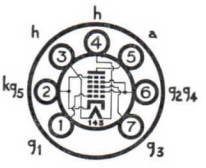

BRIMAR 5749
V_{g2}=100V
3·0 WATTS
V_{g1}=0V
-1V
-2V
-4V
-8V
ANODE CURRENT (mA)
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (VOLTS)


BRIMAR 5749
I_a —— I_{g2} – – –
V_a=250V
V_{g2}=125V
100V
125V
100V
20
15
10
5
0
ANODE & SCREEN CURRENT (mA)
-16
-14
-12
-10
-8
-6
-4
-2
0
CONTROL GRID VOLTAGE (VOLTS)


BRIMAR 5749
V_a=250V
V_{g2}=125V
100V
MUTUAL CONDUCTANCE mA/V
0
1
2
3
4
5
6
-8
-7
-6
-5
-4
-3
-2
-1
CONTROL GRID VOLTAGE (VOLTS)



TYPE 5750
TRUSTWORTHY MINIATURE HEPTODE FREQUENCY CHANGER



The BRIMAR 5750 is a trustworthy heptode which may be employed as a self-oscillating frequency changer at frequencies exceeding 60 Mc/s, with excellent frequency stability.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.3	amp.
Anode Voltage	300	volts max.
Anode Dissipation	1.0	watt max.
Screen ($g_2 + g_4$) Voltage	100	volts max.
Screen Dissipation	1.0	watt max.
Total Cathode Current	14	mA max.

OPERATING CHARACTERISTICS (SEPARATE EXCITATION)

Vh = 6.3, Va = 250, Vg_1 = 0, $Vg_2 + g_4$ = 100, Vg_3 = −1.5

	Min.	Bogey	Max.	
Anode Current	1.9	3.0	4.1	mA
Screen Current	5.2	7.5	9.8	mA
Anode Impedance	—	1.0	—	MΩ
Oscillator Grid (g_1) Current	—	0.5	—	mA
Oscillator Grid Resistor	—	20,000	—	ohms
Oscillator Mutual Conductance ...	5.5	7.25	9.0	mA/V
Conversion Conductance	0.280	0.475	0.750	mA/V
Control Grid Voltage		−30		volts

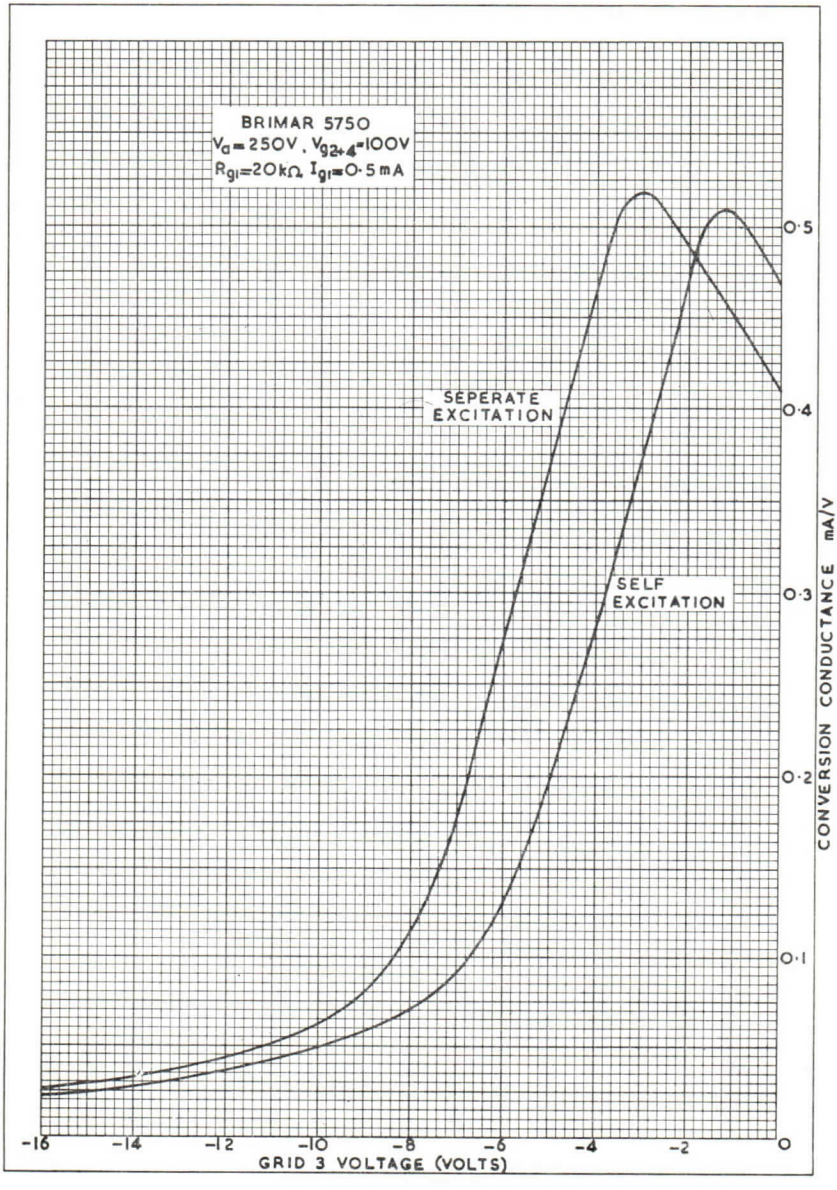
(For Conversion Conductance of 0.001 mA/V)

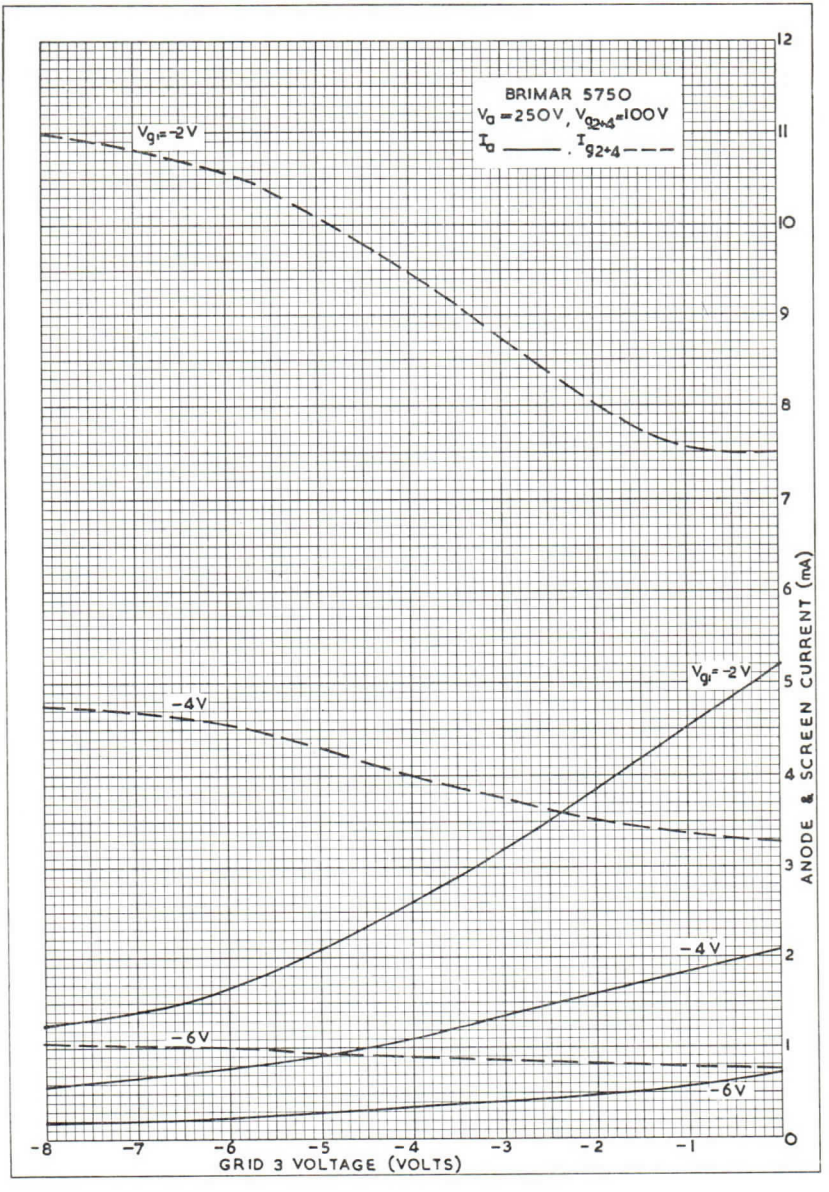
INTER-ELECTRODE CAPACITANCES*

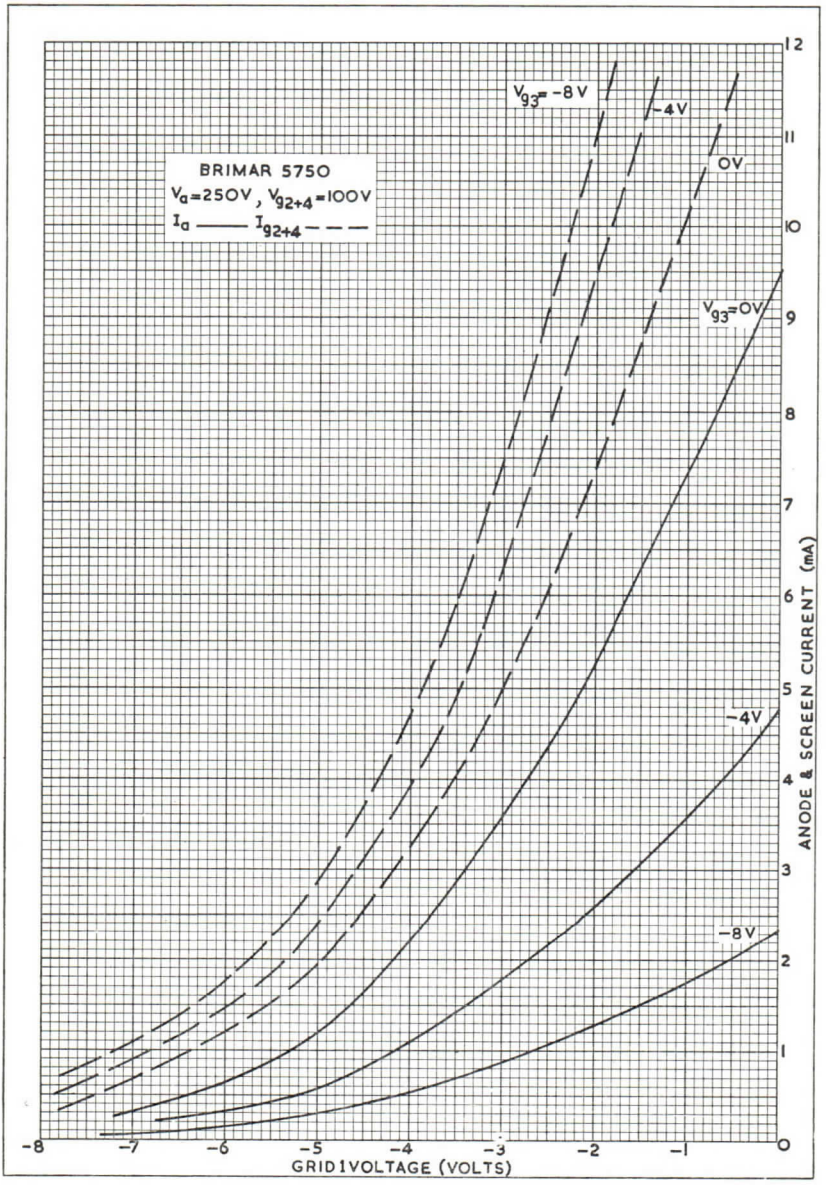
C in (nom.)	7.5	pF
C out (nom.)	13.5	pF
Ca, g_3 (max.)	0.35	pF

* *Measured with external shield.*

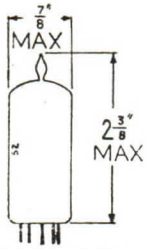
Type 5750 *is a commercial equivalent to* CV4012.


BRIMAR 5750
V_a = 250V, V_{g2+4} = 100V
R_{g1} = 20kΩ I_{g1} = 0·5 mA
SEPERATE EXCITATION
SELF EXCITATION
0·5
0·4
0·3
0·2
0·1
CONVERSION CONDUCTANCE mA/V
-16
-14
-12
-10
-8
-6
-4
-2
0
GRID 3 VOLTAGE (VOLTS)


BRIMAR 5750
V_a =250V, V_{g2+4}=100V
I_a ——— . I_{g2+4} – – –
V_{g_1}=-2V
-4V
-6V
V_{g_1}=-2V
-4V
-6V
ANODE & SCREEN CURRENT (mA)
GRID 3 VOLTAGE (VOLTS)
0
1
2
3
4
5
6
7
8
9
10
11
12
-8
-7
-6
-5
-4
-3
-2
-1

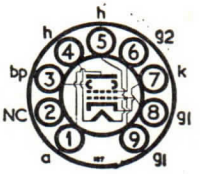

BRIMAR 5750
V_a=250V, V_{g2+4}=100V
I_a —— I_{g2+4} – – –
V_{g3}= -8 V
-4V
0V
V_{g3}=0V
-4V
-8 V
ANODE & SCREEN CURRENT (mA)
GRID1VOLTAGE (VOLTS)
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12

Current Equipment Type



B9A (Noval) Base

TYPE 5763 MINIATURE V.H.F. BEAM POWER AMPLIFIER



The BRIMAR type 5763, owing to its small size and comparatively high ratings, is very suitable for use in portable V.H.F. equipment. Sufficient ventilation must be provided to ensure that the bulb temperature never exceeds 250°C.

RATINGS

Heater Voltage	6.0 volts	
Heater Current	0.75 amp.	
Anode Voltage	300 volts	Absolute Maximum
Anode Dissipation	12 watts	
Screen (g_2) Voltage	250 volts	
Screen Dissipation	2.0 watts	
Control Grid (g_1) Current	5.0 mA D.C.	
Hot Spot Bulb Temperature	250° C.	
Heater to Cathode Potential	100 volts max.	
D.C. Cathode Current	65 mA max.	

Frequency for above ratings 175 Mc/s max.

OPERATION AS CLASS "A" AMPLIFIER

Anode Voltage	250 volts	Control Grid Voltage	−7.25 volts
Anode Current	45 mA	Anode Impedance	27,000 ohms
Screen Voltage	250 volts	Mutual Conductance	7.0 mA/V
Screen Current	4.7 mA	Amp. Factor (μg_1-g_2)	16

OPERATION AS OSCILLATOR OR POWER AMPLIFIER (CLASS "C" TELEGRAPHY) AT 50 Mc/s

Anode Voltage	300 volts
Anode Current	50 mA
Screen Voltage	250 volts
Screen Current	5.0 mA
Control Grid Voltage	−60 volts
Control Grid Resistor	22,000 ohms
Control Grid Current	3 mA
Peak R.F. Grid Voltage	80 volts
Input Driving Power	0.35 watts
Output Power	8.0 watts

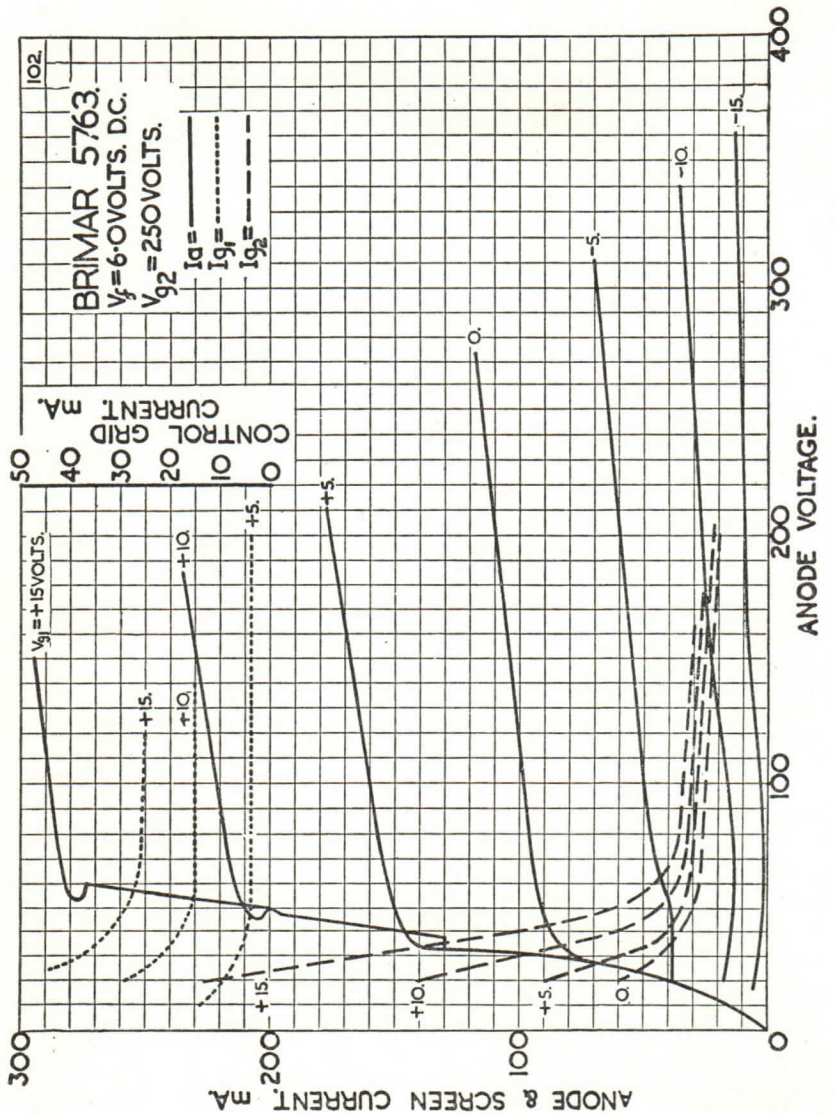
OPERATION AS FREQUENCY MULTIPLIER

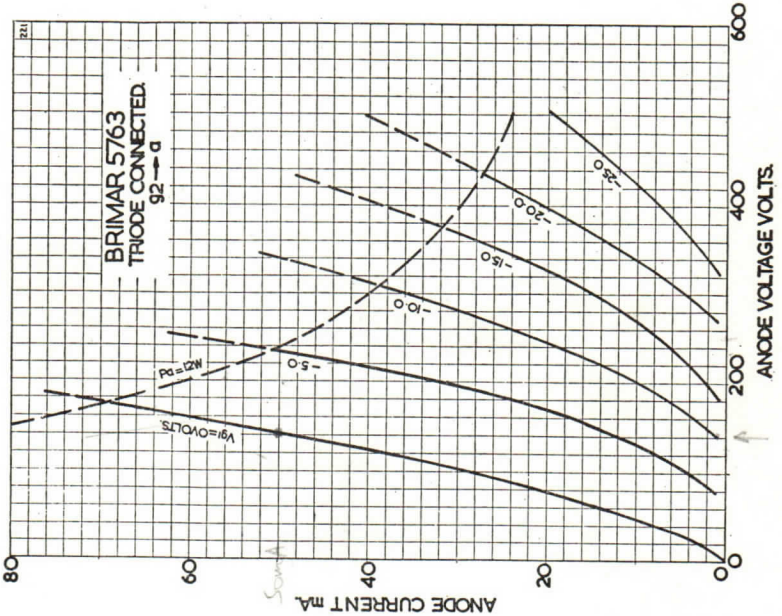
	Doubler to 175 Mc/s	*Tripler to 175 Mc/s*	
Anode Voltage	300	300	volts
Anode Current	40	35	mA
Screen Supply Voltage	300	300	volts
Series Screen Resistor	12,500	12,500	ohms
Screen Current	4.0	5.0	mA
Control Grid Voltage	−75	−100	volts
Control Grid Resistor	75,000	100,000	ohms
Peak R.F. Grid Voltage	95	120	volts
Control Grid Current	1.0	1.0	mA
Input Driving Power	0.6	0.6	watts
Output Power	3.6	2.8	watts

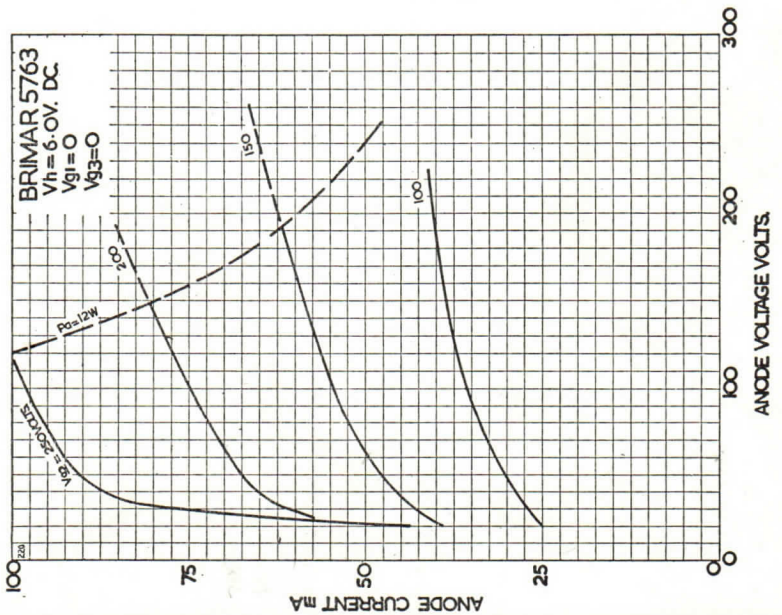
INTER-ELECTRODE CAPACITANCES (No External Shield)

Input	9.5 pF
Output	4.5 pF
Control Grid to Anode	0.3 pF max.

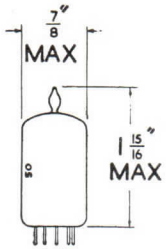
Type 5763 is a commercial equivalent of the CV2129.


102.
BRIMAR 5763.
V_f=6·0VOLTS. D.C.
V_{g2}=250VOLTS.
Ia=
Ig_1=
Ig_2=
CONTROL GRID CURRENT mA.
50
40
30
20
10
0
V_{g1}=+1SVOLTS.
+15.
+10.
+5.
+15.
+10.
+5.
0.
-5.
-10.
-15.
+10.
+5.
0.
300
200
100
0
ANODE & SCREEN CURRENT. mA.
400
300
200
100
0
ANODE VOLTAGE.

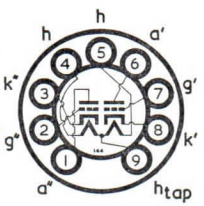




BRIMAR VALVES



TYPE 5965
LONG LIFE
MINIATURE DOUBLE TRIODE



The BRIMAR 5965 is a miniature double triode designed for use in high-speed digital computers and other switching applications. Each triode section features a high zero-bias anode current, a sharp cut-off characteristic, and a separate cathode connection. In addition, the balance of the cut-off characteristic between the two sections is controlled. The heater-cathode construction is designed for dependable service under conditions of intermittent operation. When used in "on-off" control applications, the 5965 will maintain its emission capabilities after long periods of operation under cut-off conditions.

RATINGS

Heater Voltage (A.C. or D.C.)	6.3 or 12.6		volts
Heater Current	0.45 or 0.225		amp.
Anode Voltage	300		volts max.
Positive D.C. Grid Voltage	0		volts max.
Anode Dissipation	2.2		watts max.
Cathode Current	15.0		mA max.
Heater Cathode Voltage	90		volts max.
Grid Circuit Resistance—With Fixed Bias	0.1		MΩ max.
With Cathode Bias	0.5		MΩ max.

OPERATING CHARACTERISTICS (Each Section)

Va = 150V, Vg = 0 V, Rk = 220 ohms, Vh = 6.3 (parallel connection)

	Min.	Bogey	Max.	
Anode Current	6.3	8.2	10.7	mA
Mutual Conductance	5.3	6.5	8.1	mA/V
Amplification Factor	39	47	55	
Anode Resistance, approximate		7,250		ohms

TYPICAL OPERATION (Computer Service, Each Section)

	On Condition	*Off Condition*	
Anode Supply Voltage	150	150	volts
Anode Load Resistor	7,200	7,200	ohms
Grid Voltage	0†	—	volts
Anode Current, approximate	10.5	—	mA
Grid Voltage for I_a = 150 μA approx.‡	—	−5.5	volts

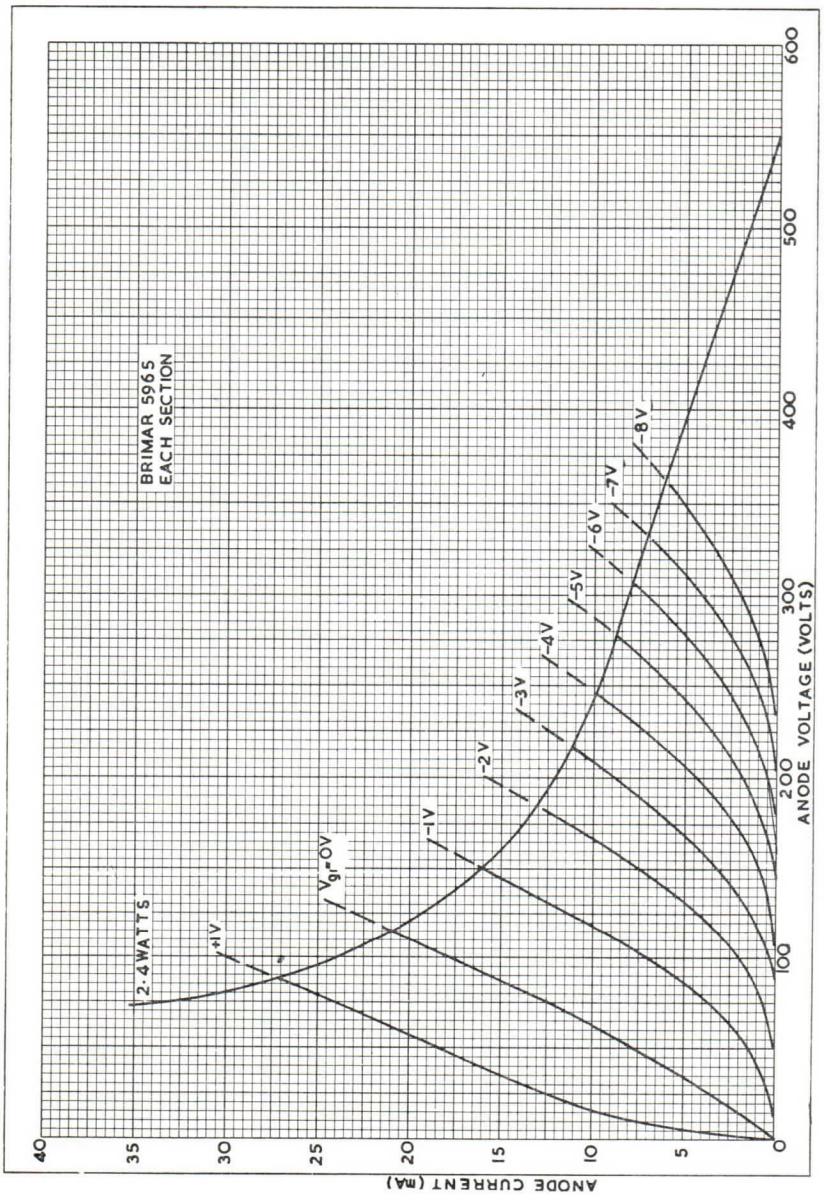
DIRECT INTER-ELECTRODE CAPACITANCES*

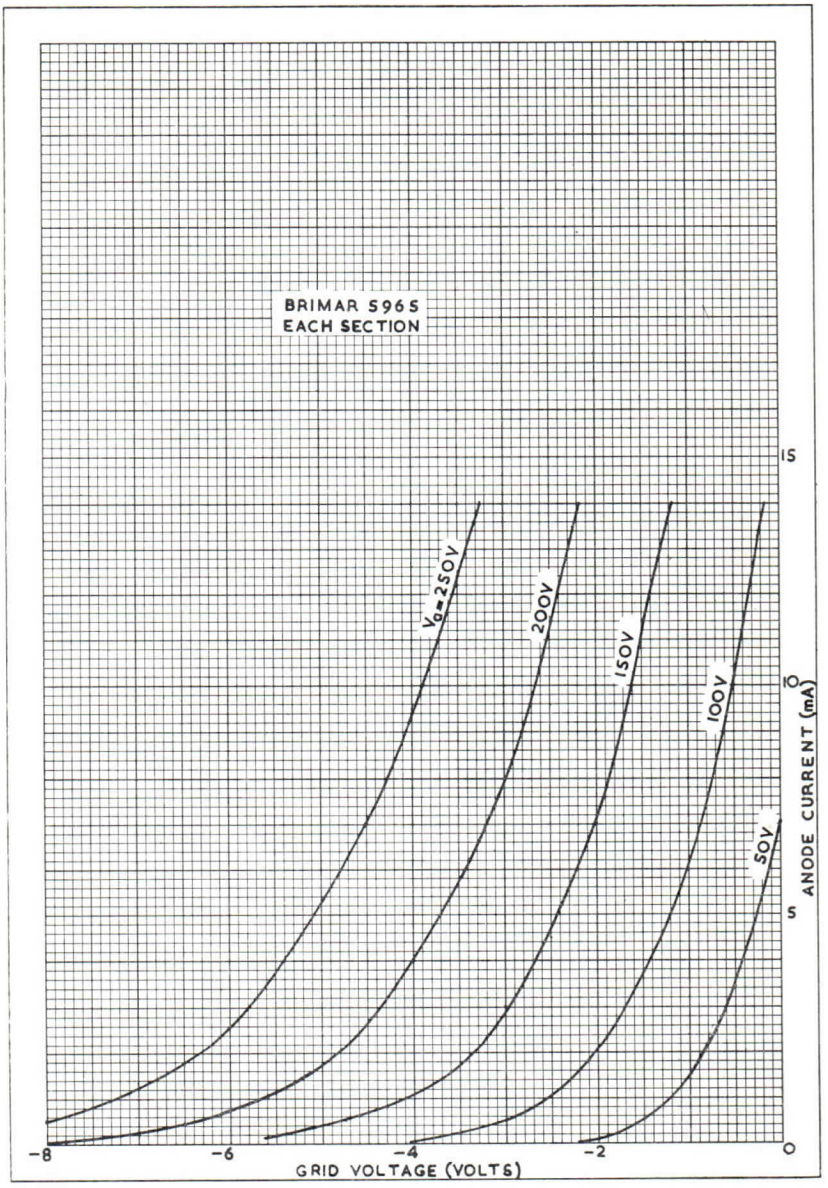
Grid to Anode (each section)	3.0	pF
Input (each section)	3.8	pF
Output (Section 1)	0.5	pF
Output (Section 2)	0.38	pF
Anode to Anode	0.5	pF

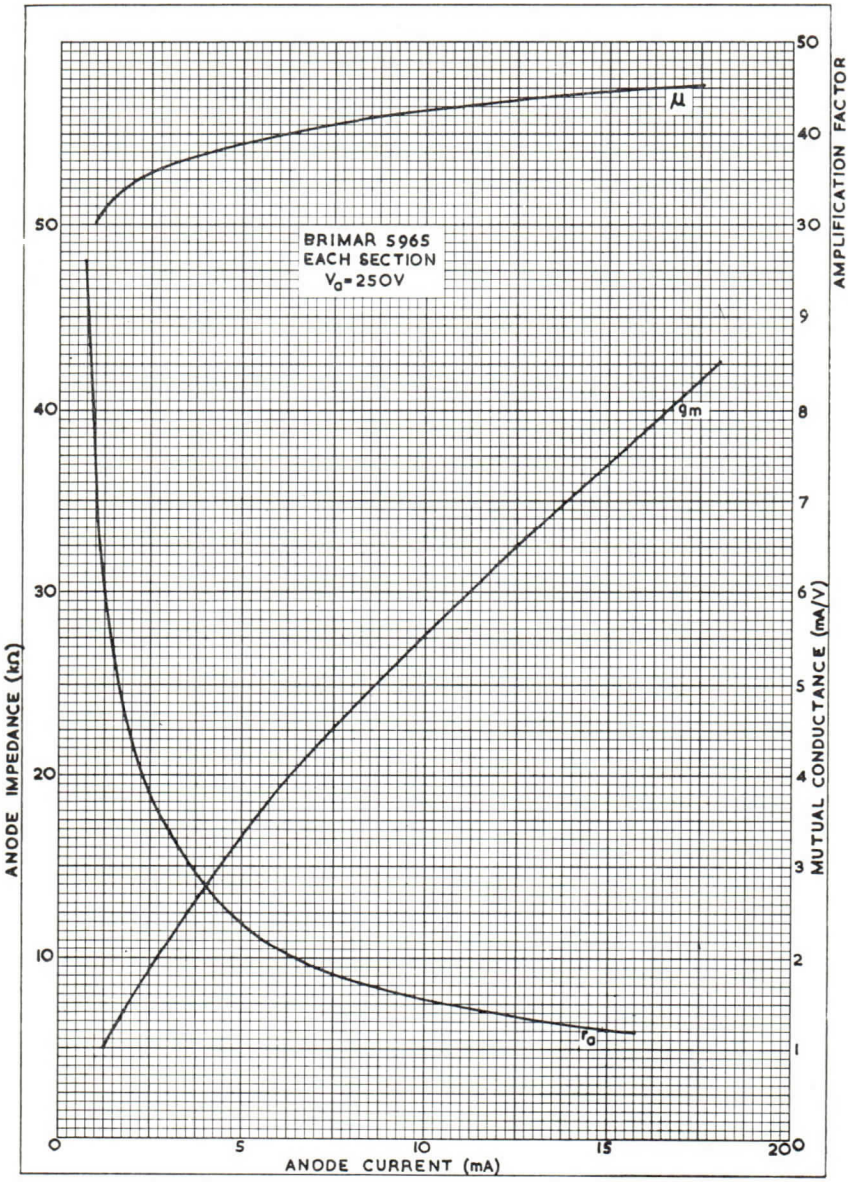
* *Without external shield.*

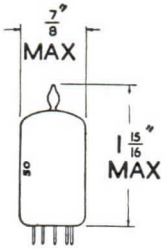
† *Approximate value of grid voltage with grid current adjusted for approximately* 140 μA.

‡ *The grid voltage required to produce* 150 μA *in one section normally will not differ by more than* 1.5 *volts from the grid voltage required to produce* 150 μA *in the other section with an anode supply voltage of* 150 *volts and an anode load resistor of* 7,200 *ohms.*

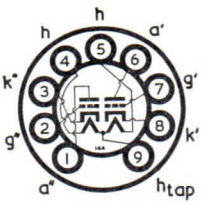

BRIMAR 5965
EACH SECTION
2·4 WATTS
+1V
V_{g1}=0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
-8V
ANODE CURRENT (mA)
ANODE VOLTAGE (VOLTS)
0
5
10
15
20
25
30
35
40
100
200
300
400
500
600


BRIMAR 5965
EACH SECTION
V_a=250V
200V
150V
100V
50V
15
10
5
0
ANODE CURRENT (mA)
-8
-6
-4
-2
0
GRID VOLTAGE (VOLTS)


BRIMAR 5965
EACH SECTION
V_a=250V
μ
g_m
r_a
ANODE IMPEDANCE (kΩ)
MUTUAL CONDUCTANCE (mA/V)
AMPLIFICATION FACTOR
ANODE CURRENT (mA)
0
5
10
15
20
50
40
30
20
10
9
8
7
6
5
4
3
2
1



TYPE **6057**
TRUSTWORTHY MINIATURE DOUBLE TRIODE
(High-Mu)



The BRIMAR 6057 is a trustworthy miniature double triode with separate cathode connections and a tapped heater enabling it to be used in a variety of applications.

RATINGS

Heater Voltage ...	6.3	or 12.6	volts
Heater Current	0.3	or 0.15	amp.
Anode Voltage ...		300	volts max.
Anode Dissipation		1.0	watts max.
Anode Voltage (zero Anode Current)		550	volts max.

OPERATING CHARACTERISTICS (EACH SECTION)

Va = 250, Vg = −2, Vh = 12.6 V (series connection)

	Min.	Bogey	Max.	
Anode Current ...	0.75	1.25	1.75	mA
Anode Impedance	—	59,000	—	ohms
Mutual Conductance	1.25	1.6	2.05	mA/V
Amplification Factor	75	95	115	

OPERATION AS RESISTANCE COUPLED AMPLIFIER

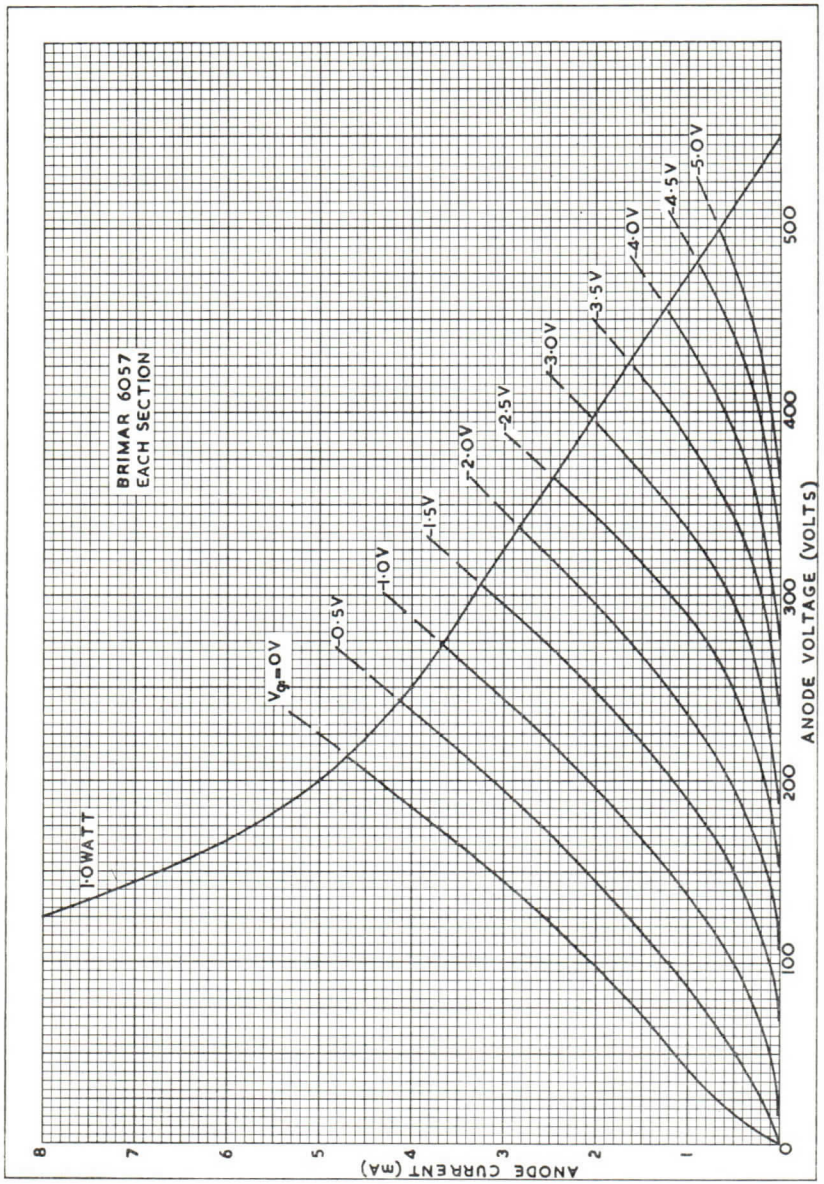
Anode Supply Voltage ...	100	250	volts
Anode Load Resistor ...	0.27	0.27	MΩ
Cathode Bias Resistor ...	6,800	3,300	ohms
Peak Output ...	10	50	volts
Stage Gain ...	45	60	

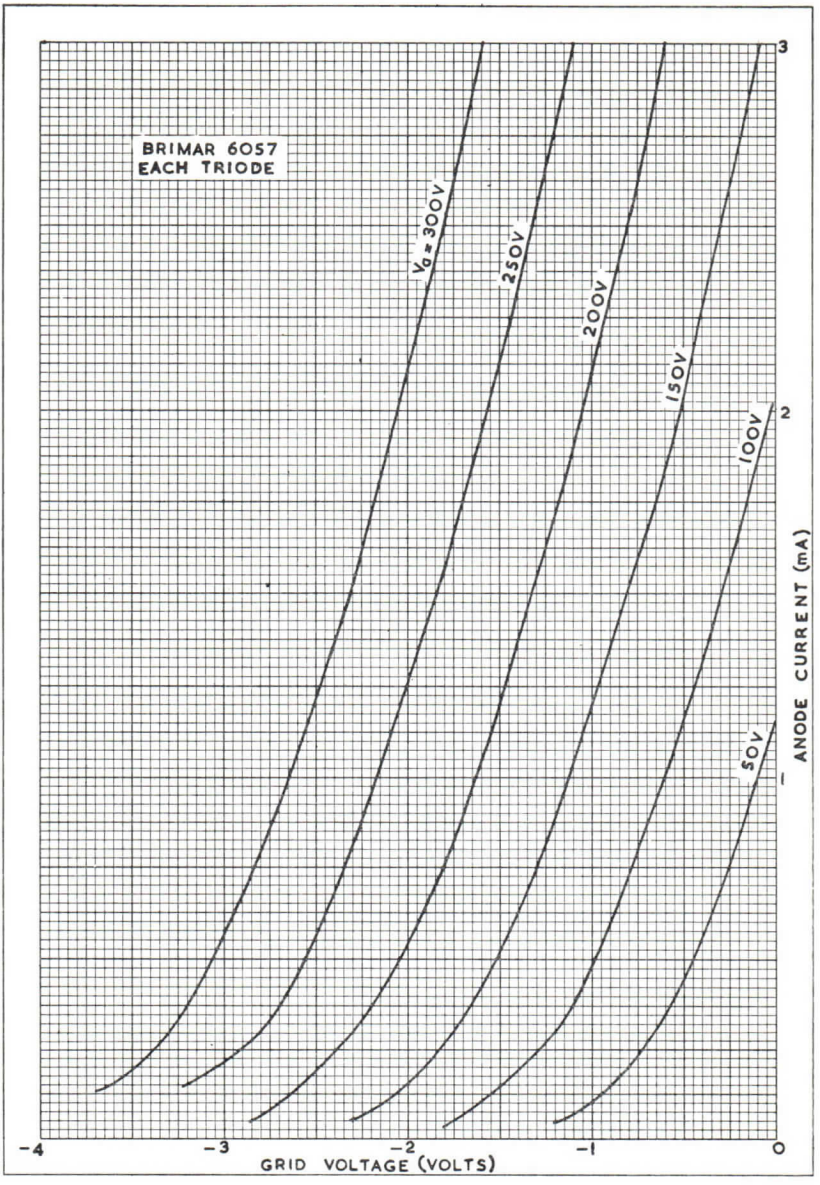
INTER-ELECTRODE CAPACITANCES*

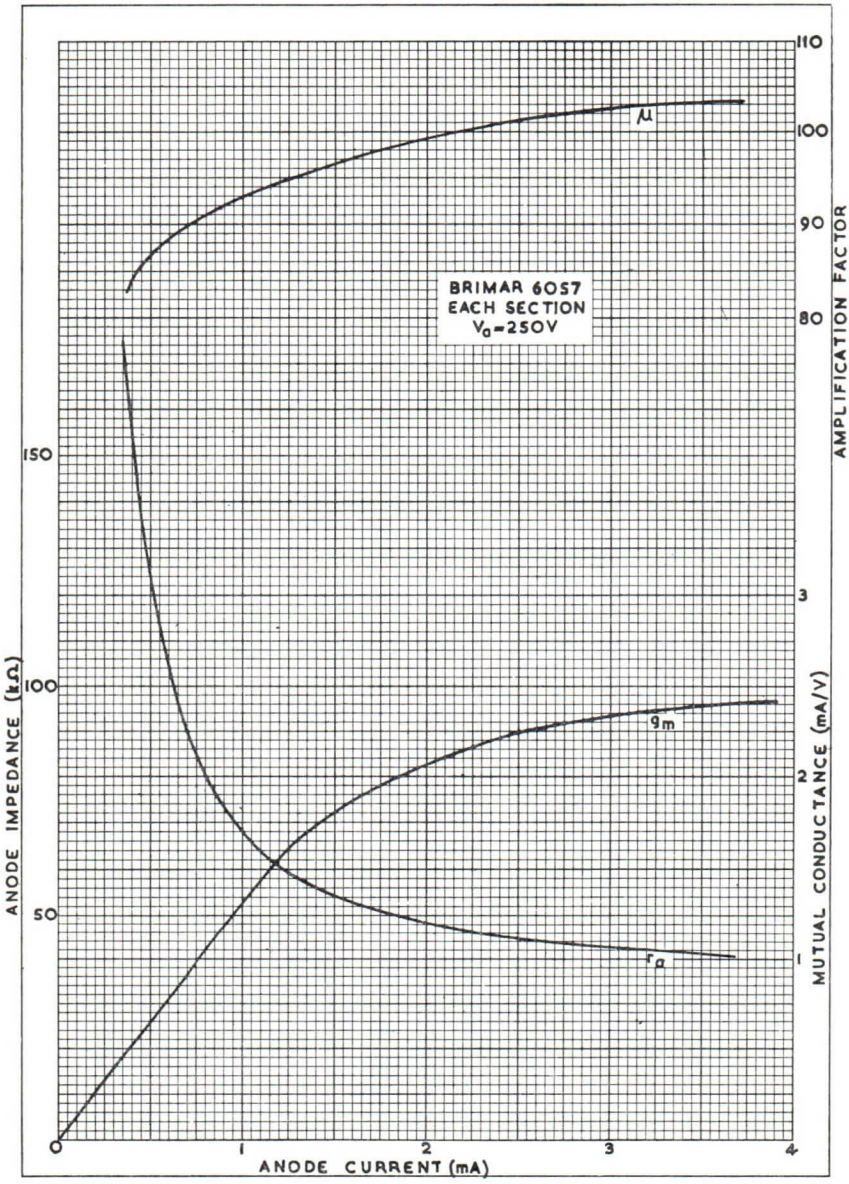
	Section 1	Section 2	
Input ...	1.6	1.6	pF
Output ...	0.46	0.34	pF
Grid to Anode ...	1.7	1.7	pF

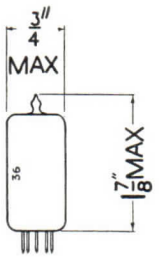
* *With no external shield.*

Type 6057 *is a commercial equivalent to* CV4004.

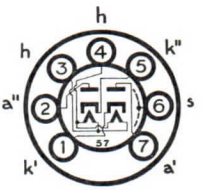

BRIMAR 6057
EACH SECTION
1·0 WATT
V_g=0V
-0·5V
-1·0V
-1·5V
-2·0V
-2·5V
-3·0V
-3·5V
-4·0V
-4·5V
-5·0V
ANODE CURRENT (mA)
ANODE VOLTAGE (VOLTS)
0
1
2
3
4
5
6
7
8
100
200
300
400
500


BRIMAR 6057
EACH TRIODE
Vg = 300V
250V
200V
150V
100V
50V
3
2
1
0
ANODE CURRENT (mA)
-4
-3
-2
-1
0
GRID VOLTAGE (VOLTS)


BRIMAR 6057
EACH SECTION
V_a=250V
μ
g_m
r_a
ANODE IMPEDANCE (kΩ)
150
100
50
0
AMPLIFICATION FACTOR
110
100
90
80
MUTUAL CONDUCTANCE (mA/V)
3
2
1
ANODE CURRENT (mA)
1
2
3
4



TYPE **6058**
TRUSTWORTHY MINIATURE DOUBLE DIODE



The BRIMAR 6058 is a trustworthy miniature double diode designed for reliable operation under severe conditions of vibration and shock.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.3	amp.
Peak Inverse Voltage	420	volts max.
Peak Anode Current	54	mA max.
Resonant Frequency	700	Mc/s approx.

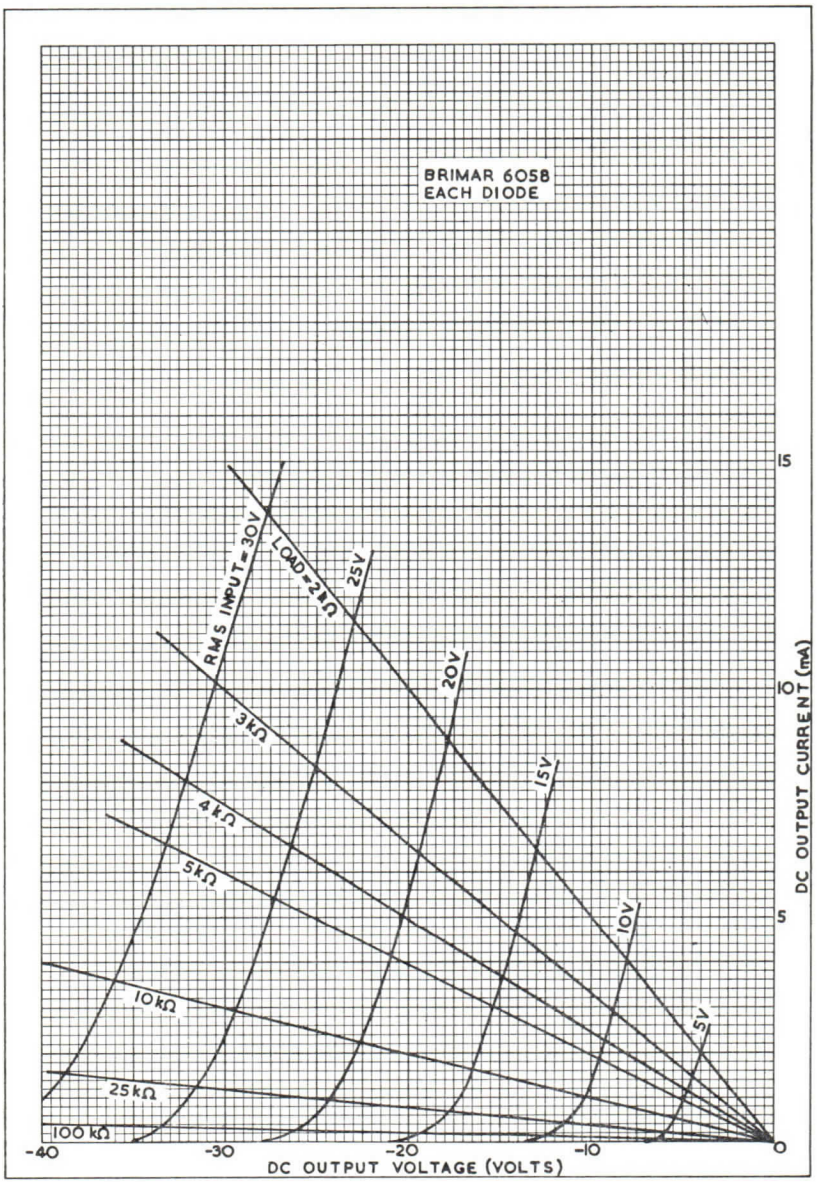
OPERATION AS HALF-WAVE RECTIFIER

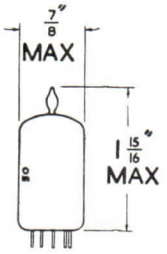
R.M.S. Input per Anode	150	volts max.
Supply Impedance per Anode	300	ohms min.
Rectified Current per Anode	9	mA max.

INTER-ELECTRODE CAPACITANCES

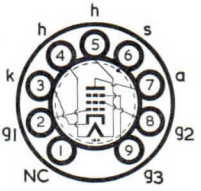
Diode 1 to Cathode 1 and Heater	3.2	pF
Diode 2 to Cathode 2 and Heater	3.2	pF
Cathode 1 to Diode 1 and Heater	3.9	pF
Cathode 2 to Diode 2 and Heater	3.9	pF
Diode 1 to Diode 2	0.026	pF max.

Type 6058 *is the commercial equivalent to the* CV4025.


BRIMAR 6058
EACH DIODE
RMS INPUT = 30V
LOAD = 2kΩ
25V
20V
15V
10V
5V
3kΩ
4kΩ
5kΩ
10kΩ
25kΩ
100kΩ
15
10
5
0
DC OUTPUT CURRENT (mA)
-40
-30
-20
-10
0
DC OUTPUT VOLTAGE (VOLTS)



TYPE 6059
TRUSTWORTHY LOW MICROPHONY AMPLIFIER PENTODE



The BRIMAR type 6059 has been specially designed for use in the early stages of high gain A.F. amplifiers. Its thorough screening and rigid construction ensure low microphony and greatly reduced hum.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.15	amp.
Anode Voltage	300	volts max.
Anode Dissipation	0.75	watt max.
Screen (g_2) Voltage	125	volts max.
Screen Dissipation	0.3	watt max.

OPERATING CHARACTERISTICS (g_3 connected to Cathode)

Vh = 6.3, Va = 250, Vg_2 = 100, Vg_1 = −3, Vg_3 = 0.

	Min.	Bogey	Max.	
Anode Current	1.2	2.1	3.0	mA
Screen Current	0.2	0.6	0.8	mA
Anode Impedance	—	2.3	—	MΩ
Mutual Conductance	0.95	1.275	1.6	mA/V

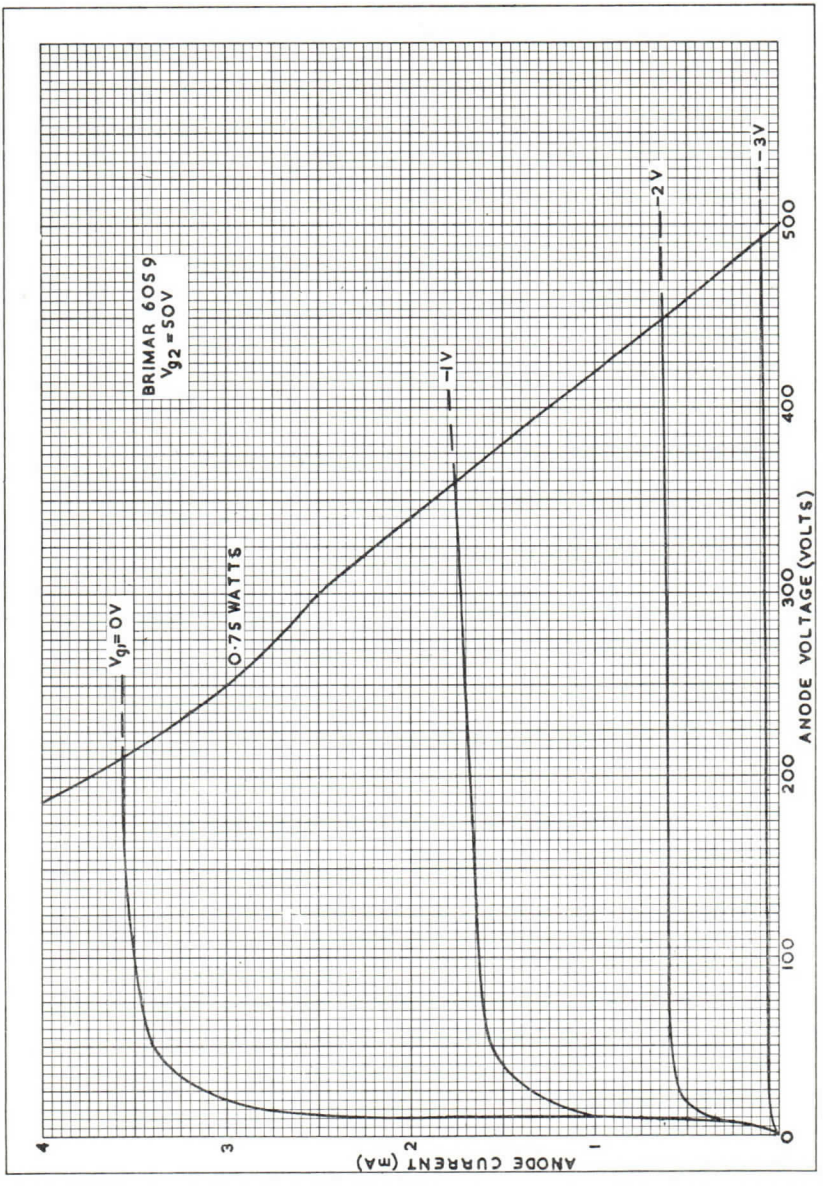
OPERATION AS RESISTANCE COUPLED AMPLIFIER

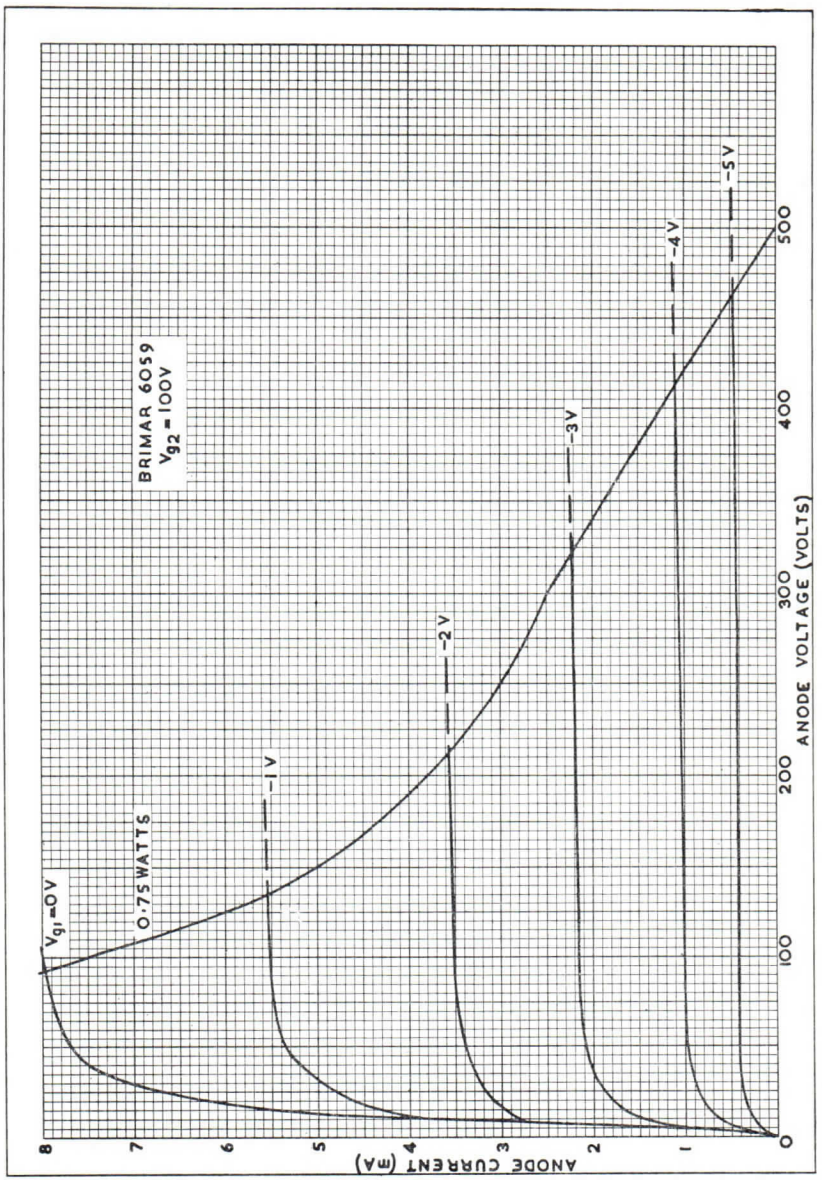
Anode and Screen Supply Voltage	100	200	300	volts
Anode Load Resistor	0.27	0.27	0.27	MΩ
Screen Series Resistor	1.0	1.0	1.2	MΩ
Peak Output	35	70	100	volts
Voltage Gain	90	120	140	
Cathode Bias Resistor	2,700	1,500	1,200	ohms

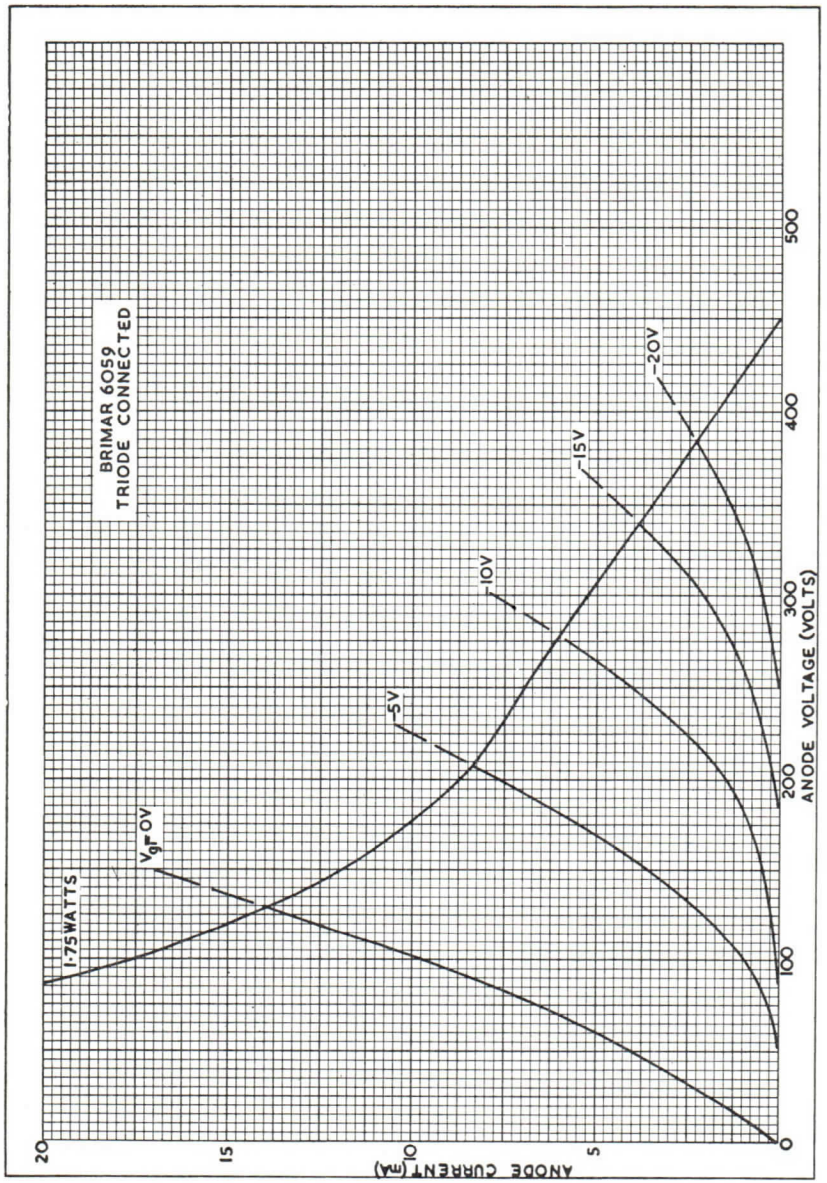
INTER-ELECTRODE CAPACITANCES

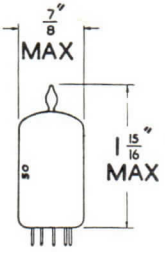
Input	4.25	pF
Output	4.0	pF
Control Grid to Anode	0.01	pF max.

Type 6059 is a commercial equivalent to the CV4006.

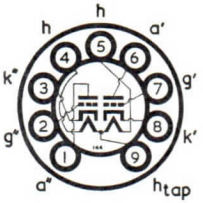

BRIMAR 6059
V_{g2} = 50V
V_{g1} = 0V
0·75 WATTS
-1V
-2V
-3V
ANODE VOLTAGE (VOLTS)
100
200
300
400
500
ANODE CURRENT (mA)
0
1
2
3
4


BRIMAR 6059
V_{g2} = 100V
0·75 WATTS
V_{g1}=0V
-1V
-2V
-3V
-4V
-5V
ANODE CURRENT (mA)
ANODE VOLTAGE (VOLTS)
0
1
2
3
4
5
6
7
8
100
200
300
400
500


BRIMAR 6059
TRIODE CONNECTED
1·75 WATTS
V_{g1}=0V
-5V
-10V
-15V
-20V
ANODE CURRENT (mA)
ANODE VOLTAGE (VOLTS)
0
5
10
15
20
100
200
300
400
500



TYPE **6060**
TRUSTWORTHY MINIATURE HIGH SLOPE DOUBLE TRIODE



The separate cathode connections and tapped heater features enable the 6060 to be used in a variety of applications. As a frequency changer it will operate at frequencies up to 500 Mc/s.

RATINGS

Heater Voltage	6.3 or 12.6	volts	
Heater Current	0.3 or 0.15	amp.	
Anode Voltage	300	volts max.	
Anode Dissipation (each section)	2.5	watts	
D.C. Cathode Current (each section)	20	mA max.	
Anode Voltage (zero anode current)	550	volts max.	

OPERATING CHARACTERISTICS (EACH SECTION)

Va = 250 V, Vg = 0 V, Rk = 200 ohms, Ck = 1,000 μF, Vh = 12.6 V (series connection).

	Min.	Bogey	Max.	
Anode Current	7	10	14	mA
Anode Impedance	—	10,900	—	ohms
Mutual Conductance	4.5	5.5	6.5	mA/V
Amplification Factor	50	60	70	
Grid Voltage (for Anode Current = 10 μA)	—	—	—20	volts

OPERATION AS FREQUENCY CHANGER

Oscillator Section		
Anode Supply Voltage	250	volts
Anode Decoupling Resistor	1,000	ohms
Grid Resistor	10,000	ohms
Mixed Section		
Anode Supply Voltage	250	volts
Anode Decoupling Resistor	1,000	ohms
Cathode Bias Resistor	680	ohms
*Conversion Conductance	2.5	mA/V
†Heterodyne Voltage	(see note)	

* *Exact value depends on circuit constants and input impedance considerations.*

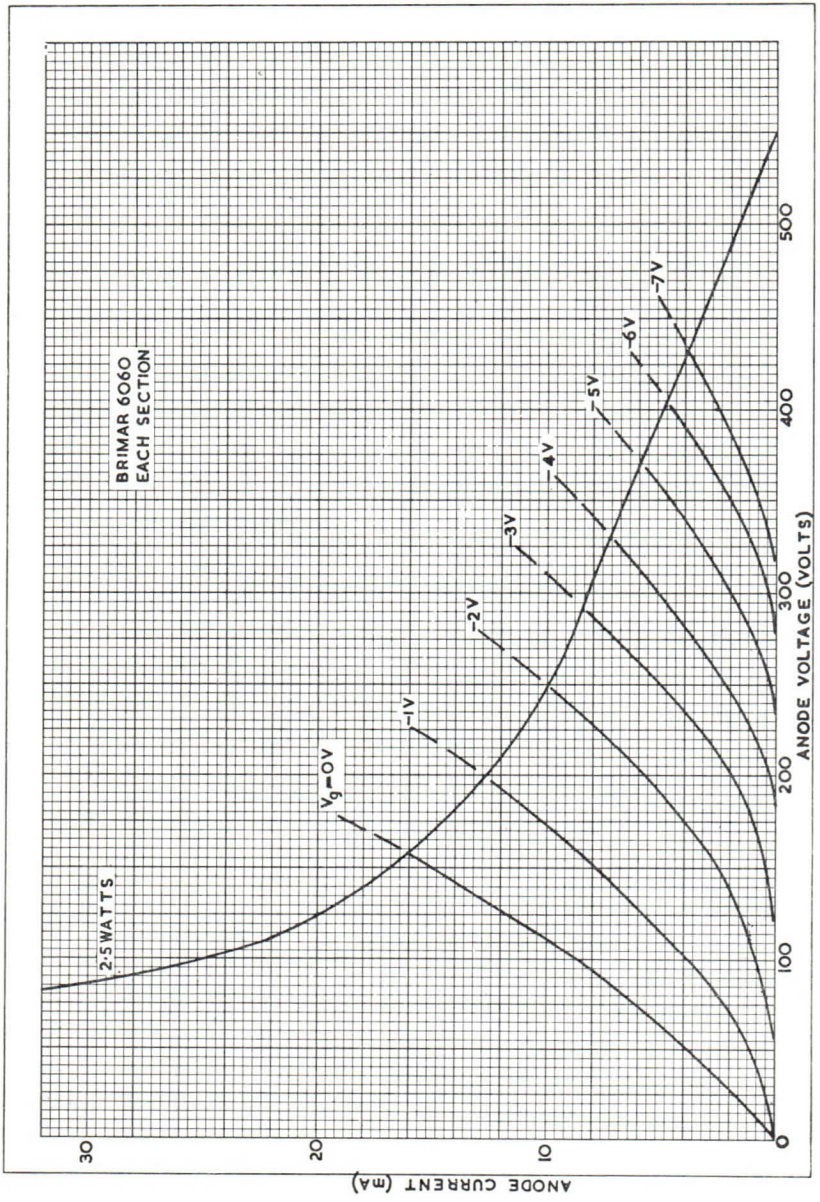
† *Heterodyne voltage should be just less than that required to cause grid current in the mixer section.*

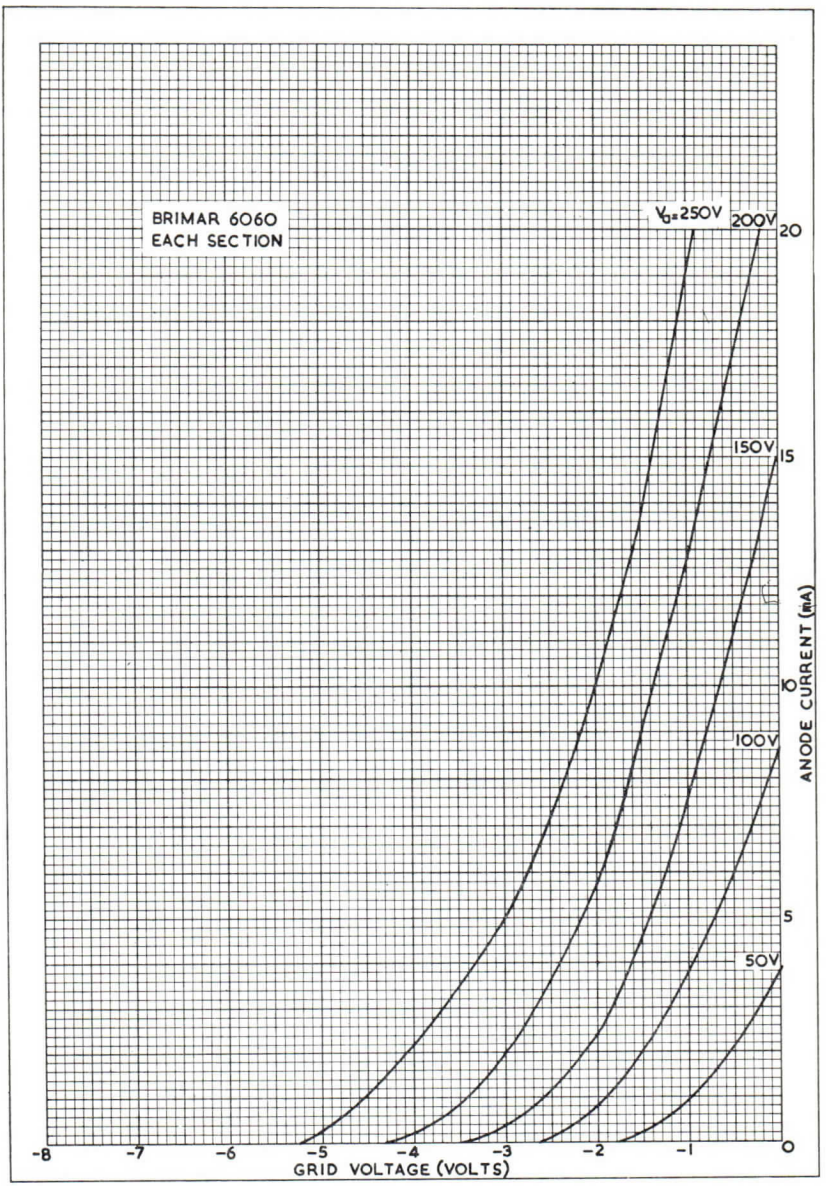
INTER-ELECTRODE CAPACITANCES**

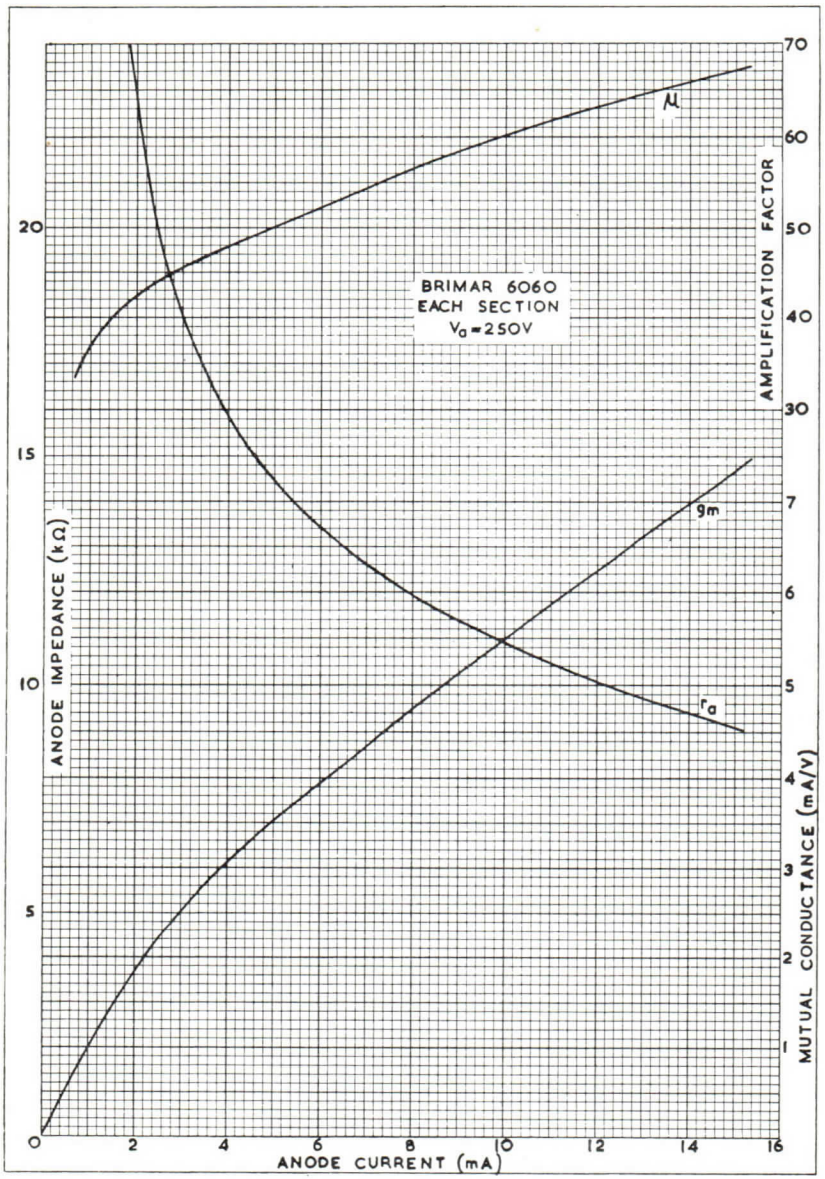
Anode to Anode (max.) Each Section	0.33	pF
C in (nom.)	2.5	pF
C out (nom.)	0.4	pF
Ca–g (nom.)	1.6	pF

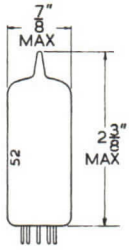
** *Measured with no external shield.*

Type 6060 *is a commercial equivalent to* CV4024.

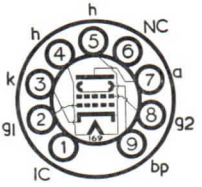

BRIMAR 6060
EACH SECTION
2·5 WATTS
V_g=0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
ANODE CURRENT (mA)
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (VOLTS)


BRIMAR 6060
EACH SECTION
V_b=250V
200V
150V
100V
50V
20
15
10
5
0
ANODE CURRENT (mA)
-8
-7
-6
-5
-4
-3
-2
-1
GRID VOLTAGE (VOLTS)


BRIMAR 6060
EACH SECTION
V_a = 250V
μ
g_m
r_a
ANODE IMPEDANCE (kΩ)
AMPLIFICATION FACTOR
MUTUAL CONDUCTANCE (mA/V)
ANODE CURRENT (mA)
0
2
4
6
8
10
12
14
16
5
10
15
20
1
2
3
4
5
6
7
30
40
50
60
70



TYPE **6061**
TRUSTWORTHY MINIATURE OUTPUT BEAM TETRODE



The BRIMAR type 6061 is a B9A (Noval) based output beam tetrode, the characteristics and ratings of which are identical to those of the 6V6G/GT. It is suitable for R.F. applications up to frequencies of the order of 150 Mc/s.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.45	amp.
Anode Voltage	315	volts max.
Anode Dissipation	12	watts max.
Screen Voltage	285	volts max.
Screen Dissipation	2	watts max.
Hot Spot Bulb Temperature	250	°C max.
D.C. Cathode Current	65	mA max.

OPERATING CHARACTERISTICS

$V_h = 6.3$, $V_a = 250$, $V_{g_2} = 250$, $V_{g_1} = -12.5$, $V_{g_3} = 0$.

	Min.	Bogey	Max.	
Anode Current (Zero Signal)	33	45	57	mA
Screen Current (Zero Signal)	0.6	4.5	7.5	mA
Anode Impedance		50		kΩ
Mutual Conductance	3.0	4.1	5.2	mA/V
Optimum Load		5		kΩ
Power Output		4.5		watts
Harmonic Distortion		8		%
Signal Voltage		8.8		V (rms)

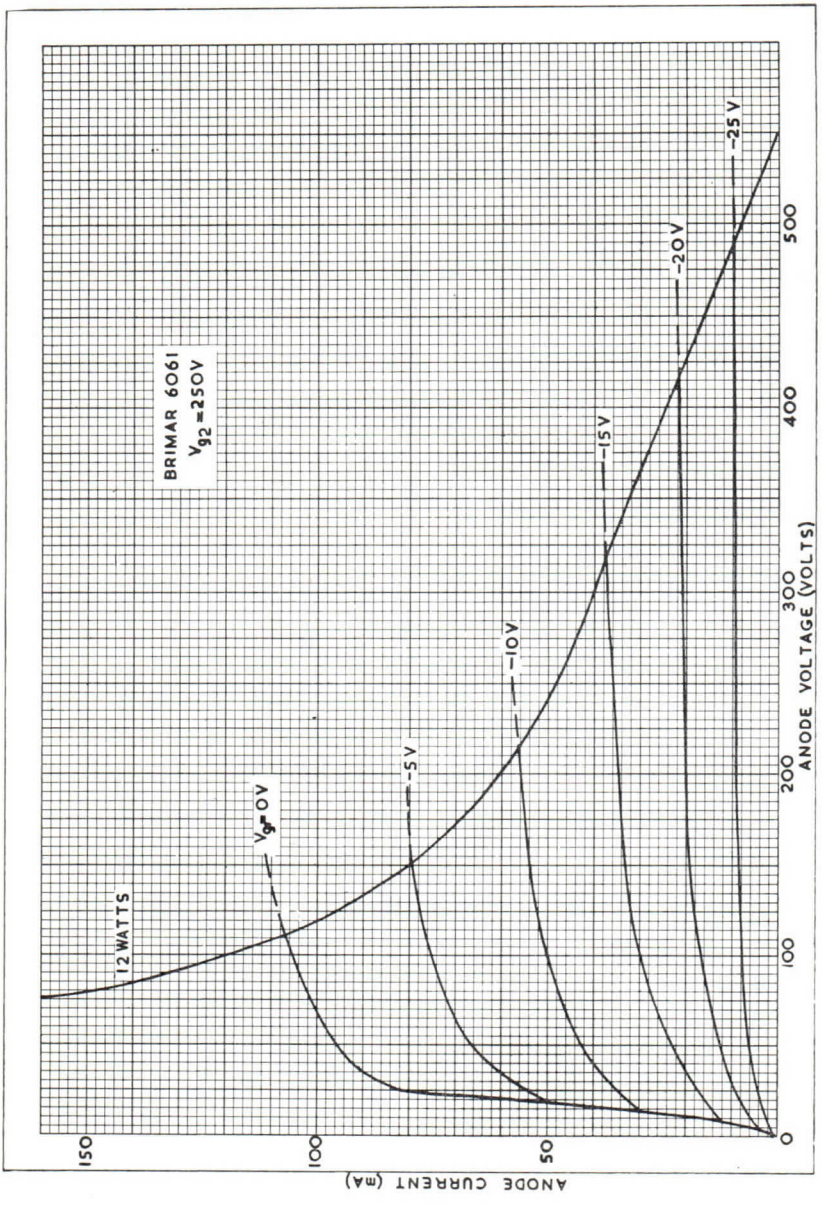
OPERATION AS A TRIODE (ANODE AND SCREEN STRAPPED) CLASS A PUSH-PULL (2 VALVES)

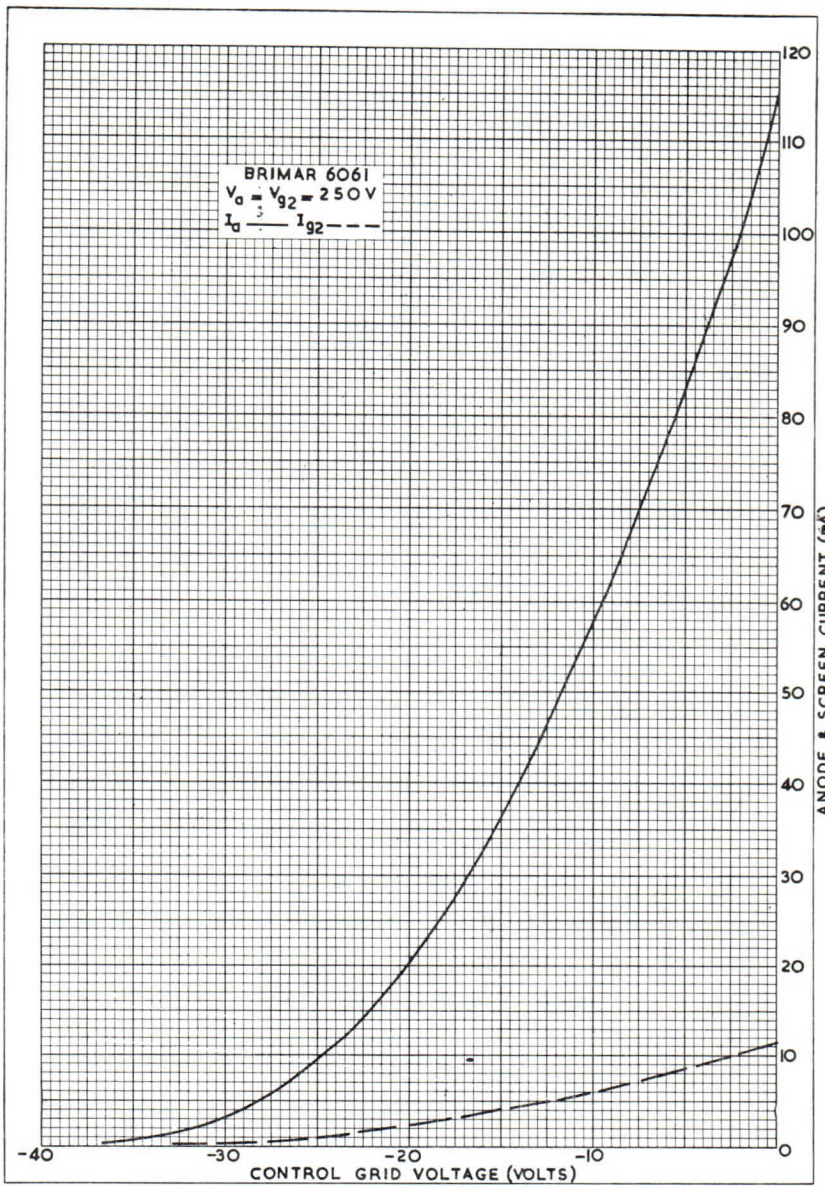
Anode Voltage	250	285	volts
Grid Voltage	−13.5	−19	volts
Cathode Bias Resistor	150	240	ohms
Anode current (no signal)	90	78	mA
Optimum Load (Anode to Anode)	4,000	4,500	ohms
Power Output	1.7	3.1	watts
Harmonic Distortion	0.4	0.5	%

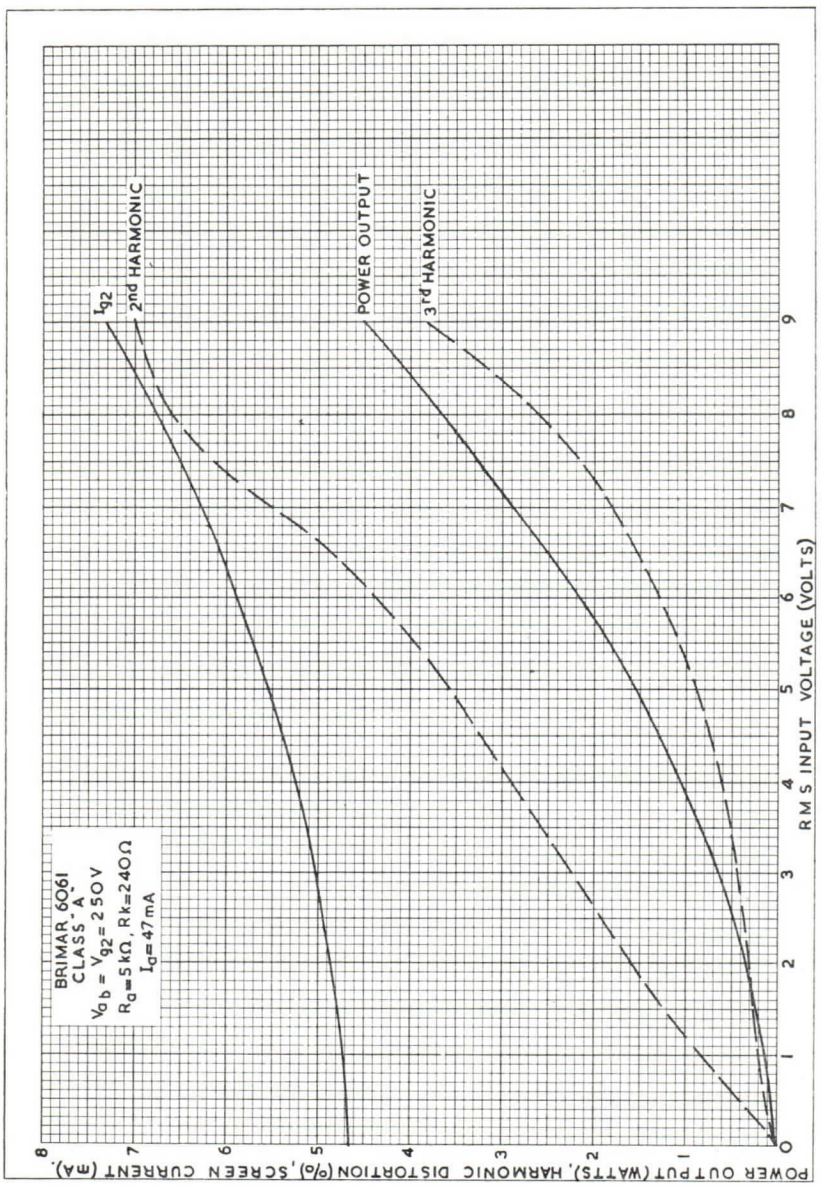
INTER-ELECTRODE CAPACITANCES

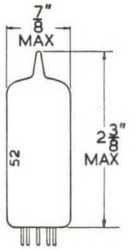
Input	8.3	pF
Output	7.0	pF
Grid to Anode (max.)	0.5	pF

Type 6061 is a commercial equivalent to the CV4043.

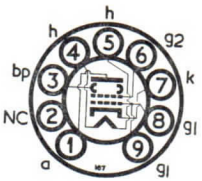

BRIMAR 6061
V_{g2}=250V
12 WATTS
V_{g1}=0V
-5V
-10V
-15V
-20V
-25V
ANODE CURRENT (mA)
150
100
50
0
100
200
300
400
500
ANODE VOLTAGE (VOLTS)


BRIMAR 6061
$V_a = V_{g2} = 250V$
I_a —— I_{g2} - - -
120
110
100
90
80
70
60
50
40
30
20
10
0
ANODE & SCREEN CURRENT (mA)
-40
-30
-20
-10
CONTROL GRID VOLTAGE (VOLTS)


BRIMAR 6061
CLASS 'A'
$V_{b\,b}$ = V_{g2} = 250 V
R_a = 5 kΩ, Rk = 240 Ω
I_a = 47 mA
I_{g2}
2nd HARMONIC
POWER OUTPUT
3rd HARMONIC
POWER OUTPUT (WATTS), HARMONIC DISTORTION (%), SCREEN CURRENT (mA).
R.M.S. INPUT VOLTAGE (VOLTS)
0
1
2
3
4
5
6
7
8
9



TYPE 6062
TRUSTWORTHY
V.H.F. BEAM
POWER AMPLIFIER



The BRIMAR type 6062, owing to its small size and comparatively high ratings, is very suitable for use in portable V.H.F. equipment. Sufficient ventilation must be provided to ensure that the bulb temperature never exceeds 250°C.

RATINGS

Heater Voltage	6.0	volts
Heater Current	0.75	amp.
Anode Voltage	300	volts
Anode Dissipation	12	watts
Screen (g_2) Voltage	250	volts
Screen Dissipation	2.0	watts
Control Grid (g_1) Current	5.0	mA D.C.
Hot Spot Bulb Temperature	250	°C
Heater to Cathode Potential	100	volts max.
D.C. Cathode Current	65	mA max.

(Max. Frequency for above ratings 175 Mc/s)

OPERATION AS CLASS A AMPLIFIER

$Vh = 6.0$, $Va = 250$, $Vg_2 = 250$, $Vg_1 = -7.5$, $Vg_3 = 0$, $Vhk = 0$

	Min.	Bogey	Max.	
Anode Current	33	45	57	mA
Screen Current		4.5	7	mA
Anode Impedance		27		k. ohms
Mutual Conductance	5.6	7.0	9.0	mA/V
Amplification Factor ($\mu g_1 - g_2$)	13	16	20	

OPERATION AS OSCILLATOR OR POWER AMPLIFIER (CLASS C TELEGRAPHY) AT 50 Mc/s

Anode Voltage	300	volts
Anode Current	50	mA
Screen Voltage	250	volts
Screen Current	5.0	mA
Control Grid Voltage	−60	volts
Control Grid Resistor	22,000	ohms
Control Grid Current	3	mA
Peak R.F. Grid Voltage	80	volts
Input Driving Power	0.35	watts
Output Power	8.0	watts

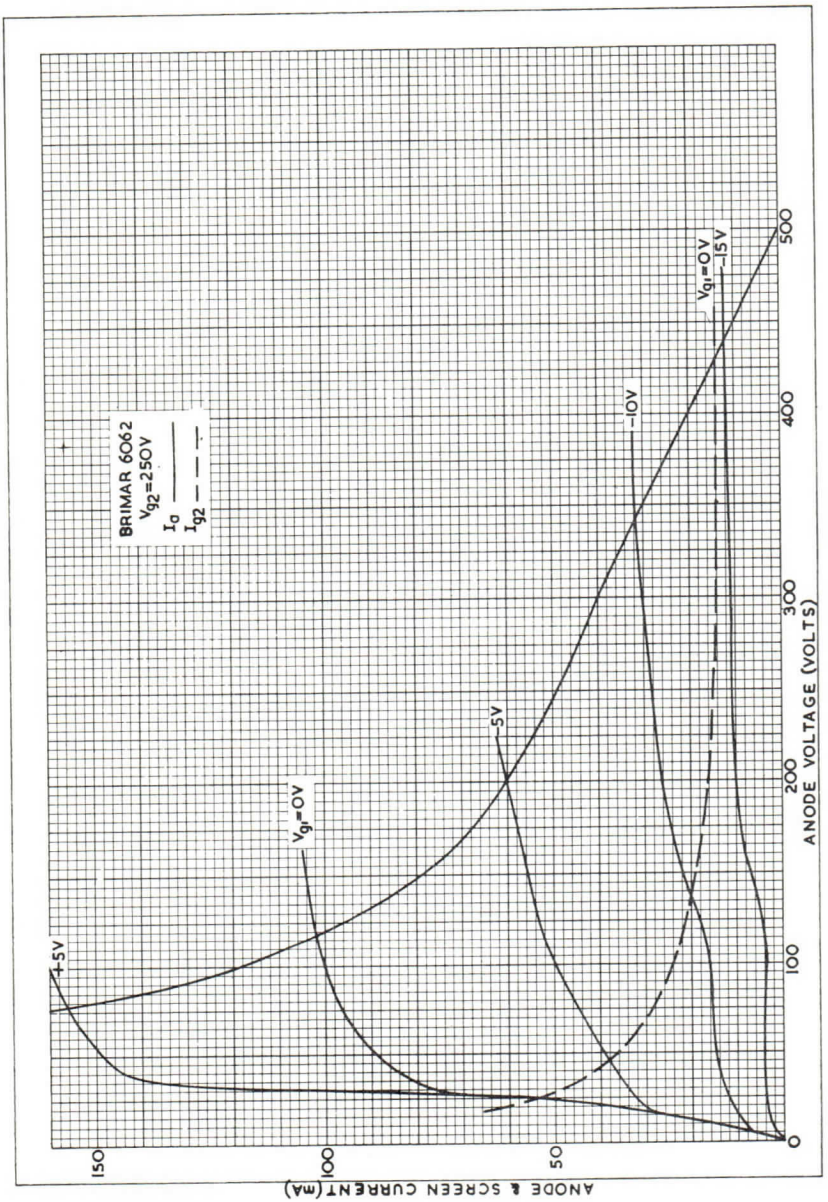
OPERATION AS A FREQUENCY MULTIPLIER

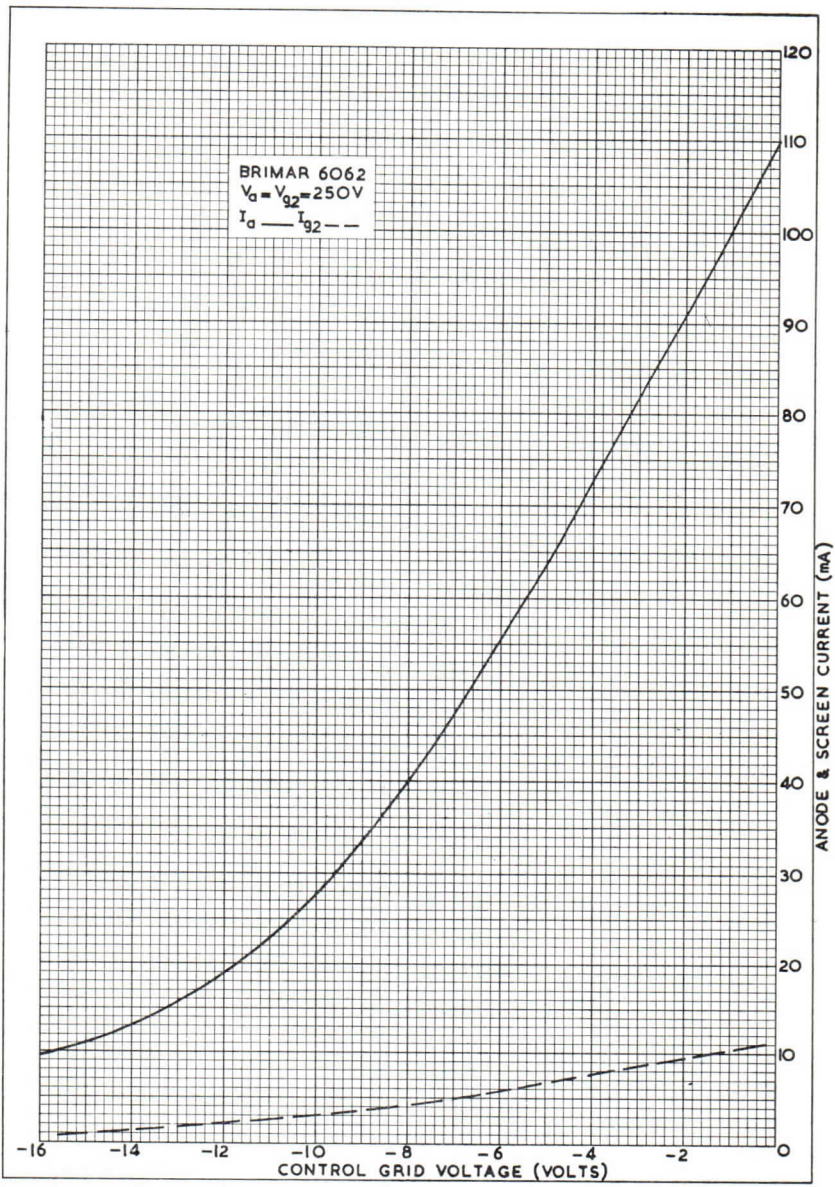
	Doubler to 175 Mc/s	Triplet to 175 Mc/s	
Anode Voltage	300	300	volts
Anode Current	40	35	mA
Screen Supply Voltage	300	300	volts
Series Screen Resistor	12,500	12,500	ohms
Screen Current	4.0	5.0	mA
Control Grid Voltage	−75	−100	volts
Control Grid Resistor	75,000	100,000	ohms
Peak R.F. Grid Voltage	95	120	volts
Control Grid Current	1.0	1.0	mA
Input Driving Power	0.6	0.6	watts
Output Power	3.6	2.8	watts

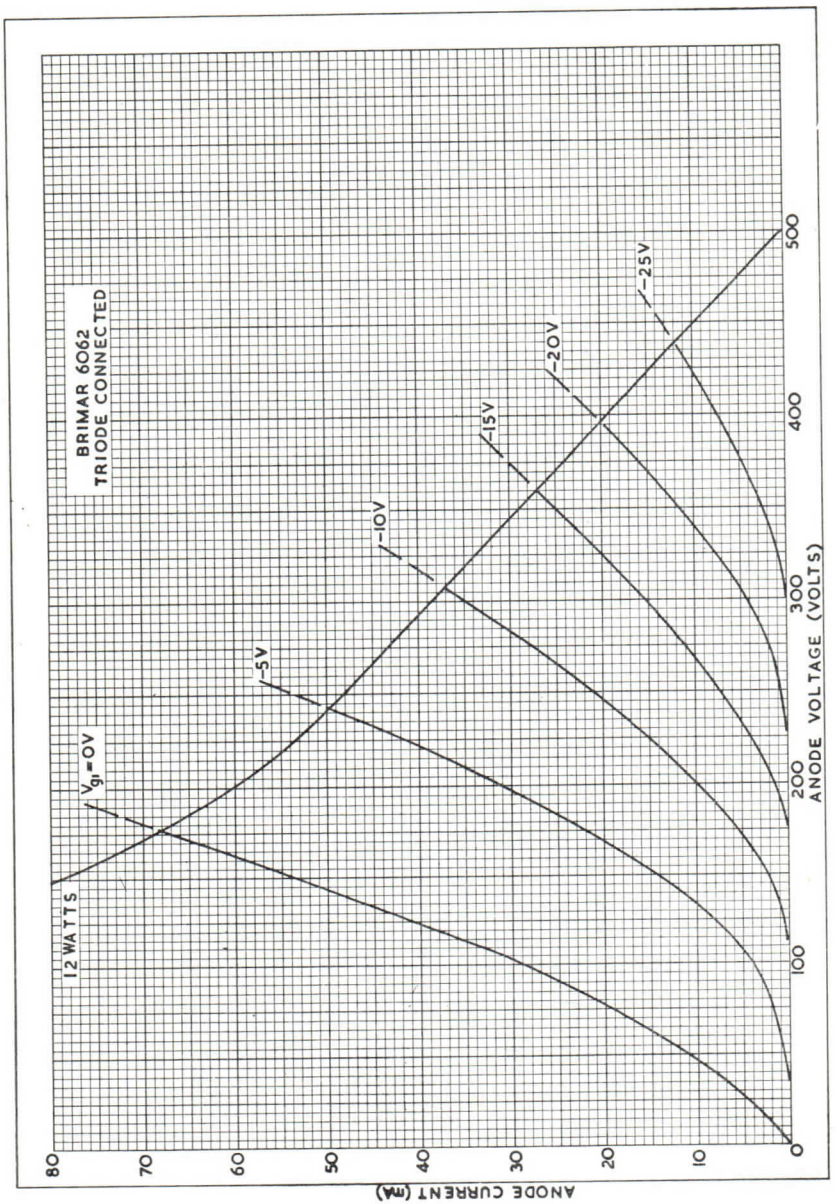
INTER-ELECTRODE CAPACITANCES (No external shield)

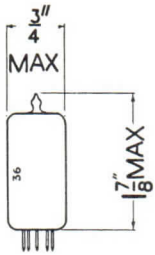
Input	9.5	pF
Output	4.5	pF
Control Grid to Anode	0.3	pF max.

Type 6062 is a commercial equivalent to the CV4039.

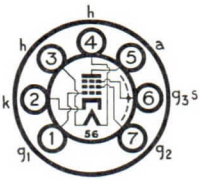

BRIMAR 6062
V_{g2}=250V
I_a ——
I_{g2} — — —
V_{g1}=0V
-5V
-10V
-15V
+5V
ANODE VOLTAGE (VOLTS)
ANODE & SCREEN CURRENT (mA)
0
100
200
300
400
500
50
100
150


BRIMAR 6062
$V_a = V_{g2} = 250V$
I_a —— I_{g2} – –
120
110
100
90
80
70
60
50
40
30
20
10
0
ANODE & SCREEN CURRENT (mA)
-16
-14
-12
-10
-8
-6
-4
-2
CONTROL GRID VOLTAGE (VOLTS)


BRIMAR 6062
TRIODE CONNECTED
12 WATTS
V_{g1}=0V
-5V
-10V
-15V
-20V
-25V
ANODE CURRENT (mA)
80
70
60
50
40
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (VOLTS)



TYPE 6064
TRUSTWORTHY MINIATURE HIGH SLOPE R.F. PENTODE



The BRIMAR 6064 is an indirectly-heated high slope R.F. Pentode suitable for a wide variety of applications. It may be used as an R.F. or I.F. or video amplifier, as a limiter, or as a frequency changer at frequencies up to 100 Mc/s in conjunction with a suitable oscillator.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.3	amp.
Anode Voltage	275	volts max.
Anode Dissipation	2.75	watts max.
Screen (g_2) Voltage	275	volts max.
Screen Dissipation	0.8	watts max.
Heater to Cathode Potential	150	volts max.

OPERATING CHARACTERISTICS

(Suppressor Grid (g_3) connected to Cathode)

Vh = 6.3, Va = 250, Vg_2 = 250, Vg_1 = 0, Vg_3 = 0, Rk = 160 ohms, Ck = 1,000 μF.

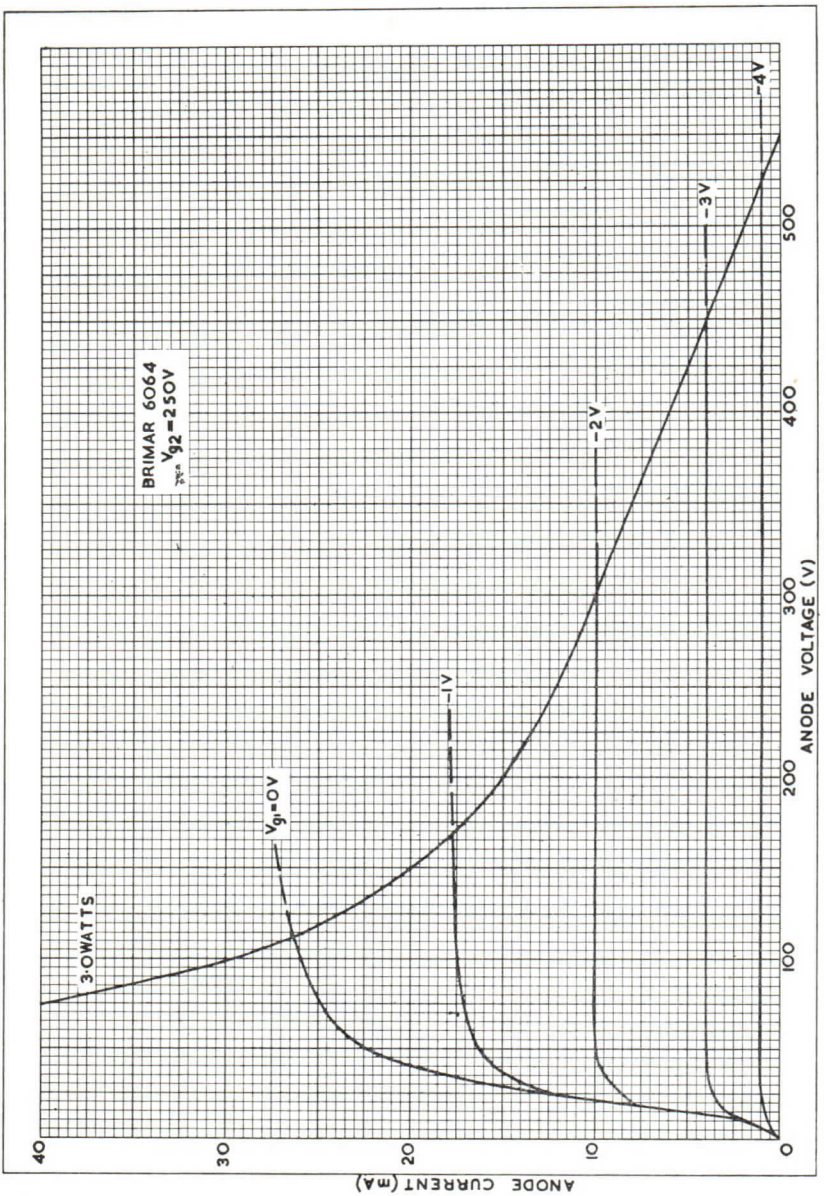
	Min.	Bogey	Max.	
Anode Current	7.5	9.85	12.2	mA
Screen Current	1.8	2.6	3.4	mA
Mutual Conductance	6.0	7.62	9.25	mA/V
Inner Amplification Factor	60	75	89	
Anode Current at Vg_1 = −8 V			100	μA

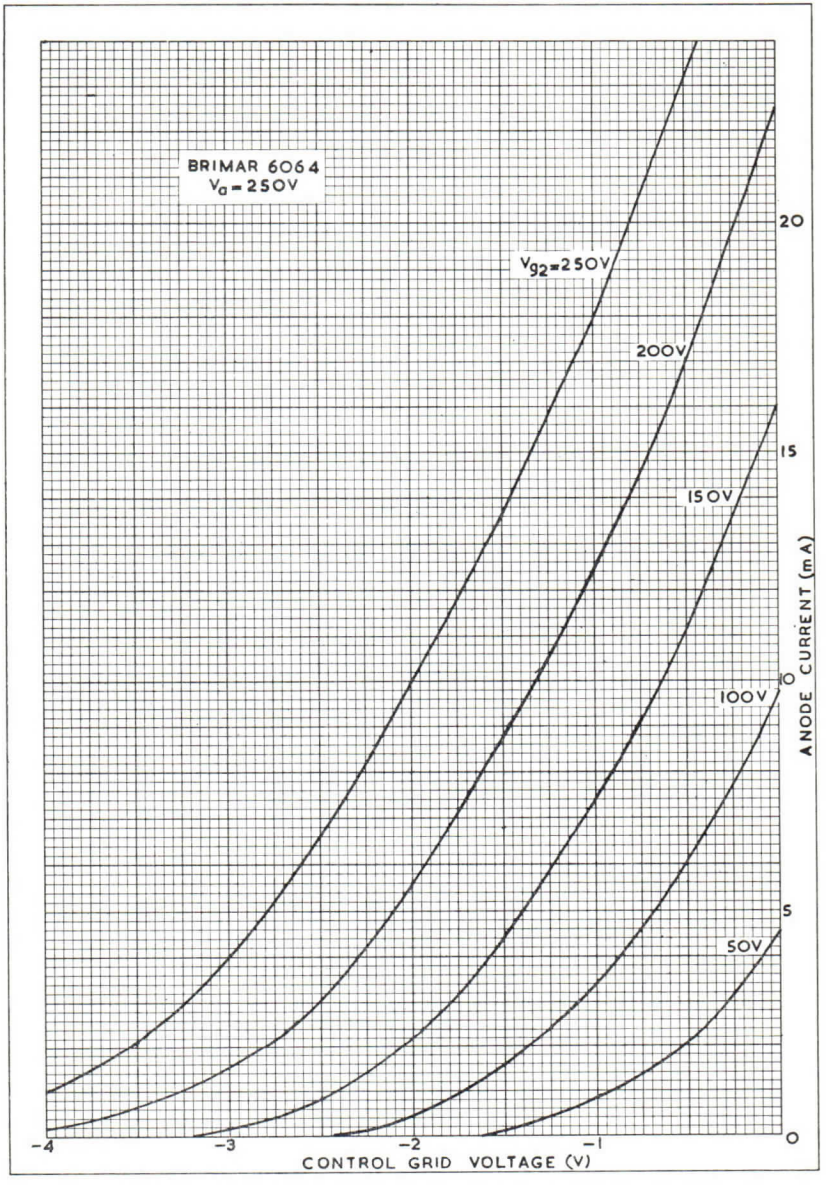
INTER-ELECTRODE CAPACITANCES*

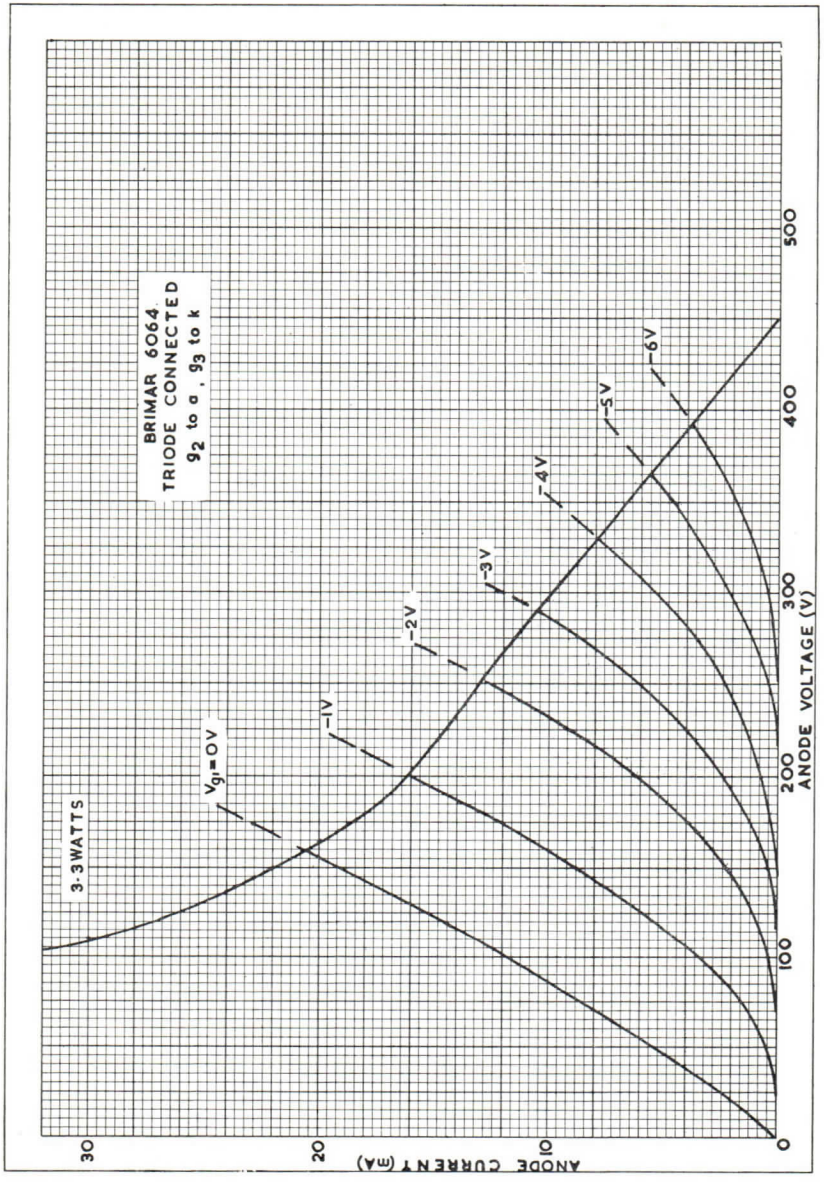
Input	7.6	pF
Output	3.25	pF
Control Grid to Anode (max.)	0.01	pF

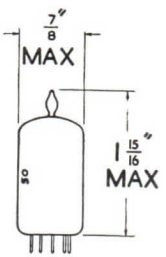
* *With close-fitting shield connected to Cathode.*

Type 6064 is a commercial equivalent to the CV4014.

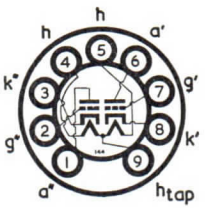

BRIMAR 6064
V_{g2}=250V
Max.
3·0WATTS
V_{g1}=0V
-1V
-2V
-3V
-4V
ANODE VOLTAGE (V)
100
200
300
400
500
ANODE CURRENT (mA)
0
10
20
30
40


BRIMAR 6064
V_a = 250V
V_{g2}=250V
200V
150V
100V
50V
20
15
10
5
0
ANODE CURRENT (mA)
−4
−3
−2
−1
0
CONTROL GRID VOLTAGE (V)


BRIMAR 6064
TRIODE CONNECTED
g_2 to a, g_3 to k
3·3WATTS
V_{g1}=0V
-1V
-2V
-3V
-4V
-5V
-6V
ANODE CURRENT (mA)
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (V)



TYPE **6067**
TRUSTWORTHY MINIATURE DOUBLE TRIODE
(Low-Mu)



The BRIMAR 6067 is a trustworthy miniature double triode (Low-mu) with separate cathode connections and a tapped heater enabling it to be used in a variety of applications.

RATINGS

Heater Voltage	6.3	or 12.6	volts
Heater Current	0.3	or 0.15	amp.
Anode Voltage		300	volts max.
Anode Dissipation (per section)		2.75	watts max.
Cathode Current (per section)		20	mA max.
Anode Voltage (Zero Anode Current)		550	volts max.

OPERATING CHARACTERISTICS

(Each Section)

Va = 250 V, Vg = −8.5 V, Vh = 12.6 V (series connection).

	Min.	Bogey	Max.	
Anode Current	6.5	10.5	14.5	mA
Anode Impedance		7,700		ohms
Mutual Conductance	1.75	2.2	2.65	mA/V
Amplification Factor	15.5	17	18.5	
Anode Current at Vg = −25 V ...			20	μA

OPERATION AS RESISTANCE COUPLED AMPLIFIER

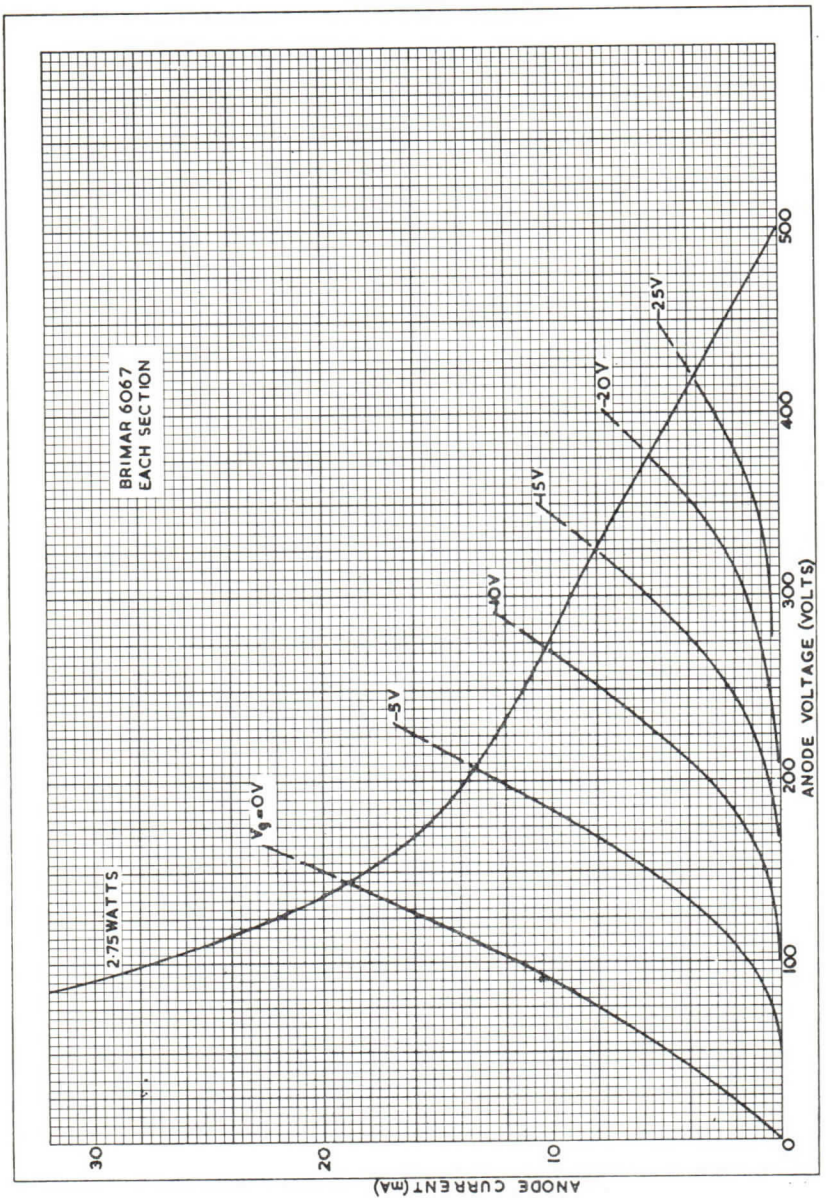
Anode Supply Voltage	100	250	volts
Anode Load Resistor	0.1	0.1	MΩ
Cathode Bias Resistor	3.9	2.7	kΩ
Peak Output	17	50	volts
Stage Gain	11	12	

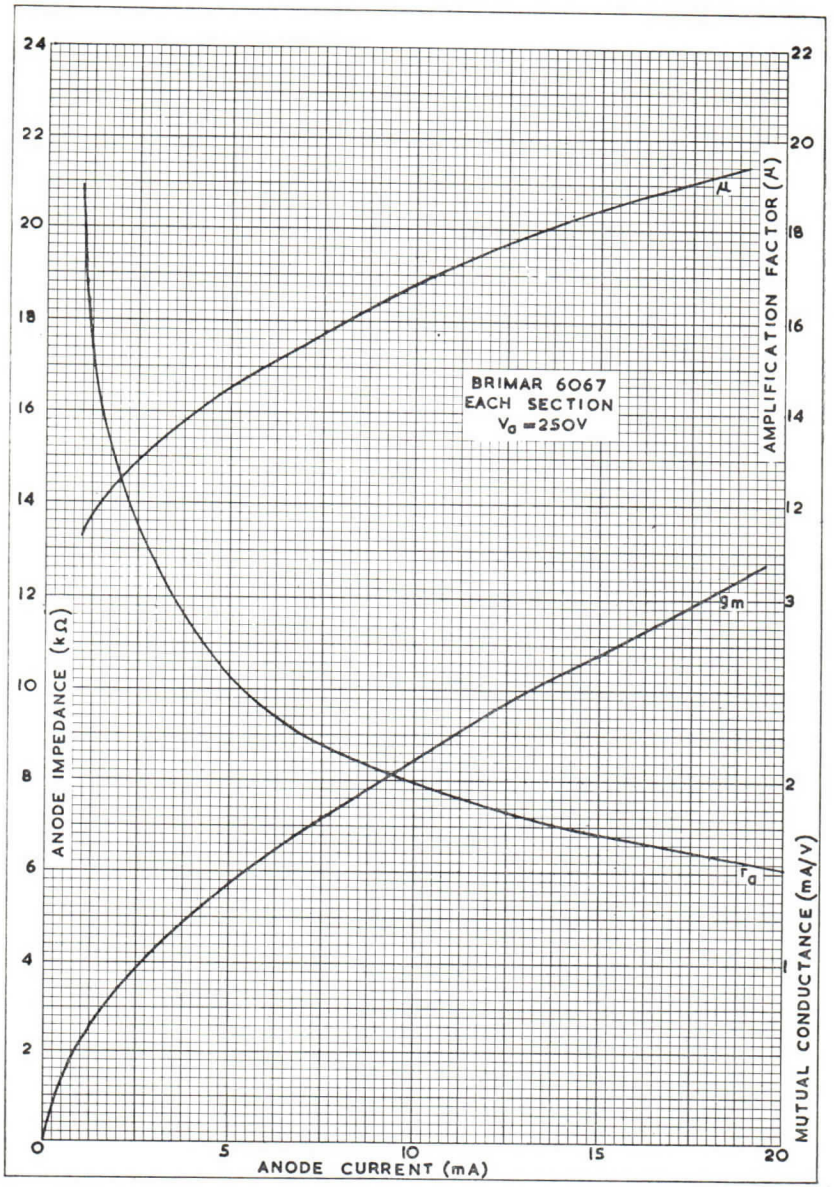
INTER-ELECTRODE CAPACITANCES*

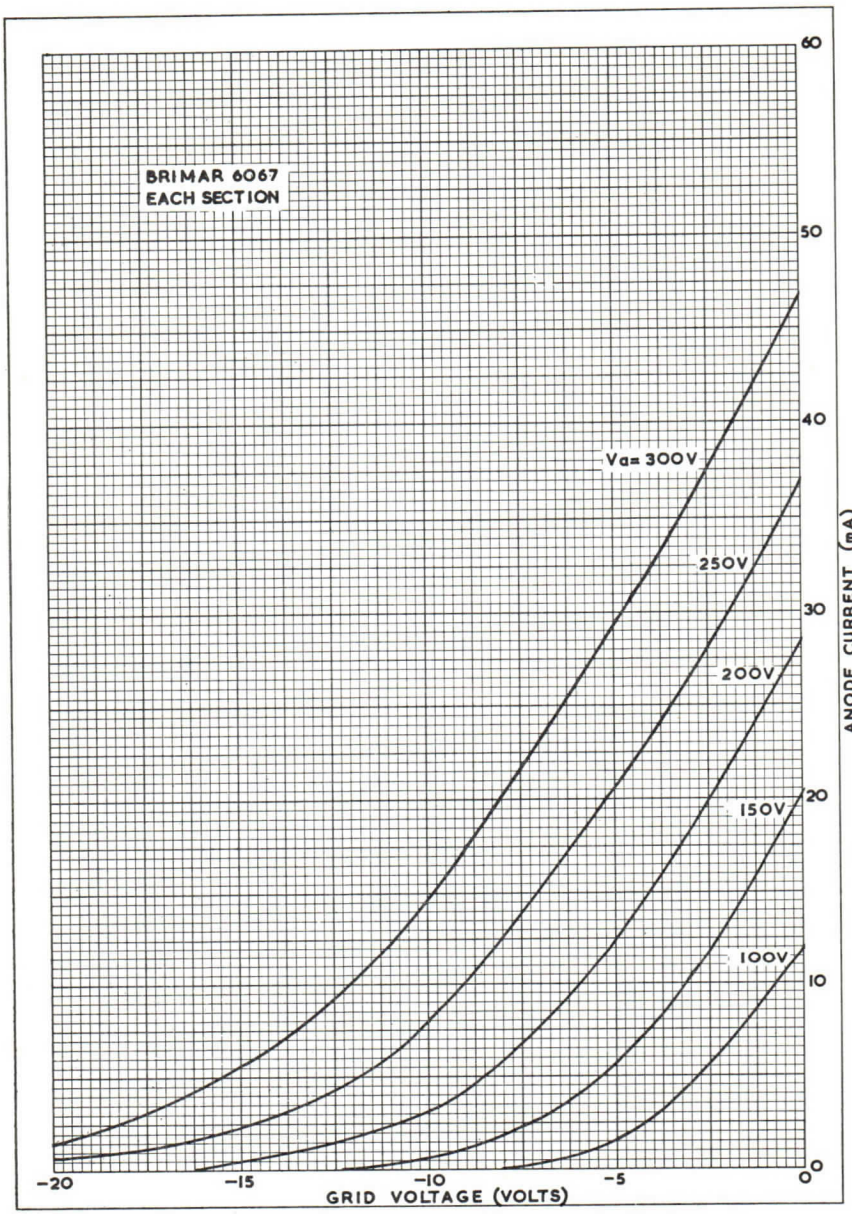
	Section 1	Section 2	
Input	1.6	1.6	pF
Output	0.5	0.45	pF
Grid to Anode	1.5	1.5	pF

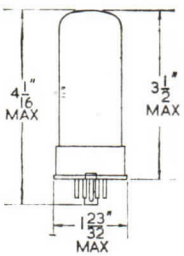
* *With no external shield.*

Type 6067 is a commercial equivalent to the CV4003.


BRIMAR 6067
EACH SECTION
2·75 WATTS
V_g=0V
-5V
-10V
-15V
-20V
-25V
ANODE CURRENT (mA)
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (VOLTS)


BRIMAR 6067
EACH SECTION
V_a =250V
μ
g_m
r_a
ANODE IMPEDANCE (kΩ)
AMPLIFICATION FACTOR (μ)
MUTUAL CONDUCTANCE (mA/V)
ANODE CURRENT (mA)
0
5
10
15
20
2
4
6
8
10
12
14
16
18
20
22
24
1
2
3

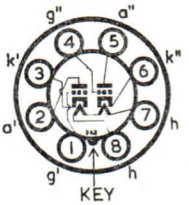

BRIMAR 6067
EACH SECTION
Va= 300V
250V
200V
150V
100V
60
50
40
30
20
10
0
ANODE CURRENT (mA)
-20
-15
-10
-5
0
GRID VOLTAGE (VOLTS)



Current Equipment Type

TYPE 6080

DOUBLE TRIODE



The BRIMAR 6080 is a low μ double triode with separate cathodes designed for use as a series regulator valve or in servo applications. The valve is constructed to operate satisfactorily under conditions where vibration and shock may be encountered.

Heater Voltage	6.3 volts
Heater Current	2 5 amps

RATINGS

*Max. Anode Voltage (Ia = 0)	550 volts
*Max. Anode Voltage	250 volts
*Max. Cathode Current	125 mA
*Max. Anode Dissipation	13 watts
*Max. Grid Circuit Resistance (Cathode bias)	1 M ohms
*Max. Grid Circuit Resistance (Fixed bias)	100 k ohms
*Max. Heater Cathode Voltage (Peak)	300 volts
Max. Bulb Temperature	260° C.
Max. Vibration (32 hrs. max.)	2.5 g
Max. Intermittent Shock	450 g

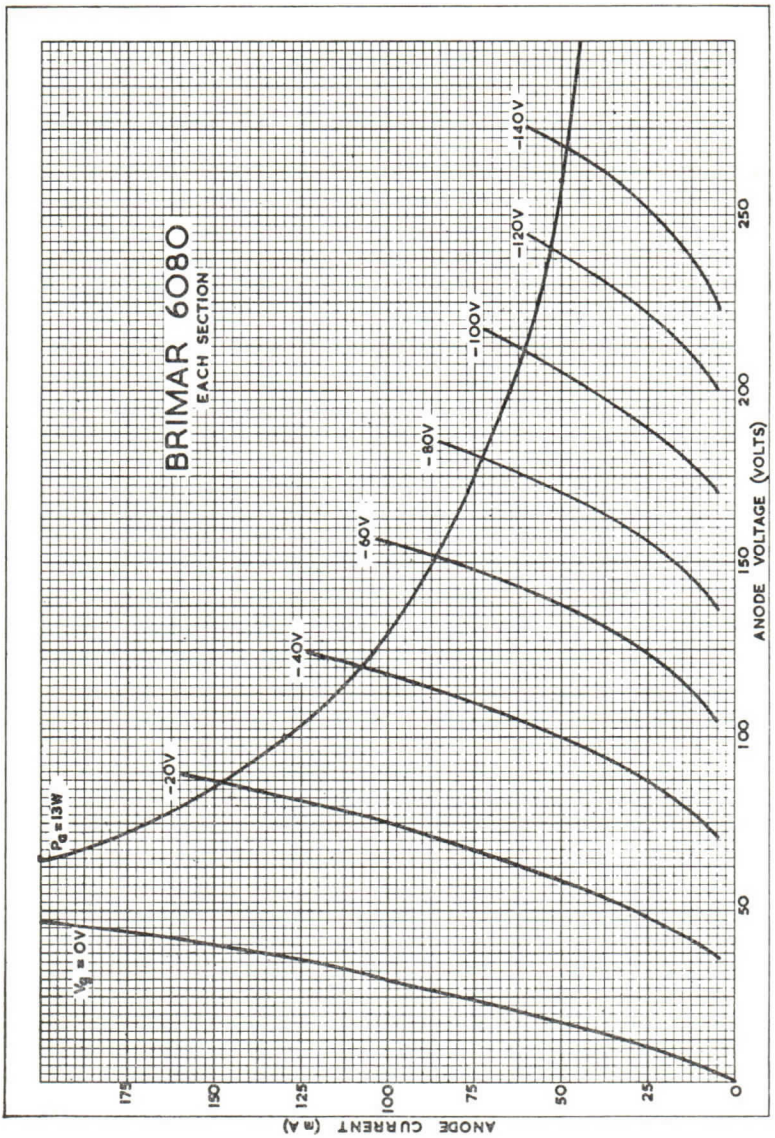
* *Each Section.*

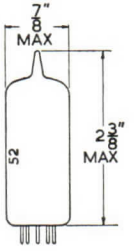
OPERATING CHARACTERISTICS

Anode Supply Voltage	—	135 volts	
Anode Voltage	100	— volts	
Anode Current	100	125 mA	
Cathode Resistance	300	250 ohms	
Mutual Conductance	6.5	7 mA/V	
Anode Resistance	300	280 ohms	
Amplification Factor	2	2	

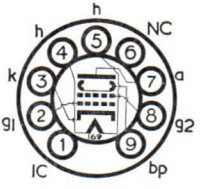
INTER-ELECTRODE CAPACITANCES

Ca — g (each section)	8.6 pF
C in ,,	5.5 pF
C out ,,	2.5 pF
Ch — k ,,	7.0 pF
Ca′ — a″	2.2 pF
Cg′ — g″	0.5 pF


BRIMAR 6080
EACH SECTION
P_g = 13W
V_g = 0V
-20V
-40V
-60V
-80V
-100V
-120V
-140V
ANODE CURRENT (mA)
0
25
50
75
100
125
150
175
ANODE VOLTAGE (VOLTS)
50
100
150
200
250



TYPE **6132**
TRUSTWORTHY MINIATURE VIDEO OUTPUT PENTODE



The BRIMAR type 6132 is a miniature high slope pentode suitable for video amplification when more power is required than is obtainable from normal R.F. pentodes. Its high anode dissipation and current rating make it suitable for working into loads of low impedance and high self-capacity.

RATINGS

Heater Voltage	6.3	volts
Heater Current	0.75	amp.
Anode Voltage	275	volts max.
Screen (g_2) Voltage	275	volts max.
Anode Dissipation	12	watts max.
Screen Dissipation	2.5	watts max.
D.C. Cathode Current	60	mA max.
Maximum Peak Cathode Current (absolute)	1.5	amp.*
Maximum Control Grid Circuit Resistance	0.1	MΩ†

* *The duration of current flow must not exceed 2 μsecs. and must not be greater than 5 per cent of the duty cycle.*

† *This value may be increased to* 220,000 *ohms if autobias is employed.*

OPERATING CHARACTERISTICS

Vh = 6.3, Va = 250, Vg_2 = 250, Vg_1 = −4.5, Vg_3 = 0.

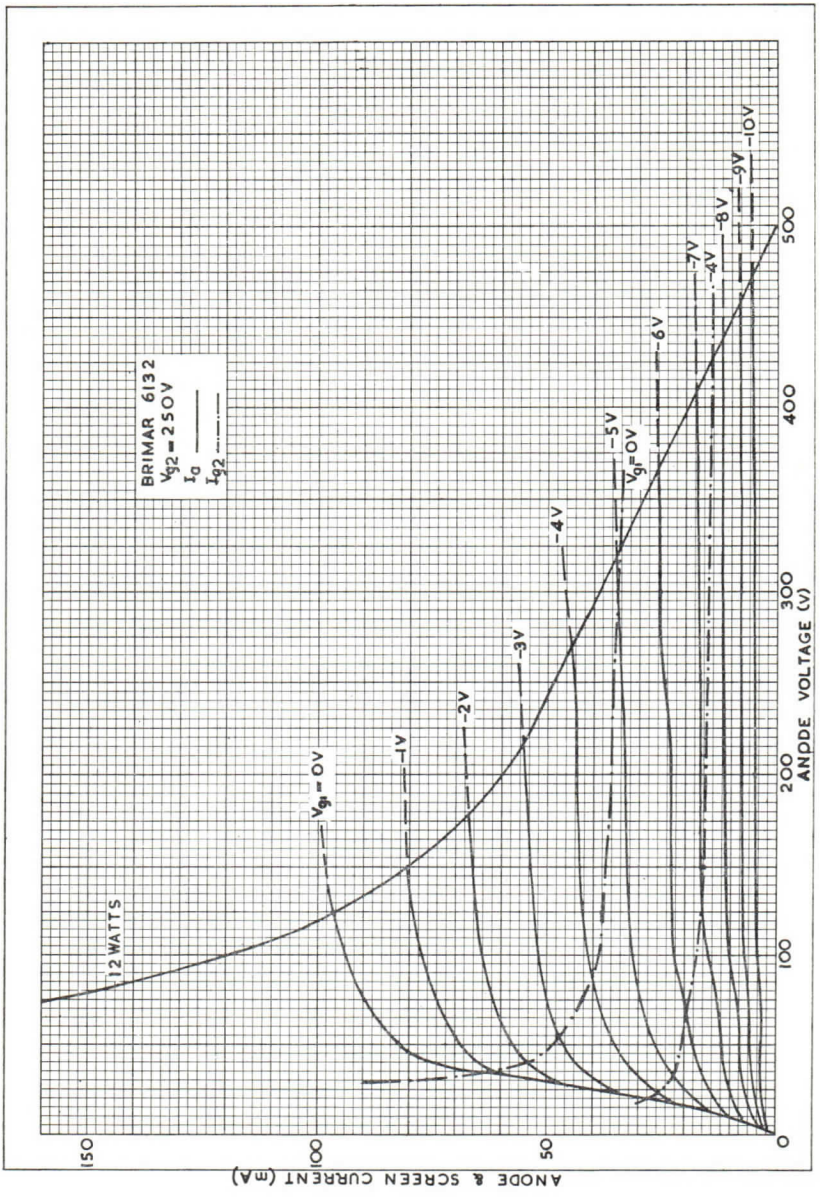
	Min.	Bogey	Max.	
Anode Current	30	40	50	mA
Screen Current	—	6	7.5	mA
Mutual Conductance	9	11	13.5	mA/V
Anode Impedance	—	50,000	—	ohms
Inner Amplification Factor	20	26	32	

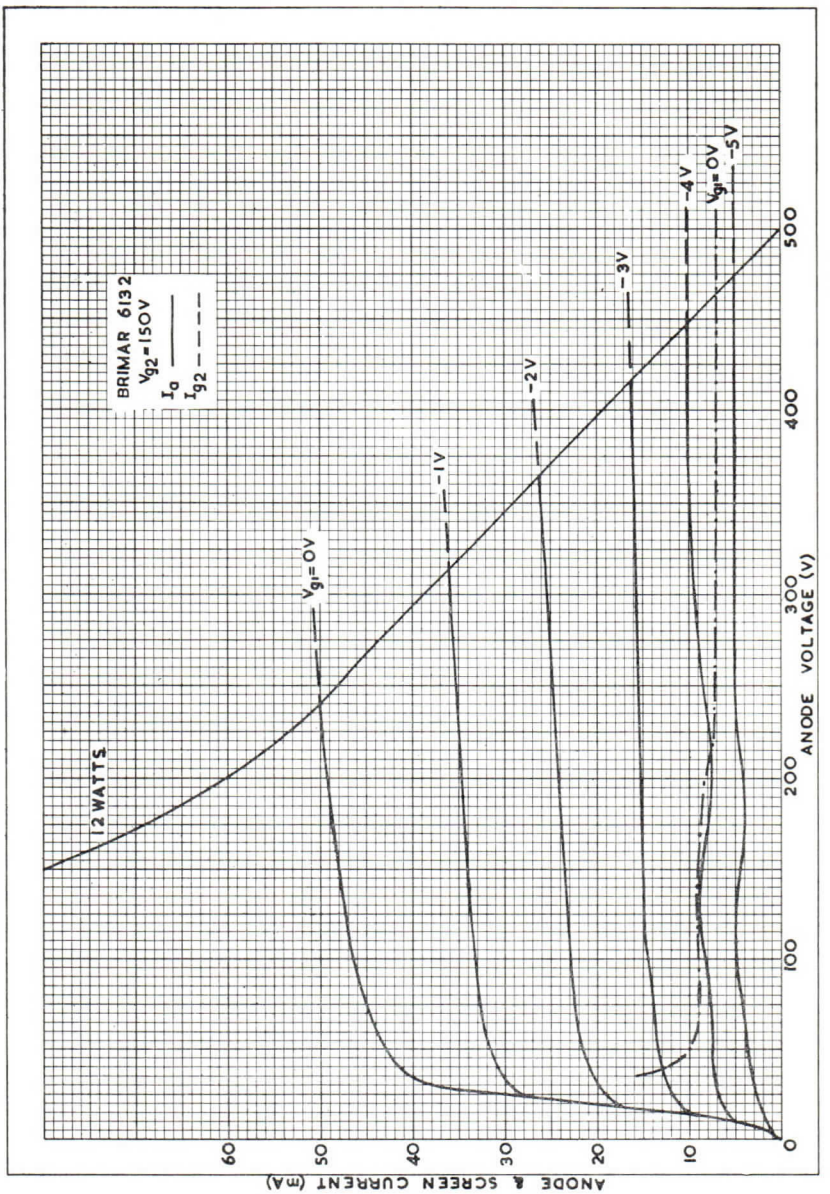
INTER-ELECTRODE CAPACITANCES**

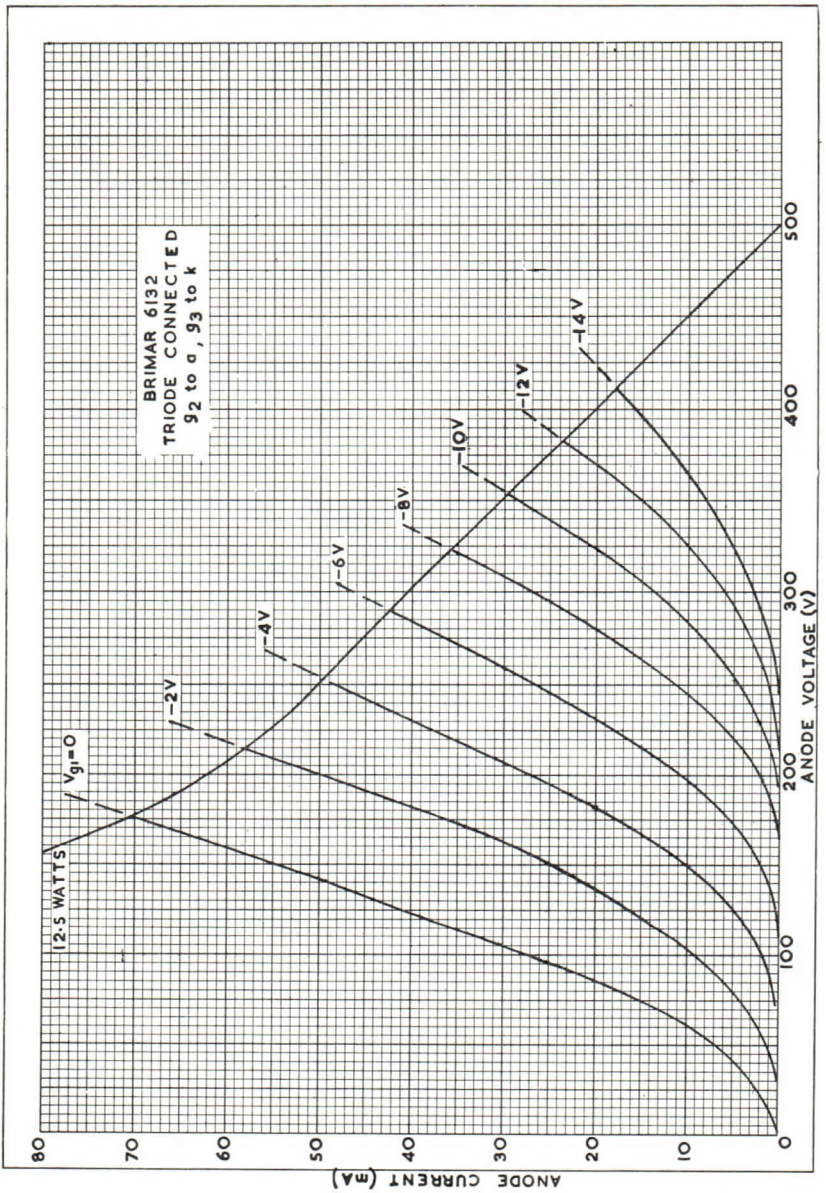
Input	12.5	pF
Output	5.0	pF
Grid to Anode (max.)	0.18	pF

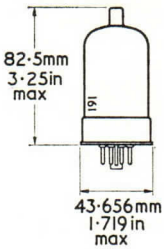
** *No external shield.*

Type 6132 *is a commercial equivalent to the* CV4055.

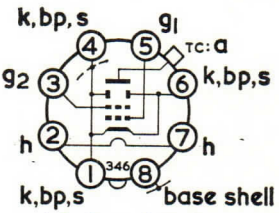

BRIMAR 6132
V_{g2} = 250V
I_a ——
I_{g2} -·-·-·-
12 WATTS
V_{g1} = 0V
-1V
-2V
-3V
-4V
-5V
V_g=0V
-6V
-7V
-8V
-9V
-10V
0
100
200
300
400
500
ANODE VOLTAGE (V)
150
100
50
ANODE & SCREEN CURRENT (mA)


BRIMAR 6132
V_{g2}=150V
I_a ——
I_{g2} - - - -
12 WATTS
V_{g1}=0V
-1V
-2V
-3V
-4V
V_{g1}=0V
-5V
ANODE VOLTAGE (V)
0
100
200
300
400
500
ANODE & SCREEN CURRENT (mA)
60
50
40
30
20
10


BRIMAR 6132
TRIODE CONNECTED
g2 to a, g3 to k
12·5 WATTS
Vg1=0
-2V
-4V
-6V
-8V
-10V
-12V
-14V
ANODE VOLTAGE (V)
100
200
300
400
500
ANODE CURRENT (mA)
0
10
20
30
40
50
60
70
80



V.H.F. POWER OUTPUT BEAM TETRODE



I.O. Base, CT2 Cap

GENERAL

This valve is intended for use as an R.F. amplifier and oscillator or in A.F. power amplifier and modulator applications.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	1·25	A

ABSOLUTE MAXIMUM RATINGS

As a Linear R.F. Power Amplifier—Class AB_1, Single Sideband Suppressed Carrier Service.

		CCS	ICAS	
Maximum Anode Dissipation	$P_{a(max)}$	20	25	W
Maximum Anode Signal Input Power	$P_{a(in)max}$	60	85	W
Maximum Screen Grid Signal Input Power	$P_{g2(in)max}$	3·0	3·0	W
Maximum Anode Voltage	$V_{a(max)}$	600	750	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	250	250	V
Maximum Peak Heater to Cathode Voltage	$V_{h-k(pk)max}$	±135	±135	V
Maximum Control Grid to Cathode Resistance, Fixed Bias	$R_{g1-k(max)}$	30*	30*	kΩ
Maximum Operating Frequency	f_{max}	60	60	Mc/s
Maximum Bulb Temperature (hottest point)	$T_{bulb(max)}$	220	220	°C

TYPICAL OPERATION—Single Tone†, at 60 Mc/s

		CCS		ICAS		
Anode Voltage	V_a	400	600	600	750	V
Screen Grid Voltage	V_{g2}	190	180	200	195	V
Control Grid Voltage	V_{g1}	−40	−45	−50	−50	V
Quiescent Anode Current	$I_{a(o)}$	32	13	14	12	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	114	100	115	110	mA
Screen Grid Current (maximum signal)	$I_{g2(max\ sig)}$	12	11	14	13	mA
Effective R.F. Load Resistance	R_a	2·0	3·5	3·0	4·0	kΩ
Peak R.F. Signal Grid Voltage	$V_{g(sig)pk}$	40	45	50	50	V
Driving Power (maximum signal) approx.	$P_{dr(max)}$	0	0	0	0	W
Power Output (maximum signal) approx.	$P_{out(max\ sig)}$	27	41	48	60	W

* The type of input coupling network used should not introduce too much resistance into the control grid circuit. Transformer or impedance coupling devices are recommended.

† 'Single Tone' operation refers to that class of amplifier service in which the control grid input consists of a monofrequency R.F. signal having constant amplitude. This signal is produced in a single sideband suppressed carrier system when a single audio frequency of constant amplitude is applied to the input of the system.

INTER-ELECTRODE CAPACITANCES*

Anode to Control Grid	C_{a-g1}	<0·24	pF
Input	C_{in}	13	pF
Output	C_{out}	8·5	pF

* Measured without an external shield.

NOTE CCS—Continuous commercial service.
ICAS—Intermittent commercial and amateur service.

CHARACTERISTICS RANGE VALUES

		Min.	Av.	Max.	
Heater Current (V_h = 6·3 V)	I_h	1·175	1·25	1·325	A
Anode to Grid 1 Capacitance*	c_{a-g1}	—	—	0·24	pF
Input Capacitance*	c_{in}	12	13	15	pF
Output Capacitance*	c_{out}	7·3	8·5	9·5	pF
Anode Current†	I_a	46	—	94	mA
Screen Grid Current†	I_{g2}	—	—	5·5	mA
Dynamic Screen Grid Current‡	I_{g2}	3·0	—	21	mA
Useful Power Output‡	P_{out}	47	—	—	W

* Measured without an external shield.

† At V_h = 6·3 V, V_a = 300 V, V_{g2} = 200 V, V_{g1} = −33 V.

‡ In a self-excited oscillator circuit, V_h = 6·3 V, V_a = 600 V, V_{g2} = 180 V, R_{g1} = 30 kΩ ± 10%, I_a = 100 to 112 mA, I_{g1} = 2 to 2·5 mA and f = 15 Mc/s.

ABSOLUTE MAXIMUM RATINGS

As an Anode Modulated R.F. Power Amplifier—Class C Telephony

Carrier condition for modulation factor of 1

		CCS	ICAS	
Maximum Anode Dissipation	$p_{a(max)}$	13·3	16·7	W
Maximum Anode Input Power	$P_{a(in)max}$	45	67·5	W
Maximum Screen Grid Input Power	$P_{g2(in)max}$	2·0	2·0	W
Maximum Anode Voltage	$V_{a(max)}$	480	600	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	250	250	V
Maximum Negative Control Grid Voltage	$-V_{g1(max)}$	150	150	V
Maximum Peak Heater to Cathode Voltage	$v_{h-k(pk)max}$	±135	±135	V
Maximum Anode Current	$I_{a(max)}$	117	125	mA
Maximum Control Grid Current	$I_{g1(max)}$	3·5	4·0	mA
Maximum Control Grid to Cathode Resistance	$R_{g1-k(max)}$	30*	30*	kΩ
Maximum Operating Frequency	f_{max}	60§	60§	Mc/s

TYPICAL OPERATION

		CCS		ICAS	
Anode Voltage	V_a	400	475	600	V
Screen Grid Voltage	V_{g2}†	150	135	150	V
Series Screen Grid Resistance	R_{g2}	33	51	56	kΩ
Control Grid Voltage	V_{g1}‡	−87	−77	−87	V
Series Control Grid Resistance	R_{g1}	27	27	27	kΩ
Peak R.F. Control Grid Voltage	$v_{g1(pk)}$	107	95	107	V
Anode Current	I_a	112	94	112	mA
Screen Grid Current	I_{g2}	7·8	6·4	7·8	mA
Control Grid Current (approximately)	I_{g1}	3·4	2·8	3·4	mA
Driving Power (approximately)	P_{dr}	0·4	0·3	0·4	W
Power Output	P_{out}	32	34	52	W

* When the control grid is driven positive and the valve operated at maximum ratings the total D.C. control grid resistance should not exceed 30 kΩ. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply. For operation at less than maximum ratings the D.C. control grid resistance may be up to 100 kΩ.

† Obtained preferably from a separate source modulated with the anode supply or from the modulated anode supply through a series resistor.

‡ Obtained from a control grid resistor or from a combination of control grid resistor with either fixed supply or cathode resistor.

§ For $V_{a(max)}$ and $P_{a(in)max}$ above 60 Mc/s see Rating Chart 1.

CHARACTERISTICS

Anode Voltage	V_a	200	V
Screen Grid Voltage	V_{g_2}	200	V
Anode Current	I_a	100	mA
Mutual Conductance	g_m	7·0	mA/V
Inner Amplification Factor	$\mu_{g_1\text{-}g_2}$	4·5	

ABSOLUTE MAXIMUM RATINGS

As an A.F. Power Amplifier and Modulator—Class AB_1

		CCS	ICAS	
Maximum Anode Dissipation	$P_{a(max)}$	20*	25*	W
Maximum Anode Signal Input Power	$P_{a(in)max}$	60*	85*	W
Maximum Screen Grid Signal Input Power	$P_{g_2(in)max}$	3·0*	3·0*	W
Maximum Anode Voltage	$V_{a(max)}$	600	750	V
Maximum Screen Grid Voltage	$V_{g_2(max)}$	250	250	V
Maximum Peak Heater to Cathode Voltage	$v_{h\text{-}k(pk)max}$	±135	±135	V
Maximum Anode Current	$I_{a(max)}$	125*	135*	mA
Maximum Control Grid to Cathode Resistance, Fixed Bias	$R_{g_1\text{-}k(max)}$	0·1†	0·1†	MΩ
Maximum Bulb Temperature (hottest point)	$T_{bulb(max)}$	220	220	°C

TYPICAL OPERATION—CCS Push-Pull (values are for two valves)

Anode Voltage	V_a	400	500	600	V
Screen Grid Voltage	V_{g_2}	190‡	185‡	180‡	V
Control Grid Voltage (Fixed Bias)	V_{g_1}	−40	−40	−45	V
Peak A.F. Grid to Grid Voltage	$v_{g\text{-}g(pk)}$	80§	80§	90§	V
Quiescent Anode Current	$I_{a(o)}$	63	57	26	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	228	215	200	mA
Quiescent Screen Grid Current	$I_{g_2(o)}$	2·5	2·0	1·0	mA
Screen Grid Current (maximum signal)	$I_{g_2(max\ sig)}$	25	25	23	mA
Anode to Anode Load Resistance	$R_{a\text{-}a}$	4·0	5·5	7·0	kΩ
Maximum Driving Power	$P_{dr(max)}$	0	0	0	W
Power Output (maximum signal) approx.	$P_{out(max\ sig)}$	55	70	82	W

TYPICAL OPERATION—ICAS Push-Pull (values are for two valves)

Anode Voltage	V_a	600	750	V
Screen Grid Voltage	V_{g_2}	200‡	195‡	V
Control Grid Voltage (Fixed Bias)	V_{g_1}	−50	−50	V
Peak A.F. Grid to Grid Voltage	$v_{g\text{-}g(pk)}$	100§	100§	V
Quiescent Anode Current	$I_{a(o)}$	28	23	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	229	220	mA
Quiescent Screen Grid Current	$I_{g_2(o)}$	1·0	1·0	mA
Screen Grid Current (maximum signal)	$I_{g_2(max\ sig)}$	27	26	mA
Anode to Anode Load Resistance	$R_{a\text{-}a}$	6·0	8·0	kΩ
Maximum Driving Power (approx.)	$P_{dr(max)}$	0	0	W
Power Output (maximum signal) approx.	$P_{out(max\ sig)}$	95	120	W

* Averaged over any audio frequency cycle of sine-wave form.

† The type of input coupling network used should not introduce too much resistance in the grid circuit. Transformer or impedance coupling devices are recommended.

‡ Obtained preferably from a separate source or from the anode voltage supply with a voltage divider.

§ The driver stage should be capable of supplying the control grids of the Class AB_1 stage with the specified driving voltage at low distortion.

ABSOLUTE MAXIMUM RATINGS

As A.F. Power Amplifier and Modulator—Class AB_2

		CCS	ICAS	
Maximum Anode Dissipation	$P_{a(max)}$	20*	25*	W
Maximum Anode Signal Input Power	$P_{a(in)max}$	62·5*	90*	W
Maximum Screen Grid Signal Input Power	$P_{g2(in)max}$	3·0*	3·0*	W
Maximum Anode Voltage	$V_{a(max)}$	600	750	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	250	250	V
Maximum Peak Heater to Cathode Voltage	$v_{h-k(pk)max}$	±135	±135	V
Maximum Anode Current (maximum signal)	$I_{a(max\ sig)max}$	125*	135*	mA
Maximum Control Grid to Cathode Resistance	$R_{g1-k(max)}$			
Fixed Bias		30‡	30‡	kΩ

TYPICAL OPERATION—CCS Push-Pull (values are for two valves)

Anode Voltage	V_a	400	500	600	V
Screen Grid Voltage	V_{g2}	175†	175†	165†	V
Control Grid Voltage (Fixed Bias)	V_{g1}	−41	−44	−44	V
Peak A.F. Grid to Grid Voltage	$v_{g-g(pk)}$	95	102	97	V
Quiescent Anode Current	$I_{a(o)}$	33	27	22	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	232	242	207	mA
Quiescent Screen Grid Current	$I_{g2(o)}$	1·1	0·7	0·6	mA
Screen Grid Current (maximum signal)	$I_{g2(max\ sig)}$	18	18	17	mA
Control Grid Current (maximum signal)	$I_{g1(max\ sig)}$	1·6	1·9	1·1	mA
Anode to Anode Load Resistance	R_{a-a}	3·7	4·6	6·8	kΩ
Maximum Driving Power (approx.)	$P_{dr(max)}$	0·2§	0·3§	0·2§	W
Power Output (maximum signal) approx.	$P_{out(max\ sig)}$	62	83	90	W

TYPICAL OPERATION—ICAS Push-Pull (values are for two valves)

Anode Voltage	V_a	600	750	V
Screen Grid Voltage	V_{g2}	190†	165†	V
Control Grid Voltage (fixed bias)	V_{g1}	−48	−46	V
Peak A.F. Grid to Grid Voltage	$v_{g-g(pk)}$	109	108	V
Quiescent Anode Current	$I_{a(o)}$	28	22	mA
Anode Current (maximum signal)	$I_{a(max\ sig)}$	270	240	mA
Quiescent Screen Grid Current	$I_{g2(o)}$	1·2	0·3	mA
Screen Grid Current (maximum signal)	$I_{g2(max\ sig)}$	20	20	mA
Control Grid Current (maximum signal)	$I_{g1(max\ sig)}$	2·0	2·6	mA
Anode to Anode Load Resistance	R_{a-a}	5·0	7·4	kΩ
Driving Power (maximum signal) approx.	$P_{dr(max)}$	0·3§	0·4§	W
Power Output (maximum signal) approx.	$P_{out(max\ sig)}$	113	131	W

* Averaged over any audio frequency cycle of sine-wave form.

† Obtained preferably from a separate source or from the anode voltage supply with a voltage divider.

‡ To minimize distortion the effective resistance should be held at a low value. For this purpose the use of transformer coupling is recommended. Under no circumstances should this resistance exceed 30 kΩ when the valve is being operated at maximum ratings. For operation at less than maximum ratings this resistance may be as high as 100 kΩ.

§ Driver stage should be capable of supplying the specified driving power at low distortion to the control grid of the Class AB_2 stage.

ABSOLUTE MAXIMUM RATINGS

As an R.F. Power Amplifier and Oscillator—Class C Telegraphy† and R.F. Power Amplifier—Class C FM Telephony

		CCS	ICAS	
Maximum Anode Dissipation	$p_{a(max)}$	20	25	W
Maximum Anode Input Power	$P_{a(in)max}$	67·5	90	W
Maximum Screen Grid Input Power	$P_{g_2(in)max}$	3·0	3·0	W
Maximum Anode Voltage	$V_{a(max)}$	600	750	V
Maximum Screen Grid Voltage	$V_{g_2(max)}$	250	250	V
Maximum Peak Heater to Cathode Voltage	$v_{h\text{-}k(pk)max}$	±135	±135	V
Maximum Anode Current	$I_{a(max)}$	140	150	mA
Maximum Control Grid Current	$I_{g_1(max)}$	3·5	4·0	mA
Maximum Control Grid to Cathode Resistance	$R_{g_1\text{-}k(max)}$	30*	30*	kΩ
Maximum Operating Frequency	f_{max}	60**	60**	Mc/s

TYPICAL OPERATION—As an amplifier up to 60 Mc/s

		CCS		ICAS		
Anode Voltage	V_a	500	600	600	750	V
Screen Grid Voltage	V_{g_2}‡	170	150	180	160	V
Series Screen Grid Resistance	R_{g_2}	36	51	43	56	kΩ
Control Grid Voltage	V_{g_1}§	−66	−58	−71	−62	V
Control Grid Resistance	R_{g_1}	27	20	24	20	kΩ
Cathode Bias Resistance	R_k	470	470	430	470	Ω
Peak R.F. Control Grid Voltage	$v_{g_1(pk)}$	84	73	91	79	V
Anode Current	I_a	135	112	150	120	mA
Screen Grid Current	I_{g_2}	9·0	9·0	10	11	mA
Control Grid Current (approx.)	I_{g_1}	2·5	2·8	2·8	3·1	mA
Driving Power (approx.)	P_{dr}	0·2	0·2	0·3	0·2	W
Power Output (approx.)	P_{out}	48	52	66	70	W

TYPICAL OPERATION—As an amplifier up to 175 Mc/s

		CCS	ICAS	
Anode Voltage	V_a	320	400	V
Screen Grid Voltage	V_{g_2}‡	180	190	V
Series Screen Grid Resistance	R_{g_2}	13	20	kΩ
Control Grid Voltage	V_{g_1}§	−51	−54	V
Control Grid Resistance	R_{g_1}	27	24	kΩ
Cathode Bias Resistance	R_k	330	330	Ω
Peak R.F. Control Grid Voltage	$v_{g_1(pk)}$	64	68	V
Anode Current	I_a	140	150	mA
Screen Grid Current	I_{g_2}	10	10·4	mA
Control Grid Current (approx.)	I_{g_1}	2·0	2·2	mA
Driving Power (approx.)	P_{dr}	3·0	3·0	W
Power Output (approx.)	P_{out}	25	35	W

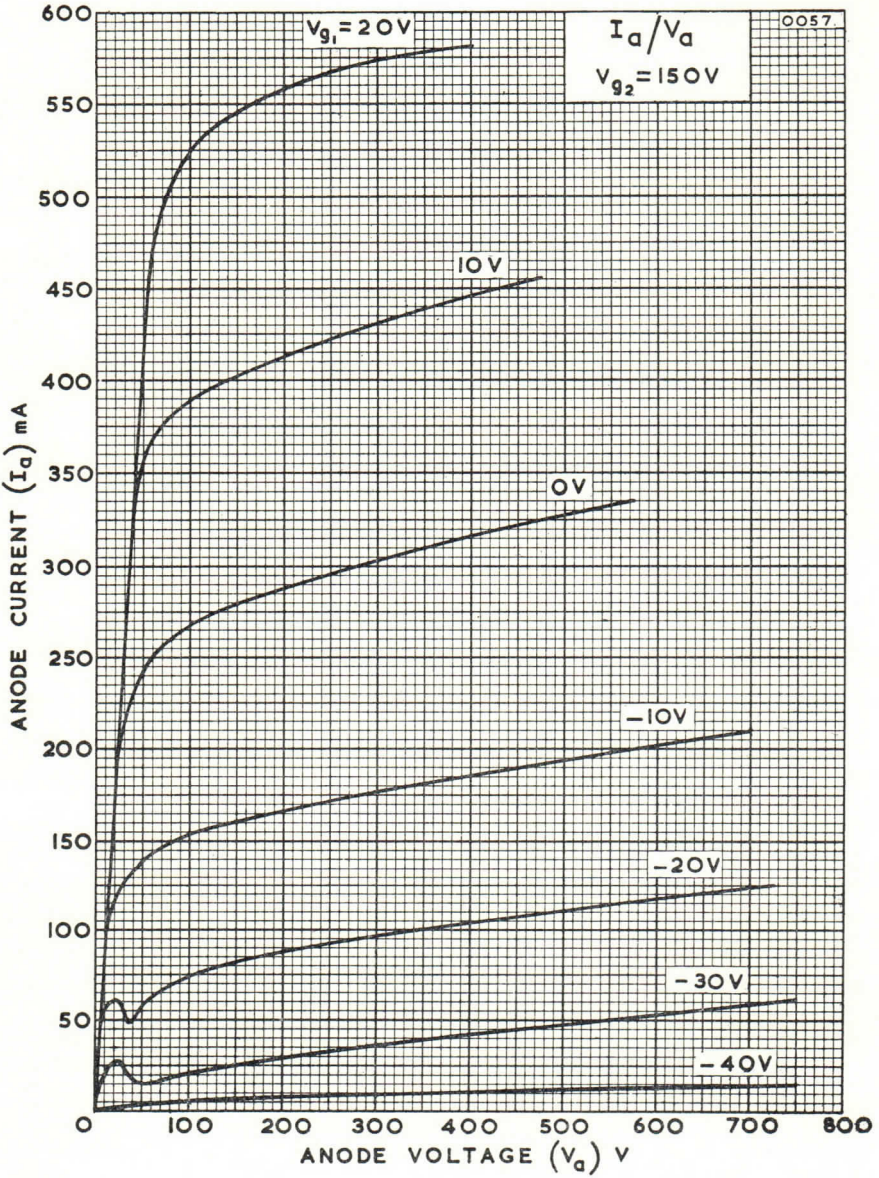
* When the grid is driven positive and the valve operated at maximum ratings, the total D.C. control grid resistance should not exceed the specified value of 30 kΩ. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply. For operation at less than maximum ratings, the D.C. control grid resistance may be as high as 100 kΩ.

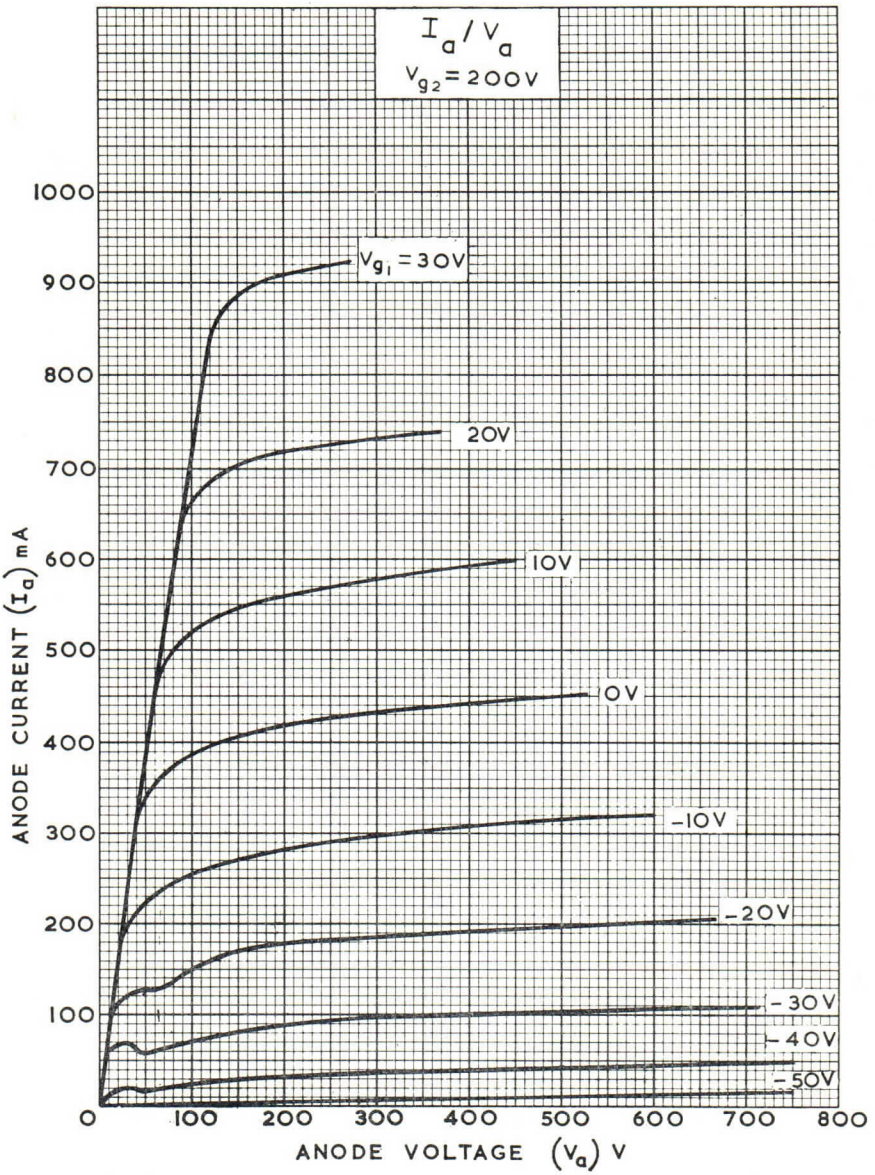
** For $V_{a(max)}$ and $P_{a(in)max}$ above 60 Mc/s see Rating Chart 2.

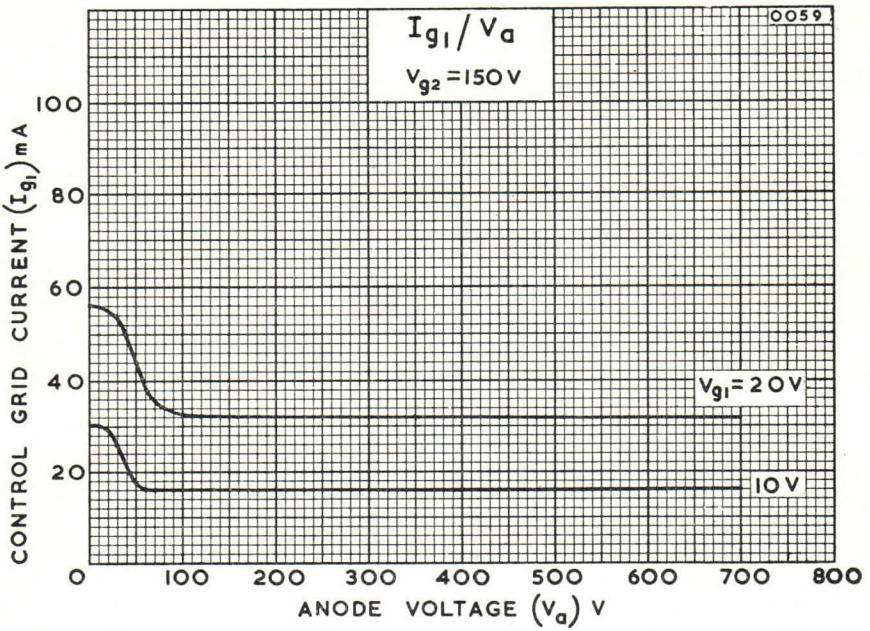
† Key down conditions without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio frequency envelope does not exceed 115 per cent of the carrier conditions.

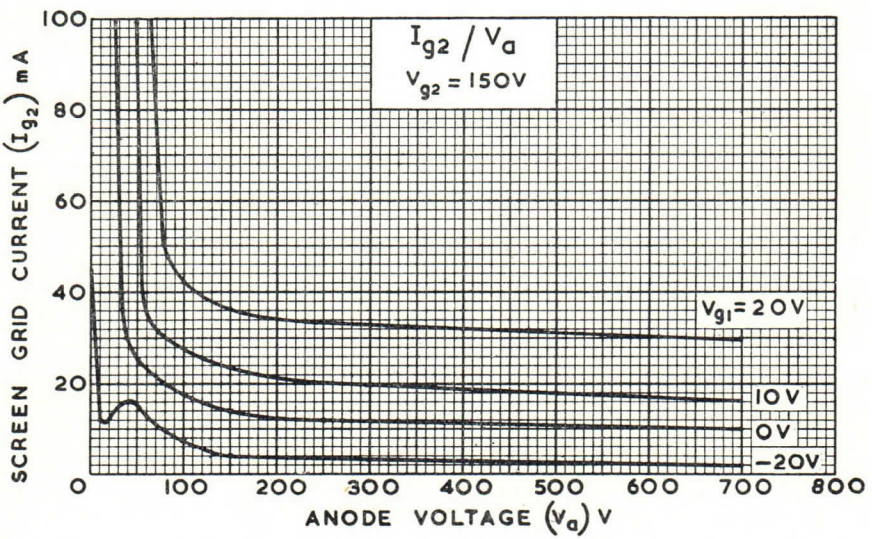
‡ Obtained preferably from a separate source or from the anode supply voltage with a voltage divider or through a series resistor. A series screen grid resistor should be used only when this valve is used in a circuit which is not keyed. V_{g_2} must not exceed 400 V under key-up conditions.

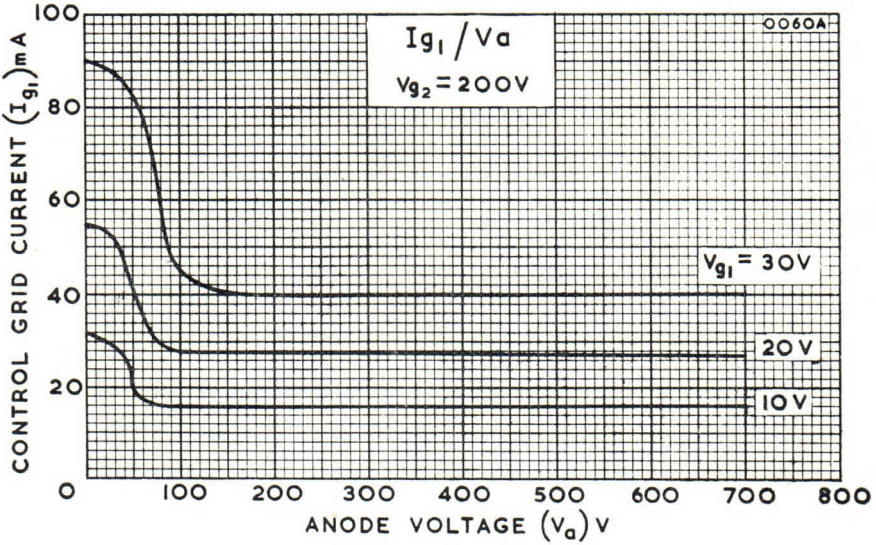
§ Obtained from fixed supply, by control grid resistor, by cathode resistor or by combination methods.

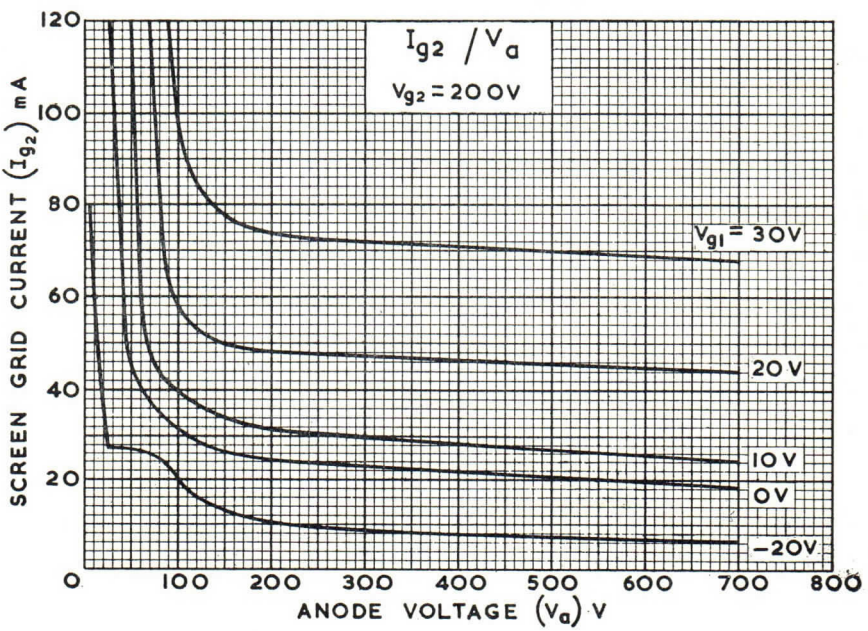

0057
I_a/V_a
V_{g_2}=150V
V_{g_1}=20V
10V
0V
-10V
-20V
-30V
-40V
ANODE CURRENT (I_a) mA
ANODE VOLTAGE (V_a) V
600
550
500
450
400
350
300
250
200
150
100
50
0
100
200
300
400
500
600
700
800

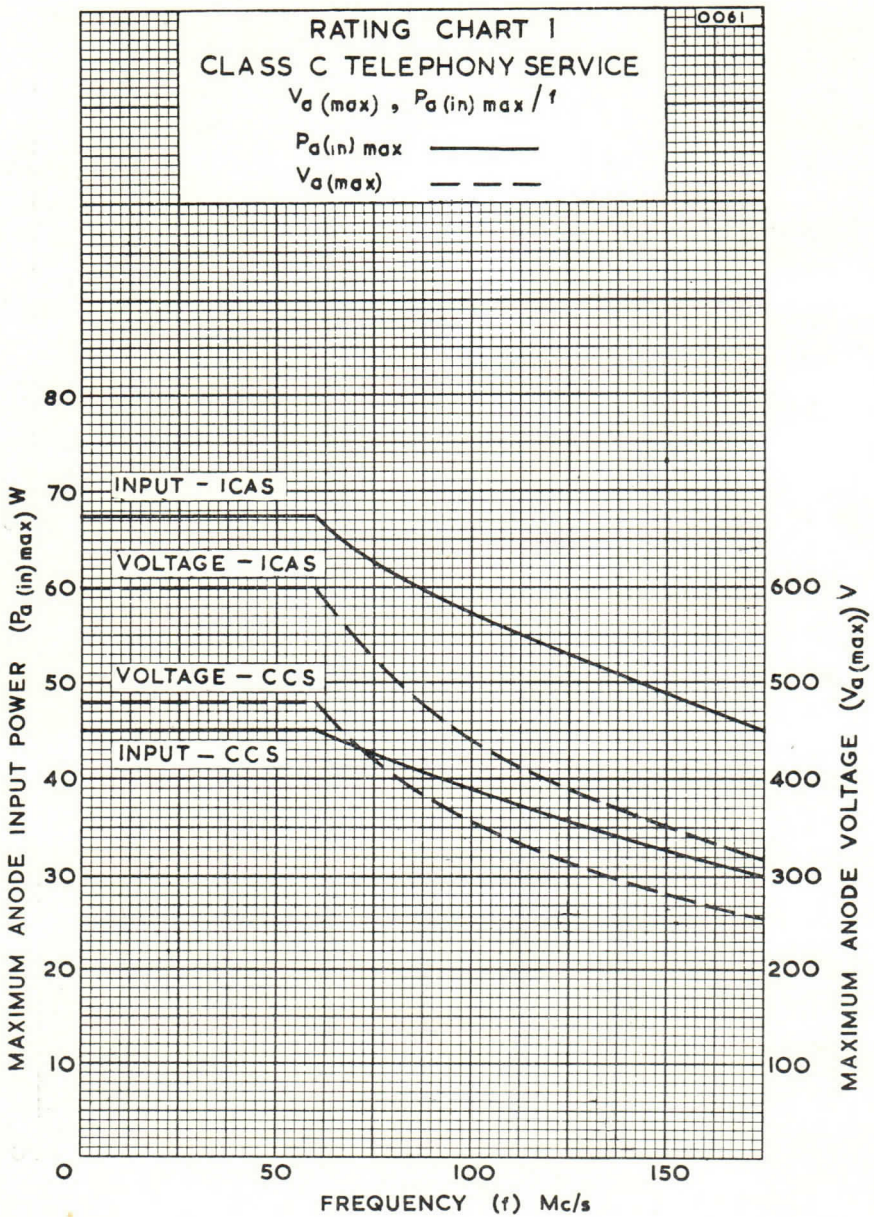

I_a / V_a
$V_{g_2} = 200V$
$V_{g_1} = 30V$
20V
10V
0V
-10V
-20V
-30V
-40V
-50V
ANODE CURRENT (I_a) mA
ANODE VOLTAGE (V_a) V
0
100
200
300
400
500
600
700
800
900
1000


0059
I_{g1} / V_a
V_{g2} = 150 V
CONTROL GRID CURRENT (I_{g1}) mA
100
80
60
40
20
0
100
200
300
400
500
600
700
800
ANODE VOLTAGE (V_a) V
V_{g1} = 20 V
10 V

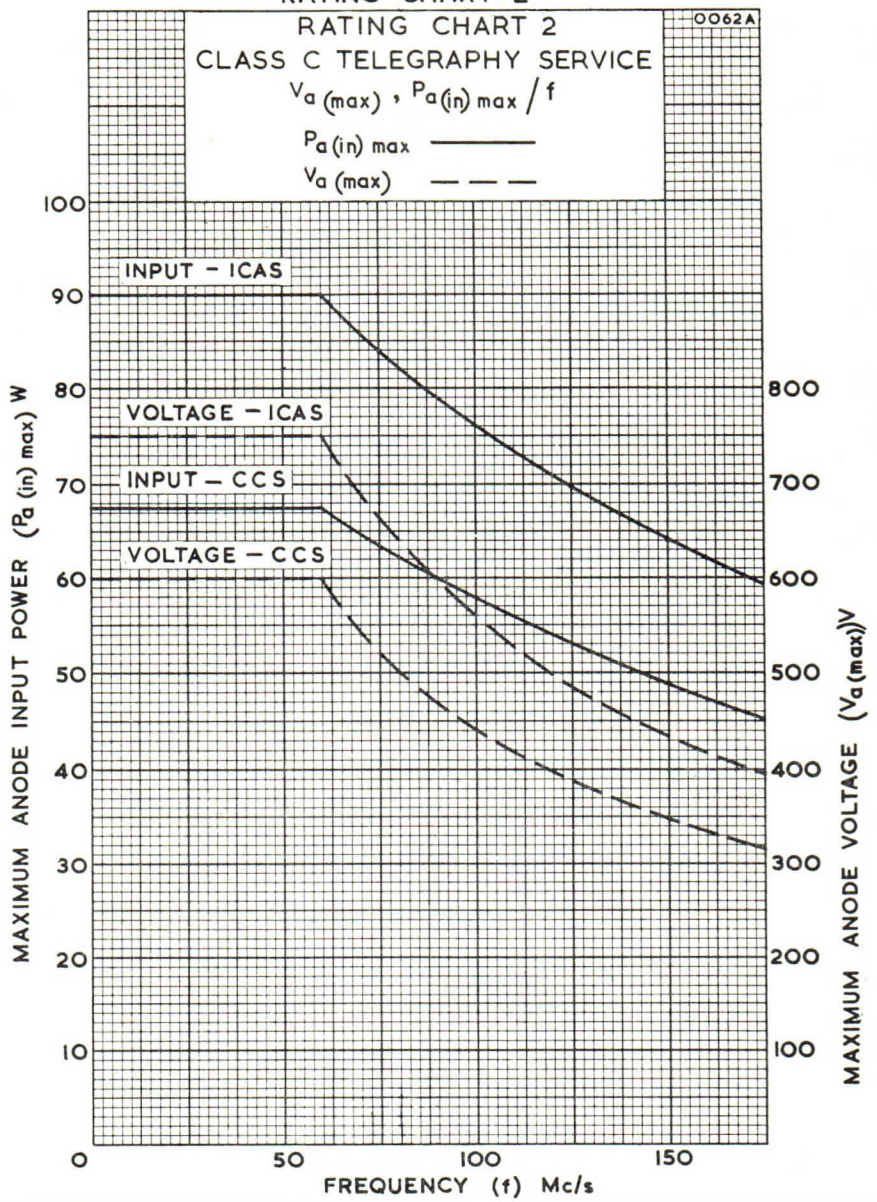

I_{g2} / V_a
V_{g2} = 150 V
SCREEN GRID CURRENT (I_{g2}) mA
100
80
60
40
20
0
100
200
300
400
500
600
700
800
ANODE VOLTAGE (V_a) V
V_{g1} = 20 V
10 V
0 V
−20 V

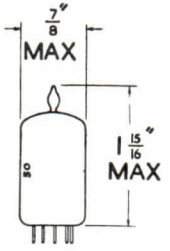

0060A
Ig_1 / Va
$V_{g_2} = 200V$
CONTROL GRID CURRENT (I_{g_1}) mA
100
80
60
40
20
0
100 200 300 400 500 600 700 800
ANODE VOLTAGE (V_a) V
$V_{g1} = 30V$
20 V
10 V


I_{g2} / V_a
$V_{g_2} = 200V$
SCREEN GRID CURRENT (I_{g_2}) mA
120
100
80
60
40
20
0
100 200 300 400 500 600 700 800
ANODE VOLTAGE (V_a) V
$V_{g1} = 30V$
20 V
10 V
0V
−20V

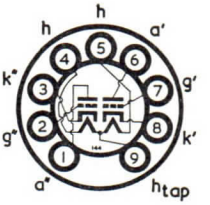

RATING CHART 1
CLASS C TELEPHONY SERVICE
V_a (max) , P_a (in) max / f
$P_{a(in)}$ max
$V_{a(max)}$
0061
INPUT – ICAS
VOLTAGE – ICAS
VOLTAGE – CCS
INPUT – CCS
MAXIMUM ANODE INPUT POWER (P_a (in) max) W
MAXIMUM ANODE VOLTAGE ($V_{a(max)}$) V
FREQUENCY (f) Mc/s
0
10
20
30
40
50
60
70
80
100
200
300
400
500
600
50
100
150

RATING CHART 2





TYPE 6158
TRUSTWORTHY DOUBLE TRIODE
(Medium Mu)



The BRIMAR type 6158 is an indirectly-heated double triode, having a rigid structure to reduce microphony. It is particularly suitable as a D.C. amplifier due to its stable characteristics.

RATINGS

Heater Voltage	6.3	or 12.6	volts
Heater Current	0.6	or 0.3	amp.
Anode Voltage (Ia = 0)		500	volts max.
Anode Voltage		300	volts max.
Anode Dissipation (each section)		5	watts max.
Cathode Current		35	mA max.
Negative Grid Voltage		75	volts max.
Average Grid Current		7	mA max.
Grid Resistor (Fixed Bias)		250	kΩ max.
(Auto Bias)		1.5	MΩ max.

OPERATING CHARACTERISTICS

Va = 250 V, Vg = −4.6 V, Vh = 12.6 V (series connection)

	Min.	Bogey	Max.	
Anode Current	3.5	6.0	8.5	mA
Amplification Factor	27	32	37	
Mutual Conductance	1.7	2.35	3.0	mA/V
Anode Impedance	—	14		kΩ

OPERATION AS A PUSH-PULL ZERO BIAS CLASS B AMPLIFIER

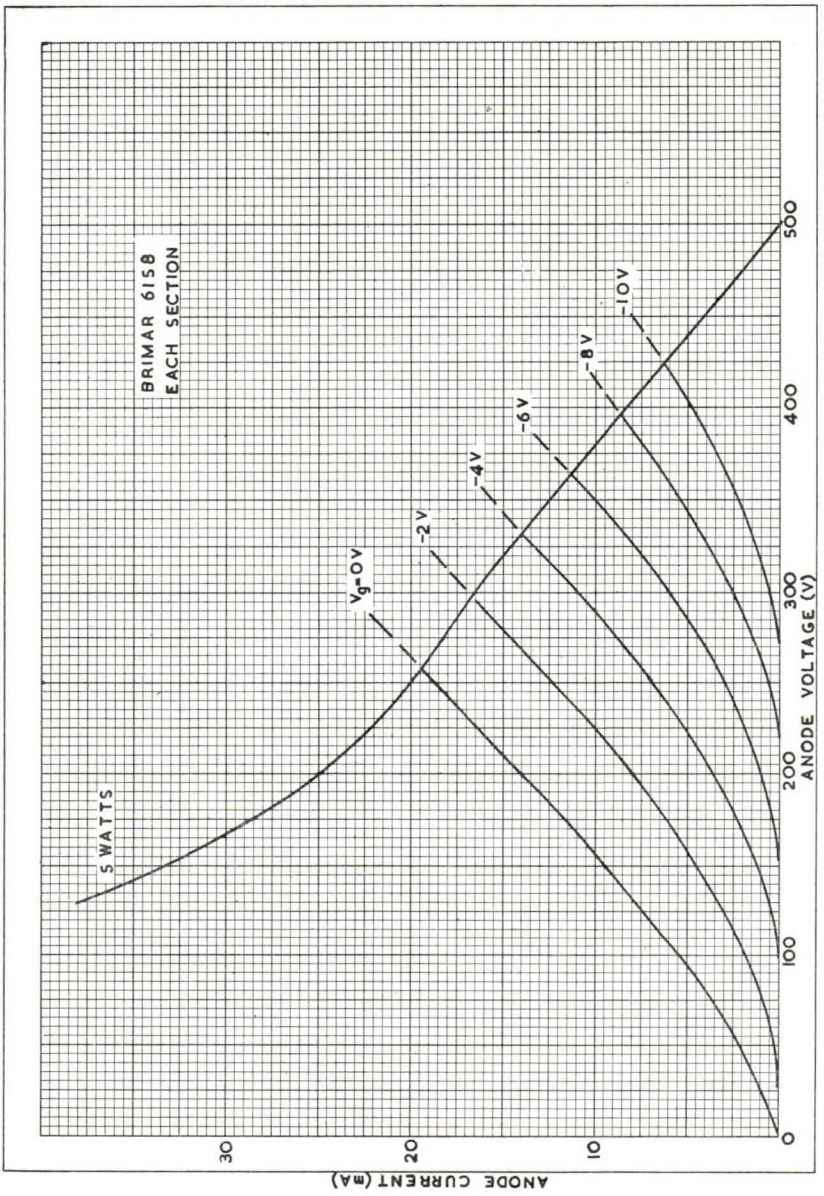
Anode Voltage	250	volts
Grid Voltage	0	volts
Anode Current (Zero Signal)	39	mA
Anode Current (Max. Signal)	43.2	mA
Output Load Impedance (Anode-Anode)	20	kΩ
R.M.S. Input Voltage	32	volts
Grid Current	12.8	mA
Total Harmonic Distortion	11.5	%
Power Output	6.7	watts

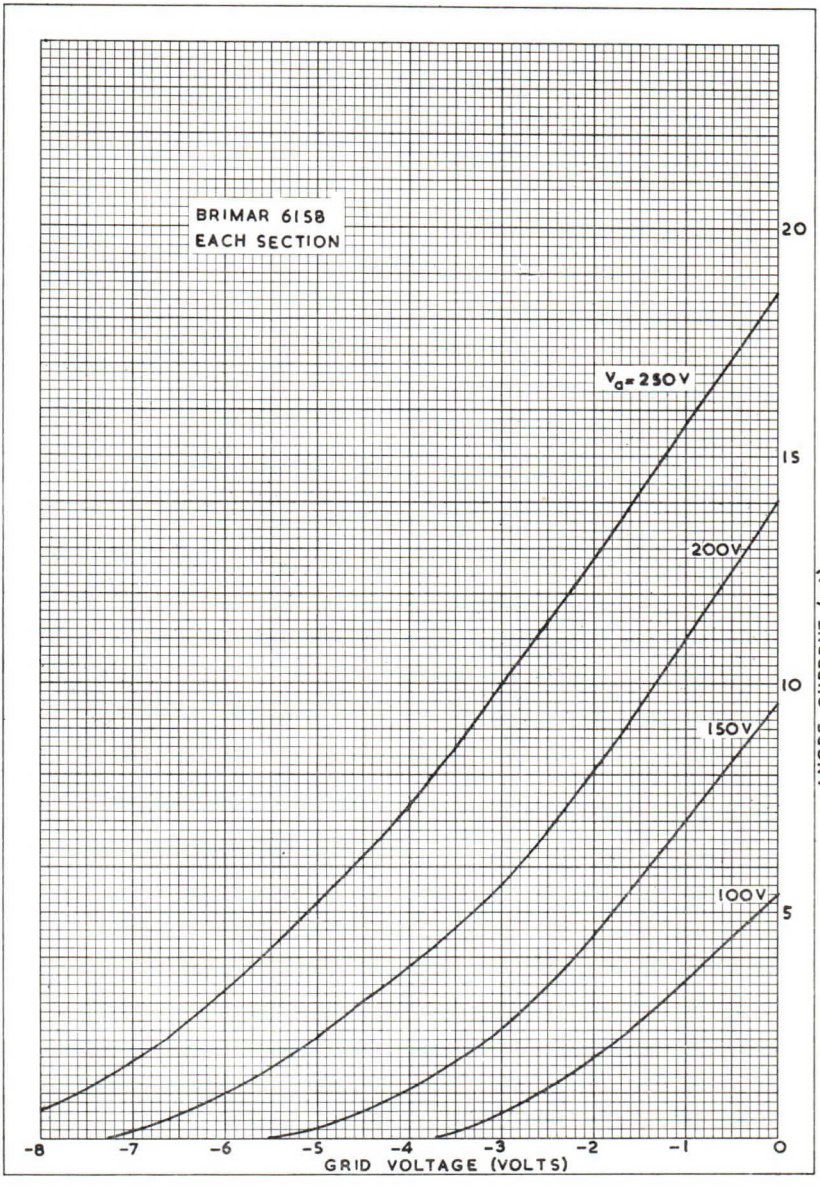
INTER-ELECTRODE CAPACITANCES*

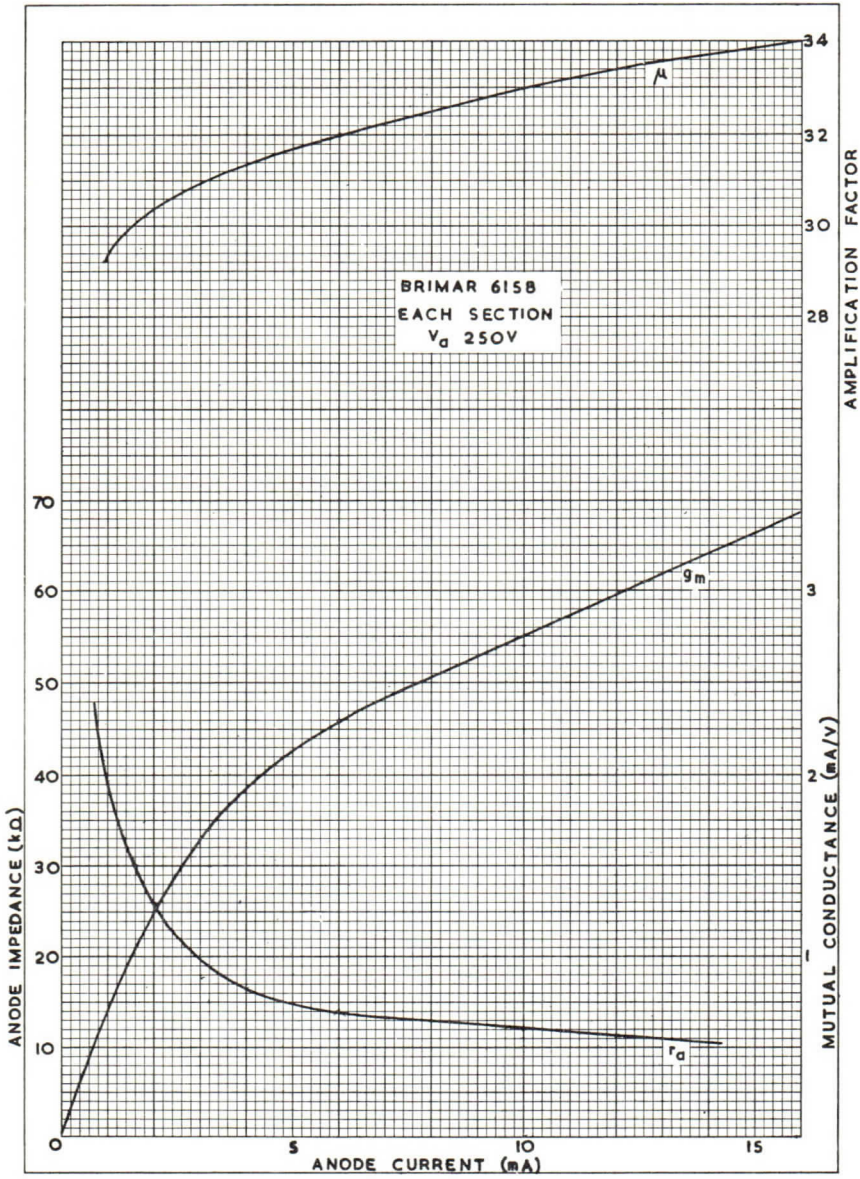
	Section 1	*Section 2*	
Input	2.2	2.2	pF
Output	2.0	2.0	pF
Grid to Anode	1.9	1.9	pF
Heater to Cathode	4.9	4.9	pF
Grid 1 to Anode 2		0.02	pF
Grid 2 to Anode 1		0.035	pF
Anode 1 to Anode 2		0.46	pF
Grid 1 to Grid 2		0.0035	pF

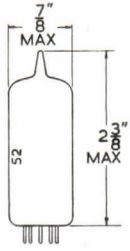
* *With no external shield.*

Type 6158 *is a commercial equivalent to* CV4068.

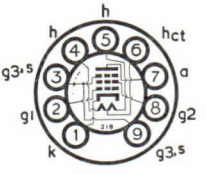

BRIMAR 6158
EACH SECTION
5 WATTS
V_g=0V
-2V
-4V
-6V
-8V
-10V
ANODE CURRENT (mA)
30
20
10
0
100
200
300
400
500
ANODE VOLTAGE (V)


BRIMAR 6158
EACH SECTION
V_a = 250V
200V
150V
100V
20
15
10
5
ANODE CURRENT (mA)
-8
-7
-6
-5
-4
-3
-2
-1
0
GRID VOLTAGE (VOLTS)


BRIMAR 6158
EACH SECTION
V_a 250V
μ
g_m
r_a
ANODE IMPEDANCE (kΩ)
MUTUAL CONDUCTANCE (mA/V)
AMPLIFICATION FACTOR
ANODE CURRENT (mA)
0
10
20
30
40
50
60
70
2
3
28
30
32
34
5
10
15



TYPE 6870
TRUSTWORTHY MINIATURE R.F. AND VIDEO PENTODE



The BRIMAR 6870 is a trustworthy high slope pentode for use as a small transmitting valve or as a video valve giving a larger output with low anode loads than an ordinary R.F. amplifying pentode.

RATINGS

Heater Voltage	6.3	or 12.6	volts
Heater Current	0.6	or 0.3	amp.
Anode Voltage		300	volts max.
Anode Voltage (Ia = 0)		500	volts max.
Anode Dissipation		6.3	watts max.
Screen Voltage		250	volts max.
Screen Voltage (Ig_2 = 0)		500	volts max.
Screen Dissipation		2.0	watts max.
Control Grid Current (D.C.)		3.0	mA max.
Control Grid Circuit Resistance—Fixed Bias		0.1	MΩ max.
Auto Bias		0.5	MΩ max.
Cathode Current		50	mA max.
Frequency of Operation		150	Mc/s max.
Shock (Intermittent Service)		500	g
Vibration (Continuous Service)		2.5	g

OPERATING CHARACTERISTICS (Class A)

Va = Vg_2 = 180 V, Vg_1 = Vg_3 = 0 V, Rk = 56 ohm, Ck = 1,000 μF, Vh = 6.3 V (parallel connection)

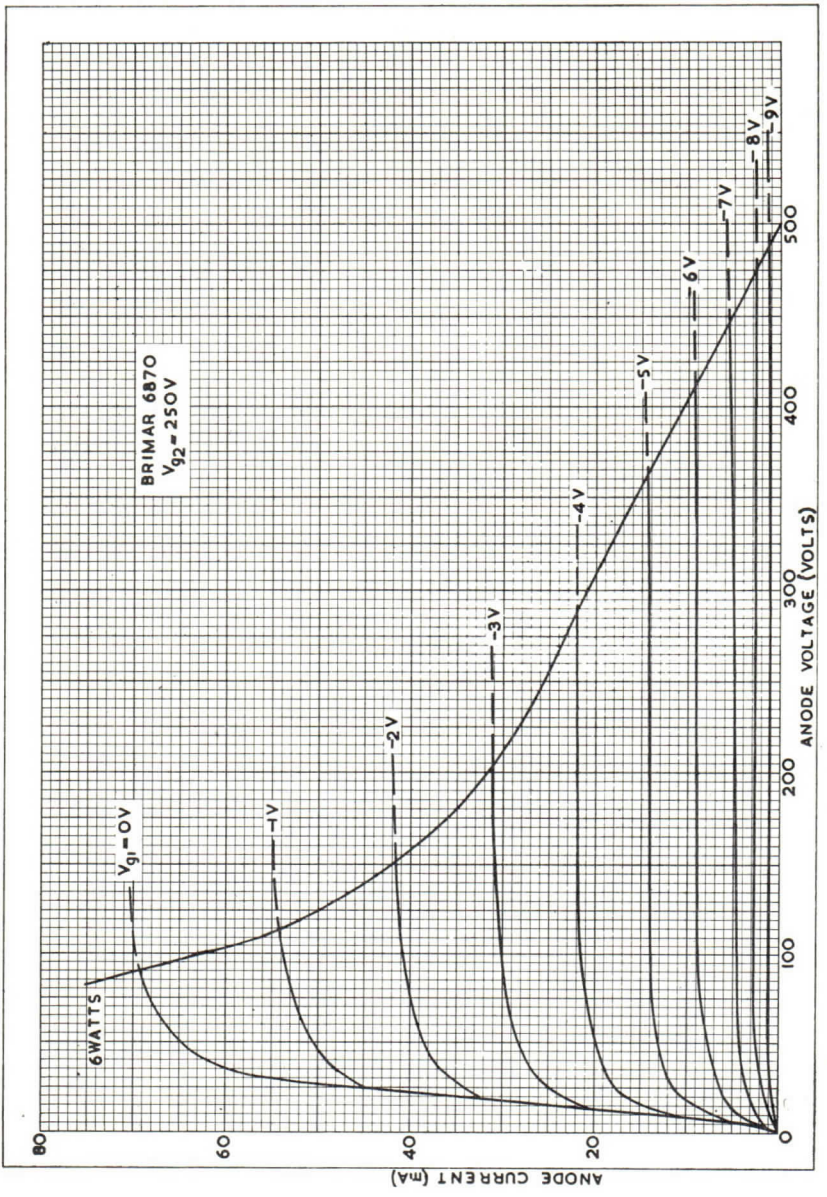
	Min.	Bogey	Max.	
Anode Current	19	25	31	mA
Screen Current	1.5	3.5	5.5	mA
Mutual Conductance	7.2	9.0	10.8	mA/V
Anode Impedance		170		kΩ
Inner Amplification Factor ($\mu g_1 - g_2$)	28	35	42	
Control Grid Voltage for Ia = 100 μA		−9	−12	volts

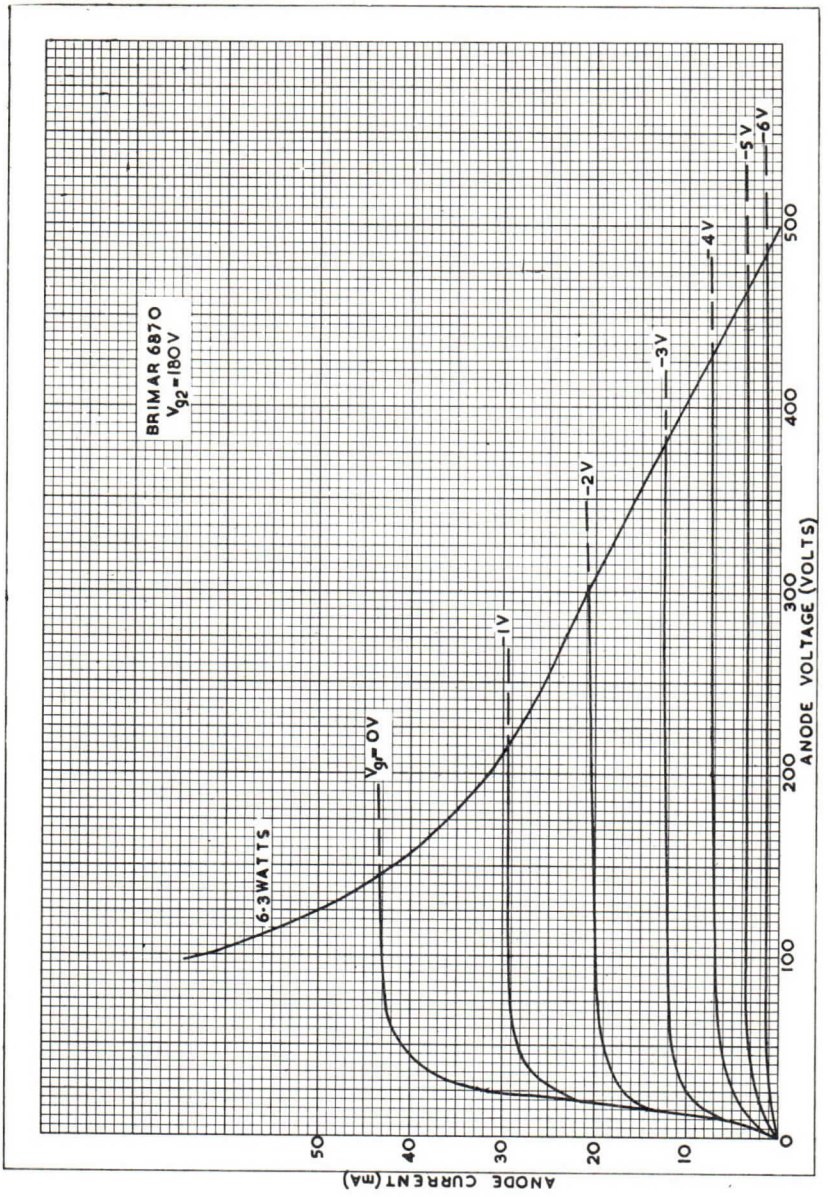
INTER-ELECTRODE CAPACITANCES*

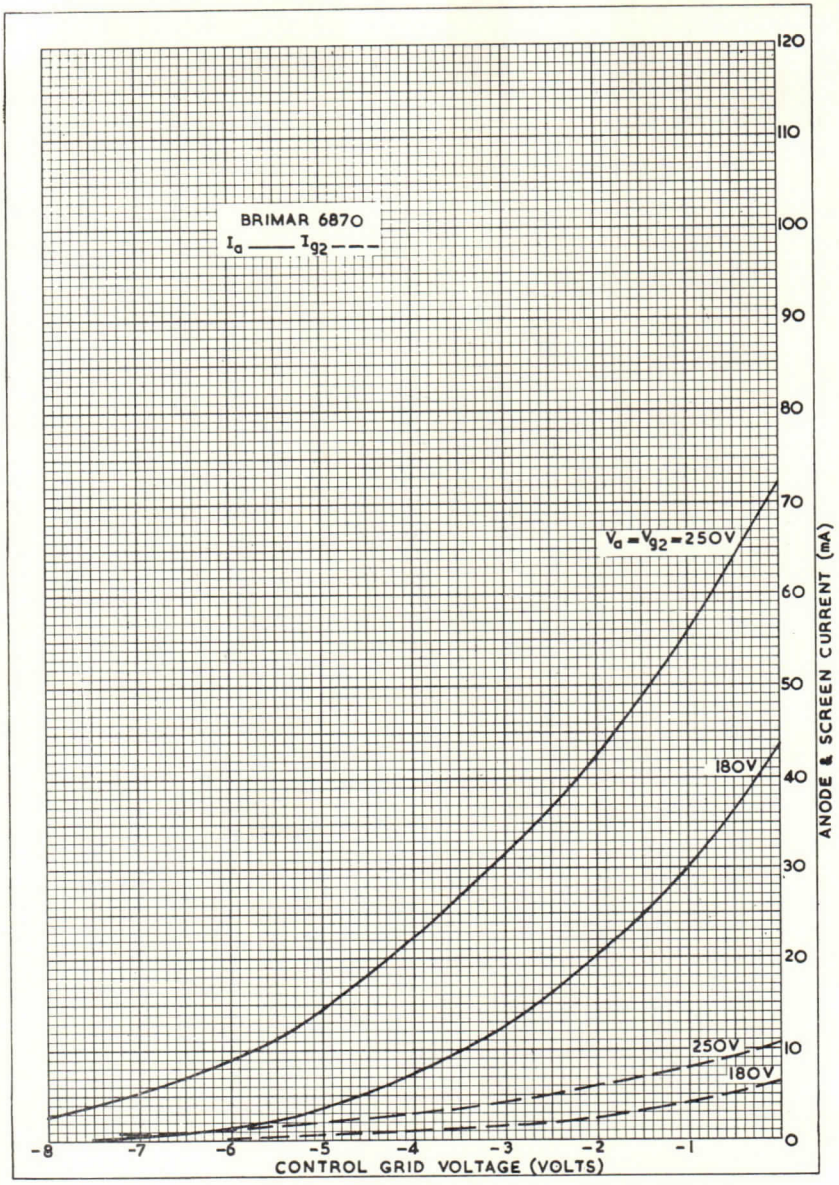
Input	8.5 pF
Output	7.0 pF
Control Grid to Anode (max.)	0.025 pF

* *With no external shield.*

Type 6870 is a commercial equivalent to CV5121.


BRIMAR 6870
V_{g2} = 250V
V_{g1} = 0V
-1V
-2V
-3V
-4V
-5V
-6V
-7V
-8V
-9V
6WATTS
ANODE CURRENT (mA)
80
60
40
20
0
ANODE VOLTAGE (VOLTS)
100
200
300
400
500


BRIMAR 6870
V_{g2}=180V
6·3WATTS
V_{g1}=0V
-1V
-2V
-3V
-4V
-5V
-6V
ANODE CURRENT (mA)
ANODE VOLTAGE (VOLTS)
0
10
20
30
40
50
100
200
300
400
500


BRIMAR 6870
I_a —— I_{g2} - - -
$V_a = V_{g2} = 250V$
180V
250V
180V
120
110
100
90
80
70
60
50
40
30
20
10
0
-8
-7
-6
-5
-4
-3
-2
-1
CONTROL GRID VOLTAGE (VOLTS)
ANODE & SCREEN CURRENT (mA)

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