

U.H.F. BEAM POWER TETRODE

QV2-250C

QUICK REFERENCE DATA

Forced-air cooled beam power tetrode suitable for use as power amplifier, oscillator, frequency multiplier and linear amplifier for s.s.b. applications.

The QV2-250C is of ceramic construction.

	Class 'AB' Linear Amplifier for S.S.B. operation	Class 'C' Telephony Anode and Screen Grid Modulation	Class 'C' Telegraphy or F.M. Telephony		
f	175	175	175	500	Mc/s
P _{out}	*300	235	390	250	W
f max.	500	500	500		Mc/s
V _a max.	2.0	1.5		2.0	kV
p _a max.	250	165	250		W

*P.E.P._{out}

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

CLASS 'AB' LINEAR AMPLIFIER FOR SINGLE SIDEBAND OPERATION

Maximum operating conditions

f	175	175	175	Mc/s
P.E.P _{out}	120	215	300	W
P.E.P _{load}	108	193	270	W
**d ₃	30	29	28	dB
**d ₅	35	36	35	dB
V _a	1.0	1.5	2.0	kV
V _{g2}	350	350	350	V
***-V _{g1}	55	55	55	V
I _{a(o)}	100	100	100	mA
I _{g2(o)}	0	0	0	mA

	Single tone	Double tone	Single tone	Double tone	Single tone	Double tone	
I _a	250	190	250	190	250	190	mA
I _{g2}	10	2.0	8.0	-1.0	5.0	2.0	mA
I _{g1}	0	-	0	-	0	-	mA
v _{in(pk)}	50	-	50	-	50	-	V
P.E.P _{load (driver)}	1.0	1.0	1.0	1.0	1.0	1.0	W
p _a	130	-	160	-	200	-	W
η _a	48	32	57	38	60	40	%

**Third and fifth order intermodulation products. Maximum values encountered at any level of drive voltage referred to the amplitude of either of the two tones at that level.

***Adjust to give the desired value of I_{a(o)}.

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CLASS 'AB' AUDIO AMPLIFIER OR MODULATOR

Maximum operating conditions for two valves in push-pull

P_{out}	240	430	600	W
R_{a-a}	3.5	6.2	9.5	k Ω
V_a	1.0	1.5	2.0	kV
V_{g2}	350	350	350	V
*- V_{g1}	55	55	55	V
$I_{a(o)}$	2 x 100	2 x 100	2 x 100	mA
$I_{g2(o)}$	0	0	0	mA
$I_{a(max.sig)}$	2 x 250	2 x 250	2 x 250	mA
$I_{g2(max.sig)}$	2 x 10	2 x 8.0	2 x 5.0	mA
I_{g1}	0	0	0	mA
$v_{in(g1-g1) pk}$	100	100	100	V
p_a	2 x 100	2 x 150	2 x 200	W
η_a	48	57	60	%

*Adjust to give the desired value of $I_{a(o)}$.

CLASS 'C' TELEGRAPHY OR F.M. TELEPHONY

Maximum operating conditions.

f	175	175	175	175	**500	Mc/s
P_{out}	70	190	280	390	250	W
P_{load}	60	160	240	330	225	W
η_a	56	76	75	80	50	%
V_a	0.5	1.0	1.5	2.0	2.0	kV
I_a	250	250	250	250	250	mA
V_{g2}	250	250	250	250	300	V
I_{g2}	45	38	21	19	10	mA
- V_{g1}	90	90	90	90	90	V
I_{g1}	35	31	28	26	25	mA
$v_{in} (pk)$	114	114	112	112	-	V
$P_{load} (driver)$	4.0	3.5	3.2	2.9	18	W
p_a	55	60	95	110	250	W
p_{g2}	12	11	9.0	7.5	-	W

**With coaxial cavity

CLASS 'C' TELEPHONY ANODE AND SCREEN-GRID MODULATION

Maximum operating conditions (Carrier conditions for 100% modulation)

f	175	175	175	Mc/s
P _{out}	60	140	235	W
P _{load}	51	120	200	W
η_a	60	70	78	%
V _a	0.5	1.0	1.5	kV
I _a	200	200	200	mA
V _{g2}	250	250	250	V
I _{g2}	31	22	20	mA
-V _{g1}	100	100	100	V
I _{g1}	15	14	14	mA
v _{in(pk)}	118	117	117	V
P _{load (driver)}	1.8	1.7	1.7	W
P _a	40	60	65	W
For 100% modulation				
P _{mod}	50	100	150	W

CLASS 'B' AMPLIFIER FOR TELEVISION SERVICE

Negative modulation, positive synchronisation

Maximum operating conditions

f	216	216	216	Mc/s
Bandwidth (-3dB)	5.0	5.0	5.0	Mc/s
P _{out sync}	160	300	440	W
P _{load sync}	140	260	385	W
V _a	1.0	1.5	2.0	kV
V _{g2}	350	350	350	V
-V _{g1}	60	65	70	V
v _{in(pk) sync}	65	71	76	V
black	52	57	62	V
I _{a sync}	355	360	360	mA
black	250	250	250	mA
I _{g2 sync}	27	29	29	mA
black	4.0	0	0	mA
I _{g1 sync}	2.0	5.0	5.0	mA
black	0	0	0	mA
P _{load (driver) sync}	0.4	1.2	1.2	W

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ABSOLUTE MAXIMUM RATINGS

	Class 'AB' Amplifier for S.S.B.	Class 'AB' Amplifier	Class 'C' Telephony	Class 'C' Telegraphy or Television Service	
f max.	500	-	500	500	Mc/s
V_a max.	2.0	2.0	1.5	2.0	kV
V_{g2} max.	400	400	300	300	V
$-V_{g1}$ max.	250	250	250	250	V
I_k max.	265	265	285	340	mA
p_a max.	250	250	165	250	W
p_{g2} max.	12	12	12	12	W
I_{g1} max.	-	-	40	45	mA
P_{g1} max.	2.0	2.0	2.0	2.0	W
R_{g1-h}	25	100	25	25	k Ω
V_{h-k} max.	150	150	150	150	V

CATHODE

Indirectly heated, oxide coated

V_h	6.0	V
I_h (at $V_h = 6.0V$)	2.6	A
t_{hk} min.	30	s

The heater voltage should be reduced as follows :-

Up to 300Mc/s	6.0	V
300 to 400Mc/s	5.75	V
400 to 500Mc/s	5.5	V

CAPACITANCES

	$g1, g2$ earthed	k earthed	
c_{a-g1}	-	<60	mpF
c_{out}	4.5	4.5	pF
c_{in}	13	15.7	pF

CHARACTERISTICS

g_m (measured at $V_a = 500V$, $V_{g2} = 250V$, $I_a = 200mA$)	12	mA/V
μ_{g1-g2} (measured at $V_{g2} = 300V$, $I_a = 50mA$)	5.2	

MOUNTING POSITION

Any

COOLING

Forced-air

Maximum temperatures

Anode core and seals	250	°C
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Air cooling must commence simultaneously with the application of heater voltage. A socket and air system chimney must be used to direct air on to the base seals, past the screen-grid seal and envelope, and through the radiator.

A typical value of air flow for maximum anode dissipation is given in the following table:

Anode dissipation	Height above sea-level	Inlet temperature	Rate of flow of air	Pressure difference between inlet and outlet
p_a (W)	h (m)	T_{in} (°C)	m^3/min ft^3/min	(mm of water) (in of water)
250	0	20	0.11 3.8	6.4 0.25

At higher altitudes or ambient temperatures the air flow required to maintain the temperature of the anode core and all seals within the permitted maximum must be increased.

PHYSICAL DATA

	oz	g
Weight of valve	4.2	120
Weight of valve and carton	10.6	300

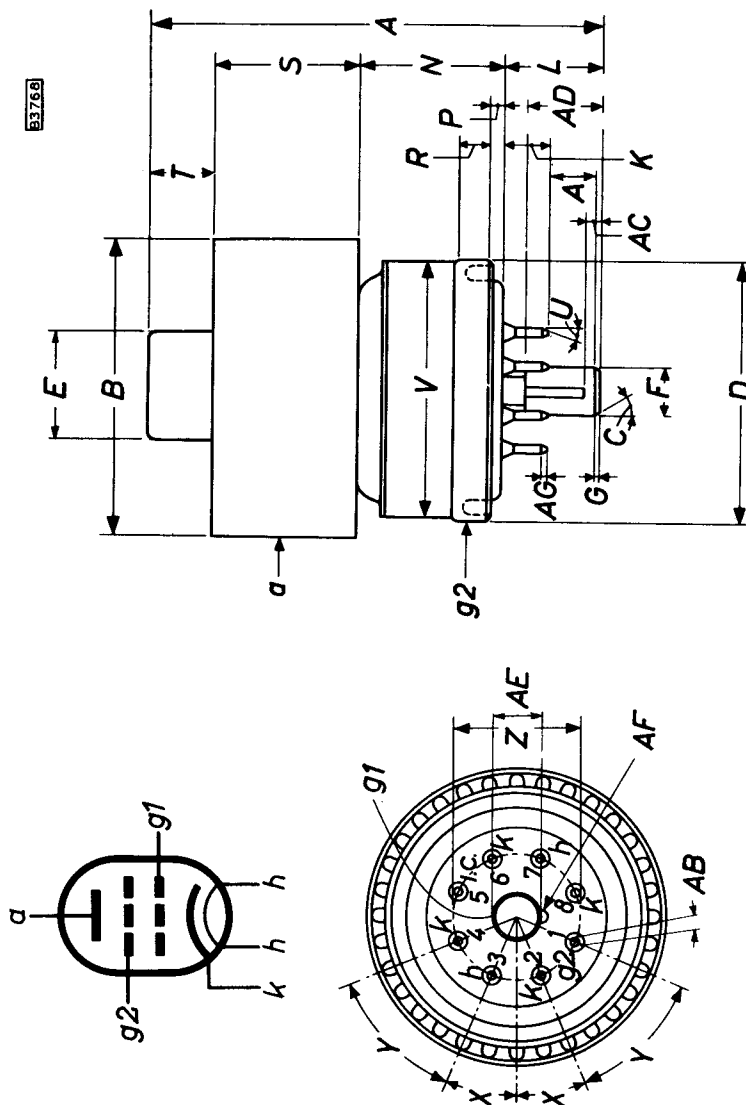
ACCESSORIES

Air system socket (including air system chimney)	40222
Air system chimney	56 590 81/40



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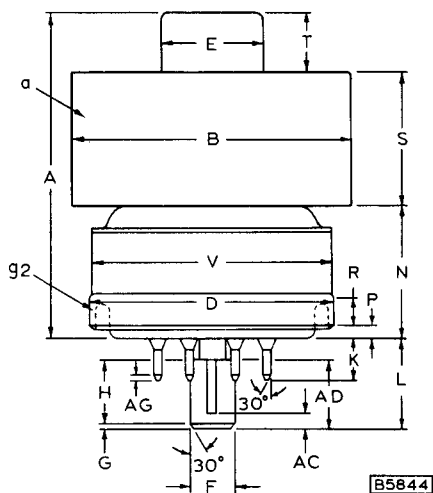
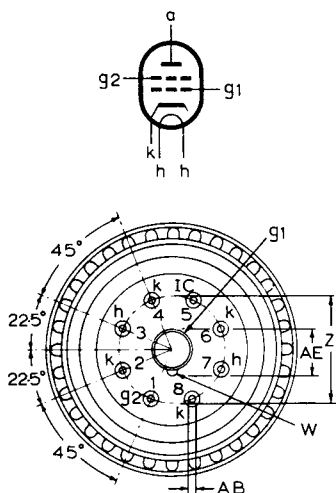
DIMENSIONS

	Inches	Millimetres	
A	1.860 ± 0.049	47.245 ± 1.265	
B	1.624 ± 0.015	41.275 ± 0.375	dia.
C		30°	
D	1.424 ± 0.007	36.195 ± 0.195	dia.
E	0.568 ± 0.0068	14.375 ± 0.175	dia.
F	0.259 ± 0.0048	6.605 ± 0.125	dia.
G	0.031	0.79	typ.
H	0.340	8.65	min.
K	0.25	6.35	max.
L	0.534 ± 0.02	13.565 ± 0.505	
M	0.035	0.89	typ.
N	0.776 ± 0.026	19.71 ± 0.66	
P	0.020	0.51	typ.
R	0.187	4.75	min.
S	0.75 ± 0.039	19.05 ± 1.01	
T	0.240	6.10	typ.
U		22.5°	
V	1.405	35.7	dia. max.
W	0.043	1.09	rad. max.
X		22.5°	
Y		45°	
Z	0.688 ± 0.007	17.45 ± 0.17	dia.
AB	0.049 ± 0.003	1.245 ± 0.095	dia.
AC	0.088 ± 0.02	2.235 ± 0.505	
AD	0.461	11.58	max.
AE	0.302 ± 0.0048	7.695 ± 0.125	
AF	0.082 ± 0.003	2.085 ± 0.095	
AG	0.005	0.13	rad. min.

Inch dimensions derived from original millimetre dimensions

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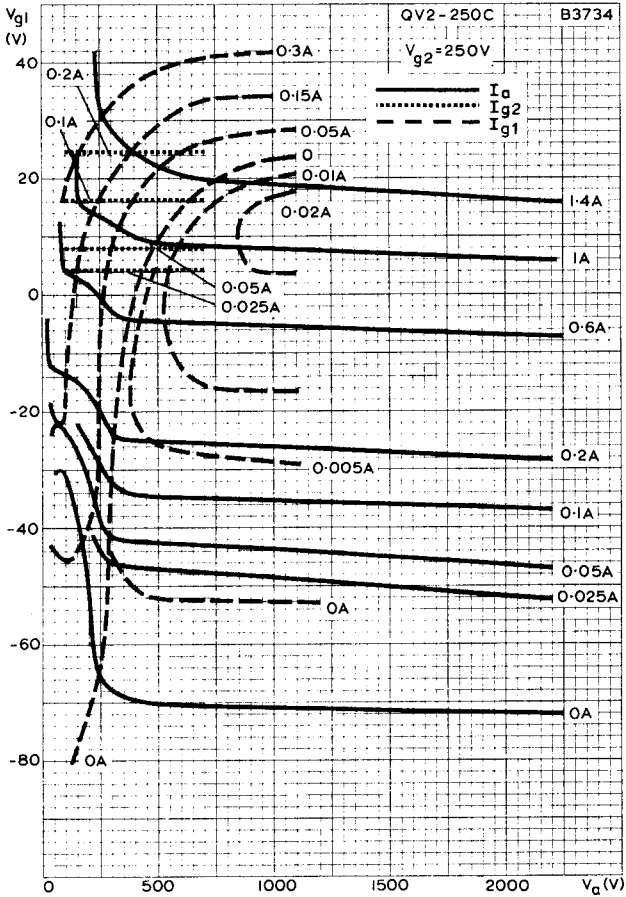
DIMENSIONS

	Inches	Millimetres	
A	1.860 ± 0.050	47.25 ± 1.27	
B	1.625 ± 0.015	41.28 ± 0.38	dia.
D	1.425 ± 0.008	36.20 ± 0.02	dia.
E	0.568 ^{+0.005} -0.009	14.43 ^{+0.13} -0.23	dia.
F	0.260 ± 0.005	6.61 ± 0.13	dia.
G	0.031	0.79	
H	0.360	9.15	min.
K	0.250 ± 0.005	6.35 ± 0.12	
L	0.534 ± 0.020	13.56 ± 0.50	
N	0.780 ± 0.030	19.81 ± 0.76	
P	0.020	0.51	
R	0.187	4.75	min.
S	0.750 ± 0.040	19.05 ± 1.01	
T	0.255 ^{+0.025} -0.015	6.48 ^{+0.64} -0.38	
V	1.40	35.71	dia. max.
W	0.043	1.09	rad. max.
Z	0.687 ± 0.007	17.45 ± 0.17	dia.
AB	0.050 ^{+0.003} -0.005	1.27 ^{+0.08} -0.13	dia.
AC	0.088 ± 0.020	2.23 ± 0.50	
AD	0.456	11.58	max.
AE	0.303 ± 0.005	7.70 ± 0.13	
AG	0.005	0.13	rad. min.

Millimetre dimensions derived from original inch dimensions

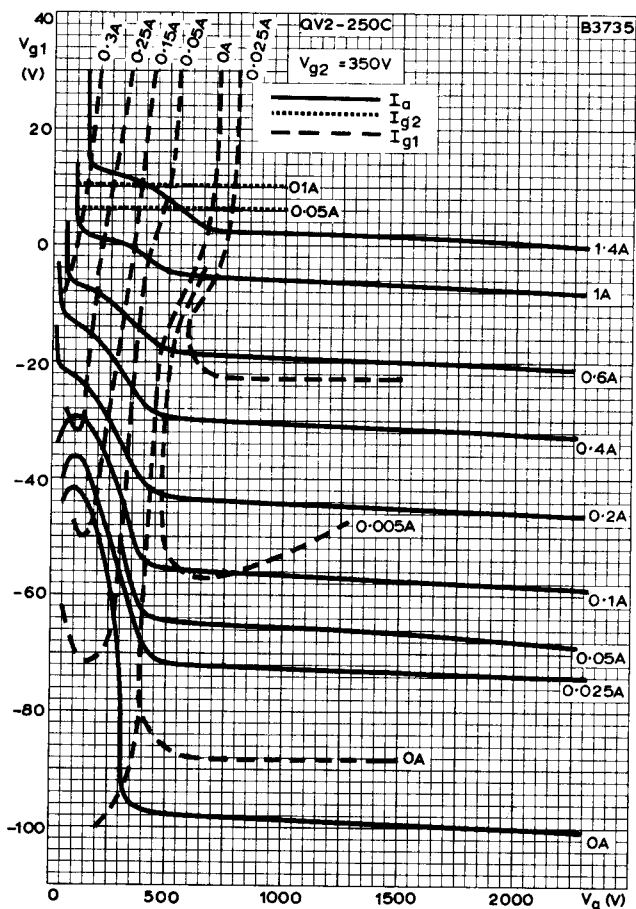
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CONSTANT CURRENT CHARACTERISTICS. $V_{g2} = 250V$

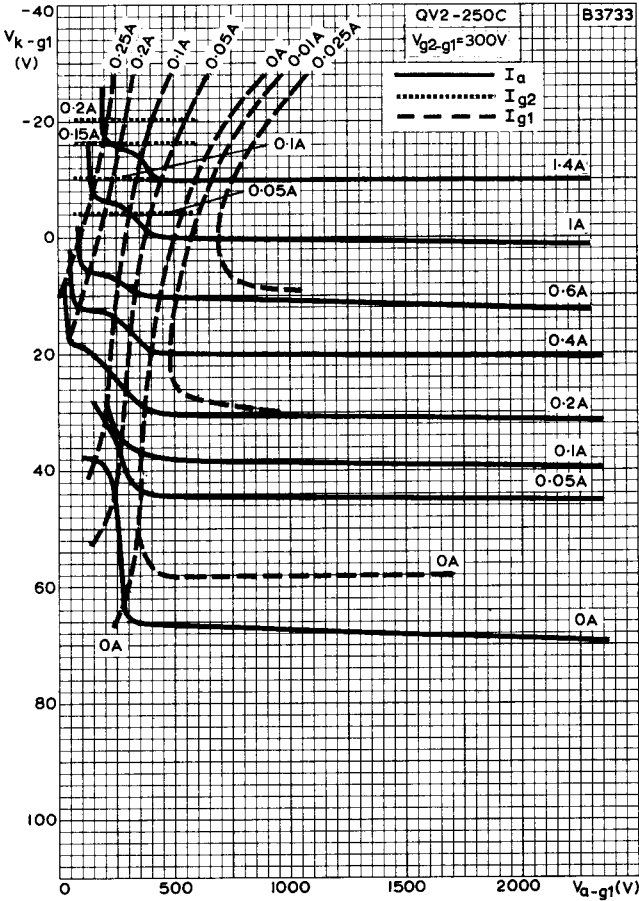




CONSTANT CURRENT CHARACTERISTICS. $V_{g2} = 350V$

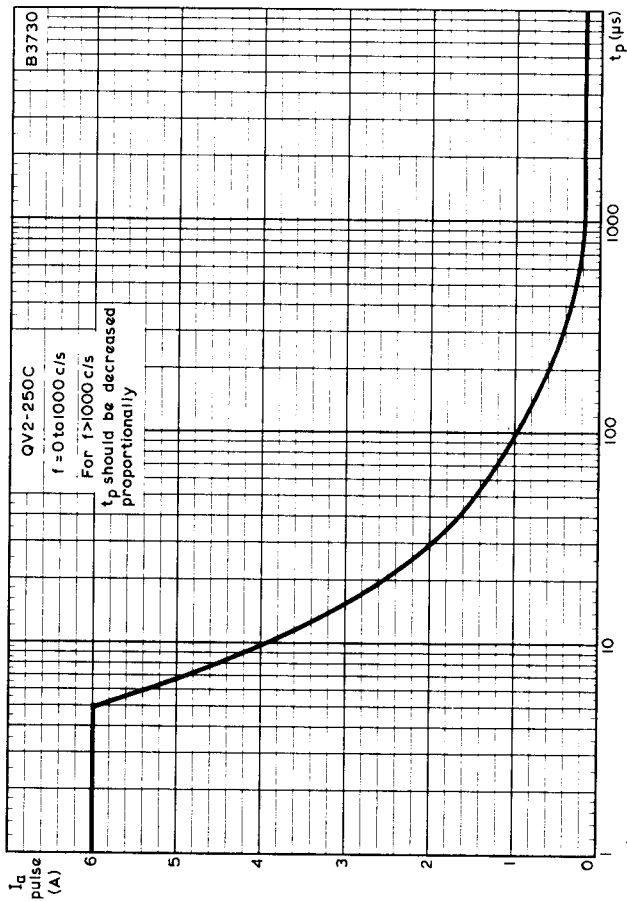
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CONSTANT CURRENT CHARACTERISTICS. $V_{g2-g1} = 300V$
 (COMMON GRID)





MAXIMUM PULSE ANODE CURRENT PLOTTED AGAINST
 PULSE TIME