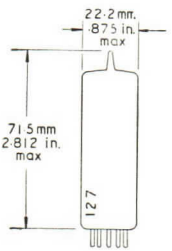
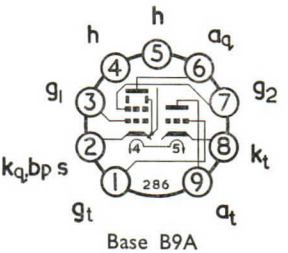


TRIODE OUTPUT BEAM TETRODE



Base B9A

GENERAL

This triode output beam tetrode is for use in television receivers with the triode as A.F. amplifier or time base oscillator and the tetrode as audio or field output valve.

Heater Voltage	V_h	6·3	V
Heater Current	I_h	0·78	A

RATINGS

		Triode	Tetrode	
Maximum Anode Dissipation	$P_{a(max)}$			
For $V_a \leqslant 250V$		1·0	7·0	W
For $V_a > 250V$		—	5·0	W
Maximum Screen Grid Dissipation	$P_{g2(max)}$	—	1·8	W
For speech and music		—	3·2	W
Maximum Anode Supply Voltage ($I_a = 0$)	$V_{a(b)max}$	550	550	V
Maximum Anode Voltage	$V_{a(max)}$	300	300	V
Maximum Peak Anode Voltage	$V_{a(pk)max}$			
Pulse Positive		0·6*	2·5†	kV
Pulse Negative		—	500	V
Maximum Screen Grid Supply Voltage ($I_{g2} = 0$)	$V_{g2(b)max}$	—	550	V
Maximum Screen Grid Voltage	$V_{g2(max)}$	—	300	V
Maximum Heater to Cathode Voltage	$V_{h\text{-}k(max)}$	100‡	100‡	V
Maximum Mean Cathode Current	$I_{k(av)max}$	15	50	mA
Maximum Resistance Grid 1 to Cathode	$R_{g1\text{-}k(max)}$			
Self Bias		3	2	MΩ
Fixed Bias		1	1	MΩ
Grid Current Bias		22	—	MΩ
Maximum Resistance Heater to Cathode	$R_{h\text{-}k(max)}$	20	20	kΩ

* Maximum pulse duration 200μs.
† Maximum pulse duration 4 per cent. of one cycle with a maximum of 800μs.
‡ Measured with respect to the higher potential heater pin.

THORN — A E I RADIO VALVES & TUBES LTD.

INTER-ELECTRODE CAPACITANCES

		§	¶	‖	
Tetrode Input	$c_{in(q)}$	9·3	9·6	10·7	pF
Tetrode Output	$c_{out(q)}$	9·0	9·3	10·4	pF
Tetrode Anode to Grid 1	c_{aq-g1}	0·35	0·37	0·38	pF
Triode Input	$c_{in(t)}$	3·0	3·2	4·1	pF
Triode Output	$c_{out(t)}$	4·3	4·5	5·4	pF
Grid Triode to Anode Triode	c_{gt-at}	4·2	4·3	4·4	pF
Anode Tetrode to Anode Triode	c_{aq-at}	0·15	0·18	0·19	pF
Grid 1 to Grid Triode	c_{g1-gt}	0·011	0·030	0·063	pF
Grid 1 to Anode Triode	c_{g1-at}	0·017	0·023	0·028	pF
Grid Triode to Anode Tetrode	c_{gt-aq}	0·014	0·020	0·022	pF
Grid Triode to Heater	c_{gt-h}	0·018	0·031	0·042	pF
Grid 1 to Heater	c_{g1-h}	0·24	0·38	0·71	pF

§ In fully-shielded socket without can.

¶ With holder capacitance balanced out (holder as below).

‖ Total inter-electrode capacitances including B9A nylon phenolic holder without skirt or radial shield (AEI holder type VH19/902).

CHARACTERISTICS

		Triode	Tetrode	
Anode Voltage	V_a	100	200	V
Screen Grid Voltage	V_{g2}	—	200	V
Anode Current	I_a	3·5	35	mA
Screen Grid Current	I_{g2}	—	7	mA
Control Grid Voltage	V_{g1}	0	–16	V
Mutual Conductance	g_m	2·5	6·4	mA/V
Amplification Factor	μ	70	—	
Inner Amplification Factor	μ_{g1-g2}	—	9·5	

TYPICAL OPERATION

Single Valve as Class A Audio Output

Anode Voltage	V_a	200	250	V
Screen Grid Voltage	V_{g2}	200	250	V
Undecoupled Screen Grid Resistor	R_{g2}	0	2·2	kΩ
Cathode Resistor	R_k	390	680	Ω
Grid Bias Voltage	V_{g1}	–16	–22·5	V
Quiescent Anode Current	$I_{a(o)}$	35	28	mA
Quiescent Screen Grid Current	$I_{g2(o)}$	7	5·5	mA
Power Output for 10 per cent. total distortion	P_{out}	3·5	3·4	W
Anode Load Resistance	R_a	5·6	9·0	kΩ
Input Swing Voltage (R.M.S.)	$V_{in(r.m.s.)}$	6·6	9·5	V
Input Swing for 50 mW output (R.M.S.)		0·6	0·78	V

Field Scanning

The field scan output stage should be designed to allow for valve spread and deterioration during life in addition to component variation. Values of total tetrode peak anode current available for a new average valve and at the assumed end of life point on any valve are as follows :—

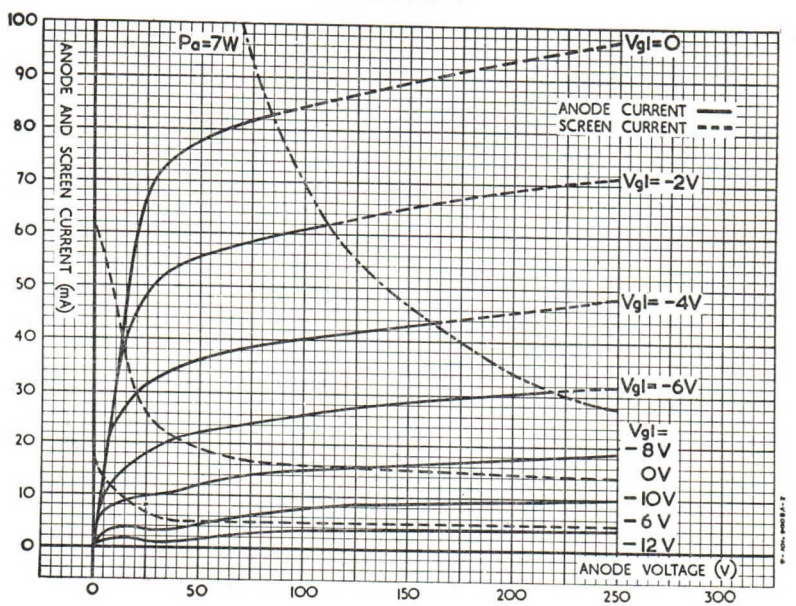
		*	†	
Anode Voltage	V_a	50	50	V
Screen Grid Voltage	V_{g2}	170	170	V
Anode Current	I_a	135	85	mA

Where V_{g1} is adjusted so that $I_{g1} = +0{\cdot}3\mu A$.
* Average new valve.
† Assumed end of life condition.

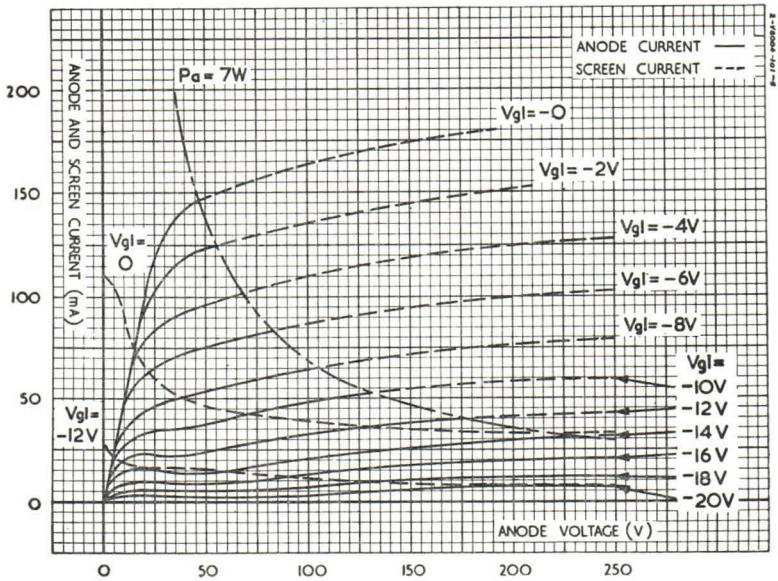
MOUNTING POSITION—Unrestricted

CHARACTERISTIC CURVES

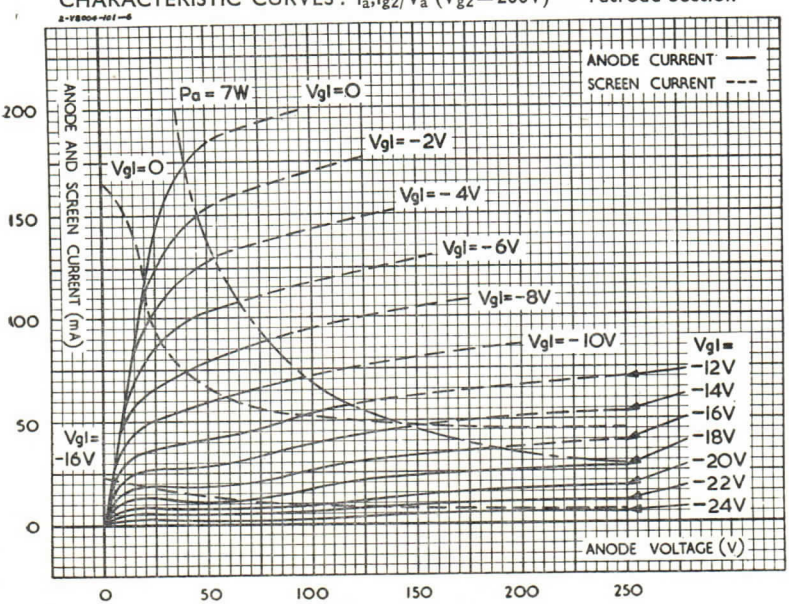
$I_a, I_{g2}/V_a$ ($V_{g2}=100V$)
Tetrode Section



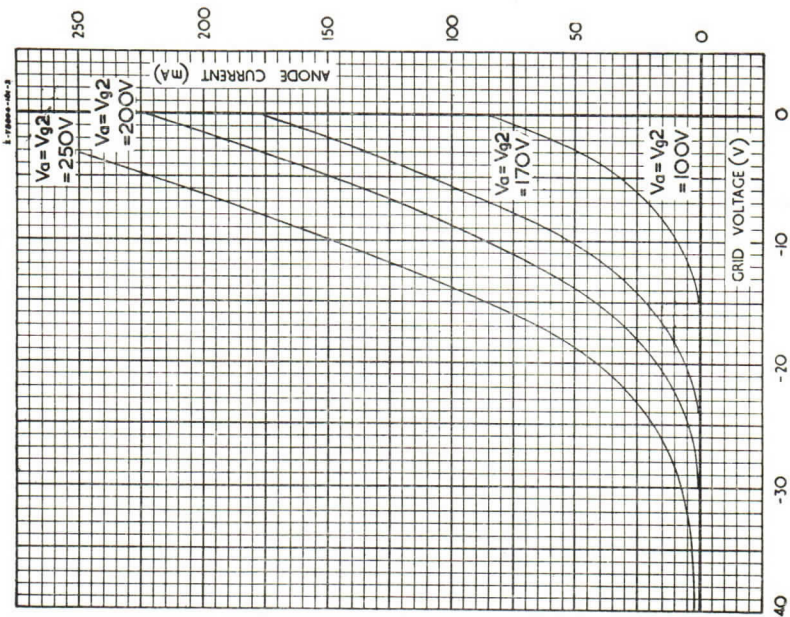
CHARACTERISTIC CURVES : $I_a, I_{g2}/V_a$ (V_{g2}=170V) — Tetrode Section



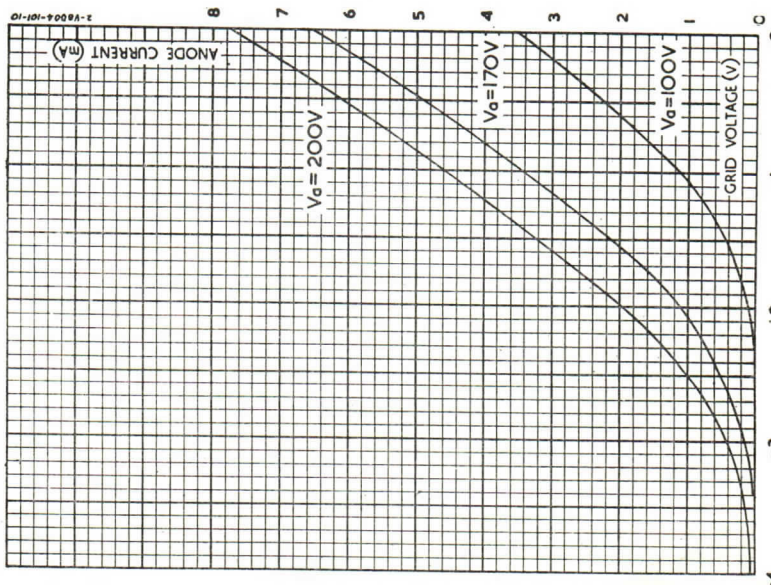
CHARACTERISTIC CURVES : $I_a, I_{g2}/V_a$ (V_{g2}=200V) — Tetrode Section



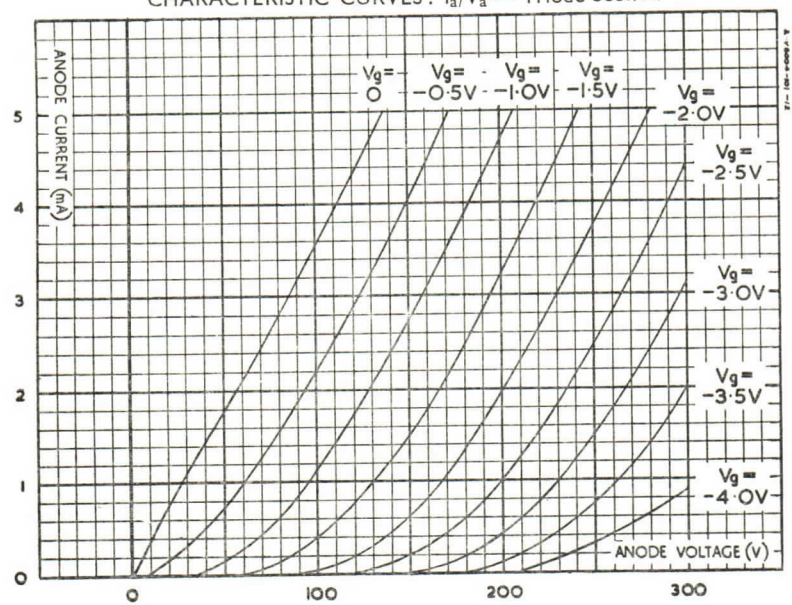
CHARACTERISTIC CURVES : I_a/V_{g1} — Tetrode Section



CHARACTERISTIC CURVES : I_a/V_g — Triode Section



CHARACTERISTIC CURVES : I_a/V_a — Triode Section



CHARACTERISTIC CURVES : g_m/V_g — Triode Section