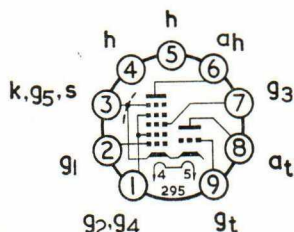


TRIODE HEPTODE FREQUENCY CHANGER



B9A Base

GENERAL

This triode heptode valve combination, with separate electrode structures, is for use in AM/FM broadcast radio AC/DC receivers. The valve is intended to be used as a frequency changer for AM signals with the triode as local oscillator and the heptode switched to operate as an I.F. amplifier for FM signals.

Heater Current	I_h	0.1	A
Heater Voltage	V_h	19.0	V

RATINGS

		Triode	Heptode	
Maximum Anode Dissipation	$P_a(\max)$	0.8	1.7	W
Maximum Screen Grids Dissipation	$P_{g2+g3}(\max)$	—	1	W
Maximum Anode Voltage	$V_a(\max)$	250	250	V
Maximum Screen Grids Voltage ($I_a = 7.6\text{mA}$)	$V_{g2+g3}(\max)$	—	125	V
Maximum Screen Grids Voltage ($I_a < 1\text{mA}$)		—	250	V
Maximum Heater to Cathode Voltage (R.M.S.)	$V_{h-k(r.m.s.)\max}$		100*	V
Maximum Mean Cathode Current	$I_{k(av)\max}$	6.5	12.5	mA

* Measured with respect to the higher potential heater pin.

INTER-ELECTRODE CAPACITANCES

		Triode	Heptode	
Output	C_{out}	2.1	7.9	pF
Input (g_1)	$C_{in}(g_1)$	2.6	4.8	pF
Input (g_3)	$C_{in}(g_3)$	—	6	pF
Grid 1 to Anode	C_{g1-a}	1	<0.006	pF
Grid 1 to Grid 3	C_{g1-g3}	—	<0.3	pF
Grid 1 to Grid 3, Grid Triode	$C_{g1-g3gt}$		<0.45	pF
Grid 1 to Grid Triode	C_{g1-gt}		<0.17	pF
Anode Heptode to Anode Triode	C_{ah-at}		0.2	pF

Inter-electrode capacitances measured with holder capacitances balanced out.

CHARACTERISTICS

		Triode	Heptode	
Anode Voltage	V_a	100	170	V
Screen Grids Voltage	V_{g2+g4}	—	102	V
Grid 3 Voltage	V_{g3}	—	0	V
Control Grid Voltage	V_{g1}	-1	-2.2	V
Anode Current	I_a	10	6.2	mA
Mutual Conductance	g_m	3.2	2.3	mA/V
Amplification Factor	μ	19	—	
Inner Amplification Factor	$\mu_{g1-(g2+g4)}$	—	20	

TYPICAL OPERATION AS R.F. or I.F. AMPLIFIER

Heptode Section

Supply Voltage	V_b	170	V
Anode Voltage	V_a	170	V
Screen Grids Resistance	R_{g2+g4}	18	k Ω
Screen Grids Voltage (Initial)	V_{g2+g4}	102	V
Grid 3 Voltage	V_{g3}	0	V
Control Grid Voltage	V_{g1}	-2.2	V
Anode Current (approximately)	I_a	6.2	mA
Screen Grids Current (approximately)	I_{g2+g4}	3.8	mA
Mutual Conductance	g_m	2.3	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	0.6	M Ω
Equivalent Grid Noise Resistance	R_{eq}	8.8	k Ω
Grid 1 Voltage for 100 : 1 reduction of Mutual Conductance		-28	

TYPICAL OPERATION AS A.M. FREQUENCY CHANGER

Heptode Section

Supply Voltage	V_b	170	V
Anode Voltage	V_a	170	V
Screen Grids Resistance	R_{g2+g4}	10	k Ω
Screen Grids Voltage (Initial)	V_{g2+g4}	102	V
Control Grid Voltage	V_{g1}	-2.2	V
Anode Current (approximately)	I_a	3.2	mA
Screen Grids Current (approximately)	I_{g2+g4}	6.8	mA
Heptode Grid 3 and Triode Grid Current	I_{g3+g1}	200	μ A
Heptode Grid 3 and Triode Grid Resistance	R_{g3+g1}	47	k Ω
Peak Heterodyne Voltage	$V_{(pk)het}$	12	V
Conversion Conductance	g_c	750	μ A/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	0.9	M Ω
Equivalent Grid Noise Resistance	R_{eq}	70	k Ω
Grid Voltage for 100 : 1 reduction of Conversion Conductance		-24	V

Triode

Anode Voltage	V_a	103	V
Anode Current (Average)	$I_a(av)$	4.5	mA

MOUNTING POSITION—Unrestricted

APPROXIMATE WEIGHT

Net	0.5	oz
Packed	0.75	oz

AVERAGE CHARACTERISTIC CURVES:

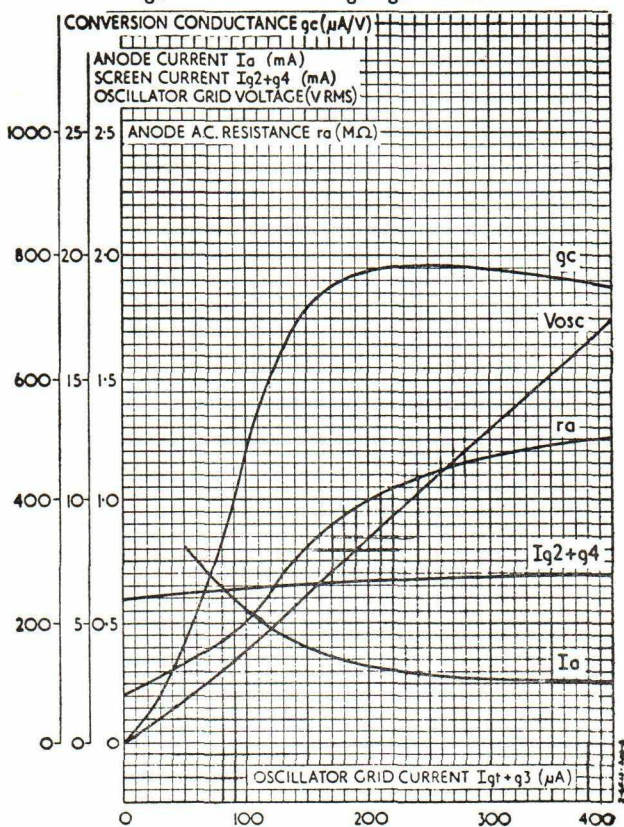
$I_a, I_{g2}, g_c, r_a, V_{osc}/I_{gt} + g_3$

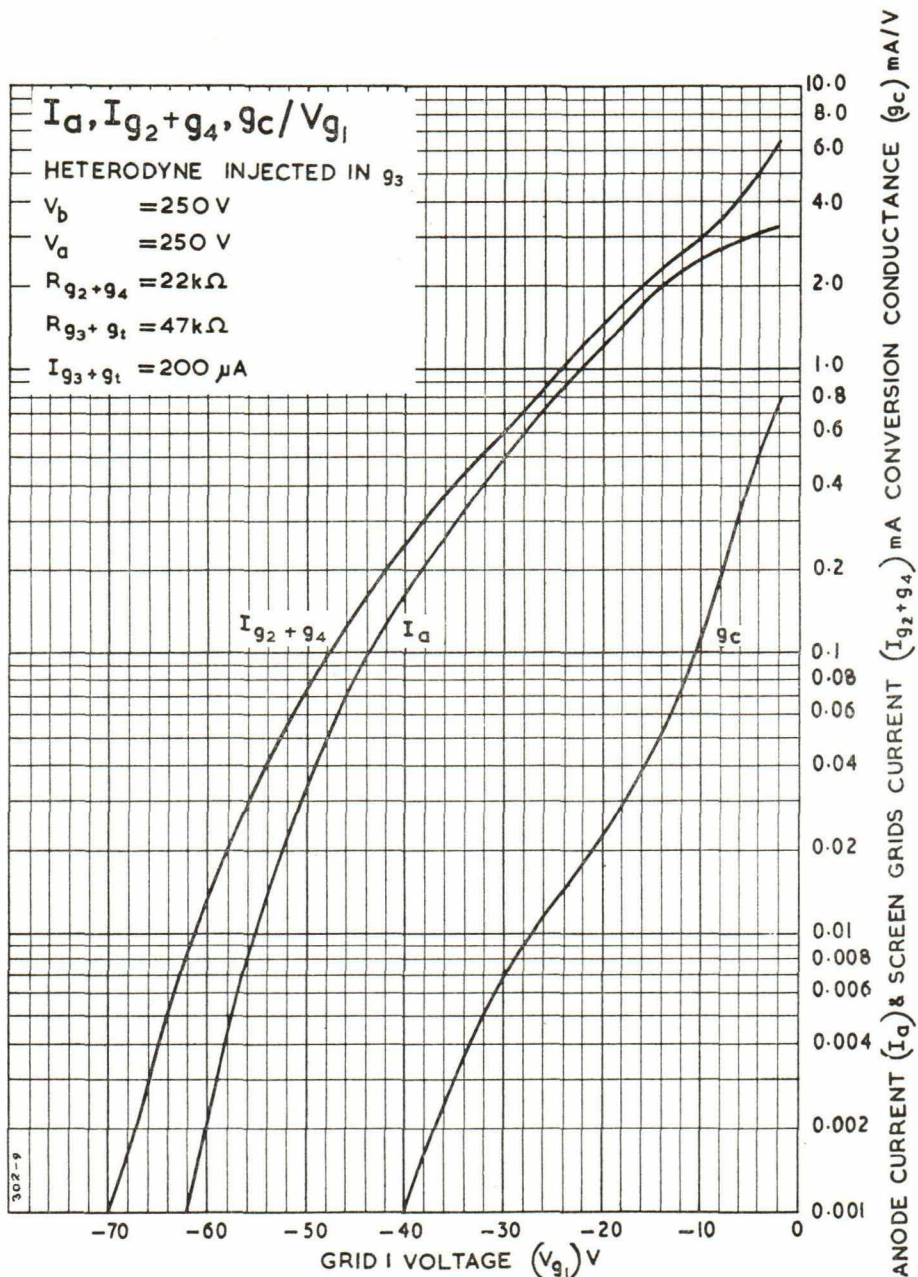
$V_a = 250V$

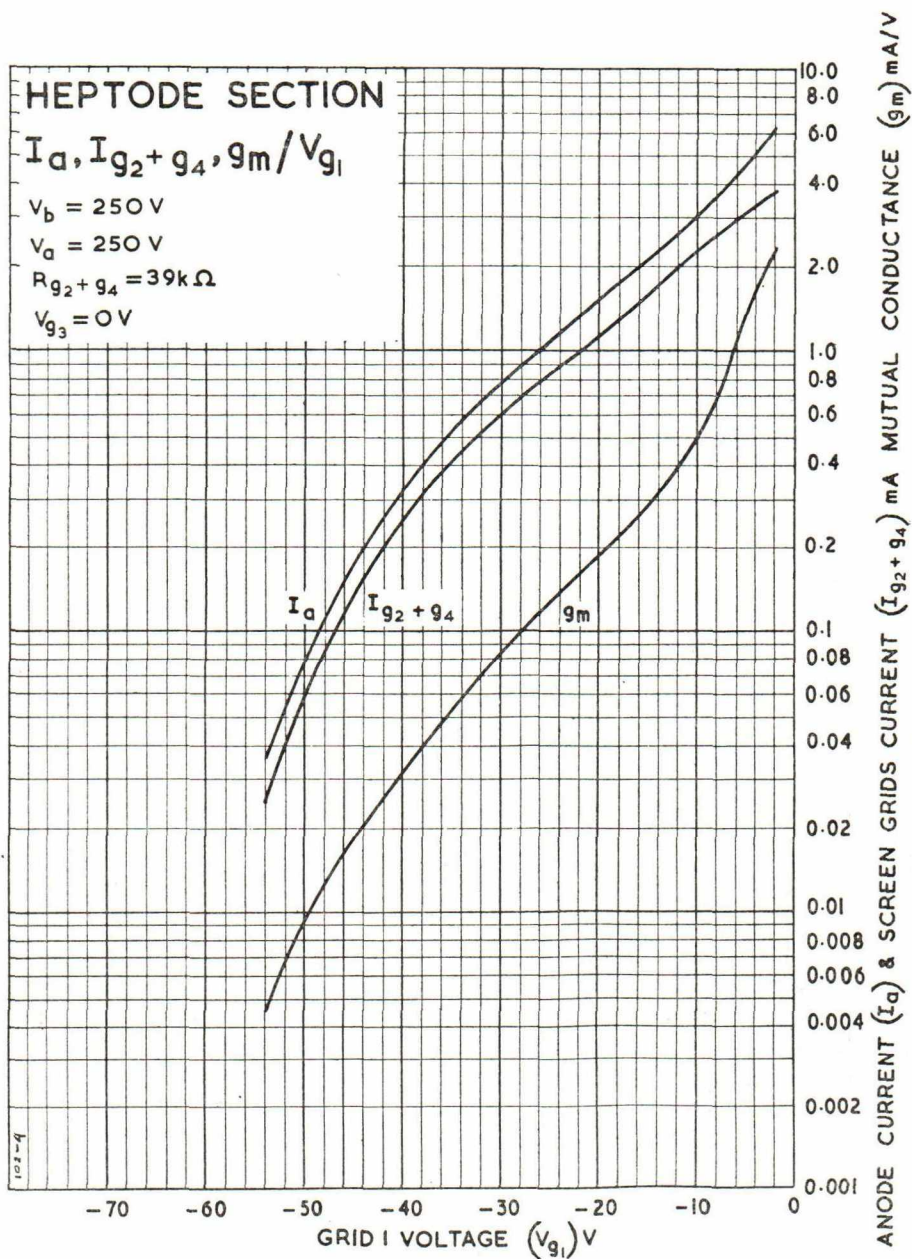
$R_{g2} + g_4 = 22k\Omega$

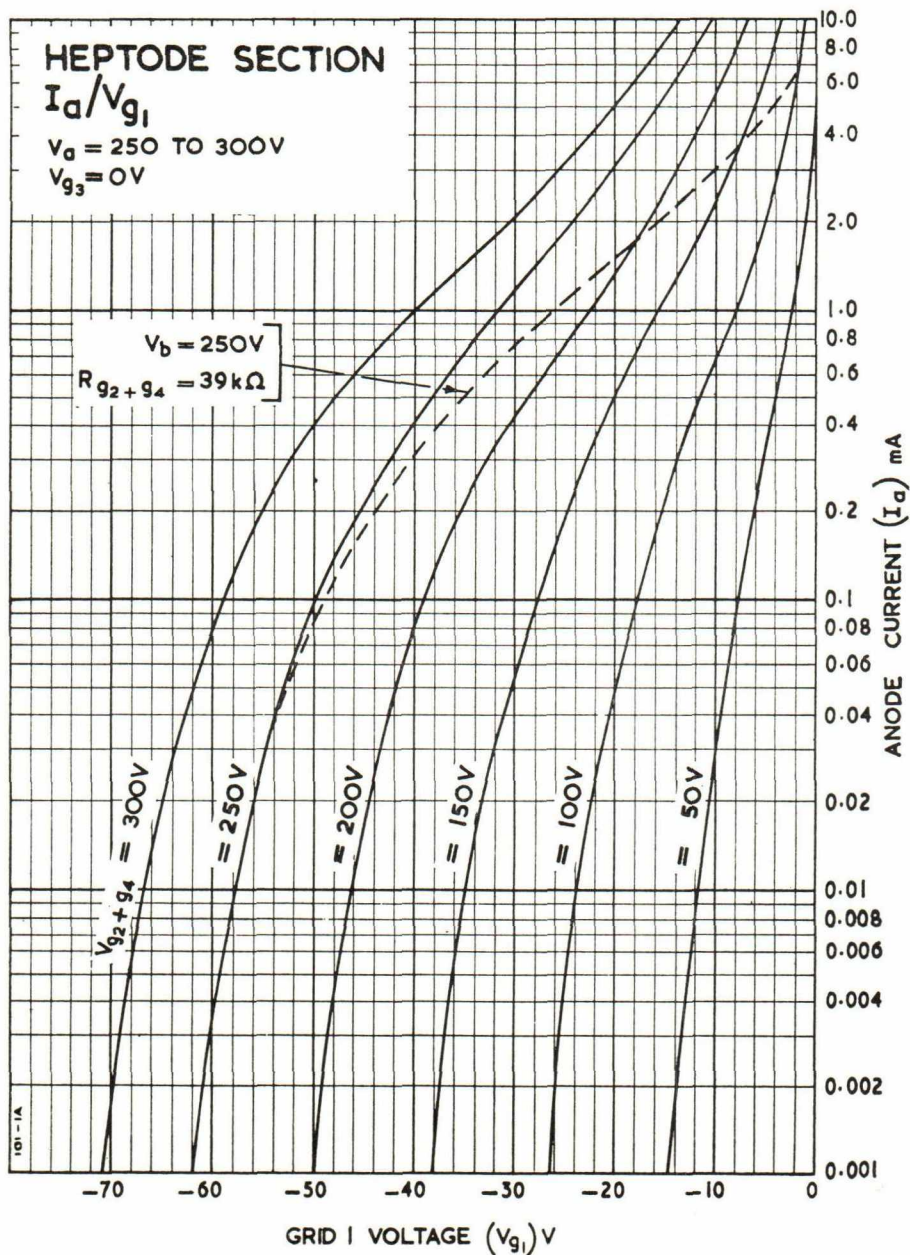
$V_{g1} = -2V$

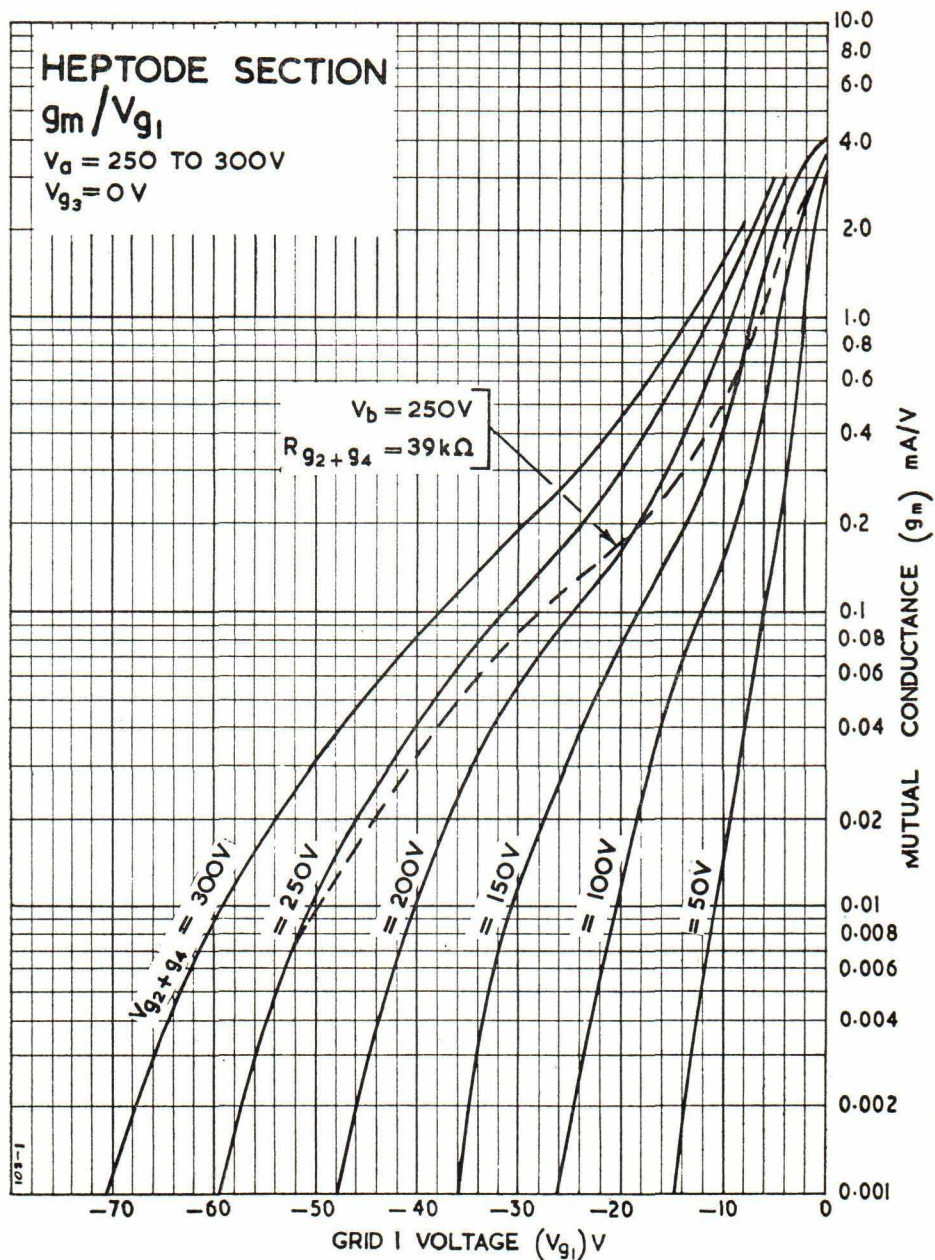
$R_{gt} + g_3 = 47k\Omega$

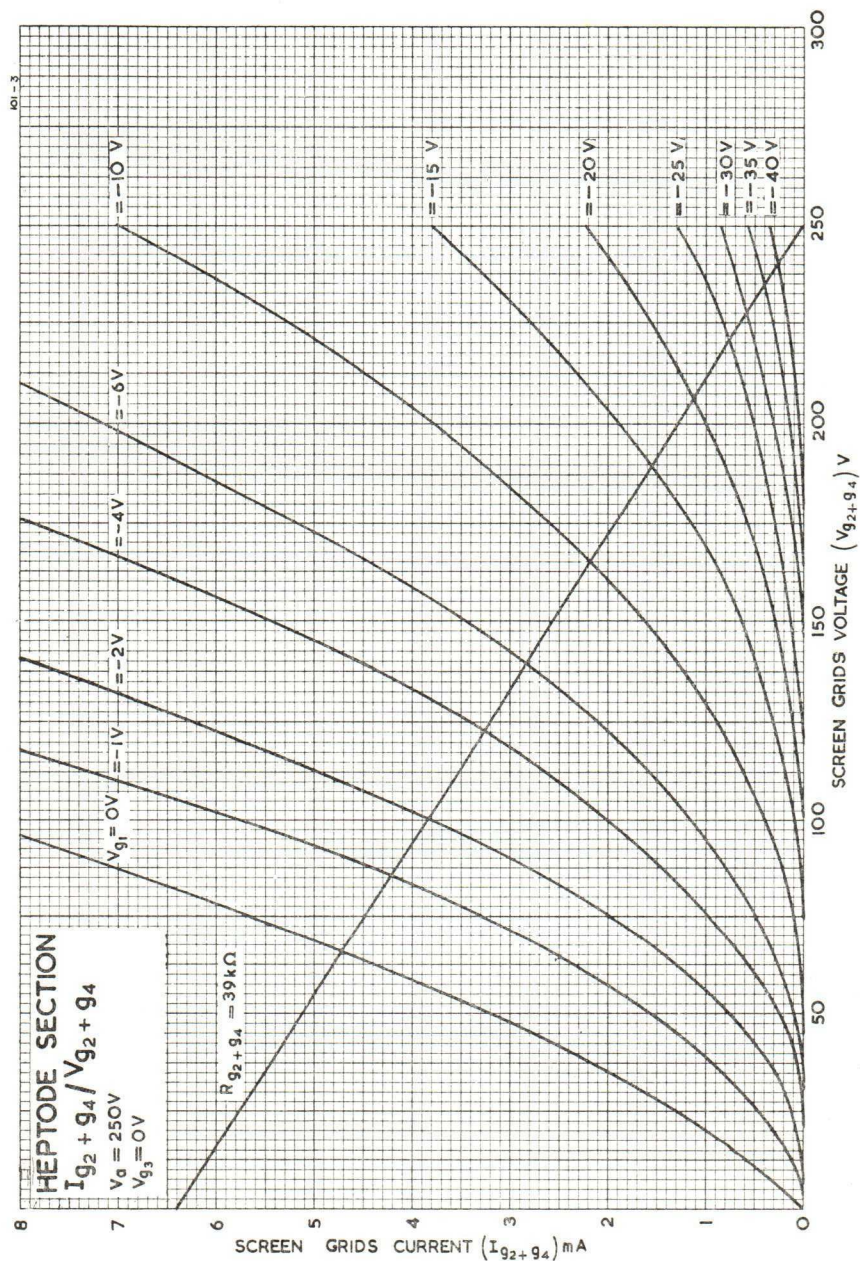


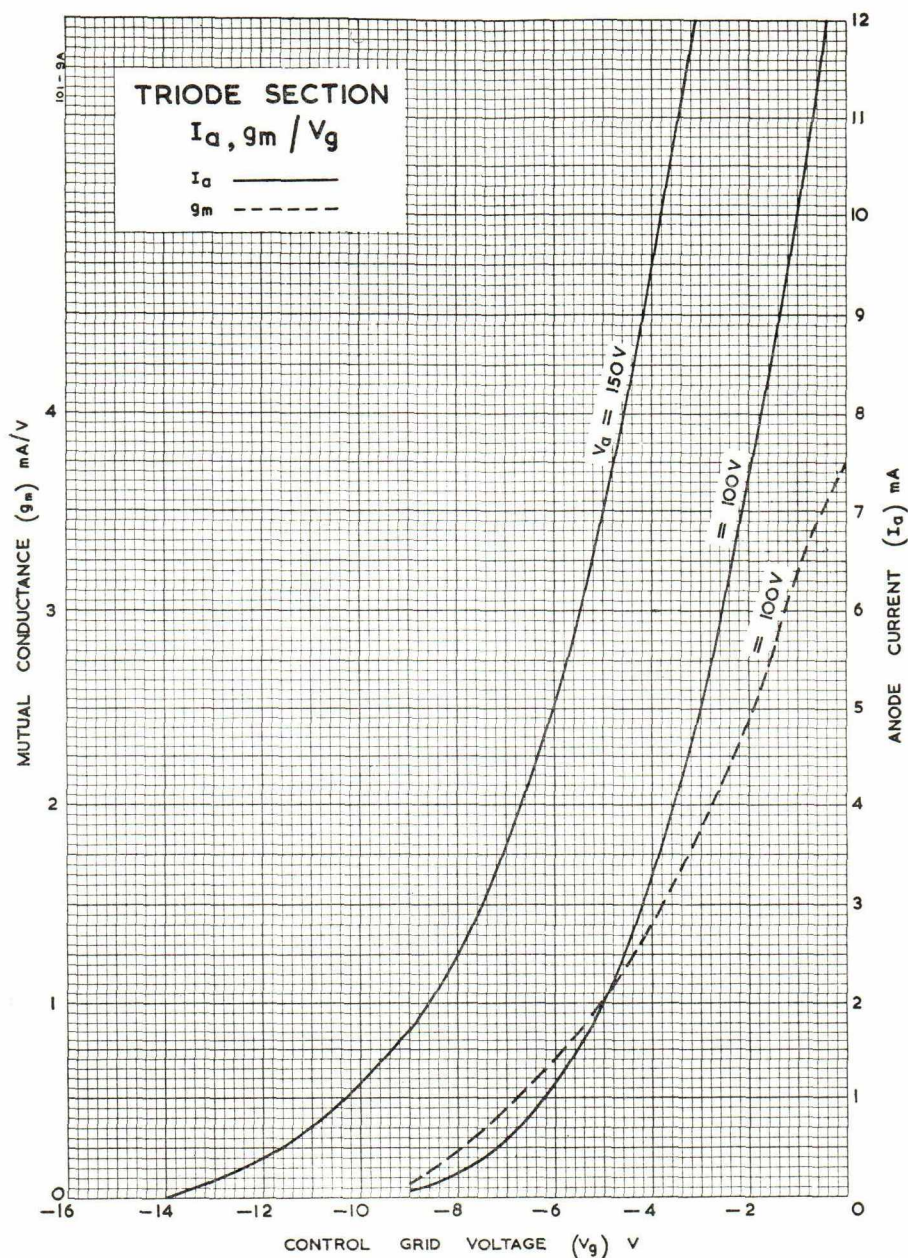












CHARACTERISTIC CURVES: I_a/V_a
Triode Section

