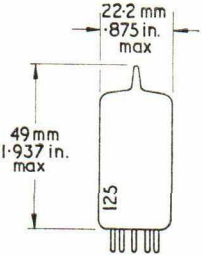
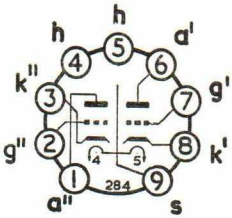


DOUBLE TRIODE



B9A Base

GENERAL

This valve is a double triode primarily intended for use as an R.F. amplifier and self-oscillating mixer in F.M. receivers.

Heater Current	I_h	0·1	A
Heater Voltage	V_h	26	V

RATINGS

Maximum Anode Voltage	$V_{a(max)}$	250	V
Maximum Anode Dissipation (either section)	$P_{a(max)}$	2·5	W
Maximum Total Anode Dissipation	$P_{a(tot)max}$	4·5	W
Maximum Heater to Cathode Voltage (R.M.S.)	$V_{h-k(max)r.m.s.}$	90	V
Maximum Cathode Current	$I_{k(max)}$	15	mA
Maximum Grid to Cathode Resistance	$R_{g-k(max)}$	1	MΩ

INTER-ELECTRODE CAPACITANCES

		*	†	‡	
Anode′ to Grid′	$C_{a'-g'}$	1·5	1·6	1·8	pF
Anode″ to Grid″	$C_{a''-g''}$	1·5	1·6	1·6	pF
Anode′ to Cathode′, Heater, Shield	$C_{a'-k',h,s}$	1·2	1·6	2·5	pF
§ Anode′ to Cathode′, Heater, Shield	$C_{a'-k',h,s}$	1·9	2·0	2·8	pF
Anode″ to Cathode″, Heater, Shield	$C_{a''-k'',h,s}$	1·2	1·6	2·4	pF
§ Anode″ to Cathode″, Heater, Shield	$C_{a''-k'',h,s}$	1·9	2·1	2·8	pF
Grid′ to Cathode′, Heater, Shield	$C_{g'-k',h,s}$	3·0	3·3	4·2	pF
Grid″ to Cathode″, Heater, Shield	$C_{g''-k'',h,s}$	3·0	3·4	4·2	pF
Anode′ to Anode″	$C_{a'-a''}$	·028	·032	·033	pF
§ Anode′ to Anode″	$C_{a'-a''}$	·003	·0067	·0081	pF
Anode″ to Cathode′	$C_{a''-k'}$	·006	·014	·02	pF

CHARACTERISTICS (Each Section)

Anode Voltage	V_a	170	200	V
Anode Current	I_a	10	10	mA
Grid Voltage	V_g	−1·5	−2·1	V
Mutual Conductance	g_m	6·2	5·8	mA/V
Amplification Factor	μ	50	48	
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	8·1	8·3	kΩ

NOTES

* Measured in fully-shielded socket. Without can, except where stated otherwise.
† Measured with holder capacitance balanced out. (Holders as below).
‡ Total capacitance including, where applicable, Plessey B9A ceramic type holders CP180900/1 (without can) or CP180024/3 (with can).
§ Measured with can.

TYPICAL OPERATION AS R.F. AMPLIFIER

Supply Voltage	V_b	170	170	V
Anode Load Resistance	R_a	1·5	1·3	kΩ
Anode Voltage	V_a	155	160	V
Anode Current	I_a	8·7	6	mA
Grid Bias Voltage	V_g	−1·4	−2	V
Mutual Conductance	g_m	6	4·7	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	8·4	10·5	kΩ
Equivalent Grid Noise Resistance	R_{eq}	500	650	Ω
Input Loss at 100 Mc/s	r_g (100 Mc/s)	6	8	kΩ

TYPICAL OPERATION AS SELF-OSCILLATING MIXER ¶

Supply Voltage	V_b	170	200	V
Anode Load Resistance	R_a	4·7	8·2	kΩ
Grid to Cathode Resistance //	R_{g-k}	1	1	MΩ
Anode Current	I_a	4·8	5·2	mA
Peak Heterodyne Voltage	$v_{(pk)het}$	4	4	V
Conversion Conductance	g_c	2·2	2·3	mA/V
Valve Anode Resistance ($\delta v_a/\delta i_a$)	r_a	16	15	kΩ

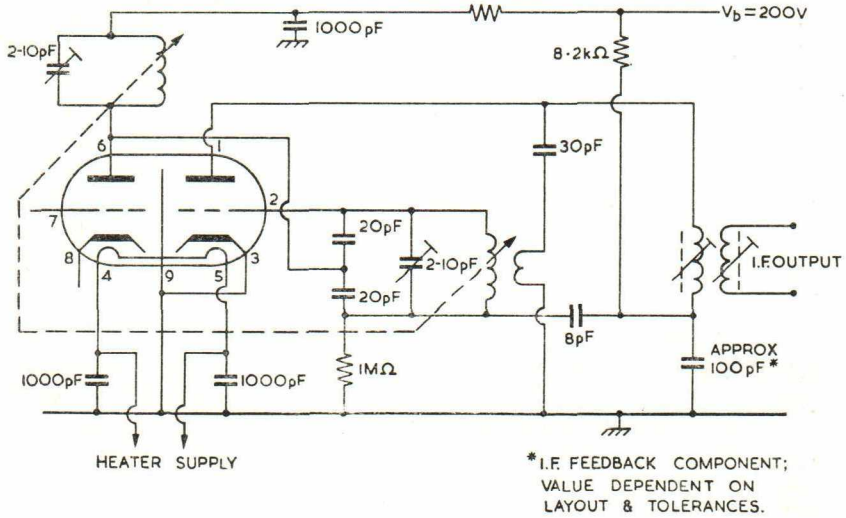
NOTES

The triode on pins 6, 7 and 8 should be used as the R.F. amplifier and that on pins 1, 2 and 3 as the self-oscillating mixer.

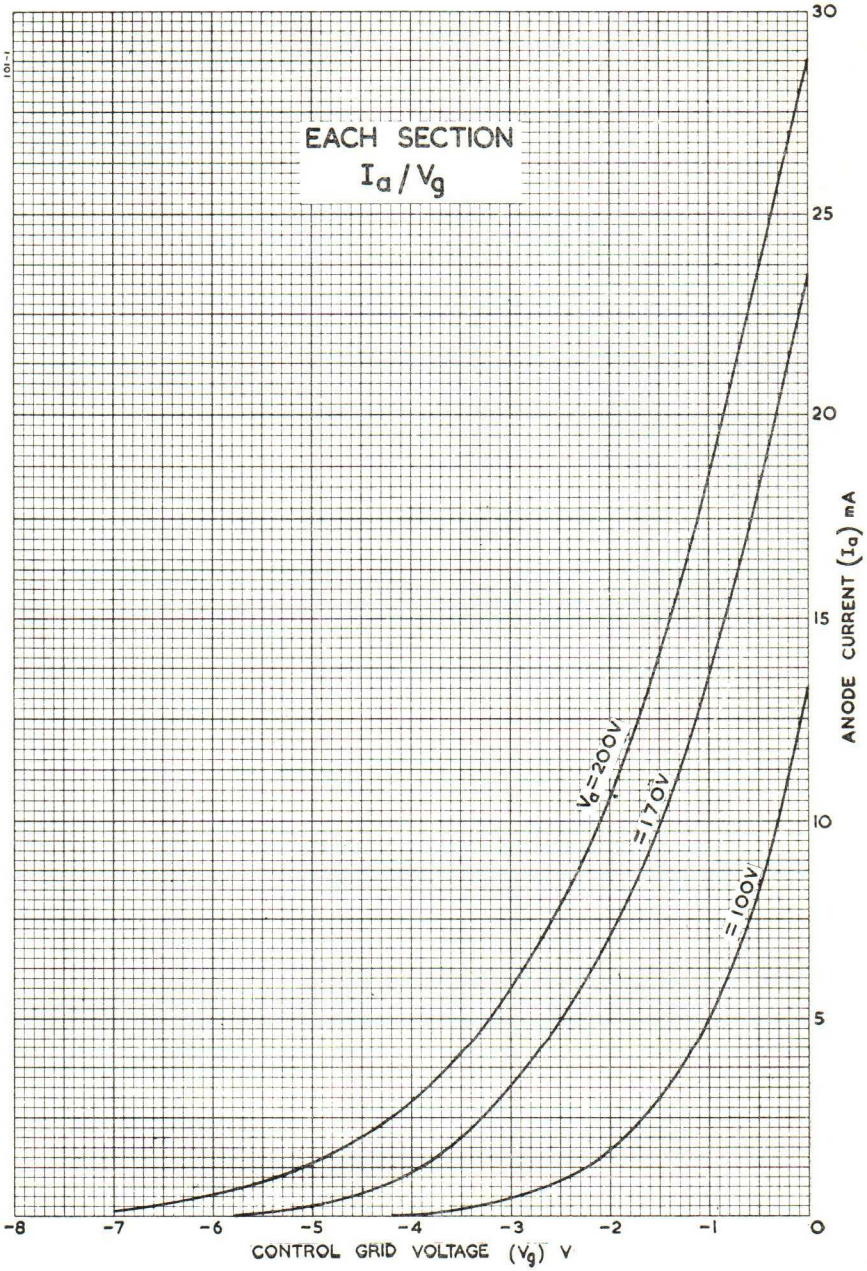
¶ For typical circuit as self-oscillating mixer see circuit below.

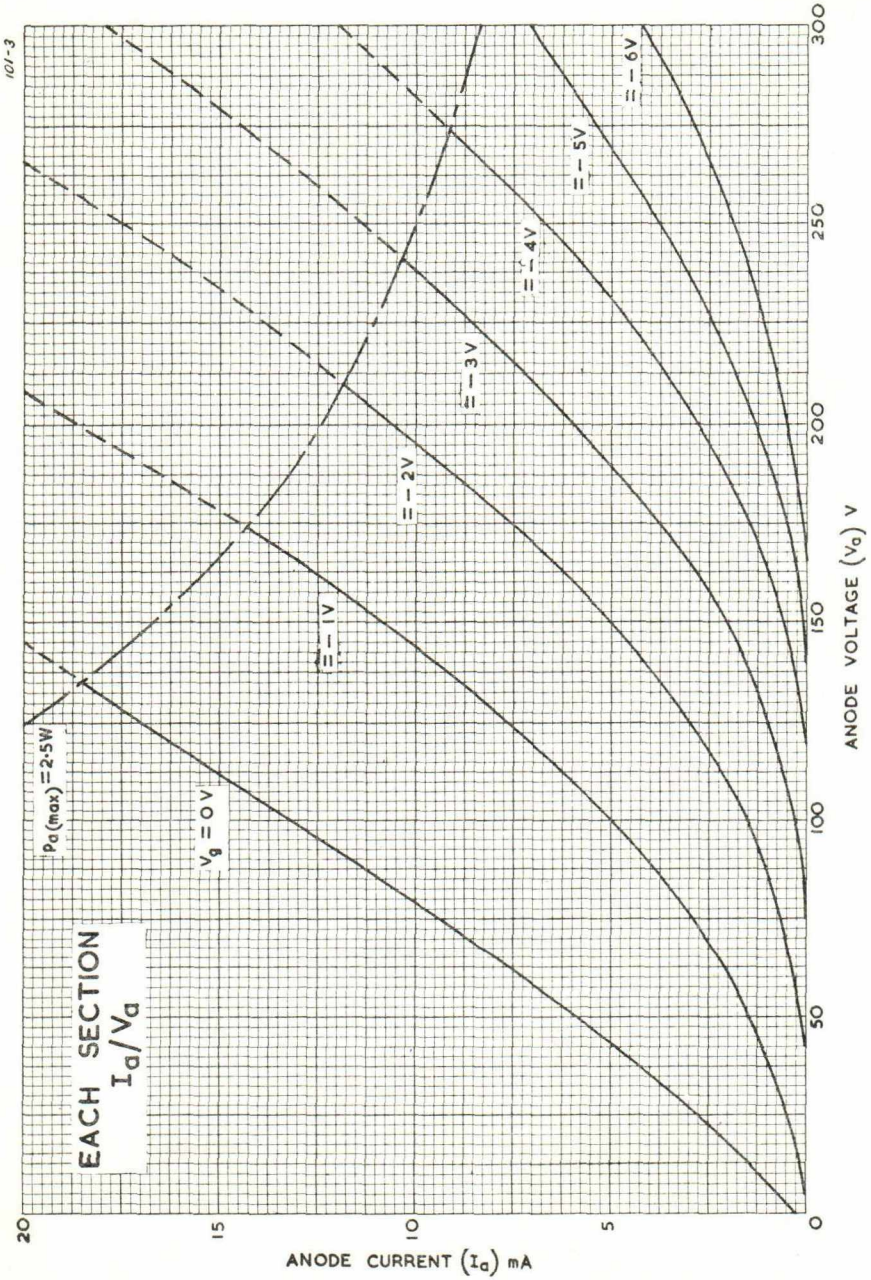
// I.F. feedback voltage tends to stabilise oscillator performance and permits this relatively high grid leak.

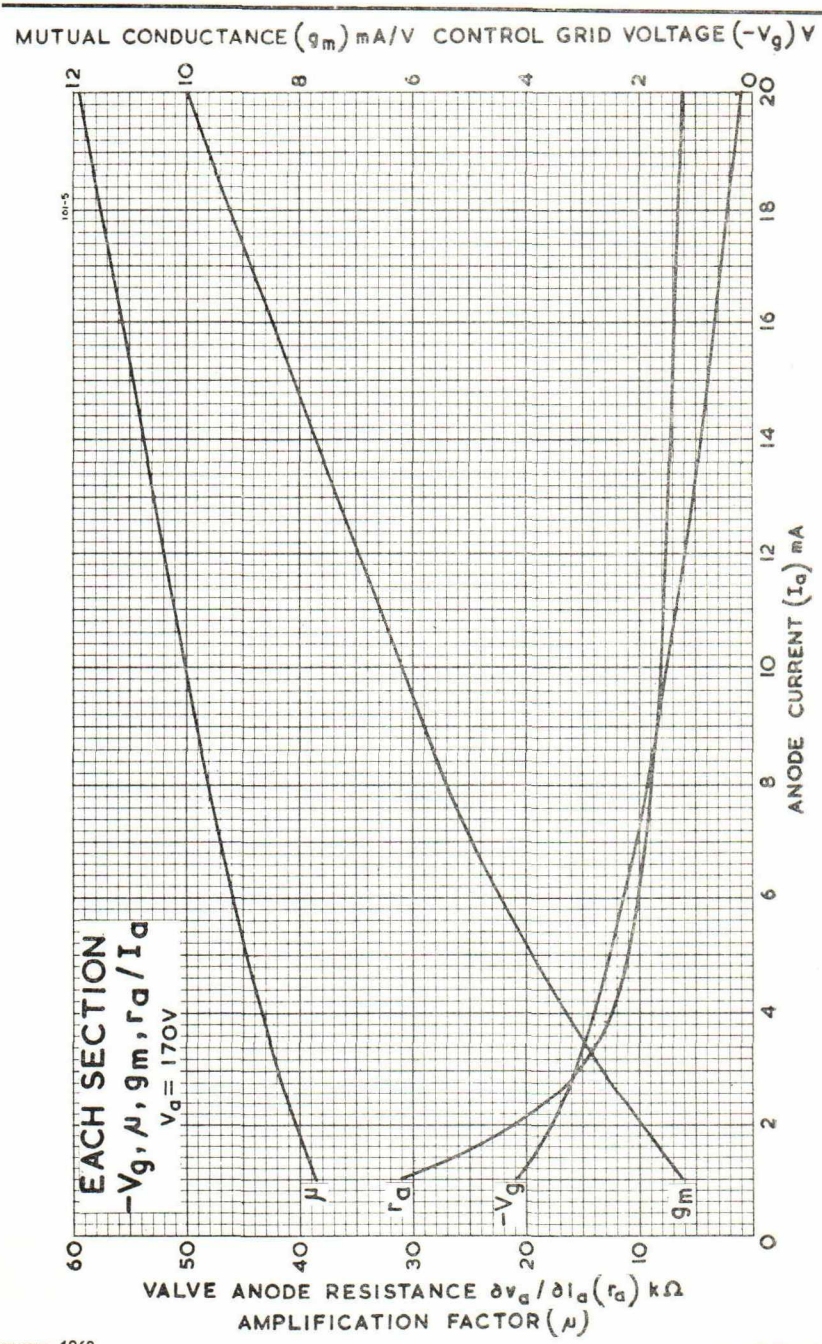
TYPICAL CIRCUIT AS SELF-OSCILLATING MIXER

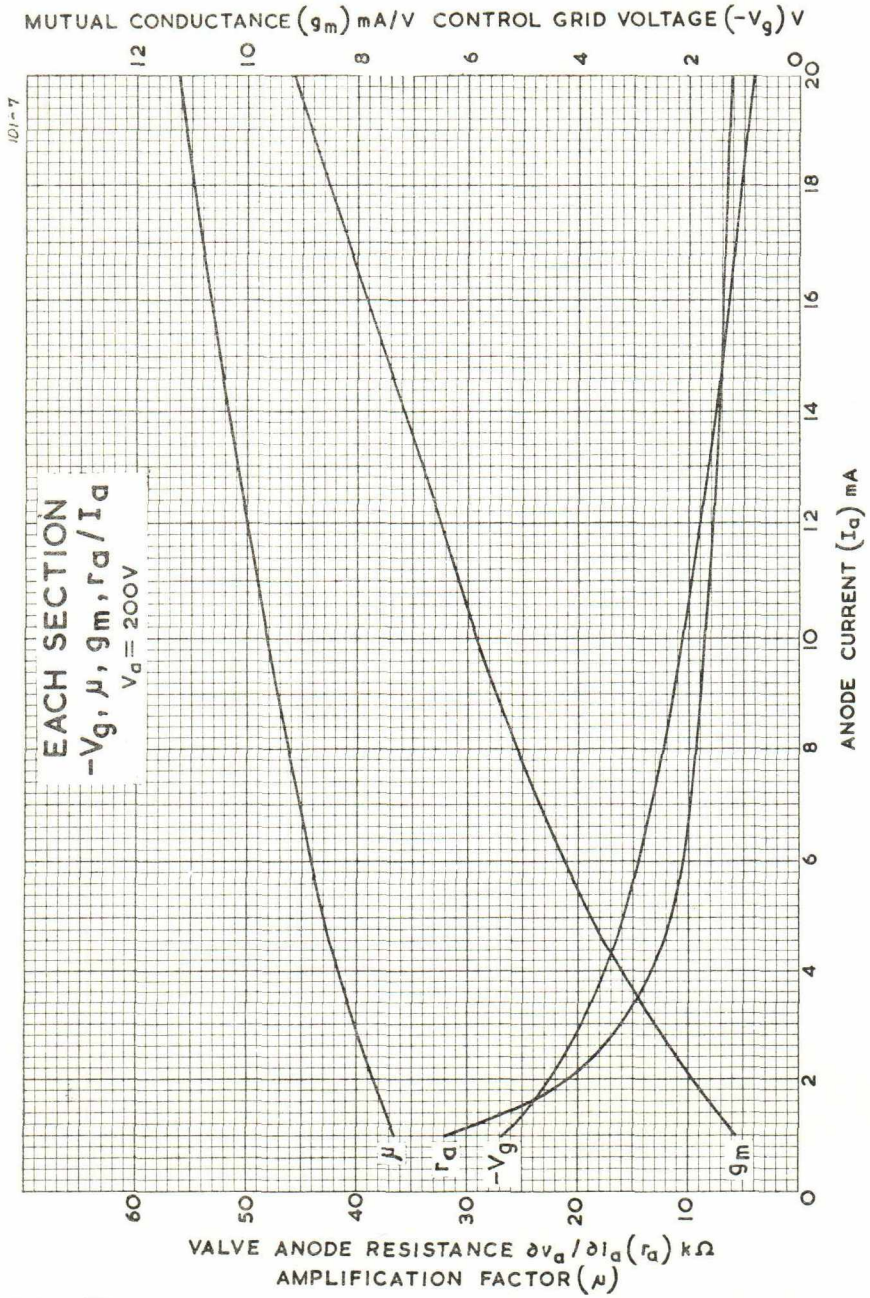


MOUNTING POSITION—Unrestricted


EACH SECTION
Ia / Vg
Va=200V
=170V
=100V
30
25
20
15
10
5
0
ANODE CURRENT (Ia) mA
-8
-7
-6
-5
-4
-3
-2
-1
CONTROL GRID VOLTAGE (Vg) V


101-3
EACH SECTION
I_a/V_a
$P_a(max) = 2{\cdot}5W$
$V_g = 0V$
$= -1V$
$= -2V$
$= -3V$
$= -4V$
$= -5V$
$= -6V$
ANODE CURRENT (I_a) mA
ANODE VOLTAGE (V_a) V
0
5
10
15
20
50
100
150
200
250
300


MUTUAL CONDUCTANCE (g_m) mA/V
CONTROL GRID VOLTAGE ($-V_g$) V
12
10
8
6
4
2
0
101-5
EACH SECTION
$-V_g, \mu, g_m, r_a / I_a$
$V_a = 170V$
μ
r_a
$-V_g$
g_m
60
50
40
30
20
10
0
VALVE ANODE RESISTANCE $\partial v_a / \partial i_a$ (r_a) kΩ
AMPLIFICATION FACTOR (μ)
0
2
4
6
8
10
12
14
16
18
20
ANODE CURRENT (I_a) mA


MUTUAL CONDUCTANCE (g_m) mA/V
CONTROL GRID VOLTAGE ($-V_g$) V
12
10
8
6
4
2
0
101-7
EACH SECTION
$-V_g$, μ, g_m, r_a / I_a
V_a = 200V
μ
r_a
$-V_g$
g_m
60
50
40
30
20
10
0
VALVE ANODE RESISTANCE $\partial v_a / \partial i_a$ (r_a) kΩ
AMPLIFICATION FACTOR (μ)
0
2
4
6
8
10
12
14
16
18
20
ANODE CURRENT (I_a) mA