N.A.T.O. PRIORITY LIST

MINISTRY OF SUPPLY - DLRD(A)/TRE

VALVE ELECTRONIC **CV 2129**

Specification MOS(A)/CV2129 Issue 4 Dated 13.2.53 To be read in conjunction with K1001	SECURITY Specification: UNCLASSIFIED Valve: UNCLASSIFIED

→ Indicates a change

TYPE OF VALVE - V.H.F. Power Amplifier Pentode

CATHODE - Indirectly-heated

ENVELOPE - Glass - unmetallised

PROTOTYPE - 5763

MARKING

See K1001/4.
In addition, the RTMA number shall also be clearly marked.

RATING

			Note
Heater Voltage	(V)	6.0	
Heater Current	(A)	0.75	
Max. Anode Voltage (Ia = 0)	(V)	500	A
Max. Screen Voltage (Ig2 = 0)	(V)	500	A
Max. Operating Anode Voltage	(V)	300	A
Max. Operating Screen Voltage	(V)	250	A
Max. Anode Dissipation	(W)	12	A
Max. Screen Dissipation	(W)	2	A
Anode Current	(mA)	45	B
Screen Current	(mA)	4.5	B
Mutual Conductance	(mA/V)	7.0	B
Amplification Factor (g1 - g2)		16	B
Max. Operating Frequency	(Mc/s)	175	
→ Max. Bulb Temperature	(°C)	250	

BASE

B9A

CONNECTIONS

Pin	Electrode
1	Anode
2	No connection
3	Suppressor Grid
4	Heater
5	Heater
6	Screen Grid
7	Cathode
8	Control Grid
9	Control Grid

DIMENSIONS

See K1001/A1/D4

Dimensions	Min.	Max.
A mm	-	66.2
L mm	-	59.9
B mm	-	22.2

CAPACITANCES (pF)

Cag1 (max.)		0.3	C
Cge (nom.)		9.5	C
Cae (nom.)		4.5	C

NOTES

A. Absolute maximum values.

B. Measured at Va = 250; Vg2 = 250; Vg1 = -7.5.

C. Measured without metal screen.

CV 2129

TESTS

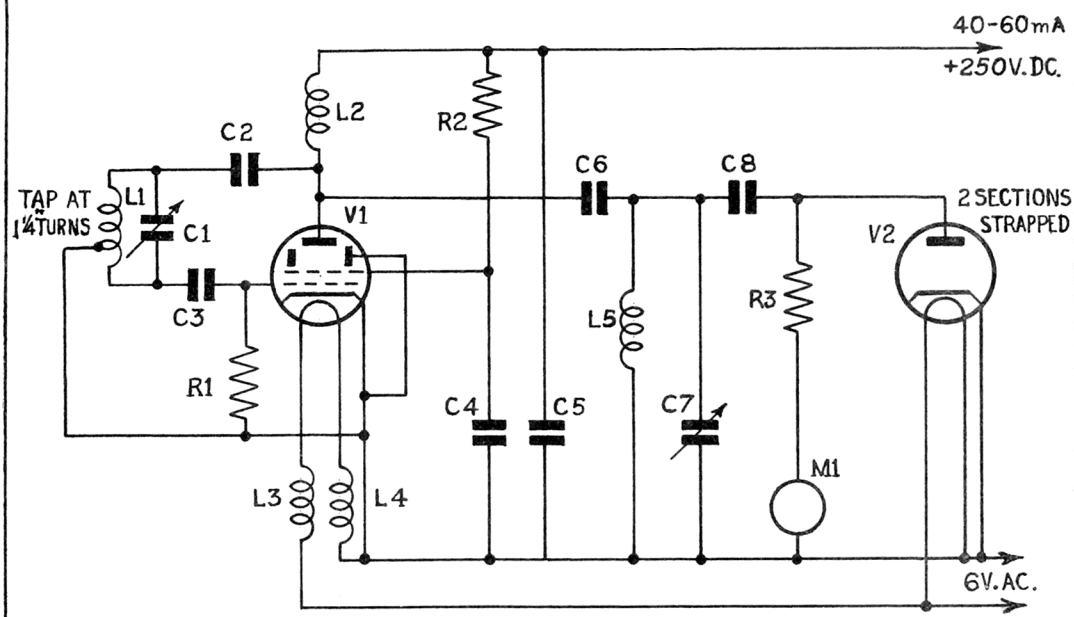
To be applied in addition to those applicable in K1001.

	Test Conditions					Test	Limits Min.	Limits Max.	No. Tested	Note
	See K1001/AIII									
	Links to H.P.		Links to L.P.	Links to E		CAPACITANCES (pF)				
a	1		8,9	2,3,4,5,6 7,10, TC1, TC2		Cag1	-	0.3	20 per week	2
a	8,9		2,3,4,5 6,7,10	1,TC1,TC2		Cge	7.9	11.1		
a	1		2,3,4,5 6,7,10	8,9, TC1, TC2		Cae	3.0	6.0		
	Vh	Va	Vg3	Vg2	Vg1					
b	6.0	0	0	0	0	Ih (A)	0.690	0.810	100% or S	
c	6.0	250	0	250	-7.5	Ia (mA)	33	57	100%	3
d	6.0	250	0	250	-7.5	Ig2 (mA)	-	7.0	100%	
e	6.0	250	0	250	-7.5	Reverse Ig1 (μA)	0	2.5	100%	
f	6.0	250	0	250	-7.5	gm (mA/V.)	5.6	9.0	100% or S	
g	6.0	250	0	250	-7.5	Inner μ	13	20		
h	6.0	250	0	250	-15.0	Ia Tail (mA)	0	15	100%	
j	6.0	30	30	30	30	D.C. Emission (mA)	180	-	100%	5
k	6.0	-	-	-	-	Power Oscillation(mA)	6.0	-	20 per week	4
m	6.0	Anode and grids strapped. Peak applied voltage = 200V. Tp = 10μsec. min. PRF = 50 c/s. pulse shape half sine wave.				Peak Cathode Current (A)	4.5	-	100% or S	

NOTES

1. Before commencing tests, the valves shall be preheated for not less than 5 minutes under the following conditions:-
   Vh = 6.0 to 6.6; Va = 250; Vg2 = 250; Vg1 = 0; Rk = 150ohms ± 10% (1 watt min.)
2. Measured without metal screen.
3. With Vg1 applied in turn to pins 8 and 9, Ia must show no change.
4. Measured in circuit (as shown on Page 3) with Anode and screen supply 250V. and frequency 70 Mc/s. output measured as diode current of CV.140.
5. Test voltages to be applied only for sufficient time to obtain steady reading.

CV2129



LEGEND

Component	Description	No.Off
R1 & R3	Resistors 22KΩ 1W ± 10%	2
R2	Resistor 10KΩ 1W ± 10%	1
C1 & C7	Condensers 3-30 pF. Trimmer	2
C2, C3, C4 & C5	Condensers .001 μF. 500V. D.C. Wkg.	4
C6 & C8	Condensers 50 pF. Mica Type.	2
M1	0-10mA Directly Calibrated Meter	1
Valve 1	CV 2129	
Valve 2	CV140	1
Test Socket	Noval Valve Socket P.T.F.E. Type EH499/901	1

COIL DETAILS

L1 & L5 4 TURNS ≡16SWG. 1" LONG 0.8" IN DIA. (NOVAL BULB AS FORMER)

L2, L3 & L4 R.F. CHOKES. 20 TURNS ≡22SWG 1/8" IN DIA. 2" LONG.

POWER OSCILLATOR TEST CIRCUIT

DATA SHEET

Valve Electronic Type CV 2129

TYPICAL OPERATING CONDITIONS (AUDIO FREQUENCIES).

Class A Amplifier (Single Ended). Triode Connection (Pins 1 7 6 strapped)

Heater voltage	6.0	Volts
Anode voltage	250	Volts
Grid voltage	-7.5	Volts
Autobias resistor (Rk)	150	Ohms
Anode current (no signal)	50	mA
Anode impedance (ra)	2100	Ohms
Amplification factor (μ)	15.75	
Mutual conductance	7.5	mA/V
Anode load resistor (Ra)	4000	Ohms
Peak A.F. grid voltage	7.1	Volts
Total harmonic distortion	5.2	%
Power output	0.7	Watts

Class A Amplifier Push-Pull. Triode connected (Pins 1 and 6 strapped)

Heater voltage	6.0	Volts
Anode voltage	250	Volts
Grid voltage	-7.25	Volts
Autobias resistor (Rk)	75	Ohms
Anode current (no signal)	98	mA
Output load (anode-anode) (Ra)	5000	Ohms
Peak A.F. grid voltage (grid-grid)	29.4	Volts
Total harmonic distortion	1.6	%
Power output	1.7	Watts

Note: Values given are for two valves.

Class A Amplifier (Single ended). Tetrode connection

Heater voltage	6.0	6.0	6.0	6.0	Volts
Anode voltage	250	250	300	300	Volts
Screen voltage	225	225	225	225	Volts*
Grid voltage	-6.25	-	-7.4	-	Volts
Autobias resistor	-	120	-	175	Ohms
Anode current	45	45	40	40	mA
Screen current	3.7	3.9	2.3	2.4	mA
Anode impedance (ra)	38000	-	65000	-	Ohms
Mutual conductance	6.8	-	6.3	-	mA/V
Anode load resistance	5500	5500	8500	8500	Ohms
Peak A.F. grid voltage	6.1	6.2	6.8	7.3	Volts
Harmonic distortion total	5.1	5.6	7.0	7.6	%
Power output	2.85	2.8	4.0	4.15	Watts

* The screen voltage where lower than the anode voltage should be obtained from a potentiometer across the H.T. line to chassis, adequately by-passed, and not by means of a series resistance.

CV 2129 DATA SHEET

Class A Amplifier (Push-Pull). Tetrode connection

Heater voltage	6.0	6.0	6.0	Volts
Anode voltage	250	300	300	Volts
Screen voltage	225	225	225	Volts
Grid voltage	-6.25	-	-	Volts
Autobias resistor	-	68	68	Ohms
Peak A.F. grid-grid voltage	12.5	14	13.75	Volts
No signal anode current	88	84	86.5	mA
Max. signal anode current	89	84.5	85	mA
No signal screen current	7.2	6.9	5.6	mA
Max. signal screen current	18	18	14.6	mA
Load resistance anode-anode	11500	11500	11500	Ohms
Total harmonic distortion	3.9	4.2	4.2	%
Power output	6.2	6.7	7.5	Watts

Note: Values given are for two valves.

Class AB1 Amplifier (Push-Pull). Tetrode connection

Heater voltage	6.0	6.0	6.0	6.0	Volts
Anode voltage	250	250	300	300	Volts
Screen voltage	225	225	225	225	Volts
Grid voltage	-9	-	-9	-	Volts
Autobias resistor	-	150	-	150	Ohms
Peak A.F. grid-grid voltage	18	21.5	18.5	21	Volts
No signal anode current	58	56	59	57	mA
Max. signal anode current	67	56	70	57	mA
No signal screen current	3.8	3.7	3.0	2.8	mA
Max. signal screen current	18	16.4	17.2	14.5	mA
Load resistance (anode-anode)	11500	11500	13500	13500	Ohms
Total harmonic distortion	4.2	3.5	5.1	4.4	%
Power output	7.8	7.2	9.8	8.8	Watts

Note: Values given are for two valves.

Class AB2 Amplifier (Push-Pull). Tetrode connection

Heater voltage	6.0	Volts
Anode voltage	300	Volts
Screen voltage	225	Volts
Grid voltage	-12.5	Volts
Peak A.F. grid-grid voltage	71	Volts
No signal anode current	27	mA
Max. signal anode current	140	mA
No signal screen current	1.2	mA
Max. signal screen current	18	mA
Peak grid input power	0.8	Watts
Load resistance (anode-anode)	4500	Ohms
Total harmonic distortion	9.6	%
Power output	25	Watts

Note: Values given are for two valves.

DATA SHEET

CV 2129

R.F. POWER AMPLIFIER AND OSCILLATOR (Class C Telegraphy or Class C - F.M. Telephony) AND FREQUENCY MULTIPLIER

Maximum continuous ratings (Absolute values)

D.C. anode voltage (Max.)	300	Volts
D.C. grid 3 voltage (Max.)	0	Volts
D.C. grid 2 voltage (Max.)	250	Volts
D.C. grid 1 voltage (Max.)	-125	Volts
D.C. anode current (Max.)	50	mA
D.C. grid 2 current (Max)	15	mA
D.C. grid 1 current (Max.)	5	mA
D.C. anode input (Max.)	15	Watts
D.C. anode dissipation (Max.)	12	Watts
D.C. grid 2 input (Max.)	2	Watts
Bulb temperature at hottest point on the surface (Max.)	250	°C

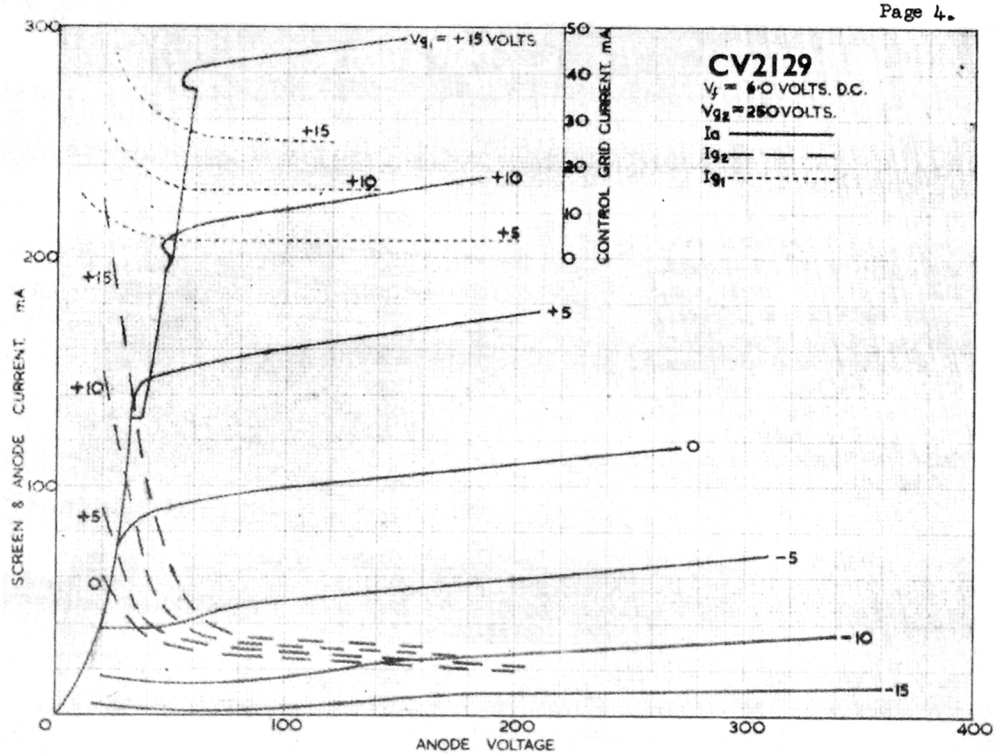
R.F. Power Amplifier and Oscillator (Class C Telegraphy or Class C - F.M. Telephony)

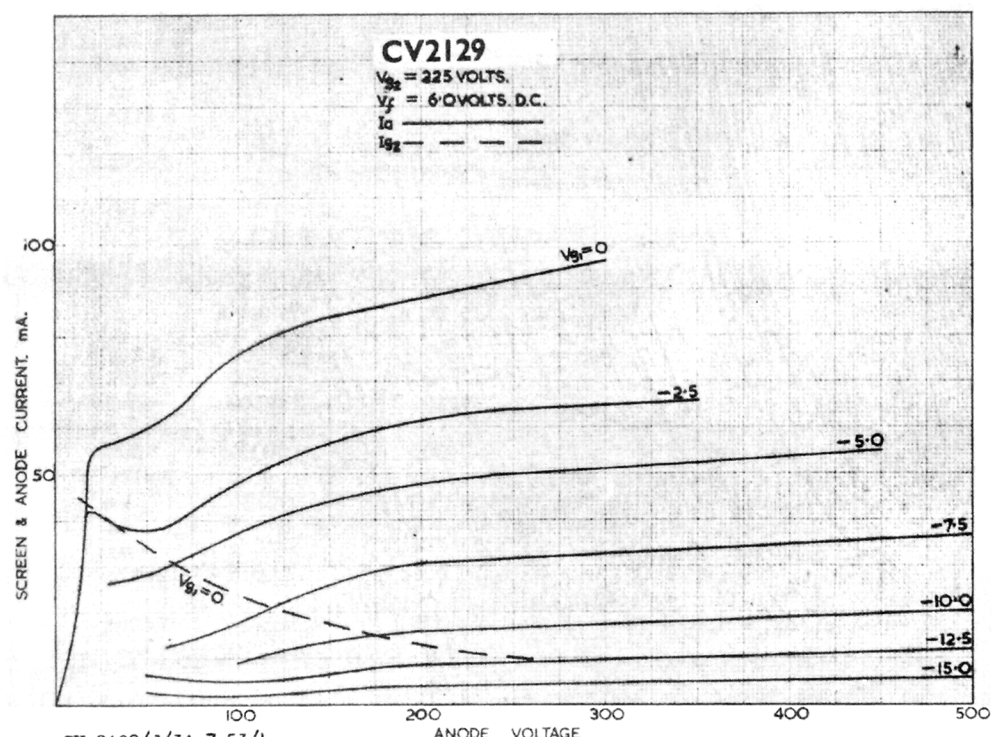
Typical operation at 50 Mc/s

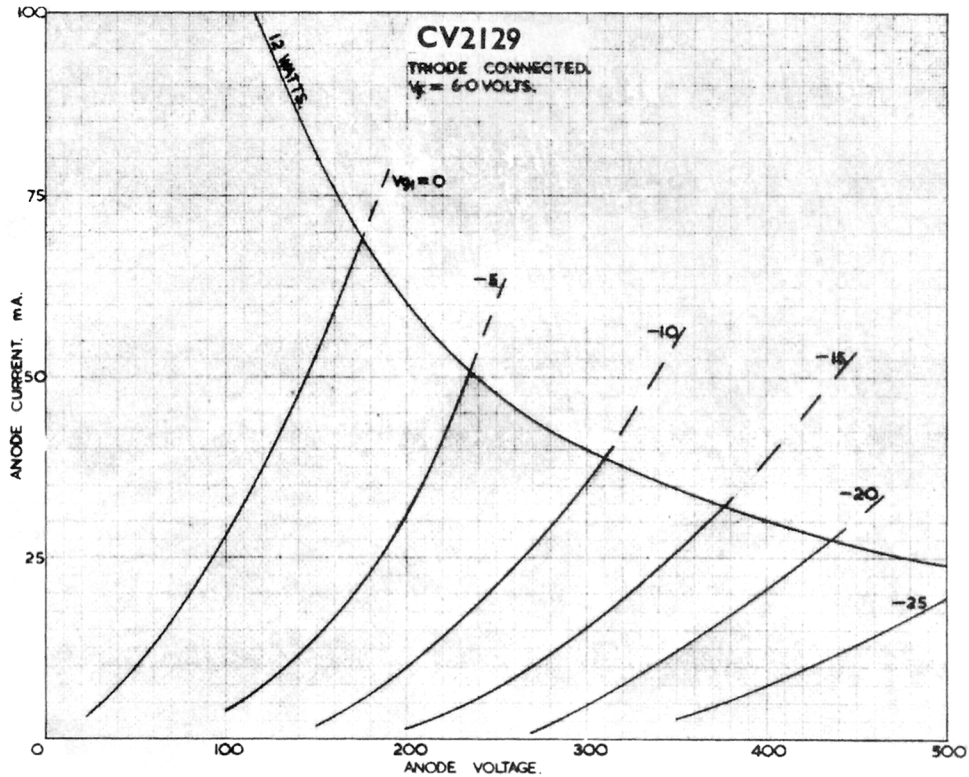
D.C. anode voltage	300	Volts
D.C. grid 2 voltage	250	Volts
D.C. grid 1 voltage	-60	Volts
D.C. grid 1 resistor	22,000	Ohms
Peak R.F. grid voltage	80	Volts
D.C. anode current	50	mA
D.C. grid 2 current	5	mA
D.C. grid 1 current (approx.)	3	mA
Driving power (approx.)	0.35	Watts
Power output (neglecting output tuned circuit loss)	8	Watts

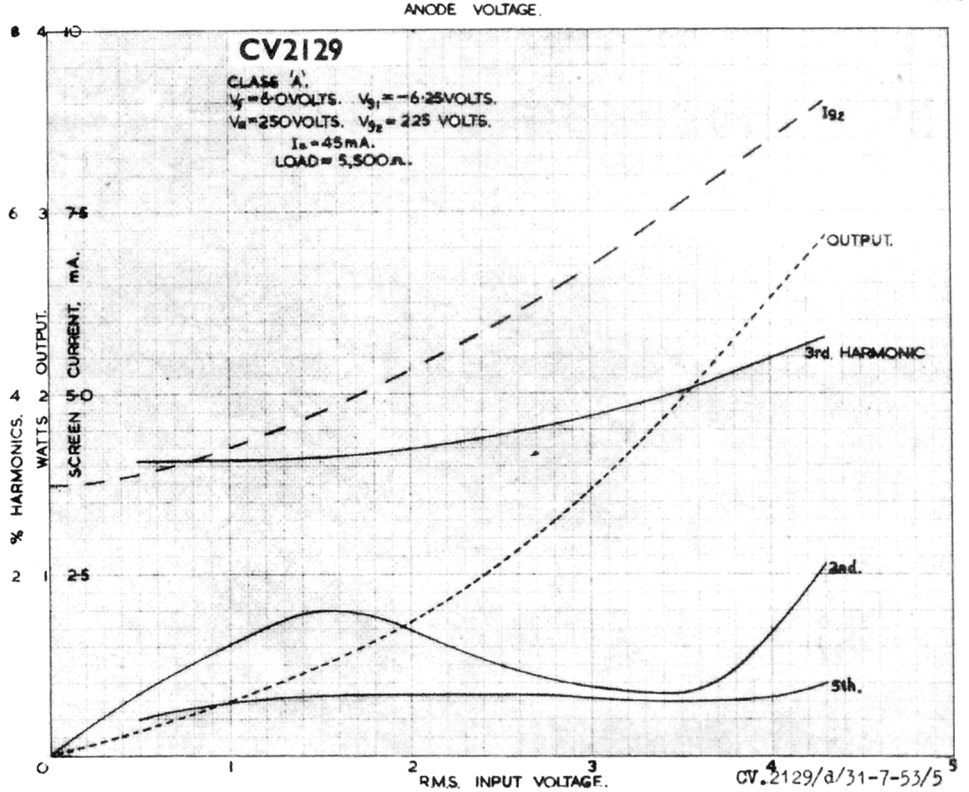
Frequency Multiplier - Typical operation

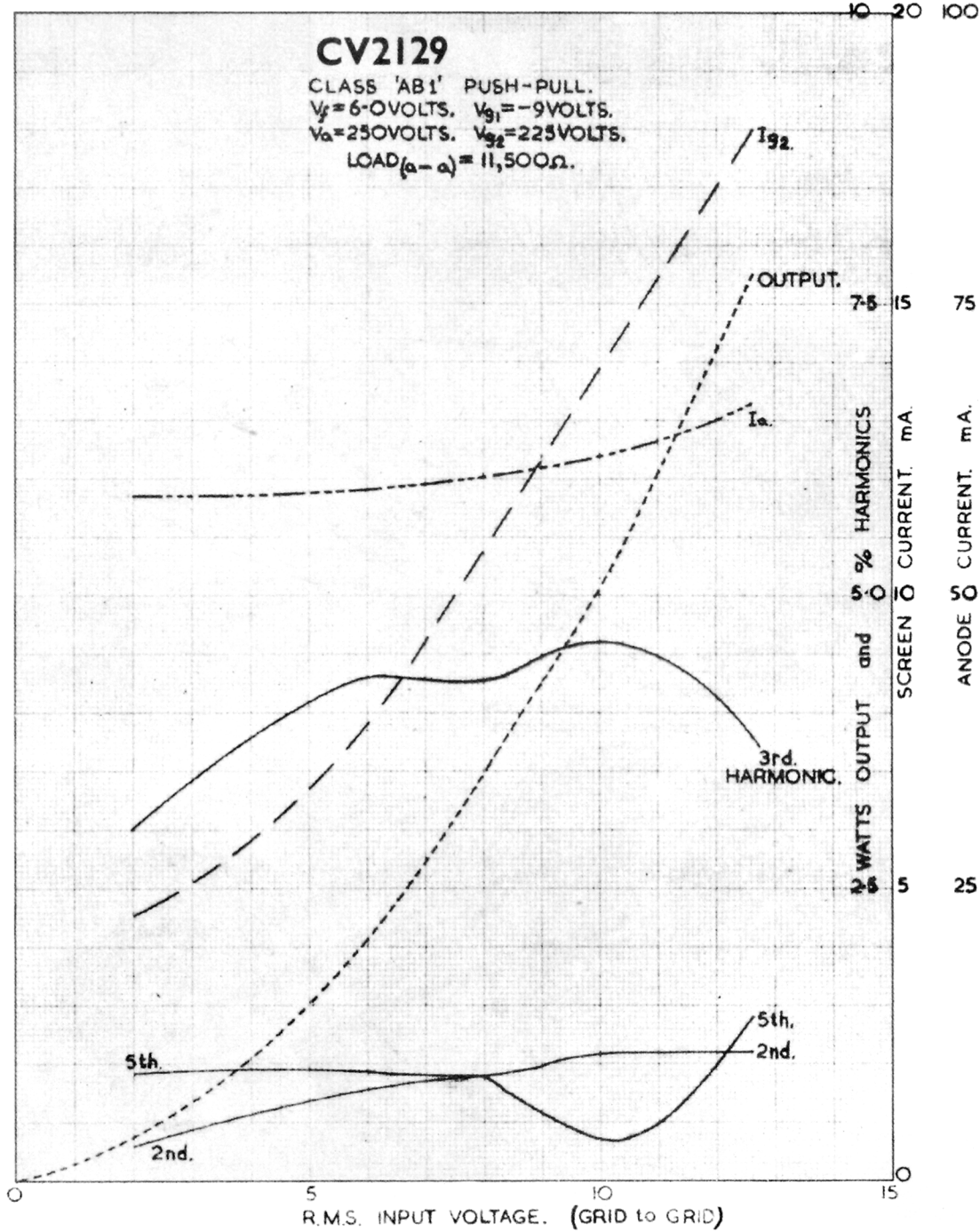
	Doubler to 175 Mc/s	Tripler to 175 Mc/s	
D.C. anode voltage	300	300	Volts
D.C. grid 2 supply voltage	300	300	Volts
Series grid 2 resistor	12500	12500	Ohms
D.C. grid 1 voltage	-75	-100	Volts
D.C. grid 1 resistor	75000	100000	Ohms
Peak R.F. grid 1 voltage	95	120	Volts
D.C. anode current	40	35	MA
D.C. grid 2 current	4	5	mA
D.C. grid 1 current (approx.)	1	1	mA
Driving power (approx.)	0.6	0.6	Watts
Power output (neglecting output tuned circuit loss)	3.6	2.8	Watts


CV2129
V_f = 6·0 VOLTS. D.C.
V_{g_2} = 250 VOLTS.
Ia
I_{g_2}
I_{g_1}
V_{g_1} = +15 VOLTS
+15
+10
+5
0
-5
-10
-15
SCREEN & ANODE CURRENT. mA
CONTROL GRID CURRENT. mA
ANODE VOLTAGE
0
100
200
300
400
50
40
30
20
10
0


CV2129
V_{g_2} = 225 VOLTS.
V_f = 6·0 VOLTS. D.C.
Ia
I_{g_2}
V_{g_1}=0
-2·5
-5·0
-7·5
-10·0
-12·5
-15·0
SCREEN & ANODE CURRENT. mA.
ANODE VOLTAGE
100
50
100
200
300
400
500


CV2129
TRIODE CONNECTED.
V_f = 6·0 VOLTS.
12 WATTS.
V_{g1} = 0
-5
-10
-15
-20
-25
ANODE CURRENT. mA.
ANODE VOLTAGE.
0
25
50
75
100
100
200
300
400
500


CV2129
CLASS 'A'.
V_f = 6·0 VOLTS. V_{g1} = −6·25 VOLTS.
V_a = 250 VOLTS. V_{g2} = 225 VOLTS.
I_a = 45 mA.
LOAD = 5,500 Ω.
I_{g2}
OUTPUT.
3rd. HARMONIC
2nd.
5th.
% HARMONICS.
WATTS OUTPUT.
SCREEN CURRENT. mA.
RMS. INPUT VOLTAGE.
0
1
2
3
4
5
2
4
6
8
1
2
3
4
5
7·5
10
2·5
5·0


CV2129
CLASS 'AB1' PUSH-PULL.
V_f = 6·0VOLTS. V_{g1} = −9VOLTS.
V_a = 250VOLTS. V_{g2} = 225VOLTS.
LOAD (a−a) = 11,500Ω.
I_{g2}.
OUTPUT.
I_a.
3rd. HARMONIC.
5th.
2nd.
5th.
2nd.
10 20 100
7·5 15 75
5·0 50
2·5 25
0
SCREEN CURRENT. mA.
ANODE CURRENT. mA.
% HARMONICS
WATTS OUTPUT and
0 5 10 15
R.M.S. INPUT VOLTAGE. (GRID to GRID)