Ministry of Supply - D.L.R.D./S.R.D.E.

VALVE ELECTRONIC **CV4093**

Specification MOS/CV4093
Issue 1, Dated 8.1.59
To be read in conjunction with K.1001, BS448 and BS1409

SECURITY	
Specification Unclassified	Valve Unclassified

→ Indicates a change

Type of Valve - Reliable H.F. Beam Tetrode Sharp Cut Off
Cathode - Directly Heated
Envelope - Glass Metallised
Prototype - VX9185

MARKING

See K.1001/4, except that the valve shall only be marked with the CV Number Factory and Date Code.

RATING
(All limiting values are absolute)

			NOTE
Filament Voltage	(V)	1.25	
Filament Current	(mA)	20	
Max. Anode Voltage	(V)	100	
Max. Screen Voltage	(V)	100	
Anode Impedance	(MΩ)	1.0	
Max. Bulb Temperature	(°C)	100	
Max. Shock (Short Duration)	(g)	450	
Max. Acceleration (Continuous Operation)	(g)	5	

Typical Operating Conditions

Measured at Va = Vg_2 = 67.5V
Vg_1 = 0, Rg_1 = 5 MΩ

Anode Current	(mA)	1.8
Screen Current	(mA)	0.5
Mutual Conductance	(mA/V)	1.1

Capacitances (pF)

C_{in} (nom.)	3.7
C_{out} (nom.)	4.6
Ca, g_1 (max.)	0.01

BASE

~~See App. 1 to CV 2237~~
BS 448/B5G/F

CONNECTIONS

PIN	ELECTRODE
1	a (red dot)
2	g_2
3	f (-), bp_1, M
4	g_1
5	f (+), bp_2

DIMENSIONS

~~See App. 1 to CV 2237~~
See BS448/B5G/F
Size Ref. No. 1

Dimensions (millimetres)	Min.	Max.
A. Overall Length	-	38.15
Diameter		
B. Minor	-	7.264
C. Major	-	9.804
Lead Length	38.1	

MOUNTING POSITION
ANY

TESTS

To be performed in addition to those applicable in K.1001. Tests shall be performed in the specified order unless otherwise agreed with the Inspecting Authority.

Test conditions - unless otherwise specified

Vf(V)	Va(V)	Vg_2(V)	Vg_1(V)	Rg_1 (Megohms)
1.25	67.5	67.5	0	5

K.1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Limits Min.	Limits Max.	Units
7.1	Glass Strain	No voltages	6.5	I				
	GROUP A							
	Electrode Insulation	Vg_1 - all = -100V Vg_2 - all = -100V Va - all = -100V Vf = 0		100% 100% 100%	R R R	100 100 100		MΩ MΩ MΩ
	Reverse Grid Current	Vg_1 = -0.5V Rg_1 = 0.1 MΩ max.		100%	Ig_1	-	0.5	µA
	Contact Potential	Vf=1.25V, Va=Vg_2=0, Vg_1=1.8V through 200k		100%	+Ig1	0.25	~~0.6~~	mA
	GROUP B	Combined AQL	1.0	II				
	Filament Current		0.65	II	If	18	22	mA
	Anode Current		0.65	II	Ia	1.2	2.4	mA
	Screen Grid Current		0.65	II	Ig_2	0.35	0.7	mA
	Mutual Conductance (1)	Note 1	0.65	II	gm	0.75	1.45	mA/V
	GROUP C	Combined AQL	4.0	I				
	Mutual Conductance (2)	Note 1 Vf = 1.0V	2.5	I	gm	0.60	1.45	mA/V
	Mutual Conductance (3)	Note 1 Vf = 1.0V Take reading after 15 minutes	2.5	I	gm	0.60	1.45	mA/V
	GROUP D							
5.12	Lead Fragility		6.5	IA				
	Filament Anode Short	Note 2		T.A.				
	Capacitance	Measured on a 1 Mc/s bridge with the valve mounted in a fully screened socket. No shield.	6.5	IC	Ca,g_1		0.01	pF
					C_{in}	3.0	4.4	pF
					C_{out}	3.7 3.5	5.5	pF

TESTS (Cont'd)

CV4093

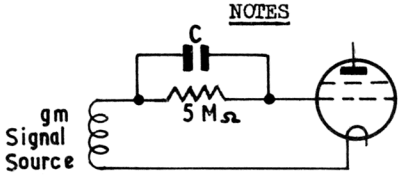
K.1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	GROUP D (Cont'd) Functional Test			T.A.		The valves shall operate satisfactorily in W.S. A40 and A41. Bull 3		
	GROUP E							
11.3	Fatigue	Acceleration = 5g peak min. Time = 99 hrs. Note 3		IA				
	Post Fatigue Tests							
	Mutual Conductance (1)	Note 1	2.5		gm	0.60		mA/V
11.4	Shock	Hammer Angle 30° No voltages		IA				
	Post Shock Tests							
	Mutual Conductance (1)	Note 1	2.5	gm		0.60		mA/V
A VI/ 5	GROUP F Life							
A VI/ 5.1	Stability Life Test							
	Mutual Conductance (2)	Note 1 Vf = 1.0V	1.0	I	gm	0.60		mA/V
A VI/ 5.3	Intermittent Life Test							
	Life Test End Point (500 hrs.)	Combined AQL	6.5	IA				
A VI/ 5.6	Inoperatives		2.5					
	Mutual Conductance (1)	Note 1	2.5		gm	0.60		mA/V
	Electrode Insulation	Vf = 0	4.0					
		Vg_1 - all = -100V			R	50		MΩ
		Vg_2 - all = -100V			R	50		MΩ
		Va - all = -100V			R	50		MΩ

TESTS (Cont'd)

K.1001 Ref.	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	GROUP F (Cont'd)							
	Life Test End Point 1,000 hrs.	Combined AQL	10	IA				
A VI/ 5.6	Inoperatives		4.0					
	Mutual Conductance (1)	Note 1	4.0		gm	0.60		mA/V
	Reverse Grid Current	As in Group A	4.0		Ig_1	-	1.0	µA
	Control Potential Electrode	As in Group A			$+Ig_1$	To be	recorded	µA
	Insulation	Vf = 0 Vg_1 - all = -100V Vg_2 - all = -100V Va - all = -100V	6.5		R R R	30 30 30		MΩ MΩ MΩ
	GROUP G							
A IX/ 2.4 & 2.5	Electrical Retest after 28 days holding period			100%				
A VI/ 5.6	Inoperatives		0.5					
	Mutual Conductance (1)	Note 1			gm	0.75	1.45	mA/V
	Reverse Grid Current	As in Group A	0.5		Ig_1	-	0.5	µA

NOTES

1. Test in circuit



Bypass capacity C shall have a resistance of less than 20,000 ohms at the test frequency.

2. Raise V_f until filament opens. Test for filament to anode short only. After performance of the filament burn out test, if the short circuit shall pass in excess of five times the rated filament current without burning out the short circuit, the valve shall be deemed a failure. This test shall be performed by a Service Laboratory on three valves which shall be in addition to the required number for Type Approval samples. Manufacturer's data are not required for this test.

3. Filament voltage and H.T. voltage are switched simultaneously 1 min. on 3 min. off throughout the duration of the test. Frequency = 170 cps. The valves to be vibrated in each of three mutually perpendicular planes in turn for periods of 30, 30 and 39 hours. One plane to include the longitudinal axis of the valve.

SPECIFICATION MOS/CV4093

ISSUE 1, DATED 8.1.59

AMENDMENT No. 1.

Page 2, Group A

Add a new test as follows:-

N.B

Test	Test Conditions	AQL	Insp. Level	Symbol	Limits		Units
					max.	min.	
Contact Potential	Vf = 1.25 V Va = Vg2 = 0 Vg1 = 1.8 V through 200 k		100%	+ Ig1		0.25	uA

Page 4, Group F, Life Test End Point 1,000 hours.

Add a new test as follows:-

Contact Potential	As in Group A			+ Ig1	To be recorded	uA

T.V.C. for S.R.D.E.

May, 1959.

Z.19201.

AHS

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOS/CV 4093
ISSUE 1 DATED 8.1.59

AMENDMENT NO. 2

Page 2 GROUP D, Capacitance

On bottom line of page, in column headed "Limits Min."

Amend figure against "C_{out}" from 3.7 to 3.5.

May 1960.
N.17175/D.

T.V.C. for S.R.D.E.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOS/CV4093
ISSUE 1 DATED 8.1.1959

AMENDMENT NO. 3

Page 3 GROUP D (Continued)

Functional Test.

In remark at right hand side of page delete "A40 and"

T.V.C. for S.R.D.E.

December 1960

N 46654/D

ELECTRONIC VALVE SPECIFICATION

CV4093 Issue 1 dated 8.1.59
AMENDMENT No. 4

Page 1 Base

Delete:- See Appendix I to CV2237

Dimensions

Delete:- See Appendix I to CV2237

Signals Radio Development
Establishment.

DECEMBER 1961

(7732)

28.2.62