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

VALVE ELECTRONIC **CV4093**

| Specification MOS/CV4093<br>Issue 1, Dated 8.1.59<br>To be read in conjunction with K.1001, BS448 and BS1409 | SECURITY<br>Specification: Unclassified<br>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 $Va = Vg_2 = 67.5V$
$Vg_1 = 0$, $Rg_1 = 5\ M\Omega$

| | | |
|---|---|---|
| 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

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 | Symbol | Limits Min. | Limits Max. | Units |
|---|---|---|---|---|---|---|---|---|
| 7.1 | Glass Strain | No voltages | 6.5 | I | | | | |
| | GROUP A | | | | | | | |
| | Electrode Insulation | $Vg_1$ - all = -100V | | 100% | R | 100 | | MΩ |
| | | $Vg_2$ - all = -100V | | 100% | R | 100 | | MΩ |
| | | Va - all = -100V<br>Vf = 0 | | 100% | R | 100 | | MΩ |
| | Reverse Grid Current | $Vg_1$ = -0.5V<br>$Rg_1$ = 0.1 MΩ max. | | 100% | $Ig_1$ | - | 0.5 | μA |
| | 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<br>Vf = 1.0V | 2.5 | I | gm | 0.60 | 1.45 | mA/V |
| | Mutual Conductance (3) | Note 1<br>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)

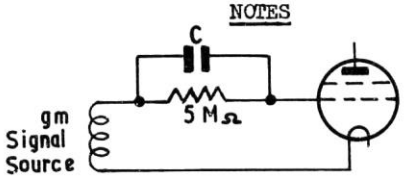
# CV4093

| K.1001 Ref. | Test | Test Conditions | AQL % | Insp. Level | Sym-bol | Limits Min. | Limits Max. | Units |
|---|---|---|---|---|---|---|---|---|
| | GROUP D (Cont'd) | | | | | | | |
| | Functional Test | | | T.A. | | The valves shall operate satisfactorily in W.S. A40 and A41. S.R.D.E | | |
| | 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 |

| K.1001 Ref. | Test | Test Conditions | AQL % | Insp. Level | Sym-bol | Limits | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Min. | Max. | |
| | 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 |
| | Electrode Insulation | Vf = 0 | 6.5 | | | | | |
| | | $Vg_1$ - all = -100V | | | R | 30 | | MΩ |
| | | $Vg_2$ - all = -100V | | | R | 30 | | MΩ |
| | | Va - all = -100V | | | R | 30 | | 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:-

| Test | Test Conditions | AQL | Insp. Level | Symbol | Limits | | Units |
|---|---|---|---|---|---|---|---|
| | | | | | max. | min. | |
| Contact Potential | Vf = 1.25 V<br>Va = Vg2 = 0<br>Vg1 = 1.8 V through 200 k | | 100% | + Igl | | 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 | | | + Igl | To be recorded | uA |

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

May, 1959.

Z.19201.

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION MOS/CV 4093
ISSUE 1 DATED 8.1.59

AMENDMENT NO. 2

Page 2 GROUP D, Capacitance

O/K

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.

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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)