MINISTRY OF SUPPLY - DLRD/RRE.

VALVE ELECTRONIC

CV 4038

Specification MOS/CV4038.
Issue 3 Dated 6.11.56.
To be read in conjunction with K1001 , BS448 and BS 1409

SECURITY	
Specification	Valve
UNCLASSIFIED	UNCLASSIFIED

Indicates a change →

TYPE OF VALVE - Reliable Low Impedance Triode with Flexible Leads suitable for Series Stabiliser Service

CATHODE - Indirectly heated

ENVELOPE - Glass

PROTOTYPE - VX3208; E2359

MARKING

K1001/4

BASE

B9A/F

RATING

All limiting values are absolute

			Note
Heater Voltage	(V)	6.3	C
Heater Current	(A)	0.95	
Max. Anode Voltage	(V)	300	
Max. Anode Voltage at Ia = 0	(V)	500	
Max. Cathode Current	(mA)	120	
Max. Anode Dissipation	(W)	15	
Max. Heater-cathode Voltage (cathode positive)	(V)	250	
Mutual Conductance	(mA/V)	12.0	B
Anode Impedance	(ohms)	375	B
Amplification Factor		4.5	B
Max. Bulb Temperature	(°C)	225	C
Max. Shock (short duration)	(g)	500	
Max. Acceleration (continuous operation)	(g)	2.5	

CONNECTIONS

Lead	Electrode
1	Internally connected
2	Cathode k
3	Anode a
4	Heater h
5	Heater h
6	Grid g
7	Internally connected
8	Internally connected
9	Anode a

DIMENSIONS

See K1001/A1/D11.

Dimension (mm)	Min.	Max.
A	-	66
B	19	22.2
D	38	-

MOUNTING POSITION

Any

CAPACITANCES (pF)

Cag (nom.)		10.0	D
C in (nom.)		6.8	D
C out (nom.)		3.0	D

NOTES

B. Measured at Va = 150V, Ia = 100 mA.

C. Caution to Electronic Equipment Design Engineers: Special attention should be given to the temperature of valves to be operated in aircraft. Reliability will be seriously impaired if the maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the valve and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardised if heater voltage ratings are exceeded: life and reliability performance are directly related to the degree that regulation of the heater voltage is maintained at its centre-rated value.

D. Measured without shield.

To be performed in addition to those applicable in K1001

Tests shall be performed in the specified order unless otherwise agreed with the Inspection Authority.

Test Conditions - unless otherwise specified

Vh (V) 6.3 Va (V) 150 Ia (mA) 100

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min	LAL	Bogey	UAL	Max	ALD	Units
→ 7.1	Glass Strain	No voltages	6.5	I								
	GROUP A											
	Insulation	Vgl-all = -100V		100%	R	100	-	-	-	-		MΩ
		Va - all = -300V		100%	R	100	-	-	-	-		MΩ
	Reverse Grid Current	Rg = 500kΩ Max		100%	Ig	-	-	-	-	2.5		µA
	GROUP B	Combined AQL	1.0									
	Heater Current		0.65	II	Ih	0.85	-	-	-	1.05		A
	Heater Cathode Leakage Current	Vhk = 250V cathode positive to heater	0.65	II	Ihk	-	-	-	-	50		µA
				V2	Ihk	-	-	-	10	-		µA
	Negative Grid Voltage		0.65	II	Vg	18	-	-	-	29		V
				V2	Vg	-	21.5	24	26.5	-	5.55	V
	Mutual Conductance		0.65	II	gm	9	-	-	-	15		mA/V
				V2	gm	-	10.5	12.0	13.5	-	3.33	mA/V
	Negative Grid Cut-off Voltage	Va = 100V Ia = 2 mA	0.65	II	Vg	-	-	-	-	35		V
	GROUP C											
	Emission	Va = Vg = 15V	2.5	I	Ia+g	200	-	-	-	-		mA
→ 11.1	Vibration Noise	Va(b) = 150V RL = 2k, Rk = 150 Ck = 200 uF	2.5	I	VaAC	-	-	-	-	75		mV r.m.s.
	GROUP D											
	Amplification Factor		6.5	IA	µ	3.5	-	-	-	5.5		
5.12	Lead Fragility	No voltages	6.5	IA								
	Capacitances	Measured on 1 Mc/s Bridge with the valve mounted in a fully screened socket. No shield.	6.5	IC	Ca,g	8.5	-	10.0	-	11.5		pF
					C in	5.0	-	6.8	-	8.4		pF
					C out	2.0	-	3.0	-	4.0		pF
	Cathode Heating Time	Va = 170V Vg = 0/180 Rk = ~~230~~ ohms Measure time for Ia = 100 mA Note 2.	6.5	IA	thk	-	-	-	-	40		secs.

TESTS (Cont'd)

CV 4038

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min	LAL	Bogey	UAL	Max	ALD	Units
	GROUP E											
11.2	Resonance Search	Va(b) = 150V, RL=1kΩ Frequency 25-500 c/s	2.5	IC	VaAC f	- 200	-	-	-	Record -	-	mV rms c/s
	Fatigue Test	Vh = 6.9V switched 1 min. on, 3 mins. off Va = 0. Min. peak Acceleration = 5g Duration = 30, 39, 30 hrs Frequency = 170 c/s		IA								
	Post Fatigue Tests	Combined AQL	6.5									
11.1	Vibration Noise	Note 1	2.5		Va(AC)	-	-	-	-	100		mV rms
	Heater Cathode Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-		100		µA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Ig	-	-	-		5.0		µA
	Mutual Conductance		2.5		gm	8	-	-	-	-		mA/V
11.5	Shock Test	Hammer Angle = 30° No voltages.		IA								
	Post Shock Tests	Combined AQL	6.5									
11.1	Vibration Noise	Note 1	2.5		Va(AC)	-	-	-	-	100		mV rms
	Heater Cathode Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-	-	100		µA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Ig	-	-	-	-	5.0		µA
	Mutual Conductance		2.5		gm	8	-	-	-	-		mA/V
	GROUP F											
A VI/5	Life	Vhk = 200V. 50c/s Va = 120 V Ia = 125mA										
A VI/5.1	Stability Life Test											
	Change in Mutual Conductance		1.0	I	Δgm	-	-	-	-	10		%
A VI/5.3	Intermittent Life Test	See above		IA								
	Life Test End-point (500 hours)	Combined AQL	6.5									
	Inoperatives		2.5									
	Heater Current		2.5		Ih	0.85	-	-	-	1.05		A
	Heater Cathode Leakage Current	Vhk = 250V	2.5		Ihk	-	-	-	-	50		µA
	Reverse Grid Current	Rg = 500kΩ Max	2.5		Ig	-	-	-	-	3.0		µA
	Mutual Conductance		2.5		gm	8.5	-	-	-	15		mA/V
	do. Average change				Δgm	-	-	-	-	15		%
	Negative Grid Voltage		4.0		Vg	17	-	-	-	29		V
	Insulation	Vg-all= -100V) Va-all= -300V)	4.0		R	50	-	-	-	-		MΩ

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits						Units
						Min	LAL	Bogey	UAL	Max	ALD	
	GROUP F (Cont'd)											
	Life Test End-point (1000 hours)	Combined AQL	10.0									
	Inoperatives		4.0									
	Heater Current		4.0		Ih	0.85	-	-	-	1.05		A
	Heater Cathode Leakage Current	Vhk = 250V	4.0		Ihk	-	-	-	-	50		µA
	Reverse Grid Current	Rg = 500kΩ Max	4.0		Ig	-	-	-	-	3.5		µA
	Mutual Conductance		4.0		gm	8.0	-	-	-	-		mA/V
	Negative Grid Voltage		6.5		Vg	16	-	-	-	29		V
	GROUP G											
A IX/ 2.5	Electrical Re-test after 28 days holding period			100%								
	Inoperatives		0.5									
	Reverse Grid Current	Rg = 500kΩ Max	0.5		Ig	-	-	-	-	3.5	-	µA

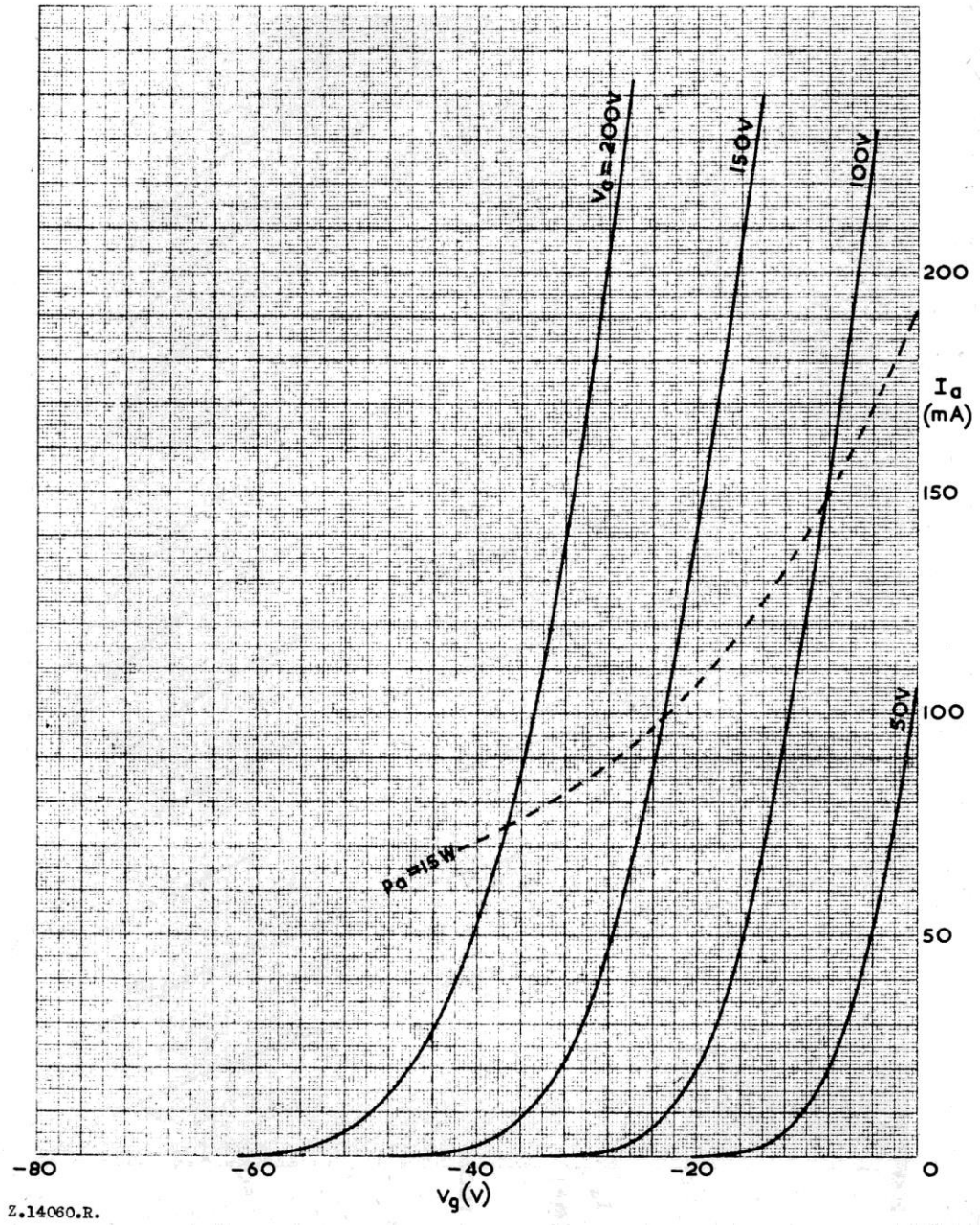
NOTES

1. The test conditions for Vibration Noise in Group C shall apply.

2. Valve to be cold when plugged into socket or switched on. A cold valve is one which has had its heater supply switched off for at least 2 hours.

DATA SHEET

VALVE
ELECTRONIC
TYPE
CV4038



Z.14060.R.

DATA SHEET

VALVE
ELECTRONIC
TYPE

CV4038