

MINISTRY OF SUPPLY DLRD/PRE

VALVE ELECTRONIC

CV 4006

Specification MOS/CV4006

Issue 1 Dated 25th June, 1957.

To be read in conjunction with K1001, BS448 and BS1409

SECURITYSpecification

UNCLASSIFIED

Valve

UNCLASSIFIED

TYPE OF VALVE - Reliable, Low Noise, Low Microphony Amplifier Pentode

CATHODE - Indirectly Heated

ENVELOPE - Glass - unmetallised

PROTOTYPE - VX7081

RETMA Designation - 6059

MARKING

See K1001/4

ADDITIONAL MARKING

6059

RATING

All limiting values are absolute

Note

Heater Voltage (V) 6.3
 Heater Current (A) 0.15
 Max. Anode Voltage (V) 300
 Max. Anode Dissipation (W) 0.75
 Anode Current (mA) 2.1
 Max. Screen Voltage (V) 125
 Max. Screen Dissipation (W) 0.3
 Screen Current (mA) 0.6
 Mutual Conductance (mA/V) 1.25
 Amplification Factor (g₁ - g₂) 20
 Max. Shock (short duration) (g) 500
 Max. Acceleration (Continuous operation) (g) 2.5

CONNECTIONS

Pin

Electrode

1	No Connection	N.C.
2	Control Grid	g ₁
3	Cathode	k
4	Heater	h
5	Heater	h
6	Internal Shield	s
7	Anode	a
8	Screen Grid	g ₂
9	Suppressor Grid	g ₃

CAPACITANCES (pF)

C_{g1} Max.
 C_{g2} (Nom)
 C_{as} (Nom)

0.01 B
 4.25 B
 4.0 B

DIMENSIONS

See BS448/B9A/2.1
 Size ref. No.2

Dimension (mm)

Min

Max

A. seated height	-	49
C. diameter	19	22.2
D. overall length	-	56

MOUNTING POSITION

ANY

NOTESA. Measured at V_a = 250; V_{g2} = 100; V_{g1} = -3

B. Measured without metal screen.

TO BE PERFORMED IN ADDITION TO THOSE APPLICABLE IN K1001

TESTS SHALL BE PERFORMED IN THE SPECIFIED ORDER, UNLESS OTHERWISE AGREED WITH THE INSPECTING AUTHORITY

TEST CONDITIONS -UNLESS OTHERWISE SPECIFIED												
Vh (V)		Va (V)		Vg1 (V)		Vg2 (V)		Vg3 (V)		Vhk (V)		
6.3		250		-3		100		0		0		
K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL.	Bogey	U/L	Max.	ALD	
	<u>GROUP A.</u>											
	Insulation	Vg1 - all = -100V Vg2 - all = -300V Va - all = -300V	100% 100% 100%		R R R	100 100 100						M Ω M Ω M Ω
	Reverse Grid Current	Rg1 = 500 k max.	100%		Ig1					0.5		μA
	<u>GROUP B.</u>	Combined AQL	1.0									
	Heater Current		0.65	II	Ih	136		150		162		mA
	Heater - Cathode Leakage current	Vhk = ± 100V	0.65	II	Ihk					10		μA
		Vhk = 100V, Cath + Ve		V2	Ihk				2			μA
	Anode Current (1)		0.65	II	Ia	1.2				3.0		mA
				V2	Ia		1.77	2.1	2.43		0.74	mA
	Mutual Conductance		0.65	II	gm	0.95				1.6		mA/V
				V2			1.16	1.275	1.4		0.27	mA/V
	<u>GROUP C.</u>											
	Screen Grid Current		2.5	I	Ig2	0.2				0.8		mA
	Anode Current (2)	Vg1 = -8V	2.5	I	Ia					140		μA
	Change in Mutual Conductance	Vh = 5.7V Note 1	2.5	I	gm					15		%
	Vibration Noise	Va(g) = 250V Vg(2) = 100V RL = 2k; Rk = 1.1k, Ck = 1000 μF	2.5	I	Va AC					2		mV rms
	<u>GROUP D</u>											
	Capacitances	Measured on a 1 Mc/s bridge with the valve mounted in a fully screened socket. No shield.	6.5	IC	Cag1 Cin Cout	3.0 2.75				0.01 5.5 5.25		pF pF pF
	Hiss Output	Va(b) = Vg2 = 300V RL = 470 K Rg2 = 5.3 M Rk = 1.5k; Rg1 = 500k - 0 Ck = 50 μF; Cg2 = 0.1 μF Note 2.	6.5	IA	Va AC					1		mV rms
	Grid Hum Output	As for Hiss Output Pin 4 earthed Amplifier band-width = 30-3000/s Rg1 = 500k	6.5	IL	Va AC					4		mV rms

TESTS. (Contd.)

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K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL.	Bogey	UAL.	Max.	ALD	
	<u>GROUP D (Contd.)</u>											
	Cathode Hum	As for Grid Hum except $R_{g1} = 0$, $C_k = 0$	6.5	IA	Va AC					7.0		mV rms
	Reverse Grid Current	$V_h = 6.9V$, $V_a = 330V$ $V_{g3} = 0$, $V_{g2} = 135V$ V_{g1} set to give I_a $= 2.5 \text{ mA}$. Note 3	6.5	IA						1.0		μA
7.1	Glass Strain	No voltages	6.5	I								
7.2	Base Strain	No voltages	6.5	IA								
	<u>GROUP E</u>											
11.2	Resonance Search	As for Vibration Noise in Group C. Frequency range 25 - 500 c/s.		IC				record				
11.3	Fatigue	$V_h = 6.9$ switched 1 min ON, 3 mins OFF. $V_a = V_{g2} = 0$ Min peak accel. = 5g Frequency = 170 c/s Duration = 30, 39, 30 hrs.		IA								
	<u>Post Fatigue Tests</u>	Combined AQL	6.5									
	Heater-Cathode Leakage Current	$V_{hk} = \pm 100V$	2.5		Ihk	-	-	-	-	20		μA
	Reverse Grid Current	$R_{g1} = 500 \text{ K max.}$	2.5		Igl	-				1.5		μA
	Mutual Conductance		2.5		gm	.75				1.6		mA/V
	Vibration Noise	As in Group C.	2.5	Va AC						10		mV rms
11.4	Shock	Hammer angle = 30° No voltages										
	<u>Post Shock Tests</u>											
	As for Post Fatigue Tests, above.											

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K1001	TEST	TEST CONDITIONS	AQL %	Insp. Level	Symbol	Limits						Units
						Min.	LAL	Bogey	UAL	Max.	ALD	
	<u>GROUP F</u>											
AVI/5	Life	Va = 250. Vhk = 170v rms Vg2 = 100. Vg3 = 0 Rk = 1.2k. Rg = 100k (nom)										
AVI/5.1	<u>Stability Life Test</u>											
	Change in Mutual Conductance.		1.0	I	gm	-	-	-	-	15		%
AVI/5.3	<u>Intermittent Life Test</u>	see above		IA								
	<u>Life Test End-point 500 hrs.</u>	Combined AQL	6.5									
AVI/5.6	Inoperatives		2.5									
	Heater Current		2.5		Ih	138		150		162		mA
	Heater-Cathode Leakage Current	Vhk = ± 100V	2.5		Ihk	-	-	-	-	20		μA
	Reverse Grid Current	Rgl = 500K max.	2.5		Igl	-	-	-	-	1.5		μA
	Mutual Conductance		2.5		gm	0.75	-	-	-	1.6		mA/V
	-dc- Average Change				Δ gm	-	-	-	-	15		%
	Insulation	As in Group A.	4.0		R	50	-	-	-	-		M
	<u>Life Test End-point 1000 hrs.</u>	Combined AQL	10	LA								
AVI/5.6	Inoperatives		4.0									
	Heater Current		2.5		Ih	138		150		162		mA
	Heater-Cathode Leakage Current	Vhk = ± 100V	4.0		Ihk	-	-	-	-	20		μA
	Reverse Grid Current	Rgl = 500K max.	4.0		Igl	-	-	-	-	2.0		μA
	Mutual Conductance		4.0		gm	0.7	-	-	-	1.6		mA/V
	<u>GROUP G</u>											
AXI/2.5	Re-test after 28 holding period			100%								
	Inoperatives		0.5									
AVI/5.6	Reverse Grid Current.	Rgl = 500 k max.	0.5		Igl	-	-	-	-	0.5		μA

NOTES

1. The change in mutual conductance is expressed as:-

$$\frac{gm \text{ at } 6.3V - gm \text{ at } 5.7V}{gm \text{ at } 6.3V} \times 100 \%$$

2. Noise output measured at anode of V.U.T. Amplifier band-width 30 c/s - 13 Kc/s (3 db points)
3. Ig, shall not be rising or out of limit after 10 minutes.

Amendment No. 1
to Specification CV4006, Issue 1, dated 25th June, 1957

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Group D

Test Conditions

Hiss Output

Amend RG1 = 500K to read RG1 = 0

Grid Hum Output

Add RG1 = 500K

December, 1957.

N.24400;

T.V.C.
for R.R.E.

✓ AAS