

MINISTRY OF SUPPLY DLRD/ARE

VALVE ELECTRONIC

CV 4006

Specification MOS/CV4006 Issue 1 Dated 25th June, 1957. To be read in conjunction with K1001, BS448 and BS1409	<u>SECURITY</u>	
	Specification UNCLASSIFIED	Valve UNCLASSIFIED

TYPE OF VALVE - Reliable, Low Noise, Low Microphony Amplifier Pentode  CATHODE - Indirectly Heated  ENVELOPE - Glass - unmetallised  PROTOTYPE - VX7081  RETMA Designation - 6059		<u>MARKING</u>  See K1001/4  <u>ADDITIONAL MARKING</u>  6059													
<u>RATING</u>  All limiting values are absolute		<u>R/SE</u>  See BS448/B9A/1.1													
		<u>CONNECTIONS</u>													
		Pin	Electrode												
		1	No Connection N.C.												
		2	Control Grid g1												
		3	Cathode k												
		4	Heater h												
		5	Heater h												
		6	Internal Shield s												
		7	Anode a												
		8	Screen Grid g2												
		9	Suppressor Grid g3												
<u>CAPACITANCES (pF)</u>  Cag1 Max. 0.01 B Cge (Nom) 4.25 B Cae (Nom) 4.0 B		<u>DIMENSIONS</u>  See BS448/B9A/2.1 Size ref. No.2													
		<table border="1"> <thead> <tr> <th>Dimension (mm)</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>L.seated height</td> <td>-</td> <td>49</td> </tr> <tr> <td>C.diameter</td> <td>19</td> <td>22.2</td> </tr> <tr> <td>D.overall length</td> <td>-</td> <td>56</td> </tr> </tbody> </table>		Dimension (mm)	Min	Max	L.seated height	-	49	C.diameter	19	22.2	D.overall length	-	56
Dimension (mm)	Min	Max													
L.seated height	-	49													
C.diameter	19	22.2													
D.overall length	-	56													
		<u>MOUNTING POSITION</u>  ANY													
<u>NOTES</u>  A. Measured at Va = 250; Vg2 = 100; Vg1 = -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.	L.L.	Bogey	U.L.	Max.	ALD	
	<u>GROUP A.</u>											
	Insulation	Vg1 = all = -100V Vg2 = all = -300V Va = all = -300V	100%		R	100						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 Vhk = 100V, Cath + Ve	0.65	II	Ihk					10		μA
	Anode Current (1)		0.65	II	Ia	1.2				2		μA
	Mutual Conductance		0.65	II	Ia	1.2	1.77	2.1	2.43	3.0	0.74	mA/V
				II	V2							mA/V
				II	gm	0.95	1.16	1.275	1.4	1.6	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	Cagl 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 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 bandwidth = 30-3400/s	6.5	LI	Va AC					4		mV rms

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	II	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 $I_a = 2.5$ mA. Note 3	6.5	II						1.0		$\mu A$
7.1	Glass Strain	No voltages	6.5	I								
7.2	Base Strain	No voltages	6.5	II								
	<u>GROUP E</u>											
11.2	Resonance Search	As for Vibration Noise in Group C.			IC					record		
11.3	Fatigue	Frequency range 25 - 500 c/s. $V_h = 6.9$ 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.			II							
	<u>Post Fatigue Tests</u>											
	Heater-Cathode Leakage Current	$V_{hk} = \pm 100V$	2.5		Ihk	-	-	-	-	20		$\mu A$
	Reverse Grid Current	$R_{g1} = 500 K$ max.	2.5		Ig1	-				1.5		$\mu A$
	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 = $30^\circ$ No voltages										
	<u>Post Shock Tests</u>											
	As for Post Fatigue Tests, above.											

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	Rg1 = 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	IA								
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	Rg1 = 500K max.	4.0	Igl	-	-	-	-	-	2.0		µA
	Mutual Conductance		4.0	gm	0.7	-	-	-	-	1.6		mA/V
	<u>GROUP G</u>											
AIX/2.5	Re-test after 28 holding period Inoperatives		0.5	100%								
AVI/5.6	Reverse Grid Current.	Rg1 = 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.