MINISTRY OF SUPPLY - DLRD/RRE

VALVE ELECTRONIC

CV4055

Specification MOS/C V 4055

Issue 2 Dated 23. Nov. 56.

To be read in conjunction with K1001 , BS448 and BS 1409

SECURITY	
Specification	Valve
Unclassified	Unclassified

Indicates a change →

TYPE OF VALVE - Reliable Video Output Pentode

CATHODE - Indirectly-heated

ENVELOPE - Glass

PROTOTYPE - CV2127; 6CH6

MARKING

See K1001/4

BASE

See BS 448 : B9A/2.1 ←

CONNECTIONS

Pin	Electrode	
1	Internally connected	i/c
2	Control Grid	g1
3	Cathode	k
4	Heater	h
5	Heater	h
6	No connection	n/c
7	Anode	a
8	Screen Grid	g2
9	Suppressor Grid	g3

DIMENSIONS

See BS.448 : B9A/2.1/3

Dimensions (mm)	Min.	Max.
A.Seated height	-	60.3
B.Diameter	19.0	22.2
D.Overall length	-	67.5

MOUNTING POSITION

Any

RATINGS

All limiting values are absolute

			Note
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.75	
Max Anode Voltage (Ia = 0)	(V)	500	
Max Operating Anode Voltage	(V)	300	
Max Screen Grid Voltage (Ig2 = 0)	(V)	500	
Max Operating Screen Voltage	(V)	300	
Max D.C. Cathode Current	(mA)	65	
Max Peak Cathode Current	(A)	1.5	
Max Grid Circuit Resistance	(Kohms)	100	B
Max Bulb Temperature	(°C)	250	C
Max Shock (Short Duration)	(g)	500	
Max Acceleration (continuous operation)	(g)	2.5	
PENTODE CONNECTION			
Max Anode Dissipation	(W)	12	
Max Screen Grid Dissipation	(W)	2.5	
Anode Current	(mA)	40	D
Screen Grid Current	(mA)	6	D
Mutual Conductance	(mA/V)	11	D
Inner Amplification Factor		26	D
TRIODE CONNECTION (g2 to a, g3 to k)			
Max Anode Dissipation	(W)	12.5	
Cathode Current	(mA)	46	D
Mutual Conductance	(mA/V)	13	D
Amplification Factor		26	D

CAPACITANCES (pF) (See Note E)

PENTODE CONNECTION	
Cin (nom)	12.5
Cout (nom)	5.0
Cag1 (max)	0.18
TRIODE CONNECTION	
Cin (nom)	6.0
Cout (nom)	6.0
Cag1 (nom)	6.5

NOTES

B. This value may be increased to 220k if cathode bias is used.

C. Caution to Electronic Equipment Design Engineers: Special attention should be given to the temperature of valve 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.

NOTES (cont'd)

D. Measured at Va = Vg2 = 250V, Vg1 = -4.5V, Vg3 = 0.

E. Measured in a fully screened socket, no external shield.

TESTS

To be performed in addition to those applicable in K1001
and 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)
6.3	250	-4.5	250	0

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			100%	R							
		Va, all = -300V				100				-		M
		Vg1, all = -100V				100				-		M
		Vg2, all = -300V				100				-		M
	Reverse Grid Current	Rg1 = 100K Max		100%	Ig1	-				1.0		uA
	GROUP B	Combined AQL	1.0	II								
	Heater Current		0.65	II	Ih	0.69	-	0.75	-	0.81		A
	Heater-cathode Leakage Current	Vhk = ±100V	0.65	II	Ihk	-	-	-	-	10		uA
		Vhk = -100V Cathode positive		V2	Ihk	-	-	-	2	-		uA
	Anode Current		0.65	II	Ia	30	-	-	-	50		mA
				V2	Ia	-	36.3	40	43.7	-	8.2	mA
	Mutual Conductance		0.65	II	gm	9.0	-	-	-	13.5		mA/V
				V2	gm	-	10.26	11.0	11.74	-	1.65	mA/V
	GROUP C	Combined AQL	0.5	I								
	Screen Grid Current		2.5	I	Ig2	-	-	-	-	7.5		mA
				V1	Ig2	-	-	6.0	6.72	-		mA
	Anode Current	Vg1 = -25V	2.5	I	Ia	-	-	-	-	10		uA
	Change in mutual conductance	Vh = 5.7V	2.5	1	Δ gm	-	-	-	-	10		%
	Reverse Grid Current	Vh = 6.9V, Va = 300V Vg2 = 250V, Ia = 40mA Rg1 = 100K Max Note 1	2.5	I	Ig1	-	-	-	-	2.5		uA
11.1	Vibration Noise Output Voltage	Va(b) = 250V RL = 2K Rk = 1.5K Ck = 1000/uF	2.5	I	Va AC	-	-	-	-	75		mV rms

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TESTS (Cont'd)

MOD1	Test	Test Conditions	AQL %	Insp. level	Sym-bol	Limits Min.	LAL	Bogey	UAL	Max.	ALD	Units
	GROUP D											
	Base Strain	No voltages	6.5	IA								
	Capacitance	Measured on a 1 Mc/s bridge with the valve mounted in a fully screened socket No shield	6.5	IC	C in	10.0		12.5		15.0		pF
					C out	4.0		5.0		6.0		pF
					Ca,g1	-		0.145		0.18		pF
	g3 continuity	Vg3 = 250V Note 2	6.5	IA								
	Inner amplification Factor		6.5	IA	ug1,g2	20	-	26	-	32		
	Peak emission	Vg1 = Vg2 = Va = 70V pulsed half sine wave. tp = 10 uSec max prf = 50 pps	6.5	IA	Ik_{pk}	1.5	-	-	-	-	-	A
	GROUP E											
11.2	Resonance Search (1)	Va(b) = 250V;RL = 2K; frequency range: 25 to 500 c/s		IC								
	Vibration Noise Output Voltage	Note 3	2.5		Va AC	-	-	-	-	record		mV rms
	Resonant Frequency		2.5		f	200	-	-	-	-		c/s
11.3	Fatigue	Vh = 6.9V switched 1 min on, 3 mins off Va = Vg2 = 0; Min. pk accel = 5g: Duration = 30, 39, 30 hrs. f = 170 c/s		IA								
	Post Fatigue Tests	Combined AQL.	6.5									
	Heater-cathode Leakage Current	Vhk = ±100V	2.5		Ihk	-	-	-	-	20		uA
	Reverse Grid Current	Rg1 = 100K Max.	2.5		Ig1	-	-	-	-	1.5		uA
	Mutual Conductance		2.5		gm	7.6	-	-	-	-		mA/V
11.1	Vibration Noise Output Voltage	Note 3	2.5		Va AC	-	-	-	-	100		mV rms
11.4	Shock	No voltages Hammer angle = 30°		IA								
	Post Shock Tests	Combined AQL	6.5									
	Heater-cathode Leakage current	Vhk = ±100V	2.5		Ihk	-	-	-	-	20		uA
	Reverse Grid Current	Rg1 = 100K Max	2.5		Ig1	-	-	-	-	1.5		uA
	Mutual Conductance		2.5		gm	7.6	-	-	-	-		mA/V
11.1	Vibration Noise Output Voltage	Note 3	2.5		Va AC	-	-	-	-	100		mV rms

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KIOO	Test	Test Conditions	AQL %	Insp. level	Sym-bol	Limits Min.	LAL	Bogey	UAL	Max.	ALD	Units
	GROUP F											
AVI/5	Life	Va = 250V Vg2 = 250V Rk = 100 Rg1 = 100K Nom										
AVI/5.1	Stability Life Test											
	Change in Mutual Conductance		1.0	I	Δ gm	-	-	-	-	5	-	%
AVI/5.3	Intermittent Life Test											
	Life Test End-point (500 hours)	Combined AQL	6.5	IA								
AVI/5.6	Inoperatives		2.5									
	Heater Current		2.5		Ih	0.69	-	-	-	0.81		A
	Heater-cathode Leakage Current	Vhk = ±100V	2.5		Ihk	-	-	-	-	15		uA
	Reverse Grid Current	Rg1 = 100K Max	2.5		Ig1	-	-	-	-	1.5		uA
	Mutual Conductance		2.5		gm	8.0	-	-	-	-		mA/V
	Average change in mutual conductance				Δ gm	-	-	-	-	15		%
	Insulation		4.0		R							
		Va, all = -300V				50				-		M
		Vg1, all = -100V				50				-		M
		Vg2, all = -300V				50				-		M
	Life Test End-point (1000 hrs)	Combined AQL	10.0	IA								
AVI/5.6	Inoperatives		4.0									
	~~Heater Current~~		~~4.0~~		~~Ih~~	~~0.69~~	~~-~~	~~-~~	~~-~~	~~0.81~~		~~A~~
	Heater-cathode Leakage Current	Vhk = ±100V	4.0		Ihk	-	-	-	-	20		uA
	Reverse Grid Current	Rg1 = 100K Max	4.0		Ig1	-	-	-	-	1.5		uA
	Mutual Conductance	Va, all = -300V	4.0		gm	7.6	-	-	-	-		mA/V
	Electrode Insulation	Vg1, all = -100V Vg2, all = -300V			R	30 30	-	-	-	-		MΩ MΩ
	GROUP G											
AIX/2.5	Electrical re-test after 28-day holding period			100%								
AVI/5.6	Inoperatives		0.5									
	Reverse Grid Current	Rg1 = 100K Max.	0.5		Ig1	-	-	-	-	1.0		uA

NOTES

1. Preheat for 5 minutes under test conditions. During the test, Ig1 shall not be rising nor out of limit after 10 minutes.

2. During this test Ig2 shall rise when g3 is connected to g2.

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

SPECIFICATION CV.4055. ISSUE 2 dated 23-11.56

AMENDMENT NO. 1

PAGE 1. BASE

AMEND "See B.S.448: B9A/2.1."

to read "See B.S.448: B9A/1.1."

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ELECTRONIC VALVE SPECIFICATION

SPECIFICATION CV.4055

ISSUE 2 - DATED 23rd NOVEMBER, 1956

AMENDMENT No: 2

GROUP F

Intermittent Life Test Point (1000 hrs.)

Electrode Insulation

Delete all reference to Heater Current Test

Add at the end of this Group the following:-

K1001 Ref.	Test	Test Conditions	AQL %	INSP. LEVEL	SYMBOL	LIMITS					
						MIN	LAL	BOGEY	UAL	MAX	UNITS
	ELECTRODE	Va, all = -300V	6.5	-	R	30	-	-	-	-	MΩ
	INSULATION	Vg1,all = -100V			R	30	-	-	-	-	MΩ
		Vg2,all = -300V			R	30	-	-	-	-	MΩ

December, 1957.

T.V.C.