MINISTRY OF SUPPLY - DLRD/RRE

VALVE ELECTRONIC

CV 4043

Specification MOS /CV4043	SECURITY	
	Specification	Valve
Issue 2 Dated 6.11.56		
To be read in conjunction with K1001 BS448 & BS1409	UNCLASSIFIED	UNCLASSIFIED

Indicates a change →

TYPE OF VALVE - Reliable Beam Tetrode

CATHODE - Indirectly-heated

ENVELOPE - Glass

PROTOTYPE - CV2136

RATING

All limiting Values are absolute

			Note
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.45	
Max. Anode Voltage	(V)	350	
Max. Anode Dissipation	(W)	13.2	
Max. Screen Grid Voltage	(V)	310	
Max. Screen Grid Dissipation	(W)	2.1	
Max. Heater-cathode Voltage	(V)	±90	
Mutual Conductance	(mA/V)	4.1	B
Anode Impedance	(ohms)	50,000	B
Max. Bulb Temperature	(°C)	250	C
Max. Shock (short duration)	(g)	500	
Max. Acceleration (continuous operation)	(g)	2.5	

CAPACITANCES (pF)

Cag (max.)	0.5
Cin (nom.)	8.3
Cout (nom.)	7.0

MARKING

K1001/4

BASE

B9A

See B.S.448:1953
B9A/1.1

CONNECTIONS

Pin	Electrode	
1	Control Grid	g^1
2	Control Grid	g^1
3	Cathode	k
4	Heater	h
5	Heater	h
6	No connection	NC
7	Anode	a
8	Screen Grid	g^2
9	Suppressor	g^3

DIMENSIONS

See B.S.448 : 1953
E9A/2.1 **Size Ref No.3**

Dimensions (mm)	Min.	Max.
A. Seated height	-	60.5
C. Diameter	19.0	22.2
D. Overall length	-	67.5

MOUNTING POSITION

Any

NOTES

B. Measured at Va = Vg2 = 250V; Vg3 = 0; Vg1 = -12.5V

C. Note 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 value 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.

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TESTS

To be performed in addition to those applicable in K1001
and in the specified order unless otherwise agreed by the Inspection Authority

Test Conditions - unless otherwise specified

Vh (V)	Va (V)	Vg1 (V)	Vg2 (V)	Vg3 (V)
6.3	250	-12.5	250	0

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min	LAL	Dogey	UAL	Max	ALD	Units
7.1	Glass Strain	No voltages	6.5	I								
	GROUP A											
	Insulation			100%	R							
		Vg1 - all = -100V				100	-	-	-	-		M
		Vg2 - all = -300V				100	-	-	-	-		M
		Va - all = -300V				100	-	-	-	-		M
	Reverse Grid Current	Rg1 = 500k Max		100%	Ig1	-	-	-	-	2.0		uA
	GROUP B	Combined AQL	1.0									
	Heater Current		0.65	II	Ih	0.41	-	-	-	0.49		A
	Heater-cathode Leakage Current	Vhk = ± 90V	0.65	II	Ihk	-	-	-	-	20		uA
				V2	Ihk	-	-	-	5	-		uA
	Anode Current	Note 1	0.65	II	Ia	33	-	-	-	57		mA
				V2	Ia	-	39	45	51	-	13.3	mA
	Screen Grid Current		0.65	II	Ig2	~~3.5~~ 0.6	-	-	-	7.5		mA
	Mutual Conductance		0.65	II	gm	3.0	-	-	-	5.2		mA/V
				V2	gm	-	3.5	4.1	4.7	-	1.33	mA/V
	GROUP C	Combined AQL	6.5									
	g3 Continuity	Vg3 = 250V Note 2	2.5	I								
	Power Output	RL = 5k Input signal = 8.8V r.m.s. Frequency = 1 kc/s	2.5	I	P out	3.6	-	-	-	-		W
	Reverse Grid Current	Vh=6.9V; Va=350V; Vg2=305V; Ia=38mA; Rg1=500k; Note 3	2.5	I	Ig1	-	-	-	-	2.0		uA
	Emission	Vg1 = Vg2 = Vg3 = Va = 30V	2.5	I	Ia	100	-	-	-	-		mA
11.1	Vibration Noise Output	Va(b) = 250V Vg1 = -25V RL = 2k	2.5	I	Va AC	-	-	-	-	60		mV r.m.s.
	GROUP D											
7.2	Base Strain		6.5	IA								
	Capacitance		6.5	IC								
		Measured on a 1 Mc/s bridge with the valve mounted in a fully screened socket. No shield.			Cag1	-	-	-	-	0.5		pF
					C in	6.6	-	-	-	10.0		pF
					C out	5.5	-	-	-	8.5		pF

TESTS (Cont'd)

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K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min	LAL	Bogey	UAL	Max.	ALD	Units
	GROUP E											
11.2	Resonance Search	Va(b) = 250V Vg1 = -25V RL = 2k Frequency range = 25-500 c/s	2.5	IC								
	Vibration Noise Output				Va AC	-	-	-	-	Record		mVrms
	Resonant Frequency				f	200	-	-	-	-		c/s
11.3	Fatigue	Vh = 6.3V switched 1 min. on, 3 mins. off. Va = Vg2 = 0 Min pk accel = 5g Frequency = 170 c/s Duration = 30,39,30 hrs.		IA								
	Post Fatigue Tests	Combined AQL	6.5									
	Vibration Noise	Note 4	2.5		Va AC	-	-	-	-	120		mVrms
	Heater-cathode Leakage Current	Vhk = ± 90V	2.5		Ihk	-	-	-	-	40		uA
	Reverse Grid Current	Rg1 = 500k Max	2.5		Ig1	-	-	-	-	4.0		uA
	Power Output	Note 5	2.5		P out	2.3	-	-	-	-		W
11.4	Shock	Hammer angle = 30° No voltages		IA								
	Post Shock Tests	Combined AQL	6.5									
	Vibration Noise Output	Note 4	2.5		Va AC	-	-	-	-	120		mVrms
	Heater-cathode Leakage Current	Vhk = ± 90V	2.5		Ihk	-	-	-	-	40		uA
	Reverse Grid Current	Rg1 = 500k Max	2.5		Ig1	-	-	-	-	4.0		uA
	Power Output	Note 5	2.5		P out	2.3	-	-	-	-		W
	GROUP F											
A VI/5	Life	Vg1=0 Rg1=100k - 500k Rk =270 ± 10%										
A VI/ 5.1	Stability Life Test											
	Change in Anode Current		1.0	I	Ia	-	-	-	-	7.5		%
	Change in Mutual Conductance		1.0	I	Δ gm	-	-	-	-	5		%
A VI/ 5.3.	Intermittent Life Test			IA								
	Life Test End-point (500 hours)		6.5									
A VI/ 5.6	Inoperatives		2.5									
	Power Output	Note 5	2.5		P out	2.3	-	-	-	-		W
	Reverse Grid Current	Rg = 500k Max	2.5		Ig1	-	-	-	-	4.0		uA
	Heater-cathode Leakage Current	Vhk = ± 90V	2.5		Ihk	-	-	-	-	40		µA
	Mutual Conductance		2.5			2.55	-	-	-	5.2		mA/V
	do Average change				Δ gm	-	-	-	-	15		%

TESTS (Cont'd)

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	LAL	Bogey	UAL	Max.	ALD	Units
A VI/ 5.6	Insulation		2.5		R							
		Vg1 - all = -100V				50	-	-	-	-		M
		Vg2 - all = -300V				50	-	-	-	-		M
		Va - all = -300V				50	-	-	-	-		M
	Life Test End-point (1000 hours)		10.0									
	Inoperatives		4.0									
	Power Output		4.0		P out	2.0	-	-	-	-		W
	Reverse Grid Current	Rg1 = 500k Max	4.0		Ig1	-	-	-	-	5.0		uA
	Heater-cathode Leakage Current	Vhk = ± 90V	4.0		Ihk	-	-	-	-	50		uA
	Mutual Conductance		4.0		gm	2.3	-	-	-	-		mA/V
	GROUP C											
A IX/ 2.5	Electrical re-test after 28-day holding period			100%								
A VI/ 5.6	Inoperatives		0.5									
	Reverse Grid Current	Rg1 = 500k Max	0.5		Ig1	-	-	-	-	2.0		uA

NOTES

1. With Vg1 applied to Pins 1 and 2 in turn, Ia shall show no change.
2. During this test Ig2 shall rise when g3 is connected to g2.
3. Pre-heat for 5 minutes under the test conditions. During the test Ig1 shall not be rising or out of limit after 10 minutes.
4. The conditions for Vibration Noise specified in Group C shall apply.
5. The conditions for Power Output specified in Group C shall apply.

ELECTRONIC VALVE SPECIFICATION CV 4043

ISSUE 2 DATED 6.11.56

AMENDMENT NO. 1

Page 2 GROUP B

Screen Grid Current. Under minimum limit,
Amend "3.5" to "0.6"

R.R.E.

November 1960.

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