

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION CV 7438-9

ISSUE NO. 1 DATED 2.8.1963

AMENDMENT NO. 1

Page 2, Characteristics

$h_{FE}$  Conditions of measurement

Amend  $V_{CB}$  to read 0V to - 200mV

Delete  $I_C = 50mA$  insert  $I_E = 50mA$

Page 4, Group A, Sub Group 2,

Static Forward Current Transfer Ratio,

Under Specific Conditions delete  $I_C = 50mA$

insert  $I_E = 50mA$

Amend  $V_{CB}$  to read 0V to -200mV

March, 1964.  
(222050)

Ministry of Aviation/S.R.D.E.

MILITARY SPECIFICATION

**CV7438-9**

SEMICONDUCTOR DEVICE, TRANSISTORS

Description:- This specification covers the detail requirements for PNP Germanium Alloy Low Frequency Transistors and is in accordance with K.1007 except as otherwise stated.

Mechanical Dimensions and Outlines:- K.1007, Section B, 10.3.2.2 and 10.4.2.2.

Connections:- Base connected to case.  
 Lead 1 Emitter, Lead 2 Base, Lead 3 Collector.

Absolute Maximum Ratings:-

Rating	V <sub>CB</sub>	V <sub>CE</sub>	V <sub>CE</sub>	V <sub>EB</sub>	I <sub>C</sub>	I <sub>E</sub>	I <sub>B</sub>	P <sub>tot</sub>
Unit	V	V	V	V	A	A	mA	mW
Min	-	-	-	-	-	-	-	-
Max	-4.0	-32	-20	-12	1.0 pK 0.5 av	1.05 pK 0.525av	50 pK 25 av	24.0
Note		1	2		3	3	3	4

Rating	T <sub>opr</sub>	T <sub>stg</sub>	Vib	Shock
Unit	°C	°C	g	g
Min	-55	-55	-	-
Max	+85	+85	20	1500
Note				5

- Note 1.  $+V_{BE} > 1.0V$ ,  $I_C \leq 50 \text{ mA}$   
 2.  $I_C = 500 \text{ mA}$   
 3. Averaged over any 20 m sec period.  
 4. See derating curve. Fig. 1 Page 9.  
 5. Duration 0.5 m secs.  
 6. Commercial equivalents ACY 20 and ACY 21.

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## Primary Electrical Characteristics

Characteristic	$I_{CBO}$	$I_{CBO}$	$I_{CBO}$	$h_{FE}$		$V_{CE}$ (sat)	$V_{BE}$	$f_1$	F	$I_{EBO}$	
				CV7438	CV7439						
Unit	$\mu A$	$\mu A$	$\mu A$			mV	mV	Mc/s	dB	$\mu A$	
Min	-	-	-	50	90	-	-	0.6	-	-	
Max	10	100	80	130	250	200	380	10	16	20	
CONDITIONS	$T_{amb}$ °C	25	25	55	25	25	25	25	25	25	25
	$V_{CB}$ V	-6	-4.0	-6	0	0		0			
	$V_{CE}$ V								-6	-2	
	$V_{EB}$ V										-6
	$I_C$ mA				50	50	50	50	1	0.5	0
	$I_B$ mA						1.3				
	$I_E$ mA	0	0	0							
	f Kc/s									1	

Requirements:

Marking: K.1007, Section B, 1.3.4.

Quality Assurance Provisions:

Destructive Tests: The tests listed in Table 2, Group B Inspection, Sub-Groups 2, 3 and 4 and Table 3, Group C Inspection Sub-Group 2 are considered destructive.

Group C Inspection: This inspection shall be conducted on the initial lot, and thereafter every ninety days or every fifth lot, whichever occurs first.

Preparation for Delivery:

Packaging: The device shall be packed according to K.1007, Issue 3, Section A, 1.2(c). A.I.S. Size 6.

Joint Service Catalogue Numbers:

CV7438 = 5960-99-037-3498  
CV7439 = 5960-99-037-3499

This specification has been prepared by, and the Qualification Approval Authority is:-

Ministry of Aviation, Signals Research and Development Establishment,  
Christchurch, Hampshire, England.

2nd Aug. 1963

Table 1 GROUP A INSPECTION

Examination or Test	Test Conditions		AQL %	Insp. Level	Sym- bol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min	Max	
<u>SUB-GROUP 1</u> Visual and Mechanical Inspection.	5.1	Excluding Physical Dimensions	0.65	I				
<u>SUB-GROUP 2</u> Collector-Base Cut-Off Current (1).	7.2.5.1	$V_{CB} = -6V$ $I_E = 0$	0.65	II	$I_{CBO}$	-	10	$\mu A$
Collector-Base Cut-Off Current (2).	7.2.5.1	$V_{CB} = -4.0V$ $I_E = 0$			$I_{CBO}$	-	100	$\mu A$
Static Forward Current Transfer Ratio (1).	7.3.4	$I_C = 50mA$ $V_{CB} = 0V$						
		CV74.38			$h_{FE}$	50	130	
		CV74.39			$h_{FE}$	90	250	
Collector-Emitter Saturation Voltage.	7.3.3	$I_C = 50mA$ $I_B = 1.3mA$			$V_{CE (sat)}$	-	200	mV
<u>SUB-GROUP 3</u> Emitter-Base Cut-Off Current.	7.2.6	$V_{EB} = -10V$ $I_C = 0$	2.5	I	$I_{EBO}$	-	20	$\mu A$

Table 1 GROUP A INSPECTION (Cont'd)

Examination or Test	K1007/ NATO Ref.	Test Conditions.	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min	Max	
SUB-GROUP 3 (Cont'd) Base-Emitter Voltage	7.3.2	$I_C = 50 \text{ mA}$			$V_{BE}$	-	380	mV
		$I_B = 1.3 \text{ mA}$						
Cut-Off Frequency.		$V_{CE} = -6 \text{ V}$			$f_1$	0.6	3.5	Mc/s
		$I_C = 1 \text{ mA}$						
Noise Figure.		$V_{CE} = -2\text{V}, I_C = 0.5 \text{ mA}$			F	-	16	dB
		$R_{\text{Source}} = 500 \text{ ohms}, f = 1\text{Kc/s}$						
SUB-GROUP 4 Static Forward-Current Transfer Ratio (2).	7.3.4	As in Sub-Group 2.	4.0	IA				
		$T_{\text{amb}} = -55^\circ\text{C}$						
Collector-Base Cut-Off Current (3).		CV7438			$h_{FE}$	25		
		CV7439				45		
		$V_{CB} = -6\text{V}$					80	$\mu\text{A}$
		$I_C = 0$			$h_{FE}$			
		$T_{\text{amb}} = +55^\circ\text{C}$			$I_{CBO}$			

**Table 2 GROUP B INSPECTION**

Examination or Test	Test Conditions		AQI %	Insp. Level	Sym-bol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min	Max	
<u>SUB-GROUP 1</u> Physical Dimensions	5.1	According to drawings 10.3.2.2 and 10.4.2.2.	6.5	IC				
<u>SUB-GROUP 2</u> Solderability	5.13		4.0	IA				
Temperature Cycling	5.5	-55°C to +85°C						
Moisture Resistance	5.3.1							
<u>SUB-GROUP 3</u> Vibration Fatigue	5.15		4.0	I				
<u>SUB-GROUP 4</u> Lead Fatigue	5.10.2	2 cycles.	6.5	IA				
<u>SUB-GROUP 5</u> Omitted.								
<u>SUB-GROUP 6</u> Omitted.								

Table 2 GROUP B INSPECTION (Cont'd)

Examination or Test	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min	Max	
<u>SUB-GROUP 7</u> High Temperature Life (Non-operating).	6.2.1	$T_{stg} = +75^{\circ}C$ Duration = 1000 hours.	4.0	I				
	6.6.1.2.2							
<u>SUB-GROUP 8</u> Operating Life.	6.3	$T_{amb}$ at any single temperature between $25^{\circ}C$ and $65^{\circ}C$ with the corresponding $P_{tot}$ given on the derating curve Fig. 1, Page 9. $V_{CE} = -10 V$	4.0	IA				
	6.5 6.6.1.1 6.6.1.2.2							
<u>POST TEST END POINTS FOR SUB-GROUPS 2, 3, 7 and 8.</u> Collector-Base Cut-Off Current (1). Static Forward-Current Transfer Ratio (1).	7.2.5.1	As in Group A SUB-GROUP 2.			$I_{CBO}$	-	15	$\mu A$
	7.3.4	As in Group A SUB-GROUP 2. CV7438 CV7439			$h_{FE}$ $h_{FE}$	40 70	160 265	



Table 3 GROUP C INSPECTION

Examination or Test	Test Conditions		AQL %	Insp. Level	Sym-bol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min	Max	
<u>SUB-GROUP 1</u>								
Omitted.								
<u>SUB-GROUP 2</u>			6.5	IA				
Shock.	5.17	Non-operating. 5 blows in each of three mutually perpendicular planes.						
<u>POST TEST END POINTS</u>								
Collector-Base Cut-Off Current (1).	7.2.5.1	As in Group A, SUB-GROUP 2.			I <sub>CBO</sub>	-	15	μA
Static Forward Current Transfer Ratio (1).	7.3.4	As in Group A, SUB-GROUP 2.						
		CV7438			h <sub>FE</sub>	40	160	
		CV7439			h <sub>FE</sub>	70	265	

FIG. 1  
DERATING CURVE.

