

ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION CV7377-8

ISSUE NO.1 DATED 13.2.1963

AMENDMENT NO.1

Page 6, Sub Group 2

Under examination or test delete Thermal Shock
Under K1007/NATO Ref. delete 5.6.2

Ministry of Aviation/RRE

May, 1963

(175405)

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AMENDMENT NO. 2

Page 4, Sub group 3, I.F. Impedance:

Delete /140/220/ from min max limits column
Insert /110/210

September 1963
(39974)

Ministry of Aviation/RRE

MILITARY SPECIFICATION
CV7377-8
SEMICONDUCTOR DEVICE, DIODE
VX4180/1 (R.V.T.S.0018)

Description: This specification covers the detail requirements for Silicon Coaxial Mixer Diodes and is in accordance with Specification K1007, Issue 3, except where otherwise stated.

Mechanical Dimensions and Outline:

Section D, Appendix 1, Drawing D12A. (Note B)

Polarity:

Red mark on body indicates positive polarity of pin, CV7377,
Green mark on body indicates negative polarity of pin, CV7378.

Absolute Maximum Ratings:

Device	Rating	CW. Input (r.f.)	T _{stg}	T _{amb}	Shock	Vib.
	Unit	mW	°C	°C	g	g
VX4180-1	Min.	-	-55	-	-	-
	Max.	50	90	90	100	10
Note		A				

- Notes: A. The user is warned that the crystal can also be damaged by excessive voltage of an oscillatory nature.
- B. When plugged into a holder contact is made to the open face of the outer. The end of the pin Socket of the holder must not exceed 0.247 inches from the open end of the diode.

CV 7377-8

Primary Electrical Characteristics

Characteristics	Forward Resistance	Reverse Resistance	R_L	Overall Noise Factor	Overall Noise Factor	Low Freq. Noise	I_0	Freq. Range
Unit	Ohms	k Ohms	Ohms	dB	dB	dB	mA	k Mc/s
Min	-	10	-	-	-	-	-	-
Max	200	-	20	8.5	9.5	-127	3.5	12
Condition	$V_F=0.5V$	$V_R=-0.5V$						
Note			C	D,F	E,F	G		H

- Notes:
- C. Includes resistance of meter and of any filter network in series with diodes.
 - D. Not exceeding 25°C at 0.8mA
 - E. Not exceeding 100°C at 0.8mA
 - F. For i.f. amplifier noise factor of 2 dB. The overall noise factor applies when transmitter in operating, i.e. temporary deterioration is negligible with these crystals. This noise figure normally varies with frequency at the rate of 3 dB per octave.
 - G. The value quoted is given as carrier to noise ratio obtained with a rectified current of 3.5mA, measured at 9375 Mc/s within a 70 c/s bandwidth centred at 10 kc/s off carrier.
 - H. The normal rectifier admittance at a plane 0.247 inches from the open end of the diode (inside the body) at a rectified current of 3.0mA is:-

$$\frac{1}{67} (0.556 + j0.472) \text{mhos at } 9375 \text{ Mc/s}$$

Reliability Assurance Requirements: Under discussion.

Requirements:

Marking.

The device shall be marked first with a CV number and a polarity marking. The date code shall appear on multiple packs of 100 or more and the manufacturers code on individual packs. Additional marking as K1007, Issue 3, Section B.1.3.4. shall be on the packing.

Quality Assurance Provision

Destructive Tests

The tests listed in Table 2, Group B Inspection, Sub-Group 3 are considered destructive.

Preparation for Delivery

Packaging

The device shall be packed according to K1007, Issue 3, Section A, 1.2.(c). No lead shield is required.

Joint Services Catalogue Numbers

CV7377 = 5960-99-037-3339

CV7378 = 5960-99-037-3340

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

Ministry of Aviation, Royal Radar Establishment, Malvern, Worcs., England.

13th February, 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	5.1.2		0.65	I				
<u>SUB GROUP 2</u> Reverse Current	8A.2.2	$V_R = -0.5V$	0.65	II	I_R	-	10	μA
Noise Temperature Ratio	8B.3.2	L.O. = 9375 ± 500 Mc/s $I_0 = 0.8 \pm .05$ mA i.f. amplifier noise factor = 2dB Note 1, 3, 7.			N_T	-	8.5	dB
<u>SUB GROUP 3</u> Low Frequency Noise		r.f. input = $3 \pm 15\%$ mW Note 1, 4, 7.	2.5	I	N_{Lf}	-	-127	dB
Rectifier Admittance	8B.3.5	$f = 9375 \pm 25$ Mc/s				-	1.35	v.s.w.r.
i.f. impedance	8B.3.5	L.O. power = $3 \pm 15\%$ mW $f = 9375 \pm 100$ Mc/s L.O. power = $3 \pm 15\%$ mW i.f. frequency = 45 ± 15 Mc/s Note 1, 5, 7.			z_{if}	140	220	Ohms
Forward current	8A.3.1	$V_F = 0.5V$			I_F	4	-	mA

TABLE 1 GROUP A INSPECTION (Contd.)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS	AQL %	Insp. Level	Sym- bol	LIMITS		Units
						Min.	Max.	
<u>SUB GROUP 4</u>			10	IA				
<u>C.W. Power Test</u>		<p>Combined AQL -</p> <p>$f = 9375 \pm 25 \text{ Mc/s}$</p> <p>Note 1, 6, 7.</p>						
<u>Post C.W. Power Test</u>								
<u>Reverse Current</u>	8A.2.2				I_R	-	10	μA
<u>Noise Temperature Ratio</u>	8B.3.2	As in Sub Group 2.			N_T	-	8.5	dB
					ΔN	-	0.5	dB

TABLE 2 GROUP B INSPECTION
(See Quality Assurance Provisions, Page 3)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp. Level	Sym-bol	LIMITS		Units
		SPECIFIC CONDITIONS					Min.	Max.	
<u>SUB GROUP 1</u>				6.5	IC				
Physical Dimensions	5.1.2	According to Drawing D12A Section D, Appendix 1.		10	IA				
<u>SUB GROUP 2</u>									
Temperature Cycling	5.5	Combined AQL - 3 cycles -55°C to +100°C							
Thermal Shock	5.6.2	Max Temperature 35 ± 2°C							
Moisture Resistance	5.3.1.2	As in Group A							
<u>Post Temperature and Climatic Tests</u>									
Reverse Current	8A.2.2	Note 1, 3, 5, 7.				I _R	15		/ μ A
Noise Temperature Ratio	8B.3.2					N _r	9.0		dB
<u>SUB GROUP 3</u>						Δ N	0.5		dB
<u>Fatigue</u>									
<u>Post Fatigue Tests</u>									
Reverse Current	5.15.1	No Voltages							
Noise Temperature Ratio	8A.2.2	As in Group A							
Reverse Current	8B.3.2	Note 1, 3, 7.				I _R	15		/ μ A
Noise Temperature Ratio						N _r	9.0		dB
						Δ N	0.5		dB

TABLE 2 GROUP B INSPECTION (Cont'd).

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Sym-bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
<u>SUB GROUP 4</u> Tension	5.11	No Voltages	6.5	IA				
<u>Post Tension Tests</u> Reverse Current	8A.2.2	$V_R = -0.5V$ $V_F = +0.5V$			I_R I_F	15 4	15 -	μA mA
<u>SUB GROUP 5</u> Omitted								
<u>SUB GROUP 6</u> Omitted								
<u>SUB GROUP 7</u> High and Low Temperature (Non Operating)		Combined AQL -	10	IA				
High Temperature	6.2.1	No Voltages. $T_{amb} = +90^\circ C$				150	-	Hours
Low Temperature	6.2.2	No Voltages. $T_{amb} = -55^\circ C$				150	-	Hours
<u>Post High and Low Temperature Tests</u> Reverse Current	8A.2.2	$V_R = -0.5V$ $V_F = +0.5V$ As in Group A.			I_R I_F	4	15 -	μA mA
Noise Temperature Ratio	8B.3.2				N_r ΔN	-	9.0 0.5	dB dB

TABLE 2 GROUP B INSPECTION (Cont'd).

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
<u>SUB GROUP 8</u>			10	IA				
Life		Combined AQL -						
Life Test End point	6.3.2	50 c/s at 5mA rectified current Reverse Voltage not greater than 3V. As in Group A.					500	Hours
<u>Post Life Tests</u>								
Reverse Current	8A.2.2				I_R	15		/uA
Noise Temperature Ratio	8B.3.2				N_T ΔN	9.0 0.5		dB dB

NOTES

1. All standard holders shall conform to R.R.E. Drawing CTR.213278 (9375 Mc/s). The spread of admittance of these crystals in a holder designed for their use is better than 1.43 V.S.W.R. Test holders should give the same V.S.W.R. as the appropriate standard holders within $\pm 2\%$.
 Test and standard holders for use at 9375 Mc/s may alternatively be tested as follows. The crystal shall be replaced by a 67 ohm coaxial line with matched termination and the admittance measured with respect to a reference plane corresponding to a short circuit at a plane within the crystal body 0.247 inches from the open end. The normalised admittance at 9375 ± 25 Mc/s shall then be within limits defined by the following co-ordinates:- 1.755 - j0.805; 1.845 - j.805; 1.755 - j.895 and 1.845 - j0.895.
2. Crystals shall not be used as standards for measurement of any parameter, but may be used as transfer standards. The standard admittance shall be defined by holders supplied by the Approving Authority. Calibrated crystals will also be supplied for the noise factor test. (Note 3).
3. The Standard of reference shall be a noise tube type CV1881 assuming a noise level of 15.5 dB above thermal for a discharge current of 180 mA. Any approved method of measurement may be used with allowance for experimental error.
4. The low frequency noise power level shall be measured with an approved noise measuring equipment and measurements shall be made at 10 Kc/s $\pm 5\%$ from the carrier in a 70 c/s bandwidth. The results shall be expressed as ratio to the carrier power.
5. The Standard of reference shall be a RC7K resistor within the range 140 - 280 ohm mounted axially in a holder having the same socket dimensions as referred to page 1 'Dimensions', with Lead lengths less than 0.125 inch. The resistance shall be assumed equal to the d.c. value.
6. This Test shall be made at an r.f. power level of 50 mW for a period not less than 10 minutes.
7. Load Resistance 15 ohms max.
 Source Impedance 1.05 max. at signal and image frequencies.