MINISTRY OF SUPPLY - DLRD(A)/TRE

VALVE ELECTRONIC

CV2154

Specification MOS(A)/CV2154 Issue 4 Dated 12.2.53 To be read in conjunction with K1001	SECURITY Specification: UNCLASSIFIED Valve: UNCLASSIFIED

→ Indicates a change

TYPE OF VALVE - High Burn-out Silicon Crystal Diode.

FREQUENCY - The crystal is intended to be suitable for use as a mixer at frequencies up to 12000 Mc/s.

OPERATION - Best operating condition depends on the noise factor of the succeeding amplifier and the amount of excess local oscillator noise. In usual practice the rectified current should be 0.6 mA.

CONSTRUCTION - The crystal shall be pan-climatic within the temperature range -40°C to +100°C. The cat's whisker shall be connected to the inner contact.

POLARITY - The pin is equivalent to the cathode of a conventional diode.

PROTOTYPE - VX3053; VX4040.

MARKING

CV2154

Manufacturer's Code and Date Code.

Red mark on top to indicate polarity of the pin.

DIMENSIONS

See K1001/A1/D9.

Z.4498.R.

TESTS

To be performed in addition to those applicable in K1001

	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
a	Agreed compression and vibration conditions corresponding to those normally encountered in Service.	Stability			TA	
b	K1001/5C 3.3 Energy 0.3 erg.	Resistance to voltage breakdown Change in Noise Factor (db)	- -	 1.0	TA	1
c	Voltage 1.0 ± 2% applied with positive to pin negative to case.	Reverse Current (μA)	-	50	100%	
d	Frequency 9375 ± 10 Mc/s. Level of power incident on crystal to be such that crystal of average rectification efficiency gives 1 mA rectified current. Holder to be matched to crystal of average admittance. Bias resistance (including meter resistance) 15 ± 5 ohms.	Rectifier Admittance V.S.W.R. in standard holder	 -	 0.75 (1.33)	100%	2,7.
e	Frequency 9500 ± 500 Mc/s. Holder matched to crystal of average admittance. Source matched within V.S.W.R. of 0.95. Available power 0.65 mW. Bias resistance (including meter resistance) 15 ± 5 ohms.	Rectification Efficiency Average from sample (mA)	 0.9	 1.1	100% or S	3,7.
f	Frequency 3000 ± 3 Mc/s. Other conditions as Test (d).	Rectifier Admittance V.S.W.R. in standard holder	 -	 0.75 (1.33)	100% or S	2,3& 7

TESTS (Cont'd)

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	Test Conditions	Test	Limits Min.	Limits Max.	No. Tested	Note
g	Local Oscillator frequency 9500 ± 500 Mc/s. Rectified Current 1.0 mA (± 5%). Bias less than 20 millivolts. Holder to be of approved type matched to average crystal within 0.95 V.S.W.R. at signal and image frequencies. Noise Factor of I.F. Amplifier 2.0 db including any losses in crystal holder at intermediate frequency. Ambient Temperature 20 ± 5°C.	Noise Factor (db)	-	10.5	100%	4,7.
h	Waveguide source to be matched within 0.95 V.S.W.R. at signal and image frequencies. Local Oscillator power to be such that crystal of average rectification efficiency gives 1 mA rectified current. Other relevant conditions (local oscillator frequency, matching, bias as for Test (g). Frequency of measurement between 10 and 60 Mc/s.	Intermediate Frequency Admittance	280	420	100% or S	3,5&7

NOTES

1. Future issue of this Specification may require 100% proof testing at suitable level.

2. In production tests any type of holder which gives satisfactory matching as compared with the appropriate standard holder may be used. The recommended working limit is 0.8 V.S.W.R. In the event of dispute the limit of 0.75 V.S.W.R. will be applied with test in a standard holder.

   Other control tests, e.g. at lower level, or higher frequency may be used to different limits where approved. (See K1001/5C4).

3. See K1001/7.

4. 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. (See K1001/5C4).
   With Test Set XT97 the recommended working limit is 10.3 db, but the reject limit for final inspection on this Test Set will be 10.5 db.

NOTES (Cont'd)

5. The standard of reference will be an RC 7K resistor within the range 330 to 390 ohms, mounted axially in a holder having the same socket dimensions as a Crystal, Type CV2154 or CV2155. The lead lengths shall be less than 0.125 in. and the resistance will be assumed equal to the D.C. value.

6. The nominal rectifier admittance at a plane 0.247 ins back from the open end of the crystal (inside the body) is $\frac{1}{83.5} + \frac{j}{350}$ mhos, at a frequency of 9375 Mc/s and rectified current of 1 mA.

7. Crystals will not be used as standards for measurement of any paremeter, 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.