

MINISTRY OF SUPPLY - DLRD(A)/RRE

VALVE ELECTRONIC

CV 458

Specification MOS(A)/CV458 Issue 3 Dated 24.11.54 To be read in conjunction with K1001	<table> <tr> <th colspan="2"><u>SECURITY</u></th></tr> <tr> <th><u>Specification</u></th><th><u>Valve</u></th></tr> <tr> <td>UNCLASSIFIED</td><td>UNCLASSIFIED</td></tr> </table>	<u>SECURITY</u>		<u>Specification</u>	<u>Valve</u>	UNCLASSIFIED	UNCLASSIFIED
<u>SECURITY</u>							
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UNCLASSIFIED	UNCLASSIFIED						

→ Indicates a change

TYPE OF VALVE - Broad-band TR Cell		<u>MARKING</u>	
PROTOTYPE - VX9025		See K1001/4	
<u>RATING</u>		<u>DIMENSIONS AND CONNECTIONS</u>	
		Note	
Operating Frequency Range	(Mc/s)	9180 to 10000	
Max. Peak Power	(kW)	250	A
Min. Peak Power	(kW)	4	
Min. Primer Supply Voltage	(-V)	950	B
Max. Primer Current	(μA)	185	B
Min. Primer Current	(μA)	100	
		See Drawing on Page 5.	

NOTES

- A. With duty cycle not exceeding 0.001.
- B. The primer current shall be limited by series resistances, of which at least one megohm must be placed adjacent to the valve.

TESTS

To be performed in addition to those applicable in K1001

Test Conditions			Test	Limits		No Tested	Note
				Min.	Max.		
a	Primer Supply Voltage (V) 900	Test shall be performed at least 7 days after any previous discharge.	<u>Primer Breakdown (secs)</u> The delay shall be measured between application of primer voltage and breakdown	-	5	100%	1
b	1000	-	<u>Primer Operating Voltage (V)</u> The primer voltage shall be measured after breakdown has occurred.	180	280	100%	1
c	1000	Line shall be energised with not more than 10 mW RF and terminated in a load matched better than 1.02 VSWR	<u>VSWR</u> (i) Measured at frequencies of 9180, 9400, 9600, 9800, & 10,000 Mc/s. (ii) Measured over the frequency range of 9180 to 10 000 Mc/s.	-	1.20 1.25	100% 5%	1 1
d	1000	Valve shall be mounted between impedances matched better than 1.10 VSWR. Line to be energised with not more than 10 mW RF. Test frequency = 10.000 Mc/s.	Insertion Loss (db)	-	1.0	100%	1
e	1000	Line to be energised using 200W + 15% peak RF with PRF = 1000 c/s + 10% and terminated in a matched load. Total power shall be measured with $T_p = 1.0 \mu\text{sec} \pm 10\%$. Test frequency = 9375 ± 100 Mc/s. The apparatus used for this test must be approved.	<u>High Power Leakage</u> (1) Spiko Energy (erg/pulse) (2) Total Power (mW peak)	- 35	0.3 100	100% 100%	1, 2 3 & 4.

Test Conditions			Limits		No. Tested	Note
			Min.	Max.		
f	Primary Supply Voltage (V)					
	1000	<p>The test frequency of the simulated echo pulse shall be within the range 9180 to 10000 Mc/s, and its power, incident on the cell shall be less than 10mW peak RF.</p> <p>The test frequency of the transmitter pulse shall be 9375 ± 100 Mc/s. Line shall be energised with 200kW $\pm 15\%$ peak RF.</p> <p>PRF = 1000 c/s $\pm 10\%$</p> <p>Tp = 1.0 μsec $\pm 10\%$</p>	<p><u>Recovery Time (usecs)</u></p> <p>The time shall be measured from the trailing edge of the transmitter pulse for an insertion loss exceeding that immediately before the applied pulse by:</p> <p>(i) 6 db</p> <p>(ii) 2 db</p>		<p>3 5%</p> <p>8 5%</p>	1 & 5
g	1000	<p>Applied power shall be varied from 500mW to 100 watts.</p> <p>Tp = 1.0 μsec $\pm 10\%$</p> <p>Other conditions as for Test (e)</p>	<p><u>Low Power Leakage (mW peak)</u></p> <p>The total leakage through the cell shall be measured as the applied power is varied from 500 mW to 100 watts</p>		500 5%	1
h	1000	<p>Line to be energised at a convenient low power level.</p> <p>Test frequencies = 9180, 9600 and 10000 Mc/s.</p>	<p><u>Electrical Length (degrees)</u></p> <p>The length shall be determined of RCSC No. 16 Waveguide having the same effective electrical length as the cell. For a sampling test, the mean value of a sample of not less than 6 cells must lie within the limits given:</p> <p>(i) at 9180 Mc/s</p> <p>(ii) at 9600 Mc/s</p> <p>(iii) at 10000 Mc/s</p>		<p>216 236</p> <p>292 312</p> <p>360 380</p> <p>5% or 6 per week, whichever is the greater</p>	1 and 6
j	1000	As for Test (e)	<p><u>Position of Short (ins)</u></p> <p>The distance shall be measured of the effective RF short behind the front flange of the cell.</p>		0.014 0.028 TA	1

Test Conditions			Test	Limits		No. Tested	Note
				Min.	Max.		
k	Primary Supply Voltage (V) 1000	Line shall be energized with not more than 4 kW peak RF measured immediately after the cell. Other conditions as for Test (e)	Arc Loss (db)	-	0.8	TA	
m	1000	The cell shall be operated for one hour with the air pressure in the waveguide on the input side maintained at 30 lbs/sq. in. absolute. $T_p = 1.0 \mu\text{sec} \pm 10\%$. Other conditions as in Test (e)	High Pressure	-	-	TA	1

NOTES

- The primer supply voltage shall be DC having a peak-to-peak ripple voltage not exceeding 1% and shall be negative with respect to the body of the cell. The regulation of the supply shall be negligible at load currents up to 0.2 mA. The supply shall be connected to the primer electrode through resistances totalling 5.5 megohms $\pm 5\%$, of which at least one megohm must be placed adjacent to the valve.

- The high power leakage tests shall be performed using a Magnetron, Type CV2166.

- High power leakage may be measured by the two-pulse method, or other suitable methods using approved equipment. If the two-pulse method is used, the pulse lengths shall be approximately 0.1 (t_1) and 1.0 (t_2) microseconds. If the measured leakage powers are p_1 and p_2 microwatts, respectively:

(a) Spike Energy

With pulse length, t_1

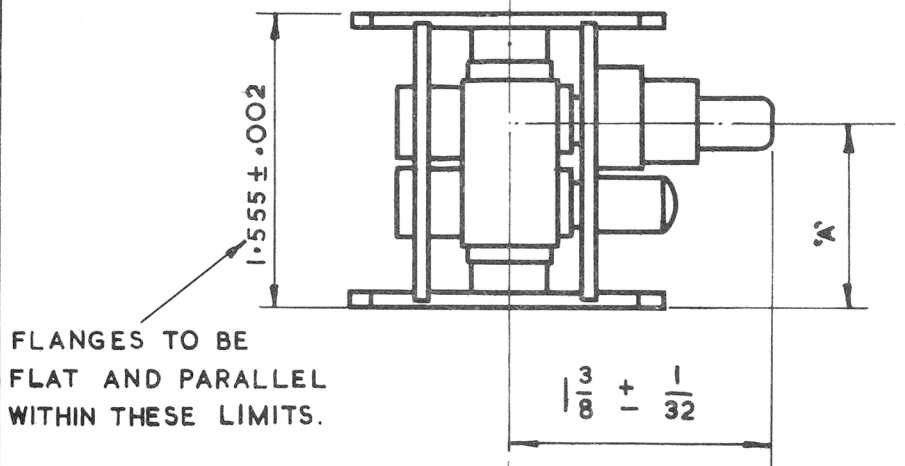
$$\text{Spike energy} = \frac{10p_1}{\text{FRF}} \text{ ergs/pulse}$$

(b) Total Power

With pulse length t_2

$$\text{Total power} = \frac{10^3 p_2}{\text{FRF} \times t_2} \text{ mW peak.}$$

- The minimum limit for total leakage is a manufacturing test limit applying to new cells only.
- The limits for recovery time are manufacturing limits applying to new cells only. The recovery time will change with life, and a cell is considered to have reached its end-of-life when the recovery time to 6 db exceeds 10 microseconds.
- If a sample of cells does not pass this test the whole of the batch shall be examined at the three frequencies. A cell shall then be accepted if its electrical length lies within ± 25 degrees of the mean figure at each frequency; otherwise it shall be rejected.



ALL DIMENSIONS IN INCHES

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