



M537A

X-BAND MAGNETRON

Service Type CV6108

The data should be read in conjunction with the Magnetron Preamble.

ABRIDGED DATA

Fixed frequency pulse magnetron

Frequency range	8770 to 8830	MHz
Typical peak output power	9.0	kW
Magnet		integral
Output	no. 16 waveguide (0.900 x 0.400 inch internal)	
Coupler	UG-40B/U (5985-99-083-0051)	
Cooling		forced-air

GENERAL

Electrical

Cathode		indirectly heated
Heater voltage (see note 1)	6.3	V
Heater current at 6.3V	0.5	A
Heater starting current, peak value, not to be exceeded	3.0	A max
Cathode heating time (minimum) (see note 2)	2	min

Mechanical

Overall dimensions	5.375 x 4.468 x 3.562 inches max 136.5 x 113.5 x 90.47mm max
Net weight	3¼ pounds (1.5kg) approx
Mounting position	any

A minimum clearance of 2 inches (50mm) must be maintained between the magnet and any magnetic materials.

Cooling (see note 7)	forced-air
----------------------	------------

February 1970

MAXIMUM AND MINIMUM RATINGS (Absolute values)

These ratings cannot necessarily be used simultaneously, and no individual rating should be exceeded.

	Min	Max	
Heater voltage	5.7	7.0	V
Heater starting current (peak)	—	3.0	A
Anode voltage (peak)	—	6.0	kV
Anode current (peak)	3.5	5.5	A
Input power (peak)	—	33	kW
Input power (mean) (see note 3)	—	82.5	W
Duty cycle (see note 4)	—	0.0025	
Pulse length (see note 4)	—	2.5	μ s
Rate of rise of voltage pulse (at 4.5A peak anode current) (see note 6)	—	75	kV/ μ s
Anode temperature (see note 7)	—	140	°C
V.S.W.R. at the output coupler	—	1.5:1	
Altitude	—	10 000	ft
	—	3.05	km

TYPICAL OPERATION

Operational Conditions

Heater voltage	5.4	V
Anode current (peak)	4.5	A
Pulse length	1.0	μ s
Pulse repetition rate	1000	p.p.s.

Typical Performance

Anode voltage (peak)	5.5	kV
Output power (peak)	9.0	kW
Output power (mean)	9.0	W

TEST CONDITIONS AND LIMITS

The valve is tested to comply with the following electrical specification

Test Conditions

	Oscillation 1	Oscillation 2	
Heater voltage (for test)	4.5	6.3	V
Anode current (mean)	9.0	4.5	mA
Duty cycle	0.002	0.001	
Pulse length (see note 5)	1.0	2.0	μs
V.S.W.R. at the output coupler (maximum)	1.05:1	1.05:1	
Rate of rise of voltage pulse (see note 6)	75	75	kV/μs

Limits

	Min	Max	Min	Max	
Anode voltage (peak)	5.3	5.7	—	—	kV
Output power (mean)	16	—	—	—	W
Frequency (see note 8)	8770	8830	—	—	MHz
R.F. bandwidth (see note 9)	—	2.5	—	1.25	MHz
Frequency pulling (see note 10)	—	15	—	—	MHz
Stability (see note 11)	—	0.25	—	0.25	%
Cold impedance	see note 12				
Heater current	see note 13				
Temperature coefficient of frequency	see note 14				

LIFE TEST

The quality of all production is monitored by the random selection of valves which are then life-tested under Oscillation 2 Test Conditions above. If the valve is to be operated under conditions other than those specified herein, English Electric Valve Company Ltd. should be consulted to verify that the life of the valve will not be impaired.

End of Life Criteria (under Test Conditions Oscillations 1 and 2)

	Oscillation 1	Oscillation 2	
Output power (mean)	12.5	—	W min
R.F. bandwidth at ¼ power (anode current 7.5mA mean)	3.0	—	MHz max
Frequency: must be within Test Limits above, Oscillation 1			
Stability	—	1.0	% max

NOTES

1. With no anode input power.

For average pulse input powers greater than 25 watts the heater voltage shall be reduced within 3 seconds after the application of h.t. according to the following schedule:

$$V_h = 6.3 \left[1 - \frac{P_i}{180} \right] \pm 0.6 \text{ volts}$$

where P_i = mean input power in watts.

The valve heater shall be protected against arcing by the use of a minimum capacitance of 4000pF shunted across the heater directly at the input terminals; in some cases a capacitance as high as $2\mu\text{F}$ may be necessary depending on the equipment design. For further details see the preamble to this section.

2. For ambient temperatures above 0°C . For ambient temperatures between 0 and -55°C the cathode heating time is 3 minutes minimum.
3. The various parameters are related by the following formula:

$$P_i = i_{apk} \times v_{apk} \times D_u$$

where P_i = mean input power in watts

i_{apk} = peak anode current in amperes

v_{apk} = peak anode voltage in volts

and D_u = duty cycle.

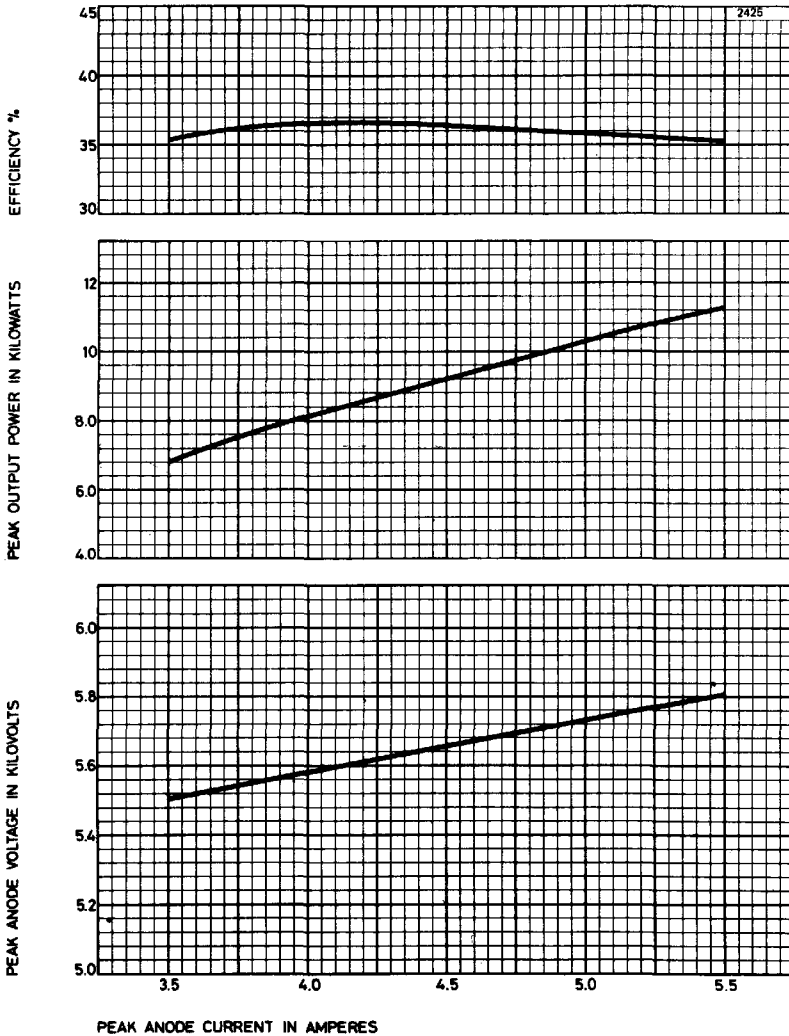
4. These ratings apply only for equally spaced pulses.
5. Tolerance $\pm 10\%$.
6. Defined as the slope of the steepest tangent to the leading edge of the voltage pulse above 80% amplitude. Any capacitance in the viewing system must not exceed 6.0pF.
7. The anode temperature measured at the point indicated on the outline drawing must be kept below the limit specified by means of a suitable flow of air over the anode body and waveguide attachment brackets which serve as cooling fins.
8. With anode temperature $40^\circ\text{C} \pm 10^\circ\text{C}$ measured at the point indicated on the outline drawing.
9. The bandwidth is measured at $\frac{1}{4}$ power points. The side lobes will be at least 6db down.
10. Measured with a v.s.w.r. greater than 1.5:1 in all phases of the mis-

match. Frequency pulling is the maximum variation in frequency as the mismatch is varied through all phases.

11. Pulses are defined as missing when the r.f. energy level is less than 70% of the normal energy level in the frequency range 8770 to 8830MHz. Missing pulses are expressed as a percentage of the number of input pulses applied during any consecutive 5 minute interval of a 15 minute test period.
12. When a signal of the same frequency as the magnetron operating frequency is fed into the valve, a standing wave is produced in the feeder system. The v.s.w.r. is tested to be greater than 8:1.
13. Measured with heater voltage of 6.3V and no anode input power, the heater current limits are 0.43A minimum, 0.60A maximum.
14. Design test only. The maximum frequency change with anode temperature change (after warm-up) is $-0.25\text{MHz}/^{\circ}\text{C}$.

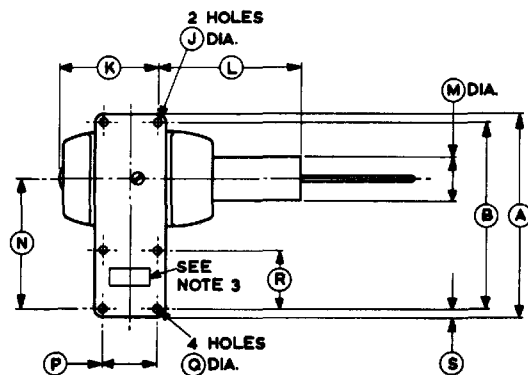
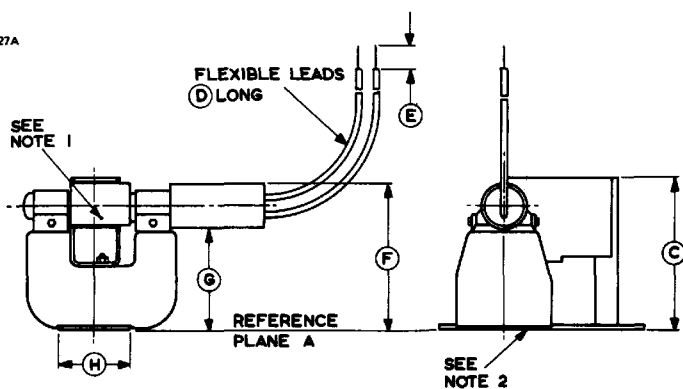


TYPICAL PERFORMANCE CHART



OUTLINE

2427A



Lead Connections

Colour	Element
Yellow	Heater
Green	Heater, Cathode

Outline Dimensions (All dimensions without limits are nominal)

Ref	Inches	Millimetres
A	4.468 max	113.5 max
B	4.103 ± 0.004	104.216 ± 0.102
C	3.562 max	90.47 max
D	6.000 min	152.4 min
E	0.500	12.70
F	3.325 max	84.46 max
G	2.225 min	56.52 min
H	1.640 max	41.66 max
J	0.175 ± 0.003	4.445 ± 0.076
K	2.390 max	60.71 max
L	3.187 max	80.95 max
M	1.250 max	31.75 max
N	2.937 ± 0.250	74.60 ± 6.35
P	1.220 ± 0.004	30.988 ± 0.102
Q	0.170 ± 0.003	4.318 ± 0.076
R	1.280 ± 0.004	32.512 ± 0.102
S	0.187 max	4.75 max

Millimetre dimensions have been derived from inches.

Outline Notes

1. Anode temperature to be measured at this point.
2. The flatness of the mounting plate will be such that with the valve resting on a plane surface a feeler gauge 0.015 inch (0.38mm) thick and 0.125 inch (3.18mm) wide will not enter more than 0.125 inch (3.18mm) at any point.
3. The position of the waveguide and fixing holes will be such that the magnetron operates into coupler type UG-40B/U (5985-99-083-0051).