



# product bulletin

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## 2J42A X-Band Magnetron

### GENERAL DESCRIPTION

2J42A is a fixed frequency pulsed X-band magnetron, designed to operate in the frequency range of 9345 to 9405 MHz with a peak output power of 20 kW. It is packaged and waveguide output type and forced or natural air cooled.

### GENERAL CHARACTERISTICS

#### Electrical

Heater voltage (see note 1) .....	6.3 V
Heater current .....	0.52 A
Minimum preheat time .....	120 s

#### Mechanical

Dimensions .....	per outline drawing
Net weight .....	2.3 kg approximately
Mounting position .....	any
Cooling (see note 5) .....	forced air or natural
Output coupling .....	UG-40/U

### MAXIMUM AND MINIMUM RATINGS (Absolute)

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

	Min	Max	Unit
Heater voltage (see note 1)	—	6.9	V
Peak anode voltage	6.0	8.0	kV
Peak anode current	3.5	8.0	A
Peak anode power input	21	64	kW
Average anode power input (see note 2)	—	80	W
Duty cycle	—	0.0025	
Pulse duration (see note 3)	—	2.5	$\mu$ s
Rate of rise of voltage pulse (see note 4)	—	60	kV/ $\mu$ s
Anode temperature (see note 5)	—	120	$^{\circ}$ C
V.S.W.R. at the output coupler	—	10000	ft
Altitude:	—	3.0	km

### TYPICAL OPERATION

Operational Conditions	Condition	Unit
Heater voltage	4.6	V
Peak anode current	7.0	A
Pulse duration	1.0	$\mu$ s
Pulse repetition rate	1000	p.p.s.
<b>Typical Performance</b>		
Peak anode voltage	6.9	kV
Peak output power	20	kW
Average output power	20	W

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## TEST CONDITIONS AND LIMITS

The tube is tested to comply with the following electrical specification.

Test Conditions	Oscillation 1		Oscillation 2		Unit
	Min	Max	Min	Max	Units
Heater voltage (operating)		4.4		6.3	V
Average anode current		7.5		2.25	mA
Duty cycle		0.001		0.0003	
Pulse duration (see note 3)		1.0		0.1	$\mu$ s
V.S.W.R. at the output coupler		1.15:1		1.15:1	
Rate of rise of voltage pulse (see note 4)		60		80	kV/ $\mu$ s
Limits	Min	Max	Min	Max	Units
Peak anode voltage	6.4	7.2	—	—	kV
Average output power	18	—	—	—	W
Frequency	9345	9405	—	—	MHz
R.F. bandwidth at 1/4 power	—	2.5/tp	—	2.5/tp	MHz
Frequency pulling (v.s.w.r. not less than 1.5:1)	—	15	—	—	MHz
Stability (see note 6)	—	0.25	—	1.0	%
Heater current					see note 7
Temperature coefficient of frequency					see note 8

## LIFE TEST

End of Life Performance (under Test Conditions Oscillation 1)

The tube is deemed to have reached end of life when it fails to satisfy the following:

Peak anode voltage	13.5 kW min
R.F. bandwidth at 1/4 power	3 MHz max
Frequency	9345 MHz min 9405 MHz max
Stability (see note 6)	1.0% max

## NOTES

1. With no anode input power.

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

$$E_f = 6.3 \left( 1 - \frac{P_i}{180} \right) \text{ volts}$$

where  $P_i$  = mean input power in watts

2. The various parameters are related by the following formula:

$$P_i = i_b \times e_{py} \times Du$$

where  $P_i$  = mean input power in watts

$i_b$  = peak anode current in amperes

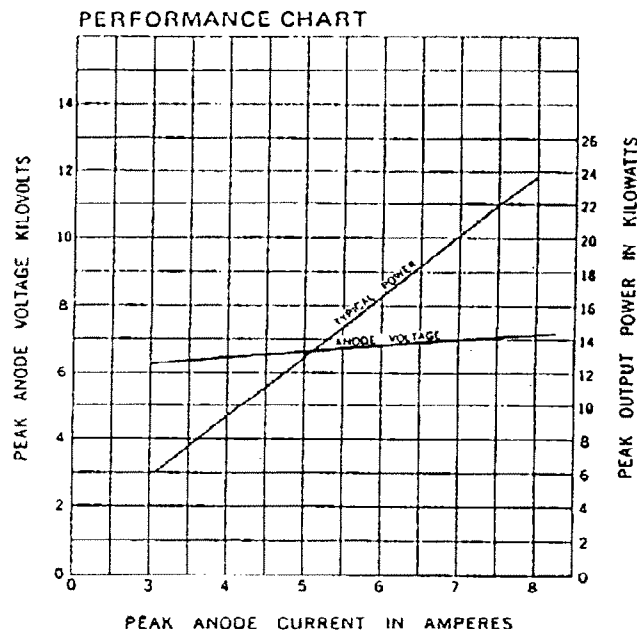
$e_{py}$  = peak anode voltage in volts

$Du$  = duty cycle

3. Tolerance  $\pm 10\%$ .

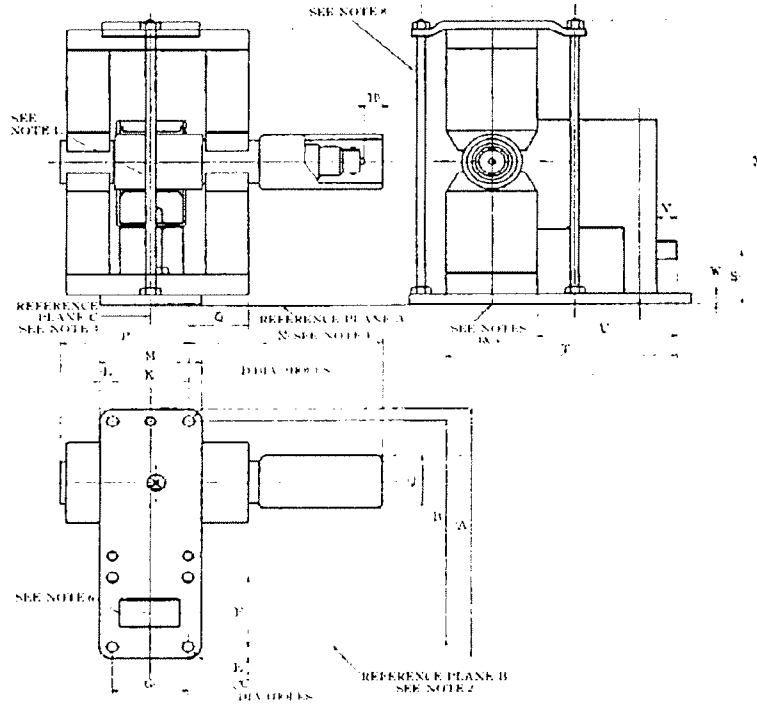
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4. Defined as steepest tangent to leading edge of voltage pulse above 80% amplitude. Any capacitance in viewing system must not exceed 6.0 pF.
5. The anode temperature measured at the point indicated on the outline drawing must be kept below the limit specified by means of a suitable flow of air over the anode body and waveguide attachment brackets which serve as cooling fins.
6. With the tube operating into a v.s.w.r. of 1.5:1 phased to give maximum instability. Pulses are defined as missing when the r.f. energy level is less than 70% of normal energy level in a 0.5% frequency range. Missing pulses are expressed as a percentage of the number of input pulses applied during the period of observation after a period of 10 minutes.
7. Measured with heater voltage of 6.3 V and no anode input power, the heater current limits are 0.43 A minimum, 0.6 A maximum.
8. Design test only. The maximum frequency change with anode temperature change (after warming) is  $-0.25$  MHz/ $^{\circ}$ C.



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OUTLINE



Outline Dimensions (All dimensions without limits are nominal)

Ref	Inches	Millimeters	Ref	Inches	Millimeters
A	4.469max	113.5max	M	1.625 + 0.016	41.28 + 0.41
B	4.103 + 0.004	104.216 + 0.102	N	3.187max	80.95max
C	0.170 + 0.004	4.318 + 0.076	P	2.187max	55.55max
D	0.175 + 0.003	4.445 + 0.076	Q	1.187max	30.16max
E	0.172 + 0.016	4.37 + 0.41	S	0.875 + 0.125	22.22 + 3.18
F	1.280 + 0.004	32.512 + 0.102	T	4.000max	101.6max
G	1.220 + 0.004	30.988 + 0.102	U	1.938max	49.21min
H	0.250max	6.35max	V	0.375max	9.53max
J	1.000max	25.40max	W	0.125	3.18
K	1.220 + 0.004	30.988 + 0.102	X	5.250max	133.4max
L	0.203 + 0.016	5.16 + 0.41			

Outline Notes

1. Reference plane "A" lies on bottom surface of mounting plate.
2. Reference plane "B" passes through the centers of the two top holes of the mounting plate as shown and is perpendicular to planes "A".
3. Reference plane "C" intersects plane "B" at the center of the mounting plate hole as shown, and is perpendicular to planes "A" and "B".
4. With bottom surface of mounting plate resting on a flat surface, a feeler guage 0.508 (0.02 inch) thick and 3.18 (0.125 inch) wide shall not enter more than 3.18 (0.125 inch) at any point.
5. All metal surfaces except bottom surface of mounting plate shall be painted.
6. The position of the waveguide and fixing holes will be such that the valve operates into coupler type UG-40 B/U.
7. Anode temperature measured at this point.
8. Recommended direction of air flow.