



product bulletin

2J55

X-BAND MAGNETRON

GENERAL DESCRIPTION

The 2J55 is a fixed frequency pulsed type X-band magnetron designed to operate in the frequency range of 9345 to 9405 MHz with a peak output power of 50 KW. It is packaged and waveguide output type and forced air cooled.

GENERAL CHARACTERISTICS

Electrical

Heater voltage (see note 1).	. . . . .	6.3 V
Heater current . . . . .	. . . . .	1.0 A
Minimum preheat time . . . . .	. . . . .	120 sec.

Mechanical

Dimensions . . . . .	. . . . .	per outline drawing
Net weight . . . . .	. . . . .	1.9 Kg approximately
Mounting position . . . . .	. . . . .	any
Cooling (see note 5) . . . . .	. . . . .	forced air
Output coupling . . . . .	. . . . .	UG-52 B/U

MAXIMUM AND MINIMUM RATINGS (Absolute)

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

	<u>Min.</u>	<u>Max.</u>	<u>Units</u>
Heater voltage (see note 1)	5.7	7.0	V
Peak anode voltage	---	16	KV
Peak anode current	---	16	A
Peak anode power input	---	230	KW
Average anode power input (see note 2)	---	180	W
Duty cycle	---	0.001	
Pulse duration (see note 3)	---	2.5	μsec
Rate of rise of voltage pulse (see note 4)	---	150	KV/μsec
Anode temperature (see note 5)	---	150	°C
V.S.W.R. at the output coupler	---	1.5:1	
Stressing of waveguide	---	45	lb/in ²
	---	3.2	Kg/cm ²

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**We have
 moved &
 our new
 address is:**

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 E. RUTHERFORD, NEW JERSEY 07073
 PHONE: (201) 460-8800

TYPICAL OPERATION

Operational Conditions

Heater voltage	0 V
Peak anode current	12 A
Pulse duration	1.0 μ s
Pulse repetition rate	1000 p.p.s.
Rate of rise of voltage pulse	1000 KV/ μ s

Typical Performance

Peak anode voltage	12.5 KV
Peak output power	50 KW
Average output power	50 W

TEST CONDITIONS AND LIMITS

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

<u>Test Condition</u>	<u>Oscillation 1</u>	<u>Oscillation 2</u>	<u>Units</u>
Heater voltage (operating)	0	2.5	V
Average anode current	12	8.0	mA
Duty cycle	0.001	0.00065	
Pulse duration (see note 3)	1.0 \pm 10%	2.0 (min.)	μ s
V.S.W.R. at the output coupler (max.)	1.5:1	1.5:1	
Rate of rise of voltage pulse (max.) (see note 4)	100	100	KV/ μ sec

<u>Limits</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Units</u>
Peak anode voltage	11	13	---	---	KV
Average output power	42	---	---	---	W
Frequency	9345	9405	---	---	MHz
R.F. bandwidth at $\frac{1}{2}$ power	---	3	---	1.25	MHz
Frequency pulling (v.s.w.r. not less than 1.5:1)	---	18	---	---	MHz
Stability (see note 6)	---	0.6	---	0.6	%
Heater current					see note 7
Temperature coefficient					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:

Average output power	30 W min.
R.F. bandwidth at ½ power	3.0 MHz max.
Frequency range	9345 to 9405 MHz
Stability (see note 6)	1.0% max.

NOTES:

1. With no anode input power.
For average pulse input powers less than 150 watts the heater voltage must be reduced within 3 seconds after the application of h.t. according to the following schedule:

$$E_f = 6.3 \sqrt{1 - \frac{P_i}{180}} \text{ volts}$$

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

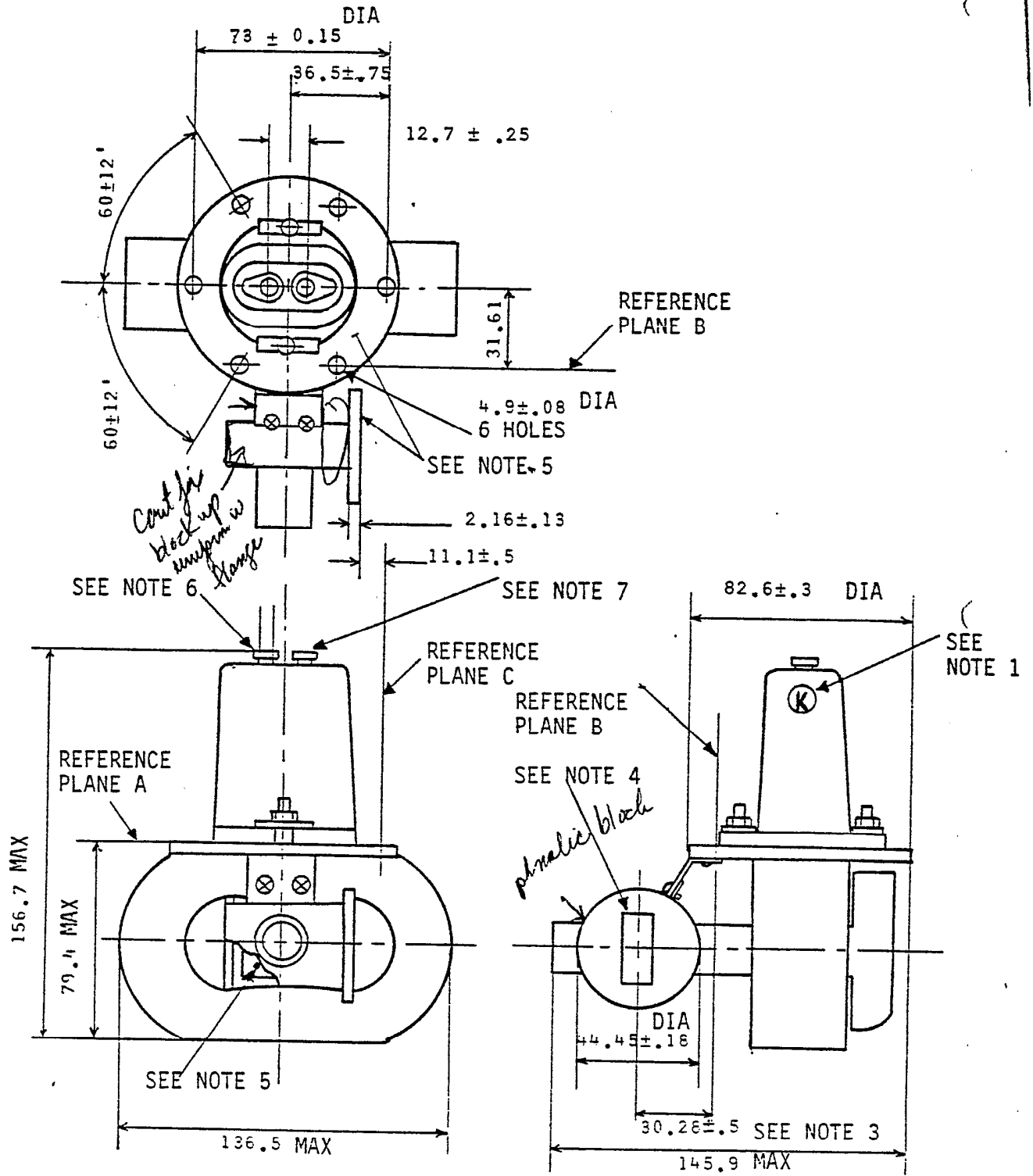
i_b = peak anode current in amperes

e_{py} = peak anode voltage in volts

Du = duty cycle

3. Tolerance $\pm 10\%$.
4. Defined as steepest tangent to leading edge of voltage pulse above 80% amplitude. Any capacitance in the 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 cooling fins.
6. With the tube operating into a v.s.w.r. of 1.5:1 phased to give maximum instability. Pulse 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 0.9 A minimum, 1.1 maximum.
8. Design test only. The maximum frequency change with anode temperature change (after warming) is $-0.25\text{MHz}/^\circ\text{C}$.

OUTLINE M1348



OUTLINE NOTES

1. Common cathode connection is indicated by letter "K".
2. All metal surfaces except bottom surface of mounting plate and nylon cover shall be painted.
3. Output flange will be concentric with open end of waveguide to within 0.25mm.
4. 31.75 X 15.88 mm external dimension X 1.63mm wall commercial rectangular waveguide.
5. This surface will be free from paint.
6. Heater connection.
7. Cathode connection.



2J55 X-Band Magnetron

GENERAL DESCRIPTION

2J55 is a fixed frequency pulsed type X-band magnetron designed to operate in the frequency range of 9345 to 9405 MHz with a peak output power of 50 kW. It is packaged and waveguide output type and forced air cooled.

GENERAL CHARACTERISTICS

Electrical

Heater voltage (see note 1)	6.3 V
Heater current	1.0 A
Minimum preheat time (see note 9)	120 s

Mechanical

Dimensions	per outline drawing
Net weight	1.9 kg approximately
Mounting position	any
Cooling (see note 5)	forced air
Output coupling	UG-52 B/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)	5.7	6.9	V
Peak anode voltage	—	16	kV
Peak anode current	—	16	A
Peak anode power input	—	230	kW
Average anode power input (see note 2)	—	180	W
Duty cycle	—	0.001	
Pulse duration (see note 3)	—	2.5	μ s
Rate of rise of voltage pulse (see note 4)	—	100	kV/ μ s
Anode temperature (see note 5)	—	100	$^{\circ}$ C
V.S.W.R. at the output coupler	—	1.5:1	
Pressurizing of waveguide	—	45	lb/in ²
	—	3.2	kg/cm ²

TYPICAL OPERATION

Operational Conditions

Heater voltage	0 V
Peak anode current	12 A
Pulse duration	1.0 μ s
Pulse repetition rate	1000 p.p.s.
Rate of rise of voltage pulse	100 kV/ μ s

Typical Performance

Peak anode voltage	12 kV
Peak output power	50 kW
Average output power	50 W

TEST CONDITIONS AND LIMITS

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

Test Conditions	Oscillation 1	Oscillation 2	Unit
Heater voltage (operating)	0	2.5	V
Average anode current	12	8.0	mA
Duty cycle	0.001	0.00065	
Pulse duration (see note 3)	1.0	2.0	μ s
V.S.W.R. at the output coupler (max)	1.1:1	1.1:1	
Rate of rise of voltage pulse (max) (see note 4)	100	100	kV/ μ s

Limits	Min	Max	Min	Max	Unit
Peak anode voltage	11	13	—	—	kV
Average output power	40	—	—	—	W
Frequency	9345	94405	—	—	MHz
R.F. bandwidth at 1/4 power	—	3	—	1.25	MHz
Frequency pulling (v.s.w.r. not less than 1.5:1)	—	18	—	—	MHz
Stability (see note 6)	—	0.6	—	0.6	%
Heater current					see note 7
Temperature coefficient					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:

Average output power	30 W min
R.F. bandwidth at 1/4 power	3.0 MHz max
Frequency range	9345 to 9405 MHz
Stability (see note 6)	1.0% max

NOTES:

1. With no anode input power.

For average pulse input powers less than 150 watts the heater voltage must be reduced within 3 seconds after the application of h.t. according to the following schedule:

$$E_f = 6.3 \sqrt{1 - \frac{P_i}{150}} \text{ volts}$$

where P_i = mean input power in watts.

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

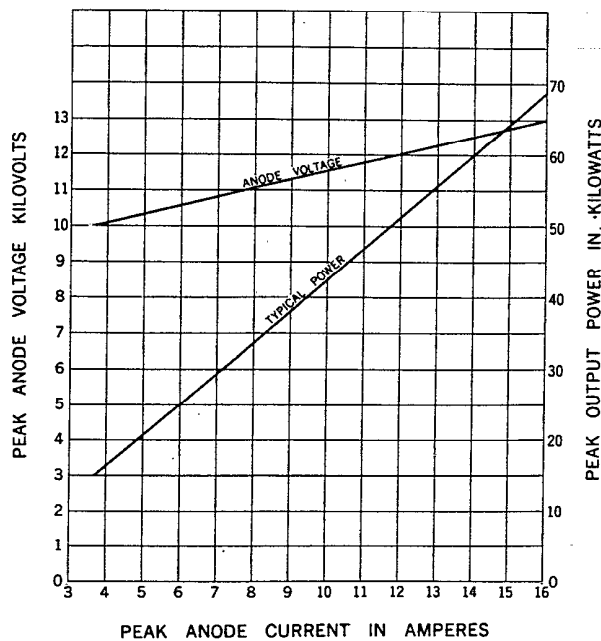
$$P_i = i_b \times e_{py} \times D_u$$

where P_i = mean input power in watts
 i_b = peak anode current in amperes
 e_{py} = peak anode voltage in volts
 D_u = duty cycle

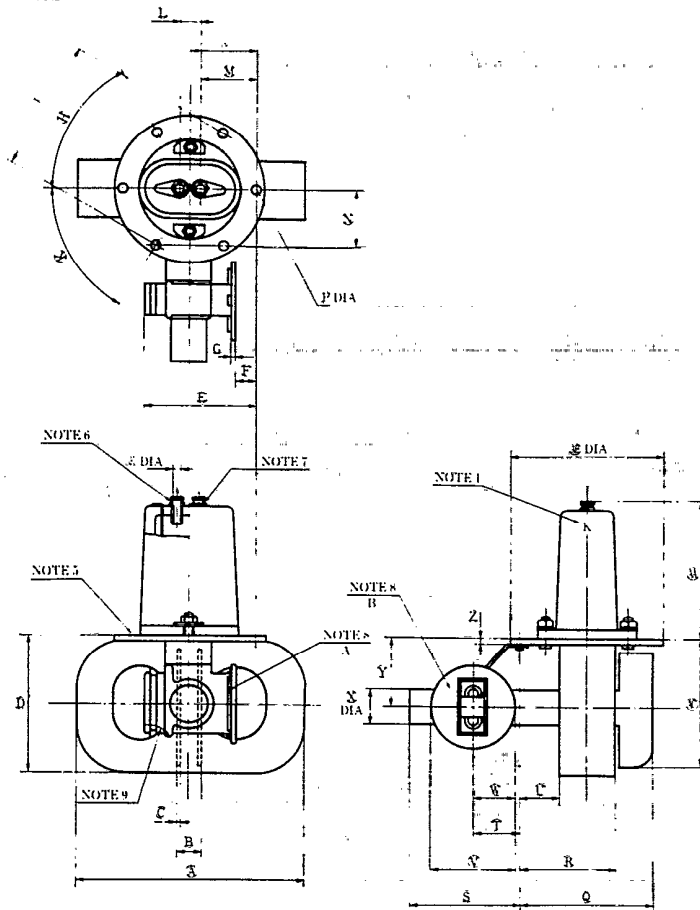
3. Tolerance $\pm 10\%$.

4. Defined as steepest tangent to leading edge of voltage pulse above 80% amplitude. Any capacitance in the 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 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 0.9 A minimum, 1.1 A maximum.
8. Design test only. The maximum frequency change with anode temperature change (after warming) is $-0.25 \text{ MHz}/^\circ\text{C}$.
9. For ambient temperatures above 0°C . For ambient temperatures between 0 and -55°C the cathode heating time is 3 minutes minimum.

PERFORMANCE CHART



OUTLINE



OUTLINE DIMENSIONS (All dimensions without limit are nominal.)

Ref	Max (mm)	Min (mm)	Ref	Max (mm)	Min (mm)
A	136.5		R		52.3
B	12.7		S	67.6	
C		1.6	T	30.78	29.78
D	79.4		U		11
E	63.5		V	44.63	44.27
F	11.6	10.6	W	22.385	22.065
G	2.29	2.03	X		19.1
H	60°12'	59°48'	Y	40.18	39.18
J	73.15	72.85	Z	3.33	3.07
K	60°12'	59°48'	AA	77.3	74.3
L	12.95	12.45	AB	83.4	81.8
M		30.15	AC	75.4	
N		31.61	AD	37.25	35.75
P	4.98	4.82	AE	4.43	4.17
Q	69.7				

Outline Notes:

1. Common cathode connection is indicated by letter "K".
2. All metal surfaces except bottom surface of mounting plate and nylon cover shall be painted.
3. Output flange will be concentric with open end of waveguide to within 0.25 mm.
4. 31.75 x 15.88 mm external dimension x 1.63 mm wall commercial rectangular waveguide.
5. This surface will be free from paint.
6. Heater connection.
7. Cathode connection.
8. Surfaces A, B and interior surfaces of waveguide is alodine disposition.