JRC product bulletin

M 1 4 6 1 *S-Band Magnetron*

GENERAL DESCRIPTION

M1461 is a fixed frequency pulsed type S-band magnetron, desined to operate in the frequency range of 3025 to 3075 MHz with a peak output power of 50 kW.It is waveguide output type and conduction cooled. A permanent magnet is packaged as part of the magnetron. It is recommended to use our TL378A as adequate protector for this magnetron.

GENERAL CHARACTERISTICS

Electrical

Heater voltage (see note 1) ..... 6.3 V
Heater current ..... 1.3 A
Minimum preheat time ..... 180 s

Mechanical

Dimensions ..... per outline drawing
Net weight ..... 4.3 kg approximately
Mounting position ..... any
Cooling (see note 5) ..... conduction cooling or forced air.
Output coupling J.S.C.No.5986-99-083-0058

MAXIMUM AND MINIMUM RATINGS (Absoulte)

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	–	9.5	kV
Peak anode current	–	18	A
Peak anode power input	–	170	kW
Average anode power input (see note 2)	–	170	W
Duty cycle	–	0.001	
Pulse duration (see note 3)	–	2.0	μs
Rate of rise of voltage pulse (see note 4)	–	130	kV/μs
Anode temperature (see note 5)	–	120	°C
V.S.W.R. at the output coupler	–	1.5:1	

TYPICAL OPERATION

Operational Conditions	Condition 1	Condition 2	Unit
Heater voltage	6.3	4.5	V
Peak anode current	16.0	16.0	A
Pulse duration	0.07	1.0	μs
Pulse repetition rate	4000	1000	p.p.s.
Rate of rise of voltage pulse	130	130	kV/μs
Typical Performance			
Peak anode voltage	9.0	9.0	kV
Peak output power	53	53	KW
Average output power	14.8	53	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)	3.1	6.3	V
Average anode current	16.0	4.5	mA
Duty cycle	0.001	0.00028	
Pulse duration (see note 3)	1.0	0.07	μs
V.S.W.R. at the output couple	1.15:1	1.15:1	
Rate of rise of voltage pulse (see note 4)	130	130	kV/μs

Limits	Min	Max	Min	Max	Unit
Peak anode voltage	8.5	9.5	–	–	kV
Average output power	50.0	–	14	–	W
Frequency	3025	3075	–	–	MHz
R.F. bandwidth at 1/4 power	–	2.0	–	36	MHz
Minor lobe	6.0	–	–	–	dB
Frequency pulling (v.s.w.r. not less than 1.5:1)	–	13.0	–	–	MHz
Stability (see note 6)	–	0.5	–	0.5	%
Frequency pushing (see note 9)	–	1.5	–	–	MHz/A
Cold impedance					see note 7
Heater current					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:

	Min	Max	Unit
Average output power	40	–	W
R.F. bandwidth at 1/4 power	–	2.5	MHz
Frequency	3025	3075	MHz
Stability (see note 6)	–	2.0	%

NOTES:

1. With no anode input power.
   For average pulse input powers greater than 28 watts, the heater voltage must be reduced within 3 seconds after the application of h.t. according to the following schedule:

$$Ef = 6.3\sqrt{1 - Pi/200} \quad (Volt) \pm 10\ \%$$

Ef : Heater Voltage (V)
Pi : Mean input power (W)

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 ± 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 must be kept below the limit specified by means of a suitable flow of air over the anode body.

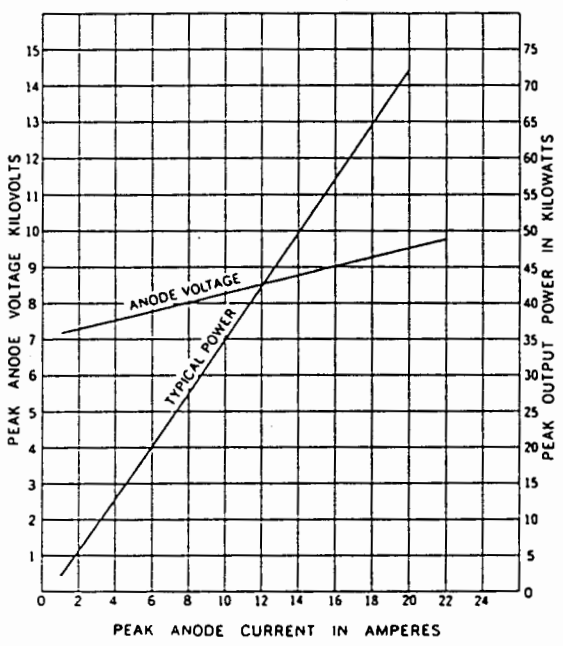
6. With the tube operating into a v.s.w.r. of 1.5:1 phased to give maximum instability. Pulses are defined as missing when the r.f. energy level is less than 70% of normal energy level in a 0.5% frequency range. Missing pulses are expressed as a percentage of the number of input pulses applied during the period of observation after a period of 10 minutes.

7. For the range 3025 to 3075 MHz the impedance of the tube measured at the operating frequency when not oscillating will be such as to give a v.s.w.r. of at least 10:1 with a minimum 90 to 120 mm from the output flange away from the anode.

8. Measured with heater voltage of 6.3 V and no anode input power, the heater current limits are 1.1 A minimum, 1.4 A maximum.

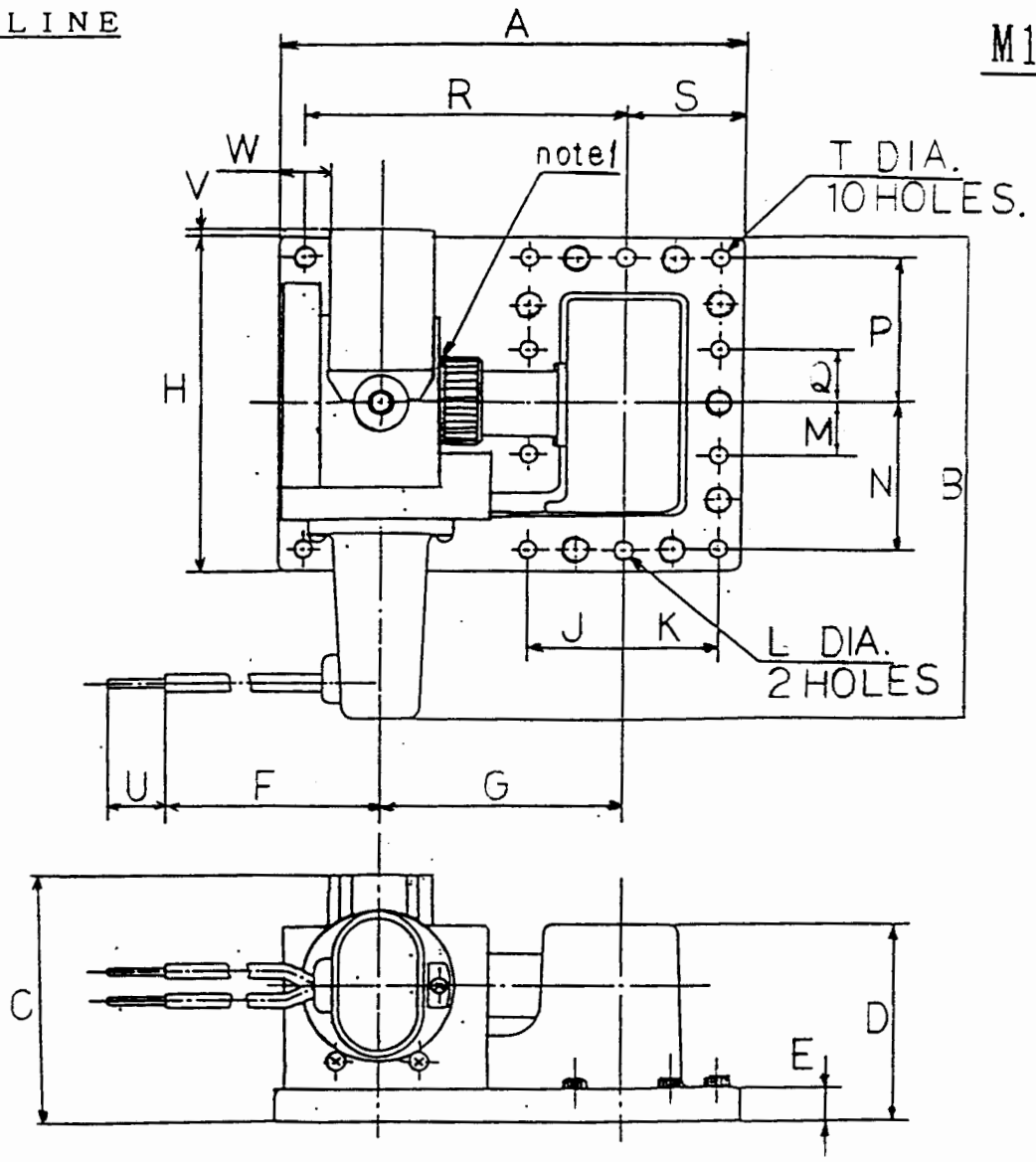
9. Measured as the peak anode current is varied between 10A and 16A.

PERFORMANCE CHART



OUTLINE

M1461



LEAD CONNECIONS

COLOR	ELEMENT
GREEN	HEATER
YELLOW	HEATER CATHODE

Outline Dimensions.(All dimensions without limits are nominal)

Ref.	Millimeters		Ref.	Millimeters	
	Min.	Max.		Min.	Max.
A	-----	165.1	M	18.999	19.101
B	-----	177.8	N	51.529	51.637
C	-----	95	P	51.529	51.637
D	-----	72	Q	18.999	19.101
E	12		R	111.1	
F	298.5	-----	S	42.7	
G	76.2	88.9	T	6.35	6.63
H	-----	123.2	U	12.70	
J	32.486	32.588	V	-----	5.00
K	32.486	32.588	W	16	-----
L	6.35	6.375			

Outline Notes.

1. Anode temperature measured at this point.