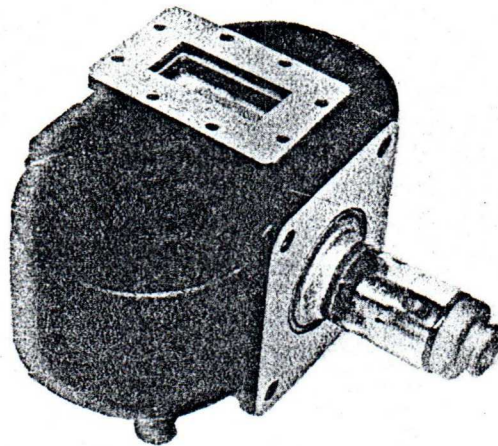


RM-127/MA-2865

Pulsed C-Band Magnetron

Bulletin 1565



DESCRIPTION

A long life C-Band Magnetron. Fixed frequency integral magnet forced air cooled.

APPLICATIONS

Airborne Weather Radar and Navigation Systems.

MICROWAVE ASSOCIATES, WATSONVILLE, INC. d/b/a

RELMAG DIVISION • MICROWAVE ASSOCIATES, INC.

For More Information Contact: **RELMAG DIVISION • Watsonville, California • Phone 408-722-7181**



Microwave Associates, Inc. Burlington, Massachusetts Tel. (617) 272-3000

Western Union Fax
TWX-710-332-6789
Telex-94-9464

SPECIFICATIONS

Electrical Characteristics

Peak Power	85 kW
Fixed Frequency	5400 MHz
Pulling Factor (1.5:1 VSWR)	6.0 MHz Max.
Pushing Factor ($\pm 10\% 1_{\text{p}}$)	1 MHz/A
Missing Pulse Rate	.25 Max.
Side Lobes	8dB Min.
Thermal Coefficient	.15 MHz/ $^{\circ}\text{C}$ Max.

Mechanical Characteristics

Size	See Outline Drawing
Weight	11.5 lbs./5,216 kg Max.
Mounting Position	Any
Output Connector	Waveguide
	See Outline dwg

Operating Conditions

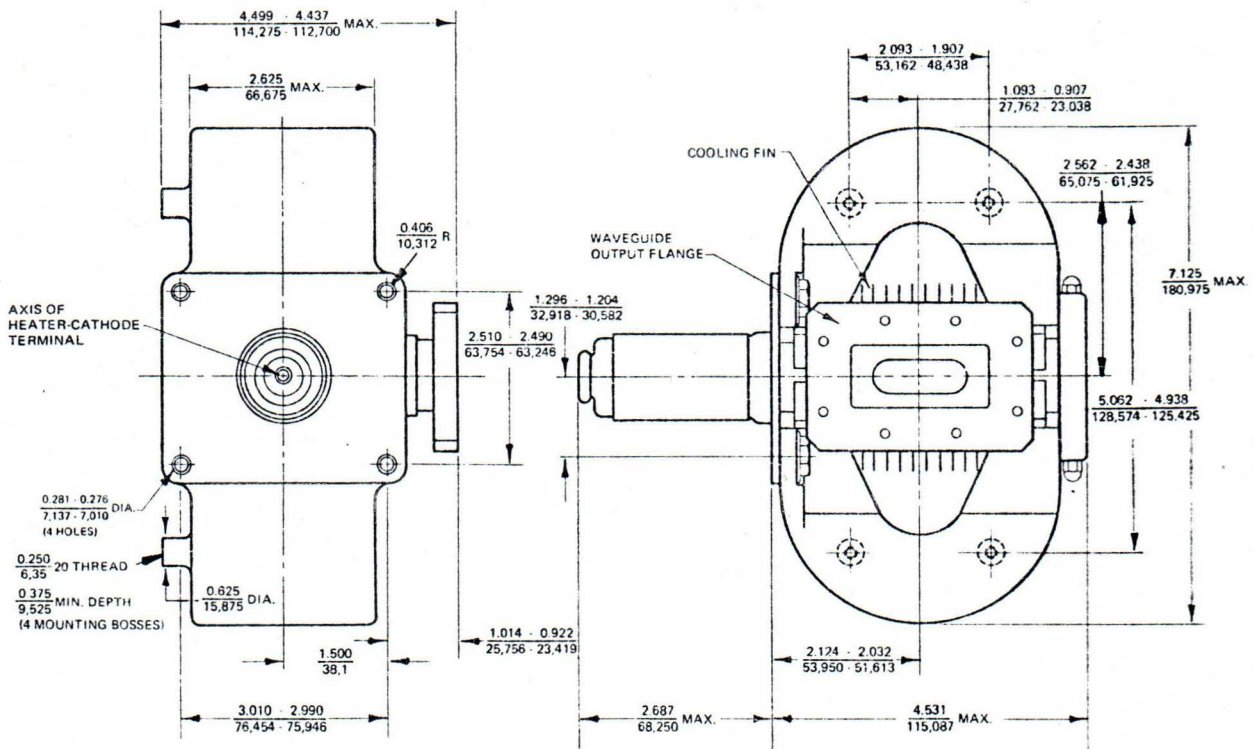
Heater Voltage*	10.0 V
Heater Current	3.1 A Max.
Preheat Time	240 Sec. Min.
Pulse Voltage	14.0-15.5 kV
Pulse Current	14.0 A
Duty Cycle	.00126 Ratio Max.

Environmental Characteristics

Cooling	Forced Air
Ambient Temperature	-40 $^{\circ}\text{C}$ to 71 $^{\circ}\text{C}$
Altitude	50,000 Ft./15240 m
Vibration (10 - 1000 cps)	3 G
Shock (11 \pm 1 ms)	10 G

* Heater voltage is reduced during oscillation to a specified value.

OUTLINE DRAWING



NOTE
INCH
MM

RM 127

- Input power (peak)
- Input power (mean) (see note 3)
- Duty cycle
- Pulse duration
- Rate of rise of voltage pulse (see note 4)
- Anode temperature (see note 5)
- V.S.W.R. at the output coupler

TYPICAL OPERATION

Operational Conditions

- Heater voltage
- Anode current (peak)
- Pulse duration
- Pulse repetition rate
- Rate of rise of voltage pulse

1	2	
9.1	9.1	✓
1.35	1.35	a
2	6	us
400	200	PPS
100	100	100 <i>more</i>

Typical Performances

- Anode voltage (peak)
- Output power (peak)
- Output power (mean)

1	2	
15.0	15.0	KV
75	75	KW
60	90	W

TEST CONDITIONS AND LIMITS

The magnetron is tested to comply with the following electrical specification

Test Conditions

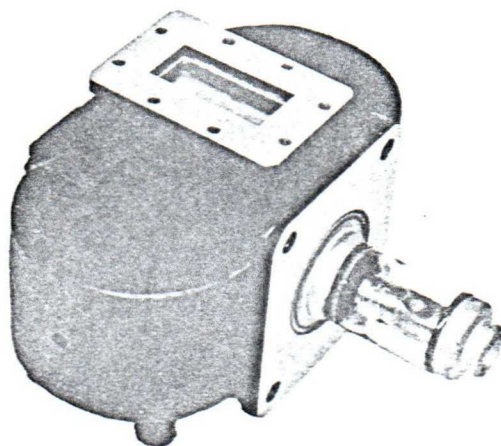
- Heater voltage (for test)
- Anode current (mean)
- Duty Cycle
- Pulse duration (see note 6)
- V.S.W.R. at the output coupler
- Rate of rise of voltage pulse (see note 4)

Limits

- Anode voltage (peak)
- Output power (mean)
- Frequency (see note 7)
- R.F. bandwidth at 1/2 power
- Frequency pulling (v.s.w.r. not less than 1.5:1)
- Stability (see note 8)
- Cold impedance
- Heater current
- Temperature coefficient of frequency

RM-127

Pulsed C-Band Magnetron



DESCRIPTION

A long life C-Band Magnetron. Fixed frequency integral magnet forced air cooled.

APPLICATIONS

Airborne Weather Radar and Navigation Systems.

For More Information Contact:



EEV, INC.
RELMAG DIVISION
1240 HIGHWAY 1
WATSONVILLE, CA. 95076

• Phone 408-722-7181

SPECIFICATIONS

Electrical Characteristics

Peak Power	85 kW
Fixed Frequency	5400 MHz
Pulling Factor (1.5:1 VSWR)	6.0 MHz Max.
Pushing Factor ($\pm 10\% 1_b$)	1 MHz/A
Missing Pulse Rate	.25 Max.
Side Lobes	8dB Min.
Thermal Coefficient	.15 MHz/ $^{\circ}$ C Max.

Mechanical Characteristics

Size	See Outline Drawing
Weight	11.5 lbs./5,216 kg Max.
Mounting Position	Any
Output Connector	Waveguide
	See Outline dwg

Operating Conditions

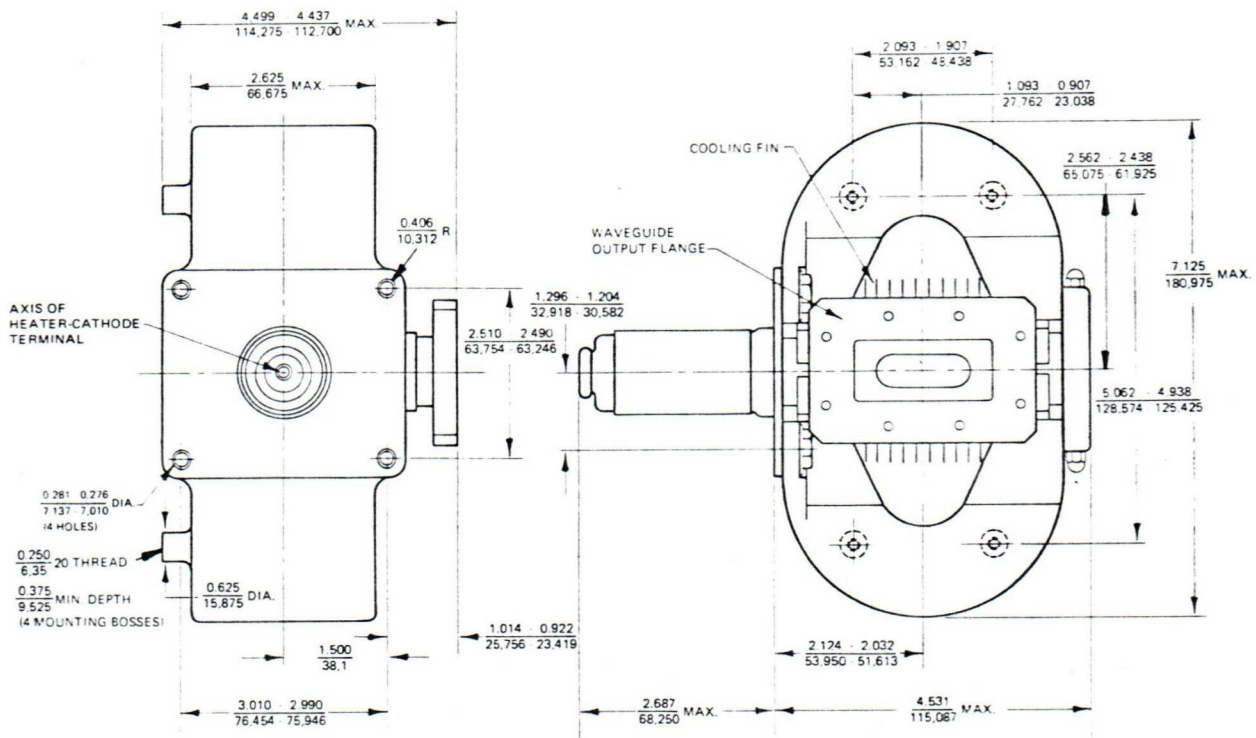
Heater Voltage*	10.0 V
Heater Current	3.1 A Max.
Preheat Time	240 Sec. Min.
Pulse Voltage	14.0-15.5 kV
Pulse Current	14.0 A
Duty Cycle	.00126 Ratio Max.

Environmental Characteristics

Cooling	Forced Air
Ambient Temperature	-40 $^{\circ}$ C to 71 $^{\circ}$ C
Altitude	50,000 Ft./15240 m
Vibration (10 - 1000 cps)	3 G
Shock (11 \pm 1 ms)	10 G


* Heater voltage is reduced during oscillation to a specified value.

OUTLINE DRAWING



NOTE
INCH
MM

SPECIFICATION - RM-127
 C-BAND PULSED MAGNETRON
 85 KW PEAK POWER. FIXED FREQUENCY
 INTEGRAL MAGNET FORCED AIR COOLED

RM-127	DATE PRINTED	SEE ASSEMBLY	RM-127	Page 1 of 5
MAT'L.	SPECIFICATION		RELMAG, INC. 1740 HIGHWAY 1, WATSONVILLE, CALIFORNIA 95076	
DIF:	CH	SCALE		
<i>JB</i>	8-19-75			

1.0 DESCRIPTION

C-Band magnetron. 85 Kilowatts peak power. Fixed frequency 5400 MHz \pm 20. Integral magnet, Forced Air Cooling.

2.0 ABSOLUTE RATINGS

Parameter	If Surge	Heater Volt	Tpc	Duty Cycle	Anode Temp	Cathode Temp	Alt	VSWR
Units	Amps	Volts	μ sec	Ratio	$^{\circ}$ C	$^{\circ}$ C	ft	Ratio
Maximum	12.6	12.5	2.5	.00126	150	165	25,000	1.5:1
Minimum	---	---	---	---	---	---	Note	---

3.0 DEPENDENT RATINGS

Parameter	Ef	If	Tk	Tpc	Eb	Ib	TSRV
Units	V	A	Secs	μ secs	V	A	Kv/ μ sec
Maximum	12.5	3.1	--	6.0	15,500	14.0	---
Minimum	10.0	--	240	5.5	14,000	---	.10

4.0 PHYSICAL CHARACTERISTICS

- 4.1 Dimensions - See RM-127-1
- 4.2 Mounting Position - Any
- 4.3 Support - Mounting Plate. See RM-127-1
- 4.4 Cooling - Forced Air
- 4.5 Coupling - Waveguide. See RM-127-1
- 4.6 Weight - 11 $\frac{1}{2}$ lbs. max
- 4.7 Specification References - Mil Std 1311A

5.0 ELECTRICAL REQUIREMENTS

- 5.1 Oscillation Conditions
- 4304 Pulse Width Tpc=5.75 μ sec \pm .25 μ sec
- Duty Cycle du = .0012
- 4305 Average Current ib =16.8 madc
- TSRV=.1 μ sec max

- 8.1 Prior to the application of high voltage, the cathode shall be heated to the required initial operation temperature. This may be done by applying 10.0 volts $\pm 5\%$ for 240 seconds.
- 8.2 The time of steepest rise of voltage (TSRV) shall be expressed as the time between the 20 and 85 percent points on a line defining the steepest tangent to the leading edge of the voltage pulse above 50 percent amplitude. Any capacitance in the viewing circuit shall not exceed 6.0 PF.
- 8.3 Input capacitance shall be measured between the cathode terminal and a mounting plate $\frac{1}{4}$ inch thick with the minimum cut-out required to flush mount the tube.
- 8.4 TA is the operating ambient temperature.
- 8.5 The temperature is to be measured at the point indicated on the outline drawing. Figure 1.
- 8.6 Since pulse width and duty cycle are inter-related, care must be exercised that the duty cycle is correct if other than nominal pulse width is used.
- 8.7 Unless otherwise specified, tests shall be made at standard room ambient conditions.
- 8.8 With the magnetron in the "warm-stdby" mode it shall be possible to apply full pulse power after only a 30 second application of the "warm-up" filament voltage (10.0 volts $\pm 5\%$). Filament voltage will automatically return to its normal "operate" value TBS V $\pm 5\%$ upon the application of full pulse power.
- 8.9 During an interruption of the 115V 400 cycle primary power of T seconds, when T has any value from 10 sec to 50 sec the magnetron shall perform normally when the filament is reheated for $1\frac{1}{2}T$ seconds at 14.0 volts $\pm 5\%$ prior to reapplication of full pulse power.
- 8.10 Operating temperature test consists of the following:
Low Temperature Operation: Soak tube in ambient temperature of -50°C for 30 minutes. Stabilize tube temperature in ambient temperature of -40°C . Both conditions are non-operate. After stabilization at -40°C operate for 15 minutes.

5.2 Operating Conditions

Ref	Test	Conditions	Symbol	Limits		Units
				Min	Max	
	Holding Period	Non-Operate		168		Hrs
	Dimensions	Per Outline RM-127-1				
1301	Heater Current	EF= 10.0 V Note 1	If		3.1	Amps
	Heater Current Warm Standby & Operate	EF = TBS Note 1	If		3.1	Amps
1369	Heater Warm Up Time	EF = 10.0 V	Tk	240		Secs
4306	Pulse Voltage	Osc 1	epy	14.0	15.5	Kv
4218	Frequency	Osc 1	f	5380	5420	MHz
4307	Power Output	Osc 1	Po	90		Watts
4310	Pulling Fig	VSWR=1.5:1	Δf		6.0	MHz
4311	Pushing Factor	lb = 10%	Δf		1.0	MHz/Amp
4315	Stability	Osc 1	M.P.		.25	%
4308	Minor Lobes	Osc 1	Ratio	8.0		Db
4308	Bandwidth	Osc 1	F		$\frac{2.5}{\text{TPC}}$	MHz
6.0	QUALIFICATION TESTS					
	Temp Coefficient	Osc 1 T= -40°C +55°C	Δf		.150	MHz/°C
	Vibration	10-55Hz = 3g 55-1000 Hz.1.5g	Δf		1	MHz
	Shock	10 ms @ 6g	Δf		1	MHz
1026	High Temp Op	+71°C	MP		.25	%
1026	Low Temp Op	-40°C	MP		.25	%
7.0	LIFE TEST					
	Life Test	Osc 1	T	2000		Hrs
4250	End Points Power Output	Osc	Po	60		Watts
4308	Minor Lobes		Ratio		6.0	Db
4315	Stability		MP		1.0	%
4218	Frequency		f	5370	5430	MHz

High Temperature Operation: Non-operate, soak 30 minutes at ambient temperature of 71°C, operate 30 minutes at ambient temperature of 71°C, then operate 2 hours at 55°C ambient.

- 8.11 The average microwave stray radiation power from the magnetron cathode stem shall not exceed 2.0 milliwatts as measured with any standard pickup horn and a microwave power meter. The horn shall be directed as close as possible to that part of the cathode stem which is leaking the greatest power.