

TECHNICAL DATA

MAGNETRON 2M248 Series

Toshiba 2M248 series is a fixed frequency continuous wave magnetron intended for use in microwave cooking appliances.

The average output power is 1030 watts to a matched load at 330 mA anode current in the frequency range from 2450 to 2470 MHz.

The tube is a packaged magnet type and requires forced air cooling.

The output is fed either into a rectangular waveguide or into an oven cavity directly.



FEATURES

1. Smaller filter box

Design of filter box is introduced aiming to be suitable for compact oven design.

2. Clean spectrum

New design of anode with optimized choke structures complies with tighter regulations on spurious radiation and line conducted noise.

3. High reliability and long life expectancy.

As well as balanced design has achieved with a help of CAD, the reliability and the thermal endurance are equivalent to conventional magnetrons.

4. High efficiency

2M248 operates at 4.35 kV anode voltage and 330 mA anode current and gives 1030 W output power in a matched load condition.

This means 71.8 percent of efficiency.

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GENERAL DATA**ELECTRICAL :**

Frequency (matched load)	2460 ± 10	MHz
Filament Voltage	3.15	V
Filament Current	10.0	A
Cold Filament Resistance	0.03	ohms
Anode Potential	to be ground	
Filament Potential	Negative high voltage	

MECHANICAL :

Physical Dimensions	See outline drawing
Terminal Connection	See outline drawing
Mounting Position	Any
Output Coupling	See outline drawing
Magnetic Field	Ferrite magnet packaged
Cooling	Forced air (Side blow)
Weight (approx.)	830 g
Type of Cathode	Directly heated thoriated tungsten filament

ABSOLUTE MAXIMUM RATING

	Minimum	Maximum	
Filament voltage (Note 1)	2.7	3.6	V
Cathode preheating time	0	-	s
Peak anode voltage		4.85	kV
Average anode current		380	mAdc
Peak anode current		1.5	A
Anode input power		1.8	kW
Load VSWR (Note 2)		4	
Anode temperature (Note 3)		300	°C
Antenna seal temperature (Note 4)		320	°C
Case temperature (Note 5)		120	°C
Storage temperature	-30	60	°C

The maximum ratings in this table which are interrelated should not be exceeded either individually or in combination under any worst case.

Even if the maximum ratings are not exceeded, reduced life can occur as the operating conditions approach to the maximum ratings.

TYPICAL OPERATION

Power supply : Single phase full wave rectified without filter		
Frequency	2460	MHz
Filament voltage	3.15	V
Peak anode voltage (Note 6)	4.35	kV
Average anode current	330	mAdc
Output power (matched load, Note 6)	1030	W
Cooling air flow	800	ℓ / min
Pressure drop (Approx.)	70	Pa

Note 1 : The filament transformer design center must be 3.15 ± 0.1 V for normal line voltage.

Note 2 : The load VSWR larger than 4 may be allowable unless it is locked in such a condition.
It is required to consult with Toshiba Hokuto for the best design of peak anode current and impedance even if the VSWR is either less or larger than 4.

Note 3 : See outline drawing for measuring point.
Maximum anode temperature for normal condition (with load in the cavity) should be 250°C.

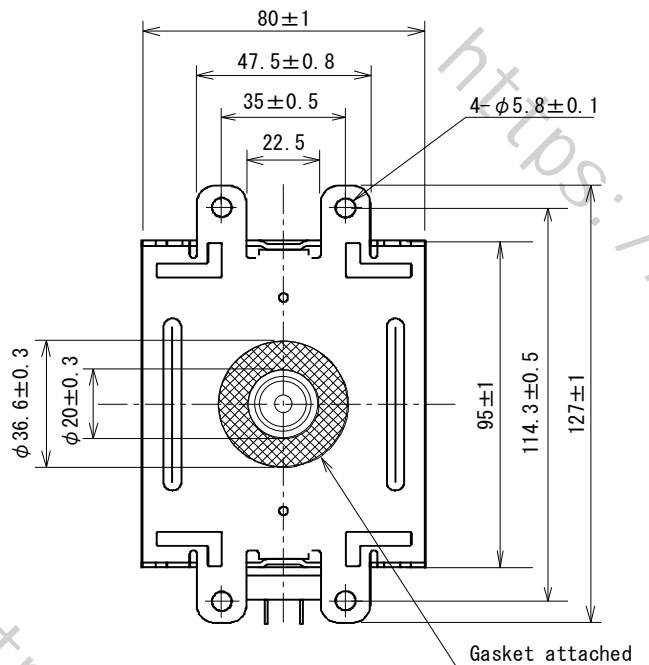
Note 4 : Temperature of metal to ceramic seal.
Maximum allowable built-up curves of seal temperature is shown in the application note 3-3-1.

Note 5 : See outline drawing for measuring point.

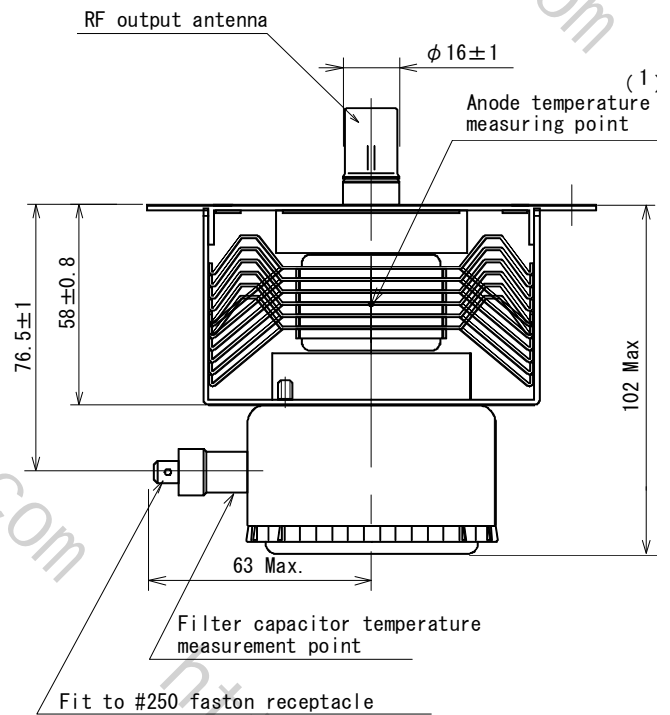
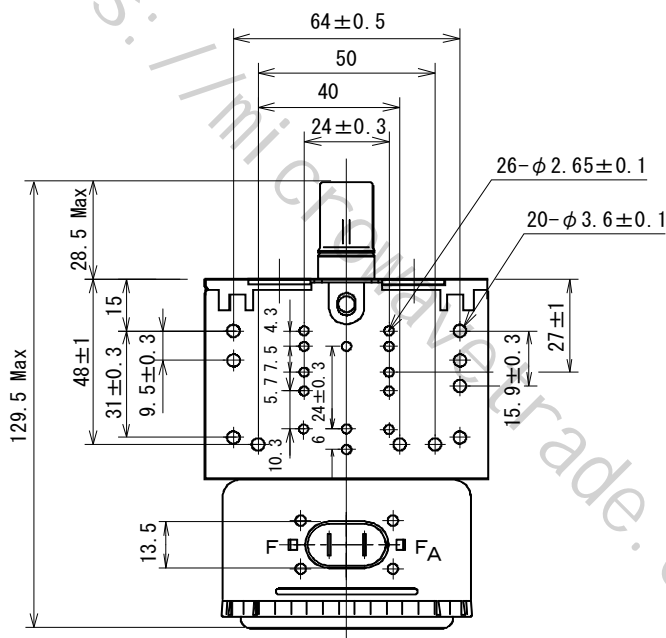
Note 6 : This is measured within 15 seconds after applying anode voltage.
The standard ambient temperature of the magnetron during this measurement is 25°C.
Peak anode voltage goes down with operating time from this value to a lower value due to the rather large temperature coefficient of ferrite magnet.

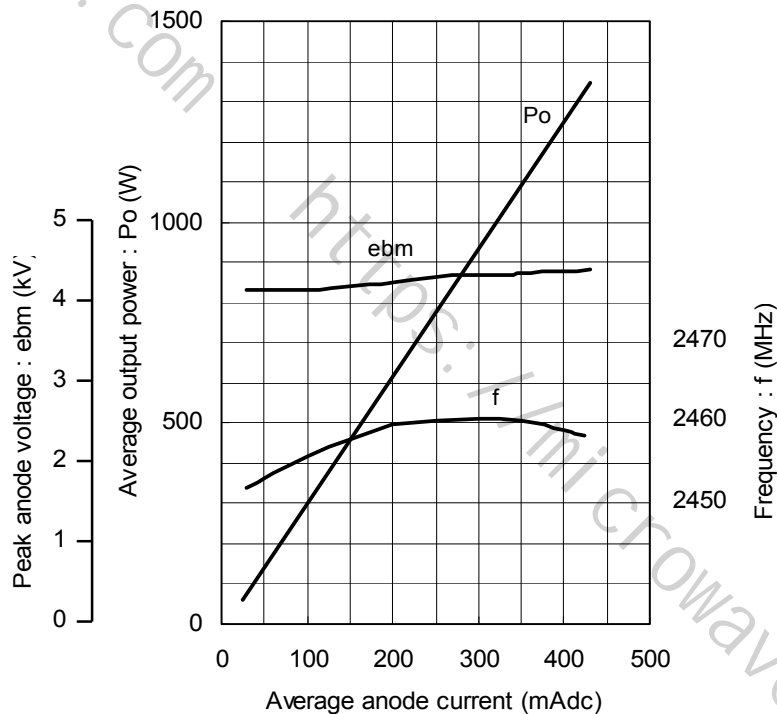
OUTLINE DRAWING OF 2M248K

Unit : mm



- (1) Temperature to be measured at the outlet side of air flow.
- (2) Refer filament connection.
- (3) "F" and "FA" are marked at these positions.



PERFORMANCE CHART

Operating conditions:

Anode supply: Single phase full wave rectified without filter

Filament voltage: 3.15 V

Load VSWR: 1.1 Max.

(This is measured within 15 seconds after applying anode voltage)

RIEKE DIAGRAM

Operating conditions:

Anode supply

: Single phase full wave rectified without filter

Filament voltage

: 3.15 V

Average anode current

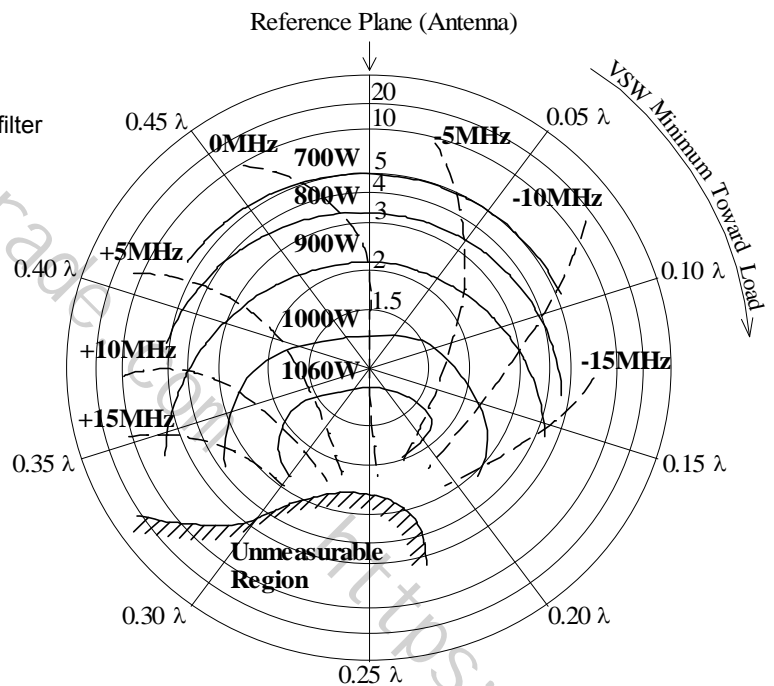
: 330 mA (constant)

Peak anode voltage (matched load)

: 4.35 kV

Oscillating frequency (matched load)

: 2460 MHz

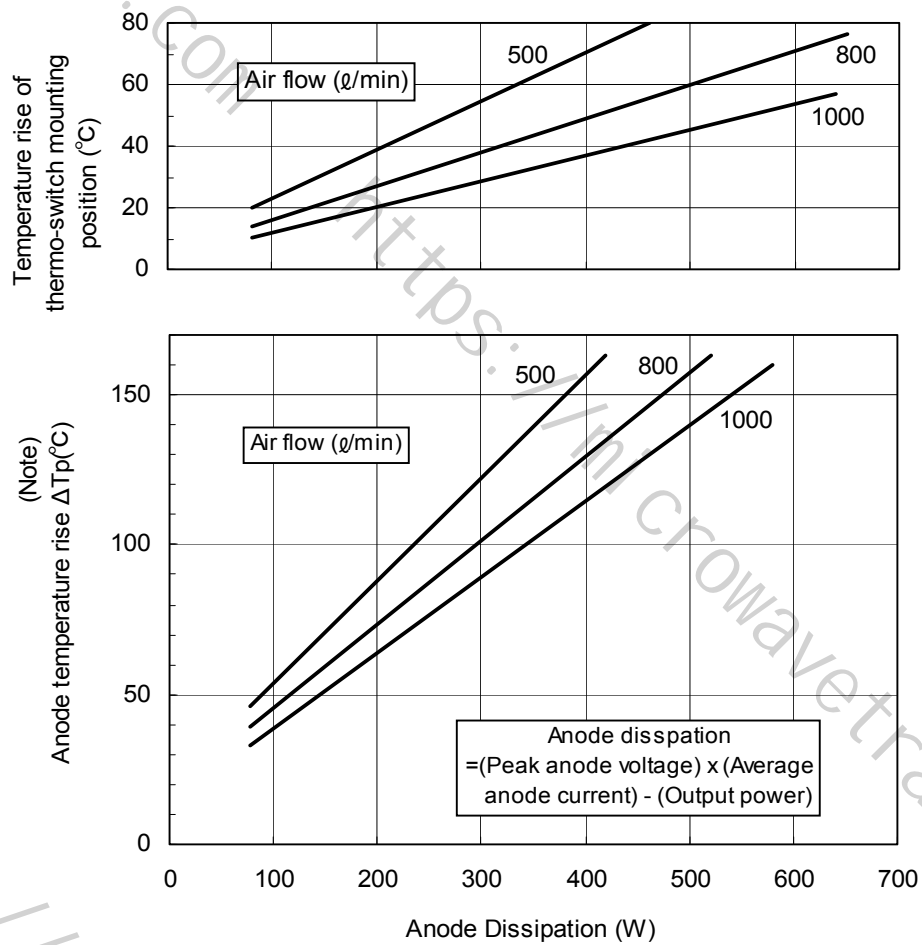


Note: i.e., toward generator (on Smith chart).

—— Power (W)

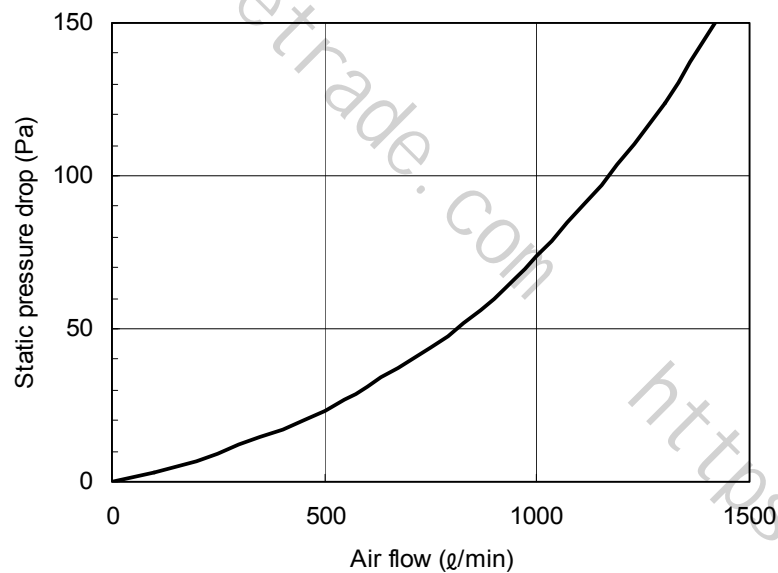
----- Frequency (MHz)

COOLING CHARACTERISTICS



Note : (ΔT_p + room temperature) should not exceed the maximum rating of anode temperature; 250°C under loaded condition.

RADIATOR CHARACTERISTICS

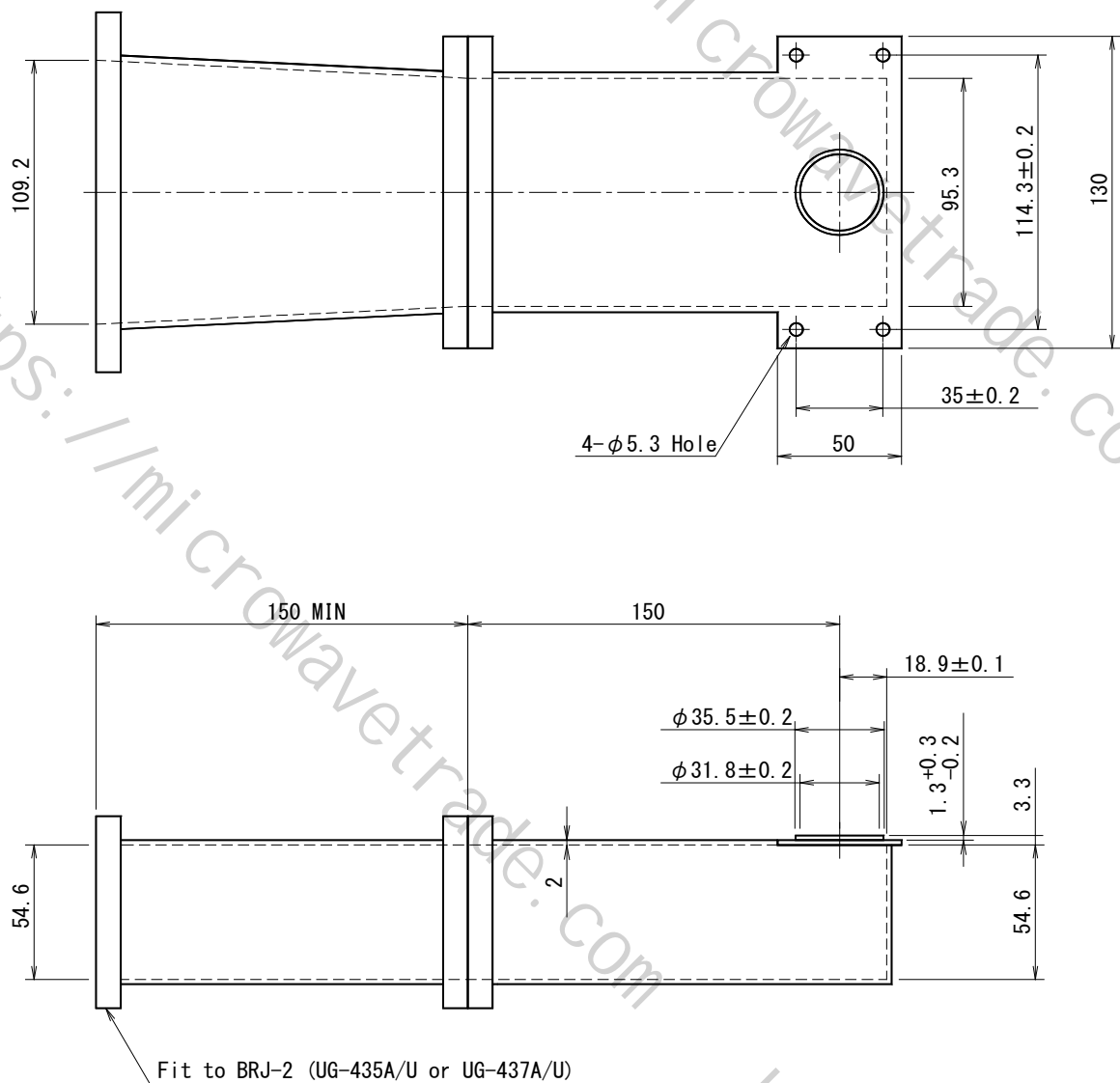


FILAMENT CONNECTION

To minimize possible transient voltages, the terminals F and FA should be connected to the transformer in such a way that the anode voltage increases and anode current decreases compared with those for reversed connection when a single phase half wave doubler without filter is used as a power supply.

OUTPUT COUPLER (The output coupler used in the Toshiba Hokuto inspection)

Unit : mm



PRECAUTIONS FOR SAFETY

Carefully take the following precautions for safety in using the magnetrons for microwave ovens or for other applications.

Magnetrons must be handled by individuals possessing adequate backgrounds of electrical, electronic, microwave and mechanical experience.

Toshiba Hokuto Corporation cannot be responsible for the interpretation of this information, nor can it be assumed any liability in connection with its use.

1.High Voltage

Since the magnetron is operated with negative high potential at the cathode terminals, a special care must to be taken as follows.

- 1.1 Properly install and tightly fasten the magnetron in the oven or in the waveguide coupler.
- 1.2 To avoid shock hazards, never insert metallic wire or like into the filter box, and never operate the magnetron with the lid of filter box open.
- 1.3 Before removing the magnetron from the oven, carefully check that power is turned off, and discharge the cathode terminal or the capacitors in the power supply circuit by using the discharging rod adequately designed for safety.

2.Radiation Leakage

Care should be taken for radiation leaked from the magnetron, though the leakage from the input part of magnetron is restricted to a level which human body is not adversely affected.

- 2.1 Properly install and tightly fasten the magnetron in the oven or in the waveguide coupler.
- 2.2 Do not deform the gasket or do not operate the magnetron with the gasket removed, to avoid hazardous conditions such as radiation leakage and arcing.
- 2.3 Never operate the magnetron without installing it in the oven or with the output antenna exposed.
- 2.4 Do not remove the lid of the filter box nor deform the filter box.
- 2.5 Always keep your eyes apart from the operating magnetron in consideration of the unexpected hazardous conditions.

3.Temperature

Although the magnetron is subjected to forced air cooling during operation, high temperature (sometimes more than 200°C) is observed on the enclosure of magnetron.
Care should be taken as follows.

- 3.1 Do not touch the magnetron immediately after turning power off.
Allow the magnetron to cool before handling.
- 3.2 Putting on cotton gloves or the equivalent is recommended for safe handling.

4.Alteration

Do not alter the magnetron.