

DESCRIPTION

VRB-2111A reflex klystrons are compact, rugged oscillators for airborne equipment or other applications requiring good frequency stability under adverse environmental conditions. Each tube delivers at least 300 milliwatts into a matched load over a 1.5 per cent tuning range selected between 80 and 110 gigahertz. Tuning is achieved by means of a simple single-screw tuner. The base and leads are molded to the tube to permit reliable high altitude operation without pressurization.


MAXIMUM RATINGS¹

Resonator Voltage ²	2550 Vdc
Resonator Current	27 mAdc
Reflector Voltage ³	-1250 Vdc
Heater Voltage	6.5 V
Body Surface Temperature ⁴	120 °C

GENERAL CHARACTERISTICS⁵
ELECTRICAL

Frequency Coverage ^{2, 6}	80 to 110 GHz
Mechanical Tuning Range, each tube	1.5 %
Output Power, minimum ⁷	300 mW
Heater Voltage	6.3 ± 0.2 V
Heater Current, typical	0.95 A

PHYSICAL

Dimensions	See Outline Drawing
Weight, approximate	10 oz
Mounting Position	Any
Cathode	Impregnated, Unipotential
Cooling ⁴	Forced Air or Conduction
R-F Output ⁸	Mates with VAB-2001 Series Adapter and Heat Sinks
Base	Molded Flexible Leads

TYPICAL OPERATING CONDITIONS⁵

Frequency ⁶	92 GHz
Mechanical Tuning Range	±690 MHz
Output Power, matched load ⁷	400 mW
Resonator Voltage ²	2500 Vdc
Resonator Current	24 mAdc
Reflector Voltage ³	-650 Vdc
Electronic Tuning Range ⁹	200 MHz
Reflector Modulation Sensitivity ¹⁰	3 MHz/V
Frequency/Temperature Coefficient ¹¹	-1.6 MHz/°C

RANGE VALUES FOR EQUIPMENT DESIGN^{1, 2}

	Min	Max
Resonator Voltage ²	---	2550 Vdc
Resonator Current	---	27 mAdc
Reflector Voltage ³	-300	-900 Vdc
Electronic Tuning Range ⁹	150	---
Reflector Modulation Sensitivity ¹⁰	3	4 MHz/V
Frequency/Temperature Coefficient ¹¹	---	±1.9 MHz/°C
Heater Current, at 6.3 V	0.75	1.25 A

VRB-2111A

NOTES:

1. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limitation and simultaneous operation at more than one rating may not be possible. Equipment design should limit voltage and environmental variations so that the ratings will never be exceeded.
2. Frequency increases as resonator voltage decreases. Hence, if operation at other than 2500 volts is contemplated, please specify desired resonator voltage when ordering.
3. Reflector must always be at least 20 volts negative with respect to the cathode.
4. Sufficient forced-air flow or conduction cooling must be supplied to maintain the body surface temperature below 120 °C; for optimum tube life, this temperature should be less than 100 °C. For conduction cooling, refer to Adapter and Heat Sink data sheets to find the appropriate Varian adapters and liquid-cooled, convection-cooled and conduction-cooled heat sinks.
5. Characteristic and operating values are based on performance tests. These figures may change without notice as a result of additional performance data or product refinement. Consult Varian Associates of Canada, Ltd. before using this information for equipment design.
6. When ordering, specify the center frequency or frequency range desired.
7. Output power is a function of frequency and maximum output is normally obtained at the low-frequency end of the band. Output decreases as frequency is increased. The ratio of output at the lowest frequency to the output at the highest frequency is typically 0.5 dB.
8. Tube couples to several waveguide sizes by use of suitable adapters or heat sinks. A type VAB-2001A13 adapter flange to mate with a UG-387/U flange on WR-10 waveguide is supplied with the tube unless otherwise specified.
9. Measured between half-power points.
10. This parameter varies with operating frequency and mode. For more detailed information please contact your local Varian Sales Office or Varian Associates of Canada, Ltd.
11. The rate of frequency change with temperature variation is a function of tuner position. Figures apply only at the high-frequency end of the tuning range.
12. These values are acceptance limits for VRB-2111A series tubes. Equipment design should allow for these variations.

OUTLINE DRAWING

