varian associates of canada ltd.

TECHNICAL DATA

# VRT-2123A
Series

REFLEX KLYSTRON

110-142 GHz
50 mW

Formerly VC-714

## DESCRIPTION

VRT-2123A 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 50 milliwatts into a matched load over a selected tuning range of 8 gigahertz between 110 and 142 gigahertz. It is equally useful as a local oscillator, where only a small amount of power is needed. 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 RATINGS [1]

| | |
|---|---|
| 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 CHARACTERISTICS [5]

### ELECTRICAL

| | |
|---|---|
| Frequency Coverage[2,3] | 110 to 142 GHz |
| Mechanical Tuning Range, each tube | 8 GHz |
| Output Power, minimum[7] | 50 mW |
| Heater Voltage | 6.3 ± 0.2 V |
| Heater Current, typical | 1.05 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 VAT-2002 Series Adapter and Heat Sinks |
| Base | Molded Flexible Leads |

## TYPICAL OPERATING CONDITIONS [5]

| | |
|---|---|
| Frequency[6] | 122 GHz |
| Mechanical Tuning Range | ±4 GHz |
| Output Power, matched load[7] | 75 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 MHz/°C |

## RANGE VALUES FOR EQUIPMENT DESIGN [12]

| | Min | Max | |
|---|---|---|---|
| Resonator Voltage[2] | --- | 2550 | Vdc |
| Resonator Current | --- | 27 | mAdc |
| Reflector Voltage[3] | -250 | -900 | Vdc |
| Electronic Tuning Range[9] | 150 | --- | MHz |
| Reflector Modulation Sensitivity[10] | 2 | 4 | MHz/V |
| Frequency/Temperature Coefficient[11] | --- | -2.6 | MHz/°C |
| Heater Current, at 6.3 V | 0.75 | 1.25 | A |

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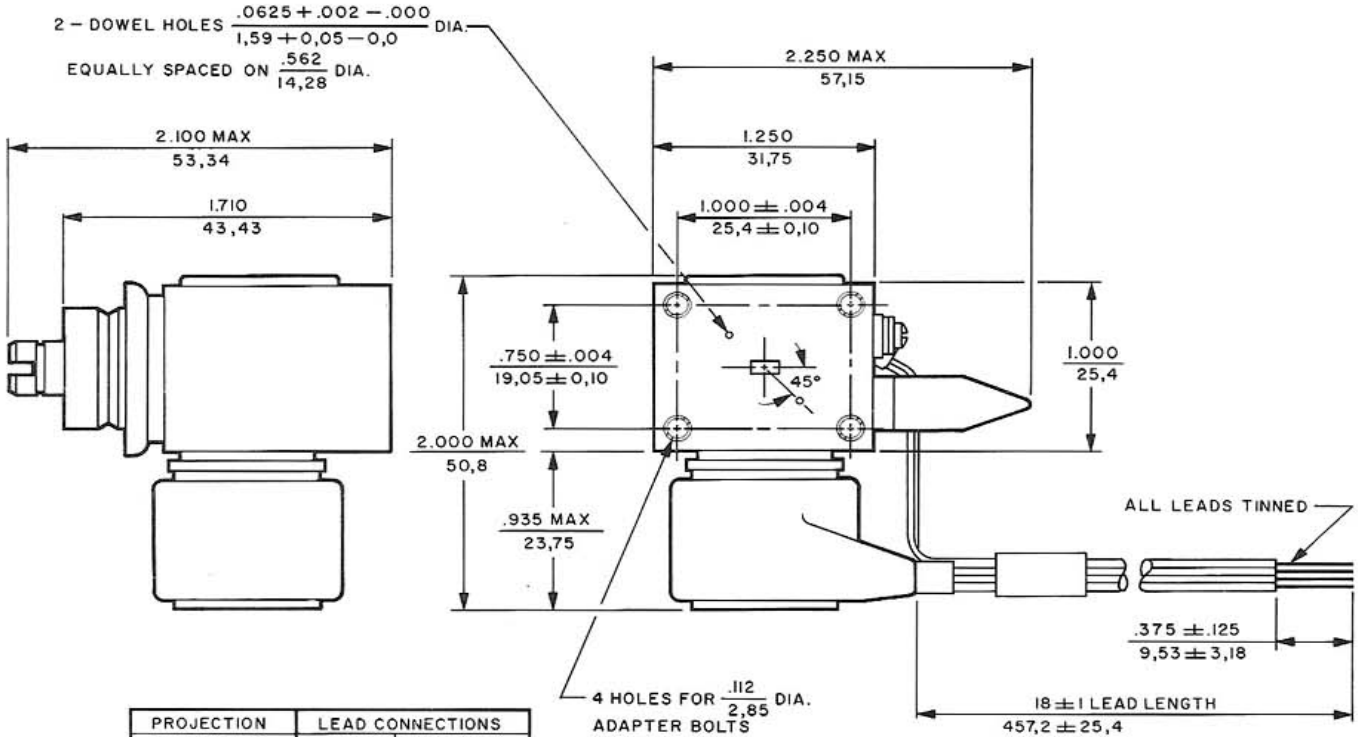
NOTES:

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. Characteristics 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 high frequency end of the band. Output decreases as frequency is decreased. The ratio of output at the highest frequency to the output at the lowest frequency is typically 3 dB.
8. Tube couples to several waveguide sizes by use of suitable adapters or heat sinks. A type VAT-2002A15 adapter flange to mate with a Philips Claw type flange on RG-136/U 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 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. Accurate figures apply only at the high-frequency end of the tuning range.
12. These values are acceptance limits for VRT-2123A series tubes. Equipment design should allow for these variations.

## OUTLINE DRAWING




| PROJECTION | LEAD CONNECTIONS | |
|---|---|---|
| inch / mm | YELLOW | HEATER |
| | YELLOW | HEATER |
| | GREEN | CATHODE |
| | GRAY | REFLECTOR |
| | BROWN | BODY/RES. |