



varian
palo alto tube division

TECHNICAL DATA

VA-866
Series

7.1-12.0 GHz
1 kW CW

DESCRIPTION

VA-866 series four-cavity klystron amplifiers are for use in transportable troposcatter communication equipment, special test facilities, and CW radar. Models can be furnished for operation at any specified center frequency between 7.1 and 12.0 gigahertz. Each tube delivers at least 1 kilowatt within its 100-megahertz tuning range. Gain of approximately 45 decibels and efficiency of about 30 per cent minimize input power requirements. The beam is focused by an integral permanent magnet and the collector and body are forced-air cooled.

MAXIMUM RATINGS¹

Beam Voltage	8.5 kVdc
Beam Current	700 mAdc
Body Current, with drive	50 mAdc
Heater Surge Current	8 A
Reflected Power ²	40 W

GENERAL CHARACTERISTICS³

ELECTRICAL

Frequency Coverage	7.1 to 12.0 GHz
Tuning Range, per tube	±50 MHz
Power Output, minimum	1 kW
Heater Voltage	6.0 ± 0.5 V
Heater Current, typical	5.8 A
Heater Warm-up Time, minimum ...	5 min
Focusing	Permanent Magnet

PHYSICAL

Dimensions	See Outline Drawing
Weight, approximate	45 lb
Mounting Position	Any
Cooling ⁴	Forced Air
Collector Flow, minimum	450 lb/hr
Body Flow, minimum	90 lb/hr
RF Connectors	
Below 10 GHz	Mate with UG-51/U
At 10 GHz and above	Mate with UG-52/U



TYPICAL OPERATING CONDITIONS³

High Efficiency Tuned

Power Output	1.2 kW
Drive Power	40 mW
Gain	44.8 dB
Bandwidth, 3-dB	19.6 MHz
Beam Voltage	7.5 kVdc
Beam Current	550 mAdc
Body Current, with drive	22 mAdc
Load VSWR	1.05:1

RANGE VALUES FOR EQUIPMENT DESIGN⁵

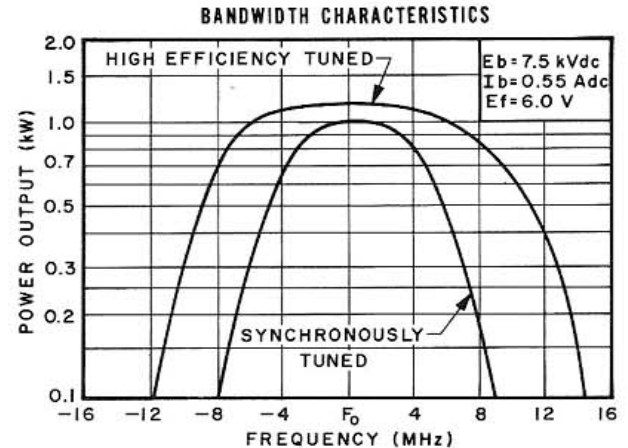
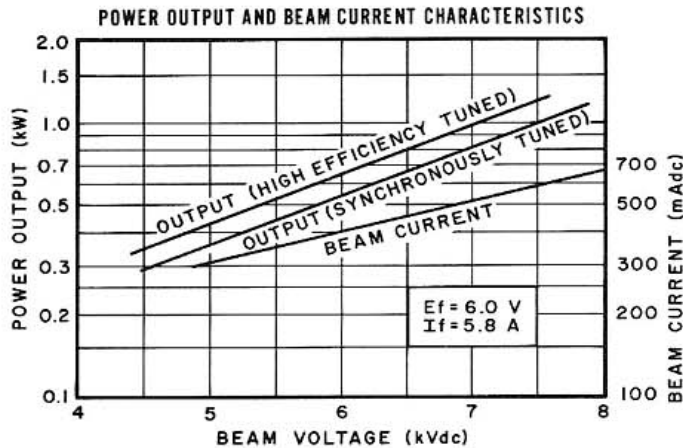
	Min	Max
Beam Voltage	---	8.5 kVdc
Beam Current	---	650 mAdc
Heater Current	5.0	6.0 A

NOTES:

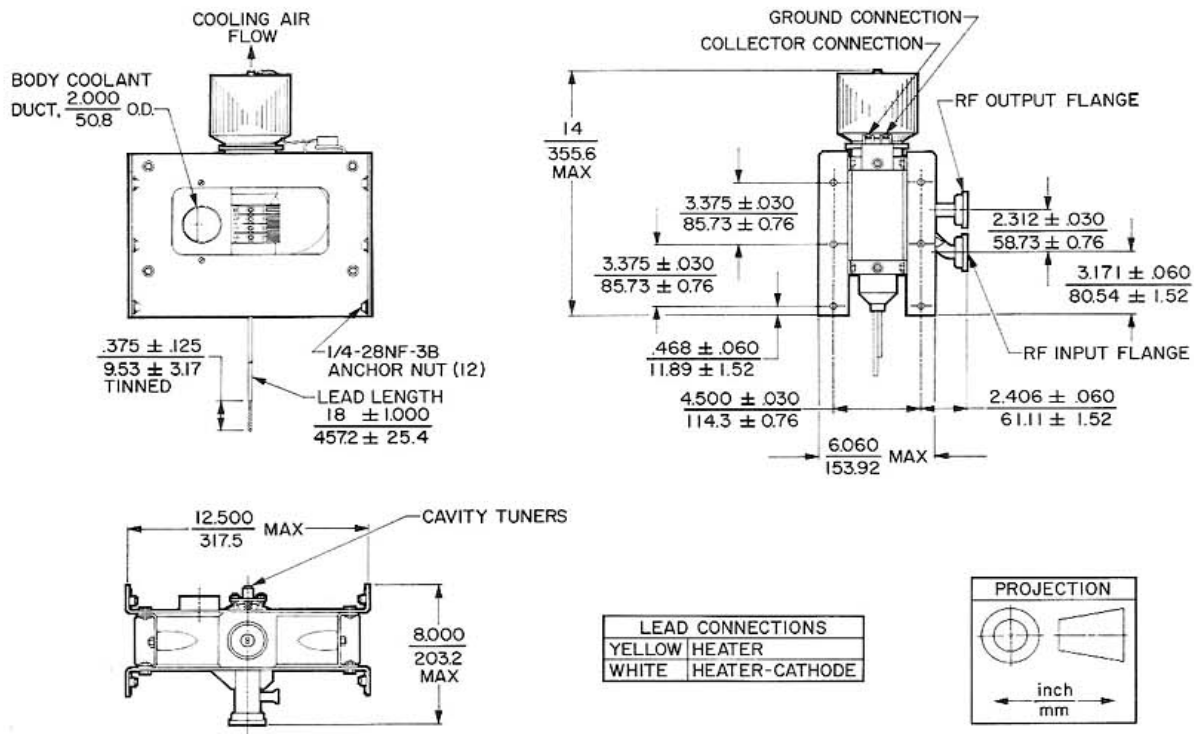
1. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limitation and simultaneous operation at more than one rating may not be possible. Equipment design should limit voltage and environmental variations so that the ratings will never be exceeded.
2. Represents a load VSWR of about 1.5:1 at 1 kW output.
3. Characteristics and operating values are based on performance tests. These figures may change without notice as a result of additional data or product refinement. Varian Associates should be consulted before using this information for final equipment design.
4. Forced air flow of at least 450 lb/hr (100 ft³/min) at 2.0 inches of water and 25°C air temperature must be drawn, not forced, through the collector fins. Minimum air flow of 90 lb/hr (20 ft³/min) through the body cooling duct at 0.25 inch of water is required.
5. These values are acceptance limits for the VA-866. Equipment design should allow for these variations.

CHARACTERISTIC CURVES

Typical performance values



OUTLINE DRAWING



OPERATING HAZARDS

Read the following and take all necessary precautions to protect personnel. Safe operating conditions are the responsibility of the equipment designer and the user.

High Voltage. This tube operates at voltages which can be deadly. Equipment must be designed so personnel cannot come in contact with operating voltages. Enclose high-voltage circuits and terminals and provide fail-safe interlocking switch circuits to open the primary circuits of the power supply and to discharge high-voltage capacitors whenever access is required.

Microwave Radiation. Exposure of the human body to microwave radiation in excess of 1 milliwatt per square centimeter is unsafe and can result in blindness

or other injury. Personnel must be fully protected from the microwave energy which radiates from this device. All input and output r-f connections, waveguide flanges, and gaskets must be r-f leakproof and properly engaged. Never operate this device without a microwave-energy-absorbing load attached. Personnel must be prevented from looking into open waveguides or antennas while such a device is energized. (Ref. Proc. IRE, Vol. 49, No. 2, pp. 427-447, Feb. 1961).

Equipment must be designed to fully safeguard all personnel from these hazards. Labels and caution notices must be provided on equipment and in manuals clearly warning of those hazards which cannot be avoided.