

DESCRIPTION

The VA-838B is a five-cavity pulsed klystron for use as a pulse amplifier in L-band systems requiring high output power together with high gain and high efficiency. It can produce a peak output of at least 300 kilowatts or more than 100 kilowatts with reduced operation over its tunable frequency range of 1.230 to 1.345 gigahertz. This conservatively-designed, rugged klystron provides reliable, long-life service. Focusing is achieved by means of an electromagnet. The tube and magnet are both liquid cooled.

FEATURES

High Power -

Peak output in excess of 300 kilowatts at average power levels up to 15 kilowatts.

High Gain -

Saturation gain is 47 dB or more.

Precise Tuning -

Tuners located on the upper mounting plate are equipped with dial cavity-tuning indicators.

Low Noise -

Integrated random noise and peak spurious output are at least 60 dB below the carrier level.

Ample Bandwidth -

Three-dB bandwidth is 25 MHz over the tuning range.



GENERAL CHARACTERISTICS¹

ELECTRICAL

Frequency Range	1.230 - 1.345 GHz
Output Power, peak	350 kW
Heater Voltage	7.0 V
Heater Current, at 7.0 V, typ	18.0 A
Heater Surge Current, max	30 A
Heater Warm-up Time, min	15 min
Interelectrode Capacitance	
Anode-to-Cathode	40 pF
Focusing	VA-1589C Electromagnet
Magnet Voltage, max	126 V
Magnet Current, max	20 A

PHYSICAL

Dimensions	See Outline Drawing
Weight, max	
Tube	130 lb
Magnet	430 lb
Mounting Position	Any
X-ray Shielding	Required
Cooling	Liquid
Outlet Temperature, max	80 °C

COOLING

The tube and electromagnet require a cooling system capable of dissipating about 60 kilowatts. Distilled water is the preferred coolant. Metals in the circulating system should be close to copper in the galvanic series. Maximum coolant

inlet temperature of 40°C is for cooling systems operating at atmospheric pressure at sea level. For different coolants or operating conditions, contact the nearest Varian Sales Office or the Palo Alto Tube Division for recommendations.

Water Flow, min

Tube	22 gal/min
Electromagnet	1 gal/min

Pressure Drop, at min flow

Tube	45 lbf/in ²
Electromagnet	7 lbf/in ²

TYPICAL OPERATING CONDITIONS AND RATINGS

	300 kW OPERATION ¹		100 kW OPERATION ¹		MAXIMUM RATINGS ²
	NARROWBAND	BROADBAND	NARROWBAND	BROADBAND	
Frequency	1.28	1.28	1.28	1.28	--- GHz
Power Output, peak	339	300	113	100	--- kW
Power Output, average	12.07	10.7	5.65	5.0	15 kW
Drive Power, peak	5	30	2	15	30 W
Pulse Duration, beam	125	125	50	50	300 μs
Gain, at saturation	48.9	40	47.5	38	--- dB
Duty	0.0356	0.0356	0.05	0.05	---
Bandwidth, 3-dB	10	25	8	20	--- MHz
Efficiency ³	42	31.9	39.1	29.5	--- %
Beam Voltage, peak	45	47	30	32	50 kV
Beam Current, peak	18	20	9.6	10.6	25 A
Beam Power, peak	810	940	288	339	1.25 MW
Load VSWR	1.1:1	1.1:1	1.1:1	1.1:1	1.5:1

NOTES:

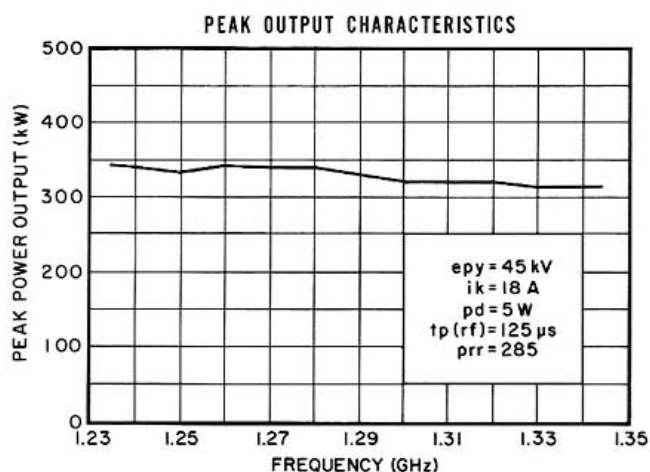
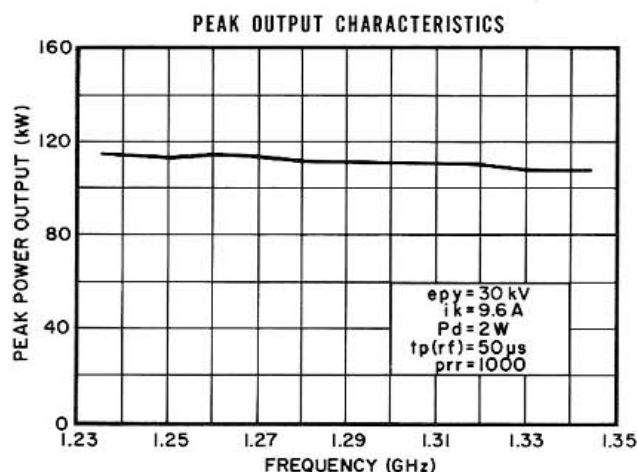
1. Characteristics and operating values are based on performance tests. These figures may change without notice as a result of additional data or product refinement. The Varian Palo Alto Tube Division should be consulted before using this information for final equipment design.

2. 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 ratings will never be exceeded.

3. Peak output power divided by peak input power.

CHARACTERISTIC CURVES

Typical performance values



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 condensers 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).

X Rays. This device may produce X-ray radiation when energized. Operating personnel must be protected by appropriate shielding. Provide adequate X-ray shielding on all sides of this device, as well as the modulator and pulse transformer tanks. X-ray caution signs or labels must be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.

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.

OUTLINE DRAWING

