varian associates of canada ltd.

TECHNICAL DATA

EM-1114/B

REFLEX KLYSTRONS

13.88-13.92 GHz
200 mW

DESCRIPTION

The EM-1114 and EM-1114B are fixed-frequency reflex klystrons designed for use as pump tubes in parametric amplifiers. They are also suitable for a wide variety of general-purpose applications where small size, light weight, and high frequency stability are required. Each tube delivers a CW output of at least 200 milliwatts at a specified frequency between 13.88 and 13.92 gigahertz. These conduction-cooled tubes provide excellent reliability and long operating life under severe environmental conditions.

MAXIMUM RATINGS[1]

Resonator Voltage	425 Vdc
Cathode Current	55 mAdc
Reflector Voltage[2]	-500 Vdc
Body Temperature	150 °C

GENERAL CHARACTERISTICS[3]

ELECTRICAL

Frequency Coverage[4]	13.88 - 13.92 GHz
Power Output, minimum	200 mW
Heater Voltage	6.3 ± 0.3 V
Heater Current, typical	1.08 A
Warm-up Time, minimum	30 s

ENVIRONMENTAL

Altitude, maximum	100,000 ft
Temperature Coefficient	
TA = 60 to 80°C, maximum	±150 kHz/°C

PHYSICAL

Dimensions	See Outline Drawing
Weight, approximate	170 g, 6 oz
Mounting Position	Any
Cooling	Conduction
RF Output Flange	Mates with special flange on WR75 Waveguide
Supply Connections	
EM-1114	Flying Leads
EM-1114B	Winchester Plug M7P-LSH-19C

TYPICAL OPERATING CONDITIONS[3,4]

Frequency	13.9 GHz
Power Output, matched load	300 mW
Resonator Voltage	400 Vdc
Cathode Current	35 mAdc
Reflector Voltage[2]	-280 Vdc
Reflector Modulation Sensitivity	800 kHz/V
Electronic Tuning Range[5]	45 MHz

RANGE VALUES FOR EQUIPMENT DESIGN[6]

	Min	Max
Power Output	200	--- mW
Resonator Voltage	---	400 Vdc
Cathode Current	---	50 mAdc
Reflector Voltage[2]	-255	-305 Vdc
Heater Current, at 6.3 V	---	1.3 A
Electronic Tuning Range[5]	25	--- MHz

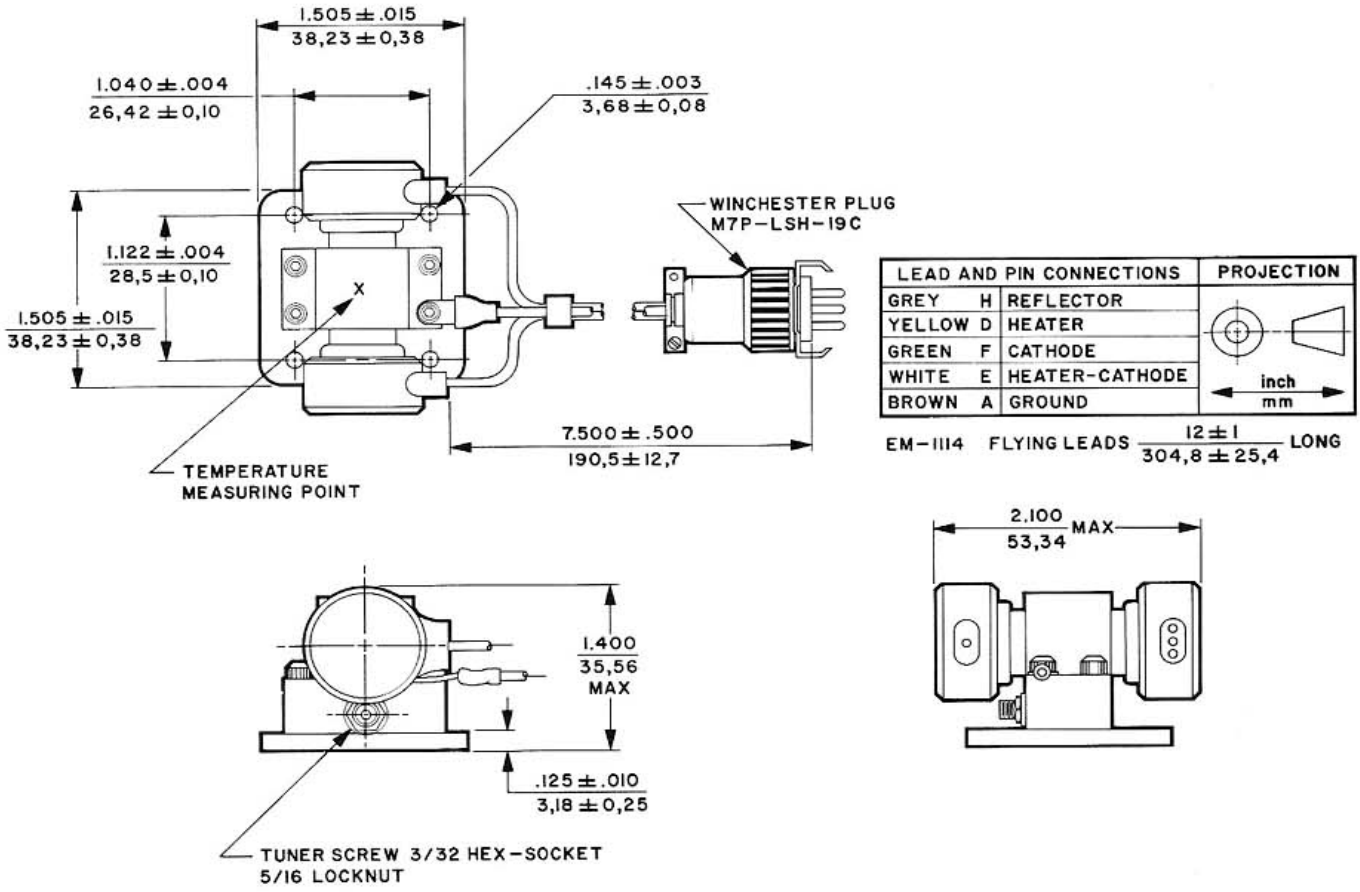
2540 2/71

Printed in U.S.A.

NOTES:

1. Ratings should not be exceeded under continuous or transient conditions. Simultaneous operation at more than one rating may not be possible. Equipment design should limit voltage and environmental variations so that no ratings will ever be exceeded.
2. The reflector must always be at least 20 volts negative with respect to the cathode.
3. 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.
4. These tubes can be factory adjusted to provide optimum performance at any specified frequency within this range. When ordering, please specify the center frequency desired.
5. The electronic tuning range is measured between the half-power points.
6. These values are acceptance limits for the tubes. Equipment design should allow for these variations.

OUTLINE DRAWING



LEAD AND PIN CONNECTIONS			PROJECTION
GREY	H	REFLECTOR	
YELLOW	D	HEATER	
GREEN	F	CATHODE	
WHITE	E	HEATER-CATHODE	inch / mm
BROWN	A	GROUND	

EM-1114 FLYING LEADS 12 ± 1 / 304,8 ± 25,4 LONG

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 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.