

These ratings represent those of current samples of this type. Refer to the Objective Technical Information sheet for design-objective ratings.

This technical information is proprietary and is furnished only as a service to customers.

ZM-3142

TRAVELING-WAVE TUBE

1 Milliwatt Power Output
25 db Gain

Permanent Magnet

2300 - 4450 Megacycles
Less than 8 db Noise Figure

The ZM-3142 is a ruggedized, low-noise, broadband traveling-wave tube for use in the 2300-to-4450-megacycle frequency range. It has a noise figure of less than 8 decibels across the entire band with a power output of 1 milliwatt.

The tube is of metal-and-ceramic construction and is supplied as a completely packaged assembly which includes a permanent-magnet focusing structure, connectors and housing. The entire assembly weighs approximately 12.3 pounds.

The broad bandwidth, low noise, high gain, freedom from tuning adjustments, and rugged construction are important features for application in military systems. The device is particularly useful as the input tube for radar receivers, where its low noise and protection to the crystal mixer are decided advantages. Other applications include electronic countermeasures equipment, microwave relay systems, and radiometry.

GENERAL

Electrical

Frequency 2300 to 4450 Megacycles

Heater

Voltage 6.3 Volts
Current, nominal 0.4 Ampere

A heater-voltage regulation of ± 2 percent is recommended to realize optimum gain and noise figure.

Focusing Method - Permanent Magnet

Noise Figure*#, maximum 8 Decibels
Small Signal Gain, minimum 25 Decibels
Saturation Power Output, nominal 1.0 Milliwatt
Collector Dissipation 1.0 Watt
Impedance, Coaxial 50 Ohms
Input, VSWR Less than 2.5 to 1
Output, VSWR Less than 2.5 to 1

Mechanical

Mounting Position - Any

Connectors

DC Socket - Winchester M10P-LSH-19 (or equivalent)

RF Connectors, Coaxial

Input - Type N, Female

Output - Type N, Female

Over-all Dimensions

Length, approximate 9.25 Inches
Width, approximate 4.25 Inches
Height, approximate 4.25 Inches
Weight (Complete Assembly), approximate 11.5 Pounds

Thermal

Cooling - Convection

TYPICAL OPERATING CONDITIONS**

Electrode-No. 1 (Grid) Voltage	 -10 to 0	Volts
Electrode-No. 2 (Anode) Voltage	 10 to 30	Volts
Electrode-No. 3 Voltage	 25 to 100	Volts
Electrode-No. 4 Voltage	 50 to 200	Volts
Helix		
Voltage	 150 to 275	Volts
Current, maximum	 50	Microamperes
Collector Voltage	 400 to 600	Volts
Beam Current	 200 to 600	Microamperes

ENVIRONMENTAL

Shock (energized)	50 G for 11 milliseconds on each of three mutually perpendicular axes.
Vibration (operating)	0.06 inches double amplitude from 5 to 70 cycles per second and 15 G from 70 to 2000 cycles per second with sweep over 5 to 2000 cycles per second for 100 minutes on each of three mutually perpendicular axes.
Humidity (non-operating)	MIL-E-5272 C, Paragraph 4.4.1 (Procedure I); i.e., non-operating tube in 95 percent relative humidity atmosphere for 10 days with temperature cycled slowly from approximately 30 C to 71 C each day.
Acoustic noise (operating)	135 decibels, 25 to 12,000 cycles per second random noise.
Altitude (operating)	100,000 feet mean sea level.
Operating temperature, ambient	-60 to +100C

* Over band with the same operating voltages that provide minimum gain variation.

Noise figures of 5.5 to 7 db can be supplied for narrow-band optimized versions of this tube. If requirements exist for an improved noise figure over a limited bandwidth, consult the nearest Power Tube Department sales office.

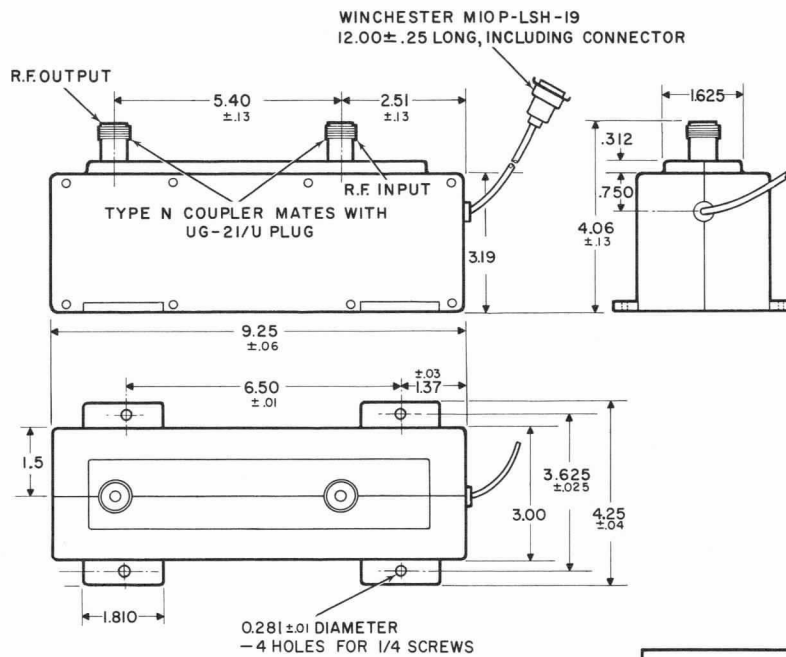
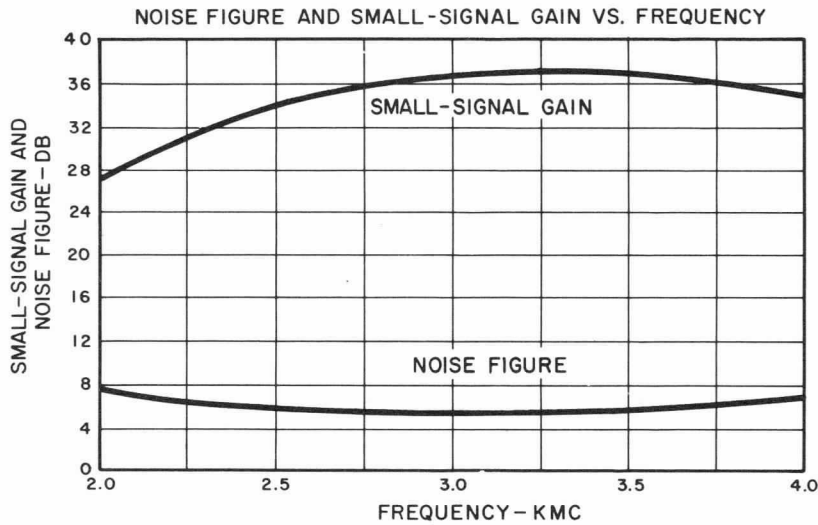
** All voltages may be isolated from ground; i.e., it is not necessary to operate the cathode, helix, collector, or any other electrode at ground potential. Voltages shown are measured with respect to cathode. For minimum noise and optimum gain characteristics, voltages should be adjusted within ranges specified by instructions accompanying each tube.

PERMANENT-MAGNET PRECAUTIONS

This tube uses a uniform-field permanent magnet as the focusing structure. A label on the tube specifies a nominal lower limit of two inches on magnetic-material proximity. It must be realized that strong external magnets or large amounts of magnetic material at this distance may permanently damage the tube. A small screw-driver will not, while a large a-c transformer or a large sheet of steel at this distance may cause damage by defocusing the tube.

In addition, a related caution is important and must be remembered whenever handling a uniform-field tube. The permanent magnets of these tubes cause a large attractive force between the tube and magnetic material. Unless one is always careful to hold the tube and/or magnetic objects near the tube firmly, the result is sudden direct contact. The magnetic object may cause tube damage due to violations of the minimum spacing requirement.

For small steel hand tools, a two-inch limit is sufficient. For large magnetic objects with magnetic fields of their own, the lower minimum distance should be determined accurately by testing. To accomplish this, the tube may be secured to a suitable three-foot-long dielectric support and the tube case grounded. With the tube operating and its helix current being measured, the tube may be moved slowly by the dielectric support toward the magnetic object. (CAUTION: Appropriate electrical safety procedures should be followed at all times.) The minimum distance for which there is no degradation in r-f performance is the point at which the helix current starts to increase. If a slight degradation in noise figure can be accepted, the helix current may be allowed to increase somewhat as long as it stays below its operating maximum.



ALL DIMENSIONS ARE IN INCHES AND
THOSE WITHOUT TOLERANCES ARE
APPROXIMATE.

PIN CONNECTIONS MIOP-LSH-19	
ELECTRODE	PIN
CATHODE	B
HEATER	D
NO. 1, GRID	C
NO. 2, ANODE	F
NO. 3, FOCUS	A
NO. 4, FOCUS	E
NO CONNECTION	J
NO CONNECTION	H
HELIX	K
COLLECTOR	L

