# Traveling Wave Tube LD-550B

## Preliminary Data Sheet

The LD-550B is a CW traveling wave tube for operation over the frequency range 7.2 kMc to 8.5 kMc. The nominal gain is 40db at 1 watt output level with a typical saturation output power of 10 watts.

It is recommended that the tube be operated in the periodic permanent magnet focusing mount, type LD-550B Mount, incorporated with waveguide input and output connections fitted with matching devices. The collector electrode is depressed to approximately one half of the helix voltage and convection cooling is usually adequate when the mount is fixed with its axis horizontal and air can circulate freely past the radiator. Forced air cooling is required if the ambient temperature exceeds 55°C or the mount axis is vertical.

Tubes are fully interchangeable in the approved mount and tube replacement is a relatively simple operation.

### Feature

1. PPM Focused and Field Replaceable.
2. Depressed Collector Operation for Improved Efficiency.
3. Conduction and Natural Convection Cooling.

### General Data

#### Physical

| | |
|---|---|
| Dimensions ..... | See Outline |
| Weight ..... | Tube Envelope : 0.23 kg (0.51 lb) |
| | LD-550B Mount : 4.3 kgs (9.5 lbs) |
| Preferred Mounting Position .... | Horizontal |
| Cathode ..... | Oxide Coated, Unipotential |
| R.F. Connections ..... (on LD-550B Mount) | WR-112 with UG-51/U Flange |

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## Electrical

| Maximum Ratings (Note 1) | Min. | Max. |
|---|---|---|
| Collector Voltage (Eb) ..... | 1600 Vdc | 3000 Vdc |
| Collector Current (Ib) ..... | — | 34 mA dc |
| Helix Voltage (Ew) ..... | 2700 Vdc | 3400 Vdc |
| Helix Current (Iw) ..... | — | 2.0 mA dc |
| Accelerating Anode Voltage (Ea) ..... | — | 3400 Vdc |
| Accelerating Anode Current (Ia) ..... | — | 1.0 mA dc |
| Focusing Electrode Voltage (Ec) ..... | -60 Vdc | -20 Vdc |
| Collector Dissipation | — | 56 W |
| Collector Seal Temperature | — | 130 °C |
| Mount Ambient Temperature Range | -10 °C | +55 °C |
| Cathode Heating Time | 90 sec. | — |

## Typical Operation

Cold input and output match over 7.2 to 7.65, 7.65 to 8.1 and 8.1 to 8.5 kMc band. VSWR $<$ 1.4

Heater Current at 6.3 Volts ..... 0.6 A

| Frequency | 7.2 kMc | 7.8 kMc | 8.5 kMc |
|---|---|---|---|
| Eb | 1600 Vdc | 1600 Vdc | 1600 Vdc |
| Ib | 33 mAdc | 33 mAdc | 33 mAdc |
| Ew | 3100 Vdc | 3050 Vdc | 3000 Vdc |
| Iw | 0.3 mAdc | 0.3 mAdc | 0.3 mAdc |
| Ea | 2500 Vdc | 2500 Vdc | 2500 Vdc |
| Ia | 0.01 mAdc | 0.01 mAdc | 0.01 mAdc |
| Ec | -35 Vdc | -35 Vdc | -35 Vdc |
| RF Output Power : (0.5 mW input level) | 8.5 W | 7.5 W | 4.5 W |
| RF Saturated Output Power (Ew/max. Po) | 14.0 W | 12.0 W | 10.0 W |
| Small Signal Gain (0.1 mW input level) | 44 db | 43 db | 40 db |

Noise Figure (Note 2) (Small signal) ..... 28 db

Note 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 allow for voltage and environmental variations so that ratings will never be exceeded.

Note 2: This noise figure is temporarily measured by signal generator method at 6320 Mc.

## Operating Instructions

The following instructions provide the basic information for installing and operating the LD-550B traveling wave tube.

### 1. Installation of LD-550B Mount

The optimum arrangement for installation of the Mount is to provide a mounting clamp in the center of the mount between the two waveguides and then use flexible waveguides for the input and output connectors. A satisfactory alternative arrangement is to use a fixed waveguide for the output connector, supporting the mount at this point, and then use a flexible waveguide for the input connector. Rigid waveguides may also be used providing the mechanical line-up of the waveguides is adjustable to the extent that excessive pressure is not applied to the tube flanges when the flange bolts are tightened into position.

### 2. Stray Magnetic Field

There is a small stray magnetic field external to the tube mount. Magnetic materials should not be kept a minimum of 0.5 inch from any portion of the tube mount except the radiator and metal cap ends of tube envelope. Isolators should be located at spots suitable for avoidance of any influence on the tube current transmission. It is desirable to keep the increase of helix current due to other magnetic materials less than 0.1 mA.

### 3. Mounting Tube Envelope

Undo tube envelope positioning screws three on each side, and insert tube envelope into the mount so that the shielded flying leads fit into the notch provided in the mount, and set the envelope firmly in place by use of the clamping nut on the radiator. Care should be taken to avoid radial force.

4. Impedance Matching

Adjust the input and output plungers. Then adjust the impedance matching screws for a minimum cold VSWR.
A cold VSWR of less than 1.1 to 1. will be attained over any 30 Mc band from 7.2 to 8.5 kMc.

5. Applications of Voltage

5.1 Apply the heater voltage and allow a minimum warm-up period of 90 seconds.

5.2 Set the focusing electrode, collector and helix voltages according to the instructions on Test Performance Sheet accompanied by each LD-550B tube envelope shipped.

It is recommended that the collector be kept at ground potential since it is connected to the tube mount internally.

5.3 Switch on all voltages. Accelerating anode voltage should be about 1500 volts.

5.4 Adjust tube position carefully to optimize current transmission by observing the helix current.

5.5 Apply the specified rf drive and adjust accelerating anode voltage until the rated collector current is reached, keeping the helix voltage at the value specified on the Test Performance Sheet.

5.6 Adjust the helix voltage for optimum operation. The helix voltage should never be made to exceed 3400 volts or fall below 2700 volts. If the helix voltage is above or below this range, the tube may be damaged by porr current transmission. The collector voltage should never be depressed below 1600 volts with respect to the cathode.

5.7 Readjust tube position and adjust the focusing electrode voltage for the best current transmission compatible with power output requirements, and then lock the tube envelope firmly to the tube mount by envelope positioning screws.

6. Dismantling Tube Envelope

After the power source is cut off, loosen all envelope positioning screws. Turn the clamping nut on the radiator in CCW several times and pull out tube envelope carefully from the mount after clamping nut has been completely disengaged.

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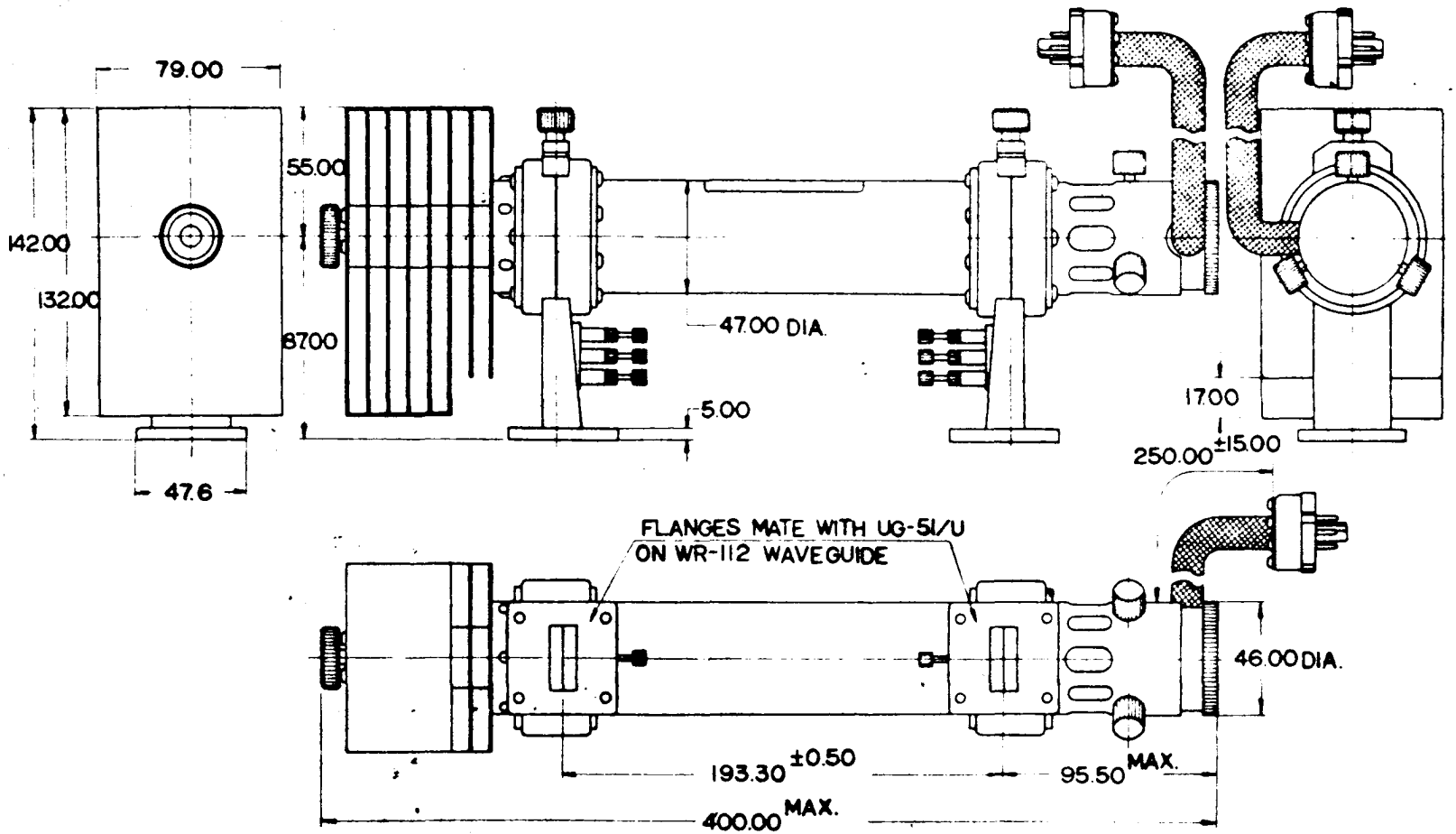
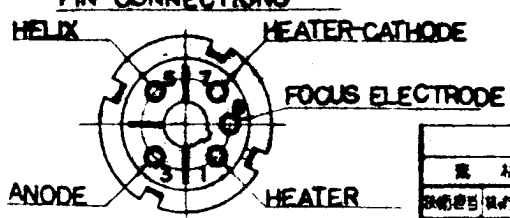



NOTES

DIMENSIONS ARE IN MILLIMETERS.

PIN CONNECTIONS




| 材名 | 所要寸度 | 仕上および処理 |
|---|---|---|
| | | |

LD-550 B
OUTLINE DRAWING

| 版数 | 年月日 | 修正 |
|---|---|---|
| 1 | 9 5 1963 | |

尺度 1/2

第三角法

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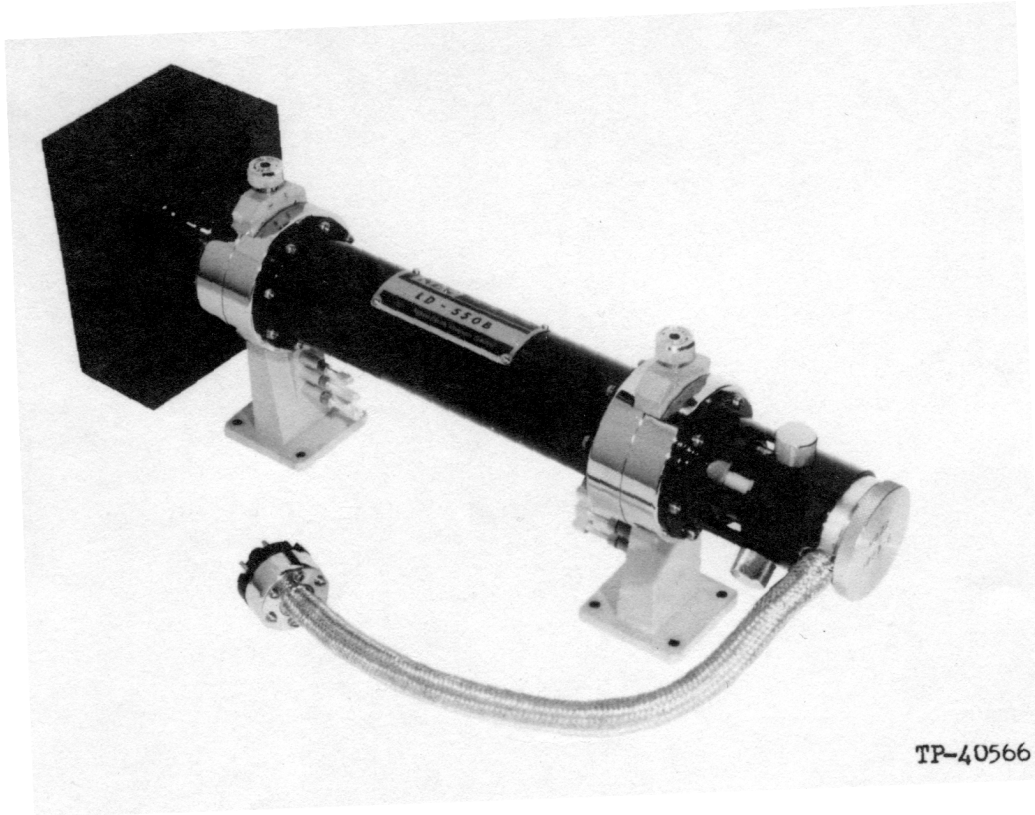
JIS A3 (297×420)

配布先

日本電気株式會社

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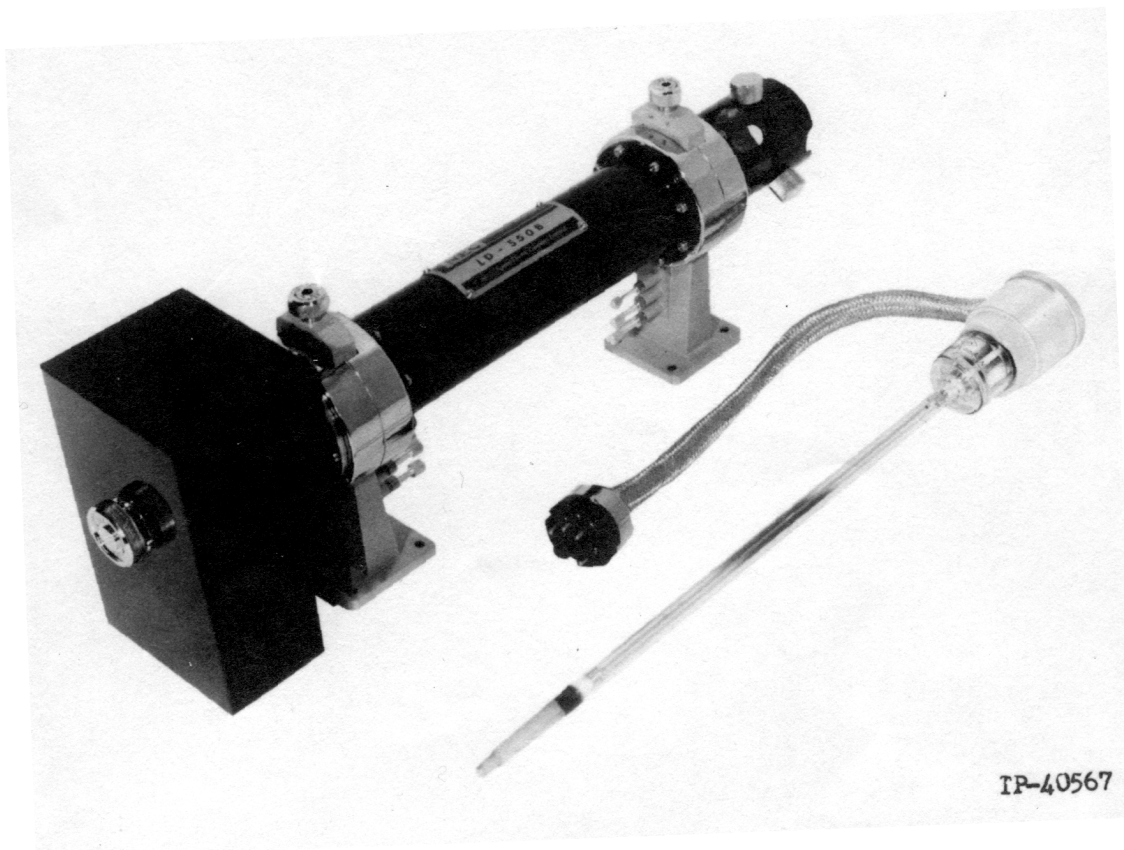


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