

Traveling Wave Tube LD-605

Preliminary Data Sheet

The LD-605 is a CW traveling wave tube for operating over the frequency range of 5.85 kMc to 7.2 kMc. For the frequency band of 5.85 kMc to 6.45 kMc, this tube type has an average gain of 40 db at 10 watt output level and a saturated output power of about 20 watts. For the frequency band of 6.45 kMc to 7.2 kMc, the average gain at 10 watt output level is 38 db and the saturated output power is about 17 watts.

It is recommended that the tube be operated in the periodic permanent magnet focusing mount, type LD-605 Mount, incorporated with waveguide input and output connections fitted with matching devices. The collector electrode is depressed to 2 KV and convection cooling is usually adequate when the mount is fixed with the axis horizontal and air can circulate freely past the radiator. Forced air cooling is required if the ambient temperature exceed 55°C or the mount axis is vertical.

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

Features

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

General DataPhysical

Dimensions	See Outline
Weight	Tube Envelope : 0.25 kg (0.55 lb) LD-605 Mount : 4.3 kgs (9.5 lbs)
Preferred Mounting Position	Horizontal
Cathode	Oxide Coated, Unipotential
R. F. Connections (on LD-605 Mount)	WR-137 with UG-344/U Flange

Electrical

<u>Maximum Ratings (Note 1)</u>	Min.	Max.
Collector Voltage (Eb)	1900 Vdc	2100 Vdc
Collector Current (Ib)	—	40 mAdc
Helix Voltage (Ew)	3000 Vdc	3600 Vdc
Helix Current (Iw)	—	2.0 mAdc
Accelerating Anode Voltage (Ea)	—	3600 Vdc
Accelerating Anode Current (Ia)	—	1.0 mAdc
Focusing Electrode Voltage (Ec)	-60 Vdc	-20 Vdc
Collector Dissipation	—	84 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 5.85 to 6.45 and 6.45 to 7.2 kMc band	VSWR < 1.3		
Hot input match over 5.85 to 6.45 and 6.45 to 7.2 kMc	VSWR < 1.4		
Hot output match over 5.85 to 6.45 kMc	VSWR < 1.5		
Hot output match over 6.45 to 7.2 kMc	VSWR < 2		
Heater Current at 6.3 Volts	0.6 A		
Frequency (kMc)	5.85	6.45	7.2
Eb (Vdc)	2000	2000	2000
Ib (mAdc)	40	40	40
Ew (Vdc)	3220	3150	3130
Iw (mAdc)	0.15	0.13	0.06
Ea (Vdc)	2600	2600	2600
Ia (mAdc)	0.005	0.005	0.005
Ec (Vdc)	-35	-35	-35

RF Output Power (W) (1mW input level)	12	10	7
RF Saturated Output Power (W) (E_w /Max. P_o)	23	19	16
Small Signal Gain (db) (0.1 mW input level)	42	41	40
Noise Figure (Note 2)(db) (Small Signal) 21.3		

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 measured by signal generator method at 6320 MC.

Operating Instruction

The following instructions provide the basic information for installing and operating the LD-605 traveling wave tube.

1. Installation of LD-605 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 the 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 30 MC band from 5.85 to 7.2 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-605 tube envelope shipped.
- 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 3600 volts or fall below 3000 volts. If the helix voltage is above or below this range, the tube may be damaged by poor current transmission. The collector voltage should never be depressed below 1900 volts with respect to the cathode.
- 5.7 Readjust tube position and adjust the focusing electrode voltage for the best current transmission, 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.

LD-605

Frequency Output Power Characteristics

Tube No. MB-12
Collector Current 40 mA

Saturated Output Power

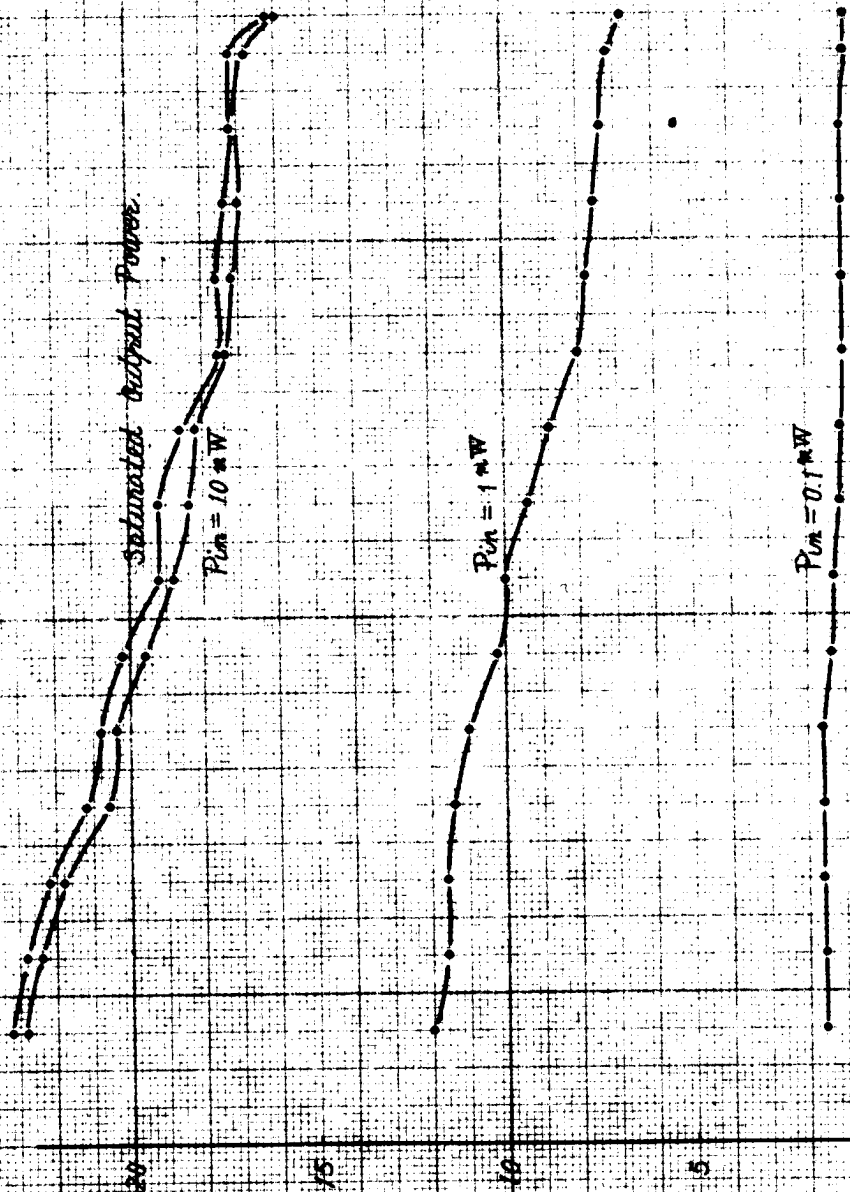
$P_{in} = 10 \text{ mW}$

$P_{in} = 1 \text{ mW}$

$P_{in} = 0.1 \text{ mW}$

Output Power (W)

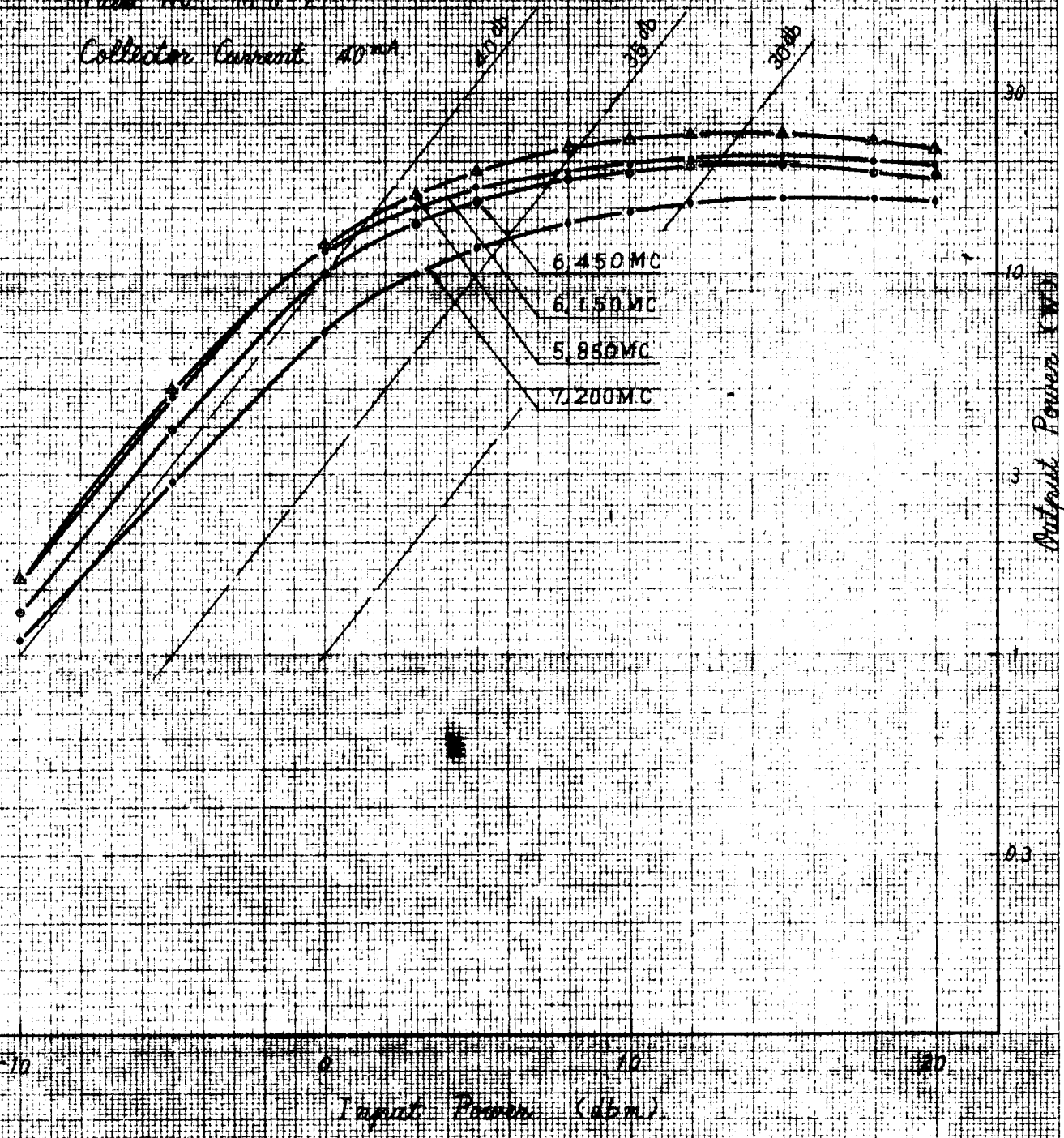
Frequency (KMC)



Input Power - Output Power Characteristics

Tube No. M8-2

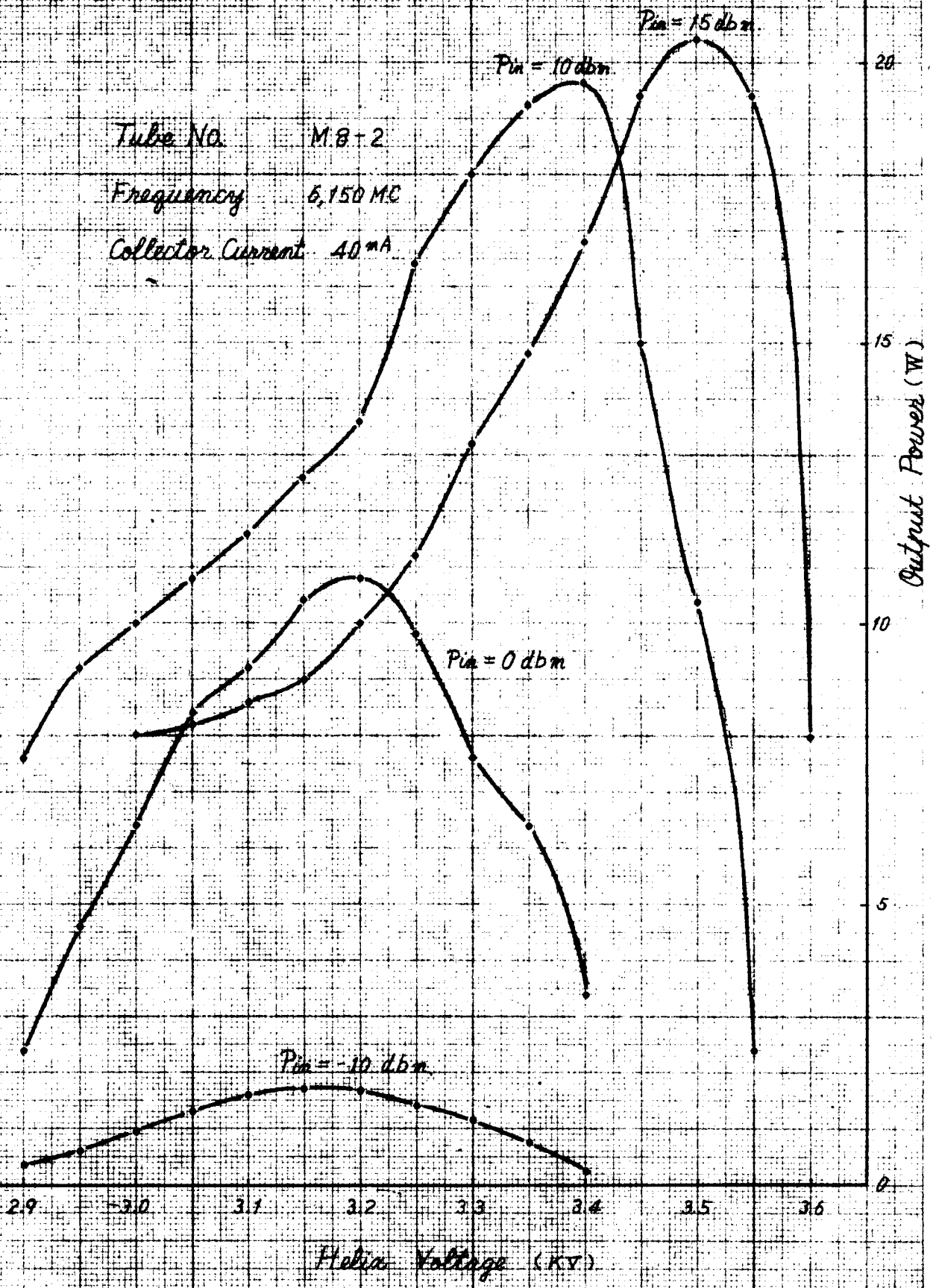
Collector Current 40 mA



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Helix Voltage Output Power Characteristics

Tube No. M.8-2
Frequency 6,150 MC
Collector Current 40 mA

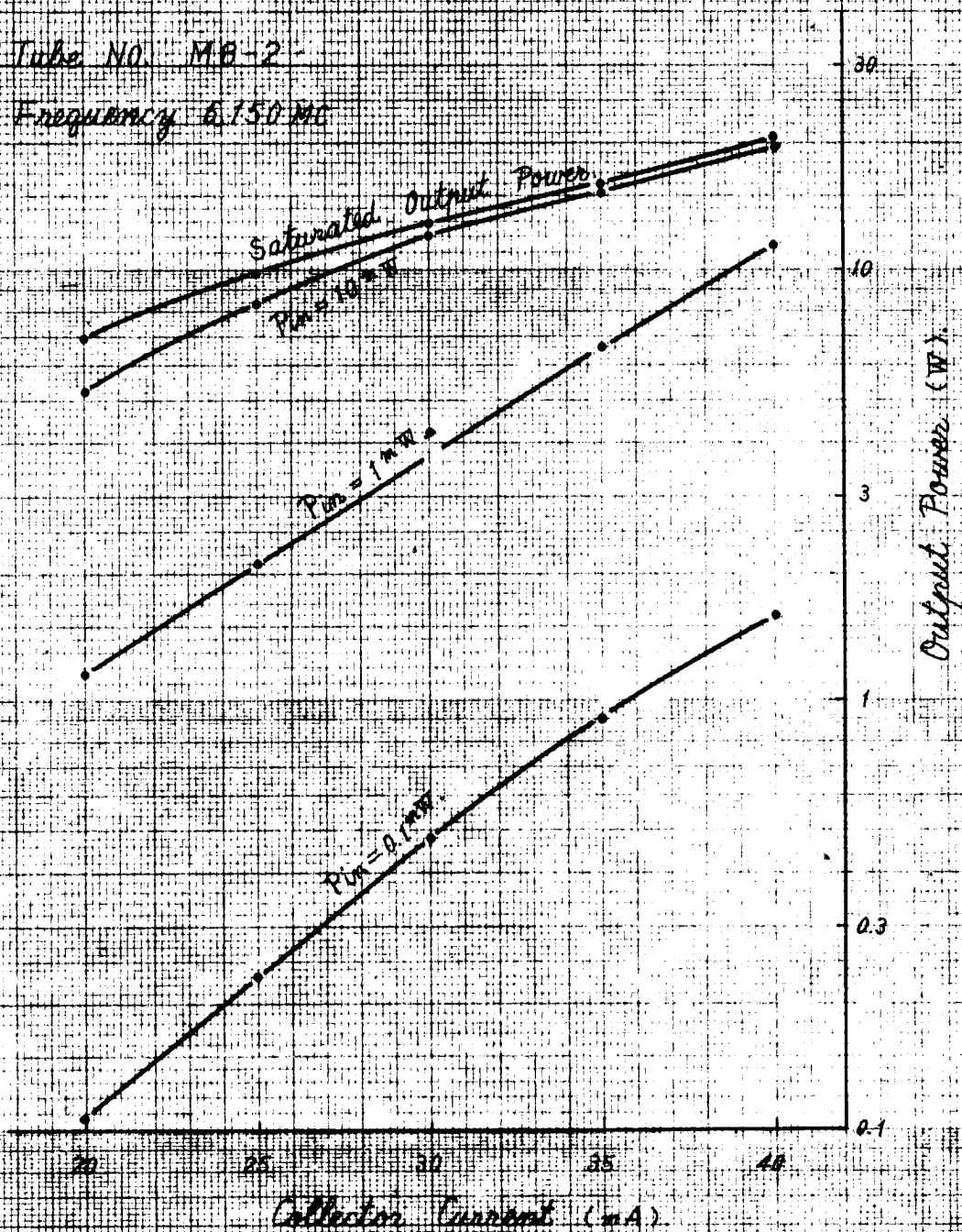


1D-805

Collector Current - Output Power Characteristics

Tube NO. MB-2-

Frequency 6.150 MC



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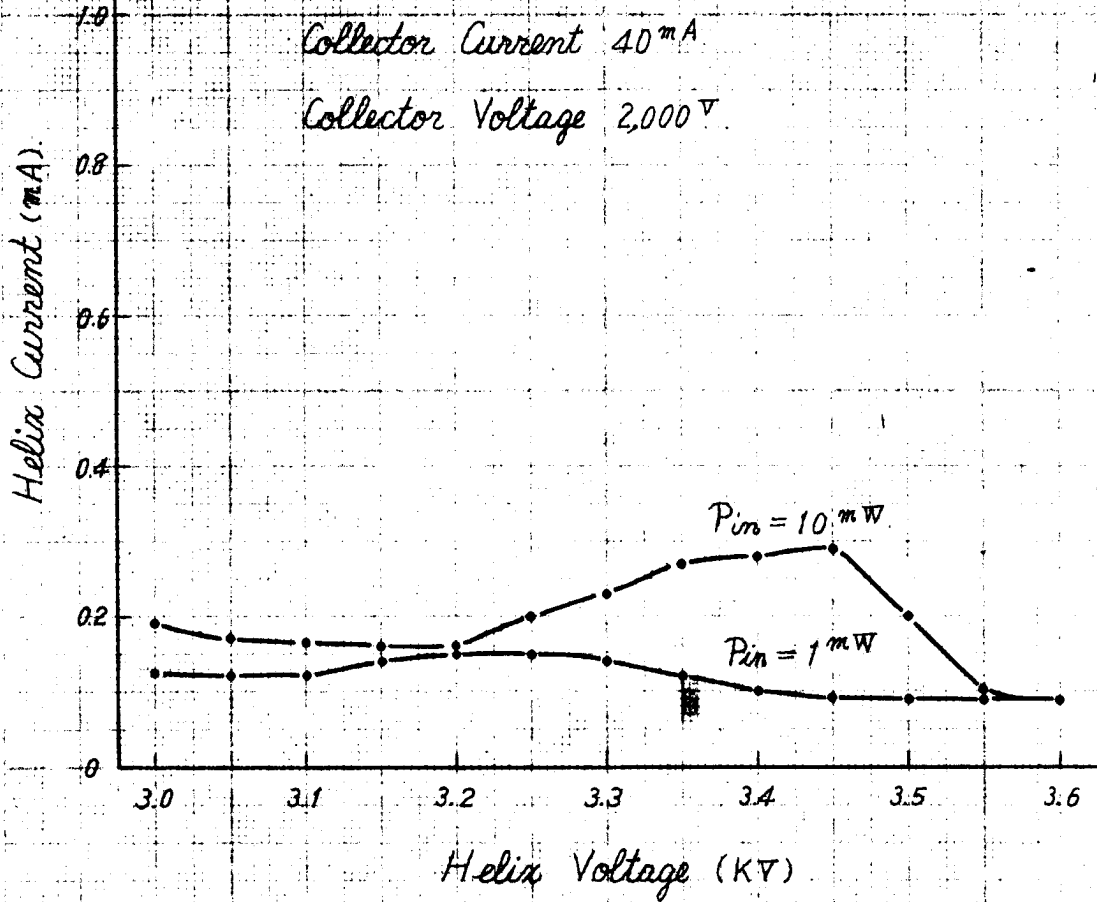
Helix Voltage - Helix Current Characteristics

Tube NO. M 8-2

Frequency 6,150 MC

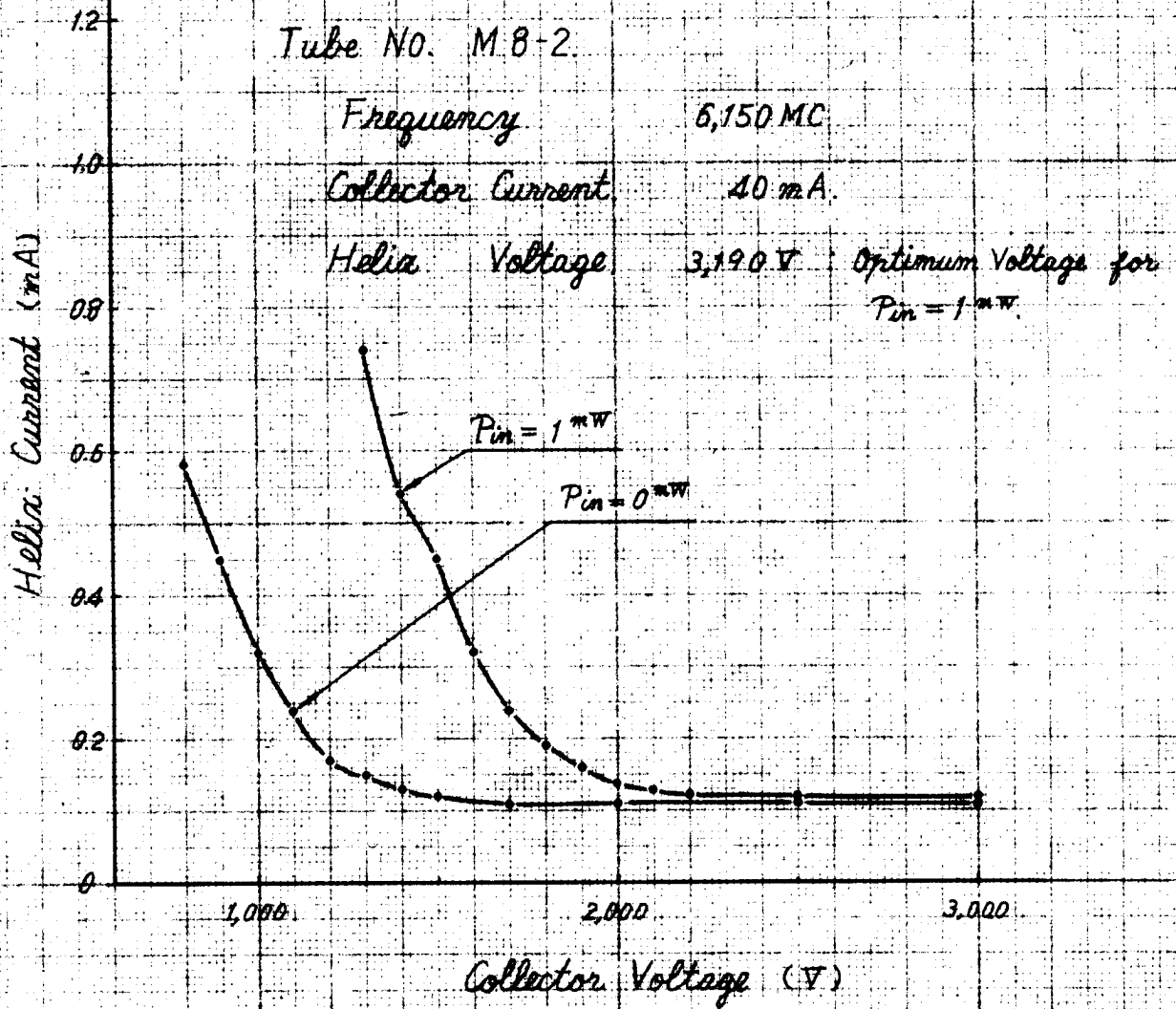
Collector Current 40 mA

Collector Voltage 2,000 V



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Helix Current - Collector Voltage Characteristics



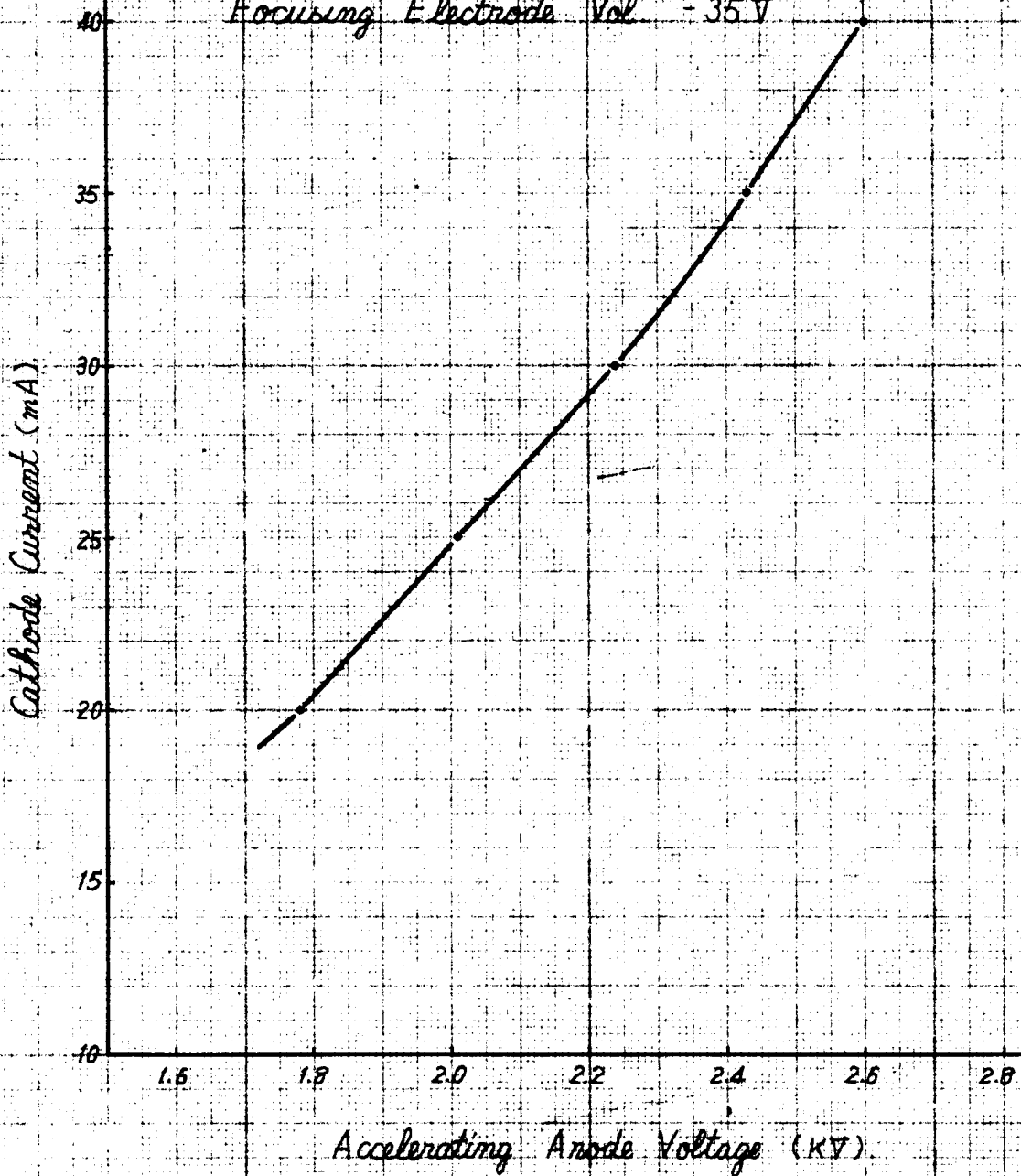
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Accelerating Anode Voltage

- Cathode Current Characteristics.

Tube NO. M8-2

Focusing Electrode Vol. -35V



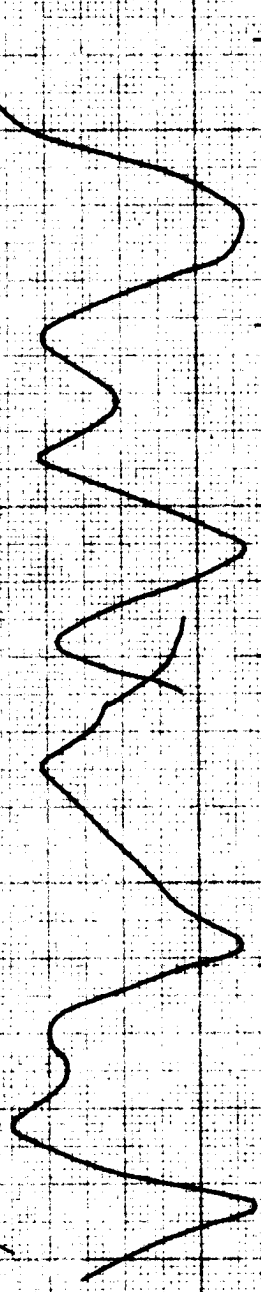
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Frequency - VSWR Characteristics

Tube NO. MB-2

Input Side VSWR in Cold State

VSWR
1.25
1.20
1.15
1.10



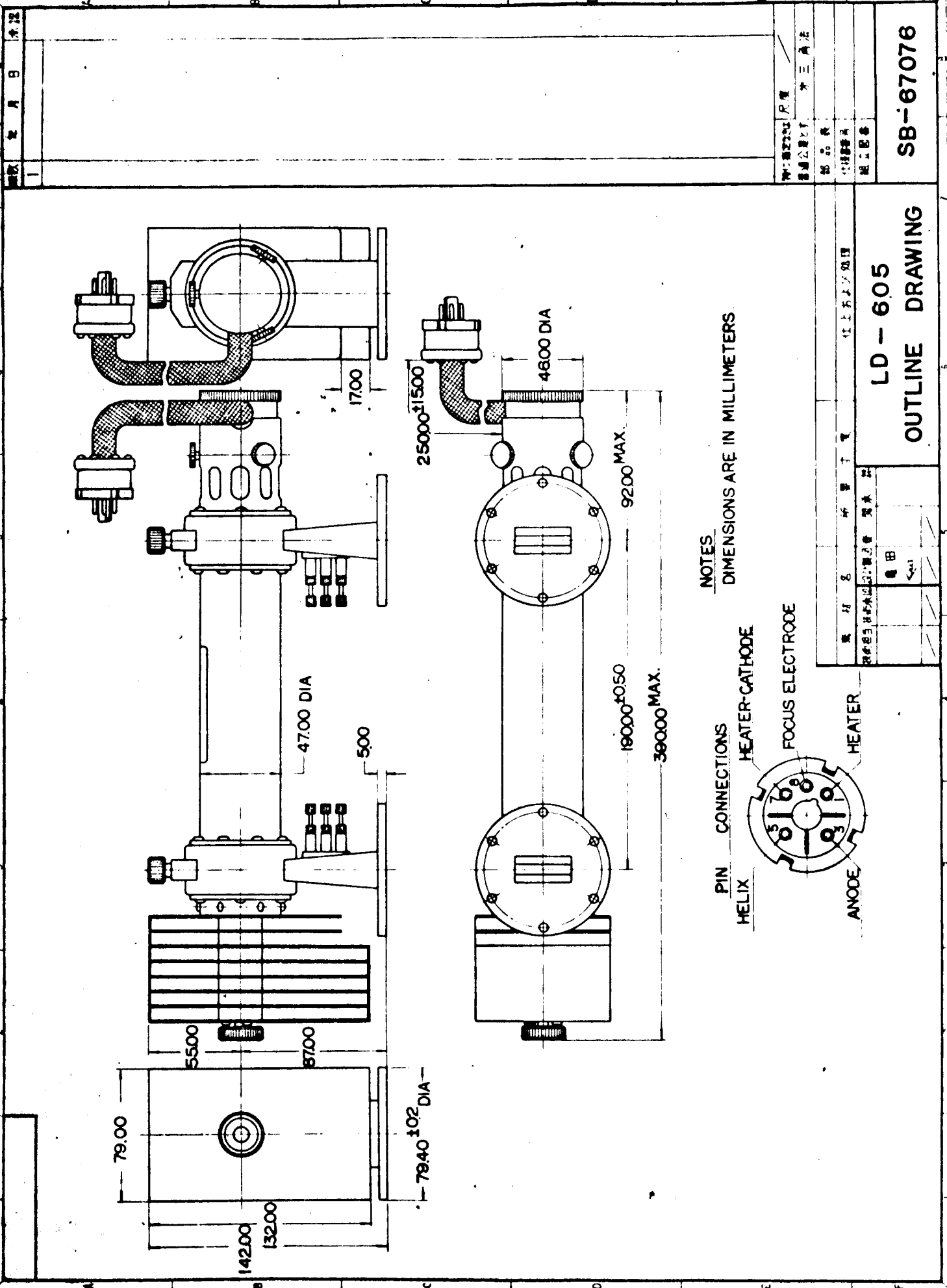
Frequency (GC)

Output Side VSWR in Cold State

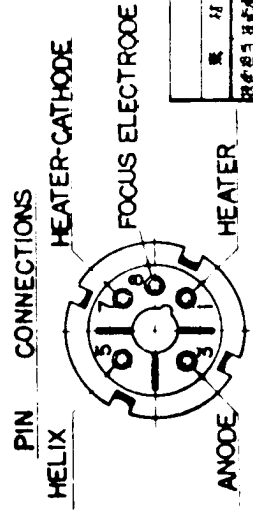
VSWR
1.40
1.35
1.30
1.25
1.20
1.15
1.10



Frequency (GC)



NOTES
DIMENSIONS ARE IN MILLIMETERS



LD - 605
OUTLINE DRAWING

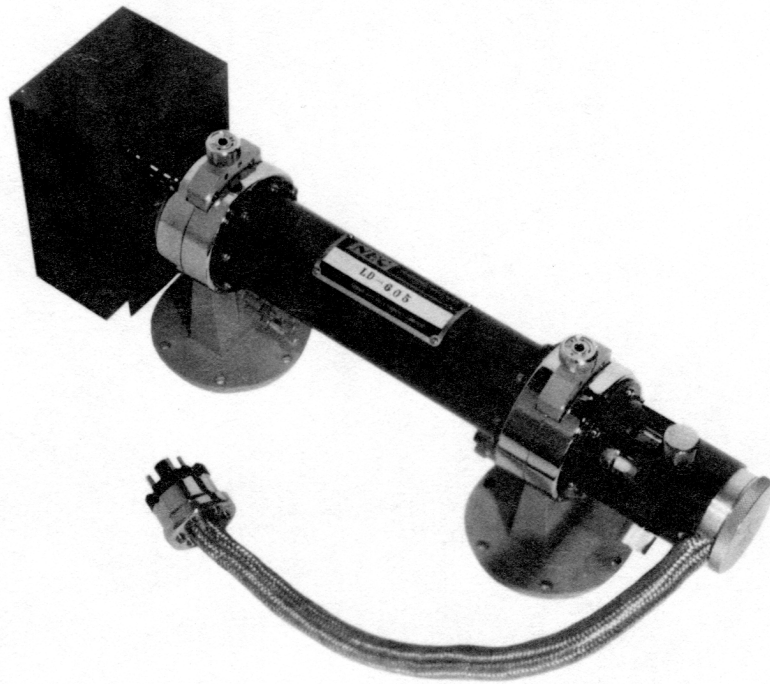
製造者	日本電業株式会社
製品名	真空管
型式	LD-605
規格	JEDEC 18
寸法	見図
重量	見図
価格	見図
納入	見図
検査	見図
保管	見図
廃棄	見図

SB-67076

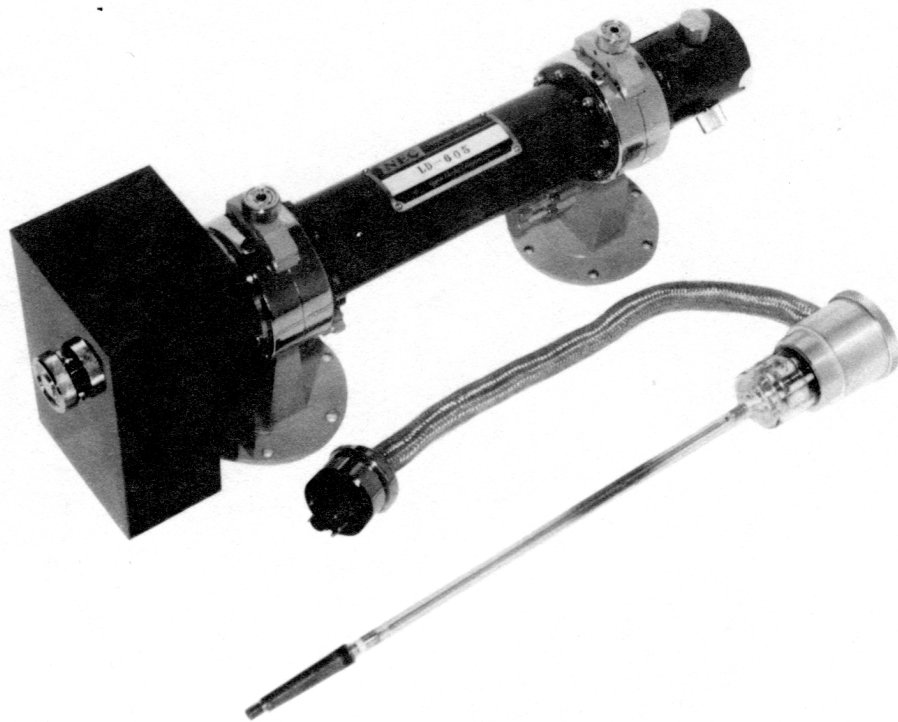
日本電業株式会社

配布丸

JIS A3 (297-420)



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