VES-3410

Nippon Electric Co., Ltd.
3/11/63

Traveling Wave Tube CW Amplifier NEC LD-550A

(Tentative Data Sheet)

The NEC LD-550A is a CW traveling-wave amplifier for operation over a frequency range of 5.8 to 8.2 kMc. For the upper half of this frequency range, this type tube has an average small signal gain of 30 db and a saturated output power of about 8 watts. For the lower half of the feq-ency range, the average small signal gain is 33db and the saturated output power is about 10 watts. The construction of the tube is of the conventional helical line type employing input and output waveguide couplings.

The LD-550A is available with a light-weight periodic permanent magnet focusing system, LD-550A Mount; it is convention-cooled, and operates with a collector electrode voltage that is depressed to approximately one half of the helix voltage. This latter feature produces a significant inprovement in the operating efficiency.

The design, construction, and long life expectancy of the tube wake it exceptionally well suited for use in point-to-point, broad-band, or multi-channel microwave relay equipments.

Features

1. PPM Focused and Field Replaceable.
2. Depressed Collector Operation For Improved Efficiency.
3. Convection Cooled.
4. Long Life.

Characteristics

Physical

Dimensions - - - - - - - - - - - - - - - - See Outline

Weight - - - - - - - - - - - - - - -	Tube Envelope: 0.25 Kg.
	Tube Mount: 4.6 Kg.
Preferred Mounting Position - -	Horizontal 1
Cathode - - - - - - - - - - - - - -	Oxide coated, unipotential
Connections	
RF Input & Output - - - - - - - -	WR-137 with UG-344/U flange

Electrical

Maximum Ratings 2

Accelerating Anode Voltage - - - - - - - - - - -	3400 V
Accelerating Anode Current - - - - - - - - - - -	1.0 mA
Helix Voltage - - - - - - - - - - - - - - - - - -	3400 V
Helix Current 3 - - - - - - - - - - - - - - - - -	1.0 mA
Collector or Voltage, min. - - - - - - - - - -	1600 V
Collector Current - - - - - - - - - - - - - - - -	35 mA
Collector Dissipation - - - - - - - - - - - - - -	56 W
Focusing Electrode Voltage, max. - - - - - - - -	-20 V
Focusing Electrode Voltage, min. - - - - - - - -	-60 V
Ambient Temperature, max. - - - - - - - - - - - -	55°C
Ambient Temperature, min. - - - - - - - - - - - -	-55°C
Collector Seal Temperature - - - - - - - - - - -	130°C

Operation

- Heater Voltage = 6.3 V; Heater Current at 6.3 V = 0.73A
- Frequency - 6860 ± 15 Mc
- Accelerating Anode Voltage - - - - - - - - - - - 2500 V
- Accelerating Anode Current - - - - - - - - - - - 0.01 mA
- Helix Voltage - - - - - - - - - - - - - - - - - - 3100 V
- Helix Current - - - - - - - - - - - - - - - - - - 0.3 mA

- Collector Voltage - - - - - - - - - - - - - - - - - 1600 V
- Collector Current - - - - - - - - - - - - - - - - - 35 mA
- Focusing Electrode Voltage - - - - - - - - - - - -30 V
- RF Output (3 mW input level) - - - - - - - - - - - 5 W
- RF Output Saturated - - - - - - - - - - - - - - - - 11 W
- Noise Figure (Small Signal) - - - - - - - - - - 27 db
- Small Signal Gain - - - - - - - - - - - - - - - - - 33 db
- Cold and hot input match over 30 Mc/s band with matching device adjusted - - - - - - - - - - - - VSWR $<$ 1.1
- Cold output match over 30 Mc/s band with matching device adjusted - - - - - - VSWR $<$ 1.1
- Hot output match over 30 Mc/s band with matching device adjusted - - - - - - VSWR $<$ 1.2
- Gain Linearity over 30 Mc/s band - - - - - - - - 0.2 db

Note

1. Convection cooling is sufficient when the tube is used in a horizontal position. For any other mounting position it may be necessary to direct a flow of air through the cooling fins through a convection duct or other means in order to keep the collector seal temperature at a safe operating level.
2. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limit, and simultaneous operation at another rating may not be possible.
   Design values for systems should include a safety factor aimed at maintaining operation within ratings under voltage and environmental variations.
3. Helix current increases gradually with tube life. Warning of the end of tube life is given when helix current reaches 2 milliamperes.

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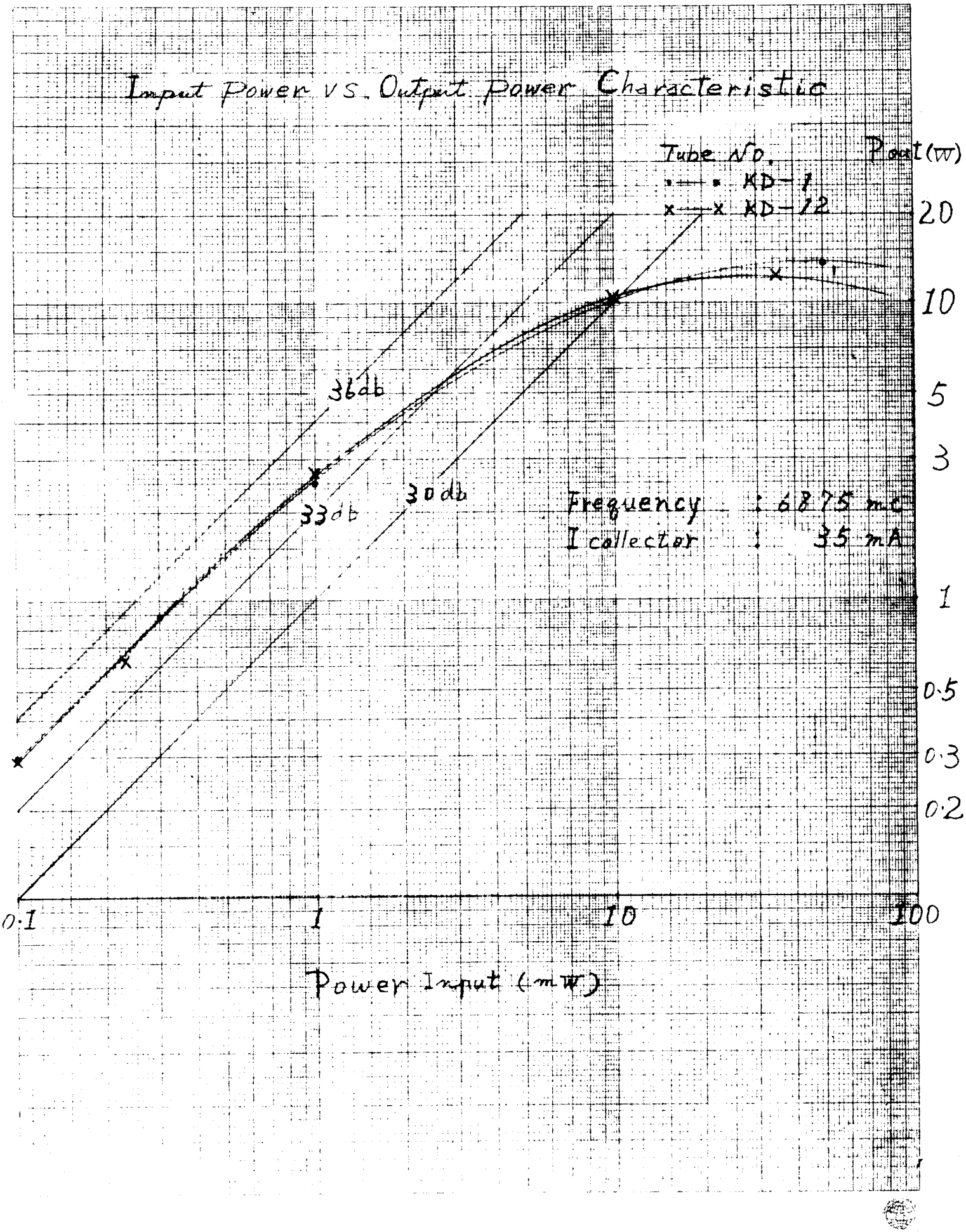
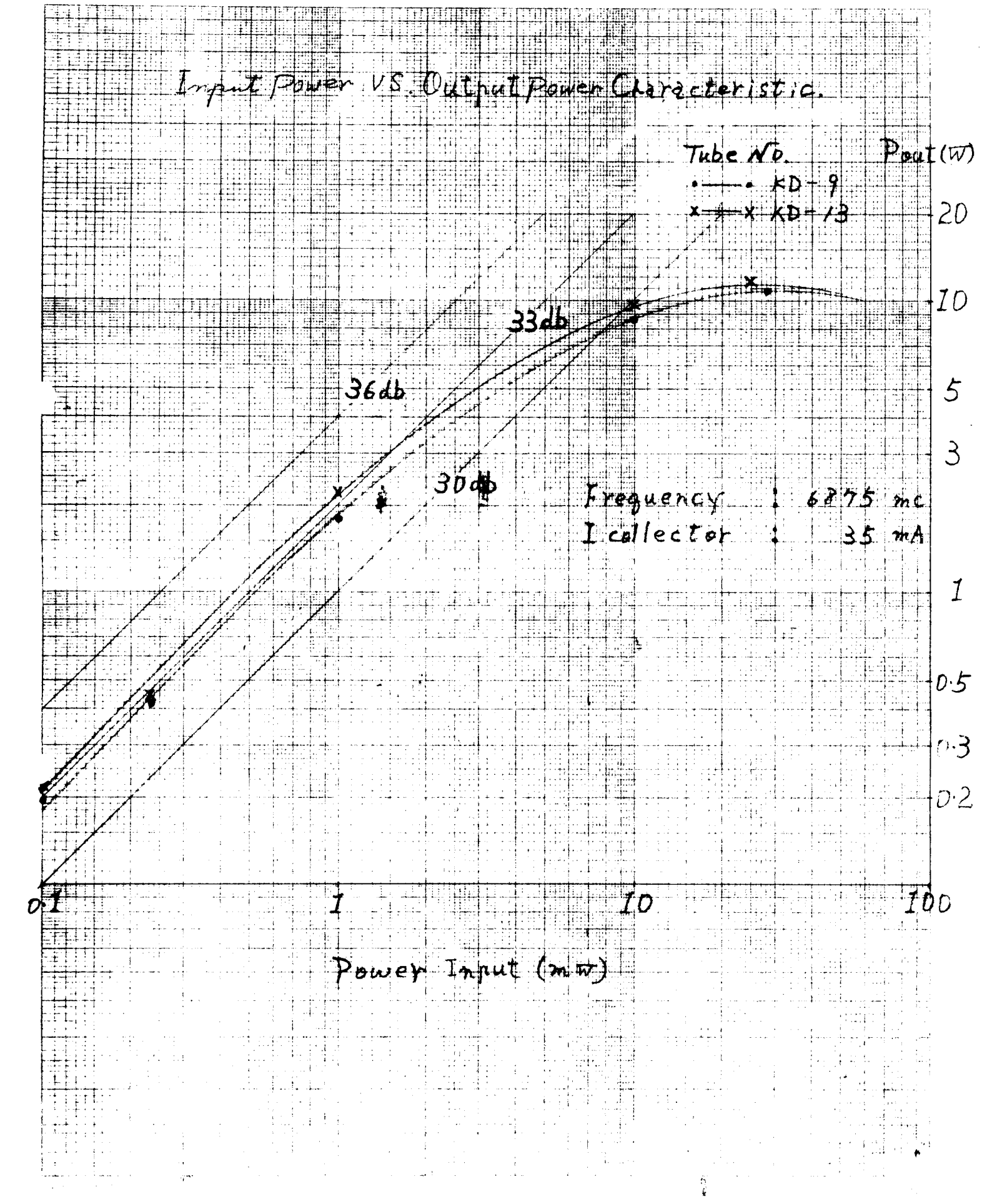

Input Power vs. Output Power Characteristic
Tube No.
• — • KD-1
x — x KD-12
Pout (W)
20
10
5
3
1
0.5
0.3
0.2
36db
33db
30db
Frequency : 6875 mc
I collector : 35 mA
0.1
1
10
100
Power Input (mW)


Input Power VS. Output Power Characteristic.
Tube No.
KD-9
KD-13
Pout (W)
20
10
5
3
1
0.5
0.3
0.2
33db
36db
30db
Frequency : 6875 mc
I collector : 35 mA
0.1
1
10
100
Power Input (mW)

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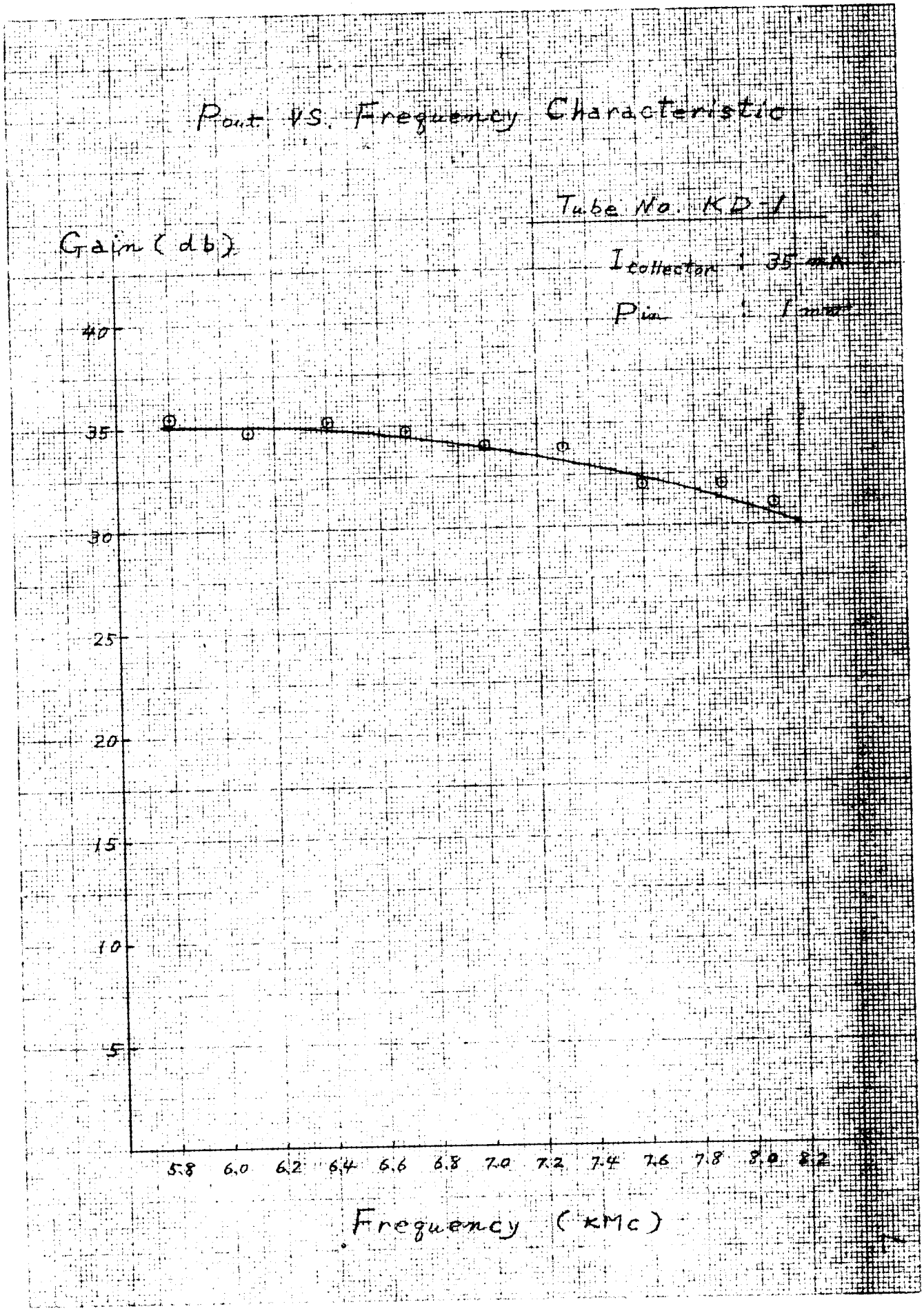
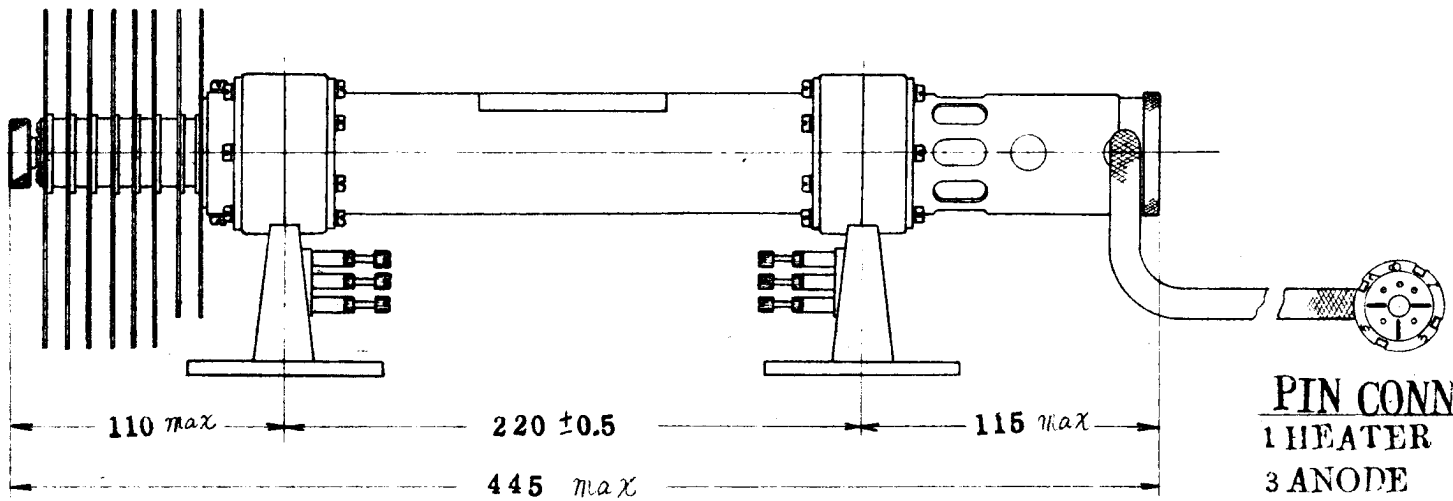
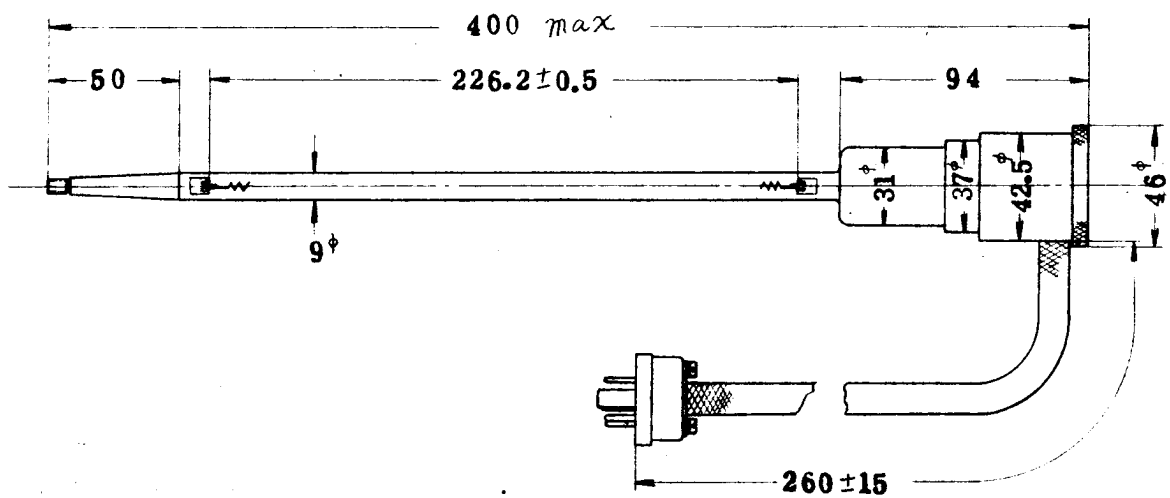

Pout. VS. Freqeuency Characteristic
Tube No. KD-1
Gain (db)
I collector : 35 mA
Pin : 1 mW
40
35
30
25
20
15
10
5
5.8
6.0
6.2
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Freqeuency (KMc)

LD-550A AMPLFIER

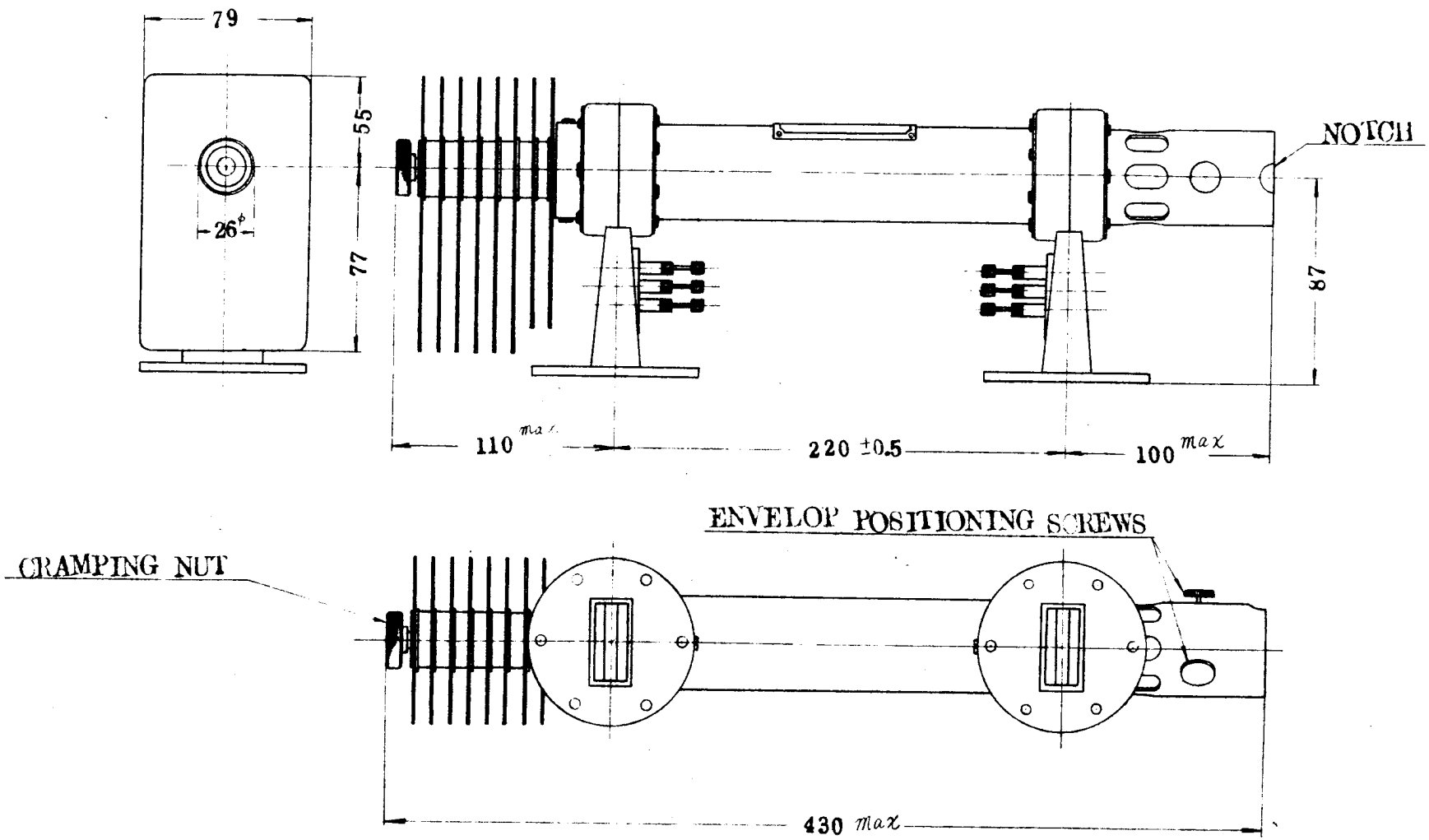




PIN CONNECTONS

1 HEATER
3 ANODE
5 HELIX
7 HEATER&CATHODE
8 FOCUSING ELECTRODE

LD-550A TUBE ENVELOPE



LD-550A MOUNT