



TETRODE

DESCRIPTION

The GL-4X150A is a small and compact four-electrode tube designed for use as a power amplifier or oscillator. The tube may also be used as a wide-band amplifier in video applications. The anode is forced-air cooled and is capable of dissipating 150 watts. The cathode is indirectly heated. Maximum ratings apply up to 500 megacycles.

A feature of this tube is a special terminal arrangement to facilitate its use in tank circuits of the coaxial type. The output circuit is effectively isolated from the input circuit at the higher frequencies by the contact-ring terminal for the screen grid. For operation of the GL-4X150A at the lower frequencies a base-pin terminal for the screen grid is available.

TECHNICAL INFORMATION

These data are for reference only. For design information refer to specifications.

GENERAL

Electrical Data

Heater Voltage.....	6.0	Volts
Heater Current.....	2.6	Amperes
Minimum Heating Time.....	.30	Seconds
Transconductance, $E_p = 500$, $E_{c2} = 250$, $I_p = 250$ ma.....	12,000	Micromhos
Amplification Factor, Grid No. 2 to Grid No. 1.....	5	
Direct Interelectrode Capacitances*		
Control Grid to Plate.....	0.02	uuf
Input.....	16.1	uuf
Output.....	4.7	uuf



GENERAL  ELECTRIC

TECHNICAL INFORMATION (CONT'D)

Mechanical Data

- Mounting position any
- Type of cooling forced air
- Required air flow on anode
 - Plate dissipation—Percentage of rating 100
 - Air flow—Cubic feet per minute 5.6
 - Pressure—Inches water 0.26The specified air flow should be delivered by a blower through the radiator before and during the application of any voltages.
- Required air flow on base
 - Forced-air-cooling of the base end of the tube must be provided to limit the temperature of the base seals to 150 C.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

Carrier conditions per tube for use with a maximum modulation factor of 1.0

- Maximum ratings, absolute values
- For operating frequencies up to 500 megacycles
- D-c plate voltage 1000 max volts
 - D-c grid No. 2 voltage 300 max volts
 - D-c grid No. 1 voltage-250 max volts
 - D-c plate current 200 max milliamperes
 - Plate dissipation 100 max watts
 - Grid No. 2 dissipation 15 max watts
 - Grid No. 1 dissipation 2 max watts
- Maximum circuit value
- Grid No. 1 circuit resistance 25,000 max ohms

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY
AND
RADIO-FREQUENCY POWER AMPLIFIER—CLASS C FM TELEPHONY

Key-down conditions per tube without amplitude modulation ¶

- Maximum Ratings, Absolute Values
- For operating frequencies up to 500 megacycles
- D-c plate voltage 1250 max volts
 - D-c grid No. 2 voltage 300 max volts
 - D-c grid No. 1 voltage-250 max volts
 - D-c plate current 250 max milliamperes
 - Plate dissipation 150 max watts
 - Grid No. 2 dissipation 15 max watts
 - Grid No. 1 dissipation 2 max watts
- Typical operation
- Frequencies up to 165 megacycles
- | | | | | |
|--|-----|-----|------|------------------|
| Heater voltage | 6 | 6 | 6 | 6 volts |
| D-c plate voltage | 600 | 750 | 1000 | 1250 volts |
| D-c grid No. 2 voltage | 250 | 250 | 250 | 250 volts |
| D-c grid No. 1 voltage | -75 | -80 | -80 | -90 volts |
| Peak r-f grid No. 1 voltage, approximate | 91 | 96 | 95 | 106 volts |
| D-c plate current | 200 | 200 | 200 | 200 milliamperes |
| D-c grid No. 2 current | 37 | 37 | 31 | 20 milliamperes |
| D-c grid No. 1 current, approximate† | 11 | 11 | 10 | 11 milliamperes |
| Driving power, approximate† | 1.0 | 1.1 | 1.0 | 1.2 watts |
| Power output, approximate | 85 | 110 | 150 | 195 watts |

TECHNICAL INFORMATION (CONT'D)

Typical Operation

At 500 megacycles with coaxial cavity

Heater voltage†	5.2	5.2	5.2	5.2	volts
D-c plate voltage	600	800	1000	1250	volts
D-c grid No. 2 voltage	250	250	250	280	volts
D-c grid No. 1 voltage	-110	-110	-110	-115	volts
D-c plate current	170	200	200	200	milliamperes
D-c grid No. 2 current	6	7	7	5	milliamperes
D-c grid No. 1 current, approximate†	6	10	11	10	milliamperes
Driver output power, approximate	15	20	25	30	watts
Power output, approximate	50	96	122	140	watts

Maximum circuit value

Grid No. 1 circuit resistance 25,000 max ohms

*With no external shield.

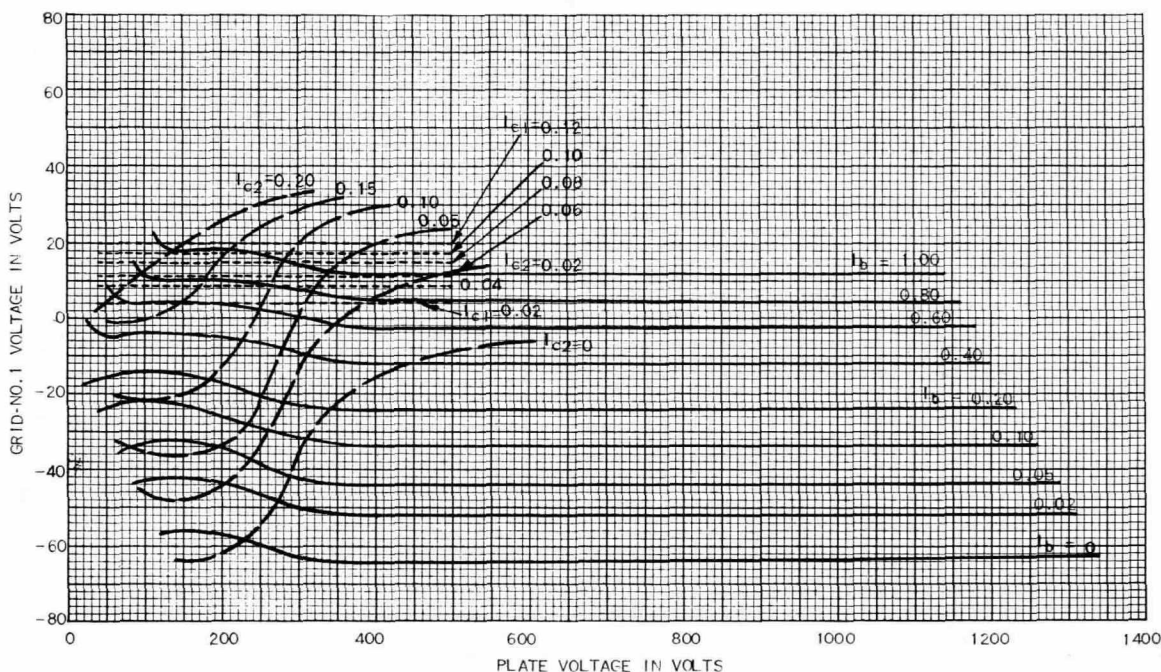
† Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

‡ The grid No. 1 current and driving power required to obtain the desired power output will vary with the plate loading. If the plate circuit presents a relatively low resistance to the tube, the desired output can be obtained with relatively low grid No. 1 current and driving power, but plate-circuit efficiency is sacrificed. Conversely, if the tube operates into a relatively high load resistance, relatively high grid No. 1 current and driving power are required to obtain the desired output and the plate-circuit efficiency will be high. In practice, a compromise must be made between these extremes.

In order to permit considerable range of adjustment, and also to provide for losses in the grid No. 1 circuit and the coupling circuits, the driver stage should have considerably more output capability than the typical driving power shown in the tabulated data. This recommendation is particularly important near the maximum rated frequency where there are other losses of driving power, such as those caused by radiation and transit-time effects.

‡ The cathode of the GL-4X150A in ultra-high frequency service is subjected to considerable back bombardment resulting from transit-time effects. This back bombardment raises the temperature of the cathode. The magnitude of the heating due to back bombardment is a function of the operating conditions and frequency, and must be compensated by reduction of the heater input in order to prevent over-heating of the cathode and resultant short life. When long life in continuous service is desired, the GL-4X150A should always be put in operation with full rated heater voltage (6 volts) which should then be reduced to a value depending on the operating conditions and frequency. At 500 megacycles and with typical operating conditions, the value of heater voltage should be approximately 5.2 volts. At lower frequencies, less reduction in heater voltage is required. After the heater voltage is reduced, circuit readjustment may be necessary.

GL-4X150A
AVERAGE CONSTANT CURRENT CHARACTERISTICS
 $E_1 = 6$ VOLTS, SCREEN GRID VOLTAGE = 250 VOLTS



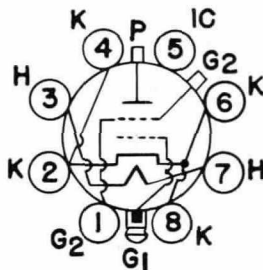
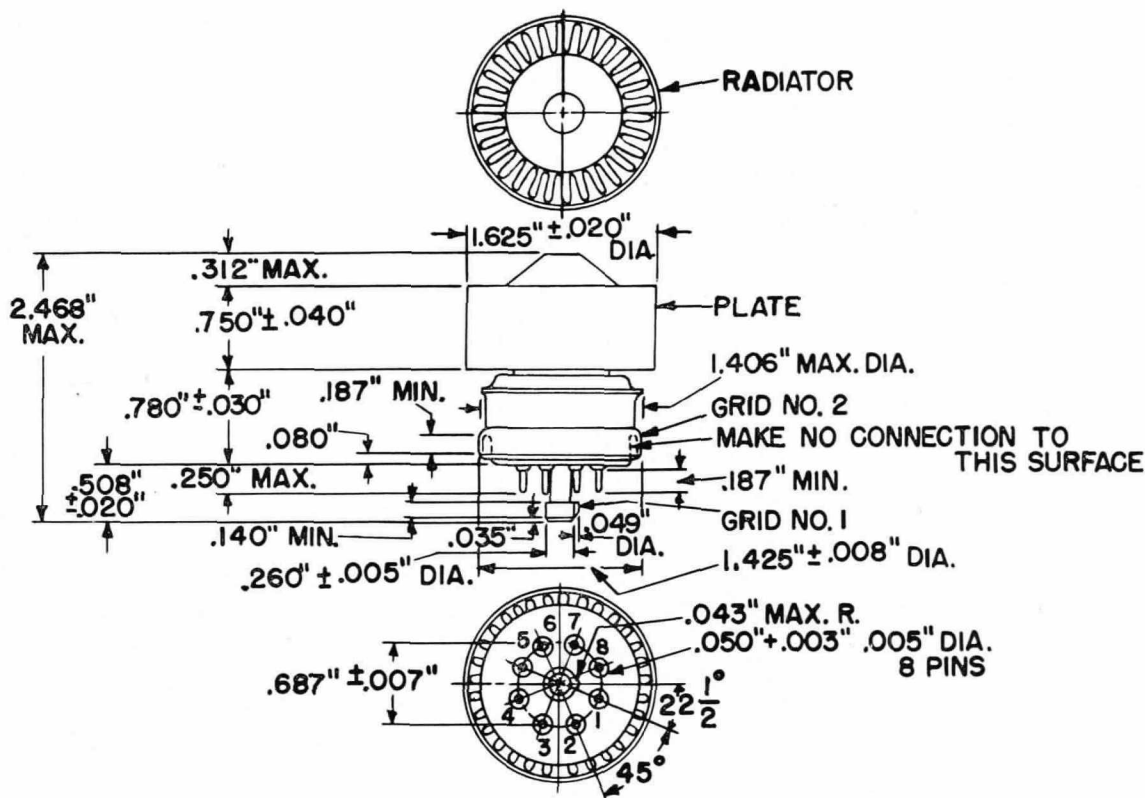
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GL-4X150A OUTLINE



BASING DIAGRAM

PIN NO. 1 FOR USE AT LOWER FREQUENCIES, CONTACT RING FOR USE AT HIGHER FREQUENCIES.

N-15149AZ

4-21-49

Tube Divisions, Electronics Department

GENERAL ELECTRIC

Schenectady, N. Y.