



## ELECTRONIC TUBE REFERENCE

**1623**

Power - Triode electronic tube

CONSOLIDATED TECHNICAL DATA

**1 SECTION**

CONSTRUCTION

**TRIODE**

Transmitting power triode intended for AF and RF power amplification, Class B modulation, and oscillator service. Published Class B intermittent-service conditions reach roughly 145 W maximum-signal output.

## GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | —                 | BASE PINS            | 4             |
| NOMINAL HEATER      | 6.3 V / 2.5 A     | PARALLEL HEATER      | — / —         |
| HEATING             | Direct            | SERIES OPERATION     | Not specified |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar       |

## SECTION RATINGS

|                                                                                                                               |          |
|-------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>SECTION 1</b> Triode                                                                                                       |          |
| TRANSCONDUCTANCE                                                                                                              | 0.0045 S |
| AMPLIFICATION FACTOR                                                                                                          | 20       |
| MAXIMUM PLATE VOLTAGE                                                                                                         | 1000 V   |
| MAXIMUM PLATE DISSIPATION                                                                                                     | 30 W     |
| <i>Representative electrical section; promoted values mapped from published ratings and characteristics where applicable.</i> |          |

**1623 — Power Triode Transmitting Tube**

The **1623** is a thoriated-tungsten-filament power triode designed for use as an audio-frequency (AF) power amplifier and modulator, as well as a radio-frequency (RF) power amplifier and oscillator. It is particularly well-suited for self-excited oscillator circuits subject to wide variations in plate load, as its operation is not critical to changes in grid excitation voltage. The 1623 is primarily utilized for renewal purposes in existing equipment.

# Mechanical Construction, Mounting, and Pinout

The 1623 features a glass envelope with a top cap anode terminal and a medium four-pin base. The tube is designed to operate without its plate showing color when run at its maximum Continuous Commercial Service (CCS) ratings.

## Physical Dimensions and Weight

- **Maximum Overall Length:** 6-13/32 inches (with a tolerance of  $\pm 5/32$  inch)
- **Seated Height:** 5-25/32 inches (with a tolerance of  $\pm 5/32$  inch)
- **Maximum Diameter:** 2-1/16 inches
- **Anode Cap Diameter:** 0.566 inch (with a tolerance of  $\pm 0.007$  inch)
- **Net Weight:** Approximately 3 ounces
- **Shipping Weight:** Approximately 7 pounds

## Installation and Mounting

The tube requires a small four-contact socket (specifically described as an A4-10 medium 4-pin base with a bayonet). It can be mounted in two permissible orientations:

1. **Vertical position** with the base down.
2. **Horizontal position** provided that pins 1 and 4 are aligned in a vertical plane (keeping the plane of the electrodes vertical).

## Pin Connection Configuration

The base connections, viewed from the bottom of the tube, are assigned as follows:

| Pin / Terminal | Connection         |
|----------------|--------------------|
| Pin 1          | Filament           |
| Pin 2          | No Connection (NC) |
| Pin 3          | Grid               |
| Pin 4          | Filament           |
| Top Cap        | Anode (Plate)      |

## Filament and Electrical Characteristics

The 1623 incorporates a thoriated-tungsten filament. Its basic electrical and interelectrode capacitance characteristics are:

- **Filament Voltage (AC/DC):** 6.3 V
- **Filament Current:** 2.5 A

- **Calculated Filament Power:** 15.75 W (calculated as 6.3 V \* 2.5 A)
- **Amplification Factor:** 20

## Direct Interelectrode Capacitances

- **Grid to Plate:** 6.7  $\mu\text{pF}$  (micromicrofarads)
- **Grid to Filament:** 5.2  $\mu\text{pF}$
- **Plate to Filament:** 0.9  $\mu\text{pF}$

## Maximum Ratings (CCS vs. ICAS)

The 1623 is rated under both Continuous Commercial Service (CCS) and Intermittent Commercial and Amateur Service (ICAS) systems. The absolute maximum ratings vary depending on the class of service:

### Class B Audio-Frequency Power Amplifier and Modulator

| Parameter                              | CCS Rating | ICAS Rating |
|----------------------------------------|------------|-------------|
| DC Plate Voltage                       | 750 V max  | 1000 V max  |
| Max-Signal DC Plate Current (per tube) | 100 mA max | 100 mA max  |
| Max-Signal Plate Input (per tube)      | 75 W max   | 100 W max   |
| Plate Dissipation (per tube)           | 25 W max   | 30 W max    |

### Class B Radio-Frequency Power Amplifier

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

| Parameter         | CCS Rating | ICAS Rating |
|-------------------|------------|-------------|
| DC Plate Voltage  | 750 V max  | 1000 V max  |
| DC Plate Current  | 50 mA max  | 50 mA max   |
| Plate Input       | 37.5 W max | 45 W max    |
| Plate Dissipation | 25 W max   | 30 W max    |

### Class C Telephony Plate-Modulated RF Power Amplifier

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

| Parameter         | CCS Rating | ICAS Rating |
|-------------------|------------|-------------|
| DC Plate Voltage  | 600 V max  | 750 V max   |
| DC Grid Voltage   | -200 V max | -200 V max  |
| DC Plate Current  | 83 mA max  | 100 mA max  |
| DC Grid Current   | 25 mA max  | 25 mA max   |
| Plate Input       | 50 W max   | 75 W max    |
| Plate Dissipation | 17.5 W max | 25 W max    |

## Class C Telegraphy RF Power Amplifier and Oscillator

*Key-down conditions per tube without modulation:*

| Parameter         | CCS Rating | ICAS Rating |
|-------------------|------------|-------------|
| DC Plate Voltage  | 750 V max  | 1000 V max  |
| DC Grid Voltage   | -200 V max | -200 V max  |
| DC Plate Current  | 100 mA max | 100 mA max  |
| DC Grid Current   | 25 mA max  | 25 mA max   |
| Plate Input       | 75 W max   | 100 W max   |
| Plate Dissipation | 25 W max   | 30 W max    |

## Typical Operating Conditions

### Class B Audio-Frequency Power Amplifier and Modulator (Two Tubes)

Unless otherwise specified, values represent typical operation for a pair of tubes:

| Parameter                     | CCS (Option 1) | CCS (Option 2) | ICAS   |
|-------------------------------|----------------|----------------|--------|
| DC Plate Voltage              | 500 V          | 750 V          | 1000 V |
| DC Grid Voltage               | -10 V          | -25 V          | -40 V  |
| Peak A-F Grid-to-Grid Voltage | 170 V          | 200 V          | 230 V  |

| Parameter                                  | CCS (Option 1) | CCS (Option 2) | ICAS           |
|--------------------------------------------|----------------|----------------|----------------|
| Zero-Signal DC Plate Current               | 40 mA          | 35 mA          | 30 mA          |
| Max-Signal DC Plate Current                | 200 mA         | 200 mA         | 200 mA         |
| Load Resistance (per tube)                 | 1300 $\Omega$  | 2100 $\Omega$  | 3000 $\Omega$  |
| Effective Load Resistance (plate-to-plate) | 5200 $\Omega$  | 8400 $\Omega$  | 12000 $\Omega$ |
| Max-Signal Driving Power (approx.)         | 3.5 W          | 4.0 W          | 4.2 W          |
| Max-Signal Power Output (approx.)          | 60 W           | 100 W          | 145 W          |

## Class B Radio-Frequency Power Amplifier (Single Tube)

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

| Parameter                 | CCS (Option 1) | CCS (Option 2) | ICAS   |
|---------------------------|----------------|----------------|--------|
| DC Plate Voltage          | 500 V          | 750 V          | 1000 V |
| DC Grid Voltage           | -25 V          | -40 V          | -50 V  |
| DC Plate Current          | 50 mA          | 50 mA          | 45 mA  |
| DC Grid Current (approx.) | 2 mA           | 1.5 mA         | 0.5 mA |
| Peak R-F Grid Voltage     | 50 V           | 60 V           | 62 V   |
| Driving Power (approx.)   | 1.8 W          | 1.4 W          | 1.7 W  |
| Power Output (approx.)    | 7.5 W          | 12.5 W         | 16 W   |

## Class C Telephony Plate-Modulated RF Power Amplifier (Single Tube)

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

| Parameter                 | CCS (Option 1) | CCS (Option 2) | ICAS          |
|---------------------------|----------------|----------------|---------------|
| DC Plate Voltage          | 500 V          | 600 V          | 750 V         |
| DC Grid Voltage           | -125 V         | -125 V         | -125 V        |
| Grid Resistor             | 5000 $\Omega$  | 5000 $\Omega$  | 6250 $\Omega$ |
| DC Plate Current          | 83 mA          | 83 mA          | 100 mA        |
| DC Grid Current (approx.) | 25 mA          | 25 mA          | 20 mA         |
| Peak R-F Grid Voltage     | 200 V          | 200 V          | 215 V         |
| Driving Power (approx.)   | 5 W            | 5 W            | 4 W           |
| Power Output (approx.)    | 30 W           | 38 W           | 55 W          |

## Class C Telegraphy RF Power Amplifier and Oscillator (Single Tube)

*Key-down conditions per tube without modulation:*

| Parameter                               | CCS (Option 1) | CCS (Option 2) | ICAS          |
|-----------------------------------------|----------------|----------------|---------------|
| DC Plate Voltage                        | 500 V          | 750 V          | 1000 V        |
| DC Grid Voltage (from grid resistor)    | 4100 $\Omega$  | 5000 $\Omega$  | 4500 $\Omega$ |
| DC Grid Voltage (from cathode resistor) | 600 $\Omega$   | 730 $\Omega$   | 750 $\Omega$  |
| DC Grid Voltage (from fixed supply)     | -70 V          | -85 V          | -90 V         |
| DC Plate Current                        | 100 mA         | 100 mA         | 100 mA        |
| DC Grid Current (approx.)               | 17 mA          | 17 mA          | 20 mA         |
| Peak R-F Grid Voltage                   | 140 V          | 160 V          | 172 V         |
| Driving Power (approx.)                 | 2.2 W          | 2.5 W          | 3.1 W         |
| Power Output (approx.)                  | 33 W           | 55 W           | 75 W          |

## High-Frequency Operation and Derating

The maximum ratings for the 1623 are fully applicable up to a frequency of 60 megacycles (Mc). When operating at higher frequencies, both the maximum plate voltage and plate power input must be reduced to protect the tube.

The required percentage of maximum rated plate voltage and plate input for elevated frequencies is specified as follows:

| Frequency | Class B | Class C (Plate Modulated) | Class C (Unmodulated) |
|-----------|---------|---------------------------|-----------------------|
| 60 Mc     | 100%    | 100%                      | 100%                  |
| 70 Mc     | 93%     | 88%                       | 88%                   |
| 100 Mc    | 80%     | 60%                       | 60%                   |

At these high frequencies, special attention must be paid to providing adequate ventilation for the glass bulb to prevent overheating.

## Circuit Design and Application Notes

### Break-In Operation

When the 1623 is employed in the final amplifier stage or a preceding stage of a transmitter designed for break-in operation and oscillator keying, a small amount of fixed bias must be incorporated into the circuit. This fixed bias is necessary to limit the plate current to a safe value when the excitation is removed. For example, with a plate voltage of 1000 volts, a fixed bias of at least -35 volts must be applied.

### Amplitude Modulation Limits

For Class C Telegraphy and RF Power Amplifier applications, amplitude modulation that is essentially negative may be utilized, provided that the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.

## Characteristic Curves and Interpretation

The typical characteristics of the 1623 are illustrated by its grid and plate curves:

- **Grid Characteristics:** Plotting grid current against plate voltage reveals how grid current behaves under positive grid potentials ranging from +20 V to +140 V. At lower plate voltages, the grid current rises significantly, particularly at higher positive grid voltages, before tapering off as plate voltage increases.

- **Average Plate Characteristics:** These curves show plate current in amperes plotted against plate voltage in volts for grid voltages ranging from -30 V to +140 V. The curves demonstrate a highly linear relationship across the typical operating regions, confirming the tube's capability to deliver clean power amplification and stable modulation.
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## Technical Summary

The **1623** is a versatile thoriated-tungsten-filament power triode designed for transmitting and modulator applications. Operating with a 6.3 V, 2.5 A filament supply, it features an amplification factor of 20 and a robust construction that allows up to 25 W of plate dissipation under CCS conditions (30 W under ICAS). It is highly capable across multiple modes of operation—including Class B AF modulator service, Class B RF amplification, and Class C telegraphy/telephony—at frequencies up to 60 Mc with full ratings, and up to 100 Mc with appropriate derating and bulb ventilation.



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1950 General Electric Transmitting Types

Published test conditions and operating points. Values on this page are preserved as reported by this source.

## 1950 GENERAL ELECTRIC TRANSMITTING TYPES

## Section 1 · Triode

| OTHER                        |                 |                  |
|------------------------------|-----------------|------------------|
| PARAMETER                    | PUBLISHED VALUE | CONDITION / NOTE |
| Maximum signal plate current | 100 mA          | ClassB           |
| Maximum signal plate input   | 100 W           | ClassB ICAS      |
| Maximum signal power output  | 145 W           | ClassB ICAS      |



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1956 RCA Transmitting Tubes

Published test conditions and operating points. Values on this page are preserved as reported by this source.

## 1956 RCA TRANSMITTING TUBES

## Section 1 · Triode

| OTHER                         |                 |                  |
|-------------------------------|-----------------|------------------|
| PARAMETER                     | PUBLISHED VALUE | CONDITION / NOTE |
| Maximum Plate/Inverse Voltage | 400 V           | Source rating    |
| Maximum Plate Dissipation     | 15 W            | —                |

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