ELECTRONIC TUBE REFERENCE

1602

Power - Triode electronic tube

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
TRIODE

Directly heated amplifier triode developed for critical audio-frequency applications where low microphonics are important. Rated for 15 W plate dissipation, it combines power-triode capability with construction intended to reduce mechanically induced signal disturbance.

General characteristics

BASE DESIGNATION	–	**BASE PINS**	4
NOMINAL HEATER	7.5 V / 1.25 A	**PARALLEL HEATER**	– / –
HEATING	Direct	**SERIES OPERATION**	Not specified
CATHODE ARRANGEMENT	Separate cathodes	**SECTION CONSTRUCTION**	Similar

Section ratings

SECTION1 Triode

AMPLIFICATION FACTOR	8
MAXIMUM PLATE VOLTAGE	450 V
MAXIMUM PLATE DISSIPATION	15 W

Published maximum ratings and characteristic values promoted from the approved source.

1602 — Amplifier Triode

The **1602** is a three-electrode vacuum tube designed primarily for audio-frequency amplification in applications where microphonic noise must be strictly minimized. Originally designated as the **10-Special**, this triode features a filamentary cathode and is capable of operating as either an audio-frequency (A-F) power amplifier or a radio-frequency (R-F) power amplifier.

Construction, Filament, and Physical Dimensions

The 1602 is constructed with a directly heated filamentary cathode. The filament is designed to operate on either alternating current (AC) or direct current (DC) power supplies.

Filament Ratings

- **Filament Voltage:** 7.5 V (AC or DC)
- **Filament Current:** 1.25 A
- **Calculated Filament Power:** 9.375 W (calculated as 7.5 V * 1.25 A)

Physical Dimensions and Base

The tube is housed in an S17 glass bulb and utilizes a medium 4-pin bayonet base. The physical dimensions of the envelope are constrained as follows:

- **Maximum Overall Length:** 5-5/8 inches
- **Maximum Seated Height:** 5 inches
- **Maximum Bulb Diameter:** 2-3/16 inches

The base pins are designed to fit a standard four-contact socket, such as the UR-542A.

Pinout and Socket Connections

When viewed from the top of the socket, the pin connections are arranged as follows:

- **Pin 1:** Filament (+)
- **Pin 2:** Plate
- **Pin 3:** Grid
- **Pin 4:** Filament (-)
- **Bayonet Pin:** Positioned on the side of the base shell, adjacent to the plate and filament (+) pins.

Electrical Characteristics and Capacitances

The 1602 is characterized by a moderate amplification factor and low interelectrode capacitances, which are critical for maintaining stability and performance in both audio and radio-frequency circuits.

Direct Interelectrode Capacitances

- **Grid-to-Plate (Grid-Plate):** 7 µµF
- **Grid-to-Filament (Grid-Filament):** 4 µµF
- **Plate-to-Filament (Plate-Filament):** 3 µµF

Basic Characteristics

- **Amplification Factor (µ):** 8

Operating Points and Maximum Ratings

The 1602 can be operated under several distinct service classes. The maximum ratings and typical operating points vary significantly depending on the application.

Audio-Frequency (A-F) Power Amplifier Service

In A-F power amplifier service, the 1602 can be operated in either Class A or Class B configurations.

Class A A-F Power Amplifier

Under Class A conditions, the tube operates with continuous plate current and a negative grid bias.

- **Maximum D-C Plate Voltage:** 425 V
- **Maximum Plate Dissipation:** 12 W

Typical Class A Operating Point:

- **D-C Plate Voltage:** 425 V
- **Grid Bias Voltage:** -40 V
- **Load Resistance:** 10,200 Ω
- **Undistorted Power Output:** 1.6 W

Class B A-F Power Amplifier

For Class B service, the maximum ratings are averaged over any audio-frequency cycle of sine-wave form:

- **Maximum D-C Plate Voltage:** 425 V
- **Maximum Signal D-C Plate Current:** 60 mA
- **Maximum Signal Plate Input:** 25 W
- **Maximum Plate Dissipation:** 12 W

Radio-Frequency (R-F) Power Amplifier Service

For high-frequency transmitter and amplifier applications, the 1602 is rated for Class B Telephony, Class C Telephony, and Class C Telegraphy.

Class B Telephony

These ratings apply to carrier conditions per tube for use with a maximum modulation factor of 1.0:

- **Maximum D-C Plate Voltage:** 450 V
- **Maximum D-C Plate Current:** 45 mA
- **Maximum Plate Input:** 18 W
- **Maximum Plate Dissipation:** 15 W

Class C Telephony

These ratings apply to carrier conditions per tube for use with a maximum modulation factor of 1.0:

- **Maximum D-C Plate Voltage:** 350 V
- **Maximum D-C Grid Voltage:** -200 V
- **Maximum D-C Plate Current:** 50 mA
- **Maximum D-C Grid Current:** 15 mA
- **Maximum Plate Input:** 17.5 W
- **Maximum Plate Dissipation:** 10 W

Class C Telegraphy

These ratings apply to key-down conditions per tube without modulation. Modulation that is essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions:

- **Maximum D-C Plate Voltage:** 450 V
- **Maximum D-C Grid Voltage:** -200 V
- **Maximum D-C Plate Current:** 60 mA
- **Maximum D-C Grid Current:** 15 mA
- **Maximum Plate Input:** 27 W
- **Maximum Plate Dissipation:** 15 W

Installation and Application Guidelines

The 1602 is specifically designed for applications where microphonic disturbances must be minimized, making it highly suitable for sensitive preamplifier and driver stages in audio systems.

For high-frequency operation above 6 megacycles, special operating precautions and circuit adjustments are required to ensure stable performance and prevent damage to the tube. The 1602 shares operational and installation characteristics with the type 801 tube, which can be referenced for general installation practices.

Technical Summary

The **1602** is a low-microphonic, directly heated amplifier triode featuring a 7.5 V, 1.25 A filament and an amplification factor of 8. It is designed to deliver reliable performance in both sensitive audio-frequency systems and radio-frequency power amplifiers. With a maximum plate voltage rating of up to 450 V and a plate dissipation limit of up to 15 W depending on the class of service, the 1602 offers a robust and versatile solution for Class A, Class B, and Class C applications. It is housed in an S17 glass envelope with a standard medium 4-pin bayonet base.

SOURCE OPERATING CONDITIONS

1938 RCA Transmitting Tubes

SOURCE PDF

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

1938 RCA TRANSMITTING TUBES

Section 1 · Triode

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
HeaterVoltageNominal	**7.5 V**	Nominal
HeaterCurrentNominal	**1.25 A**	Nominal
Maximum Plate Voltage	**450 V**	—
Maximum Plate Dissipation	**15 W**	—
Maximum Frequency	**6 MHz**	Published full-rating frequency guidance

CHARACTERISTIC		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Amplification Factor	**8**	Typical

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