



ELECTRONIC TUBE REFERENCE

1229

Voltage - Tetrode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TETRODE

Sylvania directly heated ultra-low-current tetrode for precision DC voltage amplification, intended to operate with careful electrical and light shielding in electrometer-class measurements.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	4
NOMINAL HEATER	0.9 V / 35 mA	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Tetrode

No fixed ratings recorded.

Sylvania 1229 directly heated filamentary tetrode electrometer tube, filament 0.90 V DC at 35 mA. Typical precision DC voltage-amplifier circuit uses plate supply 45 V, screen supply 16.5 V, grid 1 at -1.6 V, plate load 100 MΩ, plate current 0.33 μA and screen current 0.3 μA. DC voltage gain 125 is circuit-dependent, not intrinsic amplification factor. Tube must be shielded from light and external electrical influences; exceptionally low grid-current design with top cap and small four-pin base.

1229 — Filamentary Tetrode Electrometer Tube

The **1229** is a specialized filamentary tetrode electrometer tube designed for DC voltage amplification. It is characterized by exceptionally low grid current, making it highly suitable for measuring extremely small currents or operating in high-impedance circuits. To maintain its high input impedance and stable operation, the tube features electrostatic shielding and light shielding, and must be shielded from all light and external electrical influences during operation.

Mechanical Design and Basing

The 1229 is constructed in an ST-12 glass envelope with a small 4-pin phenolic base (designated as the A4-5 base). The control grid (Grid No. 1) is terminated at a top cap to maximize isolation and minimize leakage currents.

Physical Dimensions

- **Bulb:** ST-12
- **Outline:** 12-6
- **Top Cap:** C1-1
- **Maximum Diameter:** 1-9/16 inches
- **Maximum Overall Height:** 4-17/32 inches
- **Seated Height:** 3-29/32 inches

Pinout and Electrode Connections

The tube utilizes the **4K** basing configuration. When viewed from the bottom of the base, the pin connections are assigned as follows:

Pin / Cap	Connection	Description
Pin 1	F	Filament
Pin 2	P	Plate
Pin 3	<u>G2</u>	Grid No. 2 (Screen Grid)
Pin 4	F	Filament
Top Cap	G1	Grid No. 1 (Control Grid)

Filament Characteristics

The 1229 features a directly heated filament designed for low-power DC operation.

Parameter	Value
Filament Voltage (DC)	0.90 V
Filament Current	35 mA

Typical DC Voltage Amplifier Operation

When operated as a DC voltage amplifier, the 1229 is configured with a high-value plate load resistor to achieve significant voltage gain at extremely low operating currents. The typical operating parameters are defined under shielded conditions:

Parameter	Value
Plate Supply Voltage (DC)	45 V
Grid No. 2 Voltage (DC)	16.5 V
Grid No. 1 Voltage	-1.6 V
Plate Load Resistor	100 MΩ
Plate Current (DC)	0.33 μA
Grid No. 2 Current (DC)	0.3 μA
DC Voltage Gain	125

The DC voltage gain of 125 is defined as the ratio $\Delta E_b / \Delta E_{[c1]} (/tubes/C1)$, which is calculated from the change in Grid No. 1 voltage required to produce a 2.0-volt increase in plate voltage (E_b).

Electrometer Characteristics and Linearity

As an electrometer tube, the primary performance metrics of the 1229 are its extremely low control grid current and its transfer linearity.

Grid No. 1 Current

The maximum Grid No. 1 current is rated at $\pm 1.0 \mu\mu\text{A}$ (micromicroamperes, or picoamperes). This rating is established under the following specific test conditions:

- Filament Voltage (E_f): 0.8 to 1.0 V
- Plate Supply Voltage (E_{bb}): 45 V
- Plate Voltage (E_b): 12 V
- Grid No. 2 Voltage (E_{c2}): 16.5 V
- Plate Current (I_b): 0.33 μA
- Grid No. 1 Resistor (R_{g1}): 10,000 MΩ
- Grid No. 1 Voltage ($E_{[c1]} (/tubes/C1)$): Adjusted

Linearity

The linearity of the tube is rated at a maximum of **10 percent**. This is defined as the departure of the $E_{[c1]} (/tubes/C1)$ versus E_b curve from a straight line between the operating points of $E_b = 12$ Volts and $E_b = 14$ Volts. This departure is measured along the E_b axis and expressed as a percentage of 2 volts under typical operating conditions.

Technical Summary

The **1229** is a specialized filamentary tetrode electrometer tube housed in an ST-12 glass envelope with a small 4-pin phenolic base and a top cap for the control grid. Operating with a low-power DC filament supply of 0.90 V at 35 mA, it is optimized for high-gain, low-current DC voltage amplification. With a typical DC voltage gain of 125 and an exceptionally low control grid current limit of $\pm 1.0 \mu\text{A}$, the 1229 provides the high input impedance and sensitivity required for precision electrometer applications, provided it is fully shielded from light and external electrical influences.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Tetrode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Filament Voltage	0.9 V	DC
Filament Current	35 mA	DC
DC Voltage Gain	125 ratio	DCVoltageAmplifier
Maximum Grid1 Current	1 pA	AbsoluteMagnitude
Maximum Linearity Error	10 percent	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Supply Voltage	45 V	DCVoltageAmplifier
Grid2 Supply Voltage	16.5 V	DCVoltageAmplifier
Grid1 Voltage	-1.6 V	DCVoltageAmplifier
Plate Load Resistance	100 Mohm	DCVoltageAmplifier
Plate Current	0.33 uA	DCVoltageAmplifier
Grid2 Current	0.3 uA	DCVoltageAmplifier
Shielding Requirement	Electrical and light shielding text	—

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