

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1231

1 SECTION
CONSTRUCTION
PENTODE

Voltage - Pentode Sharp Cutoff (single) electronic tube

Sylvania triple-grid amplifier tube with published pentode, tetrode-connected, and triode-connected operating data. Its flexible electrode connections permit several amplifier configurations while retaining a conventional signal-amplifier role.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8-V	BASE PINS	8
NOMINAL HEATER	7 V / 480 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	700000 Ω
TRANSCONDUCTANCE	0.0055 S
AMPLIFICATION FACTOR	3850
Sylvania 1231 loctal eight-pin high-transconductance triple-grid amplifier pentode for TV and similar service. Nominal AC/DC heater 7.0 V 0.48 A as specified in mechanical/characteristics heading; pentode example operates 6.3 V 0.45 A. Pentode-connected characteristics at plate 300 V, screen 150 V: gm 5500 μmhos, plate resistance ~700 kΩ, amplification coefficient 3850, plate current 10 mA. Distinct tetrode-connected gm 6500 μmhos/rp 540 kΩ and triode-connected gm 6300 μmhos/rp 5200 Ω/μ33 must not overwrite physical pentode constants. Published capacitances and self-bias requirement preserved.	

1231 — High-Mu Loktal Triple-Grid Amplifier

The **1231** is a high-transconductance, triple-grid (pentode) amplifier tube featuring a compact Loktal construction. Designed primarily for television amplifiers and similar high-frequency or wideband

applications, the 1231 incorporates several mechanical and electrical design innovations to minimize parasitic effects and optimize performance at high frequencies.

Mechanical Construction and Shielding

The 1231 is built using a compact **T9-F** glass envelope with an 8-pin **Loktal** base (designated **8-V**). This construction is significantly smaller than standard glass tubes of its era, offering several physical and electrical advantages:

- **Short Electrode Leads:** The Loktal design allows for extremely short internal connections from the active electrodes to the base pins, minimizing lead inductance and resistance.
- **Low Dielectric Losses:** The materials and physical layout reduce high-frequency dielectric losses.
- **Direct Grid Connection:** Unlike older high-frequency pentodes that require a top-cap connection, the control grid of the 1231 is connected directly to a base pin. This eliminates the need for flexible external grid clips and leads, simplifying wiring and reducing stray capacitance.
- **Electrostatic Shielding:** The tube features robust internal shielding for the grid connection. Additionally, the metal guide pin (broche-guide) of the Loktal base acts as an effective electrostatic shield between the external grid and plate leads, reducing unwanted feedback.

The tube is designed to be mounted in any position.

Heater Ratings and Operating Conditions

The 1231 features a heater designed for flexible operation, with nominal ratings and specific operating-point parameters:

Parameter	Nominal Rating	Operating Point Value
Heater Voltage	7.0 V (AC or DC)	6.3 V
Heater Current	0.48 A	0.45 A

Calculated Heater Power:

- At nominal ratings: $7.0\text{ V} \times 0.48\text{ A} = \mathbf{3.36\text{ W}}$
- At typical operating points: $6.3\text{ V} \times 0.45\text{ A} = \mathbf{2.835\text{ W}}$

Direct Interelectrode Capacitances

When operated in its standard pentode configuration, the 1231 exhibits very low direct interelectrode capacitances, which is critical for maintaining stability and bandwidth in television and high-frequency amplifier circuits:

- **Grid to Plate:** 0.015 μF
- **Grid to all other elements:** 8.5 μF
- **Plate to all other elements:** 6.5 μF

Operating Configurations and Electrical Characteristics

The 1231 is highly versatile and can be configured as a pentode, tetrode, or triode. In all configurations, the tube must be operated with automatic bias (polarisation automatique). The electrical characteristics under these three operating modes are detailed below:

Parameter	Pentode Connection	Tetrode Connection	Triode Connection
Heater Voltage	6.3 V	6.3 V	6.3 V
Heater Current	0.45 A	0.45 A	0.45 A
Plate Voltage	300 V	300 V	250 V
Screen Grid Voltage	150 V	150 V	Connected to Plate
Cathode Bias Resistor	200 Ω	200 Ω	400 Ω
Suppressor Grid Connection	Connected to Cathode	Connected to Screen Grid	Connected to Plate
Plate Current	10.0 mA	12.0 mA	13.0 mA
Screen Grid Current	2.5 mA	0.5 mA	—
Internal Resistance (Approx.)	700,000 Ω	540,000 Ω	5,200 Ω
Mutual Conductance	5,500 μmhos	6,500 μmhos	6,300 μmhos
Amplification Factor	3,850	3,500	33

Analysis of Operating Modes

- **Pentode Mode:** This is the standard high-gain configuration. It provides the highest internal resistance (approximately 700,000 Ω) and a very high amplification factor of 3,850, combined with a mutual conductance of 5,500 μmhos .
- **Tetrode Mode:** By connecting the suppressor grid to the screen grid, the tube operates as a tetrode. In this mode, the mutual conductance increases to 6,500 μmhos , while the screen grid current drops significantly to 0.5 mA, and the internal resistance decreases slightly to approximately 540,000 Ω .
- **Triode Mode:** By triode-connecting the tube (suppressor grid and screen grid tied to the plate), the 1231 functions as a medium-mu triode. It delivers a low internal resistance of approximately 5,200 Ω , a mutual conductance of 6,300 μmhos , and an amplification factor of 33.

Technical Summary

The **1231** is an innovative, high-transconductance triple-grid amplifier tube utilizing a compact Loktal 8-pin envelope. Its design is optimized for high-frequency applications, such as television amplifiers, where low interelectrode capacitances, short lead lengths, and effective shielding are paramount. With a nominal 7.0 V heater, the tube is typically operated at 6.3 V in three distinct configurations—pentode, tetrode, or triode—offering designers a flexible range of gain, impedance, and transconductance characteristics.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	300 V	PentodeConnection
Screen Voltage	150 V	PentodeConnection

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