

ELECTRONIC TUBE REFERENCE

15A6

Power - Pentode Single (NOT beam) (under 10W) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
PENTODE

Video-output pentode designed for television receivers using series heater chains. Its output capability is optimized for wideband video drive rather than conventional audio-frequency power amplification.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9AR	BASE PINS	9
NOMINAL HEATER	15 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	100000 Ω
TRANSCONDUCTANCE	0.01 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	9 W
MAXIMUM SCREEN DISSIPATION	2 W
Promoted from clearly identified printed ratings/characteristics; additional published operating points and capacitances retained in TUBE_SECTION_PARAMETER.	

15A6 — Sharp-Cutoff Video Output Pentode

The **15A6** is an indirectly heated sharp-cutoff pentode designed primarily for use as a video output valve in television receivers employing series heater chains. It features high mutual conductance, high anode

dissipation capabilities, and is housed in a standard miniature glass envelope. The tube is engineered to deliver significant peak output voltage swings when operated with typical video-frequency load resistances.

Physical Construction, Heater, and Base Connections

The 15A6 is constructed with a miniature glass envelope utilizing a **B9A (Noval)** nine-pin base and a top cap designated as **CT1**. The physical dimensions of the tube are compact, with a maximum overall length of **78.5 mm** (3 3/32 inches), a maximum seated height of **71.5 mm** (2 13/16 inches), and a maximum envelope diameter of **22.2 mm** (7/8 inch). The tube is designed to be versatile in physical installation and can be mounted in **any position**.

The heater is designed for series-string operation, drawing a nominal current of **0.3 A** at a nominal voltage of **15.0 V**.

The **9AR** base connection configuration, viewed from the underside of the base, provides the following pin assignments:

Pin	Connection
Pin 1	Screen Grid (g2)
Pin 2	Control Grid (g1)
Pin 3	Cathode (k)
Pin 4	Heater (h)
Pin 5	Heater (h)
Pin 6	Suppressor Grid (g3)
Pin 7	Anode (a)
Pin 8	Internal Shield (s)
Pin 9	Internal Connection (I.C.)
Top Cap	CT1

Electrical Characteristics and Maximum Ratings

The 15A6 is characterized by high transconductance and a sharp-cutoff control grid characteristic. The maximum ratings are defined under specific limiting conditions to ensure reliable operation in television receiver circuits.

Maximum Ratings

- **Maximum DC Supply Voltage:** 550 V

- **Maximum Anode Voltage:** 250 V
- **Maximum Anode Dissipation:** 9 W
- **Maximum Screen Grid (**g₂**) Voltage:** 250 V
- **Maximum Screen Grid Dissipation:** 2 W
- **Maximum Cathode Current:** 70 mA
- **Maximum Negative Grid Voltage** (at $I_{g1} = +0.3 \mu\text{A}$): -1.3 V
- **Maximum Heater-to-Cathode Voltage (**V_{h-k}**):** 150 V
- **Maximum Heater-to-Cathode Resistance (**R_{h-k}**):** 20 k Ω
- **Maximum Control Grid-to-Cathode Resistance (**R_{g1-k}**):**
 - Under Fixed Bias: 500 k Ω
 - Under Auto (Cathode) Bias: 1.0 M Ω

Interelectrode Capacitances

The internal capacitances of the 15A6, measured without an external shield, are:

- **Input Capacitance (**C_{in}**):** 10.4 pF
- **Output Capacitance (**C_{out}**):** 6.6 pF
- **Anode to Control Grid Capacitance (**C_{a-g1}**):** <0.1 pF
- **Control Grid to Heater Capacitance (**C_{g1-h}**):** <0.15 pF

Typical Operating Points and Characteristics

The 15A6 can be operated under different Class A amplifier conditions. The published specifications document characteristics at several distinct operating points:

Class A Amplifier Characteristics

Parameter	Operating Point A	Operating Point B	Operating Point C
Anode Voltage	170 V	200 V	180 V
Screen Grid Voltage (V_{g2})	170 V	200 V	180 V
Suppressor Grid Voltage (V_{g3})	0 V	0 V	0 V
Control Grid Voltage (V_{g1})	-2.3 V	-3.5 V	-2.9 V
Anode Current (I_a)	36 mA	36 mA	36 mA
Screen Grid Current (I_{g2})	5 mA	5 mA	4.6 mA

Parameter	Operating Point A	Operating Point B	Operating Point C
Mutual Conductance (gm)	10.5 mA/V	10.5 mA/V	10.0 mA/V
Anode Impedance (rp)	100 kΩ	100 kΩ	100 kΩ
Inner Amplification Factor (μg1-g2)	25	25	—

Typical Video Output Operation

When configured specifically as a video output stage, the tube is operated with a higher negative bias to restrict quiescent current, allowing for large positive-going signal excursions:

- **Anode Supply Voltage:** 170 V
- **Screen Voltage:** 170 V
- **Suppressor Grid Voltage:** 0 V
- **Control Grid Voltage:** -6.7 V
- **Anode Current:** 4 mA
- **Screen Current:** 0.25 mA
- **Anode Load Resistance:** 2.2 kΩ
- **Peak Output Voltage:** >70 V

Under this video output operating point, the quiescent anode current is biased down to 4 mA, which provides a large dynamic range for amplifying video signals and achieving a peak-to-peak output voltage swing exceeding 70 V across the 2.2 kΩ load resistor.

Analysis of Characteristic Curves

The transfer and plate characteristics of the 15A6 illustrate its behavior across its operating envelope:

- **Transfer Characteristics (Ia, Ig2 vs. Vg1):** At a screen voltage of 200 V, the anode current reaches approximately 60 mA at zero grid bias ($V_{g1} = 0$ V) and drops smoothly to near-zero as the grid bias approaches -10 V. At a screen voltage of 170 V, the zero-bias anode current is approximately 50 mA. The screen current tracks the anode current at a much lower level, peaking at approximately 8 to 10 mA at zero bias.
- **Plate Characteristics (Ia vs. Va):** The family of curves plotted for a screen voltage of 200 V shows a classic pentode profile with a sharp knee. At $V_{g1} = 0$ V, the anode current rises rapidly below $V_a = 50$ V and flattens out above 100 V, maintaining a level of over 70 mA. As the control grid voltage is stepped down from 0 V to -6 V in 1-volt increments, the plate current curves remain highly horizontal and evenly spaced, indicating high anode impedance and linear transconductance over a wide voltage range.

Technical Summary

The **15A6** is a high-performance, sharp-cutoff pentode housed in a B9A Noval envelope with a CT1 top cap. Featuring a 15.0 V, 0.3 A heater designed for series-string television receivers, it is optimized for video output service. It combines a high transconductance of 10.0 to 10.5 mA/V with an anode dissipation rating of 9 W and a maximum anode voltage of 250 V. Its electrical design allows it to deliver peak output swings greater than 70 V in typical video amplifier circuits, making it a highly effective solution for television receiver video stages.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	180 V	ClassA
Screen voltage	180 V	ClassA
Control-grid voltage	-2.9 V	ClassA
Plate current	36 mA	ClassA
Screen current	4.6 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	100000 Ω	ClassA
Transconductance	10000 μS	ClassA

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Ferranti Technical Handbook

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

1961 FERRANTI TECHNICAL HANDBOOK

Section 1 · Pentode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Television video output	—

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