



ELECTRONIC TUBE REFERENCE

15HB6

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

PENTODE

Power pentode heater variant whose source explicitly references the corresponding 6-volt parent electrical characteristics; intended for power-output service in series-heater equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	14.7 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	24000 Ω
TRANSCONDUCTANCE	0.02 S
MAXIMUM PLATE VOLTAGE	350 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	10 W
MAXIMUM SCREEN DISSIPATION	2 W
<i>Inherited from explicitly referenced parent 6HB6; supplied sheet changes heater characteristics.</i>	

15HB6 — Beam Power Pentode

The **15HB6** is a high-transconductance miniature power pentode (also classified as a beam power pentode) designed primarily for use in color television receivers as a vertical deflection amplifier. It is electrically identical to the **6HB6** except for its heater ratings, which are optimized for series-string heater circuits.

Overview

The 15HB6 is a specialized vacuum tube engineered to handle the demanding requirements of vertical deflection circuits in television receivers. It features a high transconductance of 24,000 μmhos under typical operating conditions, allowing it to deliver significant plate current swings with relatively small grid-drive voltages. The tube is constructed in a T-6½ miniature glass envelope with a 9-pin button base, utilizing the 9NW basing arrangement.

While the 15HB6 shares its physical structure, electrode configuration, and electrical ratings with the [6HB6](#), it is distinguished by its 14.7-volt, 300 mA heater. This heater design includes a controlled warm-up time, making the 15HB6 suitable for series-connected heater strings in television chassis, whereas the [6HB6](#) is designed for standard 6.3-volt parallel heater systems.

Heater Characteristics and Ratings

The 15HB6 incorporates an indirectly heated, coated cathode. The heater is specifically designed for series-string operation, featuring a controlled warm-up characteristic to prevent voltage surges across other tubes in the string during start-up.

Heater Parameter	Value
Nominal Heater Voltage (AC or DC)	14.7 V
Nominal Heater Current	0.300 ± 0.020 A (300 mA)
Average Warm-up Time	11 seconds

Heater-Cathode Voltage Limits

To maintain insulation integrity and prevent hum injection or breakdown between the heater and the cathode, the following maximum voltage limits must be observed:

- **Heater Negative with Respect to Cathode:**
 - Maximum Total DC and Peak Voltage: 200 V
- **Heater Positive with Respect to Cathode:**
 - Maximum DC Voltage: 100 V
 - Maximum Total DC and Peak Voltage: 200 V

Physical Construction and Basing

The 15HB6 is housed in a miniature glass envelope with a standard 9-pin button base. The internal structure is aligned as a beam power pentode, utilizing beam-confining electrodes to direct electron flow and minimize secondary emission from the plate.

Physical Dimensions

- **Envelope Type:** Miniature T-6½

- **Base Type:** Button 9-Pin, E9-1
- **Outline Designation:** 6-4
- **Maximum Diameter:** 0.875 inches
- **Maximum Seated Height:** 2.812 inches
- **Maximum Overall Height:** 3.062 inches

Pin Connections (9NW Basing)

The 9NW basing diagram provides dual connections for both the control grid (Grid No. 1) and the suppressor grid (Grid No. 3). This configuration assists in heat dissipation and simplifies circuit layout. Viewed from the bottom of the base, the pin connections are:

Pin Number	Electrode Connection
1	Grid No. 1 (Control Grid)
2	Cathode
3	Grid No. 1 (Control Grid)
4	Heater
5	Heater
6	Grid No. 3 (Suppressor Grid)
7	Plate
8	Grid No. 2 (Screen Grid)
9	Grid No. 3 (Suppressor Grid)

Direct Interelectrode Capacitances

The typical direct interelectrode capacitances of the 15HB6, measured without an external shield, are:

- **Grid No. 1 to Plate:** 0.18 pF
- **Input (G1 to all other electrodes except Plate):** 13 pF
- **Output (Plate to all other electrodes except G1):** 8 pF

Design-Maximum Ratings

The ratings of the 15HB6 are established under the Design-Maximum Rating System. These limits must not be exceeded under the worst-case operating conditions of supply voltage, signal input, and environmental factors.

- **Maximum Plate Voltage:** 350 V
- **Maximum Peak Positive Plate Voltage:** 2500 V

- **Maximum Grid No. 2 (Screen Grid) Voltage:** 300 V
- **Maximum Grid No. 1 (Control Grid) Voltage:** -100 V
- **Maximum Plate Dissipation:** 10 W
- **Maximum Grid No. 2 Dissipation:** 2 W
- **Maximum Grid No. 1 Circuit Resistance:**
 - With Fixed Bias: 1.0 MΩ
 - With Cathode Bias: 2.2 MΩ

Special Application Constraints

The maximum peak positive plate voltage rating of 2500 V is specifically intended for television vertical deflection amplifier service. For operation in a standard 525-line, 30-frame television system, the duty cycle of the high-voltage pulse must not exceed 15% of one horizontal scanning cycle.

Additionally, in stages operating with grid-leak bias, an adequate cathode-bias resistor or other suitable protective means must be employed to safeguard the tube against excessive dissipation in the event that excitation is lost.

Typical Operation and Characteristics

The 15HB6 can be operated under different typical conditions depending on the screen grid (Grid No. 2) voltage supply. The table below compares the typical operating characteristics of the 15HB6 at a screen voltage of 125 V against the [6HB6](#) at a screen voltage of 250 V:

Parameter	15HB6	6HB6
Plate Voltage	250 V	250 V
Grid No. 2 Voltage	125 V	250 V
Plate Current	40 mA	40 mA
Grid No. 2 Current	4.2 mA	6.2 mA
Cathode Resistor	—	100 Ω
Amplification Factor (G1 to G2)	—	33
Transconductance	24,000 μmhos	20,000 μmhos
Plate Resistance	28,000 Ω	24,000 Ω
Grid No. 1 Voltage for $I_b = 100 \mu A$	-6.4 V	-13 V

At the 15HB6 operating point with a screen voltage of 125 V, the tube exhibits an extremely high transconductance of 24,000 μmhos and a plate resistance of 28,000 Ω. Under this condition, the control grid cutoff voltage (where plate current is reduced to 100 μA) is -6.4 V.

Instantaneous Plate Knee Characteristics

To characterize the tube's performance during peak current conduction (such as at the end of the deflection sweep), the instantaneous characteristics at the knee of the plate curve are specified as follows:

- **Plate Voltage (E_b):** 60 V
- **Grid No. 2 Voltage (E_{c2}):** 250 V
- **Grid No. 1 Voltage (E_{c1}):** 0 V
- **Instantaneous Plate Current (I_b):** 150 mA
- **Instantaneous Grid No. 2 Current (I_{c2}):** 37 mA

These knee characteristics demonstrate the tube's ability to pass high peak plate currents (150 mA) at very low plate voltages (60 V) when the control grid is driven to zero volts, which is a critical requirement for efficient vertical deflection output stages.

Technical Summary

The **15HB6** is a high-performance, 9-pin miniature beam power pentode designed for vertical deflection amplifier service in color television receivers. It features a 14.7 V, 300 mA heater with a controlled 11-second warm-up time, making it ideal for series-string heater designs. Housed in a T-6½ envelope with a 9NW basing configuration, it offers a robust 10 W plate dissipation rating and can withstand peak positive plate pulses up to 2500 V. Its high transconductance of 24,000 μmhos at typical operating conditions ensures efficient and linear deflection drive.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Positive plate pulse voltage	2500 V	VerticalDeflection;Pulse Inherited from explicitly referenced 6HB6.
Plate voltage	250 V	VerticalDeflection Inherited from explicitly referenced 6HB6.
Screen voltage	125 V	VerticalDeflection Inherited from explicitly referenced 6HB6.
Plate current	40 mA	VerticalDeflection Inherited from explicitly referenced 6HB6.
Screen current	4.2 mA	VerticalDeflection Inherited from explicitly referenced 6HB6.

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Instantaneous plate current	150 mA	Plate60V;Screen250V;Grid1=0V Inherited from explicitly referenced 6HB6.

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