



ELECTRONIC TUBE REFERENCE

18HB8

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-TRIODE

Triode-pentode designed for stereo and monaural audio equipment, integrating voltage amplification with approximately 1 W Class-A output.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	18 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
TRANSCONDUCTANCE	0.0039 S
AMPLIFICATION FACTOR	74
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	0.75 W
MAXIMUM CATHODE CURRENT	5 mA
Published ratings and characteristics promoted semantically from the approved source.	

SECTION2 Pentode	
TRANSCONDUCTANCE	0.00625 S
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM SCREEN VOLTAGE	135 V
MAXIMUM PLATE DISSIPATION	6.5 W
MAXIMUM SCREEN DISSIPATION	1.4 W
MAXIMUM CATHODE CURRENT	51 mA
<i>Published ratings and characteristics promoted semantically from the approved source.</i>	

18HB8 — Triode-Pentode Vacuum Tube

The **18HB8** is a miniature triode-pentode vacuum tube designed primarily for audio applications in monaural and stereo sound equipment. It combines a high-mu triode section and a power pentode (or beam power amplifier) section within a single glass envelope. The tube features a coated unipotential cathode and is designed for versatile installation in any mounting position. Except for its heater ratings, the 18HB8 is electrically identical to the [35HB8](#).

Mechanical Specifications and Physical Dimensions

The 18HB8 is constructed in a miniature T-6 1/2 glass bulb. It utilizes a miniature button 9-pin base, designated as an E9-1 base with a JEDEC 6-3 outline. The physical dimensions of the tube are constrained by the following maximum limits:

- **Maximum Overall Length / Height:** 2 5/8 inches (66.7 mm)
- **Maximum Seated Height (Base to Top):** 2 3/8 inches (60.3 mm)
- **Maximum Diameter:** 7/8 inch (22.2 mm)

The tube's compact miniature construction allows it to be integrated into space-constrained chassis designs typical of compact stereo and monaural audio systems.

Heater and Cathode Characteristics

The 18HB8 features an indirectly heated, coated unipotential cathode structure. The heater is designed for series-string operation with the following nominal ratings:

- **Heater Voltage:** 18.0 V
- **Heater Current:** 0.30 A (300 mA)

To minimize hum and potential differences in series-connected heater strings, the heater must be wired with Pin 4 positioned closest to the ground end of the heater string.

The heater-to-cathode insulation is rated under the Design-Maximum System. The limits are identical for both the triode and pentode sections:

Parameter	Limit
Heater negative with respect to cathode (Total DC and Peak)	200 V Max
Heater positive with respect to cathode (DC)	100 V Max
Heater positive with respect to cathode (Total DC and Peak)	200 V Max

Basing and Pinout Configurations

The 18HB8 is assigned a **9ME** basing arrangement. However, the technical documentation contains three distinct, conflicting descriptions of the pin connections. Designers must verify the physical layout of the specific device being utilized, as the pin assignments for the triode electrodes, pentode grids, and internal shields vary significantly between these documented configurations.

Pinout Variation A

In this configuration, the triode cathode is connected to Pin 3, while the pentode cathode is tied to Pin 8 along with Grid No. 3 and the internal shield:

- **Pin 1:** Triode Plate (P_T)
- **Pin 2:** Triode Grid (G_T)
- **Pin 3:** Cathode (K)
- **Pin 4:** Heater (H)
- **Pin 5:** Heater (H)
- **Pin 6:** Pentode Grid No. 1 (G_1)
- **Pin 7:** Pentode Grid No. 3 / Internal Shield ($G_3/I.S.$)
- **Pin 8:** Pentode Grid No. 2 (G_2)
- **Pin 9:** Pentode Plate (PP)

Pinout Variation B

In this configuration, the triode grid and plate pins are swapped relative to Variation A, and the pentode grid connections are rearranged:

- **Pin 1:** Triode Grid (G)
- **Pin 2:** Triode Cathode (K)
- **Pin 3:** Triode Plate (P)
- **Pin 4:** Heater (H)
- **Pin 5:** Heater (H)
- **Pin 6:** Pentode Grid No. 2 (G_2)
- **Pin 7:** Pentode Plate (P)
- **Pin 8:** Pentode Grid No. 3, Cathode, Internal Shield (G_3, K, IS)

- **Pin 9:** Pentode Grid No. 1 (G_1)

Pinout Variation C

This configuration shares the triode pinout of Variation A but uses the pentode pinout of Variation B:

- **Pin 1:** Triode Plate
- **Pin 2:** Triode Grid
- **Pin 3:** Triode Cathode
- **Pin 4:** Heater
- **Pin 5:** Heater
- **Pin 6:** Pentode Grid No. 2
- **Pin 7:** Pentode Plate
- **Pin 8:** Pentode Cathode, Grid No. 3, Shield
- **Pin 9:** Pentode Grid No. 1

Maximum Ratings

The maximum ratings of the 18HB8 are established under the Design-Maximum System. These limits must not be exceeded under the worst-case operating conditions of supply voltage, signal input, and environmental factors.

Rating Parameter	Triode Section	Pentode Section	Units
Maximum Plate Voltage	150	150	Volts
Maximum Grid No. 2 (Screen Grid) Voltage	—	135	Volts
Maximum Cathode Current	5	50	mA
Maximum Plate Dissipation	0.75	6.5	Watts
Maximum Grid No. 2 Dissipation	—	1.5	Watts

Grid Circuit Resistance Limits

The maximum allowable resistance in the grid circuit depends on the bias method employed. For the triode section, the limits are:

- **Fixed Bias:** 0.1 Megohm Max
- **Cathode Bias:** 0.47 Megohm Max

For the pentode section, some specifications leave the grid circuit resistance limits unspecified, while others explicitly apply the same limits as the triode section (0.1 Megohm maximum for fixed bias and 0.47 Megohm maximum for cathode bias).

Typical Operating Conditions and Electrical Characteristics

At a nominal plate voltage of 115 V, the triode and pentode sections exhibit the following typical operating characteristics in Class A1 service:

Parameter	Triode Section	Pentode Section	Units
Plate Voltage	115	115	Volts
Grid No. 2 Voltage	—	115	Volts
Peak AF Grid No. 1 Voltage	—	6.0	Volts
Cathode Bias Resistor	410	150	Ohms
Zero-Signal Plate Current	2.5	33	mA
Maximum-Signal Plate Current	—	32	mA
Zero-Signal Grid No. 2 Current	—	7.5	mA
Maximum-Signal Grid No. 2 Current	—	10	mA
Transconductance	3900	6250	μmhos
Amplification Factor (μ)	74	—	
Load Resistance	—	3500	Ohms
Maximum-Signal Power Output	—	1.0	Watt
Total Harmonic Distortion (Approx.)	—	8	%

The triode section provides a high amplification factor of 74, making it highly suitable for preamplification and voltage gain stages. The pentode section is optimized as a power amplifier, capable of delivering 1.0 Watt of audio output into a 3500 Ohm load with approximately 8% total harmonic distortion.

Circuit-Specific Audio Amplifier Example

A practical application of the 18HB8 is demonstrated in a two-stage, single-ended triode-pentode audio amplifier circuit operating from a single 115 V supply ($B+$). This circuit utilizes the high-mu triode section as a voltage preamplifier to drive the power pentode output stage.

Circuit Configuration and Component Values

- **Input Coupling:** The input signal of 0.1 V is applied to the triode grid through a 0.1 μF coupling capacitor.
- **Triode Stage:**
 - **Grid Leak Resistor:** 10 Megohms, providing grid leak bias for the triode section.
 - **Plate Load Resistor:** 0.1 Megohm (100 k Ω), connected between the triode plate and the 115 V supply.
 - **Interstage Coupling:** A 0.1 μF capacitor couples the amplified signal from the triode plate to the pentode grid.
- **Pentode Stage:**
 - **Grid Resistor:** 470 k Ω (0.47 Megohm), referencing the pentode grid to ground.
 - **Cathode Bias:** A 150 Ohm cathode resistor, bypassed by a 100 μF capacitor, provides self-bias for the pentode section.
 - **Grid No. 2 (Screen Grid):** Connected directly to the 115 V supply.
 - **Output Load:** An output transformer presenting a primary load impedance of 3500 Ohms is connected to the pentode plate.

Performance Characteristics

When operated with a 115 V supply and a 0.1 V input signal, this specific circuit configuration achieves the following performance:

- **Power Output (P_O):** 1.0 Watt
- **Total Harmonic Distortion:** Approximately 8%

This circuit demonstrates the efficiency of the 18HB8, allowing a complete, functional low-power audio amplifier stage to be built using a single active envelope and a minimal number of external components.

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 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	3900 μS	—
Amplification Factor	74	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	150 V	—
Maximum Plate Dissipation	0.75 W	—
Maximum Cathode Current	5 mA	—
Plate Voltage	115 V	Triode section
Plate Current	2.5 mA	Triode section

1950 SYLVANIA

Section 2 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	6250 μS	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	150 V	—
Maximum Screen Voltage	135 V	—
Maximum Plate Dissipation	6.5 W	—
Maximum Screen Dissipation	1.5 W	—
Maximum Cathode Current	50 mA	—
Plate Voltage	115 V	Beam power section

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Screen Voltage	115 V	Beam power section
Zero-Signal Plate Current	33 mA	—
Load Resistance	3500 ohm	—
Maximum-Signal Power Output	1 W	—
Total Harmonic Distortion	8 %	—


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Audio voltage amplifier	TriodeSection

1961 TUNG SOL

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Audio power amplifier	PentodeSection


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 3 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	150 V	WholeTube
Maximum cathode current	5 mA	WholeTube
Maximum plate dissipation	0.75 W	WholeTube
Plate voltage	115 V	TypicalOperation
Transconductance	3900 µS	TypicalOperation
Zero-signal plate current	2.5 mA	TypicalOperation

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	150 V	WholeTube
Maximum screen voltage	135 V	WholeTube
Maximum cathode current	50 mA	WholeTube
Maximum plate dissipation	6.5 W	WholeTube
Maximum screen dissipation	1.5 W	WholeTube
Plate voltage	115 V	TypicalOperation
Screen voltage	115 V	TypicalOperation
Transconductance	6250 µS	TypicalOperation
Zero-signal plate current	33 mA	TypicalOperation
Maximum-signal power output	1 W	ClassA1
Total harmonic distortion	8 percent	ClassA1

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