



ELECTRONIC TUBE REFERENCE

12BH7AEH

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Modern 12BH7A-type medium-mu twin triode intended for low-frequency voltage amplification and driver service, with relatively high current capability and 3.5-watt plate dissipation per section.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	6.3 V / 615 mA	PARALLEL HEATER	6.3 V / 615 mA
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
TRANSCONDUCTANCE	0.0032 S
AMPLIFICATION FACTOR	14
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	3.5 W
MAXIMUM CATHODE CURRENT	20 mA
Representative section for two electrically identical triodes.	

SECTION2 Triode	
TRANSCONDUCTANCE	0.0032 S
AMPLIFICATION FACTOR	14
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	3.5 W
MAXIMUM CATHODE CURRENT	20 mA
Second physical triode section; electrically identical twin section.	

12BH7AEH — Miniature Twin Triode Vacuum Tube

The **12BH7AEH** (also designated as **12BH7AEH gold**) is a miniature twin triode vacuum tube featuring equipotential (indirectly heated) cathodes. It is designed specifically to amplify low-frequency voltage in radio engineering devices. The tube features two independent triode sections housed within a single miniature glass envelope, sharing a versatile heater arrangement that supports both series and parallel filament connections.

Physical Construction and Pin Configuration

The 12BH7AEH is constructed in a miniature glass envelope with a maximum overall height of **56.5 mm** and a bulb diameter of **22.5 mm** (with a tolerance of -2 mm, giving a range of 20.5 mm to 22.5 mm).

The tube utilizes a 9-pin base arrangement. The pins are spaced at 36° intervals ($8 \times 36^\circ = 288^\circ$ total angle), with a pin circle diameter of **12 mm**. Each pin has a nominal diameter of **1 mm** (with a tolerance of +0.03 mm to -0.07 mm).

The electrode-to-lead connections are assigned as follows:

Pin	Connection
1	Second triode plate
2	Second triode grid
3	Second triode cathode
4	Heater
5	Heater
6	First triode plate
7	First triode grid
8	First triode cathode

Pin	Connection
9	Heater

The heater is tapped, allowing for either series or parallel connection using pins 4, 5, and 9.

Heater and Filament Ratings

The 12BH7AEH heater can be operated in either parallel or series configurations, depending on the supply voltage:

- **Parallel Connection:** Nominal filament voltage is **6.3 V** (permissible range of **6.0 V to 6.6 V**). Under this condition, the heater current is rated between **550 mA and 680 mA**.
- **Series Connection:** Nominal filament voltage is **12.6 V** (permissible range of **12.0 V to 13.2 V**). Under this condition, the heater current is rated between **275 mA and 340 mA**.

The cathode-to-heater insulation is rated to withstand a maximum voltage of **±200 V**, with a minimum insulation resistance of **10 MΩ** under these conditions.

Electrical Characteristics and Operating Parameters

The electrical parameters of each triode section are measured under specific nominal test conditions: a plate voltage of **250 V**, a negative grid bias of **-10.5 V**, and a filament voltage of either **6.3 V** or **12.6 V**. Under these conditions, the tube exhibits the following characteristics:

- **Plate Current (I_p):** Nominal range of **9.0 mA to 16.0 mA**.
- **Plate Current Balance:** The difference in plate current between the first and second triode sections is restricted to a maximum of **±30%**.
- **Slope of Characteristic (Transconductance, g_m):** Rated between **2.4 mA/V and 4.0 mA/V** (equivalent to 2,400 to 4,000 μmhos).
- **Amplification Factor (μ):** Minimum of **14** (no maximum specified).
- **Grid Reverse Current:** Maximum of **0.2 μA** when tested with a grid circuit resistance of **0.25 MΩ**.
- **Cutoff Characteristics:** At a plate voltage of **250 V** and an increased negative grid bias of **-23.0 V**, the plate current at the beginning of the characteristic is limited to a maximum of **80 μA** .

Maximum Permissible Operating Conditions

To ensure reliable operation and prevent damage, circuit designs must respect the following absolute maximum ratings for each triode section:

Parameter	Maximum Limit
Plate voltage	300 V
Cathode-heater voltage	±200 V

Parameter	Maximum Limit
Power dissipation at the plate of each triode	3.5 W
Cathode current	20 mA
Grid circuit resistance (fixed bias)	0.25 MΩ
Grid circuit resistance (self-bias)	1.0 MΩ

The maximum plate dissipation of **3.5 W** applies to each triode section individually. The grid circuit resistance limits differ significantly depending on the biasing method, with self-bias allowing up to **1.0 MΩ** compared to the more stringent **0.25 MΩ** limit for fixed-bias configurations.

Characteristic Curves and Behavior

The electrical behavior of the 12BH7AEH is illustrated by two primary sets of characteristic curves:

- 1. Plate Current vs. Grid Voltage ($I_p = f(E_g)$):** These transfer curves, plotted at a filament voltage of **6.3 V**, show the relationship between plate current and grid voltage for plate voltages of **200 V**, **250 V**, and **300 V**. The curves demonstrate that at a plate voltage of 250 V, the plate current approaches zero (cutoff) near a grid voltage of -23 V, matching the tabulated cutoff specification of 80 μA maximum. As the grid voltage becomes less negative, the plate current rises steeply, illustrating the transconductance (slope) of the device.
- 2. Plate Current vs. Plate Voltage ($I_p = f(E_p)$):** These plate curves, also plotted at a filament voltage of **6.3 V**, display plate current (up to 80 mA) against plate voltage (up to 300 V) for discrete grid bias steps ranging from **0 V** down to **-18 V** (specifically including curves for $E_g = 0\text{ V}$, -4 V , -6 V , -8 V , -10.5 V , -12 V , -14 V , and -18 V). These curves show the triode's low plate resistance and its ability to handle relatively high peak currents under dynamic conditions, while remaining within the continuous average cathode current limit of 20 mA and plate dissipation limit of 3.5 W.

Technical Summary

The **12BH7AEH** and **12BH7AEH gold** are high-performance, miniature twin triodes designed for low-frequency voltage amplification in radio engineering applications. Featuring independent, equipotential cathodes and a flexible heater design (supporting **6.3 V / 550-680 mA** parallel or **12.6 V / 275-340 mA** series operation), the tube is well-suited for a variety of audio and instrumentation circuits. With a maximum plate voltage of **300 V**, a maximum plate dissipation of **3.5 W** per section, and a nominal transconductance of **2.4 to 4.0 mA/V**, it provides robust voltage amplification with moderate power-handling capabilities in a compact 9-pin miniature package.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

2026 Electro Harmonix Gold

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

2026 ELECTRO HARMONIX GOLD

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current	9–16 mA	Plate 250 V; Grid -10.5 V

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