

ELECTRONIC TUBE REFERENCE

12AS5

Power - Beam Single (NOT sweep) (under 10W) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION  
CONSTRUCTION  
BEAMPOWER

Miniature beam-power output tube intended for Class-A audio-frequency power amplification in television and radio receivers, optimized for relatively low supply voltages.

GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | 7CV               | BASE PINS            | 7             |
| NOMINAL HEATER      | 12.6 V / 400 mA   | PARALLEL HEATER      | – / –         |
| HEATING             | Indirect          | SERIES OPERATION     | Not specified |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar       |

7CV - TERMINAL PINOUT

| TERMINAL  | SECTION | ELEMENT              | STATUS    |
|-----------|---------|----------------------|-----------|
| PIN1 – G3 | A       | G3 – Suppressor Grid | CONNECTED |
| PIN1 – K  | A       | K – Cathode          | CONNECTED |
| PIN2 – G1 | A       | G1 – Control Grid    | CONNECTED |
| PIN3 – H  | –       | H – Heater           | CONNECTED |
| PIN4 – H  | –       | H – Heater           | CONNECTED |
| PIN5 – G1 | A       | G1 – Control Grid    | CONNECTED |
| PIN6 – G2 | A       | G2 – Screen Grid     | CONNECTED |
| PIN7 – P  | A       | P – Plate (Anode)    | CONNECTED |

SECTION RATINGS

|                                                                                                  |                |
|--------------------------------------------------------------------------------------------------|----------------|
| <b>SECTION1</b> Beam Power                                                                       |                |
| PLATE RESISTANCE                                                                                 | 40000 $\Omega$ |
| TRANSCONDUCTANCE                                                                                 | 0.0046 S       |
| MAXIMUM PLATE VOLTAGE                                                                            | 150 V          |
| MAXIMUM SCREEN VOLTAGE                                                                           | 150 V          |
| MAXIMUM PLATE DISSIPATION                                                                        | 5.5 W          |
| MAXIMUM SCREEN DISSIPATION                                                                       | 1 W            |
| <i>Published promoted fields populated semantically; identical repeated sections compressed.</i> |                |

## 12AS5 — Beam Pentode Power Amplifier

The **12AS5** is a miniature, heater-cathode beam pentode power amplifier designed for use as an output tube in automobile and AC-operated receivers. It features a 7-pin miniature construction and is electrically identical to the [6AS5](#), except for its heater characteristics.

### Physical Specifications and Basing

The 12AS5 is constructed in a T-5 1/2 glass bulb. It has the following physical dimensions:

- **Maximum Diameter:** 3/4 inch
- **Maximum Seated Height:** 2 1/8 inches
- **Maximum Overall Length:** 2 5/8 inches

The tube utilizes a miniature button 7-pin base with a **7CV** basing arrangement. It can be mounted in any position. The pin connections, viewed from the bottom of the tube, are as follows:

- **Pin 1:** Grid No. 1 (G1)
- **Pin 2:** Cathode (K) and Grid No. 3 (G3)
- **Pin 3:** Heater (H)
- **Pin 4:** Heater (H)
- **Pin 5:** Grid No. 1 (G1)
- **Pin 6:** Grid No. 2 ([G2](#))
- **Pin 7:** Plate (P)

### Direct Interelectrode Capacitances

Measured without an external shield, the approximate interelectrode capacitances are:

- **Grid No. 1 to Plate (G1 to P):** 0.6  $\mu\text{F}$
- **Input [G1 to (H + K + [G2](#) + G3)]:** 12  $\mu\text{F}$
- **Output [P to (H + K + [G2](#) + G3)]:** 6.2  $\mu\text{F}$

# Technical Ratings

The ratings for the 12AS5 are interpreted according to the **Design Center Maximum System**:

| Parameter                                                                                   | Rating                      |
|---------------------------------------------------------------------------------------------|-----------------------------|
| Heater Voltage                                                                              | 12.6 Volts                  |
| Maximum Plate Voltage                                                                       | 150 Volts                   |
| Maximum Grid No. 2 Supply Voltage                                                           | 150 Volts                   |
| Maximum Grid No. 2 Voltage                                                                  | See Grid No. 2 Rating Curve |
| Maximum Plate Dissipation                                                                   | 5.5 Watts                   |
| Maximum Grid No. 2 Dissipation                                                              | 1.0 Watt                    |
| Maximum Heater-Cathode Voltage (Heater negative with respect to cathode, total DC and peak) | 90 Volts                    |
| Maximum Heater-Cathode Voltage (Heater positive with respect to cathode, total DC and peak) | 90 Volts                    |

Additionally, the maximum Grid No. 1 circuit resistance is restricted based on the biasing method:

- **Fixed Bias:** 0.1 Megohm maximum
- **Self Bias:** 0.5 Megohm maximum

## Typical Operating Conditions and Characteristics

When operated as a Class A1 amplifier, the typical operating parameters of the 12AS5 are as follows:

- **Heater Voltage:** 12.6 Volts
- **Heater Current:** 0.4 Amperes
- **Plate Voltage:** 150 Volts
- **Grid No. 2 Voltage:** 110 Volts
- **Grid No. 1 Voltage:** -8.5 Volts
- **Peak AF Grid No. 1 Voltage:** 8.5 Volts
- **Zero-Signal Plate Current:** 35 mA
- **Maximum-Signal Plate Current:** 36 mA
- **Zero-Signal Grid No. 2 Current (Approximate):** 2 mA
- **Maximum-Signal Grid No. 2 Current (Approximate):** 6.5 mA
- **Transconductance:** 5600  $\mu$ mhos
- **Load Resistance:** 4500 Ohms

- **Total Harmonic Distortion:** 10%
- **Maximum-Signal Power Output:** 2.2 Watts

## Analysis of Performance Curves

### Grid No. 2 Rating Curve

The Grid No. 2 rating curve defines the area of permissible operation for the screen grid. At Grid No. 2 voltages up to 75 Volts, the maximum allowable dissipation is 1.0 Watt. As the Grid No. 2 voltage increases beyond 75 Volts, the maximum permissible dissipation decreases along a curve, reaching 0 Watts at 150 Volts.

### Plate Characteristics

The plate characteristic curves show the relationship between plate voltage and plate current (or Grid No. 2 current) across various Grid No. 1 bias voltages ranging from 0 Volts down to -17.5 Volts, with the heater voltage at 12.6 Volts and Grid No. 2 voltage held at 110 Volts. The plate current curves exhibit a typical pentode knee, where plate current rises rapidly at low plate voltages and flattens out as plate voltage increases. Grid No. 2 current is highest at low plate voltages and decreases as plate voltage rises.

### Load Resistance Performance

With a constant plate voltage of 150 Volts, Grid No. 2 voltage of 110 Volts, Grid No. 1 bias of -8.5 Volts, and an RMS signal input of 6.0 Volts, the performance of the tube varies significantly with load resistance:

- **Power Output:** Power output rises with load resistance, peaking at approximately 2.2 Watts at a load resistance of 4500 Ohms. Beyond 4500 Ohms, the power output gradually decreases, falling to approximately 1.8 Watts at 10000 Ohms.
- **Total Harmonic Distortion:** Distortion reaches a minimum of 10% at the optimal load resistance of 4500 Ohms. Operating the tube with a lower load resistance (e.g., 1000 Ohms) increases distortion to approximately 18%, while operating with a higher load resistance (e.g., 10000 Ohms) increases distortion to approximately 24%.

## Technical Summary

The **12AS5** is a compact, 7-pin miniature beam pentode power amplifier designed for low-voltage audio output applications in automotive and AC-operated receivers. Operating with a 12.6 V, 0.4 A heater, it provides a maximum power output of 2.2 Watts into a 4500 Ohm load under typical Class A1 conditions. Its design center ratings limit plate voltage to 150 Volts and plate dissipation to 5.5 Watts, requiring careful attention to Grid No. 2 dissipation limits and Grid No. 1 circuit resistance constraints to ensure reliable operation.



## 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 · Beam Power

| OTHER        |                 |                  |
|--------------|-----------------|------------------|
| PARAMETER    | PUBLISHED VALUE | CONDITION / NOTE |
| Power Output | 2.2 W           | ClassA1          |



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1966 Tung Sol Electronic Tubes 2 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 2 OF 4

## Section 1 · Beam Power

| OTHER                        |                 |                  |
|------------------------------|-----------------|------------------|
| PARAMETER                    | PUBLISHED VALUE | CONDITION / NOTE |
| Plate voltage                | 150 V           | ClassA           |
| Grid #2 voltage              | 110 V           | ClassA           |
| Zero-signal plate current    | 35 mA           | ClassA           |
| Maximum-signal plate current | 36 mA           | ClassA           |
| Load resistance              | 3500 ohm        | ClassA           |
| Maximum-signal power output  | 2.2 W           | ClassA           |

| CHARACTERISTIC   |                 |                  |
|------------------|-----------------|------------------|
| PARAMETER        | PUBLISHED VALUE | CONDITION / NOTE |
| Plate resistance | 40000 ohm       | ClassA           |
| Transconductance | 4800 uS         | ClassA           |

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