



ELECTRONIC TUBE REFERENCE

12DM5

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

BEAMPOWER

Beam-power tube with explicit television horizontal-deflection amplifier service, also capable of Class-A signal power output and designed for controlled warm-up in series-heater equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7CV	BASE PINS	7
NOMINAL HEATER	12.6 V / 450 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

SECTION1 Beam Power	
PLATE RESISTANCE	14000 Ω
TRANSCONDUCTANCE	0.0075 S
MAXIMUM PLATE VOLTAGE	175 V
MAXIMUM SCREEN VOLTAGE	117 V
MAXIMUM PLATE DISSIPATION	5.5 W
MAXIMUM SCREEN DISSIPATION	1.25 W
<i>Published maximum ratings and representative Class A1 operating data promoted.</i>	

12DM5 — Beam Power Pentode

The **12DM5** is a miniature beam power pentode designed primarily for use as an audio power output amplifier in television receivers. Constructed with a 7-pin miniature button base, this tube features controlled heater warm-up characteristics to minimize heater voltage surges during the warm-up cycle when operated in series-connected heater strings with other similarly controlled tubes.

Physical Construction and Pin Configuration

The 12DM5 is housed in a T-5 1/2 glass bulb with a maximum outer diameter of 3/4 inch. The physical dimensions of the tube include a maximum overall length of 2 3/8 inches and a maximum seated height of 2 1/8 inches. It is designed to operate in any mounting position.

The tube utilizes a 7-pin miniature button base with a **7CV** basing arrangement. The pin connections, viewed from the bottom of the tube, are assigned as follows:

Pin Number	Connection
Pin 1	Grid #1 (Control Grid)
Pin 2	Cathode and Beam Plates
Pin 3	Heater
Pin 4	Heater
Pin 5	Plate
Pin 6	Grid #2 (Screen Grid)
Pin 7	Grid #1 (Control Grid)

The control grid (Grid #1) is internally connected to both Pin 1 and Pin 7. The cathode and the beam plates are internally tied and connected to Pin 2.

Heater Characteristics and Surge Control

The 12DM5 incorporates a coated unipotential cathode. The heater is designed for operation on either alternating current (AC) or direct current (DC).

Heater Parameter	Value
Nominal Heater Voltage	12.6 V
Nominal Heater Current	0.45 A
Approximate Warm-up Time	11.0 s

The heater warm-up time is specifically defined under controlled test conditions. It represents the time required for the voltage across the heater to reach 80% of its rated voltage (12.6 V) after applying four times the rated heater voltage (50.4 V) to a circuit consisting of the tube heater connected in series with a resistance equal to three times the nominal heater operating resistance. This controlled thermal characteristic ensures that when the 12DM5 is used in series-string configurations with other tubes having matching warm-up controls, transient voltage surges across individual heaters are minimized.

Electrical Ratings and Limits

The maximum ratings for the 12DM5 are established under the Design Center System. These limits represent the absolute boundaries within which the tube must be operated to ensure reliable performance and longevity.

Parameter	Rating
Maximum Plate Voltage	135 V
Maximum Grid #2 (Screen) Voltage	117 V
Maximum Plate Dissipation	5.5 W
Maximum Grid #2 Dissipation	1.25 W
Maximum Bulb Temperature (at hottest point)	250 °C

Grid Circuit Resistance Limits

The maximum allowable resistance in the control grid (Grid #1) circuit depends on the biasing method employed:

- **Fixed Bias:** 0.1 Megohms
- **Cathode Bias:** 0.5 Megohms

Heater-Cathode Voltage Limits

The maximum peak voltage between the heater and the cathode is rated at **200 Volts** under both polarities:

- **Heater Negative with respect to Cathode:** 200 V Peak
- **Heater Positive with respect to Cathode:** 200 V Peak (with the restriction that the DC component must not exceed 100 V)

Typical Operating Conditions and Characteristics

When operated as a Class A audio power amplifier, the 12DM5 exhibits the following typical characteristics and operating parameters:

Parameter	Typical Value
Heater Voltage	12.6 V
Heater Current	0.45 A
Plate Voltage	110 V
Grid #2 (Screen) Voltage	110 V
Grid #1 (Control-Grid) Voltage	7.5 V
Peak AF Grid #1 Input Voltage	7.5 V
Plate Resistance (Approximate)	14,000 Ω
Transconductance	7,500 μmhos
Zero-Signal Plate Current	49 mA
Maximum-Signal Plate Current	50 mA
Zero-Signal Grid #2 Current	4.0 mA
Maximum-Signal Grid #2 Current	8.5 mA
Load Resistance Impedance	2,500 Ω
Total Harmonic Distortion (Approximate)	9%
Maximum-Signal Power Output	1.9 W

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 12DM5, measured without an external shield, are as follows:

- **Grid #1 to Plate (G1 to P):** 0.55 μpF

- **Input (G1 to K + H + G2 + B.P.):** 13 μF
- **Output (P to K + H + G2 + B.P.):** 9 μF

These capacitance values reflect the internal shielding provided by the beam plates and the physical arrangement of the electrodes within the miniature envelope.

Technical Summary

The **12DM5** is a **7-pin miniature beam power pentode** featuring a **12.6 V, 0.45 A heater** with controlled warm-up characteristics designed for series-string television receiver applications. It is optimized for low-voltage, high-current Class A audio power output service, delivering up to **1.9 Watts** of audio output into a **2,500 Ohm** load with approximately **9% total harmonic distortion** when operated with plate and screen voltages of **110 V**. Its compact T-5 1/2 envelope, flexible mounting options, and robust heater-cathode insulation (up to 200 V peak) make it a highly specialized and efficient output stage for mid-century television audio systems.



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
Service	Television horizontal-deflection amplifier	—
Heater Warmup Time	11 s	—



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	110 V	ClassA1
Screen voltage	110 V	ClassA1
Grid 1 voltage	-7.5 V	ClassA1
Plate current	40 mA	ClassA1
Signal power output	1.7 W	ClassA1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater warm-up time	11 s	WholeTube

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