

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

12DB5

Power - TV Vertical Output electronic tube

1 SECTION
CONSTRUCTION
BEAMPOWER

Beam-power tube designed primarily for television vertical-deflection amplification and also suitable for audio power service, with high pulse-voltage capability and substantial current swing.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9GR	BASE PINS	9
NOMINAL HEATER	12.6 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9GR - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1	–	G2 – Screen Grid	CONNECTED
PIN2	–	G3 – Suppressor Grid	CONNECTED
PIN2	–	K – Cathode	CONNECTED
PIN3	–	G1 – Control Grid	CONNECTED
PIN4	–	H – Heater	CONNECTED
PIN5	–	H – Heater	CONNECTED
PIN6	–	G1 – Control Grid	CONNECTED
PIN7	–	G3 – Suppressor Grid	CONNECTED
PIN7	–	K – Cathode	CONNECTED

SECTION RATINGS

SECTION1 Beam Power	
PLATE RESISTANCE	28000 Ω
TRANSCONDUCTANCE	0.008 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	10 W
MAXIMUM SCREEN DISSIPATION	1.25 W
MAXIMUM CATHODE CURRENT	55 mA
12-V heater variant; promoted electrical fields carried from the explicitly referenced 6DB5 parent datasheet already present in the project corpus. Additional 12-V heater data remains source-specific.	

12DB5 — Beam Power Tube

An indirectly heated beam power tube designed for use as a vertical-deflection amplifier in television receivers and for Class A1 audio amplification.

Overview

The **12DB5** is a 9-pin miniature beam power tube primarily designed for service as a vertical-deflection amplifier in television receivers. It features a unipotential cathode and a heater with a controlled warm-up time, making it suitable for series-string heater arrangements. The electrical characteristics of the 12DB5 are identical to those of the **6DB5**, with the sole exception of its heater ratings.

Construction, Heater, and Pinout

The 12DB5 is housed in a miniature glass envelope requiring a standard 9-contact socket. It utilizes the **9GR** pinout arrangement, which provides dual connections for certain electrodes to facilitate circuit layout and heat dissipation.

Heater Characteristics

The heater is designed for either AC or DC operation and features a controlled warm-up time to ensure reliable performance in series-connected heater chains.

Heater Parameter	Value
Heater Voltage (AC or DC)	12.6 V
Heater Current	0.6 A $\pm$ 6%
Average Warm-up Time	11 seconds

Heater Parameter	Value
Maximum Peak Heater-Cathode Voltage	± 200 V
Maximum Average Heater-Cathode Voltage	100 V

Calculated Heater Power: Using the nominal heater voltage of 12.6 V and nominal current of 0.6 A, the calculated heater power consumption is: $\text{Power} = 12.6 \text{ V} \times 0.6 \text{ A} = 7.56 \text{ W}$

Terminal Connections (9GR Pinout)

The 9-pin miniature base connections, viewed from the bottom of the tube, are assigned as follows:

- **Pin 1:** Cathode, Grid No. 3 (Beam Plates)
- **Pin 2:** Grid No. 2 (Screen Grid)
- **Pin 3:** Grid No. 1 (Control Grid)
- **Pin 4:** Heater
- **Pin 5:** Heater
- **Pin 6:** Grid No. 1 (Control Grid)
- **Pin 7:** Cathode, Grid No. 3 (Beam Plates)
- **Pin 8:** Internal Connection (IC) — Do not use
- **Pin 9:** Plate

The duplicate connections for Grid No. 1 (Pins 3 and 6) and the Cathode/Grid No. 3 assembly (Pins 1 and 7) provide flexibility in physical wiring and help minimize lead inductance and resistance.

Class A1 Amplifier Ratings and Operation

The 12DB5 can be operated as a Class A1 audio power amplifier. The design-center maximum ratings and typical operating conditions define its performance limits in this mode.

Maximum Ratings (Design-Center Values)

- **Plate Voltage:** 300 V max
- **Grid-No. 2 (Screen-Grid) Voltage:** 150 V max
- **Plate Dissipation:** 10 W max
- **Grid-No. 2 Input:** 1.25 W max

Typical Operating Conditions

Under typical Class A1 operating conditions, the tube delivers a substantial power output with moderate distortion:

Parameter	Value
Plate Supply Voltage	200 V

Parameter	Value
Grid-No. 2 Supply Voltage	125 V
Cathode-Bias Resistor	180 Ω
Peak AF Grid-No. 1 Voltage	8.5 V
Zero-Signal Plate Current	46 mA
Maximum-Signal Plate Current	47 mA
Zero-Signal Grid-No. 2 Current	2.2 mA
Maximum-Signal Grid-No. 2 Current	8.5 mA
Plate Resistance (Approximate)	28,000 Ω
Transconductance	8,000 μmhos
Load Resistance	4,000 Ω
Total Harmonic Distortion	10%
Maximum-Signal Power Output	3.8 W

Maximum Circuit Values

- **Grid-No. 1 Circuit Resistance (Fixed Bias):** 0.1 M Ω max
- **Grid-No. 1 Circuit Resistance (Cathode Bias):** 2.2 M Ω max

Operating Calculations

- **Cathode Bias Voltage:** At zero-signal, the total current flowing through the 180 Ω cathode resistor is the sum of the plate current and the screen-grid current: $I_k = 46 \text{ mA} + 2.2 \text{ mA} = 48.2 \text{ mA} = 0.0482 \text{ A}$ The calculated cathode bias voltage is: $V_k = 0.0482 \text{ A} \times 180 \Omega \approx 8.68 \text{ V}$ This closely matches the typical peak AF grid-no. 1 drive voltage of 8.5 V.
- **Zero-Signal Plate Dissipation:** The actual voltage across the plate relative to the cathode is the plate supply voltage minus the cathode bias voltage: $V_p = 200 \text{ V} - 8.68 \text{ V} = 191.32 \text{ V}$ The calculated zero-signal plate dissipation is: $P_p = 191.32 \text{ V} \times 0.046 \text{ A} \approx 8.80 \text{ W}$ This operating point safely respects the maximum plate dissipation rating of 10 W.

Vertical-Deflection Amplifier Service

When utilized in television receivers operating on a standard 525-line, 30-frame system, the 12DB5 is subjected to pulsed operating conditions. Because of the inductive nature of the deflection yoke, the tube must withstand high peak voltage pulses.

Maximum Ratings (Design-Center Values)

- **DC Plate Voltage:** 300 V max
- **Peak Positive-Pulse Plate Voltage (Absolute Maximum):** 2,000 V max
- **DC Grid-No. 2 (Screen-Grid) Voltage:** 150 V max
- **Peak Negative-Pulse Grid-No. 1 (Control-Grid) Voltage:** -250 V max
- **Peak Cathode Current:** 200 mA max
- **Average Cathode Current:** 55 mA max
- **Plate Dissipation:** 10 W max
- **Grid-No. 2 Input:** 1.25 W max

Pulse Duration Constraints

The peak positive-pulse plate voltage rating of 2,000 V is an absolute maximum value and must never be exceeded under any circumstances. This rating is strictly limited to pulsed operation where the pulse duration does not exceed 15% of a vertical scanning cycle, which equates to a maximum duration of 2.5 milliseconds.

Maximum Circuit Values

- **Grid-No. 1 Circuit Resistance (Fixed Bias):** 0.1 MΩ max
- **Grid-No. 1 Circuit Resistance (Cathode Bias):** 2.2 MΩ max

Comparison with 6DB5

The 12DB5 is identical to the **6DB5** in its physical dimensions, pinout configuration, Class A1 amplifier performance, and vertical-deflection ratings. The sole distinction lies in the heater design:

- The **6DB5** heater operates at a nominal voltage of 6.3 V with a current draw of 1.2 A.
- The **12DB5** heater operates at a nominal voltage of 12.6 V with a current draw of 0.6 A, and features a controlled average warm-up time of 11 seconds.

This difference makes the 12DB5 ideal for series-string heater circuits where uniform warm-up characteristics are required to prevent voltage surges across other heaters in the string.

Technical Summary

The **12DB5** is a versatile, 9-pin miniature beam power tube designed for high-performance vertical-deflection and audio output stages. Featuring a 12.6 V, 0.6 A heater with an 11-second controlled warm-up time, it is optimized for series-string television designs. With a transconductance of 8,000 μmhos and a plate dissipation rating of 10 W, it delivers up to 3.8 W of audio power in Class A1 service, while its robust design permits peak positive plate pulses of up to 2,000 V in vertical deflection circuits.



SOURCE OPERATING CONDITIONS

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Beam Power

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Positive Plate Voltage	2000 V	Vertical deflection; absolute maximum
Power Output	3.8 W	Class A; 200 V plate
Plate Voltage	225 V	Triode connected

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-Plate Capacitance	0.2 pF	Maximum



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 RCA HB3 Binder 5 of 7

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

1971 RCA HB3 BINDER 5 OF 7

Section 1 · Beam Power

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage (AC or DC)	12.6 V	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Current – published value 1	600 mA	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Current – published value 2	6 A	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Warm-up time (Average)	11	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Heater voltage	12.6 V	Nominal heater rating
Heater current	600 mA	Nominal heater rating
Plate resistance	28000 ohm	InheritedFromReferencedParent 6DB5
Transconductance	8000 uS	InheritedFromReferencedParent 6DB5

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	300 V	InheritedFromReferencedParent 6DB5
Maximum screen-grid voltage	150 V	InheritedFromReferencedParent 6DB5
Maximum plate dissipation	10 W	InheritedFromReferencedParent 6DB5

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