

ELECTRONIC TUBE REFERENCE

12JB6A

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
BEAMPOWER

Novar beam-power tube for high-efficiency television horizontal-deflection amplification, providing approximately 17.5 W plate dissipation and 6.5 kV positive pulse capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9QL	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

9QL - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1	–	G2 – Screen Grid	CONNECTED
PIN2	–	G1 – Control Grid	CONNECTED
PIN3	–	K – Cathode	CONNECTED
PIN4	–	H – Heater	CONNECTED
PIN5	–	H – Heater	CONNECTED
PIN6	–	G1 – Control Grid	CONNECTED
PIN7	–	G2 – Screen Grid	CONNECTED
PIN8	–	G3 – Suppressor Grid	CONNECTED
PIN9	–	–	IC
CAP1	A	P – Plate (Anode)	CONNECTED

SECTION RATINGS

SECTION1 Beam Power	
PLATE RESISTANCE	15000 Ω
TRANSCONDUCTANCE	0.0075 S
AMPLIFICATION FACTOR	4.4
MAXIMUM PLATE VOLTAGE	770 V
MAXIMUM SCREEN VOLTAGE	220 V
MAXIMUM PLATE DISSIPATION	17.5 W
MAXIMUM SCREEN DISSIPATION	3.5 W
MAXIMUM CATHODE CURRENT	175 mA
Published ratings and characteristics extracted from the approved source. Pulse-only ratings are retained as parameter rows rather than substituted for continuous ratings.	

12JB6A — Beam Power Pentode

The **12JB6A** is a high-efficiency Novar-type beam power pentode designed primarily for use as a horizontal-deflection amplifier in television receivers. It is engineered to handle the high-voltage pulses and thermal demands of deflection circuitry. The 12JB6A is electrically identical to the [6JB6A](#) and [17JB6A](#), differing only in its heater voltage and current ratings.

Overview

The 12JB6A is a beam power tube housed in a T-12 glass envelope with a 9-pin button Novar base and a top cap. It is primarily applied as a horizontal-deflection amplifier in 525-line, 30-frame television systems, where its high-current capability at low plate voltages ensures high efficiency. Additionally, the tube is rated for vertical-deflection amplifier service.

The 12JB6A belongs to a family of identical tubes that includes the [6JB6A](#) (6.3 V heater) and the [17JB6A](#) (16.8 V heater). These "A" suffix versions are identical to the older [12JB6](#), [6JB6](#), and [17JB6](#) types, except for a modified base featuring an exhaust tip at the bottom and a shorter bulb.

Construction, Physical Dimensions, and Basing

The 12JB6A features a Novar T-12 glass construction with a Button 9-Pin (E9-88) base and a top cap (C1-2 or C1-3). The physical dimensions are as follows:

- **Maximum Diameter:** 1.563 inches
- **Maximum Seated Height:** 3.125 inches
- **Maximum Overall Height:** 3.505 inches

The tube utilizes the **9QL** basing arrangement. The pin connections, viewed from the bottom of the base, are:

- **Pin 1:** Heater
- **Pin 2:** Grid No.1 (Control Grid)
- **Pin 3:** Grid No.2 (Screen Grid)
- **Pin 4:** Cathode
- **Pin 5:** Heater
- **Pin 6:** Grid No.1 (Control Grid)
- **Pin 7:** Grid No.2 (Screen Grid)
- **Pin 8:** Grid No.3 (Suppressor Grid)
- **Pin 9:** Internal Connection (Do Not Use)
- **Top Cap:** Plate

The dual connections for Grid No.1 (Pins 2 and 6) and Grid No.2 (Pins 3 and 7) help facilitate circuit layout and heat dissipation.

Heater Characteristics

The 12JB6A has an indirectly heated cathode designed for series or parallel heater chains. The heater characteristics are:

Parameter	Value
Heater Voltage (AC or DC)	12.6 V
Heater Current	0.600 ± 0.040 A
Average Warm-up Time	11 seconds
Maximum Heater-Cathode Voltage (Peak)	± 200 V
Maximum Heater-Cathode Voltage (Average)	100 V

The nominal heater power can be calculated from the rated voltage and current: $\text{Heater Power} = 12.6 \text{ V} \times 0.6 \text{ A} = 7.56 \text{ W}$

The controlled 11-second warm-up time ensures reliable operation in series-string entertainment equipment by matching the thermal characteristics of other tubes in the string.

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the 12JB6A, measured without an external shield, are:

- **Grid No.1 to Plate:** 0.2 pF
- **Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3:** 15 pF
- **Plate to Cathode, Heater, Grid No.2, and Grid No.3:** 6 pF

Class A1 Amplifier Characteristics

The 12JB6A can be evaluated under Class A1 amplifier conditions in both triode-connected (Grid No.2 connected to plate) and pentode-connected configurations. Typical operating points are:

Parameter	Triode Connection	Pentode Connection (Low Voltage)	Pentode Connection (Standard)
Plate Voltage	150 V	60 V	150 V
Grid No.3 (Suppressor Grid)	—	Connected to cathode at socket	Connected to cathode at socket
Grid-No.2 (Screen-Grid) Voltage	—	150 V	150 V
Grid-No.1 (Control-Grid) Voltage	-22.5 V	0 V	-22.5 V
Mu-Factor (Grid No.2 to Grid No.1)	4.4	—	—
Plate Resistance (Approx.)	—	—	15,000 Ω
Transconductance	—	—	7,100 μmhos
Plate Current	—	390 mA*	70 mA
Grid-No.2 Current	—	32 mA*	2.1 mA
Grid-No.1 Voltage for Plate Current of 1 mA	—	—	-42 V

**Note: These values are measured using a recurrent waveform method to prevent exceeding the maximum ratings of the tube.*

Horizontal-Deflection Amplifier Service

In a 525-line, 30-frame television system, the 12JB6A operates under demanding horizontal-deflection conditions.

Maximum Ratings (Design-Maximum Values)

- **DC Plate Supply Voltage:** 770 V
- **Peak Positive-Pulse Plate Voltage:** 6,500 V (Pulse duration must not exceed 15% of a horizontal scanning cycle, or 10 microseconds)
- **Peak Negative-Pulse Plate Voltage:** 1,500 V
- **DC Grid-No.3 Voltage:** 70 V

- **DC Grid-No.2 Voltage:** 220 V
- **DC Grid-No.1 Voltage:** -55 V
- **Peak Negative-Pulse Grid-No.1 Voltage:** 330 V
- **Peak Cathode Current:** 550 mA
- **Average Cathode Current:** 175 mA
- **Plate Dissipation:** 17.5 W (A bias resistor or other protective means is required to safeguard the tube in the absence of excitation)
- **Grid-No.2 Input:** 3.5 W
- **Maximum Bulb Temperature (at hottest point):** 240 °C

Maximum Circuit Values

- **Grid-No.1-Circuit Resistance (for grid-resistor-bias operation):** 1 MΩ

Suppressor Grid (Grid No.3) Snivets Control

In horizontal-deflection service, a positive DC voltage can be applied to Grid No.3 to minimize "snivets" interference in both VHF and UHF television receivers. A typical value for this application is **30 V**.

Vertical-Deflection Amplifier Service

The 12JB6A is also rated for vertical-deflection amplifier service in 525-line, 30-frame television systems.

Maximum Ratings (Design-Maximum Values)

- **DC Plate Voltage:** 350 V
- **Peak Positive-Pulse Plate Voltage:** 2,500 V (Pulse duration must not exceed 15% of a vertical scanning cycle, or 2.5 milliseconds)
- **Grid-No.2 Voltage:** 300 V
- **Peak Cathode Current:** 260 mA
- **Average Cathode Current:** 75 mA
- **Plate Dissipation:** 15 W (A resistor or other protective means is required to safeguard the tube in the absence of excitation)
- **Grid-No.2 Input:** 2.75 W
- **Maximum Bulb Temperature (at hottest point):** 200 °C

Maximum Circuit Values

- **Grid-No.1-Circuit Resistance (for fixed-bias operation):** 1 MΩ
- **Grid-No.1-Circuit Resistance (for cathode-bias operation):** 2.2 MΩ

Characteristic Curves and Interpretation

The plate characteristic curves for the 12JB6A (with Grid No.3 connected to the cathode at the socket and Grid No.2 held at 150 V) illustrate its high-current capabilities. At a Grid No.1 voltage of 0 V, the plate current (I_b) rises extremely rapidly, reaching a knee of approximately 400 mA at a plate voltage of only 40 V. Under these same conditions, the Grid No.2 current (I_{c2}) peaks at approximately 32 mA at low plate voltages and drops off sharply as plate voltage increases.

As the control grid (Grid No.1) is biased more negatively (from 0 V down to -25 V in 5 V steps), the plate current curves shift downward, demonstrating effective control over the electron beam. The sharp knee and high peak current capability at low plate voltages are essential characteristics for achieving high efficiency in horizontal-deflection circuits.

Technical Summary

The **12JB6A** is a robust, high-efficiency Novar beam power pentode designed for horizontal- and vertical-deflection amplifier service in television receivers. It features a **12.6 V, 0.6 A** heater with a controlled 11-second warm-up time, making it ideal for series-string heater designs. Housed in a T-12 envelope with a 9-pin button Novar base and a top cap plate connection, the tube can withstand peak positive-pulse plate voltages of up to **6,500 V** in horizontal-deflection service and **2,500 V** in vertical-deflection service. With a transconductance of **7,100 μmhos** and a plate dissipation rating of up to **17.5 W**, the 12JB6A provides reliable, high-current performance in demanding television receiver applications.

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	12.6 V	—
Heater current	600 mA	—
Maximum DC plate voltage	770 V	HorizontalDeflection
Peak positive-pulse plate voltage	6500 V	HorizontalDeflection
Maximum screen voltage	220 V	HorizontalDeflection
Average cathode current	175 mA	HorizontalDeflection
Plate dissipation	17.5 W	—
Heater warm-up time	11 s	ControlledWarmup

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA
Screen voltage	150 V	ClassA
Plate current	70 mA	ClassA
Plate resistance	15000 ohm	ClassA
Transconductance	7500 uS	ClassA

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.26 pF	—

1975 RCA RC30

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

1975 RCA RC30
Section 1 · Beam Power

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
For fixed-bias operation	1 MΩ	Published in approved 17JB6A target datasheet entry; Section1
For cathode-bias operation	2.2 MΩ	Published in approved 17JB6A target datasheet entry; Section1
# Pulse duration must not exceed 15% of a vertical scanning cycle (	2.5 milliseconds	Published in approved 17JB6A target datasheet entry; Section1
Heater Voltage (ac/dc) 6.3 12.6	16.8 V	Published in approved 17JB6A target datasheet entry; Section1
Heater Current 1.2 0.6	450 mA	Published in approved 17JB6A target datasheet entry; Section1
Heater Warm-up Time (Average) 11	11 seconds	Published in approved 17JB6A target datasheet entry; Section1
Grid No.1 to Plate	0.2 pF	Published in approved 17JB6A target datasheet entry; Section1
and Grid No.3	15 pF	Published in approved 17JB6A target datasheet entry; Section1
DC Plate Supply Voltage	770 V	Published in approved 17JB6A target datasheet entry; Section1
Peak Positive-Pulse Plate Voltage#	6500 V	Published in approved 17JB6A target datasheet entry; Section1
Peak Negative-Pulse Plate Voltage	1500 V	Published in approved 17JB6A target datasheet entry; Section1
DC Grid-No.3 Voltagef	70 V	Published in approved 17JB6A target datasheet entry; Section1
DC Grid-No.2 Voltage	220 V	Published in approved 17JB6A target datasheet entry; Section1
DC Grid-No.1 Voltage	55 V	Published in approved 17JB6A target datasheet entry; Section1
Peak Negative-Pulse Grid-No.1 Voltage	330 V	Published in approved 17JB6A target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Cathode Current	550 mA	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.2 Input	3.5 W	Published in approved 17JB6A target datasheet entry; Section1
Bulb Temperature (At hottest point)	240 °C	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.1-Circuit Resistance, for grid-resistor-bias operation	1 MΩ	Published in approved 17JB6A target datasheet entry; Section1
# Pulse duration must not exceed 15% of a horizontal scanning cycle (	10 microseconds	Published in approved 17JB6A target datasheet entry; Section1
"snivets" interference in both vhf and uhf television receivers. A typical value is	30 V	Published in approved 17JB6A target datasheet entry; Section1
GRID - No	2 V	Published in approved 17JB6A target datasheet entry; Section1
Heater Voltage (ac/dc) 3.5 4.5	6.3 V	Published in approved 17JB6A target datasheet entry; Section1
Heater Current 0.6 0.45	300 mA	Published in approved 17JB6A target datasheet entry; Section1
Plate Voltage 330	330 V	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.3 (Suppressor-Grid) Voltage, Positive value 0	0 V	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Supply Voltage 330	330 V	Published in approved 17JB6A target datasheet entry; Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage 150 60	150 V	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Voltage – 150	150 V	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.1 (Control-Grid) Voltage –22.5 0	-22.5 V	Published in approved 17JB6A target datasheet entry; Section1
Plate Resistance (Approx.)	15000 Ω	Published in approved 17JB6A target datasheet entry; Section1
Plate Current 390"	70 mA	Published in approved 17JB6A target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
– 32"	2.1 mA	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.1 Voltage for plate current of	1 mA	Published in approved 17JB6A target datasheet entry; Section1
Grid-No.1 Voltage for plate current of 1 mA	-42 V	Published in approved 17JB6A target datasheet entry; Section1