



ELECTRONIC TUBE REFERENCE

17JN6

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
BEAMPOWER

Duodecar beam-power tube designed for television horizontal-deflection amplification, with reduced grid-to-plate capacitance and high sweep-pulse capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12FK	BASE PINS	12
NOMINAL HEATER	16.8 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Beam Power	
PLATE RESISTANCE	18000 Ω
TRANSCONDUCTANCE	0.0073 S
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
WARM-UP TIME	11 s
Reference/equivalence-only source does not reproduce the referenced electrical ratings/characteristics; promoted values intentionally not inferred from external datasheets.	

17JN6 — Beam Power Pentode

The 17JN6 is a duodecar-type compactron beam power pentode designed primarily for use as a horizontal-deflection output amplifier in both color and black-and-white television receivers.

Overview

The **17JN6** is a high-performance beam power tube designed to meet the demanding requirements of horizontal deflection circuits in television receivers. It features high zero-bias plate current, a high plate-to-screen-grid (grid No. 2) current ratio, and robust DC plate supply voltage ratings. To suppress snivets (high-frequency oscillations that cause vertical dark lines on television screens), the tube incorporates separate beam plate (grid No. 3) terminals.

The 17JN6 belongs to a family of electrically similar tubes, including the [6JN6](#) and [12JN6](#), from which it differs only in its heater ratings. It is also electrically identical to the [6JM6](#) except for a slightly lower grid-No. 1-to-plate capacitance. The tube is housed in a T-12 glass envelope and requires a standard 12-contact duodecar socket.

Construction, Physical Dimensions, and Base

The 17JN6 is constructed using the compactron/duodecar design, which utilizes a T-12 glass bulb and a 12-pin button base (EIA E12-74). This construction provides a compact physical profile with excellent thermal dissipation capabilities. The tube can be mounted in any position.

The physical dimensions of the envelope are as follows:

- **Maximum Overall Length:** 2.875 inches (73.0 mm)
- **Maximum Seated Height:** 2.500 inches (63.5 mm)
- **Maximum Diameter:** 1.563 inches (39.7 mm)

The tube features a coated unipotential cathode, which provides reliable electron emission under high-peak-current conditions.

Heater Ratings

The heater of the 17JN6 is designed for series-string heater circuits in television receivers and features a controlled warm-up characteristic.

Parameter	Value
Heater Voltage (AC or DC)	16.8 V
Heater Current	0.45 ± 0.03 A
Calculated Heater Power	7.56 W
Average Heater Warm-up Time	11 s

The calculated nominal heater power of **7.56 W** is derived from the nominal heater voltage of 16.8 V and the nominal heater current of 0.45 A.

The controlled warm-up time is verified under a specific test condition: the time required for the voltage across the heater to reach 80% of its nominal (bogey) value when four times the bogey heater voltage is applied to a circuit consisting of the heater in series with a resistance equal to three times the bogey heater voltage divided by the bogey heater current.

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and the cathode, the following maximum voltage ratings must be observed:

- **Heater Negative with Respect to Cathode:** 200 V (Total DC and Peak)
- **Heater Positive with Respect to Cathode:** 100 V (DC component), 200 V (Total DC and Peak)

Pinout and Electrode Connections

The 17JN6 uses the **12FK** basing diagram. Depending on the specific manufacturing variant or standard revision, minor differences in internal connections and pin assignments are documented. Designers must verify the specific pinout configuration of the physical device being used.

Pinout Configurations

Pin	Configuration A	Configuration B	Configuration C
1	Heater (H)	Cathode (K), Heater (H)	Heater (H)
2	Cathode (K)	Grid No. 2 (G_2)	Cathode (K), Grid No. 3 (G_3)
3	Grid No. 2 (G_2)	Grid No. 3 (G_3)	Grid No. 2 (G_2)
4	Grid No. 3 (G_3)	No Connection (NC)	Grid No. 1 (G_1)
5	No Connection (NC)	No Connection (NC)	No Connection (NC)
6	No Connection (NC)	Plate (P)	Plate (P)
7	Plate (P)	No Connection (NC)	No Connection (NC)
8	No Connection (NC)	No Connection (NC)	No Connection (NC)
9	No Connection (NC)	No Connection (NC)	No Connection (NC)
10	Grid No. 3 (G_3)	Grid No. 3 (G_3)	Grid No. 3 (G_3)
11	Grid No. 1 (G_1)	Grid No. 1 (G_1)	Grid No. 1 (G_1)

Pin	Configuration A	Configuration B	Configuration C
12	Heater (H)	Heater (H)	Heater (H)

In all configurations, the beam plates (Grid No. 3) are typically connected to the cathode at the socket to ensure proper beam-forming action and snivet suppression.

Direct Interelectrode Capacitances

The capacitances of the 17JN6 are measured without an external shield:

Capacitance	Value
Grid No. 1 to Plate	0.34 pF
Input (Grid No. 1 to Cathode, Heater, Grid No. 2, and Grid No. 3)	16 pF
Output (Plate to Cathode, Heater, Grid No. 2, and Grid No. 3)	7 pF

The low grid-to-plate capacitance (0.34 pF) is a key factor in maintaining stability and preventing unwanted feedback in high-frequency deflection circuits.

Electrical Characteristics and Operating Points

The 17JN6 exhibits high transconductance and a low plate resistance under typical pentode operating conditions.

Typical Pentode Operation

When operated with the beam plates (Grid No. 3) connected to the cathode at the socket, the typical characteristics are:

- **Plate Voltage:** 250 V
- **Grid No. 2 (Screen) Voltage:** 150 V
- **Grid No. 1 (Control Grid) Voltage:** -22.5 V
- **Plate Current:** 65 mA
- **Grid No. 2 Current:** 1.8 mA
- **Transconductance:** 7,300 μ mhos
- **Plate Resistance:** 18,000 Ω
- **Grid No. 1 Cutoff Voltage (for Plate Current = 1.0 mA):** -42 V (approximate)

Triode Amplification Factor

When connected as a triode (with Grid No. 2 tied to the plate):

- **Plate Voltage:** 150 V
- **Grid No. 1 Voltage:** -22.5 V
- **Amplification Factor (μ):** 4.4

High-Voltage Cutoff Characteristics

Under pulsed or high-voltage conditions:

- **Plate Voltage:** 5,000 V
- **Grid No. 2 Voltage:** 150 V
- **Grid No. 1 Cutoff Voltage (for Plate Current = 1.0 mA):** -100 V (approximate)

Instantaneous Knee Characteristics

To evaluate the tube's performance at the peak of the deflection cycle, instantaneous knee values are measured using a recurrent waveform to limit electrode dissipation:

- **Plate Voltage:** 60 V
- **Grid No. 2 Voltage:** 150 V
- **Grid No. 1 Voltage:** 0 V
- **Plate Current:** 345 mA
- **Grid No. 2 Current:** 27 mA

Design-Maximum Ratings

The ratings below are design-maximum values for horizontal deflection amplifier service in a 525-line, 30-frame television system. The duty cycle of any pulse must not exceed 15% of a single horizontal scanning cycle (equivalent to a maximum duration of 10 microseconds).

Rating Parameter	Maximum Value
DC Plate Supply Voltage (Boost + DC Power Supply)	770 V
Peak Positive Pulse Plate Voltage	6,500 V
Peak Negative Pulse Plate Voltage	1,500 V
Positive DC Beam Plate (Grid No. 3) Voltage	70 V
DC Grid No. 2 (Screen) Voltage	220 V
DC Grid No. 1 (Control Grid) Negative-Bias Voltage	55 V
Peak Negative Pulse Grid No. 1 Voltage	330 V
Average Cathode Current	175 mA

Rating Parameter	Maximum Value
Peak Cathode Current	550 mA
Plate Dissipation	17.5 W
Grid No. 2 Input (Dissipation)	3.5 W
Bulb Temperature (at hottest point)	220 °C
Grid No. 1 Circuit Resistance (with grid-leak bias)	1.0 MΩ

Circuit Protection Requirements

Because horizontal deflection circuits often rely on grid-leak bias, a cathode bias resistor or other protective means must be incorporated in the circuit. This protection ensures that if the drive excitation is lost, the tube's plate dissipation does not exceed the 17.5 W maximum rating, which would otherwise lead to thermal runaway and tube failure.

Qualitative Curve Observations

Analysis of the average plate characteristics (at a screen grid voltage $E_{c2} = 200$ V) reveals several key behaviors:

- **Plate Current Knee:** At zero control grid bias ($E_{c1}(\text{/tubes/C1}) = 0$ V), the plate current (I_b) rises extremely rapidly at very low plate voltages. Below $E_b = 50$ V, the curve is nearly vertical, forming a sharp knee around $E_b = 60$ V where the plate current reaches approximately 550 mA. Above this knee, the current increases very gradually, reaching about 600 mA at $E_b = 450$ V. This sharp knee is highly desirable for efficient deflection output stages.
- **Screen Grid Current Behavior:** At zero control grid bias ($E_{c1}(\text{/tubes/C1}) = 0$ V), the screen grid current (I_{c2}) is extremely high (near 250 mA) when the plate voltage is zero ($E_b = 0$ V). As the plate voltage increases, the screen current drops rapidly, falling below 50 mA once the plate voltage exceeds 100 V. This demonstrates the high plate-to-screen current ratio of the beam power design under normal operating conditions.

Related Designations and Family Members

The **17JN6** is part of a closely related family of beam power tubes:

- **6JN6:** Identical to the 17JN6 except for a 6.3 V heater.
- **12JN6:** Identical to the 17JN6 except for a 12.6 V heater.
- **17JN6A:** A variant sharing the same electrical characteristics and ratings, including the 55 V maximum negative DC grid No. 1 voltage.
- **6JM6:** Electrically identical to the 17JN6 family, with the exception that the 17JN6 has a slightly lower grid-No. 1-to-plate capacitance, which can offer improved stability in certain high-frequency layouts.

Technical Summary

The **17JN6** is a robust **compactron beam power pentode** designed for horizontal deflection amplifier service in television receivers. Operating with a **16.8 V, 0.45 A** heater with an 11-second controlled warm-up time, it is optimized for series-string heater configurations. The tube features a high transconductance of **7,300 μmhos** , a plate resistance of **18,000 Ω** , and is capable of delivering up to **345 mA** of plate current at a low plate voltage of **60 V** (at zero bias). With a peak positive pulse plate voltage rating of **6,500 V** and a plate dissipation limit of **17.5 W**, the 17JN6 provides the high voltage handling and current delivery required for driving the deflection yokes of color and monochrome television CRTs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1964 RMA EIA

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

1964 RMA EIA

Section 1 · Beam Power

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	16.8 V	—
Heater Current	450 mA	—
Heater Warm-up Time	11 s	—
Electrical Characteristics Reference	6JN6 text	SuppliedSheetStatesIdenticalExceptHeaterCharacteristics



SOURCE OPERATING CONDITIONS

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Beam Power

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.34 pF	—
Input capacitance	16 pF	—
Output capacitance	1.7 pF	—

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak positive plate voltage	6500 V	Pulse

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak negative pulse plate voltage	1500 V	Pulse
Positive DC beam-plate voltage	70 V	—
Peak cathode current	550 mA	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	—
Control-grid voltage	-22.5 V	—
Transconductance	7300 μ S	—
Plate resistance	18000 Ω	—
Triode amplification factor	4.4 ratio	TriodeConnection


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Beam Power

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warmup Time	11 s	—


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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
# Pulse duration must not exceed 15% of a horizontal scanning cycle (	10 microseconds	Published in approved 17JN6 target datasheet entry; Section1
Heater Voltage (ac/dc) 6.3 12.6	16.8 V	Published in approved 17JN6 target datasheet entry; Section1
Heater Current 1.2 0.6	450 mA	Published in approved 17JN6 target datasheet entry; Section1
Heater Warm-up Time (Average) 11	11 seconds	Published in approved 17JN6 target datasheet entry; Section1
Heater Voltage (ac/dc) 6.3	18.9 V	Published in approved 17JN6 target datasheet entry; Section1
Heater Current 0.45	150 mA	Published in approved 17JN6 target datasheet entry; Section1
Heater Warm-up Time (Average)	11 seconds	Published in approved 17JN6 target datasheet entry; Section1
Plate Voltage 300	300 V	Published in approved 17JN6 target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to Plate	0.34 pF	Published in approved 17JN6 target datasheet entry; Section1
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3	16 pF	Published in approved 17JN6 target datasheet entry; Section1
Plate to Cathode, Heater, Grid No.2, and Grid No.3	7 pF	Published in approved 17JN6 target datasheet entry; Section1
Grid No.1 to Plate	0.01 pF	Published in approved 17JN6 target datasheet entry; Section1
Shield	5.5 pF	Published in approved 17JN6 target datasheet entry; Section1
Shield	3.4 pF	Published in approved 17JN6 target datasheet entry; Section1
Grid to Plate	1.7 pF	Published in approved 17JN6 target datasheet entry; Section1
and Internal Shield	3.2 pF	Published in approved 17JN6 target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
and Internal Shield	2.2 pF	Published in approved 17JN6 target datasheet entry; Section1