



ELECTRONIC TUBE REFERENCE

17JM6

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

BEAMPOWER

Compactron beam-power pentode designed primarily for television horizontal-deflection amplification, with a separate beam-plate connection to reduce snivet interference.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12FJ	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
AMPLIFICATION FACTOR	4.4
MAXIMUM PLATE VOLTAGE	700 V
MAXIMUM SCREEN VOLTAGE	220 V
MAXIMUM PLATE DISSIPATION	17.5 W
MAXIMUM SCREEN DISSIPATION	5 W
MAXIMUM CATHODE CURRENT	175 mA
WARM-UP TIME	11 s
<i>Reference/equivalence-only source does not reproduce the referenced electrical ratings/characteristics; promoted values intentionally not inferred from external datasheets.</i>	

17JM6 — Beam-Power Pentode

The **17JM6** is a high-performance, Compactron-style beam-power pentode designed primarily for use as a horizontal-deflection output amplifier in television receivers. It features high zero-bias plate current, a high ratio of plate current to screen grid (Grid 2) current, and robust voltage ratings capable of handling the high-voltage pulses characteristic of horizontal deflection circuits.

Overview

The 17JM6 is constructed in a T-12 glass envelope using a 12-pin Compactron design. It is engineered to deliver the high peak currents required by horizontal deflection systems in television receivers, particularly color television sets. A key design feature is the separate external connection provided for the beam plates (Grid 3), which allows for independent biasing or connection to suppress "snivets" (high-frequency oscillations that cause vertical lines on television screens).

The tube is electrically identical to the [6JM6](#) except for its heater characteristics and ratings. It is designed to operate in any mounting position.

Construction, Heater, and Physical Characteristics

The 17JM6 utilizes a coated unipotential cathode and a Compactron T-12 glass envelope. The physical dimensions of the device are standardized as follows:

- **Maximum Diameter:** 1.563 inches
- **Maximum Overall Height:** 3.625 inches
- **Seated Height:** 3.000 to 3.250 inches
- **Top Cap:** JEDEC C1-3 skirted miniature cap (used for the high-voltage plate connection)
- **Base:** 12-pin JEDEC E12-74 button base

Heater Ratings

The heater of the 17JM6 is designed for series-string television receiver applications and features a controlled warm-up characteristic.

Heater Parameter	Value
Nominal Heater Voltage	16.8 V
Nominal Heater Current	450 mA (0.45 A)
Heater Current Limits	450 ± 30 mA
Heater Warm-up Time	11 seconds

The heater warm-up time is defined as the time required for the heater voltage to reach 80% of its rated value when four times the rated voltage (67.2 V) is applied in series with an external resistance equal to three times the rated hot heater resistance.

Heater-Cathode Voltage Limits

To ensure insulation integrity, the maximum voltage differences between the heater and cathode are restricted under the Design-Maximum System:

- **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)

Basing and Pinout Configurations

The 17JM6 has been documented with two primary JEDEC basing configurations: **12FK** and **12FJ**. Within these designations, minor variations in internal connections and pin assignments exist across different versions.

Basing Diagram 12FK Variations

Under the 12FK basing system, two distinct pinout configurations are recorded:

Pin	12FK Configuration A	12FK Configuration B
Pin 1	Heater (H)	Heater (H)
Pin 2	Cathode (K)	Cathode (K)
Pin 3	Grid 2 (<u>G2</u>)	Grid 2 (<u>G2</u>)
Pin 4	Grid 3 (G3)	Grid 3 (G3)
Pin 5	Grid 1 (G1)	Grid 1 (G1)
Pin 6	No Connection (NC)	No Connection (NC)
Pin 7	Plate (P)	No Connection (NC)
Pin 8	No Connection (NC)	Internal Connection (IC)
Pin 9	Internal Connection (IC)	No Connection (NC)
Pin 10	Grid 3 (G3)	Grid 3 (G3)
Pin 11	No Connection (NC)	No Connection (NC)
Pin 12	Heater (H)	Heater (H)
Top Cap	Plate (P)	Plate (P)

Basing Diagram 12FJ Variations

Similarly, the 12FJ basing system exhibits two documented configurations:

Pin	12FJ Configuration A	12FJ Configuration B
Pin 1	Heater (H)	Heater (H)
Pin 2	Cathode (K)	Grid 2 (<u>G2</u>)
Pin 3	Grid 2 (<u>G2</u>)	Grid 1 (G1)
Pin 4	Grid 3 / Beam Plates (G3)	Cathode (K)
Pin 5	Grid 1 (G1)	No Connection (NC)
Pin 6	No Connection (NC)	Grid 3 / Beam Plates (G3)
Pin 7	Plate (P)	Internal Connection (IC)
Pin 8	No Connection (NC)	No Connection (NC)
Pin 9	Internal Connection (IC)	Internal Connection (IC)
Pin 10	Grid 3 / Beam Plates (G3)	Grid 3 / Beam Plates (G3)
Pin 11	No Connection (NC)	No Connection (NC)
Pin 12	Heater (H)	Heater (H)
Top Cap	Plate (P)	Plate (P)

Due to these variations, circuit designers and technicians must verify the specific basing layout of the physical tube in use to avoid short circuits or improper electrode biasing.

Electrical Characteristics and Typical Operation

The 17JM6 family includes the standard **17JM6** and the revised **17JM6A**. While sharing the same physical footprint and heater ratings, they exhibit slight differences in plate resistance, plate current, and screen grid current under typical operating conditions.

Direct Interelectrode Capacitances

Measured without an external shield, the capacitances of the tube are:

- **Grid 1 to Plate (G1 to P):** 0.34 pF to 0.6 pF (depending on construction variant)
- **Input (G1 to H + K + G2 + G3):** 16 pF
- **Output (P to H + K + G2 + G3):** 7.0 pF

Typical Operating Points

The following table outlines the typical operating characteristics of the 17JM6 and **17JM6A** under different test conditions. In all cases, Grid 3 (beam plates) is tied to the cathode at the socket.

Parameter	17JM6 (Class A)	<u>17JM6A</u> (Class A)	17JM6 (Peak Knee)	<u>17JM6A</u> (Peak Knee)
Plate Voltage	250 V	250 V	60 V	55 V
Grid 2 Voltage	150 V	150 V	150 V	150 V
Grid 1 Voltage	-22.5 V	-22.5 V	0 V	0 V
Plate Current	65 mA	70 mA	345 mA	345 mA
Grid 2 Current	1.8 mA	2.4 mA	27 mA	30 mA
Transconductance	7,300 μ mhos	7,300 μ mhos	—	—
Plate Resistance (approx.)	18,000 Ω	15,000 Ω	—	—
Grid 1 Cutoff Voltage (approx.)	-42 V	-42 V	—	—

Note on Peak Knee measurements: These values are measured during a short interval (maximum of 2 seconds) using a recurrent waveform to prevent exceeding the maximum dissipation ratings of the grids and plate.

Cutoff and Triode Characteristics

- **High-Voltage Cutoff (Condition A):** At a plate voltage of 5,000 V and Grid 2 voltage of 150 V, the Grid 1 voltage required to reduce the plate current to 0.1 mA (or 1.0 mA depending on the test conditions) is approximately **-100 V**.
- **Triode Amplification Factor:** When triode-connected (Grid 2 tied to plate) with a plate and Grid 2 voltage of 150 V and Grid 1 voltage of -22.5 V, both the 17JM6 and 17JM6A exhibit an amplification factor (μ) of **4.4**.

Maximum Ratings

The maximum ratings of the 17JM6 and 17JM6A are defined under the Design-Maximum System for horizontal-deflection amplifier service:

- **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 Grid 3 (Beam Plate) Voltage:** 70 V
- **Grid 2 Voltage:** 220 V
- **Negative DC Grid 1 Voltage:** 55 V (specifically rated for 17JM6A)

- **Peak Negative Grid 1 Voltage:** 330 V
- **Plate Dissipation:** 17.5 W
- **Grid 2 Dissipation:** 3.5 W
- **DC Cathode Current:** 175 mA
- **Peak Cathode Current:** 550 mA
- **Grid 1 Circuit Resistance:** 1.0 MΩ
- **Bulb Temperature (at hottest point):** 220 °C

Special Operating Conditions

1. **Pulse Duty Cycle:** For operation in a standard 525-line, 30-frame television system, the peak positive pulse plate voltage of 6,500 V is restricted to a duty cycle not exceeding 15% of one horizontal scanning cycle.
2. **Grid-Leak Bias Protection:** In stages operating with grid-leak bias, an adequate cathode-bias resistor or other protective means must be incorporated into the circuit. This protects the tube from excessive current and thermal runaway in the event that the drive excitation signal is lost.

Qualitative Curve Analysis

The plate characteristics of the 17JM6 family demonstrate a sharp knee transition occurring at low plate voltages, typically between 40 V and 70 V (specifically around 50 V to 60 V when Grid 1 is at 0 V). Above this knee, the plate current curves remain relatively flat, indicating high plate resistance and stable current delivery over a wide range of plate voltages.

The screen grid (Grid 2) current exhibits a sharp peak at very low plate voltages (below 50 V), where the plate is less effective at attracting electrons. As the plate voltage rises past the knee and exceeds the screen voltage, the Grid 2 current falls rapidly to a low, stable value (typically around 1.8 mA to 2.4 mA under Class A conditions).

Transfer characteristics show that both plate and screen currents rise smoothly as the Grid 1 voltage is made less negative (approaching 0 V). Higher screen voltages (E_{c2}) shift the transfer curves to the left, requiring a more negative Grid 1 voltage to achieve cutoff.

Related Designations and Comparisons

- **6JM6 / 6JM6A:** The 17JM6 and [17JM6A](#) are identical to the [6JM6](#) and [6JM6A](#), respectively, except for their heater ratings. The 6-volt versions utilize a 6.3 V heater, whereas the 17-volt versions are designed with a 16.8 V heater for series-string power supplies.
- **17JM6 vs. [17JM6A](#):** The [17JM6A](#) is an updated variant of the 17JM6. It features a slightly lower plate resistance (15,000 Ω vs. 18,000 Ω) and higher typical plate current (70 mA vs. 65 mA) under Class A conditions. Additionally, the [17JM6A](#) has a slightly lower knee voltage (55 V vs. 60 V) and a higher peak Grid 2 current at the knee (30 mA vs. 27 mA).

Technical Summary

The **17JM6** and **17JM6A** are Compactron beam-power pentodes designed for high-stress horizontal-deflection amplifier service in television receivers. Operating with a **16.8 V, 450 mA** heater with an 11-second controlled warm-up time, these tubes are optimized for series-connected heater strings. They feature a maximum plate dissipation of **17.5 W**, a peak positive pulse plate voltage rating of **6,500 V**, and a peak cathode current rating of **550 mA**. By providing separate external connections for the beam plates (Grid 3), the design minimizes snivets and allows for flexible circuit configuration.



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 beam-power amplifier	—



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

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

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	18000 Ohm	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

SOURCE PDF

1966 Tung Sol Electronic Tubes 3 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Beam Power

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAX ~ ~ CI	-3 mA	Published datasheet
GRID	0.34 pF	Published datasheet
DESIGN MAXIMUM VALUES -SEE EIA STANDARD RS	-239 mA	Published datasheet
AVERAGE CHARACTERISTICS	450 mA	Published datasheet
HEATER WARM-UP TIME	11 s	Published datasheet
TOTAL DC AND PEAK	200 V	Published datasheet
TOTAL DC AND PEAK	200 V	Published datasheet
DESIGN MAXIMUM RATINGS •SEE EIA STANDARD RS	-239 mA	Published datasheet
POSITIVE DC GRID	70 V	Published datasheet
GRID	220 V	Published datasheet
NEGATIVE DC GRID	55 V	Published datasheet
PEAK NEGATIVE GRID	330 V	Published datasheet
PLATE DISSIPATION	17.5 W	Published datasheet
GRID	3.5 W	Published datasheet
GRID	1 ohm	Published datasheet
GRID	150 V	Published datasheet
GRID	22.5 V	Published datasheet
GRID	1.8 mA	Published datasheet
GRID	42 V	Published datasheet

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
B • APPLIED FOR SHORT INTERVAL (	50 s	Published datasheet
C - TRIODE CONNECTION (GRID	-72.5 V	Published datasheet
Eb =	250 V	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
LIMITS OF SUPPLIED CURRENT	30 mA	Published datasheet
DC PLATE -SUPPLY VOLTAGE (	770 V	Published datasheet
PEAK POSITIVE PULSE PLATE VOLTAGE	6.5 V	Published datasheet
PEAK NEGATIVE PULSE PLATE VOLTAGE	1.5 V	Published datasheet
DC CATHODE CURRENT	175 mA	Published datasheet
PEAK CATHODE CURRENT	550 mA	Published datasheet
PLATE VOLTAGE	250 V	Published datasheet
PLATE CURRENT -	65 mA	Published datasheet
PLATE RESISTANCE - APPROX. -	18 ohm	Published datasheet


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	—