

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

17DQ6A

1 SECTION
CONSTRUCTION
BEAMPOWER

Power - TV Horizontal Output (sweep) electronic tube

High-perveance beam-power pentode designed for efficient television horizontal-deflection amplification, with controlled heater warm-up and kilovolt pulse capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	6AM	BASE PINS	8
NOMINAL HEATER	16.8 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

6AM - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – Pin 1	–	–	NC · verified
PIN2 – Pin 2	–	H – Heater	CONNECTED · verified
PIN3 – Pin 3	–	–	NC · verified
PIN4 – Pin 4	A	G2 – Screen Grid	CONNECTED · verified
PIN5 – Pin 5	A	G1 – Control Grid	CONNECTED · verified
PIN7 – Pin 7	–	H – Heater	CONNECTED · verified
PIN8 – Pin 8	A	BP – Beam-Forming Plate	CONNECTED · verified
PIN8 – Pin 8	A	K – Cathode	CONNECTED · verified

TERMINAL	SECTION	ELEMENT	STATUS
CAP1 – Top cap	A	P – Plate (Anode)	CONNECTED • verified

SECTION RATINGS

SECTION1 Beam Power	
PLATE RESISTANCE	20000 Ω
TRANSCONDUCTANCE	0.0066 S
AMPLIFICATION FACTOR	4.5
MAXIMUM PLATE VOLTAGE	700 V
MAXIMUM SCREEN VOLTAGE	200 V
MAXIMUM PLATE DISSIPATION	15 W
MAXIMUM SCREEN DISSIPATION	3 W
MAXIMUM CATHODE CURRENT	140 mA
Horizontal-deflection service; 6000 V peak pulse plate rating retained as parameter.	

17DQ6A — High-Perveance Beam Power Pentode

Overview

The **17DQ6A** is an octal-based, high-perveance beam power pentode designed primarily for service as a horizontal deflection output amplifier in the high-efficiency deflection circuits of television receivers. It is specifically engineered for use in series-connected heater strings, incorporating a controlled heater warm-up characteristic to minimize voltage surges during receiver start-up.

The 17DQ6A is electrically identical to the [6DQ6A](#) except for its heater ratings and its controlled warm-up time. Key performance features of the tube include a high zero-bias plate current, a high plate-to-screen current ratio, and high DC plate supply voltage ratings.

Construction, Envelope, and Base

The 17DQ6A is constructed with a coated unipotential cathode housed in a T-12 glass bulb (conforming to JEDEC 12-51 or 12-61 outlines). The physical dimensions of the tube are:

- **Maximum overall length:** 4.250 inches
- **Maximum seated height:** 3.688 inches
- **Maximum bulb diameter:** 1.562 inches

The electrical connection to the plate is made via a top cap, which conforms to JEDEC C1-2 or C1-3 (skirted miniature) specifications. The base is a short medium-shell octal type, available in 6-pin (B6-122, B6-148) or 7-pin (B7-111, B7-119, or B5-190) configurations. When the B6-122, B6-148, or B5-190 base is used, specific pins are omitted (such as pin #1 or pin #2 depending on the exact base shell). The tube can be operated in any mounting position.

Heater Characteristics

The heater is designed for series-string television receiver applications. It has the following characteristics:

- **Average heater voltage:** 16.8 V (AC or DC)
- **Average heater current:** 450 mA (with supply limits of 450 ± 30 mA or $0.45 \text{ A} \pm 6\%$)
- **Heater warm-up time:** Approximately 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 is applied through a series resistance equal to three times the nominal heater operating resistance.

To ensure reliable operation and prevent insulation breakdown, the heater-to-cathode voltage must be kept within the following limits:

- **Heater negative with respect to cathode:** 200 V maximum (Total DC and Peak)
- **Heater positive with respect to cathode:** 100 V maximum (DC component), 200 V maximum (Total DC and Peak)

Pinout and Interelectrode Capacitances

The 17DQ6A utilizes the JEDEC 6AM basing diagram. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Connection
Pin 1	No Connection (NC) [Omitted on some bases]
Pin 2	Heater (H) [Omitted on some bases]
Pin 3	No Connection (NC)
Pin 4	Grid No. 2 (<u>G2</u> - Screen Grid)
Pin 5	Grid No. 1 (G1 - Control Grid)
Pin 7	Heater (H)
Pin 8	Cathode (K) and Grid No. 3 (G3 - Beam Plates)
Top Cap	Plate (P)

The direct interelectrode capacitances, measured without an external shield, are approximately:

- **Grid No. 1 to Plate (G1 to P):** 0.5 pF to 0.55 pF
- **Input (G1 to H + K + G3 + G2):** 15.0 pF
- **Output (P to H + K + G3 + G2):** 7.0 pF

Electrical Characteristics and Operating Points

The electrical characteristics of the 17DQ6A vary depending on the operating conditions. The typical operating points and characteristics are detailed below.

Pentode Operation

Under typical Class A pentode conditions, the characteristics are:

- **Plate Voltage:** 250 V
- **Grid No. 2 Voltage:** 150 V
- **Grid No. 1 Voltage:** -22.5 V
- **Plate Current:** 55 mA to 75 mA
- **Grid No. 2 Current:** 1.5 mA to 2.4 mA
- **Transconductance:** 6600 μmhos
- **Plate Resistance (approx.):** 20,000 Ω

Zero Bias Characteristics

Under instantaneous zero-bias conditions (measured during a short interval of 2 seconds or less, or via 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:** 300 mA to 315 mA
- **Grid No. 2 Current:** 25 mA to 27 mA

Cutoff Characteristics

At a plate current of 1.0 mA and a Grid No. 2 voltage of 150 V, the Grid No. 1 cutoff voltage is approximately:

- **At a Plate Voltage of 250 V:** -40 V to -46 V
- **At a Plate Voltage of 5000 V:** -100 V

Triode Amplification

When connected as a triode (with Plate and Grid No. 2 connected together):

- **Plate and Grid No. 2 Voltage:** 150 V

- **Grid No. 1 Voltage:** -22.5 V
- **Amplification Factor (Mu):** 4.1 to 4.5

Maximum Ratings

The maximum ratings of the 17DQ6A are defined under both the Design-Maximum System (EIA Standard RS-239) and the Design Center System. These ratings apply to horizontal deflection amplifier service in a 525-line, 30-frame television system, where the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle.

Parameter	Design Center Rating	Design-Maximum Rating
DC Plate Supply Voltage (Boost + DC Supply)	700 V	770 V
Peak Positive Pulse Plate Voltage	6000 V (Absolute Max)	6000 V
Peak Negative Pulse Plate Voltage	1375 V	1500 V
Plate Dissipation	15 W	18 W
DC Grid No. 2 Voltage	200 V	220 V
Grid No. 2 Dissipation	3.0 W	3.6 W
Peak Negative Grid No. 1 Voltage	300 V	330 V
Average Cathode Current	140 mA	155 mA
Peak Cathode Current	440 mA	540 mA
Grid No. 1 Circuit Resistance	1.0 MΩ	1.0 MΩ
Bulb Temperature (Hottest Point)	220 °C	220 °C

Note on Circuit Protection: When operating the tube with grid-leak bias, an adequate cathode bias resistor or other protective means must be employed to protect the tube from excessive dissipation in the event that excitation is lost.

Qualitative Curve Observations

The plate characteristic curves of the 17DQ6A demonstrate its high-perveance design, characterized by a sharp knee at low plate voltages:

- **At a Grid No. 2 Voltage of 100 V:** The plate current curves exhibit a sharp knee around 40 V to 50 V. At a Grid No. 1 voltage of 0 V, the plate current reaches approximately 175 mA at the knee, rising

gradually to about 200 mA as the plate voltage increases to 300 V. The Grid No. 2 current peaks sharply at plate voltages below 50 V and drops to near zero at higher plate voltages.

- **At a Grid No. 2 Voltage of 150 V:** The knee occurs around 50 V to 70 V. At a Grid No. 1 voltage of 0 V, the plate current reaches approximately 300 mA at the knee and rises to about 350 mA at 400 V. The Grid No. 2 current peaks at approximately 180 mA at zero plate voltage.
- **Overall Behavior:** Beyond the knee region, the plate current remains relatively flat across a wide range of Grid No. 1 voltages (from 0 V down to -40 V), indicating high plate resistance and stable current regulation in the normal operating region.

Technical Summary

The **17DQ6A** is a high-perveance, octal-based beam power pentode designed for horizontal deflection output service in television receivers. It features a 16.8 V, 450 mA heater with a controlled 11-second warm-up time, making it ideal for series-connected heater strings. The tube is characterized by its ability to handle high peak positive plate pulses up to 6000 V, average cathode currents up to 155 mA, and plate dissipation up to 18 W. With its high zero-bias plate current capabilities and sharp knee characteristics, the 17DQ6A provides efficient and reliable performance in demanding television deflection circuits.



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
Heater voltage	16.8 V	Nominal
Heater current	300 mA	Nominal



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
Heater voltage	16.8 V	—
Heater current	450 mA	—
Typical plate voltage	250 V	—
Typical screen-grid voltage	150 V	—
Typical grid 1 voltage	-22.5 V	—
Maximum DC plate supply voltage	700 V	—
Maximum plate dissipation	15 W	—
Maximum DC grid 2 voltage	220 V	—
Typical plate current	15 mA	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical screen-grid current	2.4 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	20000 ohm	—
Transconductance	6600 uS	—


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

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.5 pF	—
Input capacitance	15 pF	—
Output capacitance	7 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak positive pulse plate voltage	6000 V	TVHorizontalDeflection;Pulse
Peak negative pulse plate voltage	1300 V	TVHorizontalDeflection;Pulse
Peak cathode current	540 mA	TVHorizontalDeflection;Pulse
G e	0.5 pF	Published datasheet
INPUT: (G	15 pF	Published datasheet
OUTPUT' (P TO H+K, BP + B	7 pF	Published datasheet
DESIGN MA%IMUM VALUES - SEE EIA STANDARD RS	9 mA	Published datasheet
AVERAGE CHARACTERISTICS	45 V	Published datasheet

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER WARM-UP TIME S APPROX. I	1 s	Published datasheet
GRID #	2 V	Published datasheet
GRID #	3.6 W	Published datasheet
GRID #	1 ohm	Published datasheet
GRID #	1.5 mA	Published datasheet
T RANSCONDUCTANCE	6600 μ S	Published datasheet
GRID #	25 mA	Published datasheet
CUTOFF: Ib = i MA, Eb =	150 mA	Published datasheet
GRID #	1 V	Published datasheet
CUTOFF: Ib = i Ma, Eb =	150 mA	Published datasheet
BOS OF	5 V	Published datasheet
Et =	16.8 V	Published datasheet
rid #	100 V	Published datasheet
ECz =	150 V	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CURRENT OPERATION	45 mA	Published datasheet
PLATE SUPPLY VOLTAGE, DC (BOOST+DC POWER SUPPLY)	77 V	Published datasheet
PLATE VOLTAGE, PEAK PULSE, POSITIVE	6000 V	Published datasheet
PLATE VOLTAGE, PEAK PULSE, NEGATIVE	1500 V	Published datasheet
GRID #1 VOLTAGE, PEAK PULSE, NEGATIVE	330 V	Published datasheet
CATHODE CURRENT, AVERAGE	155 mA	Published datasheet
PLATE CURRENT	55 mA	Published datasheet
PLATE RESISTANCE, APPROX	20 ohm	Published datasheet
PLATE CURRENT	315 mA	Published datasheet
OF THE VOLTAGE PULSE MUST NOT EXCEED	154 V	Published datasheet

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	—

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