

ELECTRONIC TUBE REFERENCE

17DQ6

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
BEAMPOWER

Beam-power output tube designed for television horizontal-deflection amplifier service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	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

SECTION RATINGS

SECTION1 Beam Power	
PLATE RESISTANCE	20000 Ω
TRANSCONDUCTANCE	0.006 S
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM SCREEN VOLTAGE	220 V
MAXIMUM PLATE DISSIPATION	15 W
Octal horizontal-deflection beam-power pentode.	

17DQ6 — Beam-Power Pentode

The **17DQ6** and its variant **17DQ6-A** are beam-power pentodes designed primarily for use as output amplifiers in the horizontal deflection circuits of television receivers. Characterized by a high zero-bias plate current, a high ratio of plate current to grid No. 2 current, and robust high-voltage ratings, these tubes are engineered to withstand the demanding pulse service of television sweep circuits. The 17DQ6 family also includes the electrically similar [6DQ6](#), 6DQ6-A, [12DQ6](#), and 12DQ6-A, which differ primarily in their heater configurations.

Mechanical Specifications and Pinout

The 17DQ6 is constructed in a **T-12** glass bulb with a **Short Shell Octal** base. The plate connection is brought out to a **C1-3 skirted miniature top cap** at the apex of the bulb to isolate the high-voltage anode connection from the other electrodes. The tube can be mounted and operated in **any position**.

The electrical connections conform to the **6AM** basing diagram. The pin assignments, viewed from the underside of the base, are as follows:

Pin	Connection
Pin 1	No Connection (NC)
Pin 2	Heater (H)
Pin 3	No Connection (NC)
Pin 4	Grid No. 2 (G2)
Pin 5	Grid No. 1 (G1)
Pin 7	Heater (H)
Pin 8	Cathode (K), Grid No. 3 (G3)
Top Cap	Plate (P)

Heater Design

The heater of the 17DQ6 is specifically designed for use in series-connected heater strings. It features a controlled warm-up characteristic to minimize voltage surges across other tubes in the string during the initial power-on phase.

Heater Parameter	Value
Nominal Heater Voltage (AC or DC)	16.8 V
Nominal Heater Current	0.45 ± 6% A
Heater Warm-up Time	11 seconds
Cathode Type	Coated unipotential

Calculation of Heater Power: Using the nominal heater voltage (16.8 V) and nominal heater current (0.45 A), the nominal power consumed by the heater is: $\text{Power} = 16.8 \text{ V} * 0.45 \text{ A} = 7.56 \text{ W}$

Electrical Characteristics and Operating Points

The 17DQ6 exhibits high transconductance and low plate resistance, which are essential for delivering the high peak currents required in horizontal deflection systems.

Pentode Operation

Under typical Class A conditions, the electrical characteristics of the 17DQ6 and 17DQ6-A are as follows:

Parameter	Value (17DQ6)	Value (17DQ6-A)
Plate Voltage	250 V	250 V
Grid No. 2 Voltage	150 V	150 V
Grid No. 1 Voltage	-22.5 V	-22.5 V
Plate Current	75 mA	75 mA
Grid No. 2 Current	2.4 mA	2.4 mA
Transconductance	6,000 μ mhos	6,600 μ mhos
Plate Resistance	20,000 Ω	20,000 Ω

Zero-Bias Characteristics

To evaluate the tube's peak current capability during the conduction portion of the sweep cycle, characteristics are measured at zero bias using a recurrent waveform method (applied for a maximum of 2 seconds to prevent thermal damage):

- **Plate Voltage:** 60 V
- **Grid No. 2 Voltage:** 150 V
- **Plate Current:** 300 mA
- **Grid No. 2 Current:** 27 mA

At this low plate voltage of 60 V, the high plate current (300 mA) relative to the screen current (27 mA) demonstrates the highly efficient beam-forming design of the electron gun, minimizing screen grid dissipation during peak conduction.

Cutoff and Triode Characteristics

- **Cutoff Point:** At a plate voltage of 250 V and a grid No. 2 voltage of 150 V, a plate current of 1.0 mA is reached at an approximate grid No. 1 bias of **-50 V** for the 17DQ6, and **-46 V** for the 17DQ6-A.
- **Triode Amplification Factor:** When connected as a triode (with plate and grid No. 2 at 150 V and grid No. 1 at -22.5 V), the amplification factor is **4.1**.

Direct Interelectrode Capacitances

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

- **Grid No. 1 to Plate:** 0.55 μ F
- **Input (G1 to all other electrodes except Plate):** 15.0 μ F
- **Output (Plate to all other electrodes except G1):** 7.0 μ F

Maximum Ratings

The maximum ratings of the 17DQ6 and 17DQ6-A are established under the Design Center system. The 17DQ6-A features upgraded ratings in several critical areas, allowing for greater safety margins and higher power operation.

Parameter	17DQ6 Maximum	17DQ6-A Maximum
DC Plate Supply Voltage (Boost + DC Supply)	550 V	700 V
Peak Positive Pulse Plate Voltage	6,000 V	6,000 V
Peak Negative Pulse Plate Voltage	1,375 V	1,375 V
Plate Dissipation	15 W	15 W
DC Grid No. 2 Voltage	175 V	200 V
Grid No. 2 Dissipation	2.5 W	3.0 W
Peak Negative Grid No. 1 Voltage	300 V	300 V
Average Cathode Current	120 mA	140 mA
Peak Cathode Current	440 mA	440 mA
Grid No. 1 Circuit Resistance (Grid-leak bias)	0.47 M Ω	1.0 M Ω
Bulb Temperature (Hottest Point)	220 °C	220 °C

Pulse Rating Conditions

The peak positive plate voltage rating of **6,000 V (absolute maximum)** is strictly applicable to horizontal deflection service. This rating is valid only if the duty cycle of the voltage pulse does not exceed 15% of the scanning cycle, based on a maximum 525-line, 30-frame television system.

Grid No. 1 Circuit Protection

When operating at the maximum grid No. 1 circuit resistance (0.47 M Ω for the 17DQ6 or 1.0 M Ω for the 17DQ6-A) 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 dissipation in the event that the drive excitation signal is lost.

Heater-Cathode Voltage Limits

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

- **Heater Negative with Respect to Cathode:** 200 V maximum (Total DC + Peak)
- **Heater Positive with Respect to Cathode:**
 - **DC Component:** 100 V maximum
 - **Total DC + Peak:** 200 V maximum

Technical Summary

The **17DQ6** and **17DQ6-A** are high-performance, octal-based beam-power pentodes designed for television horizontal deflection output service. Featuring a **16.8 V, 0.45 A** heater with a controlled 11-second warm-up time, they are optimized for series-string operation. The tubes provide high peak plate currents (up to 300 mA at zero bias) and are rated to withstand peak positive plate pulses of up to **6,000 V**. The 17DQ6-A variant offers enhanced capabilities, including a higher DC plate supply voltage limit of **700 V**, increased screen grid dissipation of **3.0 W**, and an average cathode current rating of **140 mA**. These characteristics make the 17DQ6 family highly effective for driving the electromagnetic deflection coils of television picture tubes.

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	550 V	—
Maximum plate dissipation	15 W	—
Maximum DC grid 2 voltage	220 V	—
Typical plate current	15 mA	—
Typical screen-grid current	2.4 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	20000 ohm	—
Transconductance	6000 uS	—