

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

17DQ6B

1 SECTION
CONSTRUCTION
BEAMPOWER

Power - TV Horizontal Output (sweep) electronic tube

Glass-octal beam-power tube designed for television horizontal-deflection amplification, with high positive-pulse plate-voltage capability and controlled heater warm-up.

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	18000 Ω
TRANSCONDUCTANCE	0.0065 S
AMPLIFICATION FACTOR	4.4
MAXIMUM PLATE VOLTAGE	700 V
MAXIMUM SCREEN VOLTAGE	220 V
MAXIMUM PLATE DISSIPATION	18 W
MAXIMUM SCREEN DISSIPATION	3.6 W
MAXIMUM CATHODE CURRENT	200 mA
Reference/equivalence-only source does not reproduce the referenced electrical ratings/characteristics; promoted values intentionally not inferred from external datasheets.	

17DQ6B — Beam Power Pentode

An indirectly heated beam power tube designed for horizontal-deflection amplifier service in television receivers, featuring high efficiency and controlled heater warm-up characteristics.

Overview

The **17DQ6B** (also designated as **17DQ6-B** or within the **17GW6/17DQ6B** family) is a glass octal beam power pentode. It is primarily designed for use as a horizontal-deflection output amplifier in high-efficiency deflection circuits of television receivers. Due to its ability to deliver high zero-bias plate current at low plate and screen-grid voltages, the tube is exceptionally well-suited for receivers operating with low plate-supply voltages.

In terms of electrical characteristics, the 17DQ6B is identical to the **6DQ6B** (or **6GW6/6DQ6B**) and the **12DQ6B** (or **12GW6/12DQ6B**) except for its heater voltage, current, and warm-up ratings. It is also identical to the **17GW6**, with which it is frequently co-designated.

Construction, Physical Dimensions, and Pinout

The 17DQ6B is constructed in a T-12 glass envelope (JEDEC outline 12-19 or 12-51) with a coated unipotential cathode. The tube can be mounted in any position. It features a skirted miniature top cap

(JEDEC C1-2 or C1-3) for the plate connection, which isolates the high-voltage pulse present on the anode during horizontal retrace.

Physical Dimensions

- **Maximum Diameter:** 1.563 inches
- **Maximum Seated Height:** 3.688 inches
- **Maximum Overall Height:** 4.250 inches

Base and Pinout Configuration

The tube utilizes an octal base, which can be a 5, 6, or 7-pin configuration (such as JEDEC B5-190, B6-122, B6-148, B7-111, or B7-119). When using the 6-pin bases (B6-122 or B6-148), Pin 1 is omitted. The electrical connections follow the JEDEC **6AM** basing diagram:

Pin Number	Connection	Description
Pin 1	NC	No Connection (omitted on some bases)
Pin 2	H	Heater
Pin 3	NC / MC	No Connection / Midget Connection (Metal Collar)
Pin 4	<u>G2</u>	Grid No. 2 (Screen Grid)
Pin 5	G1	Grid No. 1 (Control Grid)
Pin 6	NC	No Connection
Pin 7	H	Heater
Pin 8	K, G3	Cathode, Grid No. 3 (Beam Plates)
Top Cap	P	Plate (Anode)

Direct Interelectrode Capacitances

The approximate capacitances of the tube, measured without an external shield, are:

- **Grid No. 1 to Plate (G1 to P):** 0.5 pF
- **Input (G1 to H + K + G3 + G2):** 15.0 pF (up to 17.0 pF depending on the specific grounding configuration)
- **Output (P to H + K + G3 + G2):** 7.0 pF

Heater Ratings and Series-String Operation

The 17DQ6B is designed for use in television receivers employing series-connected heater strings. It incorporates a controlled heater warm-up characteristic to ensure dependable operation and minimize voltage surges across other tubes in the string during start-up.

- **Heater Voltage (AC or DC):** 16.8 V
- **Heater Current:** 0.45 A (450 mA) with a tolerance of $\pm 6\%$ (450 ± 30 mA)
- **Heater Warm-up Time:** 11 seconds. This 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 to the heater in series with an external resistance equal to three times the rated heater voltage divided by the rated current (112 ohms).

Heater-Cathode Voltage Limits

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

- **Heater Negative with Respect to Cathode:** 200 V max. (Total DC and Peak)
- **Heater Positive with Respect to Cathode:**
 - **DC Component:** 100 V max.
 - **Total DC and Peak:** 200 V max.

Electrical Characteristics and Typical Operating Points

The 17DQ6B can be operated in either pentode or triode configurations. Because of its application in both monochrome and color television receivers, manufacturers established two distinct sets of typical operating characteristics.

Pentode Connection Characteristics

Parameter	Standard / Monochrome Service	High-Rating / Color TV Service
Plate Voltage	250 V	175 V
Grid No. 2 (Screen) Voltage	150 V	125 V
Grid No. 1 (Control) Voltage	-22.5 V	-25.0 V
Plate Current	65 mA (up to 70 mA)	110 mA
Grid No. 2 Current	1.8 mA (up to 2.1 mA)	5.0 mA
Transconductance	7,300 umhos (or 7,100 umhos)	10,500 umhos
Plate Resistance (Approx.)	18,000 ohms (or 15,000 ohms)	5,500 ohms

Parameter	Standard / Monochrome Service	High-Rating / Color TV Service
Grid No. 1 Cutoff Voltage (for $I_b = 1.0 \text{ mA}$)	-42 V (approx.)	-75 V (approx.)

At higher plate voltages, such as $E_b = 5000 \text{ V}$ with $E_{c2} = 150 \text{ V}$, the control grid cutoff voltage shifts significantly to approximately -100 V.

Triode Connection Characteristics

When Grid No. 2 is connected directly to the plate, the tube exhibits the following typical characteristics:

- **Under Standard Conditions** ($E_b = E_{c2} = 150 \text{ V}$, $E_{c1} = -22.5 \text{ V}$):
 - **Amplification Factor (μ):** 4.4
- **Under High-Rating Conditions** ($E_b = E_{c2} = 125 \text{ V}$, $E_{c1} = -25 \text{ V}$):
 - **Amplification Factor (μ):** 3.3

Instantaneous Plate Knee Values

The tube is capable of delivering high peak currents at low plate voltages, which is a critical requirement for horizontal deflection service. These values are measured using a recurrent waveform method or during short intervals (maximum of 2 seconds) to prevent exceeding the maximum dissipation ratings:

- **Standard Conditions** ($E_b = 60 \text{ V}$, $E_{c2} = 150 \text{ V}$, $E_{c1} = 0 \text{ V}$):
 - **Plate Current (I_b):** 345 mA (up to 390 mA)
 - **Grid No. 2 Current (I_{c2}):** 27 mA (up to 32 mA)
- **High-Rating Conditions** ($E_b = 70 \text{ V}$, $E_{c2} = 125 \text{ V}$, $E_{c1} = 0 \text{ V}$):
 - **Plate Current (I_b):** 550 mA
 - **Grid No. 2 Current (I_{c2}):** 42 mA

Horizontal-Deflection Amplifier Ratings

The 17DQ6B is rated under the **Design-Maximum Rating System** (EIA Standard RS-239). The maximum ratings differ depending on whether the tube is employed in standard monochrome television service or high-rating color television service. Both rating sets are specified for a standard 525-line, 30-frame system, where the peak positive pulse duration must not exceed 15% of one horizontal scanning cycle (or a maximum of 10 μs).

Rating Parameter	Standard / Monochrome Service	High-Rating / Color TV Service
DC Plate Supply Voltage (Boost + DC Supply)	770 V max.	900 V max.

Rating Parameter	Standard / Monochrome Service	High-Rating / Color TV Service
Peak Positive-Pulse Plate Voltage	6,500 V max.	7,000 V max.
Peak Negative-Pulse Plate Voltage	1,500 V max.	1,500 V max.
DC Grid No. 2 (Screen) Voltage	220 V max.	175 V max.
DC Grid No. 1 (Control) Voltage	-55 V max.	—
Peak Negative-Pulse Grid No. 1 Voltage	330 V max.	200 V max.
Plate Dissipation	17.5 W or 18.0 W max.	24.0 W max.
Grid No. 2 Dissipation / Input	3.5 W or 3.6 W max.	3.2 W max.
Average Cathode Current	175 mA max.	285 mA max.
Peak Cathode Current	550 mA or 610 mA max.	1,000 mA max.
Grid No. 1 Circuit Resistance (Grid-leak bias)	1.0 MΩ max.	0.47 MΩ max.
Bulb Temperature (at hottest point)	220 °C or 240 °C max.	240 °C max.

Circuit Protection Requirements

In stages operating with grid-leak bias, an adequate cathode bias resistor or other protective means must be incorporated into the circuit. This protection is necessary to prevent excessive plate and screen dissipation and safeguard the tube from damage in the event that the horizontal excitation signal is lost.

Qualitative Curve Observations

The average plate and transfer characteristics of the 17DQ6B reveal several key design features:

- **Plate Characteristics at Zero Bias ($E_{c1} = 0$ V):** When plate current (I_b) and screen-grid current (I_{c2}) are plotted against plate voltage (E_b) for various screen voltages (E_{c2}) from 50 V to 200 V, the plate current rises extremely steeply at very low plate voltages. It exhibits a sharp knee below 50 V to 100 V, above which the current levels off and remains highly flat and constant across the 100 V to 500 V range. This flat saturation region indicates high plate resistance and stable operation.

- **Screen Grid Current Behavior:** At zero control-grid bias ($E_{c1} = 0$ V), the screen-grid current (I_{c2}) peaks sharply at low plate voltages (below 50 V), where the plate is less effective at attracting electrons. As the plate voltage increases past the knee, the screen-grid current drops rapidly and stabilizes at a very low, safe operating level.
- **Transfer Characteristics:** Plots of plate and screen currents versus control-grid voltage (E_{c1}) from -60 V to 0 V show a smooth, predictable cutoff behavior. The knee of the plate current curves occurs at progressively lower plate voltages as the control-grid bias becomes more negative.

Technical Summary

The **17DQ6B** is a high-performance, octal-based beam power pentode optimized 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 designed for integration into series heater strings.

The tube is characterized by its ability to deliver high peak plate currents (up to **1,000 mA** under color TV pulse conditions) at low plate voltages, a well-defined plate knee, and robust design-maximum ratings. Depending on the application, it can support plate dissipations up to **24 W** and peak positive pulse voltages up to **7,000 V**. These characteristics make the 17DQ6B a highly efficient and reliable choice for both monochrome and color 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	770 V	—
Maximum plate dissipation	18 W	—
Maximum DC grid 2 voltage	220 V	—
Typical plate current	65 mA	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical screen-grid current	1.8 mA	—
Peak negative pulse plate voltage	1500 V	HorizontalDeflection

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	18000 ohm	—
Transconductance	7300 uS	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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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	6500 V	TVHorizontalDeflection;Pulse
Peak negative pulse plate voltage	1500 V	TVHorizontalDeflection;Pulse
Peak cathode current	610 mA	TVHorizontalDeflection;Pulse
FOR HGRIZONTAL DEFLECTION AMPLIFIER G	0 mA	Published datasheet
GRID TO PLATE (G TO P)	0.5 pF	Published datasheet
INPUT: (G	15 pF	Published datasheet
0 UTPUT: (P TO H+K, BP + B	7 pF	Published datasheet

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS	9 mA	Published datasheet
AVERAGE CHARACTERISTICS	50 V	Published datasheet
HEATER WARM-UP TIME, APPROX	11 s	Published datasheet
DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS	9 mA	Published datasheet
PLATE VOLTAGE, PEAK PULSE, POSITIVE	6500 V	Published datasheet
GRID #	33 V	Published datasheet
GRID #	22 V	Published datasheet
GRID #	2 W	Published datasheet
GRID #	1 ohm	Published datasheet
GRID #	1 mA	Published datasheet
TRANSCONDUCTANCE $\mu S/V$	1 μS	Published datasheet
GRID #	2 mA	Published datasheet
CUTOFF: $I_b =$	150 mA	Published datasheet
GRID #	-42 V	Published datasheet
GRID #	1 V	Published datasheet
$E_f =$	16.8 V	Published datasheet
$I_b E_f =$	16.8 V	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PLATE SUPPLY VOLTAGE, DC (	900 V	Published datasheet
PLATE VOLTAGE S PEAK PULSE, NEGATIVE	100 V	Published datasheet
CATHODE CURRENT, AVERAGE $\sim T$	7 mA	Published datasheet
PLATE CURRENT (	5 mA	Published datasheet
PLATE RESISTANCE, APPROX. TH	0 ohm	Published datasheet
PLATE CURRENT	345 mA	Published datasheet
OF THE VOLTAGE PULSE MUST NOT EXCEED	15 V	Published datasheet
HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE MEA	7 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	—



SOURCE OPERATING CONDITIONS

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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	16.8 V	AC or DC at rated heater current
Heater current	450 mA	Nominal current
Warm-up time	11 s	Average
Reference parent type	6GW6	Electrical characteristics same except heater



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
Maximum pulse duration	200 microseconds	Published in approved 17DQ6B target datasheet entry; Section1
be reduced to 100 mAwith a maximum pulse duration of	400 microseconds	Published in approved 17DQ6B target datasheet entry; Section1
Heater Voltage (ac/dc) 6.3 12.6	16.8 V	Published in approved 17DQ6B target datasheet entry; Section1
Heater Current 1.2 0.6	450 mA	Published in approved 17DQ6B target datasheet entry; Section1
Heater Warm-up Time (Average) 11	11 seconds	Published in approved 17DQ6B target datasheet entry; Section1
DC Plate Supply Voltage	770 V	Published in approved 17DQ6B target datasheet entry; Section1
Peak Positive-Pulse Plate Voltage*	6500 V	Published in approved 17DQ6B target datasheet entry; Section1
Peak Negative-Pulse Plate Voltage	1500 V	Published in approved 17DQ6B target datasheet entry; Section1
DC Grid-No.2 (Screen-Grid) Voltage	220 V	Published in approved 17DQ6B target datasheet entry; Section1
DC Grid-No.1 (Control-Grid) Voltage	55 V	Published in approved 17DQ6B target datasheet entry; Section1
Peak Negative-Pulse Grid-No.1 Voltage	330 V	Published in approved 17DQ6B target datasheet entry; Section1
Peak Cathode Current	550 mA	Published in approved 17DQ6B target datasheet entry; Section1
Average Cathode Current	175 mA	Published in approved 17DQ6B target datasheet entry; Section1
Plate Dissipation*	17.5 W	Published in approved 17DQ6B target datasheet entry; Section1
Grid-No.2 Input	3.5 W	Published in approved 17DQ6B target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Bulb Temperature (At hottest point)	240 °C	Published in approved 17DQ6B target datasheet entry; Section1
Grid-No. 1-Circuit Resistance, for grid-resistor-bias operation	1 MΩ	Published in approved 17DQ6B target datasheet entry; Section1
# Pulse duration must not exceed 15% of a horizontal scanning cycle (	10 microseconds	Published in approved 17DQ6B target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No	3 pF	Published in approved 17DQ6B target datasheet entry; Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage 150 60	250 V	Published in approved 17DQ6B target datasheet entry; Section1
C.rid-No.2 Voltage 150 150	150 V	Published in approved 17DQ6B target datasheet entry; Section1
Grid-No. 1 Voltage -22.5 0	-22.5 V	Published in approved 17DQ6B target datasheet entry; Section1
Plate Resistance (Approx.)	15000 Ω	Published in approved 17DQ6B target datasheet entry; Section1
Grid-No.2 Current 32"	2.1 mA	Published in approved 17DQ6B target datasheet entry; Section1
1 mA	-42 V	Published in approved 17DQ6B target datasheet entry; Section1

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