



ELECTRONIC TUBE REFERENCE

17BQ6GTB

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
BEAMPOWER

Beam-power pentode in the BQ6 horizontal-output family, designed for high-voltage pulsed television sweep service with controlled heater warm-up.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	8
NOMINAL HEATER	16.8 V / 300 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	0.006 S
AMPLIFICATION FACTOR	4.3
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM SCREEN VOLTAGE	200 V
MAXIMUM PLATE DISSIPATION	11 W
MAXIMUM SCREEN DISSIPATION	2.5 W
MAXIMUM CATHODE CURRENT	110 mA
<i>Published ratings and characteristics checked against the supplied datasheet tables.</i>	

17BQ6GTB — Beam Power Pentode

The **17BQ6GTB** is a glass-envelope beam power amplifier designed primarily for service as a horizontal deflection amplifier in television receivers. It is particularly suited for use in both color and black-and-white television designs. Featuring a coated unipotential cathode, the tube is engineered to withstand high-voltage pulses and deliver the high peak currents required by electromagnetic deflection systems.

Construction, Physical Dimensions, and Base Pinout

The 17BQ6GTB is constructed in a T-9 glass bulb envelope equipped with a skirted miniature top cap (such as C1-2, C1-3, or C1-33) and an intermediate or short intermediate shell 7-pin or 8-pin octal base (such as B5-187, B6-81, B6-84, B7-7, or B7-59). The tube can be mounted and operated in any position.

The physical dimensions of the envelope are as follows:

- **Maximum diameter:** 1.188 inches (1-9/32 inches)
- **Maximum seated height:** 3.313 inches (3-5/16 inches)
- **Maximum overall height:** 3.875 inches (3-7/8 inches)

The tube utilizes the 6AM basing diagram, which is viewed from the bottom of the base. Depending on the specific manufacturing variant, pin 1 may be omitted, and the internal electrode connections are distributed as follows:

- **Pin 1:** No Connection (NC) (may be omitted)
- **Pin 2:** Heater (H)
- **Pin 3:** Grid No. 2 (G2) or No Connection (NC)
- **Pin 4:** Grid No. 1 (G1), Grid No. 2 (G2), or No Connection (NC)
- **Pin 5:** Grid No. 1 (G1) or No Connection (NC)
- **Pin 7:** Heater (H)
- **Pin 8:** Cathode (K) and Grid No. 3 (G3)
- **Top Cap:** Plate (P)

Heater Characteristics and Warm-up

The heater of the 17BQ6GTB is designed for series-string heater circuits, providing a controlled warm-up characteristic to prevent voltage surges across other tubes in the series chain.

- **Heater Voltage (AC or DC):** 16.8 V
- **Heater Current:** 0.45 A (450 mA)
- **Heater Warm-up Time:** Approximately 11.0 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 heater voltage is applied to a series circuit consisting of the heater and a resistance equal to three times the nominal heater operating resistance.

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

Electrical Characteristics and Typical Operation

The 17BQ6GTB operates as a beam power pentode with high transconductance and a low plate knee voltage. Typical operating points and characteristics under Class A1 and zero-bias conditions are detailed below:

Parameter	Pentode Operation	Zero-Bias Knee	Cutoff (Approx.)	Units
Plate Voltage (E_b)	250	60	250	V
Grid No. 2 Voltage (E_{c2})	150	150	150	V
Grid No. 1 Voltage (E_{c1})(/tubes/C1))	-22.5	0 (instantaneous)	-43	V
Plate Current (I_b)	57	260*	1	mA
Grid No. 2 Current (I_{c2})	2.1	26*	—	mA
Transconductance (g_m)	5,900	—	—	μmhos
Plate Resistance (r_p)	14,500	—	—	Ω
Triode Amplification Factor (μ)	4.3**	—	—	

* These zero-bias values are measured using a recurrent waveform method to ensure that the maximum ratings of the tube are not exceeded. ** The triode amplification factor (Grid No. 2 to Grid No. 1) is measured under the conditions of $E_b = E_{c2} = 150$ V and E_{c1} (/tubes/C1) = -22.5 V.

Horizontal Deflection Amplifier Ratings

The 17BQ6GTB is rated under the Design Center Rating System for horizontal deflection amplifier service in a 525-line, 30-frame television system. The duty cycle of the voltage pulse must not exceed 15% of the scanning cycle, with a maximum pulse duration of 10 μs .

- **Maximum DC Plate Supply Voltage (Boost + DC Power Supply):** 600 V
- **Maximum Peak Positive Pulse Plate Voltage (Absolute Maximum):** 6,000 V

- **Maximum Peak Negative Pulse Plate Voltage:** 1,250 V
- **Maximum DC Grid No. 2 Voltage:** 200 V
- **Maximum Peak Negative Pulse Grid No. 1 Voltage:** 300 V
- **Maximum Plate Dissipation:** 11 W
- **Maximum Grid No. 2 Dissipation:** 2.5 W
- **Maximum Average Cathode Current:** 110 mA
- **Maximum Peak Cathode Current:** 400 mA
- **Maximum Grid No. 1 Circuit Resistance:** 0.47 MΩ
- **Maximum Bulb Temperature (at hottest point):** 220 °C

Heater-Cathode Voltage Ratings

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

Circuit Protection

When utilizing grid-leak bias, the circuit must incorporate an adequate cathode bias resistor or other protective means to prevent excessive plate and screen dissipation in the event that excitation is lost.

Interelectrode Capacitances and Curve Observations

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the unshielded tube are:

- **Grid No. 1 to Plate:** 0.6 pF
- **Input (Grid No. 1 to Cathode, Heater, Grid No. 2, and Grid No. 3):** 15 pF
- **Output (Plate to Cathode, Heater, Grid No. 2, and Grid No. 3):** 7.0 to 7.5 pF

Qualitative Curve Observations

The electrical characteristics of the 17BQ6GTB are characterized by a sharp knee in the plate current curves, which allows for efficient operation in deflection circuits:

- **At $E_{c2} = 100$ V:** The plate current (I_b) curves plotted for control grid voltages ($E_{c1}(/tubes/C1)$) from 0 V to -25 V show a knee occurring between 50 V and 60 V plate voltage. At $E_{c1}(/tubes/C1) = 0$ V, the plate current reaches approximately 170 to 175 mA at a plate voltage of 250 V. The screen grid current (I_{c2}) peaks at low plate voltages (around 50 mA) and drops below 10 mA as the plate voltage rises above 100 V.
- **At $E_{c2} = 150$ V:** The plate current curves are plotted for $E_{c1}(/tubes/C1)$ from 0 V to -40 V. At $E_{c1}(/tubes/C1) = 0$ V, the knee occurs around 60 V to 75 V plate voltage, with the plate current reaching approximately 280 to 300 mA at 250 V plate voltage. The screen grid current peaks sharply

near 25 V plate voltage (reaching up to 100 mA at low plate voltages) and drops below 20 mA at higher plate voltages.

Related Designations

The 17BQ6GTB is identical to the [**6BQ6GTB**](#) (and the combined [**6BQ6GTB/6CU6**](#) designation) except for its heater ratings. The [**6BQ6GTB**](#) uses a 6.3 V, 1.2 A heater, whereas the 17BQ6GTB is designed with a 16.8 V, 0.45 A heater with a controlled warm-up time for series-string applications.

Technical Summary

The **17BQ6GTB** is a glass-envelope, octal-based beam power pentode designed for horizontal deflection amplifier service in television receivers. It features a 16.8 V, 0.45 A heater with a controlled 11-second warm-up time, making it suitable for series-string heater designs. The tube is characterized by high transconductance (5,900 μmhos), a low plate knee voltage, and the ability to withstand peak positive plate pulses up to 6,000 V. With a plate dissipation rating of 11 W and a peak cathode current capability of 400 mA, the 17BQ6GTB provides robust performance in demanding electromagnetic 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

[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
THE	6 A	Published datasheet
MAXIMUM PEAK P	51 V	Published datasheet
MAXIMUM PEAK NEGATIVE PLATE V OL TAGE	5 V	Published datasheet
MAXIMUM PLATE DISSIPATION S	11 W	Published datasheet
GRID #	3 V	Published datasheet
MAXIMUM DC GRID #	2 V	Published datasheet
MAXIMUM GRID #	2.5 W	Published datasheet
MAXIMUM AVERAGE CATHODE CURRENT	11 mA	Published datasheet
MAXIMUM PEAK CATHODE CURRENT	4 mA	Published datasheet

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM GRID #	0.47 mA	Published datasheet
MAXIMUM BULB TEMPERATURE (AT HOTTEST POINT)	2 mA	Published datasheet
HEATER WARM-UP TIME (APPROX.)~	11 s	Published datasheet
* HEPTER WARM-UP TIME IS DEFINED A	5 V	Published datasheet
TUXG-SOL ELECTRIC INC. ELECTRON TUBE DIVISION BLOOMFIELD, NEW JERSEY. U.S.A. MARCH	520 mA	Published datasheet
GRID #	2 mA	Published datasheet
TRANSCONDUCTANCE	900 μ S	Published datasheet
GRID #	26 mA	Published datasheet
GRID #	43 V	Published datasheet
Efficiency =	150 mA	Published datasheet
IEt=	16.8 V	Published datasheet
Ef=	16.8 V	Published datasheet
E~Z =	150 V	Published datasheet
TUM:i-SOL ELECTRIC INC. ELECTRON TUBE DIVISION BLOOMFIELD~ NEW JERSEY U.S.A. MARCH	5210 mA	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE	16.8 V	Published datasheet
CYCLE OF THE VOLTAGE PULSE NOT TO EXCEED	154 V	Published datasheet
HEATER CURRENT	450 mA	Published datasheet
PLATE CURRENT	57 mA	Published datasheet
PLATE RESISTANCE I	500 ohm	Published datasheet
PLATE CURRENT	2 mA	Published datasheet
TRIODE AMPLIFICATION FACTOR F	4.3 A	Published datasheet