

ELECTRONIC TUBE REFERENCE

12BQ6GTB

Power - TV Horizontal Output (sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

BEAMPOWER

Improved beam-power horizontal-output tube for color and monochrome television receivers, with high pulse-voltage and current capability for flyback-output circuitry.

GENERAL CHARACTERISTICS

BASE DESIGNATION	6AM	BASE PINS	8
NOMINAL HEATER	12.6 V / 600 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	14500 Ω
TRANSCONDUCTANCE	0.0059 S
MAXIMUM PLATE VOLTAGE	600 V
MAXIMUM SCREEN VOLTAGE	200 V
MAXIMUM PLATE DISSIPATION	11 W
MAXIMUM SCREEN DISSIPATION	2.5 W
MAXIMUM CATHODE CURRENT	400 mA
12-V heater variant; promoted electrical fields carried from the explicitly referenced 6BQ6GTB parent datasheet already present in the project corpus. Additional 12-V heater data remains source-specific.	

12BQ6GTB — Beam Power Pentode

The **12BQ6GTB** (also designated as **12BQ6GTB/12CU6**) is a glass octal beam power tube designed primarily for use as a horizontal-deflection amplifier in both color and black-and-white television receivers. It features high power sensitivity, high plate current capability at low plate voltages, and is designed to withstand high-voltage pulses.

Construction and Physical Characteristics

The 12BQ6GTB is constructed with a T-9 glass envelope and utilizes a standard octal base. The tube's physical dimensions and mechanical specifications are as follows:

- **Envelope:** T-9 glass bulb
- **Base:** Octal type, with specific base designations including 85-187, 86-81, B6-84, B7-7, or B7-59. The tube may be supplied with pin number 1 omitted.
- **Top Cap:** C1-2, C1-3, or C1-33
- **Basing Arrangement:** 6AM
- **Outline Designation:** 9-49 or 9-50
- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 3.313 inches
- **Maximum Overall Height:** 3.875 inches
- **Mounting Position:** Any

The 6AM basing diagram provides the following pin connections (viewed from the bottom of the base):

- Pin 1: No Connection (NC) / Omitted
- Pin 2: Heater (H)
- Pin 3: No Connection (NC)
- Pin 4: Grid No. 2 (Screen Grid)
- Pin 5: Grid No. 1 (Control Grid)
- Pin 7: Heater (H)
- Pin 8: Cathode (K) and Grid No. 3 (Suppressor Grid)
- Top Cap: Plate (P)

Heater Characteristics and Family Variations

The 12BQ6GTB belongs to a family of identical beam power tubes that differ only in their heater ratings and warm-up characteristics. The heater is designed for operation from either an AC or DC supply.

Heater Specifications by Type

Tube Designation	Heater Voltage (V)	Heater Current (A)	Average Warm-up Time (s)
12BQ6GTB/12CU6	12.6	0.600 ± 0.040	11
6BQ6GTB/6CU6	6.3	1.2	—
17BQ6GTB	16.8	0.45	11
25BQ6GTB/25CU6	25.0	0.3	—

Heater-Cathode Voltage Ratings

The insulation between the heater and cathode is rated to withstand significant potential differences:

- **Heater Negative with Respect to Cathode:**
 - Peak value: 200 V maximum
 - Total DC and peak: 200 V maximum
- **Heater Positive with Respect to Cathode:**
 - DC value: 100 V maximum (average value)
 - Total DC and peak: 200 V maximum

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the tube, measured without an external shield, 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

Class A1 Amplifier Characteristics

Under typical Class A1 operating conditions, the 12BQ6GTB exhibits the following electrical characteristics at various operating points:

Typical Operating Points

Parameter	Point A	Point B	Point C
Plate Voltage	60 V	150 V	250 V
Grid No. 2 Voltage	150 V	150 V	150 V
Grid No. 1 Voltage	0 V	-22.5 V	-22.5 V
Plate Current	260 mA*	—	57 mA
Grid No. 2 Current	26 mA*	—	2.1 mA
Transconductance	—	—	5900 μ mhos
Plate Resistance (Approx.)	—	—	14,500 Ω
Mu-Factor (Grid No. 2 to Grid No. 1)	—	4.3	—
Amplification Factor	—	—	4.3

Cutoff and Knee Characteristics

- **Grid No. 1 Voltage for Plate Current of 1.0 mA (Approx.):** -43 V (at a plate voltage of 250 V and Grid No. 2 voltage of 150 V).
- **Instantaneous Plate Knee Values:** At a plate voltage of 60 V, Grid No. 2 voltage of 150 V, and Grid No. 1 voltage of 0 V, the instantaneous plate current is 260 mA and the Grid No. 2 current is 26 mA.

Horizontal-Deflection Amplifier Service

The primary application of the 12BQ6GTB is as a horizontal-deflection amplifier in television receivers operating under a 525-line, 30-frame scanning system.

Maximum Ratings (Design-Center Values)

- **DC Plate Voltage:** 600 V
- **Peak Positive-Pulse Plate Voltage (Absolute Maximum):** 6000 V
- **Peak Negative-Pulse Plate Voltage:** 1250 V

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

Operating Constraints and Circuit Values

- **Maximum Grid No. 1 Circuit Resistance:** 0.47 MΩ
- **Pulse Duration Limits:** For the peak positive-pulse plate voltage rating of 6000 V, the pulse duration must not exceed 15% of a horizontal scanning cycle (equivalent to 10 microseconds). Under no circumstances should this absolute maximum value be exceeded.
- **Tube Protection:** A bias resistor or other suitable means is required to protect the tube from excessive dissipation in the absence of excitation.

Predecessor Comparison (6BQ6GT)

The earlier [6BQ6GT](#) has different typical operating characteristics and ratings. For comparison, the typical single-tube Class A1 operation for the [6BQ6GT](#) is specified as:

- **Plate Voltage:** 250 V
- **Grid No. 2 Voltage:** 250 V
- **Grid No. 1 Voltage:** -7.3 V
- **Peak AF Grid No. 1 Voltage:** 6.2 V
- **Zero-Signal Plate Current:** 48 mA
- **Maximum-Signal Plate Current:** 50.6 mA
- **Zero-Signal Grid No. 2 Current:** 5.5 mA
- **Maximum-Signal Grid No. 2 Current:** 10 mA
- **Plate Resistance (Approx.):** 38,000 Ω
- **Transconductance:** 11,300 μmhos
- **Load Resistance:** 4500 Ω
- **Total Harmonic Distortion:** 10%
- **Maximum-Signal Power Output:** 5.7 W

The [6BQ6GT](#) also supports push-pull Class [AB1](#) amplifier operation with plate and Grid No. 2 supply voltages of 250 V or 300 V, delivering maximum-signal power outputs of 11 W and 17 W respectively. However, the 12BQ6GTB/[12CU6](#) features updated ratings, including an 11 W plate dissipation limit and a 2.5 W Grid No. 2 dissipation limit, which must be strictly observed in horizontal-deflection service.

Technical Summary

The **12BQ6GTB** is an octal-based, glass-envelope beam power pentode designed for horizontal-deflection amplifier service in television receivers. It features a 12.6 V, 0.6 A heater with a controlled 11-second warm-up time, making it suitable for series-string heater designs. The tube is capable of handling peak positive plate pulses up to 6000 V and peak cathode currents of 400 mA. At a typical Class A1 operating point of 250 V on the plate and 150 V on Grid No. 2, it exhibits a transconductance of 5900 μmhos and a plate resistance of 14,500 Ω . The 12BQ6GTB provides robust performance and high current capability at low plate voltages, making it highly effective in television deflection circuits.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Current – published value 1	600 mA	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Current – published value 2	40 mA	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Warm-up time (Average)	11	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Heater voltage	12.6 V	Nominal heater rating
Heater current	600 mA	Nominal heater rating
Plate resistance	14500 ohm	InheritedFromReferencedParent 6BQ6GTB
Transconductance	5900 uS	InheritedFromReferencedParent 6BQ6GTB

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	600 V	InheritedFromReferencedParent 6BQ6GTB
Maximum screen-grid voltage	200 V	InheritedFromReferencedParent 6BQ6GTB
Maximum plate dissipation	11 W	InheritedFromReferencedParent 6BQ6GTB

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
Heater-Cathode Voltage:	11 s	Other
Peak value	200 V	Other;PublishedValue1
Peak value	200 V	Other;PublishedValue2
Peak value	200 V	Other;PublishedValue3
Average value	100 V	Other;PublishedValue1
Average value	100 V	Other;PublishedValue2
Average value	100 V	Other;PublishedValue3
DC Plate Voltage	600 V	MaximumRating
Peak Positive-Pulse Plate Voltage* (Absolute Maximum)	6000 V	MaximumRating
Peak Negative-Pulse Plate Voltage	1260 V	MaximumRating
DC Grid-No	2 V	MaximumRating;PublishedValue1
DC Grid-No	200 V	MaximumRating;PublishedValue2
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	300 V	MaximumRating
Peak Cathode Current	400 mA	MaximumRating
Average Cathode Current	110 mA	MaximumRating
Plate Dissipation"	11 W	MaximumRating
Grid-No	2 W	MaximumRating;PublishedValue1
Grid-No	2.5 W	MaximumRating;PublishedValue2
Grid-No.1-Circuit Resistance	0.47 megohm	MaximumCircuitValue
Maximum Plate Voltage	600 V	Section1;Promoted
Maximum Screen Voltage	200 V	Section1;Promoted
Maximum Plate Dissipation	11 W	Section1;Promoted
Maximum Screen Dissipation	2.5 W	Section1;Promoted

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Cathode Current	110 mA	Section1;Promoted

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate to Cathode, Heater, Grid No	2 pF	Capacitance;PublishedValue1
Plate to Cathode, Heater, Grid No	3 pF	Capacitance;PublishedValue2
Plate to Cathode, Heater, Grid No	7 pF	Capacitance;PublishedValue3

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	60 V	Characteristic;PublishedValue1
Plate Voltage	150 V	Characteristic;PublishedValue2
Plate Voltage	250 V	Characteristic;PublishedValue3
Grid-No	2 V	Characteristic;PublishedValue1
Grid-No	150 V	Characteristic;PublishedValue2
Grid-No	150 V	Characteristic;PublishedValue3
Grid-No	150 V	Characteristic;PublishedValue4
Grid-No	1 V	Characteristic;PublishedValue1
Grid-No	0 V	Characteristic;PublishedValue2
Grid-No	22.5 V	Characteristic;PublishedValue3
Grid-No	-22.5 V	Characteristic;PublishedValue4
Plate Resistance (Approx.) –	14500 ohm	Characteristic
Plate Current	260 mA	Characteristic;PublishedValue1
Plate Current	57 mA	Characteristic;PublishedValue2
Grid-No	2 mA	Characteristic;PublishedValue1
Grid-No	26 mA	Characteristic;PublishedValue2
Grid-No	2.1 mA	Characteristic;PublishedValue3
Grid-No	1 mA	Characteristic;PublishedValue1
Grid-No	1 mA	Characteristic;PublishedValue2
Published value	-43 V	Characteristic
Plate Resistance	14500 ohm	Section1;Promoted

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	5900 μ S	Section1;Promoted