

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

19BG6G

1 SECTION
CONSTRUCTION
BEAMPOWER

Power - TV Horizontal Output (sweep) electronic tube

19-volt-heater beam-power output valve designed for television line time-base generators and horizontal-deflection output service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	5BT	BASE PINS	5
NOMINAL HEATER	18.9 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

5BT - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – IS	A	IS – Internal Screen	CONNECTED
PIN2 – H	–	H – Heater	CONNECTED
PIN3 – G3	A	G3 – Suppressor Grid	CONNECTED
PIN3 – K	A	K – Cathode	CONNECTED
PIN5 – G1	A	G1 – Control Grid	CONNECTED
PIN7 – H	–	H – Heater	CONNECTED
PIN8 – G2	A	G2 – Screen Grid	CONNECTED
CAP1 – P	A	P – Plate (Anode)	CONNECTED

SECTION RATINGS

SECTION1 Beam Power	
PLATE RESISTANCE	25000 Ω
TRANSCONDUCTANCE	0.006 S
MAXIMUM PLATE VOLTAGE	700 V
MAXIMUM SCREEN VOLTAGE	350 V
MAXIMUM PLATE DISSIPATION	20 W
MAXIMUM SCREEN DISSIPATION	3.2 W
MAXIMUM CATHODE CURRENT	110 mA
<i>Promoted from printed maximum-rating/characteristic columns; additional published values retained in TUBE_SECTION_PARAMETER.</i>	

19BG6G — Beam Power Amplifier

The **19BG6G** (also written as **19BG6-G**) is a glass-envelope beam power amplifier and beam pentode designed primarily for use in television receiver horizontal deflection circuits and line time base output stages. It represents a mechanical redesign of the classic **6L6G** structure, modified with a top-cap anode connection and enhanced insulation to withstand the high peak positive plate voltages encountered in television flyback systems.

Overview and Applications

In AC/DC television receivers, the 19BG6G functions as a line time base output valve. It can also operate in conjunction with a rectifier (such as the Brimar **R12**) to generate Extra High Tension (E.H.T.) power from line flyback pulses. For further characteristic curves and detailed information, reference is frequently made to the electrically similar **6BG6G** tube type.

Construction, Physical Dimensions, and Mounting

The 19BG6G features a coated unipotential cathode and is housed in an ST-16 glass bulb (outline drawing 16-5) with a small top cap for the anode (plate) connection. This top-cap configuration isolates the high-voltage anode from the base pins, providing the necessary insulation to prevent arcing during high-voltage pulses.

Physical Dimensions

- **Maximum Diameter/Width:** 2-1/16 inches
- **Maximum Overall Height:** 5-5/8 to 5-11/16 inches
- **Maximum Seated Height:** 5-1/8 inches

Mounting Position

The tube can be mounted in either a vertical (base up or down) or horizontal position. When mounted horizontally, the plane of pins 2 and 7 must be oriented vertically.

Heater and Base Connections

The heater of the 19BG6G is designed for series or parallel AC/DC operation, requiring a nominal voltage of 18.9 to 19 volts and a current of 0.3 amperes (300 mA).

Pinout Configurations

The 19BG6G utilizes an octal base (specifically a medium shell 6-pin octal base with a 5BT basing designation). The pin connections vary slightly across different manufacturer specifications:

- **Configuration A:**

- **Pin 1:** No Connection (NC)
- **Pin 2:** Heater (h)
- **Pin 3:** Cathode, Beam Plates (k, bp)
- **Pin 4:** No Pin (NP)
- **Pin 5:** Control Grid (g1)
- **Pin 6:** No Pin (NP)
- **Pin 7:** Heater (h)
- **Pin 8:** Screen Grid (g2)
- **Top Cap:** Anode (a)

- **Configuration B:**

- **Pins 2 & 7:** Heater (h)
- **Pin 4:** Screen Grid (g2)
- **Pin 5:** Control Grid (g1)
- **Pin 8:** Cathode & Grid No. 3 (k, g3)
- **Top Cap:** Plate (p)

- **Configuration C:**

- **Pin 1:** No Connection (NC)
- **Pin 2:** Heater (H)
- **Pin 3:** Grid No. 2 (G2)
- **Pin 7:** Heater (H)
- **Pin 8:** Cathode & Grid No. 3 (K, G3)
- **Top Cap:** Plate (P)

These variations reflect different historical standards and base configurations (such as the 5BT designation).

Electrical Characteristics and Typical Operation

The 19BG6G is characterized by high transconductance and a low knee voltage, making it highly efficient in deflection amplifier service.

Direct Interelectrode Capacitances (Without External Shield)

- **Grid No. 1 to Plate (g1 to p):** 0.34 pF to 0.65 pF (maximum)
- **Input (g1 to h + k + g3 + g2):** 11 pF to 12 pF
- **Output (p to h + k + g3 + g2):** 6.5 pF

Typical Operating Conditions (Class A / Static)

Under static conditions, the tube exhibits the following characteristics:

Parameter	Condition 1	Condition 2
Plate Voltage	250 V	60 V
Screen (Grid No. 2) Voltage	250 V	250 V
Control Grid (Grid No. 1) Voltage	-15 V	0 V
Plate Current	75 mA	180 mA
Screen Current	4 mA	18 mA
Plate Resistance (approx.)	25,000 Ω	—
Transconductance (g_m)	6,000 μmhos	—

Typical Operation in a Horizontal Deflection Circuit

When operating in a practical television horizontal deflection circuit, typical parameters are as follows:

- **Heater Voltage:** 18.9 V
- **Heater Current:** 300 mA
- **Plate & Grid No. 2 Supply Voltage:** 400 V
- **Peak Positive Surge Plate Voltage (Approx.):** 4,000 V
- **Peak Negative Surge Grid No. 1 Voltage (Approx.):** -100 V
- **Plate Current:** 70 mA
- **Grid No. 2 Current:** 6 mA
- **Grid No. 1 Current:** 25 μA

Maximum Ratings

The maximum ratings of the 19BG6G must be strictly observed to prevent premature failure, particularly in horizontal deflection systems where high-voltage flyback pulses are present. The ratings are interpreted according to the RMA Standard M8-210.

Parameter	Absolute / Design-Maximum Rating
Maximum DC Plate Voltage	500 V to 700 V
Maximum DC Grid No. 2 (Screen) Voltage	350 V
Maximum DC Grid No. 1 Voltage	-50 V
Maximum Peak Positive Surge Plate Voltage	6,000 V to 6,600 V *
Maximum Peak Negative Surge Grid No. 1 Voltage	-400 V
Maximum Plate Dissipation	20 W
Maximum Grid No. 2 Dissipation	3.2 W
Maximum DC Cathode Current	110 mA
Maximum DC Plate Current	100 mA
Maximum Heater-Cathode Voltage	250 V
Maximum Grid No. 1 Circuit Resistance	1.0 MΩ

* *Note on Peak Positive Surge Plate Voltage:* The duty cycle of the voltage pulse must not exceed 15% of one scanning cycle, and the pulse duration must be limited to 10 microseconds.

Qualitative Curve Observations

Analysis of the 19BG6G characteristic curves reveals several key performance traits:

- **Plate Characteristics** ($E_f = 18.9 \text{ V}$, $E_{c2} = 250 \text{ V}$): The "knee" of the plate current curves occurs sharply between 50 V and 70 V plate voltage across a wide range of control grid (E_{c1}) (/tubes/C1) voltages from +10 V to -30 V. This sharp knee allows for maximum current swing and high efficiency in deflection circuits.
- **Plate Characteristics** ($E_f = 18.9 \text{ V}$, E_{c1} (/tubes/C1) = 0 V): The plate current curves exhibit well-defined saturation plateaus for screen voltages (E_{c2}) ranging from 50 V to 350 V.
- **Screen Current Characteristics** ($E_f = 18.9 \text{ V}$, E_{c1} (/tubes/C1) = 0 V): Screen current (I_{c2}) remains low and flat at higher plate voltages, which minimizes screen dissipation during normal conduction. However, as the plate voltage drops below approximately 50 V (below the knee), the screen current rises sharply.

Technical Summary

The **19BG6G** is an octal-based, indirectly heated beam power pentode designed specifically for high-stress horizontal deflection amplifier and line time base output service in AC/DC television receivers. Featuring an 18.9 V / 0.3 A heater, a rugged ST-16 glass envelope, and a top-cap anode connection, it is mechanically optimized to withstand peak positive plate surges of up to 6,600 V. With a plate dissipation rating of 20 W, a transconductance of 6,000 μmhos , and a sharp knee characteristic, the 19BG6G provides reliable and efficient performance in television scanning systems.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

Published test conditions and operating points. Values on this page are preserved as reported by this source.

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 1 · Beam Power

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	12 pF	Section1
Output capacitance	6.5 pF	Section1
Grid-to-plate capacitance	0.34 pF	Section1

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	HorizontalDeflection
Screen voltage	250 V	HorizontalDeflection
Control-grid voltage	-15 V	HorizontalDeflection
Plate current	75 mA	HorizontalDeflection
Screen current	4 mA	HorizontalDeflection
Plate voltage	60 V	HorizontalDeflection;PeakCurrent
Screen voltage	250 V	HorizontalDeflection;PeakCurrent
Control-grid voltage	0 V	HorizontalDeflection;PeakCurrent
Plate current	180 mA	HorizontalDeflection;PeakCurrent
Screen current	18 mA	HorizontalDeflection;PeakCurrent
Maximum positive pulse plate voltage	6600 V	HorizontalDeflection
Maximum plate dissipation	20 W	HorizontalDeflection
Maximum screen dissipation	3.2 W	HorizontalDeflection
Maximum DC cathode current	110 mA	HorizontalDeflection

Characteristic		
Parameter	Published Value	Condition / Note
Plate resistance	25000 Ω	HorizontalDeflection
Transconductance	6000 μS	HorizontalDeflection



SOURCE DATA APPENDIX

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
Plate And Screen Supply Voltage	400 V	HorizontalDeflection

Characteristic		
Parameter	Published Value	Condition / Note
PeakPositiveSurgePlateVoltage	4000 V	HorizontalDeflection
Plate Current	70 mA	HorizontalDeflection

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