

ELECTRONIC TUBE REFERENCE

# 19BFP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION  
CONSTRUCTION  
CATHODERAY

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, and an aluminized P4 screen. Manufacturer documentation places it in the high-voltage picture-tube family used for bright, high-contrast receiver display.

## GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | B6-203            | BASE PINS            | 6             |
| NOMINAL HEATER      | 6.3 V / 600 mA    | PARALLEL HEATER      | – / –         |
| HEATING             | Indirect          | SERIES OPERATION     | Not specified |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar       |

## SECTION RATINGS

|                                                                                                                        |         |
|------------------------------------------------------------------------------------------------------------------------|---------|
| SECTION0 Cathode Ray                                                                                                   |         |
| MAXIMUM PLATE VOLTAGE                                                                                                  | 20000 V |
| CRT electrode ratings, focusing/deflection data, capacitances, and operating voltages are preserved in parameter rows. |         |

19BFP4 — Television Picture Tube

The **19BFP4** is a direct-view rectangular glass television picture tube designed for use in television receivers. It features a short straight electron gun that eliminates the need for an ion trap, low-voltage electrostatic focusing, and 92-degree magnetic deflection. The tube incorporates a gray-tinted faceplate and a metal-backed screen with P4 aluminized phosphor, providing white fluorescence with medium persistence.

# Mechanical Specifications and Physical Dimensions

The 19BFP4 is constructed with a rectangular glass bulb (J149B1) and a spherical faceplate. The screen has a minimum useful projected area of approximately 172 square inches, with minimum useful dimensions of 15-1/8 inches in width by 12 inches in height. The physical dimensions and mechanical characteristics of the tube are detailed below:

| Parameter                   | Specification                                |
|-----------------------------|----------------------------------------------|
| Overall Length              | 15-1/4 $\pm$ 3/8 inches                      |
| Neck Length                 | 5-1/2 $\pm$ 3/16 inches                      |
| Greatest Diagonal Dimension | 18-5/8 $\pm$ 1/8 inches                      |
| Greatest Width Dimension    | 16-13/32 $\pm$ 1/8 inches                    |
| Greatest Height Dimension   | 13-11/32 $\pm$ 1/8 inches                    |
| Bulb Weight                 | 14-3/4 lbs                                   |
| Bulb Contact                | J1-21 (Anode Recessed Small Cavity Cap)      |
| Base                        | B6-203 or B6-63 (Small Shell Duodecal 6-Pin) |
| Basing Configuration        | 12L                                          |

The J1-21 anode contact aligns with pin position No. 6 within a tolerance of  $\pm 30$  degrees on the same side as the anode terminal.

## Heater, Basing, and Interelectrode Capacitances

The 19BFP4 utilizes an indirectly heated cathode with a controlled warm-up time. The heater and electrical connection parameters are as follows:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 600 mA  $\pm$  5% (0.6 A  $\pm$  5%)
- **Heater Warm-up Time:** 11 seconds

## Pin Connections (Bottom View - Basing 12L)

The electrical connections are made through a 6-pin small shell duodecal base:

| Pin Number | Connection                      |
|------------|---------------------------------|
| Pin 1      | Heater                          |
| Pin 2      | Grid No. 1                      |
| Pin 6      | Grid No. 4 (Focusing Electrode) |

| Pin Number       | Connection                                                         |
|------------------|--------------------------------------------------------------------|
| Pin 10           | Grid No. 2                                                         |
| Pin 11           | Cathode                                                            |
| Pin 12           | Heater                                                             |
| Cap              | Anode (Grid No. 5, Grid No. 3, and collector connected internally) |
| External Coating | External conductive coating (must be grounded)                     |

## Interelectrode Capacitances

The approximate capacitances between the electrodes are:

- **Cathode to all other electrodes:** ~5 pF (uuf)
- **Grid No. 1 to all other electrodes:** ~6 pF (uuf)
- **External conductive coating to anode:** 1000 pF (minimum) to 2000 pF (maximum)

The external conductive coating forms a supplementary filter capacitor when grounded, which is a requirement for proper circuit operation.

## Design-Maximum Ratings

The design-maximum ratings represent the limiting values of operating and environmental conditions under which the tube can safely operate. These ratings must not be exceeded:

- **Anode Voltage:** 20,000 V DC maximum, 11,000 V DC minimum
- **Grid No. 4 Voltage (Focusing Electrode):** -550 to +1100 V DC maximum
- **Grid No. 2 Voltage:** 550 V DC maximum (or up to 700 V DC maximum depending on the specific rating system applied)
- **Grid No. 1 Voltage (Grid Drive):**
  - Negative bias value: 154 V DC maximum
  - Positive bias value: 0 V DC maximum
  - Positive peak value: 2 V
- **Cathode Voltage (Cathode Drive):**
  - DC negative value: 0 V minimum
  - Negative peak value: 2 V
  - DC positive value: 154 V maximum
  - Positive peak value: 220 V
- **Heater-Cathode Voltage:**
  - **Heater negative with respect to cathode:** 450 V DC maximum during the warm-up period (not to exceed 15 seconds); 200 V DC maximum after warm-up.
  - **Heater positive with respect to cathode:** 200 V DC maximum.

# Operating Conditions and Circuit Design

The 19BFP4 can be operated in either cathode-drive or grid-drive configurations. Typical operating conditions for these services are outlined below:

## Typical Operating Points

| Parameter          | Cathode Drive Service           | Grid Drive Service                   |
|--------------------|---------------------------------|--------------------------------------|
| Anode Voltage      | 16,000 V DC                     | 16,000 V DC                          |
| Grid No. 4 Voltage | 0 to 400 V DC                   | 0 to +400 V DC                       |
| Grid No. 2 Voltage | 400 V DC                        | 400 V DC                             |
| Cutoff Voltage     | 34 to 79 V DC (Cathode Voltage) | -36 to -94 V DC (Grid No. 1 Voltage) |

Under grid-drive conditions, the Grid No. 4 voltage is specified for focus with an anode current of 100  $\mu$ A and a 15-1/8" x 12" raster. Visual extinction of the focused raster occurs within the specified Grid No. 1 voltage range, while the extinction of a stationary focused spot requires approximately 5 V more negative bias. Under cathode-drive conditions, operating Grid No. 2 below 300 V is not recommended.

## Limiting Circuit Values

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms
- **Minimum Grid No. 2 & Grid No. 4 Circuit Resistance:** 10,000 Ohms (protective resistance is recommended in these circuits)

## Installation and Handling Precautions

- **X-Ray Radiation:** When operated at anode voltages above 16,000 V, the tube may produce X-rays that require shielding to protect users from exposure.
- **Centering Magnet:** A permanent magnet centering magnet (0 to 8 gauss) should extend no more than 2-3/4 inches from the Yoke Reference Line.
- **Socket Mounting:** The socket must not be mounted rigidly. The associated wiring must be flexible enough to prevent any mechanical strain on the base pins.
- **Grounding:** The external conductive coating must be reliably grounded to complete the high-voltage filter circuit.

## Technical Summary

The **19BFP4** is a 92-degree magnetic deflection, low-voltage electrostatic focus television picture tube featuring a rectangular glass envelope, a 172 sq. in. useful screen area, and a short straight electron gun. Operating at a nominal heater voltage of 6.3 V and a current of 600 mA, it is designed for reliable performance in television receivers. With an anode rating of up to 20,000 V and typical operation at 16,000 V, the tube provides high-brightness displays utilizing its P4 aluminized phosphor screen. Proper

circuit design requires grounding the external conductive coating, implementing protective resistance in the grid circuits, and adhering to heater-cathode voltage limits during and after the 11-second warm-up period.



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1951 Thomas Electronics

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

## 1951 THOMAS ELECTRONICS

## Section 0 · Cathode Ray

| CHARACTERISTIC   |                 |                  |
|------------------|-----------------|------------------|
| PARAMETER        | PUBLISHED VALUE | CONDITION / NOTE |
| FocusingMethod   | Electrostatic   | —                |
| DeflectionMethod | Magnetic        | —                |
| Deflection Angle | 70 degree       | —                |
| Heater Voltage   | 6.3 V           | —                |
| Heater Current   | 600 mA          | —                |

| OTHER                                |                 |                  |
|--------------------------------------|-----------------|------------------|
| PARAMETER                            | PUBLISHED VALUE | CONDITION / NOTE |
| MaximumMainAnodeOrAcceleratorVoltage | 20000 V         | —                |
| TypicalMainAnodeOrAcceleratorVoltage | 16000 V         | —                |
| MaximumFocusingElectrodeVoltage      | -550–1100 V     | —                |
| Maximum Grid2 Voltage                | 600 V           | —                |
| Maximum Heater Cathode Voltage       | 200 V           | AfterWarmup      |



## 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

| OTHER                                 |                 |                  |
|---------------------------------------|-----------------|------------------|
| PARAMETER                             | PUBLISHED VALUE | CONDITION / NOTE |
| Heater voltage                        | 6.3 V           | —                |
| Heater current                        | 600 mA          | —                |
| Maximum anode voltage                 | 20000 V         | —                |
| Maximum grid 2 voltage                | 700 V           | —                |
| Maximum positive cathode voltage      | 154 V           | —                |
| Maximum positive peak cathode voltage | 220 V           | —                |
| Minimum recommended anode voltage     | 11000 V         | —                |
| Maximum focusing electrode voltage    | 1100 V          | Positive limit   |

| CAPACITANCE                                 |                 |                  |
|---------------------------------------------|-----------------|------------------|
| PARAMETER                                   | PUBLISHED VALUE | CONDITION / NOTE |
| Cathode to all other electrodes capacitance | 5 pF            | —                |
| Grid 1 to all other electrodes capacitance  | 6 pF            | —                |

## TUBE TINKER

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