

ELECTRONIC TUBE REFERENCE

19ZP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch glass television picture tube with electrostatic focusing, 114-degree magnetic deflection, aluminized P4 screen, and external conductive coating. Its wide-angle construction supports a comparatively shallow direct-view monochrome receiver.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8J3	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
CRT specialized anode, grid, optical, and deflection data retained in TUBE_SECTION_PARAMETER.

19ZP4 — Electrostatic-Focus Glass Picture Tube

The **19ZP4** is a 19-inch rectangular glass picture tube designed for television display applications. It features electrostatic focusing and magnetic deflection, utilizing a short overall length and a small neck diameter to facilitate compact cabinet designs. The tube incorporates a non-ion trap gun and an external conductive coating that, when grounded, serves as a filter capacitor.

Mechanical Design and Screen Characteristics

The 19ZP4 is constructed with a J149-A1 glass bulb and uses a spherical gray faceplate. The screen is aluminized and utilizes P4 phosphor, providing a light transmittance of approximately 76% at the center.

Physical Dimensions

- **Overall Length:** 11 1/2 ± 5/16 inches
- **Neck Length:** 4 1/4 ± 3/16 inches
- **Greatest Diagonal:** 18 5/8 ± 1/8 inches
- **Greatest Width:** 16 13/32 ± 1/8 inches
- **Greatest Height:** 13 11/32 ± 1/8 inches

Screen Dimensions (Projected Minimum Useful)

- **Diagonal:** 17 9/16 inches
- **Horizontal Axis:** 15 1/8 inches
- **Vertical Axis:** 12 inches
- **Total Area:** 172 square inches

Deflection Angles (Approximate)

- **Diagonal:** 114°
- **Horizontal:** 102°
- **Vertical:** 87°

The tube is equipped with a JETEC No. B6-226 base and a JETEC No. J1-21 anode contact (Anode Terminal J1-J2). The recessed cavity contact for the anode is aligned with Pin No. 4 (or its reverse) within a tolerance of ±30 degrees.

Electrical Connections and Heater Ratings

The 19ZP4 uses the **8JS** basing diagram. The electrical connections are assigned as follows:

Pin Number	Connection
Pin 1	Heater (H)
Pin 3	Grid No. 2 (<u>G</u> 2)
Pin 4	Grid No. 4 / Focusing Electrode (F)
Pin 6	Grid No. 1 (G1)
Pin 7	Cathode (K)
Pin 8	Heater (H)
Anode	Recessed cavity contact (aligned with Pin 4 ±30°)

Heater Characteristics

The heater is designed for nominal 6.3 V operation, drawing a current of 600 mA (with a tolerance of $\pm 10\%$). The heater warm-up time is rated at 11 seconds.

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** Approximately 5 μF
- **Grid No. 1 to all other electrodes:** Approximately 6 μF
- **External conductive coating to Anode:** 1000 pF (μF) minimum, 1500 pF (μF) maximum

Operating Conditions and Design-Maximum Ratings

All voltages are positive and measured with respect to the cathode unless otherwise specified. Under the Design-Maximum System, the operating limits and typical operating points are defined as follows:

Design-Maximum Ratings

- **Anode Voltage:** 15,000 V minimum to 20,000 V maximum
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 V to +1000 V maximum
- **Grid No. 2 Voltage:** 400 V minimum to 700 V maximum
- **Grid No. 1 Voltage:**
 - Maximum Negative DC Value: 140 V
 - Maximum Negative Peak Value: 200 V
 - Maximum Positive DC Value: 0 V
 - Maximum Positive Peak Value: 2 V
- **Heater Voltage:** 5.7 V minimum to 6.9 V maximum
- **Maximum Heater-Cathode Voltage:**
 - Heater negative with respect to cathode (during warm-up ≤ 15 seconds): 410 V
 - Heater negative with respect to cathode (after warm-up): 180 V
 - Heater positive with respect to cathode: 180 V

Typical Operating Conditions

- **Anode Voltage:** 16,500 V DC
- **Grid No. 4 Voltage:** 250 V DC (Individual tubes focus satisfactorily within a range of 0 to 500 V DC)
- **Grid No. 2 Voltage:** 450 V DC
- **Grid No. 1 Voltage:** -28 to -72 V DC (for visual extinction of the focused raster)

Circuit Design and Resistance Limits

To ensure reliable operation and prevent damage to the tube's internal structures, specific circuit resistance limits must be observed:

- **Grid No. 1 Circuit Resistance:** 1.5 MΩ maximum
- **Grid No. 2 Circuit Resistance:** 0.1 MΩ minimum
- **Focusing Electrode (Grid No. 4) Circuit Resistance:** 0.1 MΩ minimum

It is advisable to include protective resistance in the Grid No. 2 and focusing electrode circuits to prevent damage from internal arc-overs. A single common resistor may be utilized for these protective functions where applicable.

Technical Summary

The **19ZP4** is a 19-inch rectangular glass picture tube featuring electrostatic focus, 114-degree magnetic deflection, and a P4 aluminized screen with a spherical gray faceplate. Operating at a nominal heater voltage of 6.3 V with an 11-second warm-up time, it is designed for high-voltage television display applications with typical anode operation at 16,500 V. Its mechanical design features a short overall length of 11 1/2 inches and a small neck diameter, while its electrical design incorporates a non-ion trap gun and an external conductive coating that functions as a filter capacitor when grounded.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	20000 V	—
Heater Warmup Time	11 s	—
Minimum Anode Voltage	15000 V	—
Maximum Grid2 Voltage	700 V	—
Minimum Grid2 Voltage	400 V	—
Typical Anode Voltage	16500 V	—
Typical Focus Grid Voltage	250 V	—
Typical Grid2 Voltage	450 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal Deflection Angle	102 degree	—
Vertical Deflection Angle	87 degree	—
Diagonal Deflection Angle	114 degree	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode To All Other Electrodes Capacitance	5 pF	—
Grid1 To All Other Electrodes Capacitance	6 pF	—