

ELECTRONIC TUBE REFERENCE

19FLP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Wide-angle aluminized P4 monochrome television picture tube using electrostatic focusing and magnetic deflection, designed for high-voltage direct-view service with a large approximately 19-inch screen.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	7
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	23000 V
Cathode-ray electron-gun/screen system; anode/ultor maximum promoted to MaxPlateVoltage when explicitly published. No explicit X-ray precaution detected in the supplied source.	

19FLP4 Picture Tube

The **19FLP4** is a specialized cathode-ray picture tube designed with PAN-O-PLY integral implosion protection, low-voltage electrostatic focusing, and a wide-angle 114-degree magnetic deflection system. It features an advanced electron gun design that operates efficiently without requiring an external ion-trap magnet.

Optical and Mechanical Design

The 19FLP4 utilizes an aluminized P4-Sulfide phosphor screen behind a filterglass faceplate. This faceplate provides approximately 48% light transmission at its center, enhancing contrast under ambient lighting conditions.

Mechanically, the tube has a weight of approximately 15 pounds. Its physical envelope is designated as a J149 FA bulb, which is terminated with a Small-Button Neoeightar 7-pin base (JEDEC No. B7-208, Arrangement 1) and a Recessed Small Cavity cap (JEDEC No. J1-21) for the high-voltage anode connection. The tube also features a Regular-Band external conductive coating, which requires a grounding contact near the reference line.

Physical Dimensions and Screen Area

- **Overall Length:** 11.625 ± 0.250 inches
- **Neck Length:** 4.375 ± 0.125 inches
- **Overall Height:** 13.500 ± 0.125 inches
- **Projected Screen Area:** 172 square inches
- **Minimum Screen Dimensions:**
 - Diagonal: 17.562 inches
 - Width: 15.187 inches
 - Height: 12.000 inches
- **Minimum Rim-Band Opening Dimensions:**
 - Diagonal: 18.285 inches
 - Width: 15.950 inches
 - Height: 12.840 inches

Electrical Characteristics and Pinout

The 19FLP4 is designed with a 7-pin base configuration designated as the 8HR bottom view. The pinout connections are assigned as follows:

Pin / Cap	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Screen, Collector)
C (Coating)	External Conductive Coating

The external conductive coating and the implosion protection hardware must be reliably connected to system ground.

Heater Ratings

The heater is designed for a nominal voltage of 6.3 V, with an allowable operating range of 5.7 V minimum to 6.9 V maximum. Under nominal conditions, the heater current is 450 ± 20 mA. The average heater warm-up time is 11 seconds.

Calculation of Nominal Heater Power: Using the nominal voltage and current: $\text{Power} = 6.3 \text{ V} \times 0.450 \text{ A} = 2.835 \text{ W}$

Interelectrode Capacitances

- **Cathode to all other electrodes:** 5 pF
- **Grid No. 1 to all other electrodes:** 6 pF
- **External coating to anode:** 1250 pF minimum to 1750 pF maximum

Operating Conditions and Drive Service

The 19FLP4 is typically operated in Cathode-Drive Service, where operating voltages are specified as positive with respect to Grid No. 1.

Typical Operating Conditions

Under typical cathode-drive conditions, the operating parameters are established as follows:

- **Anode Voltage:** 16,000 V
- **Grid-No. 4 (Focusing) Voltage:** 200 V (with an optimum focus range of 0 to +400 V under specified conditions of 100 μ A anode current on a 10.5" x 14" raster pattern)
- **Grid-No. 2 Voltage:** 300 V
- **Cathode Voltage (for raster cutoff):** 28 to 62 V

Design-Maximum Ratings

The design-maximum ratings define the absolute limits within which the tube must be operated to ensure reliability and longevity. All voltages are positive with respect to the cathode unless otherwise specified:

- **Anode Voltage:** 11,000 V minimum to 23,000 V maximum
- **Grid-No. 4 (Focusing) Voltage:** Positive 1,100 V maximum; Negative 550 V maximum
- **Grid-No. 2 Voltage:** 200 V minimum to 550 V maximum
- **Grid-No. 1 Voltage:**
 - Negative peak: 220 V maximum
 - Negative bias: 155 V maximum
 - Positive bias: 0 V maximum
 - Positive peak: 2 V maximum

- **Peak Heater-Cathode Voltage:**
 - Heater negative to cathode during warm-up (≤ 15 seconds): 450 V maximum
 - Heater negative to cathode after warm-up: 300 V maximum
 - Heater positive to cathode (combined AC & DC): 200 V maximum
 - Heater positive to cathode (DC component only): 100 V maximum
- **Maximum Grid-No. 1 Circuit Resistance:** 1.5 M Ω

Deflection and Scanning Geometry

The 19FLP4 utilizes magnetic deflection to sweep the electron beam across the wide-angle screen. The deflection angles are:

- **Diagonal Deflection Angle:** 114°
- **Horizontal Deflection Angle:** 102°
- **Vertical Deflection Angle:** 85°

The combination of a 114-degree deflection angle and a short neck length of 4.375 inches enables a highly compact cabinet depth for television receivers utilizing this tube.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	Nominal heater voltage
Heater Current	450 mA	Nominal heater current
Phosphor	P4	Published phosphor designation
/ '1 External conductive coating to anodes	1250–1750 pF	/ '1 External conductive coating to anodes. 1250 min — 1750 max pF
Projected Area of Screen	172 sq in	Projected Area of Screen 172 sq in
Anode Voltage	1000--23000 V	Anode Voltage 1 1000 min-23000 max V
Grid-No.2 Voltage	200–550 V	Grid-No.2 Voltage 200 min— 550 max V
Heater Voltage	5.7--6.9 V	Heater Voltage 5.7 min-6.9 max V
During equipment warm-up period	450 V	During equipment warm-up period 5 i5 seconds 450 max V
After equipment warm-up period	300 V	After equipment warm-up period 300 max V
Combined AC & DC voltage	200 V	Combined AC & DC voltage 200 max V
Anode Voltage	16000 V	Anode Voltage 16000 V
Grid-No.4 Voltageb	200 V	Grid-No.4 Voltageb 200 V
Grid-No.2 Voltage	300 V	Grid-No.2 Voltage 300 V
Cathode Voltage	28–62 V	Cathode Voltage 28 to 62 V

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing Method	Electrostatic	Published focusing method
Deflection Method	Magnetic	Published deflection method

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
LOW-VOLTAGE ELECTROSTATIC FOCUS	14 deg	LOW-VOLTAGE ELECTROSTATIC FOCUS 1 14° MAGNETIC DEFLECTION

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes	5 pF	Cathode to all other electrodes. 5 pF
Grid No.1 to all other electrodes	6 pF	Grid No.1 to all other electrodes. 6 pF
Heater Current at	20 mA	Heater Current at 6.3 V 450 ± 20 mA

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