

ELECTRONIC TUBE REFERENCE

19DFP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch cathode-ray tube documented by Philco. The available source identifies it as a CRT but provides insufficient extracted detail here for a more specific construction description; its source places it in the picture-tube family.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	0
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Published values promoted where clearly attributable to this section.

19DFP4 — Television Picture Tube

The **19DFP4** is a 19-inch diagonal, direct-view rectangular glass television picture tube designed primarily for cathode drive service. It features a 114-degree diagonal deflection angle, electrostatic focusing, and magnetic deflection. As a "HiGm" (high transconductance) tube, it is specifically designed to operate under low Grid #2 voltage conditions. The tube incorporates a spherical faceplate, an aluminized P4 phosphor screen, a non-ion trap gun, internal shielding, and a short tube base with straight-through leads oriented by an indexing lug.

Mechanical and Optical Design

The 19DFP4 is constructed using a rectangular glass envelope with the bulb designation **J149A2**. The physical dimensions and screen characteristics of the tube are highly standardized for television receiver integration:

- **Overall Length:** 11-11/16 inches (with a tolerance range of -3/16 to +1/4 inches)
- **Neck Length:** 4-7/16 inches (with a tolerance range of -1/16 to +1/8 inches)
- **Minimum Useful Screen Dimensions:** 17-9/16 inches diagonal, 15-1/8 inches width, and 12 inches height, providing a total minimum useful screen area of 172 square inches.
- **Anode Contact:** A J1-21 button is used for the high-voltage anode connection, aligned with Pin #4 within a tolerance of ± 30 degrees.

Optical Characteristics

The screen utilizes an aluminized P4 phosphor that produces a white light output with medium-short persistence. The spherical faceplate is designed to provide approximately 77% light transmission at the center.

Electrical Characteristics and Interelectrode Capacitances

The tube features an indirectly heated cathode with a controlled warm-up time designed for series or parallel heater strings.

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.60 A (with a $\pm 5\%$ tolerance at 6.3 V)
- **Heater Warm-up Time:** 11 seconds

Direct Interelectrode Capacitances

The capacitive coupling between the tube's internal elements and its external environment is specified as follows:

- **Cathode to All Other Electrodes:** 4.0 pF
- **Grid #1 to All Other Electrodes:** 6.0 pF
- **External Conductive Coating Capacitance:** 1300 pF minimum, 1700 pF maximum

Pinout and Basing Connections

The 19DFP4 utilizes a **B7-208** base with an **8HR** basing configuration. The short base design employs straight-through leads that are oriented by an indexing lug. The pin connections, viewed from the bottom of the base, are detailed below:

Pin Number	Connection
Pin 1	Heater (H)
Pin 2	Grid #1 (G1)
Pin 3	Grid #2 (<u>G2</u>)
Pin 4	Grid #4 (G4 - Focus Electrode)
Pin 6	Grid #1 (G1)
Pin 7	Cathode (K)
Pin 8	Heater (H)
Anode Button	J1-21 (Connects to Anode, Grid #3, and Grid #5)

Grid #1 is internally connected to both Pin 2 and Pin 6. Pin 5 is omitted from the active connections.

Cathode Drive Service Ratings and Operating Conditions

The ratings for the 19DFP4 are established under the Design-Maximum system. In cathode drive service, all electrode voltages are specified as positive with respect to Grid #1, unless otherwise noted.

Design-Maximum Ratings

- **Anode Voltage:** 22,000 V DC maximum
- **Grid #4 Voltage (Focusing Electrode):** -550 to +1100 V DC
- **Grid #2 Voltage:** 80 V DC maximum
- **Cathode Voltage:**
 - *Positive-Bias Value:* 154 V DC maximum
 - *Positive-Peak Value:* 220 V maximum
 - *Negative-Bias Value:* 0 V DC maximum
 - *Negative-Peak Value:* 2 V maximum
- **Peak Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode (during warm-up ≤ 15 seconds):* 450 V maximum
 - *Heater negative with respect to cathode (after warm-up):* 200 V maximum
 - *Heater positive with respect to cathode:* 200 V maximum
- **Grid #1 Circuit Resistance:** 1.5 M Ω maximum

Typical Operating Conditions

Under typical operating conditions in cathode drive service, the tube operates with the following parameters:

- **Anode Voltage:** 16,000 V DC
- **Grid #4 Voltage:** -100 to +300 V DC
- **Grid #2 Voltage:** 65 V DC
- **Cathode Voltage (for visual extinction of focused raster):** +41 to +56 V DC

For the cutoff of an undeflected focused spot, the absolute bias value increases by approximately 4 V relative to the raster extinction value.

Technical Summary

The **19DFP4** is a 19-inch rectangular glass television picture tube featuring a 114-degree deflection angle, electrostatic focus, and magnetic deflection. Designed for cathode drive service, its "HiGm" gun structure is optimized for low Grid #2 operating voltages (typically 65 V, with an 80 V maximum rating). The tube utilizes an aluminized P4 white phosphor screen with medium-short persistence and a 77% center light transmission. Operating at a typical anode voltage of 16,000 V (up to a maximum of 22,000 V), the 19DFP4 provides a compact, short-neck display solution with a controlled 11-second heater warm-up time and a standardized 8HR basing configuration.

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