



ELECTRONIC TUBE REFERENCE

12BLP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube documented by manufacturer data for type 12BLP4; available extracted source information is sparse, so no more specialized application or construction claim is made.

GENERAL CHARACTERISTICS

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

SECTION RATINGS

SECTION 1 Cathode Ray

MAXIMUM PLATE VOLTAGE	16000 V
-----------------------	---------

Published Westinghouse ratings, characteristics, typical operating conditions, and capacitances extracted from supplied source.

12BLP4 — Television Picture Tube

The **12BLP4** is a specialized cathode-ray tube (CRT) designed for television display applications. It features a rectangular screen with a 110-degree diagonal magnetic deflection angle, low Grid No. 2 operating voltage, electrostatic focusing, and a space-saving short neck design. The tube incorporates a banded implosion protection system and a spherical gray filter glass faceplate with an aluminized P4 phosphor screen.

Mechanical Design and Physical Dimensions

The 12BLP4 is constructed with a J99 C1 glass bulb and has a nominal screen size of 10.125 inches by 7.625 inches. The mechanical design is optimized for compact television receivers, featuring a short neck

length of 4.375 inches and an overall length of 9.348 inches.

Tube Dimensions and Weight

- **Overall Length:** 9.348" $\pm$ 0.250"
- **Neck Length:** 4.375" $\pm$ 0.125"
- **Maximum Diagonal Dimension:** 12.425" $\pm$ 0.100"
- **Maximum Width:** 10.987" $\pm$ 0.100"
- **Maximum Height:** 8.589" $\pm$ 0.100"
- **Net Weight:** 6 Pounds

Screen and Optical Characteristics

- **Minimum Useful Screen Dimensions (Projected):**
 - **Diagonal:** 11.625"
 - **Horizontal Axis:** 10.125"
 - **Vertical Axis:** 7.625"
 - **Useful Area:** 74 Sq. Inches
- **Phosphor:** Aluminized P4
- **Faceplate Glass:** Spherical Gray Filter Glass
- **Light Transmittance at Center:** Approximately 48%

Bulb Features and Grounding

The tube is equipped with a banded implosion protection system. The tension band must be grounded to ensure safety and proper electrical shielding. The tension band extends towards the faceplate up to a maximum distance that does not exceed the intersection of the leading edge of the band and the extension of the faceplate radius.

An external conductive coating is applied to the funnel of the bulb, which forms a supplementary filter capacitance when grounded. The resistance between this external conductive coating and the implosion protection hardware must be at least 5 Megohms. Additionally, a transparent insulating coating with a diameter of 3 inches is present on the bulb; this area must be kept clean and should only be wiped with a soft, dry, lintless cloth.

The electrical connection to the high-voltage anode is made via a recessed small cavity contact (JEDEC No. J1-21) located on the bulb funnel.

Heater Characteristics and Basing

The 12BLP4 utilizes an indirectly heated cathode designed for reliable operation in television receiver circuits.

Heater Specifications

- **Nominal Heater Voltage:** 6.3 V

- **Heater Current:** 450 $\pm$ 5% mA
- **Heater Warm-up Time:** 11 Seconds

The heater warm-up time is defined under specific test conditions: it is the time required for the voltage across the heater to reach 80% of its rated value (6.3 V) when four times the rated heater voltage (25.2 V) is applied to a test circuit. This test circuit consists of the tube heater connected in series with a resistance equal to three times the rated heater voltage divided by the rated heater current:

$$\text{Series Resistance} = 3 \times \frac{6.3 \text{ V}}{0.450 \text{ A}} = 42 \Omega$$

Basing and Socket Connections

The tube uses a Small Button 7-Pin Base (JEDEC No. B7-208) with an **8HR** basing configuration. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Electrode Connection
1	Heater
2	Grid No. 2 (G2)
4	Grid No. 4 (Focusing Electrode)
6	Grid No. 1 (G1)
7	Cathode (K)
8	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Screen)

To prevent damage to the tube, lateral strains on the base pins must be avoided. The receiver socket should be equipped with flexible leads that permit slight movement. The perimeter of the base wafer is designed to fit entirely within a 1.750-inch diameter circle concentric with the tube axis. Base pin 2 is aligned with the major axis of the tube face within a tolerance of 30 degrees and is positioned on the same side of the neck as the anode terminal. The maximum neck diameter at the splice is 1.168 inches.

Electrical Ratings and Operating Limits

The ratings of the 12BLP4 are defined under the Design Maximum System. Unless otherwise specified, all voltage values are positive and measured with respect to Grid No. 1.

Voltage and Current Limits

- **Anode Voltage:**
 - **Maximum:** 16,000 Volts
 - **Minimum:** 9,000 Volts
- **Grid No. 4 (Focusing Electrode) Voltage:** +1100 Volts to -550 Volts
- **Grid No. 2 Voltage:**

- **Maximum:** 60 Volts
- **Minimum:** 20 Volts
- **Grid No. 1 Drive Voltages (with respect to Grid 1):**
 - **Maximum Negative Bias Value:** 0 Volts
 - **Maximum Negative Peak Value:** 2 Volts
 - **Maximum Positive Bias Value:** 154 Volts
 - **Maximum Positive Peak Value:** 220 Volts
- **Heater Voltage:**
 - **Maximum:** 6.93 Volts
 - **Minimum:** 5.67 Volts

Heater-Cathode Voltage Limits

- **Heater Negative with Respect to Cathode:**
 - **During Warm-up Period (not to exceed 15 seconds):** 450 Volts Maximum
 - **After Equipment Warm-up Period:** 200 Volts Maximum
- **Heater Positive with Respect to Cathode:** 200 Volts Maximum

Limiting Circuit Values

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms
- **Minimum Grid No. 2 and Grid No. 4 Circuit Resistance:** 10,000 Ohms

To prevent electrical damage from internal arcing, it is advisable to include a protective resistance of at least 10,000 Ohms in the Grid No. 2 and Grid No. 4 circuits.

Typical Cathode Drive Operation

In typical television receiver applications, the 12BLP4 is operated in a cathode-drive configuration. In this mode, the video signal and bias voltages are applied to the cathode, and all operating voltages are specified as positive with respect to Grid No. 1.

Typical Operating Points

- **Anode Voltage:** 12,000 Volts
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 Volts
- **Grid No. 2 Voltage:** 30 Volts
- **Cathode Voltage for Raster Cutoff:** 30 to 45 Volts

Focusing Characteristics

The 12BLP4 utilizes low-voltage electrostatic focusing. Under typical operating conditions, with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce an anode current of 150 microamperes on a 10.125-inch by 7.625-inch raster pattern (such as that generated by a type [2F21](#)

monoscope or equivalent), satisfactory focus is achieved on individual tubes at a Grid No. 4 potential between 0 and 400 Volts.

Electrostatic Capacitances

- **Cathode to All Other Electrodes:** Approximately 5 pF
- **Grid No. 1 to All Other Electrodes:** Approximately 6 pF
- **External Conductive Coating to Anode:**
 - **Minimum:** 800 pF
 - **Maximum:** 1000 pF

The external conductive coating, when grounded, acts as a high-voltage filter capacitor in conjunction with the internal conductive coating connected to the anode.

Technical Summary

The **12BLP4** is a compact, 12-inch class rectangular television picture tube featuring a **110-degree magnetic deflection** system and **low-voltage electrostatic focusing**. Its design is characterized by a short **4.375-inch neck** and a low Grid No. 2 operating requirement of **30 Volts**, which simplifies video output stage design and reduces power supply requirements.

The tube is equipped with an **aluminized P4** phosphor screen behind a spherical gray filter glass faceplate, providing a projected useful screen area of **74 square inches**. It utilizes a **6.3 V, 450 mA** heater with a controlled **11-second warm-up time** and is housed in a J99 **C1** bulb with a **JEDEC B7-208** small button 7-pin base (8HR basing). With a design maximum anode voltage rating of **16,000 Volts** and integrated banded implosion protection, the 12BLP4 provides a robust, high-performance display solution for compact television receivers.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Westinghouse Data Book

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

1965 WESTINGHOUSE DATA BOOK

Section 1 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	450 mA	—
ControlledWarmupHeater	1 boolean	—
Heater Warmup Time	11 s	—
FocusingMethod	LowVoltageElectrostatic	—
DeflectionMethod	Magnetic	—
DeflectionAngleDiagonal	110 degree	—
DeflectionAngleHorizontal	99 degree	—
DeflectionAngleVertical	80 degree	—
Phosphor	Aluminized P4	—
Cathode To All Capacitance	5 pF	—
Grid1 To All Capacitance	6 pF	—
ExternalCoatingToAnodeCapacitanceMinimum	800 pF	—
ExternalCoatingToAnodeCapacitanceMaximum	1000 pF	—
UsefulScreenHorizontal	10.125 in	—
UsefulScreenVertical	7.625 in	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
AnodeVoltageMaximum	16000 V	—
AnodeVoltageMinimum	9000 V	—
FocusElectrodeVoltageMinimum	-550 V	—
FocusElectrodeVoltageMaximum	1100 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid2VoltageMaximum	60 V	—
Grid2VoltageMinimum	20 V	—
Heater Voltage Minimum	5.67 V	—
Heater Voltage Maximum	6.93 V	—
HeaterCathodeVoltageMaximum	450 V	Warmup<=15s;HeaterNegative
HeaterCathodeVoltageMaximum	200 V	AfterWarmup
Grid1CircuitResistanceMaximum	1.5 Mohm	—
Grid2And4CircuitResistanceMinimum	10000 ohm	—
Anode Voltage	12000 V	—
FocusElectrodeVoltage	0 to 400 V	—
Grid2 Voltage	30 V	—
CathodeVoltageForRasterCutoff	30 to 45 V	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker