

ELECTRONIC TUBE REFERENCE

12DP7C

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Twelve-inch P7 cathode-ray display tube with magnetic focusing and deflection, aluminized gray-filter faceplate, blue-white fluorescence, and long yellow phosphorescence. It combines persistent trace presentation with anode ratings to about 13.2 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	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	
MAXIMUM PLATE VOLTAGE	13200 V
Published source values promoted where applicable.	

12DP7C — Monochrome Cathode Ray Tube

The **12DP7C** is a 12-inch, direct-viewed, round glass cathode ray tube (CRT) designed for special and general-purpose display applications. It features magnetic deflection, magnetic focus, a spherical faceplate, and an aluminized screen. The tube utilizes a long-persistence phosphor screen with a yellow phosphorescent decay following a blue-white fluorescence, making it highly suitable for applications requiring prolonged image retention.

The 12DP7C is closely related to the [12DP7A](#), sharing many physical and electrical characteristics but differing in its screen construction (the 12DP7C is aluminized), faceplate glass, and certain maximum ratings, such as anode voltage and peak heater-to-cathode voltage limits.

Mechanical Design and Physical Dimensions

The 12DP7C is constructed with a round glass bulb (J96S or equivalent) and a spherical gray filter glass faceplate. The gray filter glass provides a light transmittance of approximately 75 percent, which helps improve display contrast under ambient lighting conditions.

Key mechanical specifications and dimensions include:

- **Overall Length:** $19 \frac{5}{8} \pm \frac{3}{8}$ inches
- **Bulb Diameter:** $12 \pm \frac{3}{16}$ inches
- **Minimum Useful Screen Diameter:** 10 inches
- **Neck Diameter:** $1 \frac{3}{8} \pm \frac{1}{16}$ inches
- **Weight (Approximate):** 8 $\frac{1}{2}$ pounds
- **Deflection Angle (Approximate):** 50 degrees
- **Faceplate Radius of Curvature:** 20 inches (spherical)

The tube is equipped with a long medium shell 8-pin base (JEDEC designation B8-65) and a medium cap bulb contact (C1-5) for the high-voltage anode connection. The anode terminal is aligned with Pin No. 5 within a tolerance of ± 10 degrees and is positioned on the same side of the bulb as Pin No. 5. The yoke reference line is determined by the plane of the upper edge of a JEDEC No. 112 reference line gauge when resting on the cone.

Electrical Characteristics and Basing

The 12DP7C features an indirectly heated cathode. The heater is designed for operation from a standard 6.3-volt supply.

Heater and Electrostatic Capacitance Data

Parameter	Value
Heater Voltage	6.3 V
Heater Current	$0.6 \pm 10\%$ A
Direct Interelectrode Capacitance: Cathode to All Other Electrodes (approx.)	5 pF
Direct Interelectrode Capacitance: Grid No. 1 to All Other Electrodes (approx.)	8 pF

The nominal heater power can be calculated from the rated voltage and current: $\text{Heater Power} = 6.3 \text{ V} \times 0.6 \text{ A} = 3.78 \text{ W}$

Basing Configuration (5AN)

The 12DP7C uses the **5AN** basing diagram. Viewed from the bottom of the base, the pin connections are as follows:

- **Pin 2:** Heater
- **Pin 3:** Grid No. 2
- **Pin 6:** Grid No. 1
- **Pin 7:** Cathode
- **Pin 8:** Heater
- **Recessed Small Cavity Cap (Anode):** Aligns with Pin No. 5 $\pm$ 10 degrees

Typical Operating Conditions

For typical operation, the 12DP7C requires external magnetic focusing and deflection components. The specified typical operating point is:

- **Anode Voltage:** 4,000 V dc
- **Grid No. 2 Voltage:** 250 V dc
- **Grid No. 1 Voltage Required for Cutoff:** -25 to -70 V dc (defined as the visual extinction of an undeflected focused spot)
- **Focusing Coil Current (approximate):** 75 to 102 mA dc
- **Line Width A (12DP7C):** 0.50 mm maximum

The focusing coil current is specified for a JEDEC focusing coil No. 106 (or equivalent) positioned at a distance of 4 1/8 inches from the yoke reference line to the center of the coil's air gap. The line width of 0.50 mm is measured in accordance with MIL-E-1 at an anode current of 200 μ A.

Display brilliance and definition decrease as the anode voltage is reduced. Consequently, the anode voltage should not be operated below 4,000 volts.

Maximum Ratings and Circuit Values

To ensure reliable operation and prevent damage to the tube, the following absolute maximum ratings must be observed. The table below compares the ratings of the 12DP7C with those of the non-aluminized [12DP7A](#):

Parameter	12DP7A Limit	12DP7C Limit	Unit
Anode Voltage	11,000	13,200	V dc
Grid No. 2 Voltage	770	770	V dc
Grid No. 1 Negative Bias Value	200	200	V dc
Grid No. 1 Positive Bias Value	0	0	V dc
Grid No. 1 Positive Peak Value	2	2	V

Parameter	<u>12DP7A</u> Limit	12DP7C Limit	Unit
Peak Heater-Cathode Voltage (Heater Negative)	140	200	V
Peak Heater-Cathode Voltage (Heater Positive)	140	200	V

The 12DP7C offers a higher maximum anode voltage rating (13,200 V dc compared to 11,000 V dc for the 12DP7A) and a higher peak heater-to-cathode voltage rating (200 V compared to 140 V).

Circuit Values

- **Maximum Grid No. 1 Resistance:** 1.5 Megohms

Safety and Operational Warnings

When operating the 12DP7C at high voltages, safety precautions regarding X-ray radiation must be observed. X-ray radiation shielding may be necessary to protect personnel against the danger of personal injury from prolonged exposure at close range if the tube is operated at voltages higher than the manufacturer's maximum rated anode voltage or 16,000 volts, whichever is less.

Additionally, because the tube operates with high anode voltages (up to 13,200 V dc under absolute maximum ratings), appropriate high-voltage insulation and safety practices must be implemented in the chassis design.

Technical Summary

The **12DP7C** is a specialized 12-inch round glass cathode ray tube featuring magnetic focus, magnetic deflection (50-degree deflection angle), and an aluminized screen with long-persistence yellow phosphorescence (P7 phosphor characteristics). It operates with a 6.3 V, 0.6 A heater and is designed for a typical anode voltage of 4,000 V dc, with an absolute maximum anode voltage rating of 13,200 V dc. Utilizing the 5AN basing configuration on a long medium shell 8-pin base, the 12DP7C provides a maximum line width of 0.50 mm at 200 μ A anode current, making it an effective display device for applications requiring high contrast and image persistence.



SOURCE OPERATING CONDITIONS

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P7	—
Deflection method	Magnetic	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

Section 1 · Cathode Ray

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Magnetic text	—
Deflection Method	Magnetic text	—
Fluorescence	Blue-White text	—
Persistence	Long text	—
Phosphorescence	Yellow text	—
Deflection Angle	50 deg	Approximate
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	8 pF	Approximate

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Screen Aluminized	Yes text	—
Faceplate	Gray Filter Glass text	—
Maximum Line Width	0.5 mm	12DP7C

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	13200 V	—
Maximum Grid2 Voltage	770 V	—
Maximum Grid1 Negative Bias	200 V	—
Maximum Grid1 Positive Peak	2 V	—
Maximum Heater-Cathode Voltage	200 V	EitherPolarity
Anode Voltage	4000 V	—
Grid2 Voltage	250 V	—
Grid1 Cutoff Voltage Minimum	-70 V	—
Grid1 Cutoff Voltage Maximum	-25 V	—
Focusing Coil Current Minimum	75 mA	—
Focusing Coil Current Maximum	102 mA	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

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