

ELECTRONIC TUBE REFERENCE

10ANP25

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Magnetically focused and deflected P25 cathode-ray display tube with orange long-persistence fluorescence, approximately 50-degree deflection, and typical 9 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 300 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.
Special-purpose CRT electron-gun/display section.

10ANP25 Cathode Ray Tube

The **10ANP25** is a special-purpose, 10-inch round glass cathode ray tube (CRT) designed for applications requiring magnetic deflection and magnetic focusing. It features a spherical, gray-glass faceplate with an aluminized screen utilizing the **P25 phosphor**. The P25 phosphor is characterized by orange fluorescence and orange phosphorescence with long persistence, making it suitable for applications where image retention or continuous observation of slow-scan signals is required.

The tube is constructed with a space-saving 7/8-inch diameter neck and a miniature E9-37 base. It operates with a nominal 6.3 V, 300 mA heater. The 10ANP25 is part of the broader 10ANP-* family of CRTs, which share identical mechanical and electrical structures but differ in their screen phosphors (such as P4, P7, P16, and P19).

Mechanical Construction and Physical Dimensions

The 10ANP25 is built around a 10-inch round glass envelope with a spherical faceplate. The faceplate is made of gray glass and is aluminized to enhance brightness and prevent ion burn.

Key mechanical specifications include:

- **Overall Length:** 16 inches maximum.
- **Faceplate Diameter:** 10-1/2 $\pm$ 1/16 inches.
- **Minimum Useful Screen Diameter:** 9 inches.
- **Neck Diameter:** Nominal 7/8 inch (0.840 +0.056 / -0.030 inch).
- **Deflection Angle:** Approximately 50 degrees.
- **Bulb Contact:** J1-21 recessed small cavity cap.
- **Base:** E9-37 miniature base.
- **Basing Configuration:** 9NB.

Bulb Contact and Base Alignment

The high-voltage anode connection is made via the J1-21 recessed small cavity cap located on the side of the bulb. The alignment of this cap is tightly controlled: the plane of the J1-21 cap passes halfway between Pin 1 and Pin 9 of the base with an angular tolerance of $\pm$ 10 degrees. The cap is positioned on the same side of the tube as Pins 1 and 9.

Reference Line Definition

The mechanical reference line of the tube, from which several axial dimensions are measured, is defined by the point where the leading edge of a JEDEC G-112 reference line gauge stops. This gauge is a cylinder 2 inches long with an internal diameter (I.D.) of 1.500 (+0.003 / -0.000) inches. The J1-21 anode cap is located 2-1/4 $\pm$ 1/4 inches from this reference line toward the faceplate.

Electrical and Heater Characteristics

The 10ANP25 utilizes an indirectly heated cathode. The heater is designed for low power consumption, drawing significantly less current than larger-neck CRTs.

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.3 $\pm$ 10% A (300 mA)
- **Heating Method:** Indirect

Heater Power Calculation

As a calculation, the nominal heater power consumption is: $\text{Heater Power} = 6.3 \text{ V} \times 0.3 \text{ A} = 1.89 \text{ W}$ This low power consumption is advantageous for reducing thermal dissipation in compact equipment enclosures.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 10ANP25 are relatively low, which minimizes loading on the driving circuitry:

- **Cathode to all other electrodes:** Approximately 5 pF
- **Grid No. 1 to all other electrodes:** Approximately 6 pF
- **Grid No. 2 to all other electrodes:** Approximately 5 pF

Pinout and Basing (9NB)

The tube uses the **9NB** basing diagram with an E9-37 miniature base. The pin connections, viewed from the bottom of the base, are as follows:

- **Pin 1:** Grid No. 1 (G1)
- **Pin 2:** Heater (H)
- **Pin 3:** Grid No. 2 (G2)
- **Pin 4:** No Connection (NC)
- **Pin 5:** Cathode (K)
- **Pin 6:** No Connection (NC)
- **Pin 7:** Grid No. 2 (G2) - internally connected to Pin 3
- **Pin 8:** Heater (H)
- **Pin 9:** Grid No. 1 (G1) - internally connected to Pin 1
- **Anode Cap (J1-21):** Anode (A)

A socket with a center opening must be used to clear the exhaust tubulation at the base of the tube. Care must be exercised during handling to prevent damage to this exposed tubulation and to avoid bending the miniature base pins.

Maximum Ratings (Design Maximum Values)

The maximum ratings represent the absolute limits within which the 10ANP25 must be operated to ensure reliability and prevent premature failure. These values are based on the Design Maximum rating system.

- **Anode Voltage:** 12,000 V dc Max.
- **Grid No. 2 Voltage:** 450 V dc Max.
- **Grid No. 1 Negative Bias Value:** 200 V dc Max.
- **Grid No. 1 Positive Bias Value:** 0 V dc Max.
- **Grid No. 1 Positive Peak Value:** 0 V dc Max.
- **Peak Heater-Cathode Voltage (Heater Negative with respect to Cathode):** 180 V Max.
- **Peak Heater-Cathode Voltage (Heater Positive with respect to Cathode):** 180 V Max.
- **Grid No. 1 Circuit Resistance:** 1.5 M³ Max.

Screen Protection and Current Density

The P25 phosphor screen is highly sensitive to thermal damage and burning if the electron beam current density is permitted to rise too high. To prevent permanent screen damage, the tube must be operated with the minimum beam current density necessary for the application, and the spot should never be allowed to remain stationary at high intensity.

X-Ray Radiation Warning

When operating the 10ANP25, X-ray radiation shielding may be necessary to protect personnel from prolonged exposure at close range. This precaution is particularly important if the tube is operated at voltages exceeding the maximum rated anode voltage of 12,000 V dc, or 16,000 V dc, whichever is less.

Typical Operating Conditions

Under typical operating conditions, the 10ANP25 is set up with the following parameters:

- **Anode Voltage:** 9,000 V dc
- **Grid No. 2 Voltage:** 250 V dc
- **Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -15 to -45 V dc
- **Focusing Coil Current:** Approximately 40 to 60 mA dc
- **Linewidth A:** 0.013 inch maximum (measured per MIL-E-1 specifications at an anode current of 400 'A)
- **Spot Position (Undeflected):** Within a 1/2-inch radius circle concentric with the center of the tube face (measured with the tube shielded)
- **Modulation:** 40 V max. (measured per MIL-E-1 specifications at an anode current of 400 'A)

Operating Considerations

1. **Accelerator Voltage Limits:** The brilliance and definition of the displayed image decrease as the accelerator (anode) voltage is reduced. To maintain acceptable performance, the anode voltage should not be allowed to fall below 7,000 V dc.
2. **Focusing Coil Alignment:** The typical focusing coil current of 40 to 60 mA dc is specified for a JEDEC Focus Coil No. 127 (or equivalent) with the center of its air gap positioned exactly 2-1/2 inches from the mechanical reference line, measured at an anode current of 100 'A.

Phosphor Characteristics and Related Designations

The **10ANP25** is specifically distinguished by its **P25** phosphor. The 10ANP bulb family can be supplied with several other screen phosphors depending on the application requirements:

- **10ANP4:** Features a P4 phosphor with white fluorescence, white phosphorescence, and medium persistence. Typically used for standard television or general-purpose display applications.
- **10ANP7:** Features a P7 phosphor with blue fluorescence, yellow phosphorescence, and long persistence. Often used in radar or low-frame-rate applications.

- **10ANP16:** Features a P16 phosphor with violet fluorescence, violet phosphorescence, and extremely short persistence. Ideal for high-speed flying-spot scanners or photographic recording.
- **10ANP19:** Features a P19 phosphor with orange fluorescence, orange phosphorescence, and long persistence.
- **10ANP25:** Features a P25 phosphor with orange fluorescence, orange phosphorescence, and long persistence.

The P25 phosphor provides a long-persistence orange display, which is highly effective for applications requiring prolonged visual retention of trace paths without rapid flickering.

Technical Summary

The **10ANP25** is a specialized **10-inch round glass cathode ray tube** featuring **magnetic deflection (50-degree angle)**, **magnetic focusing**, and a **long-persistence orange P25 phosphor screen**. Operating with a highly efficient **6.3 V, 300 mA heater** and a compact **7/8-inch neck**, it minimizes power consumption and physical space compared to standard-neck CRTs.

With a maximum anode rating of **12,000 V dc** and typical operation at **9,000 V dc**, the tube provides high-resolution displays with a maximum linewidth of **0.013 inch** under standard test conditions. The E9-37 miniature base and 9NB basing configuration provide straightforward electrical connectivity, though care must be taken to protect the delicate exhaust tubulation and avoid high beam current densities that could permanently burn the P25 phosphor.

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	300 mA	—
Focusing Method	Magnetic text	—
Deflection Method	Magnetic text	—
Deflection Angle	50 deg	Approximate
Phosphor	P25 text	—
Fluorescence	Orange text	—
Persistence	Long text	—
Maximum Line Width	0.013 in	—
Maximum Undelected Spot Radius	0.5 in	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	12000 V	—
Maximum Grid2 Voltage	450 V	—
Maximum Grid1 Negative Bias	200 V	—
Maximum Grid1 Positive Bias	0 V	—
Maximum Heater-Cathode Voltage	180 V	EitherPolarity
Anode Voltage	9000 V	—
Grid2 Voltage	250 V	—
Grid1 Cutoff Voltage Minimum	-45 V	—
Grid1 Cutoff Voltage Maximum	-15 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing Coil Current Minimum	40 mA	Approximate
Focusing Coil Current Maximum	60 mA	Approximate
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

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