



ELECTRONIC TUBE REFERENCE

14ASP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Fourteen-inch direct-view television picture tube with electrostatic focus, magnetic deflection, short neck, aluminized screen, and approximately 110-degree diagonal deflection. Its compact geometry was intended for monochrome television receiver display service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B7-183	BASE PINS	7
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 0 Cathode Ray

No fixed ratings recorded.

CRT electrode ratings, focusing/deflection data, capacitances, and operating voltages are preserved in parameter rows.

14ASP4 — Electrostatic Focus Television Picture Tube

The **14ASP4** is a direct-view, rectangular glass picture tube designed for television receivers. It features electrostatic focusing and magnetic deflection, incorporating a short straight electron gun that operates without the need for an external ion trap magnet. The tube is characterized by a short neck length, a wide diagonal deflection angle of 110 degrees, and a gray-tinted spherical faceplate with a metal-backed, aluminized screen.

Mechanical Design and Physical Dimensions

The 14ASP4 utilizes a rectangular glass envelope with a spherical faceplate. The faceplate is constructed of gray filter glass, which provides approximately 79% light transmission to improve picture contrast under ambient light. The screen is backed with an aluminized metal layer and utilizes P4 phosphor, which exhibits white fluorescence and medium persistence.

The physical dimensions of the tube are optimized for compact television cabinet designs:

- **Overall Length:** $11\text{-}3/8 \pm 1/4$ inches
- **Nominal Face Diagonal:** $13\text{-}3/4 \pm 1/8$ inches
- **Minimum Screen Diagonal:** $13\text{-}1/8$ inches
- **Minimum Useful Screen Dimensions:** $12\text{-}5/16$ inches wide by $9\text{-}7/8$ inches high
- **Minimum Useful Screen Area:** Approximately 108 square inches
- **Base Type:** Small Shell Eightar 7-Pin base (JETEC B7-183)
- **Bulb Contact:** Recessed small cavity cap (JETEC No. J1-21)

The reference line of the tube is determined using a JETEC No. 126 gauge. The distance from this reference line to the base tip is $5\text{-}7/16 \pm 3/16$ inches, while the distance from the reference line to the faceplate is $5\text{-}15/16 \pm 1/8$ inches.

During manufacturing, a bulge may occur at the splice-line seal. This bulge is constrained so that it does not increase the envelope width, diagonal, or height by more than $1/4$ inch. At any specific point around the seal, the bulge must not protrude more than $1/8$ inch beyond the specified envelope surface. Additionally, the tube features a transparent insulating coating on the neck area, which must be kept clean and should only be wiped with a soft, dry, lintless cloth.

Electron Gun, Basing, and Pin Connections

The 14ASP4 incorporates a short straight electron gun design. Because of the gun's design, no external ion trap magnet is required. The tube's electrical connections are made through a 7-pin Eightar base, designated with the 8HR basing configuration.

The pin connections, viewed from the bottom of the base, are assigned as follows:

- **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
- **Recessed Cap:** Anode (consisting of Grid No. 3, Grid No. 5, and the collector, which are internally connected)
- **External Coating (C'):** External conductive coating

The recessed small cavity cap (J1-21) is located on the same side of the envelope as Pin 4. The plane passing through the tube axis and Pin 4 aligns with the anode terminal within an angular tolerance of ± 30 degrees.

To prevent mechanical stress on the tube, the socket must not be rigidly mounted. It should be wired with flexible leads and allowed to move freely so that the circuitry does not impress lateral strains on the base pins. The bottom circumference of the base wafer fits within a 1-3/4 inch diameter circle concentric with the bulb axis.

Electrical Characteristics and Recommended Operating Points

The 14ASP4 operates with a nominal heater voltage of 6.3 volts and a nominal heater current of 0.6 amperes, with an allowable variation of $\pm 10\%$. The cathode should be electrically returned to either one side or the center tap of the heater transformer winding.

The tube's capacitance characteristics are critical for circuit integration:

- **Cathode to all other electrodes:** Approximately 5 pF
- **Grid No. 1 to all other electrodes:** Approximately 6 pF
- **External conductive coating to anode capacitance:** 500 pF minimum to 850 pF maximum

The external conductive coating must be connected to a system ground.

Under recommended operating conditions, the typical voltage distribution is established as follows:

- **Anode Voltage:** 12,000 V dc
- **Grid No. 4 Voltage:** -50 to +350 V dc (adjusted for focus with an anode current of 100 μ A and a standard 12-5/16 x 9-7/8 inch raster)
- **Grid No. 2 Voltage:** 300 V dc
- **Grid No. 1 Voltage:** -28 to -72 V dc (for visual extinction of the focused raster; achieving extinction of a stationary focused spot requires a bias approximately 5 volts more negative)

Maximum Ratings and Circuit Constraints

The maximum ratings for the 14ASP4 are specified under the Design Center system and represent limits that must not be exceeded:

- **Anode Voltage:** 14,000 V dc
- **Grid No. 4 Voltage:** -500 to +1000 V dc
- **Grid No. 2 Voltage:** 500 V dc
- **Grid No. 1 Voltage:**
 - **Negative Bias Value:** 140 V dc
 - **Positive Bias Value:** 0 V dc
 - **Positive Peak Value:** 2 V
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

The heater-to-cathode voltage limits are highly dependent on the operating state of the equipment:

- **Heater Negative with Respect to Cathode:**
 - During the initial warm-up period (not to exceed 15 seconds): 410 V dc maximum
 - After the equipment warm-up period: 180 V dc maximum
- **Heater Positive with Respect to Cathode:** 180 V dc maximum

Technical Summary

The **14ASP4** is a compact, 110-degree rectangular television picture tube utilizing electrostatic focus and magnetic deflection. Its design features a short neck, a straight electron gun requiring no ion trap magnet, and a gray-tinted spherical faceplate with a metal-backed screen. Operating with a 6.3 V, 0.6 A heater, the tube is rated for a maximum anode voltage of 14,000 V dc, with typical operation recommended at 12,000 V dc. Proper installation requires a non-rigidly mounted socket to avoid lateral pin strain, grounding of the external conductive coating, and careful adherence to the specified heater-cathode voltage limits during and after the warm-up period.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1951 Thomas Electronics

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

1951 THOMAS ELECTRONICS

Section 0 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Electrostatic	—
DeflectionMethod	Magnetic	—
Deflection Angle	110 degree	—
Heater Voltage	6.3 V	—
Heater Current	600 mA	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TypicalMainAnodeOrAcceleratorVoltage	12000 V	—
Maximum Grid2 Voltage	500 V	—
Typical Grid2 Voltage	300 V	—
Grid1CutoffVoltage	-72--28 V	—
Maximum Heater Cathode Voltage	180 V	AfterWarmup

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ExternalConductiveCoatingToAnodeCapacitance	850 pF	Maximum