



ELECTRONIC TUBE REFERENCE

12LO3A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

CATHODERAY

Twelve-inch radar cathode-ray display tube with electrostatic focusing and magnetic deflection. Cintel documentation provides operating and capacitance data for its electron-gun system, supporting a specialized radar-display role rather than ordinary television picture service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	4 V / 1 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray

No fixed ratings recorded.

CRT operating ratings and direct interelectrode capacitances are published in the approved datasheet.

12LO3A Radar Tube

The **12LO3A** is a nominal 12-inch diameter cathode ray tube designed specifically for radar applications. It features electrostatic focusing and magnetic deflection, combining a high-voltage electrostatic lens system with external magnetic deflection coils to control the electron beam. The tube is characterized by its specialized orange-emitting screen with long afterglow persistence, making it highly suitable for displaying radar sweep information.

Physical Construction and Screen Characteristics

The 12LO3A is built with a large glass envelope and an aluminium-backed screen. The screen exhibits orange fluorescence and an orange afterglow with long persistence, which helps retain radar targets on

the display between antenna sweeps.

The physical dimensions and mechanical tolerances of the tube are precisely defined:

- **Overall Length:** 535 ± 10 mm
- **Greatest Diameter of Bulb:** 306.5 mm
- **Minimum Useful Screen Diameter:** 265 mm
- **Neck Diameter:** 34.0 mm minimum to 35.5 mm maximum

The tube can be mounted in any position. It utilizes an International Octal base for its primary electrical connections and a Cavity Cap (BSS448/CT8) on the bulb side for the final anode connection.

The physical alignment of the tube components includes specific mechanical tolerances:

- The plane passing through the tube axis and the spigot key on the base may vary from the plane through the tube axis and the side anode cap by an angular tolerance of up to 10° (measured about the tube axis). The anode cap is positioned on the same side of the tube as the spigot key.
- The reference line of the neck and cone transition is determined by the position where a physical gauge with an internal diameter (I.D.) of 36 mm and a length of 50 mm rests on the bulb cone.

Electrical Connections and Pinout

The 12LO3A features an indirectly heated cathode. The heater is designed to operate on either alternating current (AC) or direct current (DC).

Heater Parameter	Value
Heater Voltage	4.0 V
Heater Current	1.0 A

The direct inter-electrode capacitances of the tube, which influence high-frequency performance and drive requirements, are as follows:

- **Modulator to all other electrodes:** 15 µµF
- **Anode 1 to all other electrodes:** 15 µµF
- **Cathode to all other electrodes:** 12 µµF

The International Octal base pinout and cap connections are assigned as follows:

Pin / Cap	Connection
Pin 1	No connection
Pin 2	Anode 1
Pin 3	Anode 2
Pin 4	No connection

Pin / Cap	Connection
Pin 5	Modulator
Pin 6	Cathode
Pin 7	Heater
Pin 8	Heater
Side Cap	Final Anode

Operating Conditions and Maximum Ratings

To ensure reliable operation and prevent damage to the tube, circuit designs must strictly adhere to the maximum ratings. These limits are defined as absolute values:

Parameter	Maximum Rating
Final Anode Voltage	13,000 V
Anode 1 Voltage	2,200 V
Modulator Voltage (Negative bias value)	130 V
Modulator Voltage (Positive bias value)	0 V
Peak Heater-Cathode Voltage (Heater negative with respect to cathode)	125 V
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	125 V

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

- **Final Anode Voltage:** 12,000 V
- **Anode 2 Voltage:** 1,900 V $\pm$ 100 V
- **Anode 1 Voltage:** 2,000 V
- **Modulator Voltage for Cut-off:** -70 V to -120 V

A critical operational requirement governs the relationship between the focusing anodes: Anode 1 must always be operated at a potential that is at least 50 volts positive relative to Anode 2. Under typical operating conditions, Anode 1 (2,000 V) is 100 V positive relative to Anode 2 (1,900 V), satisfying this requirement.

When the tube is operated under typical conditions without deflection, the center of the undeflected, focused spot is guaranteed to fall within a circle of 10 mm radius concentric with the physical center of the tube face.

Technical Summary

The **12LO3A** is a specialized 12-inch nominal radar cathode ray tube featuring electrostatic focusing, magnetic deflection, and an aluminium-backed screen with long-persistence orange fluorescence and afterglow. Operating with a 4.0 V, 1.0 A heater, the tube requires a high-voltage final anode supply of up to 13,000 V (typically 12,000 V) and utilizes an International Octal base alongside a BSS448/CT8 cavity cap. Proper operation requires maintaining Anode 1 at least 50 volts positive relative to Anode 2 to ensure correct beam focusing and spot positioning on the 265 mm minimum useful screen area.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

196X Cintel

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

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OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	4 V	Nominal published value
Heater Current	1 A	Nominal published value
Anode	15 pF	Published direct interelectrode capacitance
Cathode to all other electrodes	12 pF	Published direct interelectrode capacitance

CONSTRUCTION

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing Method	Electrostatic	Published focusing method
Deflecting Method	Magnetic	Published deflection method

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