



ELECTRONIC TUBE REFERENCE

11D3

Voltage - Triode (with diode, heptode or hexode) electronic tube

CONSOLIDATED TECHNICAL
DATA

3 SECTIONS

CONSTRUCTION

DIODE-DIODE-TRIODE

Double-diode high-mu triode for radio detector and voltage-amplifier service. The diode sections provide detection and control-voltage rectification while the high-mu triode supplies substantial subsequent gain.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	13 V / 200 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Diode

No fixed ratings recorded.

Published ratings and characteristics promoted from the supplied Brimar source.

SECTION2 Diode

No fixed ratings recorded.

Published ratings and characteristics promoted from the supplied Brimar source.

SECTION 3 Triode

PLATE RESISTANCE	90000 Ω
TRANSCONDUCTANCE	0.0011 S
AMPLIFICATION FACTOR	100

Published ratings and characteristics promoted from the supplied Brimar source.

11D3 — Double Diode Triode Vacuum Tube

Overview

The **11D3** is an indirectly heated double diode triode vacuum tube designed primarily as a replacement type. It features a 7-pin English base and a top cap connection for the triode grid. The device combines two independent diode sections and a single high-mu triode section within a single glass envelope, sharing a common cathode. This configuration is typically utilized for simultaneous signal detection, automatic volume control (AVC) rectification, and audio-frequency voltage amplification.

The 11D3 operates with a nominal heater voltage of **13.0 V** and a heater current of **0.2 A**. Its electrical characteristics are closely related to the type **75** double diode triode, but it is distinguished by its specific heater requirements and physical base configuration.

Physical Construction and Pin Connections

The 11D3 is constructed in a glass bulb with a maximum outer diameter of **1-9/16 inches** and a maximum overall height of **3-13/16 inches**. The bulb features a top cap at the apex, which provides the connection for the triode control grid, minimizing stray capacitance to the other electrodes.

The tube utilizes a 7-pin English base. The pin assignments, viewed from the bottom of the tube base, are as follows:

- **Top Cap (TC):** Triode Grid (g / G)
- **Pin 1:** Diode Anode 2 (a''d / D1)
- **Pin 2:** No Connection
- **Pin 3:** Diode Anode 1 (a'd / D2)
- **Pin 4:** Heater (h / H)
- **Pin 5:** Heater (h / H)
- **Pin 6:** Cathode (k / C)
- **Pin 7:** Triode Anode (a / A)

The heater is designed for series or parallel AC/DC operation at **13.0 V**, drawing a nominal current of **0.2 A**. The calculated power dissipation of the heater is:

$$\text{Heater Power} = 13.0 \text{ V} \times 0.2 \text{ A} = 2.6 \text{ W}$$

Electrical Characteristics and Operating Points

The triode section of the 11D3 is designed for high-voltage gain. Under typical Class A amplifier operating conditions, the electrical parameters are specified as follows:

Parameter	Value
Anode (Plate) Voltage	250 V
Grid Voltage	-2 V
Anode Current	0.4 mA
Cathode Bias Resistor	5,000 ohms
Anode Impedance (Plate Resistance)	90,000 ohms
Mutual Conductance (Transconductance)	1.10 mA/V (1,100 umhos)
Amplification Factor (u)	100

The high amplification factor ($u = 100$) combined with a high anode impedance of 90,000 ohms indicates that the triode section is highly suited for resistance-coupled audio amplifier stages where maximum voltage gain is required. The low typical anode current of 0.4 mA allows the tube to operate efficiently with high-value anode load resistors.

Triode Transfer Curves and Behavior

The transfer characteristics of the 11D3 triode section illustrate the relationship between the grid bias voltage and the resulting anode current across various anode operating potentials:

- **At 250 V Anode Voltage:** With a grid bias of -2 V, the anode current is positioned at the typical operating point of 0.4 mA. Reducing the negative grid bias causes a sharp increase in anode current; at -1 V grid bias, the current rises to approximately 1.5 mA, and it continues to climb rapidly as the grid voltage approaches 0 V.
- **At 200 V Anode Voltage:** The curve is shifted to the right. An anode current of 0.4 mA is achieved at a grid bias of approximately -1.5 V.
- **At 150 V Anode Voltage:** An anode current of approximately 0.35 mA is obtained at a grid bias of -1.2 V.
- **At 100 V Anode Voltage:** The triode conducts approximately 0.4 mA at a grid bias of -0.5 V.

These curves demonstrate the high sensitivity of the triode grid. The steepness of the curves as grid bias approaches zero volts highlights the high mutual conductance relative to the low operating current.

Comparison with Related Types

The 11D3 is frequently compared to other double diode triodes of similar vintage and application:

Type 75

The electrical characteristics of the 11D3 triode and diode sections are identical to those of the type **75** double diode triode. The primary differences lie in the heater ratings and the physical base configuration, as the 11D3 is designed specifically with a 13.0 V heater and an English base for replacement applications.

Type 11D5

The **11D5** is another double diode triode sharing the same physical dimensions, English base, and pinout configuration as the 11D3. However, it is designed for different circuit requirements:

- **Heater Current:** The **11D5** draws **0.15 A** at 13.0 V, compared to the **0.2 A** drawn by the 11D3.
- **Amplification Factor:** The **11D5** has a lower amplification factor of **40** (compared to **100** for the 11D3).
- **Anode Impedance:** The **11D5** features a much lower anode impedance of **26,700 ohms** (compared to **90,000 ohms** for the 11D3).
- **Mutual Conductance:** The **11D5** has a higher mutual conductance of **1.5 mA/V** (compared to **1.10 mA/V** for the 11D3).
- **Typical Operating Point:** At an anode voltage of 250 V and a grid bias of -3 V (using a 750 ohm cathode bias resistor), the **11D5** draws a significantly higher anode current of **3.8 mA**, making it more suitable for applications requiring lower output impedance and higher signal-handling capability than the high-gain 11D3.

Technical Summary

The **11D3** is a specialized **double diode triode** featuring a **7-pin English base**, a **13.0 V, 0.2 A heater**, and a high-mu triode section. With an amplification factor of **100**, an anode impedance of **90,000 ohms**, and a transconductance of **1.10 mA/V** at its typical operating point of 250 V anode voltage and -2 V grid bias, it is optimized for high-gain voltage amplification. The inclusion of two independent diode anodes sharing a common cathode allows the tube to perform detection and AVC functions alongside audio amplification, making it a versatile replacement valve in classic receiver designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1948 Brimar Radio Valve Manual

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

1948 BRIMAR RADIO VALVE MANUAL

Section 3 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	250 V	—
Anode Current	0.4 mA	—
Grid Voltage	-2 V	—
Cathode Bias Resistor	5000 ohm	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1958 Brimar Radio Valve No 7

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

1958 BRIMAR RADIO VALVE NO 7

Section 1 · Diode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	13 V	—
Heater Current	200 mA	—

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and their source documents.

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