



ELECTRONIC TUBE REFERENCE

13D3

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Twin triode intended for receiving and signal-amplifier applications, with a heater rating suited to series-string operation and two triode sections available for circuit functions.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	12.6 V / 300 mA	PARALLEL HEATER	6.3 V / 600 mA
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	14000 Ω
TRANSCONDUCTANCE	0.0023 S
AMPLIFICATION FACTOR	32
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	5 W
Representative of two identical triode sections.	

SECTION2 Triode	
PLATE RESISTANCE	14000 Ω
TRANSCONDUCTANCE	0.0023 S
AMPLIFICATION FACTOR	32
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	5 W
Second identical physical triode section; added to align rows with SectionCount.	

13D3 — Miniature Medium-Mu Double Triode

The **13D3** is an industrial-grade, miniature double triode vacuum tube designed with a medium amplification factor. It features separate cathodes for each triode section and is housed in a small glass envelope with a nine-pin miniature base. The tube is particularly suited for use in D.C. amplifier and low-noise amplifier applications.

Construction, Heater, and Pin Configuration

The 13D3 is constructed in a miniature glass envelope with a maximum overall diameter of 7/8 inch and a maximum height of 1 15/16 inches. It utilizes a standard B9A (Noval) nine-pin base.

The tube features an indirectly heated cathode system. The heater is center-tapped, allowing for operation from either a 6.3 V or a 12.6 V power supply. This flexibility supports integration into different equipment power architectures:

Heater Parameter	Series Connection	Parallel Connection
Heater Voltage	12.6 V	6.3 V
Heater Current	0.3 A	0.6 A

The B9A base pinout provides independent connections for each triode section, with the heater tap connected to pin 9:

- **Pin 1:** Anode (Section 2 / a'')
- **Pin 2:** Grid (Section 2 / g'')
- **Pin 3:** Cathode (Section 2 / k'')
- **Pin 4:** Heater (h)
- **Pin 5:** Heater (h)
- **Pin 6:** Anode (Section 1 / a')
- **Pin 7:** Grid (Section 1 / g')
- **Pin 8:** Cathode (Section 1 / k')
- **Pin 9:** Heater Tap (h tap)

Because the cathodes are electrically separate, the two triode sections can be operated at different bias levels or in distinct circuit configurations, provided that heater-to-cathode voltage limits are respected.

Electrical Characteristics and Operating Points

Under typical Class A operating conditions, each triode section of the 13D3 exhibits a medium amplification factor combined with moderate anode impedance. The typical operating parameters for a single section are defined as follows:

- **Anode Voltage:** 250 V
- **Grid Voltage:** -4.6 V
- **Anode Current:** 6.0 mA
- **Anode Impedance:** 14,000 Ω
- **Mutual Conductance (Transconductance):** 2.3 mA/V
- **Amplification Factor (μ):** 32

The relationship between these parameters is consistent with the fundamental triode equation:

$$\mu = g_m \times r_p$$

Using the typical values as inputs for this calculation:

$$0.0023 \text{ A/V} \times 14,000 \text{ } \Omega = 32.2$$

This calculated value closely aligns with the published nominal amplification factor of 32.

Maximum Ratings

To ensure reliable operation and prevent premature failure, circuit designs must respect the absolute maximum ratings of the 13D3. These limits apply to each independent section:

Parameter	Maximum Rating
Anode Voltage	300 V
Anode Voltage (Zero Anode Current)	550 V
Anode Dissipation (Each Section)	5.0 W

The zero-anode-current voltage rating of 550 V is particularly relevant during equipment start-up phases, where the power supply voltage may rise before the tube cathodes reach operating temperature and begin drawing current.

Inter-Electrode Capacitances

The inter-electrode capacitances of the 13D3 are measured without an external shield. The capacitive coupling between the two independent triode sections is kept low, while the individual section capacitances remain highly symmetrical:

Capacitance Parameter	Section 1	Section 2
Input Capacitance	2.3 pF	2.3 pF
Output Capacitance	0.95 pF	0.85 pF
Grid to Anode Capacitance	2.1 pF	2.1 pF

The direct capacitive coupling between the two anodes (Anode to Anode) is approximately 1.0 pF. These low values are beneficial in minimizing crosstalk and maintaining stability in high-gain or high-frequency applications.

Characteristic Curves and Load Line Interpretation

The electrical behavior of each section of the 13D3 is illustrated by its anode current versus anode voltage curves. These curves map the anode current from 0 to 20 mA across an anode voltage range of 0 to 500 V, plotted for grid bias steps from 0 V down to -16 V in 2 V increments.

A critical feature of these curves is the boundary representing the maximum anode dissipation of 5.0 watts. This boundary is defined by the locus of points where the product of anode voltage and anode current equals 5.0 W (for example, 20 mA at 250 V, or 10 mA at 500 V). When designing amplifier stages, the load line and quiescent operating point must be positioned entirely to the left and below this 5.0-watt curve to prevent thermal overload of the anodes.

Related Designations and Equivalents

The 13D3 is designated as an industrial-type valve. It is a direct commercial equivalent to the military/government designation [CV2212](#).

Technical Summary

The **13D3** is a versatile, industrial-grade miniature double triode featuring a B9A (Noval) base and separate cathodes. With a flexible 6.3 V / 12.6 V heater, a medium amplification factor of 32, and an anode dissipation rating of 5.0 W per section, it is well-suited for stable D.C. amplification and low-noise preamplifier service. Its electrical characteristics, low inter-electrode capacitances, and robust ratings make it a reliable choice for demanding industrial and instrumentation applications.

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 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	250 V	Each section
Anode Current	6 mA	Each section
Grid Voltage	-4.6 V	Each section
Grid-to-Anode Capacitance	2.1 pF	Each section
Anode-to-Anode Capacitance	1 pF	—

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