

ELECTRONIC TUBE REFERENCE

14X7

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

CONSOLIDATED TECHNICAL DATA

3 SECTIONS
CONSTRUCTION
DIODE-DIODE-TRIODE

Double-diode very-high-mu triode for detector, AVC, and voltage-amplifier service. The paired diodes provide signal and control-voltage rectification while the high-gain triode supplies substantial amplification following the detector stage.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8BZ	BASE PINS	8
NOMINAL HEATER	14 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Diode
No fixed ratings recorded.
Promoted ratings/characteristics read from the approved National Union datasheet.
SECTION2 Diode
No fixed ratings recorded.
Promoted ratings/characteristics read from the approved National Union datasheet.

SECTION3 Triode

PLATE RESISTANCE	67000 Ω
TRANSCONDUCTANCE	0.0015 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	300 V

Promoted ratings/characteristics read from the approved National Union datasheet.

14X7 — Duplex-Diode High-Mu Triode

The **14X7** is a multi-unit vacuum tube containing a single high-mu triode and two independent diode units within a single envelope. It is designed for use in receiving equipment, particularly in applications requiring detection, automatic volume control (AVC), and audio amplification. The tube features a Loktal 8-pin base and is designed to operate with a nominal heater supply of either 12.6 V or 14.0 V, though specific operating conditions are also documented at other heater voltages.

Construction, Mechanical Specifications, and Pinout

The 14X7 is constructed with coated unipotential cathodes. It is housed in a T-9 glass bulb with an 8-pin Loktal base. The physical dimensions of the tube are:

- **Maximum Diameter:** 1-3/16 inches
- **Maximum Overall Length:** 3-5/32 inches
- **Maximum Seated Height:** 2-5/8 inches

The tube can be mounted in **any position**.

Pin Connections and Basing

The 14X7 uses the **8BZ** (or **8BZ-L-4**) basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

- **Pin 1:** Heater
- **Pin 2:** Triode Plate
- **Pin 3:** Triode Grid
- **Pin 4:** Cathode #1 (shared by the Triode and Diode #1) and Diode Shields
- **Pin 5:** Diode Plate #1
- **Pin 6:** Diode Plate #2
- **Pin 7:** Cathode #2 (associated with Diode #2)
- **Pin 8:** Heater

This configuration shows that while Diode #1 shares its cathode (Cathode #1) with the triode unit, Diode #2 has an independent cathode (Cathode #2), allowing for flexible circuit configurations.

Heater Ratings and Electrical Characteristics

The heater of the 14X7 can be operated on either AC or DC. The nominal ratings and average characteristics of the heater are documented with slight variations:

- **Nominal Heater Voltage:** 14.0 V (with a nominal current of 0.15 A)
- **Average Characteristic Heater Voltage:** 12.6 V (with an average current of 0.150 A)

Triode Unit Ratings and Characteristics

The triode section of the 14X7 is a high-mu voltage amplifier.

- **Maximum Plate Voltage:** 300 V

Under Class A amplifier conditions, the average characteristics of the triode unit are documented at two distinct operating points:

Parameter	Operating Point A	Operating Point B
Heater Voltage	12.6 V	12.6 V
Heater Current	0.150 A	0.150 A
Plate Voltage	100 V	250 V
Grid Voltage	0 V	-1.0 V
Plate Current	1.2 mA	1.9 mA
Plate Resistance	85,000 Ω	67,000 Ω
Transconductance	1,000 μmhos	1,500 μmhos
Amplification Factor (μ)	85	100

At the 250 V plate operating point, the triode exhibits a high amplification factor of 100 and a transconductance of 1,500 μmhos , with a plate current of 1.9 mA.

Diode Units Characteristics

The 14X7 contains two diode units. Their characteristics are specified as follows:

- **Minimum Diode Current:** With 5 volts DC applied, each diode plate must draw a minimum of 10.0 mA.
- **Average Diode Unit Characteristics:** At a diode voltage of 2.5 V, the perveance is rated at 6.0 mA.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 14X7, measured without an external shield, are:

- **Diode #1 to All:** 2.9 μpF

- **Diode #2 to All:** 2.9 μF
- **Diode #1 to Grid:** 0.15 μF (maximum)
- **Diode #2 to Grid:** 0.10 μF (maximum)
- **Diode #1 to Diode #2:** 0.50 μF (maximum)

These low capacitances help minimize unwanted coupling between the diode detector circuits and the high-gain triode grid.

Zero-Bias Resistance-Coupled Amplifier Service

The 14X7 is highly suited for resistance-coupled Class A amplifier service. The manufacturer documents specific typical operating conditions for a zero-bias configuration. Notably, these conditions are specified at a heater voltage of 6.3 V:

Parameter	Condition 1	Condition 2
Heater Voltage	6.3 V	6.3 V
Plate Supply Voltage	100 V	300 V
Grid Leak of Following Stage	10 M Ω	10 M Ω
Load Resistance	0.25 M Ω	0.25 M Ω
Coupling Capacitance	0.01 to 0.005 μF	0.01 to 0.005 μF
Grid Resistor of Following Tube	1.0 M Ω	1.0 M Ω
External Grid Circuit Impedance	0 M Ω	0 M Ω
Voltage Gain	30	40
Voltage Output (RMS) at 5% Distortion	6 V	30 V

These operating points demonstrate that even with a lower plate supply voltage of 100 V, a voltage gain of 30 is achievable, rising to 40 when the plate supply is increased to 300 V. The corresponding RMS voltage output at 5% distortion increases from 6 V to 30 V.

Technical Summary

The 14X7 is a **Loktal-base, duplex-diode high-mu triode** designed for detector, AVC, and audio amplifier service. It features a heater rated nominally at 14.0 V (0.15 A) or 12.6 V (0.150 A), with additional zero-bias resistance-coupled amplifier operating points documented at 6.3 V. The high-mu triode section provides an amplification factor of up to 100, a transconductance of 1,500 μmhos , and a plate resistance of 67,000 Ω under typical Class A conditions. The two diode units are designed for

efficient detection, with one diode sharing a cathode with the triode and the other having an independent cathode connection.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 3 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA
Control-grid voltage	-1 V	ClassA
Plate current	1.9 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	67000 Ω	ClassA
Transconductance	1500 μS	ClassA
Amplification factor	100	ClassA