



ELECTRONIC TUBE REFERENCE

14L7

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 audio-frequency voltage-amplifier service. The paired diodes provide detection and control-voltage rectification while the triode amplifies the recovered signal with substantial voltage gain.

GENERAL CHARACTERISTICS

BASE DESIGNATION	LOCTAL	BASE PINS	8
NOMINAL HEATER	14 V / 100 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	42000 Ω
TRANSCONDUCTANCE	0.00165 S
AMPLIFICATION FACTOR	70
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM PLATE DISSIPATION	1 W
MAXIMUM CATHODE CURRENT	5 mA
SECTION2 Diode	
MAXIMUM PLATE VOLTAGE	200 V
NOMINAL OUTPUT CURRENT	0.8 mA
Representative of two diode sections.	

SECTION3 Diode	
MAXIMUM PLATE VOLTAGE	200 V
Added approved missing physical diode section row.	

14L7 — Double Diode High-Mu Triode

An indirectly heated multi-unit vacuum tube containing a high-mu triode and two independent diode sections in a single envelope, designed for detection and voltage amplification applications.

Overview

The **14L7** is a double diode high-mu triode vacuum tube developed by N.V. Philips' Gloeilampenfabrieken. It integrates a high-gain triode section with two independent diode plates sharing a common cathode. This configuration is typically employed in AM radio receivers for simultaneous signal detection, automatic volume control (AVC) generation, and audio voltage amplification. The tube features a compact glass construction, an 8-pin base, and a heater designed for a nominal **14 V, 0.1 A** electrical supply.

Physical Specifications and Basing

The 14L7 is housed in a small glass bulb with a coated unipotential cathode. It is designed to operate in any mounting position. The physical dimensions of the tube are:

- **Maximum overall length:** 2-3/8 inches (60 mm)
- **Maximum seated height:** 2-1/16 inches (53 mm)
- **Maximum diameter:** 7/8 inches (22 mm)

Basing Connections

The tube uses an **E8-30** base and follows the **8GZ** basing diagram. An internal shield is connected to Pin 4 to minimize capacitive coupling between the diode and triode sections. The pin assignments, viewed from the bottom of the base, are:

Pin	Connection
Pin 1	Heater
Pin 2	Triode Plate
Pin 3	Grid
Pin 4	Internal Shield
Pin 5	Diode Plate No. 2
Pin 6	Diode Plate No. 1

Pin	Connection
Pin 7	Cathode
Pin 8	Heater

Electrical Data and Heater Characteristics

The 14L7 is equipped with a unipotential cathode heated indirectly. The nominal heater ratings are:

- **Heater Voltage:** 14 V
- **Heater Current:** 0.1 A
- **Calculated Heater Power:** 1.4 W (calculated as 14 V × 0.1 A)

Electrode Capacitances

The internal shielding and physical layout of the electrodes result in low inter-electrode capacitances, which are critical for preventing unwanted feedback and crosstalk between the detector and amplifier sections:

Electrode Pair	Capacitance
Diode Plate No. 1 to Triode Grid	< 0.007 µF
Diode Plate No. 2 to Triode Grid	< 0.03 µF
Diode Plate to Triode Plate	< 0.01 µF
Triode Grid to Cathode	2.75 µF
Triode Plate to Cathode	1.5 µF
Triode Plate to Grid	1.3 µF
Triode Grid to Heater	< 0.05 µF
Diode Plate No. 1 to Cathode	0.8 µF
Diode Plate No. 2 to Cathode	0.7 µF
Diode Plate No. 1 to Diode Plate No. 2	< 0.3 µF
Diode Plate No. 1 to Heater	< 0.1 µF
Diode Plate No. 2 to Heater	< 0.05 µF

Maximum Ratings (Design Centre Values)

The operating limits of the 14L7 are specified under the Design Centre system. Operating the tube beyond these limits may impair its performance or shorten its operating life.

Triode Section

- **Plate Supply Voltage:** 550 V
- **Plate Voltage:** 250 V
- **Plate Dissipation:** 1 W
- **Cathode Current:** 5.0 mA
- **Grid Circuit Resistance (with self bias):** 3 M Ω
- **Voltage between Heater and Cathode:** 150 V
- **External Resistance between Heater and Cathode:** 20,000 Ω

Diode Sections (per diode)

- **Peak Plate Voltage:** 200 V
- **Plate Current:** 0.8 mA

Typical Operating Characteristics

At a typical Class A operating point, the triode section of the 14L7 exhibits high voltage amplification capability combined with a moderate plate resistance:

- **Plate Voltage:** 170 V
- **Grid Voltage:** -1.6 V
- **Plate Current:** 1.5 mA
- **Transconductance:** 1,650 μ mhos
- **Plate Resistance:** 42,000 Ω
- **Amplification Factor (μ):** 70

This relationship is consistent with the standard triode formula, where the calculated amplification factor is:

$$\mu = g_m \times r_p = 0.00165 \text{ S} \times 42,000 \text{ } \Omega = 69.3 \approx 70$$

Characteristic Curves and Analysis

The published technical curves for the 14L7 provide detailed insight into the behavior of the triode section under varying operating conditions.

Plate Characteristics

The plate current versus plate voltage curves are plotted for grid bias voltages ranging from 0 V to -5 V in 0.5 V increments:

- **0.5-Watt Dissipation Line:** A dashed curve representing a plate dissipation of 0.5 W is plotted across the family of curves. This serves as a conservative design boundary, although the absolute maximum design centre rating for plate dissipation is 1 W.

- **Grid Bias Behavior:** At a plate voltage of 250 V (the maximum rated plate voltage), a grid bias of approximately -2.5 V limits the plate current to about 1.5 mA. At 0 V grid bias, the plate current rises rapidly, reaching 5 mA (the maximum cathode current rating) at a plate voltage of approximately 140 V.

Transfer Characteristics and Transconductance

The transfer curves plot both plate current and transconductance against grid bias voltage for two distinct plate voltages: 170 V (solid lines) and 100 V (dashed lines).

- **At 170 V Plate Voltage:**
 - With 0 V grid bias, the transconductance reaches approximately 2,300 μmhos with a corresponding plate current of about 4.7 mA.
 - At the typical operating bias of -1.6 V, the transconductance is 1,650 μmhos and the plate current is 1.5 mA.
 - The triode reaches cutoff (zero plate current and transconductance) at approximately -3.4 V grid bias.
- **At 100 V Plate Voltage:**
 - With 0 V grid bias, the transconductance is approximately 2,100 μmhos with a plate current of about 2.6 mA.
 - The cutoff point is reached at a shallower grid bias of approximately -2.2 V.

These curves demonstrate that the 14L7 triode section is highly sensitive to grid bias changes, making it well-suited for high-gain preamplifier stages where small input signals must be amplified with minimal distortion.

Technical Summary

The **14L7** is a specialized **double diode high-mu triode** designed by N.V. Philips' Gloeilampenfabrieken. Featuring a **14 V, 0.1 A** heater and an **E8-30** base, it integrates a high-gain triode ($\mu = 70$) and two independent diode detectors in a single compact envelope. With an internal shield to minimize inter-electrode capacitance, the 14L7 is optimized for combined detection and audio amplification duties in compact receiver designs.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	170 V	—
Plate current	1.5 mA	—
Grid voltage	-1.6 V	—
Transconductance	1650 μ S	—
Plate resistance	42000 ohm	—
Amplification factor	70	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Triode grid-to-heater capacitance maximum	0.05 pF	—

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Section 2 · Diode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum diode peak voltage	200 V	—
Maximum diode current	0.8 mA	—