



ELECTRONIC TUBE REFERENCE

150A1

Voltage Regulator electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

VOLTAGEREGULATOR

Low-current 150 V cold-cathode gas regulator for reference and stabilization service at approximately 1-8 mA.

GENERAL CHARACTERISTICS

BASE DESIGNATION	p	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Voltage Regulator	
REGULATOR VOLTAGE	150 V
MINIMUM REGULATOR CURRENT	1 mA
MAXIMUM REGULATOR CURRENT	8 mA
STARTING VOLTAGE	205 V
MAINTAINING VOLTAGE	150 V
DYNAMIC IMPEDANCE	14000 Ω
<i>Cold-cathode gas-filled Philips voltage stabilizer/reference tube.</i>	

150A1 — Voltage Stabiliser Tube

The **150A1** is a cold-cathode, gas-filled voltage stabiliser tube designed to provide a constant voltage output in electronic circuits. Manufactured under the Philips "Miniwatt" designation, this tube is engineered to maintain a stable operating voltage across a specified range of direct current.

Physical Construction and Basing

The 150A1 is constructed in a compact glass envelope with the following physical dimensions:

- **Maximum overall height:** 72 mm
- **Maximum bulb diameter:** 27 mm
- **Base diameter:** 26 mm

The tube utilizes a **P base** (Socket P) featuring an eight-pin configuration. The internal electrode connections are assigned as follows:

- **Pin 5:** Cathode (*k*)
- **Pin 8:** Anode (*a*)

For proper and safe operation, the tube must be installed according to specific physical and electrical orientation guidelines:

1. **Polarity:** The tube must only be operated with the cathode connected to the negative terminal and the anode connected to the positive terminal.
2. **Mechanical stress:** The device is sensitive to mechanical disturbance and must not be subjected to severe shock or continuous vibration.

Electrical Characteristics and Ignition

The 150A1 is characterized by its stable voltage drop once ignition has occurred. Its primary electrical parameters include:

- **Average Operating Voltage (V_a):** 150 V
- **Operating Voltage Range:** At the nominal quiescent current of 4 mA, the operating voltage is rated between a minimum of 144 V and a maximum of 164 V (with some earlier specifications defining a range of 150 V to 170 V).
- **Starting (Ignition) Voltage (V_{ign}):** Maximum 205 V.
- **A.C. Resistance (Wechselstromwiderstand):** 1140 Ω .

Influence of Ambient Illumination

The ignition characteristics of the 150A1 are highly dependent on environmental lighting conditions. The maximum starting voltage rating of 205 V is valid only in the presence of some ambient illumination. If the tube is operated in complete darkness, a considerable delay in the ignition (striking) of the gas discharge may occur.

Regulation and Operating Limits

To maintain stable regulation and prevent premature degradation of the tube, the operating current must be kept within strictly defined absolute limits:

Parameter	Limit Value
Absolute Maximum Anode Current (I_a max)	8 mA
Absolute Minimum Anode Current (I_a min)	1 mA
Recommended Mean Current for Optimal Lifetime	≤ 4 mA

Voltage Regulation Performance

The 150A1 exhibits excellent voltage regulation across its active operating current range:

- **Maximum Voltage Variation ($I_a = 1$ to 8 mA):** 8 V. This represents the maximum allowable change in operating voltage as the current fluctuates between the minimum and maximum limits.
- **Average Regulation (Durchschnittliche Flachheit):** 4 V over the 1 to 8 mA current range.

The characteristic curve of the tube demonstrates a highly flat voltage-to-current relationship. From 1 mA to 8 mA, the operating voltage remains nearly constant, ensuring reliable voltage stabilization for connected circuitry.

Technical Summary

The **150A1** is a gas-filled voltage stabiliser tube featuring a P-type 8-pin base, designed to maintain a stable average operating voltage of **150 V**. Operating within an absolute current range of **1 mA to 8 mA**, the tube limits voltage variation to a maximum of **8 V** (with an average regulation of **4 V**), supported by an internal A.C. resistance of **1140 Ω** . To maximize the operating lifespan of the tube, the mean current should be kept at or below **4 mA**. Designers must ensure the tube is operated with correct polarity (anode positive, cathode negative), protected from severe mechanical shock or vibration, and provided with sufficient ambient light to avoid ignition delays.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1957 Philips Receiving and Amplifying Tubes

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

1957 PHILIPS RECEIVING AND AMPLIFYING TUBES

Section 1 · Voltage Regulator

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Operating Voltage	150 V	—
Regulation	8 V	Published current range

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ignition Voltage Maximum	205 V	—
Minimum Operating Current	1 mA	—
Maximum Operating Current	8 mA	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Philips Electron Tubes Handbook V2

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

1963 PHILIPS ELECTRON TUBES HANDBOOK V2

Section 1 · Voltage Regulator

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maintaining voltage at 4 mA	144–164 V	—
Voltage regulation	—8 V	I _a =1-8mA

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1999 Philips 0-D

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

1999 PHILIPS 0-D

Section 1 · Voltage Regulator

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average operating voltage	150 V	—
Maximum regulation variation	8 V	—
Dynamic AC resistance	14000 ohm	—
Recommended mean current maximum	4 mA	—

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum starting voltage	205 V	—
Minimum operating current	1 mA	—
Maximum operating current	8 mA	—

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