



ELECTRONIC TUBE REFERENCE

1801

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

RECTIFIER-RECTIFIER

Philips directly heated full-wave high-vacuum rectifier for AC mains receiver power supplies. Its dual-anode structure provides modest B-plus current for lower-power mains-operated radio equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	A35	BASE PINS	—
NOMINAL HEATER	4 V / 500 mA	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier

NOMINAL OUTPUT CURRENT	30 mA
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Directly heated full-wave high-vacuum rectifier for AC mains receivers.

SECTION2 Rectifier

NOMINAL OUTPUT CURRENT	30 mA
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Second physical rectifier section; electrical properties populated from corresponding identical section.

1801 — Full-Wave High-Vacuum Rectifier

A directly heated, full-wave high-vacuum rectifier designed for AC mains receivers and low-power rectification applications.

Overview

The **1801** (also designated as a *Vollweg Hochvakuum* or *Biplaque à vide poussé* rectifier) is a full-wave high-vacuum rectifier valve. It is designed primarily for AC mains receivers, providing rectified DC power from an alternating current source. The device features a directly heated filament and two anode plates (full-wave configuration) housed in a glass envelope with a standard European base.

Mechanical Design, Base, and Physical Dimensions

The 1801 is constructed with a glass envelope and utilizes an **A35** base. Depending on the technical specification registry, the base connection is designated as **connection reference 5** or **S III**.

The physical dimensions of the valve are compact, making it suitable for standard AC mains receiver chassis of its era:

- **Maximum Overall Length:** 93 mm (excluding the base pins)
- **Maximum Diameter:** 47 mm

The dual-anode structure within the single envelope allows for efficient full-wave rectification without requiring two separate half-wave rectifier tubes, saving space and reducing circuit complexity.

Filament and Electrical Ratings

The 1801 utilizes a directly heated filament. The filament is designed for low-voltage operation, typical of European AC receiver designs. The electrical ratings for the filament and the maximum operating limits of the anodes are as follows:

Filament Ratings

- **Filament Voltage (V_f):** 4.0 V
- **Filament Current (I_f):** Approximately 0.4 A to 0.5 A
- **Heating Method:** Direct

Maximum Ratings

To ensure reliable operation and prevent damage to the filament and anode structures, the operating conditions must not exceed the following absolute maximum limits:

- **Maximum AC Anode Voltage (V_a or V_{eff}):** $2 \times 250 \text{ V}_{\text{RMS}}$
- **Maximum Rectified DC Current (I_a):** 30 mA

Operating Characteristics and Rectification Performance

The 1801 exhibits a typical high-vacuum rectifier voltage-drop characteristic under load. Because it is a high-vacuum device (rather than a mercury-vapor rectifier), its internal resistance causes the output DC

voltage (rectified voltage, V_d) to decrease as the load current (rectified current, I_a) increases.

The relationship between the rectified voltage and the output current is documented across three typical AC input voltage levels:

1. Input Voltage: $2 \times 250 \text{ V}_{\text{RMS}}$

At the maximum rated AC input voltage, the rectified output voltage behaves as follows:

- **No-load condition (0 mA):** The rectified voltage is approximately 350 V.
- **Full-load condition (30 mA):** The rectified voltage drops to approximately 240 V.

2. Input Voltage: $2 \times 200 \text{ V}_{\text{RMS}}$

At a reduced AC input voltage of $2 \times 200 \text{ V}$, the output voltage drops proportionally:

- **No-load condition (0 mA):** The rectified voltage is approximately 280 V.
- **Full-load condition (30 mA):** The rectified voltage drops to approximately 175 V.

3. Input Voltage: $2 \times 150 \text{ V}_{\text{RMS}}$

At the lowest documented AC input voltage of $2 \times 150 \text{ V}$, the output voltage is:

- **No-load condition (0 mA):** The rectified voltage is approximately 210 V.
- **Full-load condition (30 mA):** The rectified voltage drops to approximately 110 V.

These operating points demonstrate the internal resistance of the tube. For example, at an input of $2 \times 250 \text{ V}_{\text{RMS}}$, *a current draw increase of 30 mA results in an internal voltage drop of approximately 110 V ($350 \text{ V} - 240 \text{ V} = 110 \text{ V}$)*. This characteristic must be accounted for in power supply filter design, particularly when selecting smoothing capacitors and choke values to maintain stable HT (high-tension) rails in AC receivers.

Technical Summary

The **1801** is a classic **directly heated, full-wave high-vacuum rectifier** designed for low-power AC mains receivers. Operating with a **4.0 V** filament supply drawing between **0.4 A and 0.5 A**, it provides reliable full-wave rectification. It supports a maximum AC input voltage of $2 \times 250 \text{ V}_{\text{RMS}}$ and delivers a maximum rectified DC current of **30 mA**. Housed in an envelope with a maximum length of **93 mm** and a diameter of **47 mm**, and utilizing an **A35** base, the 1801 is a highly specialized component optimized for stable, low-current high-voltage DC generation.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1938 Philips Miniwatt Vacuum Tube Catalog

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

1938 PHILIPS MINIWATT VACUUM TUBE CATALOG

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum AC no-load voltage per plate	250 V	FullWave
Maximum DC output current	30 mA	FullWave

1938 PHILIPS MINIWATT VACUUM TUBE CATALOG

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum AC no-load voltage per plate	250 V	FullWave
Maximum DC output current	30 mA	FullWave



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 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
RMS anode voltage per plate	250 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Rectified output current	30 mA	—

1999 PHILIPS 0-D

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
RMS anode voltage per plate	250 V	—
Rectified output current	30 mA	—