

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
RECTIFIER-RECTIFIER

1768

Rectifier - Full Wave electronic tube

Philips directly heated double-anode gas-filled industrial rectifier designed particularly for battery-charging equipment. Multiampere output and low forward voltage provide efficient high-current power conversion.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.9 V / 11 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	880 V
NOMINAL OUTPUT CURRENT	6 A
PEAK FORWARD CURRENT	10 A
FORWARD VOLTAGE DROP	15 V
WARM-UP TIME	60 s
Representative of two identical gas-filled paths; application rating 6 A per valve and published Ia max 3 A per anode.	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	880 V
NOMINAL OUTPUT CURRENT	6 A
PEAK FORWARD CURRENT	10 A
FORWARD VOLTAGE DROP	15 V
WARM-UP TIME	60 s
Second physical rectifier section added to represent the full-wave/double-anode structure.	

1768 — Double-Anode Gas-Filled Rectifying Valve

The **1768** is a gas-filled, double-anode rectifying valve designed primarily for high-current applications such as battery chargers. Featuring an oxide-coated filament, this robust valve is capable of delivering up to 6 A per valve, making it suitable for charging configurations of up to 110 lead-acid (Pb) cells.

Filament and Heating Requirements

The 1768 utilizes an oxide-coated filament designed for direct AC heating. Due to the gas-filled nature of the valve, strict adherence to filament heating times is necessary to prevent damage to the cathode before drawing anode current.

Parameter	Value
Filament Voltage (V_f)	1.9 V
Filament Current (I_f)	11 A
Recommended Heating Time (t_w)	60 seconds
Minimum Heating Time (Urgent)	30 seconds

Under normal operating conditions, a preheating time of 60 seconds is recommended. In urgent circumstances, this preheating period may be reduced to a minimum limit of 30 seconds.

Physical Design and Mechanical Specifications

The 1768 is a physically substantial valve designed to handle significant thermal and electrical loads. It must be operated in a vertical position with the base facing down to ensure proper internal gas distribution and structural integrity during operation.

- **Mounting Position:** Vertical, base down
- **Net Weight:** 470 g
- **Shipping Weight:** 2800 g

- **Maximum Height:** 240 mm
- **Maximum Bulb Diameter:** 76 mm (with a 71 mm lower body diameter)
- **Side Anode Caps Diameter:** 25 mm
- **Width Across Anode Caps:** 125 mm to 145 mm

The electrical connections are divided to isolate the high-voltage anode potentials from the filament supply. The filament connections consist of two bottom leads (f, f), while the two anodes are connected via dedicated side caps (a, a').

Electrical Characteristics and Limiting Values

During conduction, the 1768 exhibits a typical low arc voltage drop, which is characteristic of gas-filled rectifiers and contributes to high electrical efficiency.

- **Typical Arc Voltage (V_{arc}):** 15 V

To ensure reliable operation and prevent premature valve failure, circuit designs must respect the absolute limiting values specified for the device. The transformer voltage limits are defined specifically for standard full-wave rectification (Circuit a).

Parameter	Minimum	Maximum
Transformer Voltage (V_{tr})	130 V_{eff} (RMS)	285 V_{eff} (RMS)
Peak Inverse Anode Voltage ($V_{a\ inv\ p}$)	—	880 V
Continuous Anode Current (I_a)	—	3 A
Peak Anode Current (I_{ap})	—	10 A
Ambient Temperature (t_{amb})	-55 °C	+75 °C

The wide ambient temperature range of -55 °C to +75 °C allows the 1768 to be deployed in demanding industrial environments without requiring specialized climate control, provided the maximum current and voltage limits are not exceeded.

Technical Summary

The **1768** is a specialized gas-filled, double-anode rectifying valve engineered for heavy-duty battery charging systems. Operating with a high-current 1.9 V, 11 A directly heated filament, the valve requires a minimum preheating time of 30 to 60 seconds before anode load is applied. With a typical arc voltage of 15 V, it supports a maximum peak inverse voltage of 880 V and a peak anode current of 10 A (3 A continuous). Its physical construction features a vertical mounting requirement, dual side anode caps for high-voltage isolation, and a robust design capable of operating across a broad temperature range of -55 °C to +75 °C.

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
Maximum RMS anode supply voltage	285 V	—
Minimum RMS anode supply voltage	130 V	—
Maximum average anode current per anode	3 A	—
Permitted mercury/ambient temperature	-55–75 degC	—
DC output current	6 A	—

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Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum RMS anode supply voltage	285 V	—
Minimum RMS anode supply voltage	130 V	—
Maximum average anode current per anode	3 A	—
Permitted mercury/ambient temperature	-55–75 degC	—
DC output current	6 A	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

