



ELECTRONIC TUBE REFERENCE

1B2P

Voltage - Pentode or Tetrode (with diode) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

DIODE-PENTODE

Russian diode-pentode designed for low-frequency voltage preamplification and signal detection in receiving equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	1.2 V / 30 mA	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Diode

No fixed ratings recorded.

Russian 1B2P directly heated miniature diode-pentode for radio signal detection and low-frequency preamplification. The accessible Russian receiving specification explicitly states a 1.2 V 30 mA filament (27–33 mA range), oxide-coated directly heated cathode and RSH4 base; previous 80 mA parent rating corrected. This first physical section is the signal-detector diode. The 1981 Russian reference provides no extracted text to verify additional diode limits, so electrical maximum fields remain unfilled.

SECTION2 Pentode	
TRANSCONDUCTANCE	0.00025 S
MAXIMUM PLATE VOLTAGE	90 V
MAXIMUM SCREEN VOLTAGE	67.5 V
MAXIMUM CATHODE CURRENT	4.5 mA
<i>Russian 1B2P pentode preamplifier section of directly heated miniature diode-pentode, filament 1.2 V 30 mA (manufacturer receiving reference). Published typical at plate 60 V and screen 45 V gives transconductance 0.25 mA/V; this does not establish universal maximum plate or screen voltage. Previously stored upper limits plate 90 V, screen 67.5 V and cathode current 4.5 mA are retained pending confirmation from primary original document, whose extracted content is empty. Diode is separately represented as first physical section.</i>	

1B2P — Diode-Pentode Vacuum Tube

A miniature, directly heated glass diode-pentode designed for low-frequency voltage pre-amplification and signal detection in compact or battery-operated equipment.

Overview

The **1B2P** (also designated in Cyrillic as **1Б2П**) is a specialized miniature glass diode-pentode. It combines a single diode detector and a high-gain pentode amplifier section within a single envelope, sharing a common directly heated filament. The tube is primarily designed for simultaneous signal detection and low-frequency voltage pre-amplification.

The 1B2P is constructed in a miniature glass envelope (type 2Π) with a mass of approximately 10 grams. It is designed to plug into a standard RSH4 socket. The tube is electrically equivalent to the 1AF34 designation.

Construction, Filament, and Pinout

The 1B2P features a directly heated, oxide-coated cathode (filament) designed for low-power battery operation. The filament is highly efficient, requiring a nominal voltage of only 1.2 V. The physical layout of the tube utilizes a 6-pin arrangement on a miniature glass base (type 2Π).

The pin connections, viewed from the bottom of the tube, are assigned as follows:

Pin	Electrode Connection	Symbol
1	Cathode negative / Filament, Grid 3	$k[-\Pi], c3$
3	Diode Anode	$aД$
4	Grid 2 (Screen Grid)	$c2$

Pin	Electrode Connection	Symbol
5	Pentode Anode (Plate)	a_{Π}
6	Grid 1 (Control Grid)	c_1
7	Cathode positive / Filament	$k[+\Pi]$

The internal connection of the suppressor grid (Grid 3) to the negative side of the filament (Pin 1) simplifies external circuitry and ensures proper electron suppression within the pentode section.

Electrical Characteristics and Typical Operation

The 1B2P is characterized by its extremely low power consumption, making it ideal for portable applications. Under typical operating conditions, the tube exhibits the following electrical parameters:

Filament Ratings

- **Nominal Filament Voltage (U_H):** 1.2 V
- **Filament Current (I_H):** 30 mA (with an allowable range of 27 mA to 33 mA)

Typical Operating Point

The standard operating parameters for evaluating the tube's performance are established with a filament voltage of 1.2 V, a pentode anode voltage of 60 V, a screen grid (Grid 2) voltage of 45 V, and the control grid (Grid 1) at 0 V bias. The diode anode is tested at a reference voltage of 1.2 V.

Parameter	Typical Value
Pentode Anode Current ($I_{a.\Pi}$)	$0.9 \pm 0.4 \text{ mA}$
Grid 2 Current (I_{C2})	$0.18 \text{ to } 0.35 \text{ mA}$
Reverse Grid 1 Current ($I_{C1.обp}$)	$\leq 0.1 \text{ }\mu\text{A}$
Diode Anode Current ($I_{a.d}$)	$\geq 7 \text{ }\mu\text{A}$
Pentode Transconductance (S)	0.55 mA/V
Internal Resistance (R_i)	$1 \text{ M}\Omega$

Under reduced filament voltage conditions ($U_H = 0.95 \text{ V}$), the pentode transconductance remains at or above 0.25 mA/V .

Lifetime and Reliability

The 1B2P is rated for a minimum operating lifetime of 1500 hours. The criteria for determining the end of the tube's useful life are defined by the following performance thresholds:

- **Diode Anode Current:** $\geq 3 \text{ }\mu\text{A}$
- **Pentode Transconductance:** $\geq 0.25 \text{ mA/V}$

Interelectrode Capacitances

Due to its miniature construction, the 1B2P maintains low internal capacitances, which helps prevent unwanted feedback and high-frequency roll-off in pre-amplifier stages:

- **Input Pentode Capacitance (C_{BX}):** 1.85 pF
- **Output Pentode Capacitance (C_{BIX}):** 2.1 pF
- **Transfer Pentode Capacitance ($C_{\text{ПPOX}}$):** 0.27 pF
- **Diode Anode to Cathode Capacitance ($C_{\text{A.Д-K}}$):** 0.3 pF

Maximum Operating Ratings

To ensure reliable operation and prevent premature failure, circuit designs must adhere to the absolute maximum ratings. Operating the tube beyond these limits can cause permanent damage.

Parameter	Absolute Maximum Rating
Filament Voltage (U_H) Range	0.9 V to 1.4 V
Pentode Anode Voltage ($U_{\text{A.П}}$)	90 V
Pentode Anode Voltage (Cold Start / Switch-on)	250 V
Grid 2 Voltage (U_{C2})	75 V
Grid 2 Voltage (Cold Start / Switch-on)	250 V
Cathode Current (I_K)	2 mA
Pentode Anode Dissipation Power ($P_{\text{A.П}}$)	0.15 W
Ambient Temperature Range	-60 °C to +70 °C

The high cold-start voltage ratings (250 V) for the anode and screen grid allow the tube to safely withstand initial power-supply surges before the filament reaches operating temperature and begins drawing current.

Analysis of Characteristic Curves

The behavior of the 1B2P under varying voltage conditions is described by its characteristic curves:

- **Diode Characteristic ($I_{\text{A.Д}}$ vs $U_{\text{A.Д}}$):** With a nominal filament voltage of 1.2 V, the diode section exhibits a non-linear current rise starting from 0 V. As the diode anode voltage is increased, the current rises smoothly, reaching approximately 0.9 mA at an anode potential of 12 V.

- **Pentode Transfer Characteristic ($I_{a.\Pi}$ vs U_{C1}):** At $U_H = 1.2$ V, $U_{a.\Pi} = 60$ V, and $U_{C2} = 45$ V, the control grid cutoff voltage is located between -2.5 V and -3 V. As the grid bias becomes less negative, the anode current rises to its nominal value of 0.9 mA at $U_{C1} = 0$ V, and continues to rise slightly above 1.0 mA if a small positive bias of +0.5 V is applied.
- **Pentode Plate Characteristics ($I_{a.\Pi}$ vs $U_{a.\Pi}$):** Under standard operating conditions ($U_H = 1.2$ V, $U_{C2} = 45$ V), the plate curves display a classic pentode knee between 10 V and 15 V. Above this knee, the curves are highly flat and horizontal; at $U_{C1} = 0$ V, the anode current remains virtually constant at approximately 0.9 mA across a wide plate voltage range from 20 V to 80 V, demonstrating high dynamic plate resistance.

Technical Summary

The **1B2P** is a highly efficient, directly heated **diode-pentode** designed for low-power detection and pre-amplification. Operating on a nominal **1.2 V, 30 mA** filament, it integrates a detector diode and a high-impedance pentode ($R_i = 1$ M Ω) with a transconductance of **0.55 mA/V** into a single 10-gram miniature glass package. With its low power requirements, robust cold-start ratings, and reliable 1500-hour service life, the 1B2P serves as a compact solution for low-frequency signal processing in portable vacuum tube electronics.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1981 Russian Tubes Katsnelson and Larionov

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

1981 RUSSIAN TUBES KATSNELSON AND LARIONOV

Section 1 · Diode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate current	4	Published Russian-source value; OCR-normalized.
Plate current	100 μ A	Published Russian-source value; OCR-normalized.
Transconductance	0.3 μ S	Published Russian-source value; OCR-normalized.
Plate resistance	0.6 V	Published Russian-source value; OCR-normalized.
Input capacitance	2.4	Published Russian-source value; OCR-normalized.
Output capacitance	4.6	Published Russian-source value; OCR-normalized.
Transfer capacitance	0.3 h	Published Russian-source value; OCR-normalized.
Service life	1500	Published Russian-source value; OCR-normalized.
Heater voltage	1.2 V	Nominal/published heater value.
Heater current	80 mA	Nominal/published heater value.

1981 RUSSIAN TUBES KATSNELSON AND LARIONOV

Section 2 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Screen current	0.4 mA	Published Russian-source value; OCR-normalized.

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