



ELECTRONIC TUBE REFERENCE

12KH3S

Diode (NOT rectifier) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

DIODE-DIODE

Russian twin diode intended for high-frequency detection and signal conversion, with two rectifying sections and a relatively substantial 12.6 V heater.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	12.6 V / 735 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Diode

No fixed ratings recorded.

Published ratings/characteristics promoted where clearly identified; additional bilingual values retained as parameters.

SECTION2 Diode

No fixed ratings recorded.

Physical diode section added in approved section-structure reconciliation.

12KH3S — High-Frequency Double Diode

An indirectly heated double diode designed for high-frequency oscillation detection and signal conversion in compact, ruggedized applications.

Overview

The **12KH3S** (also designated as **12X3C** in Cyrillic) is a specialized vacuum tube containing two diode sections sharing a common, indirectly heated cathode. It is housed in a glass envelope with five rigid leads and is engineered to operate reliably under challenging environmental conditions, including high humidity and a wide temperature range. The tube is optimized for high-frequency detection and conversion, with a specified minimum operating wavelength of 17 cm.

Construction and Physical Characteristics

The 12KH3S features a compact glass bulb construction with five rigid leads. It incorporates an indirectly heated, oxide-coated cathode shared by both diode sections. The physical design is optimized for high-frequency operation, featuring a compact form factor and a specialized pin layout.

Mechanical Dimensions and Weight

- **Maximum overall length:** 41.2 mm (specified as 41 +0.2 / -0.5 mm)
- **Maximum diameter of the base/collar:** 32.0 mm
- **Bulb body diameter:** 27.0 mm (with a tolerance of -0.14 mm)
- **Upper bulb diameter:** 26.6 mm maximum
- **Pin length:** 5.0 ± 0.5 mm
- **Pin diameter:** 1.4 mm (specified as 1.4 +0.03 / -0.04 mm)
- **Maximum weight:** 35 g

Environmental Tolerances

The tube is designed to withstand harsh environmental conditions:

- **Ambient temperature range:** -60 °C to +70 °C
- **Relative humidity:** 95% to 98% at an ambient temperature of +4 °C
- **Service life guarantee:** 500 hours

Electrode Connections and Pinout

The 12KH3S utilizes a five-pin base configuration with a locating key (measuring up to 1.8 mm in width and 4.0 mm in height) to ensure correct orientation. The pin connections, viewed from the bottom of the tube, are as follows:

- **Pin 1:** Heater (h)
- **Pin 2:** Cathode (k) (common to both diode sections)
- **Pin 3:** Heater (h)
- **Pin 4:** Anode of Diode 1 (D1)
- **Pin 5:** Anode of Diode 2 (D2)

Electrical Characteristics and Operating Points

The nominal electrical characteristics of the 12KH3S are measured under specific test conditions. The standard operating point is defined with a heater voltage of 12.6 V and an anode voltage of 10 V.

Nominal Characteristics

- **Heater Voltage (U_h):** 12.6 V
- **Heater Current (I_h):** 73.5 ± 8.5 mA
- **Diode Current (I_D):** 10.75 ± 5.25 mA (measured at $U_a = 10$ V)
- **Emission Slope (S):** ≥ 0.45 mA/V (measured at an anode voltage $U_D = 1$ V with an incremental change of $U_D = \pm 0.1$ V)

Interelectrode Capacitances

Due to its high-frequency design, the 12KH3S maintains very low internal capacitances to minimize signal degradation and crosstalk:

- **Diode-to-cathode capacitance (C_{DK}):** 0.42 to 0.62 pF
- **Inter-diode capacitance (between Diode 1 and Diode 2, C_{D1D2}):** 0.05 to 0.15 pF

Maximum and Minimum Permissible Ratings

To ensure reliable operation and prevent premature failure, the operating conditions of the 12KH3S must be maintained within the following absolute limits:

Parameter	Minimum Limit	Maximum Limit
Heater Voltage (U_h)	10.8 V	14.5 V
Anode Voltage (U_a)	—	100 V
Anode Voltage with No Load (U_a)	—	250 V
Average Anode Current (I_a)	—	2 mA
Peak Anode Current (I_a)	—	20 mA
Anode Dissipation (P_a)	—	0.1 W
Heater-to-Cathode Voltage (U_{kh})	—	100 V
Bulb Temperature (T_{bulb})	—	150 °C
Operating Wavelength (λ)	17 cm	—

The minimum operating wavelength of 17 cm corresponds to a maximum operating frequency of approximately 1.76 GHz, confirming the tube's suitability for ultra-high-frequency (UHF) applications.

High-Frequency Performance and Curves

The 12KH3S is specifically optimized for high-frequency oscillation detection and conversion. The relationship between the diode current (I_D) and the anode voltage (U_D) is non-linear, as typical for thermionic diodes. At the nominal heater voltage of 12.6 V, the diode current rises progressively with increasing anode voltage:

- At $U_D = 2$ V, the current is approximately 1 mA.
- At $U_D = 6$ V, the current reaches approximately 5 mA.
- At $U_D = 10$ V, the current is approximately 10.75 mA (matching the nominal specification).
- At $U_D = 14$ V, the current rises to approximately 17 mA.
- At $U_D = 18$ V, the current exceeds 24 mA.

This characteristic curve demonstrates the tube's capability to handle rectification and detection tasks efficiently over a wide range of signal levels.

Technical Summary

The **12KH3S** is a specialized, ruggedized **double diode** designed for **high-frequency detection and conversion** up to the UHF band (with a minimum wavelength limit of **17 cm**). It features a **12.6 V heater** drawing approximately **73.5 mA**, a shared **indirectly heated cathode**, and two independent diode anodes housed in a compact glass envelope with five rigid pins. With its low interelectrode capacitances (under 0.62 pF for diode-to-cathode and under 0.15 pF between diodes) and robust environmental ratings, the 12KH3S is well-suited for high-frequency signal processing in demanding environments.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1970 Russian Tubes Mashpriborintorg

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

1970 RUSSIAN TUBES MASHPRIBORINTORG

Section 1 · Diode

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Guaranteed service life	500 h	PublishedGuarantee

TUBE TINKER

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

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker