

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

12AX4GTA

1 SECTION
CONSTRUCTION
RECTIFIER

Rectifier - Damper Diode electronic tube

Television horizontal-deflection damping diode with controlled heater warm-up, a heater-voltage variant of the corresponding 6AX4 family.

GENERAL CHARACTERISTICS

BASE DESIGNATION	4CG	BASE PINS	8
NOMINAL HEATER	12.6 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

4CG - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – IC	–	–	IC
PIN2 – IC	–	–	IC
PIN3 – K	A	K – Cathode	CONNECTED
PIN5 – P	A	P – Plate (Anode)	CONNECTED
PIN7 – H	–	H – Heater	CONNECTED
PIN8 – H	–	H – Heater	CONNECTED

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	4400 V
NOMINAL OUTPUT CURRENT	125 mA
PEAK FORWARD CURRENT	750 mA
FORWARD VOLTAGE DROP	32 V
MAXIMUM HEATER-CATHODE VOLTAGE	4400 V
WARM-UP TIME	11 s
Reference-only sheet; electrical characteristics refer to 6AX4GT. Heater data from supplied 12AX4GTA sheet; no unsupported parent ratings guessed.	

12AX4GTA — Half-Wave Vacuum Rectifier

An indirectly heated, half-wave vacuum rectifier designed for service as a damping diode in the horizontal deflection circuits of television receivers.

Overview

The **12AX4GTA** is a specialized half-wave vacuum diode designed for television damper service. Housed in a T-9 glass envelope with a 6-pin octal base, it is engineered to withstand high peak inverse voltages and transient pulses characteristic of horizontal deflection systems.

A defining feature of the 12AX4GTA is its controlled heater warm-up time of 11 seconds. This characteristic is critical for television receivers that employ series-connected heater strings, particularly where the picture-tube heater is wired in series with other tubes. When used with other tubes sharing the same heater current rating and controlled warm-up characteristics, voltage surges across individual heaters during startup are minimized, protecting the heaters from premature failure.

Construction, Heater, and Physical Specifications

The 12AX4GTA utilizes a unipotential coated cathode. The heater is designed to operate on either alternating or direct current (AC or DC).

Heater Characteristics

The heater of the 12AX4GTA is specified with the following parameters:

Parameter	Value	Rating System / Condition
Heater Voltage (AC or DC)	12.6 V	Nominal (at 0.600 A)
Heater Voltage Range	12.6 □ 1.2 V	Design-Maximum
Heater Current	0.600 A	Nominal (at 12.6 V)

Parameter	Value	Rating System / Condition
Heater Current Range	0.600 $\pm$ 0.040 A	Design-Maximum
Average Warm-up Time	11 seconds	Controlled

The heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value (10.08 V) after applying four times the rated heater voltage (50.4 V) to a circuit consisting of the tube heater in series with a resistance equal to three times the rated heater voltage divided by the rated heater current.

For the 12AX4GTA, this series resistance is calculated as follows: Series Resistance = $3 \times \frac{12.6 \text{ V}}{0.6 \text{ A}} = 63 \Omega$

Mechanical Specifications and Pinout

The tube is constructed in a T-9 glass bulb with a short intermediate-shell octal base. It can be mounted in any position.

The physical dimensions are:

- **Maximum overall length:** 3-5/16 inches
- **Seated height:** 2-3/4 inches
- **Maximum bulb diameter:** 1-9/32 inches

The 12AX4GTA uses the **4CG** basing diagram. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Connection	Description
Pin 1	IC	Internal Connection (Do not use as tie point)
Pin 2	IC	Internal Connection (Do not use as tie point)
Pin 3	K	Cathode
Pin 4	IC	Internal Connection (Do not use as tie point)
Pin 5	P	Plate
Pin 6	IC	Internal Connection (Do not use as tie point)
Pin 7	H	Heater
Pin 8	H	Heater

Pins 1, 2, 4, and 6 are designated as internal connections and must not be used as circuit tie points.

Direct Interelectrode Capacitances

The typical capacitances of the tube electrodes, measured without an external shield, are:

- **Heater to Cathode:** 4.0 pF
- **Plate to Cathode and Heater:** 5.0 pF
- **Cathode to Plate and Heater:** 8.5 pF

Electrical Characteristics and Ratings

The 12AX4GTA is rated specifically for television damper diode service. Operation as a general-purpose power rectifier is explicitly not recommended.

Maximum Ratings (TV Damper Service)

The ratings are specified under two systems: Design-Maximum Values and Design-Center Values. These ratings apply to operation in a 525-line, 30-frame television system, where the duty of the horizontal voltage pulse does not exceed 15% of one scanning cycle.

Parameter	Design-Maximum Values	Design-Center Values	Unit
Peak Inverse Voltage	5000 (Absolute Max: 5000)	4400	Volts
Peak Plate Current	1000	750	mA
DC Plate Current	165	125	mA
Plate Dissipation	5.3	4.8	Watts
Heater-Cathode Voltage (Heater Negative to Cathode)			
- DC Component	900	900	Volts
- Total DC and Peak	5000	4400	Volts
Heater-Cathode Voltage (Heater Positive to Cathode)			
- DC Component	100	100	Volts
- Total DC and Peak	300	300	Volts

Tube Voltage Drop

Under typical operating conditions, the tube exhibits a low internal voltage drop:

- **Tube Voltage Drop:** 32 Volts at a direct plate current of 250 mA.

Average Plate Characteristics and Curves

The electrical behavior of the 12AX4GTA plate is illustrated by its average plate characteristic curve, which plots plate current in milliamperes against DC plate voltage.

The curve shows a typical diode conduction profile under rated heater conditions:

- At a plate potential of **10 V DC**, the plate current is approximately **50 mA**.
- At **20 V DC**, the current rises to approximately **120 mA**.
- At **30 V DC**, the current reaches approximately **220 mA**.
- At **40 V DC**, the current is approximately **350 mA**.
- At **50 V DC**, the current is approximately **480 mA**.
- The curve extends up to a plate current of **600 mA** at approximately **57 V DC**.

This low internal resistance (indicated by the steep rise in current relative to voltage) is essential for minimizing power loss and heat generation during the high-current conduction intervals in horizontal deflection circuits.

Related Designations and Comparisons

The **12AX4GTA** is part of a family of television damper diodes sharing similar physical structures and electrical ratings, but differing in heater configurations:

- **6AX4GT / 6AX4GTB:** The 12AX4GTA is electrically identical to the [6AX4GT](#) except for its heater requirements. The [6AX4GT](#) operates at a nominal heater voltage of 6.3 V and a current of 1.2 A, whereas the 12AX4GTA operates at 12.6 V and 0.6 A.
- **12AX4GTB:** The [12AX4GTB](#) is another 12.6 V, 0.6 A variant, which is identical to the [6AX4GTB](#) except for its heater ratings.
- **17AX4-GT:** A related damper diode designed for 16.8 V, 0.45 A heater operation with an 11-second controlled warm-up time.
- **25AX4-GT:** A related damper diode designed for 25.0 V, 0.30 A heater operation.

These heater variations allowed television manufacturers to select the exact tube version that matched the current rating of their series-string heater designs (e.g., 600 mA, 450 mA, or 300 mA strings).

Technical Summary

The **12AX4GTA** is a **6-pin octal, indirectly heated half-wave vacuum rectifier** optimized for **television damper diode service**. It features a **12.6 V, 0.6 A heater** with a **controlled 11-second warm-up time** designed to prevent voltage surges in series-connected heater strings. With a maximum peak inverse voltage rating of **5000 V (Design-Maximum)**, a peak plate current rating of **1000 mA**, and a low internal voltage drop of **32 V at 250 mA**, the 12AX4GTA provides efficient and reliable performance in the demanding horizontal deflection circuits of vintage television receivers.



SOURCE OPERATING CONDITIONS

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Rectifier

APPLICATION

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Television damping diode	—



SOURCE OPERATING CONDITIONS

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Rectifier

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak inverse voltage	5000 V	—
Peak plate current	1000 mA	—
DC plate current	165 mA	—

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater-to-cathode capacitance	4 pF	—
Plate-to-cathode/heater capacitance	5 pF	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Westinghouse Data Book

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

1965 WESTINGHOUSE DATA BOOK

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	12.6 V	—
Heater Current	450 mA	—
ControlledWarmupHeater	1 boolean	—
Heater Warmup Time	11 s	—
VoltageDrop	32 V	PlateCurrent=250mA
Heater To Cathode Capacitance	4 pF	—
Plate To Cathode And Heater Capacitance	5 pF	—
Cathode To Plate And Heater Capacitance	8.5 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PeakInverseVoltageMaximum	4400 V	—
PeakPlateCurrentMaximum	750 mA	—
DCPlateCurrentMaximum	125 mA	—
Plate Dissipation Maximum	4.8 W	—
HeaterCathodeVoltageMaximum	4400 V	HeaterNegative;TotalDCPlusPeak



1971 RCA HB3 Binder 5 of 7

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

1971 RCA HB3 BINDER 5 OF 7
Section 1 · Rectifier

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage nominal	12.6 V	—
Heater current	600 mA	—
Heater warm-up time	11 s	Average

TUBE TINKER

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