



ELECTRONIC TUBE REFERENCE

12AX4GT

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Half-wave vacuum rectifier designed primarily as a television horizontal-deflection damping diode, providing high inverse-voltage capability for sweep-circuit energy recovery.

GENERAL CHARACTERISTICS

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

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	4000 V
NOMINAL OUTPUT CURRENT	125 mA
PEAK FORWARD CURRENT	600 mA
MAXIMUM HEATER-CATHODE VOLTAGE	4000 V
WARM-UP TIME	11 s
<i>Published ratings and characteristics promoted from the approved RCA source.</i>	

12AX4GT — Half-Wave Vacuum Rectifier

The **12AX4GT** (also written as **12AX4-GT**) is a half-wave vacuum rectifier of the heater-cathode type. It is designed primarily for use as a damper diode in the horizontal deflection circuits of television receivers, particularly those employing series-connected heater strings. A key design feature of the 12AX4GT is its high-voltage insulation between the heater and cathode, which allows the tube to withstand high-amplitude negative peak pulses. This robust insulation provides circuit designers with significant flexibility when configuring television deflection systems.

Electrical Characteristics and Heater Ratings

The 12AX4GT features an indirectly heated, coated unipotential cathode. The heater is designed to operate from either an AC or DC supply.

Parameter	Value
Heater Voltage (AC or DC)	12.6 V
Heater Current	0.6 A
Direct Interelectrode Capacitance (Heater to Cathode, no shield)	7.5 pF

Using the nominal heater voltage and current, the electrical power consumed by the heater can be calculated as: $\text{Heater Power} = 12.6 \text{ V} \times 0.6 \text{ A} = 7.56 \text{ W}$

Mechanical Specifications and Pinout

The tube is housed in a T-9 glass bulb and is equipped with a short intermediate-shell octal 5-pin base. It can be mounted and operated in any physical position.

Physical Dimensions

- **Maximum Overall Length:** 3-5/16 inches
- **Maximum Seated Length:** 2-3/4 inches
- **Maximum Diameter:** 1-9/32 inches

Pin Connections

The socket connections, viewed from the bottom of the base, utilize five active pins:

Pin Number	Connection	Description
Pin 2	NC	No Connection
Pin 3	K	Cathode
Pin 5	P	Plate
Pin 7	H	Heater
Pin 8	H	Heater

Damper Service Ratings

The maximum ratings for the 12AX4GT are established under the standard design-center system. Under this system, the ratings are working maximums. Equipment must be designed so that these limits are not

exceeded when operated from power lines with a nominal center voltage of 117 V, including normal line variations of up to plus or minus 10%.

Maximum Ratings (Design-Center Values)

- **Peak Inverse Plate Voltage:** 4000 max. volts (subject to duty cycle limits)
- **Peak Plate Current:** 600 max. mA
- **DC Plate Current:** 125 max. mA
- **Hot-Switching Transient Plate Current:** 3.0 max. amperes (for a maximum duration of 0.2 seconds)
- **Peak Heater-Cathode Voltage (Heater negative with respect to cathode):** 4000 max. volts (subject to duty cycle and DC component limits)
- **Peak Heater-Cathode Voltage (Heater positive with respect to cathode):** 100 max. volts

Pulse and DC Component Constraints

The 4000 V peak ratings for both the inverse plate voltage and the negative heater-cathode voltage are pulse-rated limits. They are applicable only when the duty cycle of the voltage pulse does not exceed 15% of one horizontal scanning cycle.

In a standard 525-line, 30-frame television system, 15% of one horizontal scanning cycle corresponds to a duration of 10 microseconds. From this, the total period (T) of one horizontal scanning cycle assumed by these ratings can be calculated as: $T = \frac{10 \mu s}{0.15} \approx 66.67 \mu s$

Additionally, when the heater is negative with respect to the cathode, the DC component of the heater-cathode voltage must not exceed 900 volts.

Average Plate Characteristics

The electrical behavior of the diode during conduction is characterized by its plate voltage versus plate current relationship. At a nominal heater voltage of 12.6 V, the average plate characteristic curve demonstrates a low internal tube drop under typical operating currents:

- At a DC plate potential of **10 V**, the plate current is approximately **100 mA**.
- At a DC plate potential of **20 V**, the plate current rises to approximately **230 mA**.
- At a DC plate potential of **30 V**, the plate current reaches approximately **370 mA**.
- At a DC plate potential of **40 V**, the plate current is approximately **500 mA**.

The curve continues upward, showing that the tube can deliver its maximum rated peak plate current of 600 mA at a plate voltage drop well below 60 V (approximately 48 V). This low forward voltage drop minimizes power dissipation within the tube during the conduction interval of the horizontal deflection cycle.

Technical Summary

The **12AX4GT** is a specialized, indirectly heated half-wave vacuum rectifier designed for television damper service. Operating with a **12.6 V, 0.6 A** heater, it is optimized for series-heater strings. Its

mechanical construction features a **T-9 bulb** with a **short intermediate-shell octal 5-pin base** and permits mounting in any position.

The tube is characterized by its high-voltage capability, supporting a **4000 V peak inverse plate voltage** and a **4000 V peak heater-cathode voltage** (heater negative) under pulsed conditions with a duty cycle of up to 15% (10 microseconds in a 525-line, 30-frame system). It supports a continuous **DC plate current of 125 mA**, a **peak plate current of 600 mA**, and a **hot-switching transient current of 3.0 A** for up to 0.2 seconds. With its low forward voltage drop and robust heater-cathode insulation (withstanding up to a 900 V DC component), the 12AX4GT provides a reliable and flexible solution for horizontal deflection damping.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · Rectifier

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	TVHorizontalDamper text	—



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	—

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