

ELECTRONIC TUBE REFERENCE

12AY3

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

12.6-volt heater variant of the 6AY3 half-wave vacuum rectifier, explicitly intended for television horizontal-deflection damper service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9HP	BASE PINS	9
NOMINAL HEATER	12.6 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9HP - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1	–	–	IC
PIN2	–	P – Plate (Anode)	CONNECTED
PIN3	–	–	IC
PIN4	–	H – Heater	CONNECTED
PIN5	–	H – Heater	CONNECTED
PIN6	–	–	IC
PIN7	–	P – Plate (Anode)	CONNECTED
PIN8	–	–	IC
PIN9	–	K – Cathode	CONNECTED

SECTION RATINGS

No fixed ratings recorded.

Reference-only sheet; electrical characteristics refer to 6AY3. Heater data from supplied 12AY3 sheet; no unsupported parent ratings guessed.

12AY3 and 12AY3A — Half-Wave Vacuum Rectifiers

The **12AY3** and **12AY3A** are Novar-type half-wave vacuum rectifiers designed specifically for damper service in television receivers. These tubes are characterized by their high peak inverse voltage ratings and robust heater-cathode insulation, which are essential for the demanding environment of horizontal deflection circuits.

Overview and Physical Construction

The 12AY3 and **12AY3A** are structurally identical to the **6AY3** and **6AY3B** respectively, with the sole exception of their heater ratings. They are housed in T-9 glass envelopes and utilize a Novar button 9-pin base with a 9HP basing arrangement.

The physical dimensions and base configurations differ between the two variants:

- **12AY3**: Utilizes an E9-75 Novar button 9-pin base (Outline 9-86). It has a maximum diameter of 1.188 inches, a maximum seated height of 3.030 inches, and a maximum overall height of 3.410 inches.
- **12AY3A**: Utilizes an E9-89 Novar button 9-pin base featuring an exhaust tip on the base. It has a shorter bulb configuration, resulting in a maximum seated height of 2.625 inches and a maximum overall height of 3.005 inches. The maximum diameter remains 1.188 inches.

Pin Connections (9HP Basing)

The 9-pin configuration provides the following connections:

- **Pin 1**: Internal Connection (IC) — *Must not be used as a tie point*
- **Pin 2**: Plate (P)
- **Pin 3**: Internal Connection (IC) — *Must not be used as a tie point*
- **Pin 4**: Heater (H)
- **Pin 5**: Heater (H)
- **Pin 6**: Internal Connection (IC) — *Must not be used as a tie point*
- **Pin 7**: Plate (P)
- **Pin 8**: Internal Connection (IC) — *Must not be used as a tie point*
- **Pin 9**: Cathode (K)

Heater and Electrical Ratings

The 12AY3 and 12AY3A are designed for series or parallel heater circuits, requiring a nominal heater voltage of 12.6 V (AC or DC) and drawing a nominal current of 0.600 ± 0.040 A. Both variants feature a controlled heater warm-up time of 11 seconds.

Heater-Cathode Voltage Limits

Because damper service subjects the tube to extreme potential differences between the heater and cathode, the heater-cathode insulation is highly rated:

- **Heater Negative with Respect to Cathode:**
 - Maximum DC Voltage: 900 Volts
 - Maximum Total DC and Peak Voltage: 5000 Volts
- **Heater Positive with Respect to Cathode:**
 - Maximum DC Voltage: 100 Volts
 - Maximum Total DC and Peak Voltage: 300 Volts

Design Maximum Ratings (Damper Service)

Under the Design Maximum Rating System, the rectifiers are rated for the following maximum limits:

- **Peak Inverse Plate Voltage:** 5000 Volts
- **Plate Dissipation:** 6.3 Watts
- **Steady State Peak Current:** 1100 mA
- **DC Plate Current:** 175 mA

Interelectrode Capacitances and Operating Conditions

Direct Interelectrode Capacitances

The direct capacitances of the tube, measured without an external shield, are as follows:

- **Heater to Cathode:** 2.8 pF
- **Plate to Cathode and Heater:** 6.5 pF
- **Cathode to Plate and Heater:** 9.0 pF

Television Damper Service Constraints

For proper operation in television damper service within a standard 525-line, 30-frame system, specific duty cycle limitations must be observed. The duty cycle of the voltage pulse applied to the tube must not exceed 15% of one horizontal scanning cycle. This restriction ensures that the plate dissipation and peak current limits are maintained within safe operating boundaries during the retrace and scan intervals.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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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