

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

17AY3A

1 SECTION
CONSTRUCTION
RECTIFIER

Rectifier - Damper Diode electronic tube

Half-wave vacuum rectifier designed for television horizontal-deflection damper service, with approximately 5 kV peak-inverse capability and controlled heater warm-up.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9HP	BASE PINS	9
NOMINAL HEATER	16.8 V / 450 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

SECTION1 Rectifier	
MAXIMUM PLATE DISSIPATION	6.5 W
PEAK INVERSE VOLTAGE	5000 V
NOMINAL OUTPUT CURRENT	175 mA
PEAK FORWARD CURRENT	1.1 A
FORWARD VOLTAGE DROP	32 V
MAXIMUM HEATER-CATHODE VOLTAGE	5000 V
WARM-UP TIME	11 s
Reference/equivalence-only source does not reproduce the referenced electrical ratings/characteristics; promoted values intentionally not inferred from external datasheets.	

17AY3A — Half-Wave Vacuum Rectifier

The **17AY3A** is a Novar-type half-wave vacuum rectifier designed specifically for use as a damper diode in the horizontal-deflection circuits of television receivers, particularly black-and-white television systems. It features a coated unipotential cathode and is housed in a compact T-9 glass envelope with a 9-pin button base.

The tube is electrically identical to the [6AY3B](#) and [12AY3A](#) except for its heater ratings. It is also closely related to the [6AY3](#), [6AY3A](#), [12AY3](#), and [17AY3](#) families, from which it differs physically by having a shorter bulb and a base equipped with an exhaust tip at the bottom. As a power-handling device, the 17AY3A requires adequate ventilation during operation to ensure reliable performance and prevent thermal overload.

Construction, Physical Dimensions, and Base

The 17AY3A is constructed in a T-9 glass envelope with a Novar button 9-pin base (E9-89 designation) featuring an exhaust tip at the bottom. This physical configuration results in a shorter bulb than some of its predecessor types.

Physical Dimensions

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 2.625 inches
- **Maximum Overall Height:** 3.005 inches

Socket and Wiring Requirements

The tube requires a standard Novar 9-contact socket. A critical wiring caution applies to the socket terminals: pins 1, 3, 6, and 8 are designated as Internal Connections (IC) and must never be used as tie points for external circuit wiring.

Pinout Configurations (9HP Basing Diagram)

The technical literature contains two variations for the 9HP basing diagram connections. In both configurations, pins 1, 3, 6, and 8 are reserved as Internal Connections, and pin 9 is connected to the cathode. The heater and plate connections differ as follows:

Pin	Configuration A	Configuration B
Pin 1	Internal Connection (IC)	Internal Connection (IC)
Pin 2	Plate (P)	Heater (H)
Pin 3	Internal Connection (IC)	Internal Connection (IC)
Pin 4	Heater (H)	Heater (H)
Pin 5	Heater (H)	Internal Connection (IC)
Pin 6	Internal Connection (IC)	Internal Connection (IC)
Pin 7	Plate (P)	Plate (P)
Pin 8	Internal Connection (IC)	Internal Connection (IC)
Pin 9	Cathode (K)	Cathode (K)

Heater Characteristics and Design Requirements

The 17AY3A is designed for series heater string operation or dedicated AC/DC supplies.

Heater Ratings

- **Heater Voltage (AC or DC):** 16.8 V (at the bogey current of 0.45 A)
- **Heater Current:** 0.45 A (with a tolerance of ± 0.03 A)
- **Average Heater Warm-up Time:** 11 seconds

Heater Design and Warm-up Definition

Equipment utilizing the 17AY3A must be designed so that the heater current is centered at the specified bogey value of 0.45 A. Variations in the heater supply must be restricted to keep the operating current within the ± 0.03 A tolerance.

The average heater warm-up time of 11 seconds is defined under specific test conditions: it is the time required for the voltage across the heater to reach 80% of its bogey value (13.44 V) when 4 times the bogey heater voltage (67.2 V) is applied to a circuit consisting of the tube heater in series with a resistance equal to:

$$\text{Resistance} = \frac{3 \times V_{\text{bogey}}}{I_{\text{bogey}}} = \frac{3 \times 16.8 \text{ V}}{0.45 \text{ A}} = 112 \Omega$$

This calculation uses the nominal bogey voltage of 16.8 V and the nominal bogey current of 0.45 A as inputs to determine the series test resistance of 112 ohms.

Electrical Characteristics and Capacitances

The 17AY3A exhibits low internal voltage drop and moderate interelectrode capacitances, typical of a high-efficiency damper diode.

Typical Operating Characteristics

- **Tube Voltage Drop:** 32 V (measured instantaneously at a plate current of 350 mA)

Direct Interelectrode Capacitances (Unshielded, Approximate)

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

Maximum Ratings (Design-Maximum System)

The ratings for the 17AY3A are specified under the Design-Maximum Rating System for operation in a 525-line, 30-frame television system. These values represent the limits within which the tube must be operated to ensure reliable service.

Damper Service Limits

- **Peak Inverse Plate Voltage:** 5000 V maximum (The pulse duration must not exceed 15% of a horizontal scanning cycle, or a maximum of 10 microseconds).
- **Peak Plate Current (Steady State):** 1100 mA maximum
- **Average Plate Current (DC):** 175 mA maximum
- **Plate Dissipation:** 6.3 W to 6.5 W maximum

Heater-Cathode Voltage Ratings

Due to the high-voltage pulses present in horizontal-deflection circuits, the heater-cathode insulation is rated to withstand significant potential differences:

- **Heater Negative with Respect to Cathode:**
 - **DC Limit:** 900 V
 - **Total DC and Peak Limit:** 5000 V
- **Heater Positive with Respect to Cathode:**
 - **DC Limit:** 100 V
 - **Total DC and Peak Limit:** 300 V to 800 V

Technical Summary

The **17AY3A** is a **Novar-type, half-wave vacuum rectifier** designed for **television damper service** in horizontal-deflection circuits. Operating with a **16.8 V, 0.45 A heater**, it features an average warm-up time of **11 seconds** and is housed in a compact **T-9 envelope** with a **9-pin button base** featuring an exhaust tip. It is characterized by a low **32 V instantaneous drop** at 350 mA, a peak inverse voltage rating of **5000 V**, and a peak plate current capability of **1100 mA**. Proper circuit design requires strict adherence to the **15% pulse duty cycle limit** and avoiding the use of pins 1, 3, 6, and 8 as tie points.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Rectifier

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warmup Time	11 s	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

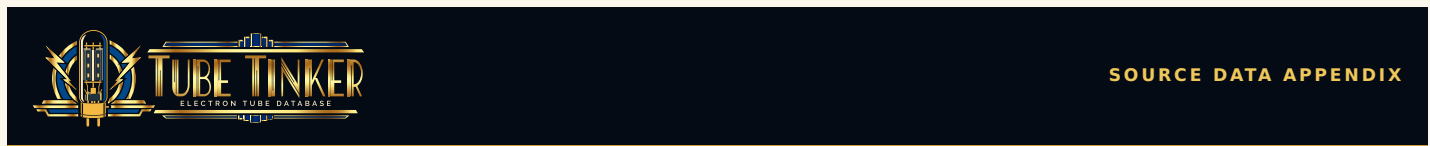
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
respect to cathodes b max	5000 V	—
b The dt component must not exceed	900 V	—
c The do component must not exceed o	10 V	—
respect to cathode a max	300 V	—

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	16.8 V	Reference sheet; AC or DC at rated heater current
Heater current	450 mA	Reference sheet nominal current
Warm-up time	11 s	Average

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Inverse Plate Voltage° max	5000 V	—
Peak Plate Current max	1100 mA	—
Average Plate Current max	175 mA	—
Plate Dissipation max	6.5 W	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
P to (K,H)	6.5 pF	—
K to (P,H)	9 pF	—
Heater to cathode	2.8 pF	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1975 RCA RC30

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

1975 RCA RC30

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak inverse plate voltage	5000 V	DamperService
Peak plate current	1100 mA	DamperService
Average plate current	175 mA	DamperService
Plate dissipation	6.5 W	DamperService

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Tube voltage drop	32 V	PlateCurrent=350mA
Heater warm-up time	11 s	Average

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate-to-cathode/heater capacitance	6.5 pF	Approximate
Cathode-to-plate/heater capacitance	9 pF	Approximate
Heater-to-cathode capacitance	2.8 pF	Approximate