

ELECTRONIC TUBE REFERENCE

17DW4A

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Novar half-wave vacuum rectifier used as a damper diode in television horizontal-deflection circuits.

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 W
PEAK INVERSE VOLTAGE	5000 V
NOMINAL OUTPUT CURRENT	200 mA
PEAK FORWARD CURRENT	1.1 A
FORWARD VOLTAGE DROP	12 V
WARM-UP TIME	11 s
<i>Promoted from published ratings/characteristics where directly applicable; additional published values retained in TUBE_SECTION_PARAMETER.</i>	

17DW4A — Half-Wave Vacuum Rectifier and Damper Diode

The **17DW4A** is a heater-cathode half-wave vacuum rectifier designed specifically for service as a damper diode in the horizontal-deflection circuits of television receivers. It is utilized in both black-and-white and color television designs. The tube is constructed in a T-9 glass envelope with a 9-pin novar button base and features a 16.8 V heater with a controlled warm-up time.

The 17DW4A is electrically identical to the **6BS3A** except for its heater ratings, and is closely associated with the **17BS3A/17DW4A** designation.

Construction, Physical Dimensions, and Installation

The 17DW4A features a Novar T-9 glass envelope and uses a 9-pin novar button base (E9-75) with a **9HP** basing arrangement.

Physical Dimensions

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 3.030 inches
- **Maximum Overall Height:** 3.410 inches
- **Envelope Outline:** Section 30B

Installation and Socketing

The tube requires a novar 9-contact socket. Because of the high voltages present in television damper service, specific socketing precautions must be observed:

- Socket terminals 1, 3, 6, and 8 are connected to internal tube structures (Internal Connection - IC) and must not be used as circuit tie points.
- It is recommended to remove the socket clips for pins 1, 3, 6, and 8 to reduce the risk of electrical arc-over and minimize leakage currents.

- Adequate ventilation must be provided in the equipment layout to prevent overheating, as the maximum bulb temperature at the hottest point must not exceed **180 °C**.

Pinout and Connections

The 17DW4A uses the **9HP** pinout configuration. There are minor variations in documentation regarding Pin 2, which is either designated as an internal connection or as an additional plate connection. The connections, viewed from the underside of the base, are:

Pin	Connection
Pin 1	IC (Internal Connection - do not use as tie point, recommend removing socket clip)
Pin 2	IC (Internal Connection) or P (Plate)
Pin 3	IC (Internal Connection - do not use as tie point, recommend removing socket clip)
Pin 4	H (Heater)
Pin 5	H (Heater)
Pin 6	IC (Internal Connection - do not use as tie point, recommend removing socket clip)
Pin 7	P (Plate)
Pin 8	IC (Internal Connection - do not use as tie point, recommend removing socket clip)
Pin 9	K (Cathode)

Heater Ratings

The heater is designed for series or parallel operation with a controlled warm-up time:

Parameter	Value
Heater Voltage (AC/DC)	16.8 V
Heater Current	0.45 A (450 mA)
Average Heater Warm-up Time	11 s

Electrical Characteristics and Typical Operation

The 17DW4A exhibits a low internal voltage drop under typical instantaneous current loads. The documented typical operating points are:

- **Tube Voltage Drop (Point 1):** 19 V at an instantaneous plate current (I_b) of 250 mA.
- **Tube Voltage Drop (Point 2):** 25 V at an instantaneous plate current (I_b) of 350 mA.

Direct Interelectrode Capacitances

The unshielded capacitances of the tube are approximately:

- **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 17DW4A are specified under the Design-Maximum Rating System for operation in a 525-line, 30-frame television system (Damper Service). Depending on the specific application and design standard, the maximum limits are defined as follows:

Rating Parameter	Value Range / Limit
Peak Inverse Plate Voltage	5500 V (Pulse duration must not exceed 15% of a horizontal scanning cycle, or 10 μ s)
Steady State Peak Plate Current	1200 mA to 1300 mA
DC / Average Plate Current	200 mA to 250 mA
Plate Dissipation	6.5 W to 8.5 W
Maximum Bulb Temperature	180 °C

Heater-Cathode Voltage Limits

The insulation between the heater and the cathode is designed to withstand high pulse voltages, which is critical in damper service where the cathode is often at a high pulse potential relative to ground:

- **Heater Negative with Respect to Cathode:**
 - **DC Limit:** 900 V
 - **Total DC and Peak Limit:** 5500 V
- **Heater Positive with Respect to Cathode:**
 - **DC Limit:** 100 V
 - **Total DC and Peak Limit:** 300 V

Technical Summary

The **17DW4A** is a specialized novar-based, half-wave vacuum rectifier designed for television damper service. Operating with a **16.8 V, 450 mA** heater, it features high peak inverse voltage capabilities up to **5500 V** and can handle peak currents up to **1300 mA**. Its construction utilizes a T-9 envelope with a 9HP

pinout, requiring careful socketing practices (such as removing unused socket clips) to prevent arc-over under high-voltage pulse conditions.

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
Heater Voltage (ac/dc) 6-3 12.6	16.8 V	Published in approved 17DW4A target datasheet entry; Section1
Heater Current 1-2 0.6	450 mA	Published in approved 17DW4A target datasheet entry; Section1
Heater Warm-up Time (Average) – 11	11 seconds	Published in approved 17DW4A target datasheet entry; Section1
Peak Inverse Plate Voltage*	5000 V	Published in approved 17DW4A target datasheet entry; Section1
Peak Plate Current	1100 mA	Published in approved 17DW4A target datasheet entry; Section1
Average Plate Current	200 mA	Published in approved 17DW4A target datasheet entry; Section1
Peak value -f300 –	-5000 V	Published in approved 17DW4A target datasheet entry; Section1
Average value +100	900 V	Published in approved 17DW4A target datasheet entry; Section1
Tube Voltage Drop for plate current of	140 mA	Published in approved 17DW4A target datasheet entry; Section1
Tube Voltage Drop for plate current of 140 mA	12 V	Published in approved 17DW4A target datasheet entry; Section1
£ Pulse duration must not exceed 15% of a horizontal scanning cycle (	10 microseconds	Published in approved 17DW4A target datasheet entry; Section1
Heater Voltage (ac/dc) 3.15 4.2	6.3 V	Published in approved 17DW4A target datasheet entry; Section1
Heater Current 0.6 0.45	300 mA	Published in approved 17DW4A target datasheet entry; Section1
Heater Warm-up Time (Average) 11	11 seconds	Published in approved 17DW4A target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage (Each Unit)	300 V	Published in approved 17DW4A target datasheet entry; Section1
Peak positive value	50 V	Published in approved 17DW4A target datasheet entry; Section1
DC negative value	50 V	Published in approved 17DW4A target datasheet entry; Section1
DC positive value	3 V	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Voltage	150 V	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.1 (Control-Grid) Voltage, Negative bias value	50 V	Published in approved 17DW4A target datasheet entry; Section1
Cathode Current	12 mA	Published in approved 17DW4A target datasheet entry; Section1
Plate Dissipation (Each Unit)	1.1 W	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.2 Input	0.75 W	Published in approved 17DW4A target datasheet entry; Section1
Plate Voltage (Each Unit) 100	100 V	Published in approved 17DW4A target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate to Cathode and Heater	6.5 pF	Published in approved 17DW4A target datasheet entry; Section1
Heater to Cathode z	8 pF	Published in approved 17DW4A target datasheet entry; Section1
Grid No. 3 to Plate (Each Unit)	1.9 pF	Published in approved 17DW4A target datasheet entry; Section1
Grid No.1 to All Other Electrodes	6 pF	Published in approved 17DW4A target datasheet entry; Section1
Grid No.3 to All Other Electrodes (Each Unit)	3.6 pF	Published in approved 17DW4A target datasheet entry; Section1
Plate to All Other Electrodes (Each Unit)	3 pF	Published in approved 17DW4A target datasheet entry; Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No-3 Voltage (Each Unit) -10	0 V	Published in approved 17DW4A target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.2 Voltage 67.6	67.5 V	Published in approved 17DW4A target datasheet entry; Section1
Plate Current (Each Unit)	2.2 mA	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.2 Current 6.5	3.3 mA	Published in approved 17DW4A target datasheet entry; Section1
Cathode Current 6.6	7.8 mA	Published in approved 17DW4A target datasheet entry; Section1
Plate Voltage 100	100 V	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.3 Voltage 0	0 V	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.2 Voltage 67.5	67.5 V	Published in approved 17DW4A target datasheet entry; Section1
Grid-No.3 Transconductance	180 μS	Published in approved 17DW4A target datasheet entry; Section1

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