

ELECTRONIC TUBE REFERENCE

17DE4

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

RECTIFIER

Glass-octal half-wave vacuum rectifier designed as a damper diode in television horizontal-deflection circuits.

GENERAL CHARACTERISTICS

BASE DESIGNATION	4CG	BASE PINS	9
NOMINAL HEATER	17 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

SECTION 1 Rectifier	
MAXIMUM PLATE DISSIPATION	6.5 W
PEAK INVERSE VOLTAGE	6500 V
NOMINAL OUTPUT CURRENT	180 mA
PEAK FORWARD CURRENT	1.1 A
FORWARD VOLTAGE DROP	34 V
WARM-UP TIME	11 s
<i>Reference/equivalence-only source does not reproduce the referenced electrical ratings/characteristics; promoted values intentionally not inferred from external datasheets.</i>	

17DE4 — Half-Wave Vacuum Rectifier

The **17DE4** is an indirectly heated, half-wave vacuum rectifier designed specifically for service as a damper diode in the horizontal-deflection circuits of television receivers. It is engineered to withstand high-voltage pulses and deliver high peak currents, making it suitable for energy recovery in black-and-white television scanning systems.

Overview and Equivalents

The 17DE4 is a heater-cathode diode featuring a unipotential cathode and a glass envelope. In terms of electrical characteristics and physical construction, the 17DE4 is identical to the [6DE4](#) and [22DE4](#) vacuum tubes, with the sole exception of its heater ratings and heater warm-up time.

The tube is designed to operate in any mounting position. It requires adequate ventilation during operation, typical of power-handling vacuum tubes, to ensure that envelope temperatures remain within safe limits.

Construction, Mechanical Specifications, and Base

The 17DE4 is constructed using a T-9 glass bulb outline (JEDEC 9-44 or JEDEC Group 1 B5-85 / B8-85).

Physical Dimensions

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 3.250 inches
- **Maximum Bulb Length:** 3.250 inches
- **Maximum Overall Height:** 3.812 to 3.813 inches

Base and Socket Requirements

The tube is equipped with a short intermediate-shell 5-pin octal base with external barriers (JEDEC Group 1 B8-85 or B5-85). On some base configurations, pins 1, 4, and 6 are omitted.

The 17DE4 requires a standard octal socket. Because of the high peak voltages encountered in damper service, socket terminals 1, 2, 4, and 6 must not be used as tie points for any other circuit wiring.

Heater Ratings and Warm-up Characteristics

The heater of the 17DE4 is designed for series-string or parallel operation using either an AC or DC supply.

Heater Specifications

- **Heater Voltage (AC/DC):** 17.0 V
- **Heater Current:** Documented as either 0.6 A (600 mA) $\pm$ 40 mA or 500 mA $\pm$ 40 mA
- **Average Heater Warm-up Time:** 11.0 seconds

The heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value when four times the rated heater voltage is applied to a circuit consisting of the tube heater in series with an external resistance equal to three times the nominal heater operating resistance.

Pinout Configurations

The 17DE4 utilizes the JEDEC 4CG basing diagram, viewed from the bottom of the tube. The technical literature documents two distinct pinout configurations:

Standard 4CG Basing

- **Pin 2:** Internal Connection (IC) — must not be used as a tie point
- **Pin 3:** Cathode (K)
- **Pin 5:** Plate (P)
- **Pin 7:** Heater (H)
- **Pin 8:** Heater (H)
- *Note:* Pins 1, 4, and 6 are physically omitted from the base.

Alternative Basing Configuration

- **Pin 2:** Internal Connection (IC)
- **Pin 3:** Plate (P)
- **Pin 5:** Plate (P)
- **Pin 7:** Heater (H) and heater terminal
- **Pin 8:** Cathode (K)

For both configurations, the restriction against using socket terminals 1, 2, 4, and 6 as tie points remains critical.

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the 17DE4, measured without an external shield, are:

- **Plate to Cathode and Heater:** 8.5 pF
- **Cathode to Plate and Heater:** 11.5 pF
- **Heater to Cathode:** 4.0 pF

Damper Service Ratings (Design-Maximum System)

The ratings of the 17DE4 are established under the Design-Maximum Rating System. These ratings are specified for operation in a standard 525-line, 30-frame television system:

- **Maximum Peak Inverse Plate Voltage:** 5500 V (The duty cycle of the voltage pulse must not exceed 15% of one horizontal scanning cycle, corresponding to a maximum pulse duration of 10 microseconds)
- **Maximum Peak Plate Current:** 1100 mA
- **Maximum DC (Average) Plate Current:** 180 mA
- **Maximum Plate Dissipation:** 6.5 W
- **Maximum Heater-Cathode Voltage (Heater Negative with respect to Cathode):** 5500 V peak (with the DC component not exceeding 900 V)
- **Maximum Heater-Cathode Voltage (Heater Positive with respect to Cathode):** 300 V peak (with the DC component not exceeding 100 V)

Electrical Characteristics and Curve Observations

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

- **Tube Voltage Drop:** 34 V at an instantaneous plate current (I_b) of 350 mA.

Plate Characteristics

The plate characteristics represent the relationship between the DC plate voltage and the resulting plate current when the heater is operated at 17.0 V. The published curves start at the origin (0 V, 0 mA) and rise nearly linearly, with two distinct sets of typical operating points documented in the technical literature:

Curve Set A

- **25 V DC Plate Voltage:** Corresponds to approximately 200 mA of plate current.
- **50 V DC Plate Voltage:** Corresponds to approximately 600 mA of plate current.
- **Transition Point:** The curve is solid up to approximately 300 mA (at ~32 V) and becomes a dashed line from 300 mA up to 1100 mA (at ~68 V).

Curve Set B

- **25 V DC Plate Voltage:** Corresponds to approximately 250 mA of plate current.

- **50 V DC Plate Voltage:** Corresponds to approximately 750 mA of plate current.
- **Transition Point:** The curve transitions to a dashed line above 750 mA, reaching approximately 1000 mA at a DC plate voltage of 60 V.

The dashed portions of these curves represent peak operating regions that are only permissible under transient or pulsed conditions, such as those encountered during the horizontal retrace period in television deflection circuits.

Technical Summary

The **17DE4** is a specialized **half-wave vacuum rectifier** designed for **damper service** in television horizontal-deflection circuits. Operating with a **17.0 V heater** (drawing either **500 mA** or **600 mA** depending on the production specification) and featuring an **11-second warm-up time**, it is optimized for series-string television designs. It is physically identical to the [6DE4](#) and [22DE4](#) except for these heater parameters. With a peak inverse plate voltage rating of **5500 V** and a peak current capability of **1100 mA**, the 17DE4 provides the robust high-voltage insulation and high peak-current handling required for television horizontal-deflection systems.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	16.8 V	Nominal
Heater current	300 mA	Nominal



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 3 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
NEATER TO CATHODE	4 pF	Published datasheet
MAXIMUM PEAK INVERSE PLATE VOLTAGE	550 V	Published datasheet
MAXIMUM PEAK PLATE CURRENT	1100 mA	Published datasheet
MAXIMUM DC PLATE CURRENT	180 mA	Published datasheet
MAXIMUM PLATE DISSIPATION	6.5 W	Published datasheet
HEATER NEGATIVE WITH RESPECT TO CATHODE	550 V	Published datasheet
HEATER POSITIVE WITH R ESPECT TO CATHODE	300 V	Published datasheet

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER WARM- UP TIME (APPROX.)*	11 s	Published datasheet
BTHE DC COMPONENT MUST NOT E%GEED	900 V	Published datasheet
THE DC COMPONENT MUST NOT EXCEED	0 V	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
OF THE VOLTAGE PULSE MUST NOT E%GEED	15 V	Published datasheet
ROS OF ITS RATED VOLTAGE AFTER APPLTING	5 V	Published datasheet


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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 DATA APPENDIX

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	17 V	AC or DC at rated heater current
Heater current	600 mA	Nominal current
Warm-up time	11 s	Average
Reference parent type	6DE4	Electrical characteristics same except heater



SOURCE DATA APPENDIX

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 17	22.4 V	Published in approved 17DE4 target datasheet entry; Section1
Heater Current 1.6 0.6	450 mA	Published in approved 17DE4 target datasheet entry; Section1
Heater Warm-up Time (Average) – 11	11 seconds	Published in approved 17DE4 target datasheet entry; Section1
Peak Inverse Plate Voltage#	6500 V	Published in approved 17DE4 target datasheet entry; Section1
Peak Plate Current	1100 mA	Published in approved 17DE4 target datasheet entry; Section1
Average Plate Current	180 mA	Published in approved 17DE4 target datasheet entry; Section1
Plate Dissipation	6.5 W	Published in approved 17DE4 target datasheet entry; Section1
Peak value +300	-5500 V	Published in approved 17DE4 target datasheet entry; Section1
Average value -f-100	900 V	Published in approved 17DE4 target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Tube Voltage Drop for plate current of	350 mA	Published in approved 17DE4 target datasheet entry; Section1
Tube Voltage Drop for plate current of 350 mA	34 V	Published in approved 17DE4 target datasheet entry; Section1
# Pulse duration must not exceed 15% of a horizontal scanning: cycle (	10 microseconds	Published in approved 17DE4 target datasheet entry; Section1
Heater Voltage (ac/dc) 4.2	6.3 V	Published in approved 17DE4 target datasheet entry; Section1
Heater Current 0.45	300 mA	Published in approved 17DE4 target datasheet entry; Section1
Heater Warm-up Time (Average)	11 seconds	Published in approved 17DE4 target datasheet entry; Section1
Plate Voltage	330 V	Published in approved 17DE4 target datasheet entry; Section1
Grid-No. 3 (Suppressor-Grid) Voltage, Positive value	0 V	Published in approved 17DE4 target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Supply Voltage	330 V	Published in approved 17DE4 target datasheet entry; Section1
Grid-No. I (Control-Grid) Voltage, Positive-bias value	0 V	Published in approved 17DE4 target datasheet entry; Section1
Plate Dissipation	2.3 W	Published in approved 17DE4 target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate to Cathode and Heater	8.5 pF	Published in approved 17DE4 target datasheet entry; Section1
Cathode to Plate and Heater	11.5 pF	Published in approved 17DE4 target datasheet entry; Section1
Heater to Cathode	4 pF	Published in approved 17DE4 target datasheet entry; Section1
Grid No.3, and Internal Shield 6.5	6.5 pF	Published in approved 17DE4 target datasheet entry; Section1
and Internal Shield	2 pF	Published in approved 17DE4 target datasheet entry; Section1

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
frequency in the order of	40 MHz	Published in approved 17DE4 target datasheet entry; Section1

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