



ELECTRONIC TUBE REFERENCE

17BE3

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Half-wave vacuum rectifier designed for television horizontal-deflection damper service, with approximately 5 kV inverse-voltage capability and high pulse current.

GENERAL CHARACTERISTICS

BASE DESIGNATION	26E	BASE PINS	12
NOMINAL HEATER	16.8 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
MAXIMUM PLATE DISSIPATION	6.6 W
PEAK INVERSE VOLTAGE	5000 V
NOMINAL OUTPUT CURRENT	200 mA
PEAK FORWARD CURRENT	1.2 A
FORWARD VOLTAGE DROP	25 V
MAXIMUM HEATER-CATHODE VOLTAGE	5000 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>	

17BE3 — Half-Wave Vacuum Rectifier

The **17BE3** (also designated as the **17BZ3**) is a compactron-type, indirectly heated half-wave vacuum rectifier designed specifically for service as a damping diode in the horizontal-deflection circuits of both

color and black-and-white television receivers. It features a single diode structure with a coated unipotential cathode and is designed to operate in any mounting position.

The 17BE3 is electrically identical to the [6BE3](#), [12BE3](#), and [6BZ3](#) vacuum tubes, differing only in its heater ratings and characteristics.

Mechanical Specifications and Pinout

The 17BE3 is housed in a T-9 glass bulb (JEDEC 9-60 outline) with a button 12-pin E12-70 base, commonly referred to as a duodecar or compactron type. This configuration requires a specialized duodecar 12-contact socket.

Physical Dimensions

- **Maximum Overall Length:** 2.875 to 3.110 inches
- **Seated Height:** 2.250 to 2.735 inches
- **Diameter:** 1.062 to 1.188 inches

Pin Connections (JEDEC 12GA)

Depending on the specific manufacturing design of the 12GA basing diagram, two pinout configurations are documented. In both configurations, certain pins are designated as internal connections (IC) or no-connection (NC) terminals. It is recommended that socket terminals for pins 5, 6, 8, and 9 not be used as tie points, and ideally, the socket clips for these pins should be removed to prevent electrical interference or breakdown.

Pinout Configuration A

Pin	Connection
1	Heater (H)
2	No Connection (NC)
3	No Connection (NC)
4	Plate (P)
5	Internal Connection (IC) — Do Not Use
6	No Connection (NC)
7	Cathode (K)
8	No Connection (NC)
9	Internal Connection (IC) — Do Not Use
10	Plate (P)

Pin	Connection
11	No Connection (NC)
12	Heater (H)

Pinout Configuration B

Pin	Connection
1	No Connection (NC)
2	No Connection (NC)
3	No Connection (NC)
4	No Connection (NC)
5	Internal Connection (IC) — Do Not Use
6	Plate (P)
7	Cathode (K)
8	No Connection (NC)
9	Internal Connection (IC) — Do Not Use
10	Plate (P)
11	Heater (H)
12	Heater (H)

Heater Characteristics

The 17BE3 is engineered with a controlled heater warm-up characteristic, which is critical for minimizing heater voltage surges when the tube is operated in series-connected heater strings.

- **Heater Voltage (AC or DC):** 16.8 V
- **Heater Current:** 0.45 A to 0.46 A (nominal range of 0.45 ± 0.03 A)
- **Average Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required for the heater voltage to reach 80% of its rated value when a voltage equal to four times the rated heater voltage (67.2 V) is applied to a test circuit. This test circuit consists of the tube heater connected in series with an external resistance equal to three times the nominal heater operating resistance (calculated as three times the rated voltage divided by the rated current).

Electrical Characteristics and Capacitances

Under typical operating conditions, the 17BE3 exhibits a low internal tube voltage drop, which ensures efficient power transfer in television deflection circuits.

- **Tube Voltage Drop:** 25 V (measured as an instantaneous value at a direct current plate current of 350 mA)

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube, measured without an external shield, vary slightly depending on the internal structural layout:

Capacitance Set A

- **Cathode to Plate and Heater [K to (P + H)]:** 10 pF
- **Plate to Cathode and Heater [P to (K + H)]:** 8.0 pF
- **Heater to Cathode [H to K]:** 3.4 pF

Capacitance Set B

- **Plate to Cathode and Heater:** 10 pF
- **Cathode to Heater and Plate:** 8.0 pF
- **Heater to Cathode:** 3.4 pF

Maximum Ratings for Television Damper Service

The ratings for the 17BE3 are defined under the Design-Maximum System (EIA Standard RS-239). These limits are specified for operation in a standard television receiver utilizing a 525-line, 30-frame scanning system. Under these conditions, the horizontal voltage pulse duty cycle must not exceed 15% of a single horizontal scanning cycle, with a maximum pulse duration of 10 microseconds.

Parameter	Design-Maximum Rating
Peak Inverse Plate Voltage	5000 V
Steady State Peak Plate Current	1200 mA
DC Output Current (Average Plate Current)	200 mA
Plate Dissipation	6.5 W

Heater-Cathode Voltage Limits

Because the damper diode operates at high potentials relative to ground, the insulation between the heater and the cathode is subjected to severe electrical stress. The maximum allowable heater-cathode voltages are:

- **Heater Negative with Respect to Cathode:**

- DC Component: 900 V
- Total DC and Peak: 5000 V
- **Heater Positive with Respect to Cathode:**
 - DC Component: 100 V
 - Total DC and Peak: 300 V to 3000 V (depending on the specific manufacturing specification and rating system applied)

Technical Summary

The **17BE3** is a specialized **compactron/duodecar half-wave vacuum rectifier** designed for high-voltage television damper service. Operating with a **16.8 V heater** drawing **0.45 A to 0.46 A**, it features a controlled **11-second warm-up time** to protect series-wired heater strings. Physically housed in a **T-9 glass envelope** with a **12-pin button base**, it provides robust performance under demanding horizontal-deflection conditions, supporting a **peak inverse plate voltage of 5000 V**, a **peak plate current of 1200 mA**, and a **plate dissipation of 6.5 W**. Its low internal voltage drop of **25 V at 350 mA** ensures highly efficient operation in television receiver circuits.



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
Service	Television damper diode	—



SOURCE OPERATING CONDITIONS

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak inverse voltage	5000 V	—
Peak plate current	1200 mA	—
DC plate current	200 mA	—



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

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO PLATE AND HEATER: K TO (P+H)	10 pF	Published datasheet
PLATE TO CATHODE AND HEATER: P TO (K+H)	8 pF	Published datasheet

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER TO CATHODE: (H TO K)	3.4 pF	Published datasheet
AVERAGE CHARACTERISTICS	12.6 mA	Published datasheet; operating column 1
AVERAGE CHARACTERISTICS	600 mA	Published datasheet; operating column 2
HEATER WARM-UP TIME 'A	11 s	Published datasheet
DC COMPONENT	900 V	Published datasheet
TOTAL DC AND PEAK	5000 V	Published datasheet
DC COMPONENT	100 V	Published datasheet
TOTAL DC AND PEAK	300 V	Published datasheet
PEAK INVERSE PLATE VOLTAGE	5000 V	Published datasheet
PLATE DISSIPATION	6.5 W	Published datasheet
Maximum plate dissipation	6.5 W	Published datasheet; promoted section value
Maximum peak inverse voltage	5000 V	Published datasheet; promoted section value
DC output current	200 mA	Published datasheet; promoted section value
Peak forward current	1.2 A	Published datasheet; promoted section value

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CURRENT	0 mA	Published datasheet; operating column 1
CURRENT	600 mA	Published datasheet; operating column 2
CURRENT	40 mA	Published datasheet; operating column 3
STEADY STATE PEAK PLATE CURRENT	1200 mA	Published datasheet
TUBE VOLTAGE DROP, $I_b =$	350 V	Published datasheet; operating column 1
TUBE VOLTAGE DROP, $I_b =$	25 V	Published datasheet; operating column 2



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 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
Voltage (AC or DC) t	6.3 V	PublishedColumn1
The do component must not exceed	900 V	—
The tic component must not exceed	100 V	—
Voltage (AC or DC) t	0.6 V	PublishedColumn2
Heater negative with respect to cathodee b max	5000 V	—
Heater positive with respect to cathode. c max	300 V	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC Plate Current max	200 mA	—
Plate Dissipation max	6.5 W	—
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
Peak Inverse Plate Voltages max	5000 V	—
Peak Plate Current max	1200 mA	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
P to (K, H)	10 pF	—
K to (P, H)	8 pF	—
H to K	3.4 pF	—



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
Peak inverse plate voltage	5000 V	DamperService
Peak plate current	1200 mA	DamperService
Average plate current	200 mA	DamperService
Plate dissipation	6.6 W	DamperService

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Tube voltage drop	26 V	PlateCurrent=350mA
Heater warm-up time	11 s	Average

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate-to-cathode/heater capacitance	10 pF	Approximate
Cathode-to-heater/plate capacitance	8 pF	Approximate
Heater-to-cathode capacitance	3.4 pF	Approximate