

ELECTRONIC TUBE REFERENCE

12BS3

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Half-wave vacuum rectifier designed for television horizontal-deflection damper service, supplied as a 12.6-volt-heater member of its damper-diode family.

GENERAL CHARACTERISTICS

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

SECTION RATINGS

SECTION1 Rectifier	
WARM-UP TIME	11 s
Supplied sheet explicitly states this is the same as 6BS3 except for heater characteristics. Parent electrical table was not present in the currently available local corpus, so no unsupported promoted values were invented.	

12BS3 — Half-Wave Vacuum Rectifier

The **12BS3** is a Novar-type half-wave vacuum rectifier designed specifically for damper service in television receivers. It is characterized by its high peak inverse voltage capability and high peak current ratings, which are essential for the demanding environment of horizontal deflection circuits. The 12BS3 is electrically identical to the 6BS3 and 17BS3, differing only in its heater ratings and warm-up characteristics.

Construction and Physical Specifications

The 12BS3 features a Novar T-9 glass envelope construction with a button 9-pin base (E9-75 designation). The physical dimensions of the tube are as follows:

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 3.030 inches
- **Maximum Overall Height:** 3.410 inches

The tube utilizes the **9HP** basing arrangement. The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Connection
Pin 1	Internal Connection (IC)
Pin 2	Plate
Pin 3	Internal Connection (IC)
Pin 4	Heater
Pin 5	Heater
Pin 6	Internal Connection (IC)
Pin 7	Plate
Pin 8	Internal Connection (IC)
Pin 9	Cathode

To prevent circuit interference or damage, pins 1, 3, 6, and 8 are designated as internal connections and must not be used as external circuit tie points.

Heater Characteristics and Operation

The 12BS3 is designed with an indirectly heated cathode. Its heater is engineered with a controlled warm-up time, making it suitable for use in series-string heater arrangements. The heater specifications for the 12BS3, alongside its related variants, are detailed below:

Parameter	12BS3	<u>12BS3A</u>	<u>6BS3</u>	<u>17BS3</u>
Heater Voltage (AC or DC)	12.6 V	12.6 V	6.3 V	16.8 V
Heater Current	0.600 ± 0.040 A	0.600 ± 0.040 A	1.200 A	0.450 A
Average Warm-up Time	11 seconds	11 seconds	—	11 seconds

The [12BS3A](#) is a closely related variant that is identical to the [6BS3A](#) except for its 12.6 V, 0.600 A heater with an 11-second average warm-up time.

Heater-Cathode Insulation Ratings

Because damper service involves high pulse voltages on the cathode, the heater-cathode insulation of the 12BS3 is highly robust. The maximum ratings (under the Design Maximum Rating System) are:

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

Electrical Capacitances

The direct interelectrode capacitances of the 12BS3 are measured without an external shield:

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

Damper Service Ratings and Typical Operation

The 12BS3 is rated under the Design Maximum Rating System for television damper service. These ratings must be strictly observed to ensure reliable operation:

- **Maximum Peak Inverse Plate Voltage:** 5000 Volts
- **Maximum Plate Dissipation:** 6.0 Watts
- **Maximum Steady-State Peak Current:** 1100 mA
- **Maximum DC Plate Current:** 200 mA

The peak inverse plate voltage rating of 5000 Volts is applicable for operation in standard television scanning systems (such as a 525-line, 30-frame system). Under these conditions, the duty cycle of the voltage pulse must not exceed 15% of one horizontal scanning cycle.

Typical Operating Characteristics

Under typical operating conditions, the tube exhibits a low internal voltage drop, which maximizes efficiency in damper circuits:

- **Tube Voltage Drop:** 12 Volts (measured at a plate current of 140 mA)

Technical Summary

The **12BS3** is a Novar-type, half-wave vacuum rectifier designed for television damper service. It features a 12.6 V, 0.600 A heater with an 11-second controlled warm-up time, making it ideal for series-connected heater strings. Housed in a T-9 glass envelope with a 9-pin button base, the tube is capable of handling peak inverse voltages up to 5000 V and peak currents up to 1100 mA, with a typical internal voltage drop of only 12 V at 140 mA.

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
Current – published value 1	600 mA	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Current – published value 2	40 mA	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Warm-up time (Average)	11	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
Heater voltage	12.6 V	Nominal heater rating
Heater current	600 mA	Nominal heater rating

TUBE TINKER

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