



ELECTRONIC TUBE REFERENCE

12DM4

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

RECTIFIER

Indirectly heated half-wave rectifier designed specifically as a television horizontal-deflection damper diode, with high inverse-voltage and pulse-current capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	12.6 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
MAXIMUM PLATE DISSIPATION	6.5 W
PEAK INVERSE VOLTAGE	5000 V
NOMINAL OUTPUT CURRENT	175 mA
PEAK FORWARD CURRENT	1.1 A
FORWARD VOLTAGE DROP	35 V
MAXIMUM HEATER-CATHODE VOLTAGE	900 V
WARM-UP TIME	11 s
<i>Supplied sheet explicitly states this is the same as 6DM4 except for heater characteristics. Parent electrical table was not present in the currently available local corpus, so no unsupported promoted values were invented.</i>	

12DM4 — Half-Wave Vacuum Rectifier

The **12DM4** is an indirectly heated half-wave vacuum rectifier designed specifically for operation as a damper diode in the horizontal-deflection circuits of black-and-white television receivers. Engineered for use in television equipment employing series heater-string arrangements, the 12DM4 features high peak voltage ratings and a controlled heater warm-up characteristic.

Physical Construction and Basing

The 12DM4 is constructed in a T-9 glass bulb with a short intermediate shell octal base. The base configuration is a 5-pin octal with external barriers (designated 85-85), conforming to the JEDEC 9-44 outline drawing. The tube is designed to operate in any mounting position.

The physical dimensions of the envelope are as follows:

- **Maximum overall length:** 3.812 inches
- **Maximum seated height:** 3.250 inches
- **Maximum diameter:** 1.188 inches

Pin Connections

The JEDEC 4CG bottom-view basing diagram defines the electrical connections for the five active pins:

Pin Number	Connection	Description
Pin 2	IC	Internal Connection (Do Not Use)
Pin 3	K	Cathode
Pin 5	P	Plate
Pin 7	H	Heater
Pin 8	H	Heater

Heater Characteristics and Ratings

The 12DM4 incorporates a coated unipotential cathode. The heater is designed for series-string operation, with a controlled warm-up time to minimize voltage imbalances during receiver start-up.

Heater Parameter	Value
Average Voltage (AC or DC)	12.6 V
Average Current	600 mA (0.6 A)
Heater Supply Limits (Current)	600 ± 36 mA (0.6 A ± 6%)

Heater Parameter	Value
Average Warm-up Time	11 seconds

Heater-Cathode Voltage Limits

Because damper service subjects the tube to high potential differences between the heater and cathode, strict design maximum ratings (conforming to EIA Standard RS-239) are established:

- **Maximum Peak Heater-Cathode Voltage (Heater Negative with Respect to Cathode):** 5000 V. The DC component of this voltage must not exceed 900 V.
- **Maximum Peak Heater-Cathode Voltage (Heater Positive with Respect to Cathode):** 300 V. The DC component of this voltage must not exceed 100 V.

Direct Interelectrode Capacitances

Measured without an external shield, the approximate direct interelectrode capacitances of the 12DM4 are:

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

Damper Service Ratings and Operating Characteristics

The 12DM4 is rated under the Design Maximum System (EIA Standard RS-239) specifically for damper service.

Maximum Ratings

- **Peak Inverse Plate Voltage:** 5000 V
- **Peak Plate Current:** 1100 mA
- **DC Plate Current:** 175 mA
- **Plate Dissipation:** 6.5 W

The peak inverse plate voltage rating of 5000 V is applicable for operation in a standard 525-line, 30-frame television system (as described in the FCC Standards of Good Engineering Practice for Television Broadcast Stations). Under these operating conditions, the duty cycle of the voltage pulse must not exceed 15% of one scanning cycle, where 15% of one horizontal scanning cycle is equivalent to 10 microseconds.

Electrical Characteristics

Under typical operating conditions, the tube exhibits a low internal voltage drop to maintain efficiency in deflection circuits:

- **Tube Voltage Drop (Approximate):** 35 V at a plate current of 400 mA.

Related Designations

The 12DM4 is electrically identical to the **6DM4** and **17DM4** vacuum tubes, except for its specific heater characteristics (voltage, current, and warm-up time). While the 12DM4 is designed for 12.6 V, 600 mA series-string operation, the other members of this family are tailored to different heater supply configurations.

Technical Summary

The **12DM4** is a specialized **T-9 half-wave vacuum rectifier** designed for **damper service** in black-and-white television horizontal-deflection circuits. Operating with a **12.6 V, 600 mA heater** optimized for series-string applications, it features an average warm-up time of **11 seconds**. The tube is capable of withstanding a **peak inverse plate voltage of 5000 V** and a **peak heater-cathode voltage of 5000 V** (heater negative), making it highly robust against the high-voltage pulses encountered in television deflection systems. With a low typical **voltage drop of 35 V at 400 mA** and a **plate dissipation rating of 6.5 W**, the 12DM4 provides efficient and reliable rectification in any mounting position.



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 horizontal-deflection damper	—
Heater Warmup Time	11 s	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 2 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 2 OF 4

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater-to-cathode capacitance	4 pF	WholeTube
Plate-to-cathode capacitance	8.5 pF	WholeTube
Cathode-to-plate-and-heater capacitance	11.5 pF	WholeTube

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum heater-cathode voltage, heater negative DC	900 V	DamperService
Maximum heater-cathode voltage, heater positive DC	100 V	DamperService

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum heater-cathode voltage, heater positive total DC and peak	300 V	DamperService



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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage IAC or DC)	12.6 V	Published value from the filename-designated RCA datasheet block; multiple numbers on one row represent separate limits or heater arrangements.
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	6 A	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