



ELECTRONIC TUBE REFERENCE

6DS4

Nuvistor Tubes (all numbers) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TRIODE

High-mu Nuvistor triode intended as a low-noise grounded-cathode neutralized RF amplifier in VHF television tuners and FM receivers.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12AQ	BASE PINS	4
NOMINAL HEATER	6.3 V / 135 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Triode	
PLATE RESISTANCE	5400 Ω
TRANSCONDUCTANCE	0.0125 S
AMPLIFICATION FACTOR	68
MAXIMUM PLATE VOLTAGE	135 V
MAXIMUM PLATE DISSIPATION	1.5 W
MAXIMUM CATHODE CURRENT	15 mA
<i>Extended-cutoff Nuvistor RF triode.</i>	

6DS4 — Extended-Cutoff High-Mu Nuvistor VHF RF Triode

An indirectly heated, metal-shell Nuvistor intended for neutralized grounded-cathode VHF amplification and improved weak-signal-area television and FM reception.

Overview

The **6DS4** is a **high-mu Nuvistor triode with extended-cutoff characteristics** for use as a **grounded-cathode, neutralized radio-frequency amplifier** in VHF television and FM receiver tuners. RCA's detailed technical sheet explicitly emphasizes **improved weak-signal-area reception**, distinguishing the 6DS4's intended performance from that of a generic receiving triode.

The tube is intended for **color and black-and-white television receivers** as well as **FM receivers**. The related **2DS4** has corresponding signal-electrode characteristics but a different heater supply.

Construction, Basing, and Mechanical Details

The 6DS4 is a **single triode** containing a control grid, plate, and indirectly heated coated unipotential cathode. Its compact **MT4 metal-shell Nuvistor** envelope uses a **medium ceramic-wafer five-contact base**, JEDEC **E5-65**, with **12AQ basing**. It requires a dedicated Nuvistor socket.

The detailed RCA basing drawing assigns **pin 2 to the plate, pin 4 to the grid, pin 8 to the cathode**, and **pins 10 and 12 to the heater**. The other indexed positions are marked **do not use**. The large index lug and shortened pin distinguish the proper socket orientation.

RCA specifies a maximum overall length of **0.800 inch**, seated length of **0.625 inch**, and diameter of **0.440 inch**. The tube can be mounted in **any position**.

Heater Characteristics

Heater characteristic	Value
Nominal heater voltage	6.3 V
Nominal heater current	0.135 A
Calculated heater power	0.851 W
Heater supply	AC or DC
Maximum peak heater-to-cathode voltage	±100 V

RCA's detailed heater data give **6.3 ± 0.6 V** as the stated heater-voltage condition. The **2DS4** uses **2.1 V at 0.45 A** and has a published **8-second warm-up time**; that warm-up value should not automatically be assigned to the 6DS4, for which the family table leaves the corresponding entry unspecified.

Extended-Cutoff and Weak-Signal Reception

RCA explicitly calls the 6DS4 a **high-mu triode having extended-cutoff characteristics** and advertises **improved weak-signal-area reception**.

The characteristic data include low-current grid-bias points of approximately **−5 V at 100 μ A plate current** and **−6.8 V at 10 μ A plate current**. These values illustrate the transfer characteristic toward

low plate currents and are specific to the stated test conditions.

The extended-cutoff characteristic is relevant to the receiver front-end role, but the datasheets do not give one universal receiver noise figure or automatic-gain-control transfer law. Actual tuner sensitivity depends on the complete tuned and neutralized circuit.

Typical Electrical Characteristics

Characteristic	RCA characteristic point	Typical operation
Plate supply voltage	110 V	70 V
Cathode-bias resistor	130 Ω	—
Grid resistor	—	47 k Ω
Plate current	6.5 mA	7.0 mA
Transconductance	9,000 μmhos	12,500 μmhos
Plate resistance	7,000 Ω	5,440 Ω
Amplification factor	63	68

These values identify the tube as a **high- μ , relatively high-transconductance receiving triode**. The characteristic quantities are consistent with the small-signal triode relationship $\mu \approx g_m \times r_p$: $0.009 \text{ S} \times 7,000 \Omega \approx 63$ and $0.0125 \text{ S} \times 5,440 \Omega \approx 68$.

Maximum Ratings and Plate Dissipation

Rating	Published value
Maximum plate voltage	135 V
Conditional maximum plate supply	300 V
Maximum cathode current	15 mA
Maximum negative grid voltage	55 V
Maximum peak positive grid voltage	0 V
Maximum fixed-bias grid-circuit resistance	0.5 M Ω
Maximum cathode-bias grid-circuit resistance	2.2 M Ω

RCA gives **1.5 W maximum plate dissipation** with at least **5,000 Ω series plate-circuit resistance**; lower resistance requires consultation of the manufacturer's plate-dissipation rating chart. The detailed sheet further explains that a **300 V supply** may be used only with appropriate plate resistance and operating conditions to keep actual plate voltage at or below **135 V** under maximum-rated dissipation.

Sylvania publishes a 1.0 W plate-dissipation maximum, so the rating differs by manufacturer and conditions. RCA documents metal-shell operating temperature conditions of approximately **125-135°C** in its editions.

Interelectrode Capacitances

Measurement	Approximate value
Grid to plate	0.92 pF
Grid to cathode, heater, and shell	4.3 pF
Plate to cathode, heater, and shell	1.8 pF
Plate to cathode	0.18 pF
Heater to cathode	1.6 pF

These capacitances matter in the **neutralized VHF amplifier** circuit because the grid-to-plate capacitance creates an input-output coupling path. The grouped input and output capacitance definitions include the shell and other named elements.

Plate and Transfer Characteristics

RCA's extended technical sheet includes **average plate-current curves**, **transfer-characteristic curves**, and a **plate-dissipation-versus-series-resistance rating chart**. The curves support interpretation of the tube's extended-cutoff behavior and the dependence of plate current on grid voltage and plate voltage.

The rating chart reinforces the importance of distinguishing the DC supply from the actual voltage at the plate and from the thermal power dissipated within the tube.

Related Designations

The **2DS4** is the 2.1 V / 450 mA heater version of the 6DS4, with the same basic signal-electrode characteristics according to RCA. The DS4 family is distinct from the **CW4** high-mu VHF Nuvistor amplifier family in the manufacturer's explicit extended-cutoff designation and characteristic tables.

Technical Summary

The **6DS4** is a **6.3 V / 135 mA high-mu extended-cutoff Nuvistor triode** for **neutralized grounded-cathode VHF RF amplification** in **FM and television tuners**. Its typical amplification factor is **63-68**, transconductance **9-12.5 mA/V**, plate resistance **5.44-7 kΩ**, and plate current **6.5-7 mA**.

Its distinguishing documented application is **improved weak-signal-area reception**, supported by the extended-cutoff characteristic and detailed RCA receiver-front-end specifications.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 RCA HB3 Binder 4 of 7

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

1971 RCA HB3 BINDER 4 OF 7

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	135 mA	—
Plate-supply voltage	300 V	—
Plate voltage	135 V	—
Negative grid voltage	-55 V	—
Cathode current	15 mA	—
Plate dissipation	1.5 W	WithSeriesResistance>=5kohm
Plate voltage	70 V	Typical
Grid resistor	47000 ohm	Typical
Plate current	8 mA	Typical

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	5400 ohm	Typical
Transconductance	12500 uS	Typical
Amplification factor	68	Typical
Extended-cutoff characteristic	Present	RemoteCutoff

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 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.92 pF	—
Grid-to-cathode/heater/shell capacitance	4.3 pF	—
Plate-to-cathode/heater/shell capacitance	1.8 pF	—
Plate-to-cathode capacitance	0.18 pF	—
Heater-to-cathode capacitance	1.6 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate supply voltage	110 V	ClassA
Cathode-bias resistor	130 ohm	ClassA
Plate current	6.5 mA	ClassA
Plate voltage	70 V	TypicalOperation
Grid resistor	47000 ohm	TypicalOperation
Amplification factor	68	TypicalOperation
Plate resistance	5440 ohm	TypicalOperation
Transconductance	12500 uS	TypicalOperation
Plate current	7 mA	TypicalOperation

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