ELECTRONIC TUBE REFERENCE

# 6DV4

Nuvistor Tubes (all numbers) electronic tube

CONSOLIDATED TECHNICAL DATA
**1 SECTION**
CONSTRUCTION
**TRIODE**

Medium-mu Nuvistor triode designed for UHF oscillator stages in color and black-and-white television receivers at frequencies to approximately 1 GHz.

## General characteristics

| | | | |
|---|---|---|---|
| **BASE DESIGNATION** | 12EA | **BASE PINS** | 3 |
| **NOMINAL HEATER** | 6.3 V / 135 mA | **PARALLEL HEATER** | — / — |
| **HEATING** | Indirect | **SERIES OPERATION** | Not specified |
| **CATHODE ARRANGEMENT** | Separate cathodes | **SECTION CONSTRUCTION** | Similar |

## 12EA - Terminal pinout

| TERMINAL | SECTION | ELEMENT | STATUS |
|---|---|---|---|
| PIN1 | — | P — Plate (Anode) | CONNECTED |
| PIN2 | — | P — Plate (Anode) | CONNECTED |
| PIN3 | — | — | IC |
| PIN4 | — | G1 — Control Grid | CONNECTED |
| PIN5 | — | — | IC |
| PIN6 | — | G1 — Control Grid | CONNECTED |
| PIN7 | — | K — Cathode | CONNECTED |
| PIN8 | — | — | IC |
| PIN9 | — | — | IC |
| PIN10 | — | H — Heater | CONNECTED |
| PIN12 | — | H — Heater | CONNECTED |

## Section ratings

| SECTION1 Triode | |
|---|---|
| PLATE RESISTANCE | 3000 Ω |
| TRANSCONDUCTANCE | 0.0115 S |
| AMPLIFICATION FACTOR | 35 |
| MAXIMUM PLATE VOLTAGE | 110 V |
| MAXIMUM PLATE DISSIPATION | 1 W |
| MAXIMUM CATHODE CURRENT | 15 mA |
| *Nuvistor UHF oscillator triode.* | |

# 6DV4 — Gold-Plated Medium-Mu Nuvistor UHF Oscillator Triode

*An indirectly heated metal-shell Nuvistor designed for stable ultra-high-frequency oscillator operation in television receivers, including operation near 950 MHz.*

## Overview

The **6DV4** is a **medium-mu Nuvistor triode** intended for **UHF oscillator stages** in color and black-and-white television receivers. RCA specifies oscillator service at frequencies **up to 1,000 MHz** and provides a representative operating point at **950 MHz**.

A particularly distinctive feature documented in RCA's detailed technical sheet is its **gold-plated envelope and base pins**, intended to provide **positive grounding and low pin-contact resistance** in UHF oscillator applications. This mechanical and electrical-contact detail is especially relevant at the frequencies for which the tube is intended.

The related **2DV4** has the same published signal-electrode characteristics except for its heater requirements.

## Construction and Mechanical Features

The 6DV4 is a **single indirectly heated triode** with a coated unipotential cathode, grid, and plate in a compact **MT4 metal-shell Nuvistor** envelope.

It uses a **medium ceramic-wafer seven-contact Nuvistor base**, **JEDEC E7-83**, with **12EA basing**. The detailed RCA drawing identifies a large index lug and shortened pin for proper orientation.

RCA assigns **pins 1 and 2 to the plate**, **pins 4 and 6 to the grid**, **pin 7 to the cathode**, and **pins 10 and 12 to the heater**. Other indicated positions are not to be used as external circuit terminals.

The published maximum dimensions are approximately **0.800 inch overall length**, **0.625 inch seated length**, and **0.440 inch diameter**. **Any mounting position** is permitted.

The gold-plated envelope and base pins are intended to improve grounding reliability and minimize contact resistance at UHF, where mechanical contact quality is part of the oscillator's electrical environment.

## Heater Characteristics

| Heater parameter | Value |
|---|---|
| Nominal voltage | **6.3 V** |
| Nominal 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 rating gives **6.3 ± 0.6 V**. The related **2DV4** uses **2.1 V at 0.45 A**, with an 8-second average heater warm-up time. The 6DV4 family tables do not establish that the 2DV4's warm-up specification applies identically to the 6DV4.

## UHF Oscillator Service

RCA specifies the 6DV4 for television UHF oscillator operation up to **1,000 MHz**. Its published **950 MHz** example is:

| Parameter | Typical value |
|---|---|
| Oscillation frequency | **950 MHz** |
| Plate voltage | **60 V** |
| Grid voltage | **−2 V** |
| Grid resistor | **5,600 Ω** |
| Plate current | **8 mA** |
| Grid current | **350 µA** |

The stated grid current is an important characteristic of this oscillator operating condition. It is not the same as the low-grid-current conditions ordinarily associated with Class A1 linear amplification.

The actual oscillation frequency depends on the surrounding resonant and feedback circuit; the 950 MHz figure is a documented representative operating point.

# Electrical Characteristics

RCA and Sylvania provide a Class A1 characteristic point:

| Characteristic | Value |
|---|---|
| Plate supply voltage | **75 V** |
| Cathode-bias resistor | **100 Ω** |
| Plate current | **10.5 mA** |
| Transconductance | **11,500 µmhos (11.5 mA/V)** |
| Plate resistance | **3,100 Ω** |
| Amplification factor | **35** |
| Grid voltage at approximately 10 µA plate current | **−7 V** |

The amplification factor of approximately **35** establishes the **medium-mu** classification. Its relatively low plate resistance and high transconductance are important in the manufacturer's specified oscillator application.

The tabulated values satisfy the approximate triode relationship $\mu \approx g_m \times r_p$: 0.0115 S × 3,100 Ω ≈ 35.7.

# Design-Maximum Ratings

| Parameter | Maximum |
|---|---|
| Plate voltage | **125 V** |
| Conditional plate supply voltage | **300 V** |
| Plate dissipation | **1 W** |
| Cathode current | **15 mA** |
| Negative grid voltage | **55 V** |
| Peak positive grid voltage | **2 V** |
| Grid-circuit resistance, fixed bias | **0.1 MΩ** |
| Grid-circuit resistance, cathode bias | **0.2 MΩ** |

The **300 V plate-supply** figure is conditional: a sufficiently large plate-circuit resistor must limit plate dissipation to **1 W** under all operating conditions. It must not be interpreted as a 300 V continuous plate-electrode rating.

RCA specifies these ratings for metal-shell temperatures up to **135°C**.

## Direct Interelectrode Capacitances

| Measurement | Approximate value |
|---|---|
| Grid to plate | **1.8 pF** |
| Grid to cathode, heater, and shell | **4.4 pF** |
| Plate to cathode, heater, and shell | **1.9 pF** |
| Plate to cathode | **0.25 pF** |
| Heater to cathode | **1.4 pF** |
| Grid to cathode | **3.7 pF** |

These capacitances are important to the design of UHF resonant circuits and oscillator feedback networks. At frequencies approaching 1 GHz, electrode and connection capacitances contribute materially to circuit reactance.

## Characteristic Curves

The RCA HB3 sheet includes **average plate characteristics**, **grid-voltage transfer curves**, and **plate-current characteristic plots** at the rated heater voltage. These provide more information than a single tabulated operating point and support analysis of grid bias, plate voltage, and current over the published operating range.

## Related Nuvistor Types

The **2DV4** is the low-voltage heater variant of the 6DV4. The DV4 family is documented for **UHF oscillator service**, unlike the **CW4** and **DS4** high-mu Nuvistor families, whose principal published application is **VHF neutralized RF amplification**.

The DV4 family's gold-plated construction and 12EA basing are additional reasons not to assume mechanical interchangeability with other Nuvistor families solely because they share a compact metal-shell appearance.

## Technical Summary

The **6DV4** is a **6.3 V / 135 mA, medium-mu metal-shell Nuvistor triode** designed for **UHF oscillator service up to 1,000 MHz**. RCA documents a representative **950 MHz** oscillator condition and specifically identifies its **gold-plated envelope and base pins** as a means of obtaining reliable grounding and low contact resistance.

Typical characteristics include **μ ≈ 35**, **11.5 mA/V transconductance**, **3.1 kΩ plate resistance**, and **10.5 mA plate current**. The tube has a **1 W plate-dissipation limit** and a dedicated **12EA Nuvistor base**.

SOURCE OPERATING CONDITIONS

# 1971 RCA HB3 Binder 4 of 7

SOURCE PDF

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** | — |
| Maximum plate voltage | **110 V** | — |
| Maximum plate dissipation | **1 W** | — |
| Plate voltage | **75 V** | ClassA |
| Plate current | **10.5 mA** | ClassA |

| CHARACTERISTIC | | |
|---|---|---|
| **PARAMETER** | **PUBLISHED VALUE** | **CONDITION / NOTE** |
| Plate resistance | **3000 ohm** | ClassA |
| Transconductance | **11500 uS** | ClassA |
| Amplification factor | **35** | ClassA |

| CAPACITANCE | | |
|---|---|---|
| **PARAMETER** | **PUBLISHED VALUE** | **CONDITION / NOTE** |
| Grid-to-plate capacitance | **1.8 pF** | — |

| APPLICATION | | |
|---|---|---|
| **PARAMETER** | **PUBLISHED VALUE** | **CONDITION / NOTE** |
| Application | **UHF oscillator** | — |

SOURCE OPERATING CONDITIONS

# 1975 RCA RC30

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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 | **1.8 pF** | Capacitance |
| Grid to Cathode, Heater, and Shell | **4.4 pF** | Capacitance |
| Plate to Cathode, Heater, and Shell | **1.9 pF** | Capacitance |

| CHARACTERISTIC | | |
|---|---|---|
| **PARAMETER** | **PUBLISHED VALUE** | **CONDITION / NOTE** |
| Plate Supply Voltage | **75 V** | ClassA |
| Cathode-Bias Resistor | **100 ohm** | ClassA |
| Plate Current | **10.5 mA** | ClassA |

| OTHER | | |
|---|---|---|
| **PARAMETER** | **PUBLISHED VALUE** | **CONDITION / NOTE** |
| Oscillator Frequency | **950 MHz** | Oscillator |
| Oscillator Plate Voltage | **60 V** | Oscillator |
| Oscillator Grid Current | **350 uA** | Oscillator |


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