



ELECTRONIC TUBE REFERENCE

12CY6

Voltage - Pentode Sharp Cutoff (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

PENTODE

Sylvania pentode documented with manufacturer electrical and operating data. The available source does not provide sufficiently clear application or cutoff terminology in the extracted material to justify a narrower functional classification beyond pentode.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	7
NOMINAL HEATER	12.6 V / 200 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	140000 Ω
TRANSCONDUCTANCE	0.00325 S
MAXIMUM PLATE VOLTAGE	33 V
MAXIMUM SCREEN VOLTAGE	33 V
<i>Sylvania 12CY6 sharp-cutoff pentode RF amplifier expressly developed for 12-volt automotive storage-battery radio receivers, using heater, anode and screen supplies directly from automotive battery. Nominal heater 12.6 V, 200 mA; designed operating heater range 10.0 to 15.9 V. Design-maximum plate voltage 33 V and screen grid voltage 33 V; typical plate and screen 12.6 V, zero control grid bias, approximately 1.6 mA plate current, gm 3250 μmhos and plate resistance ~140 kΩ. Not a series-heater receiver valve.</i>	

12CY6 — Miniature Sharp-Cutoff Pentode

The **12CY6** is a miniature, sharp-cutoff pentode designed primarily for use as a radio-frequency (RF) amplifier. It is specifically engineered for operation in mobile environments where the heater, plate, and screen grid (Grid No. 2) voltages are supplied directly from a nominal 12-volt automotive storage battery.

Mechanical Design and Pinout

The 12CY6 is constructed in a compact glass envelope with a **T-5 1/2** bulb configuration and utilizes a standard **E7-1 miniature button 7-pin** base. The tube features a coated unipotential cathode and can be mounted and operated in **any position**.

Physically, the device has a maximum overall length of **2-1/8 inches**, a maximum seated height of **1-7/8 inches**, and a maximum bulb diameter of **3/4 inch**.

The tube employs the **7BK** basing arrangement. When viewed from the bottom of the base, the pin connections are assigned as follows:

Pin Number	Electrode Connection
1	Grid No. 1 (Control Grid)
2	Grid No. 3 (Suppressor Grid)
3	Heater
4	Heater
5	Plate
6	Grid No. 2 (Screen Grid)
7	Cathode

Heater Characteristics

The heater of the 12CY6 is designed to withstand the voltage fluctuations typical of automotive electrical systems. While its nominal rating is **12.6 Volts** with a current draw of **200 mA**, the heater is engineered to operate satisfactorily over a wide supply range of **10.0 Volts to 15.9 Volts**. This broad range provides a built-in safety factor to accommodate the voltage variations encountered in automotive battery charging cycles.

The electrical isolation between the heater and the cathode is rated under the Design-Maximum system. The maximum allowable voltage difference between the heater and the cathode is:

- **Heater negative with respect to cathode:** 30 Volts Max.
- **Heater positive with respect to cathode:** 30 Volts Max.

Design-Maximum Ratings

The ratings for the 12CY6 are established under the **Design-Maximum Ratings** system. These ratings represent the limiting values at which satisfactory tube life can be expected when evaluated against a "bogey" (standard reference) tube.

To ensure reliable performance, circuit designers must analyze the worst-case operating conditions—including supply voltage fluctuations, component tolerances, control adjustments, load variations, and

environmental factors—to ensure these maximum limits are never exceeded:

Parameter	Design-Maximum Rating
Plate Voltage	33 Volts
Grid No. 2 (Screen) Voltage	33 Volts
Positive DC Grid No. 1 Voltage	0 Volts
Grid No. 1 Circuit Resistance	10 Megohms

Typical Operating Characteristics

In typical RF amplifier applications, the 12CY6 operates with low electrode potentials, matching the nominal output of a 12-volt automotive battery. Under these conditions, the control grid (Grid No. 1) is operated at zero bias relative to the cathode, utilizing a grid resistor for circuit stability.

The typical operating parameters are defined as follows:

Parameter	Typical Value
Plate Voltage	12.6 Volts
Grid No. 2 Voltage	12.6 Volts
Grid No. 1 Voltage	0 Volts
Grid No. 1 Resistor	2.2 Megohms
Plate Current	1.6 mA
Screen Current (Grid No. 2)	0.4 mA
Transconductance	3250 μ mhos
Plate Resistance (Approximate)	140,000 Ohms
Grid No. 1 Voltage for Plate Current of 10 μ A (Cutoff)	-3.0 Volts

The high transconductance of **3250 μ mhos** combined with a plate resistance of approximately **140,000 Ohms** at a plate voltage of only 12.6 Volts demonstrates the tube's efficiency in low-voltage amplification stages.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 12CY6 are measured without an external shield. These values are critical for determining input loading and feedback characteristics in high-frequency RF amplifier circuits:

- **Grid No. 1 to Plate (Feedback):** 0.18 μF Max.
- **Input [g1 to (h + k + g2 + g3)]:** 8.5 μF
- **Output [p to (h + k + g2 + g3)]:** 4.0 μF

The low grid-to-plate capacitance (maximum 0.18 μF) is a key characteristic of this sharp-cutoff pentode, minimizing Miller effect feedback and allowing stable high-gain RF amplification without neutralization in typical applications.

Technical Summary

The **12CY6** is a specialized **miniature sharp-cutoff pentode** designed for low-voltage RF amplifier service in 12-volt automotive radio systems. Featuring a **7-pin miniature button base (7BK)**, a **T-5 1/2** bulb, and a **coated unipotential cathode**, it is optimized to run directly from a nominal **12.6 V** supply. The heater is highly robust, operating across a wide range of **10.0 V to 15.9 V** to handle automotive battery variations. With a typical transconductance of **3250 μmhos** and a plate resistance of **140,000 Ohms** at **12.6 V**, the 12CY6 delivers effective high-frequency amplification at low operating voltages while maintaining a low feedback capacitance of **0.18 μF** .

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