



ELECTRONIC TUBE REFERENCE

14W7

Voltage - Pentode Remote Cutoff (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

PENTODE

High-transconductance lock-in pentode capable of extended-cutoff operation for high-frequency amplification and controlled receiver gain.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8BJ	BASE PINS	8
NOMINAL HEATER	12.6 V / 225 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	2300000 Ω
TRANSCONDUCTANCE	0.0058 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	1.6 W
MAXIMUM SCREEN DISSIPATION	0.8 W
<i>Promoted from clearly identified printed ratings/characteristics; additional published operating points and capacitances retained in TUBE_SECTION_PARAMETER.</i>	

14W7 — Sharp-Cutoff RF Pentode

The **14W7** is a sharp-cutoff radio frequency (RF) pentode designed for voltage amplification in radio receiver circuits. It features a coated unipotential cathode, a lock-in eight-pin base, and is housed in a T-9 glass envelope. The tube is characterized by high transconductance, low grid-to-plate capacitance, and

versatile screen-grid operating configurations that allow for either a sharp cut-off or an extended cut-off characteristic suitable for automatic volume control (AVC) or variable-bias gain control.

Physical Specifications and Basing

The 14W7 is constructed with a compact, mechanically robust lock-in design. Its physical dimensions and mounting requirements are as follows:

- **Bulb Type:** T-9
- **Base:** Lock-In 8-pin
- **Maximum Diameter:** 1 3/16 inches
- **Maximum Overall Length:** 2 25/32 inches
- **Maximum Seated Height:** 2 1/4 inches
- **Mounting Position:** Any

The tube utilizes the **8BJ** (also designated **8BJ-L-5**) basing arrangement. The pin connections, viewed from the bottom of the base, are:

Pin	Connection
Pin 1	Heater
Pin 2	Plate
Pin 3	Grids #2 & #3 (Screen Grid & Suppressor Grid)
Pin 4	Cathode
Pin 5	Internal Shield & Grid #4
Pin 6	Grid #1 (Control Grid)
Pin 7	Cathode
Pin 8	Heater

Both Pin 4 and Pin 7 are internally connected to the cathode. Pin 5 connects the internal shield and Grid #4. Grids #2 and #3 are internally tied to Pin 3.

Heater Characteristics and Maximum Ratings

The 14W7 is designed to operate under standard mobile or receiver power systems, with heater specifications defined for both nominal and typical operating conditions:

- **Nominal Heater Voltage (AC or DC):** 14.0 V
- **Nominal Heater Current:** 0.240 A
- **Typical Operating Heater Voltage:** 12.6 V
- **Typical Operating Heater Current:** 0.225 A

To maintain device longevity and performance, the tube must be operated within the following maximum ratings:

- **Maximum Plate Voltage:** 300 V
- **Maximum Screen Voltage:** 150 V
- **Maximum Plate and Screen Dissipation (Total):** 4.0 W
- **Maximum Screen Dissipation:** 0.8 W

Typical Operating Conditions and Characteristics

The 14W7 can be operated under two distinct typical configurations, depending on whether a fixed screen supply or a series screen resistor is utilized. Both conditions operate with a plate voltage of 300 V, a suppressor voltage of 0 V, and a minimum cathode bias resistor of 160 ohms.

Parameter	Condition I (Fixed Screen Supply)	Condition II (Series Screen Resistor)
Heater Voltage	12.6 V	12.6 V
Heater Current	0.225 A	0.225 A
Plate Voltage	300 V	300 V
Screen Supply Voltage	150 V	300 V
Screen Series Resistor	None	40,000 Ω
Suppressor Voltage	0 V	0 V
Cathode Bias Resistor	160 Ω (minimum)	160 Ω (minimum)
Plate Resistance	0.3 M Ω (300,000 Ω)	0.3 M Ω (300,000 Ω)
Mutual Conductance (Transconductance)	5,800 μ mhos	5,800 μ mhos
Plate Current	10.0 mA	10.0 mA
Screen Current	3.9 mA	3.9 mA
Grid Voltage for Cathode Current Cut-Off	-6 V	-14 V

Operating Configuration Analysis

- **Condition I (Fixed Screen Supply):** This configuration utilizes a direct, fixed 150 V screen supply. Under this condition, the control grid voltage required to cut off cathode current is -6 V. The maximum allowable d-c resistance of the grid circuit in this configuration is **0.25 megohm**.
- **Condition II (Series Screen Resistor):** This configuration uses a 300 V screen supply connected through a **40,000 ohm** series screen resistor. This arrangement provides an extended cut-off

characteristic, requiring -14 V on the control grid to achieve cathode current cut-off. Because of this extended cut-off, Condition II is recommended when stage gain is controlled by varying the grid bias. Additionally, when using a series screen resistor and full cathode bias, the maximum allowable d-c resistance in the grid circuit is increased to **0.5 megohm**.

Screen Voltage Regulation Requirement

When a screen supply voltage exceeding 150 V is employed, a series screen resistor must be incorporated. This resistor limits the voltage at the screen grid to 150 V when the plate current is at its rated value of 10.0 mA .

Calculation: With a 300 V supply and a target screen voltage of 150 V , the voltage drop across the series resistor must be: $300\text{ V} - 150\text{ V} = 150\text{ V}$. At the rated screen current of 3.9 mA (0.0039 A), the required resistance is: $R = 150\text{ V} / 0.0039\text{ A} = 38,462\text{ ohms}$. The specified standard value of **40,000 ohms** closely matches this requirement, ensuring the screen voltage does not exceed its 150 V maximum rating under full-load conditions.

Direct Interelectrode Capacitances

The capacitances of the 14W7 are measured using an RMA tube shield (type MB-308) connected directly to the cathode. The typical values are:

- **Grid to Plate Capacitance:** 0.0025 pF (maximum)
- **Input Capacitance (Grid #1 to Heater, Cathode, Grid #2, Grid #3, and Grid #4):** 9.5 pF
- **Output Capacitance (Plate to Heater, Cathode, Grid #2, Grid #3, and Grid #4):** 7.0 pF

The extremely low grid-to-plate capacitance (0.0025 pF max) is a key characteristic of this sharp-cutoff pentode, minimizing Miller effect feedback and enabling stable high-frequency RF amplification.

Technical Summary

The **14W7** is a high-performance, lock-in base, sharp-cutoff RF pentode designed for stable voltage amplification in radio-frequency applications. Operating with a typical 12.6 V heater, it delivers a high transconductance of **5,800 μmhos** and a plate resistance of **0.3 megohm** at a plate voltage of 300 V . Its design allows for two distinct operating modes: a fixed-screen mode (Condition I) with a sharp -6 V cut-off, and a series-resistor screen mode (Condition II) providing an extended -14 V cut-off for effective variable-bias gain control. With its robust lock-in construction, low interelectrode capacitance (0.0025 pF max grid-to-plate), and flexible biasing options, the 14W7 is a highly capable pentode for RF receiver and amplifier designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance	2300000 ohm	—
Transconductance	5800 μ S	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	300 V	—
Maximum Screen Voltage	150 V	—
Maximum Plate Dissipation	1.6 W	—
Maximum Screen Dissipation	0.8 W	—
Plate Voltage	300 V	Condition1
Screen Voltage	150 V	Condition1
Plate Current	10 mA	Condition1
Screen Current	3.9 mA	Condition1



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	300 V	ClassA
Screen voltage	150 V	ClassA
Cathode resistor	160 Ω	ClassA
Plate current	10 mA	ClassA
Screen current	3.9 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	300000 Ω	ClassA
Transconductance	5800 μS	ClassA

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