

ELECTRONIC TUBE REFERENCE

14C7

Voltage - Pentode Sharp Cutoff (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
PENTODE

Series-heater counterpart of the 7C7 sharp-cutoff general-purpose pentode amplifier. It provides fixed-gain signal amplification in equipment using series-connected heater strings.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8V	BASE PINS	8
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

8V - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – H	–	H – Heater	CONNECTED
PIN2 – P	A	P – Plate (Anode)	CONNECTED
PIN3 – G2	A	G2 – Screen Grid	CONNECTED
PIN4 – G3	A	G3 – Suppressor Grid	CONNECTED
PIN5 – IS	A	IS – Internal Screen	CONNECTED
PIN6 – G1	A	G1 – Control Grid	CONNECTED
PIN7 – K	A	K – Cathode	CONNECTED
PIN8 – H	–	H – Heater	CONNECTED

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	400000 Ω
TRANSCONDUCTANCE	0.002275 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	100 V
MAXIMUM PLATE DISSIPATION	1 W
MAXIMUM SCREEN DISSIPATION	0.1 W
<i>Published maximum ratings, operating characteristics, and continuation data reviewed.</i>	

14C7 — Sharp-Cutoff Pentode

The **14C7** is a sharp-cutoff, triple-grid general-purpose pentode designed primarily for detector and amplifier service. It is particularly suited for use in AC-DC receivers employing 150 mA series-string heater tubes. Housed in a T-9 glass bulb with an 8-pin lock-in base, the 14C7 features a coated unipotential cathode and can be operated in any mounting position.

With the exception of its heater ratings, the electrical characteristics of the 14C7 are identical to those of the [7C7](#) pentode.

Construction, Heater, and Base Pinout

The 14C7 is constructed with a T-9 glass bulb. The physical dimensions of the tube include a maximum overall length of 2-25/32 inches, a maximum seated height of 2-1/4 inches, and a maximum diameter of 1-3/16 inches.

Heater Specifications

The 14C7 is designed for AC or DC heater operation. The technical documentation lists two distinct sets of nominal heater specifications:

- One set of specifications defines the heater at **12.6 V** with a current of **0.15 A** (150 mA).
- The absolute maximum ratings table lists a nominal heater voltage of **14.0 V** and a nominal heater current of **0.16 A** (160 mA).

Base and Pin Connections

The tube utilizes an 8-pin lock-in base (designated 8V). When viewed from the bottom of the tube, the pin connections are assigned as follows:

- **Pin 1:** Heater (H)
- **Pin 2:** Plate (P)
- **Pin 3:** Grid #2 / Screen Grid (G2)
- **Pin 4:** Grid #3 / Suppressor Grid (G3)

- **Pin 5:** Internal Shield (Si)
- **Pin 6:** Grid #1 / Control Grid (G1)
- **Pin 7:** Cathode (K)
- **Pin 8:** Heater (H)

For typical operation, the suppressor grid (Pin 4) and the internal shield (Pin 5) are connected directly to the cathode (Pin 7) at the socket.

Electrical Ratings

The maximum ratings for the 14C7, interpreted according to the RMA Standard M8-210, are established as follows:

Parameter	Maximum Rating
Maximum Plate Voltage	300 V
Maximum Screen Supply Voltage (Grid #2)	300 V
Maximum Screen Voltage (Grid #2)	100 V
Minimum External Grid Bias Voltage (Grid #1)	0 V
Maximum Plate Dissipation	1.0 W
Maximum Screen Dissipation (Grid #2)	0.1 W
Maximum Heater-Cathode Voltage	90 V

Typical Operating Conditions and Characteristics

The 14C7 is typically operated as a Class A1 amplifier. The published operating points demonstrate its performance under low-voltage and high-voltage plate conditions:

Low-Voltage Operating Point

- **Plate Voltage:** 100 V
- **Screen (Grid #2) Voltage:** 100 V
- **Control Grid (Grid #1) Voltage:** -1 V
- **Suppressor Grid (Grid #3) Voltage:** 0 V (Pins 4 and 5 connected to Pin 7)
- **Self-Bias Resistor:** 130 ohms
- **Plate Current:** 5.7 mA
- **Screen Current:** 1.8 mA
- **Approximate Plate Resistance:** 0.325 Megohm to 0.4 Megohm
- **Transconductance:** 2275 umhos
- **Grid Voltage for Cathode Current Cutoff:** -7 V

High-Voltage Operating Point

- **Plate Voltage:** 250 V
- **Screen (Grid #2) Voltage:** 100 V
- **Control Grid (Grid #1) Voltage:** -3 V
- **Suppressor Grid (Grid #3) Voltage:** 0 V (Pins 4 and 5 connected to Pin 7)
- **Self-Bias Resistor:** 2000 ohms
- **Plate Current:** 2.2 mA
- **Screen Current:** 0.7 mA
- **Approximate Plate Resistance:** 1.0 Megohm
- **Transconductance:** 1575 umhos
- **Grid Voltage for Cathode Current Cutoff:** -7 V

Direct Interelectrode Capacitances

When measured with an external shield connected to the cathode, the capacitances are:

- **Control Grid to Plate (G1 to P):** 0.007 uuf (maximum)
- **Input (G1 to H+K+G2+G3+IS):** 6.0 uuf
- **Output (P to H+K+G2+G3+IS):** 6.5 uuf

Characteristic Curves and Interpretation

The published characteristic curves for the 14C7 (and the electrically identical 7C7) provide a detailed view of the tube's behavior across a range of voltages:

Plate Current vs. Plate Voltage

The plate characteristics show that at a fixed screen voltage (Ec2) of 100 V and suppressor voltage (Ec3) of 0 V, the plate current (Ib) rises very sharply as plate voltage increases from 0 V to approximately 50 V. Above 50 V, the curves flatten out, which is characteristic of a high plate resistance pentode. For example, with a control grid voltage (Ec1) of -1.5 V, the plate current remains nearly constant at approximately 4.0 mA across a plate voltage range of 100 V to 500 V.

Screen Current vs. Plate Voltage

The screen current (Ic2) curves show that screen current is highest at very low plate voltages (where the plate is less effective at collecting electrons) and drops to a stable, low level once the plate voltage exceeds approximately 75 V to 100 V. At Ec1 = 0 V, the screen current drops from over 2.0 mA at low plate voltages to a steady state of about 1.7 mA at higher plate voltages.

Transfer Characteristics

The transfer curves plot transconductance (gm), plate current (Ib), screen current (Ic2), and plate resistance (rp) against control grid voltage (Ec1):

- **At 250 V Plate Voltage:** As the control grid bias is made more negative, the transconductance drops from 2275 umhos at -1 V to 1575 umhos at -3 V, eventually reaching cutoff at -7 V. The plate resistance (rp) rises from approximately 0.3 Megohm at -1 V bias to 1.0 Megohm at -3 V bias, and continues to rise rapidly toward several megohms as the grid bias approaches cutoff.
- **At 100 V Plate Voltage:** The curves exhibit a similar trend, with the transconductance and plate current falling smoothly to zero at the -7 V cutoff point, while the plate resistance rises sharply.

Technical Summary

The **14C7** is an 8-pin lock-in, sharp-cutoff pentode designed for general-purpose detector and amplifier service. It features a unipotential cathode and a heater rated at either **12.6 V / 0.15 A** or **14.0 V / 0.16 A** depending on the rating standard applied. Electrically identical to the **7C7** except for its heater requirements, the 14C7 is optimized for series-string AC-DC receiver designs. Under typical Class A1 operating conditions with a 250 V plate supply and a 100 V screen supply, it provides a transconductance of **1575 umhos** and a plate resistance of **1.0 Megohm**, while drawing a plate current of **2.2 mA** and a screen current of **0.7 mA**.



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

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	300 V	Published handbook rating
Maximum screen voltage	100 V	Published handbook rating
Plate voltage	250 V	ClassA
Screen voltage	100 V	ClassA
Control-grid bias	3 V	ClassA
Plate current	2.2 mA	ClassA
Screen current	0.7 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	1000000 ohm	Published handbook characteristic
Transconductance	1575 μ S	Published handbook characteristic
Heater voltage	12.6 V	Published heater rating
Heater current	150 mA	Published heater rating



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 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ElectricalCharacteristicsReference	7C7 except heater ratings	—



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 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAX	6.3 V	Published datasheet; published column 1
MAX	300 V	Published datasheet; published column 2
WITH	0 mA	Published datasheet; published column 1
WITH	1 mA	Published datasheet; published column 2
GRID #1 TO PLATE; (G~ TO P)	0.007 pF	Published datasheet
HEATER VOLTAGE	63 V	Maximum ratings
MAXIMUM HEATER –CATHODE VOLTAGE	9 V	Maximum ratings; published column 1
MAXIMUM HEATER –CATHODE VOLTAGE	0 V	Maximum ratings; published column 2
MAXIMUM PLATE VOLTAGE	3 V	Maximum ratings; published column 1
MAXIMUM PLATE VOLTAGE	0 V	Maximum ratings; published column 2
MINIMUM GRID #1 VOLTAGE	0 V	Maximum ratings
MAXIMUM GRID #2 SUPPLY VOLTAGE	3 V	Maximum ratings; published column 1
MAXIMUM GRID #2 SUPPLY VOLTAGE	0 V	Maximum ratings; published column 2
MAXIMUM GRID #2 DISSIPATION	1 W	Maximum ratings
HEATER VOLTAGE (	3 V	Maximum ratings; published column 1
NEATER CURRENT	3 mA	Maximum ratings; published column 1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
NEATER CURRENT	0 mA	Maximum ratings; published column 2
PLATE VOLTAGE	100 V	Maximum ratings; published column 1
PLATE VOLTAGE	2 V	Maximum ratings; published column 2
GRID #2 VOLTAGE	100 V	Maximum ratings
GRID #1 VOLTAGE -Z	-3 V	Maximum ratings
SELF -BIAS RESISTOR	1 ohm	Maximum ratings; published column 1
SELF -BIAS RESISTOR	0 ohm	Maximum ratings; published column 2
PIATE CURRENT	57 mA	Maximum ratings; published column 1
PIATE CURRENT	2.2 mA	Maximum ratings; published column 2
GRID #2 CURRENT	1 mA	Maximum ratings; published column 1
GRID #2 CURRENT	0.7 mA	Maximum ratings; published column 2
PLATE RESISTANCE (APPROX.)	4000000 ohm	Maximum ratings; published column 1
PLATE RESISTANCE (APPROX.)	1000000 ohm	Maximum ratings; published column 2
GRID VOLTAGE FOR CATHODE CURRENT CUTOFF	-7 V	Maximum ratings; published column 1
EC2 =	100 V	Maximum ratings
EC3 =	0 V	Maximum ratings
ECS	0 V	Maximum ratings
Et =	6.3 V	Maximum ratings
Eb =	250 V	Maximum ratings
ECz =	100 V	Maximum ratings
Ef =	6.3 V	Maximum ratings
Eb =	100 V	Maximum ratings
PLATE (	1 mA	Maximum ratings; published column 1
PLATE (	0 mA	Maximum ratings; published column 2
Maximum plate voltage	300 V	Published datasheet; promoted section value
Maximum screen voltage	200 V	Published datasheet; promoted section value
Maximum plate dissipation	1 W	Published datasheet; promoted section value
Maximum screen dissipation	0.1 W	Published datasheet; promoted section value

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	400000 ohm	Published datasheet; promoted section value

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	0.002275 A/V	Published datasheet; promoted section value

TUBE TINKER

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and their source documents.

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