



ELECTRONIC TUBE REFERENCE

1852

Voltage - Pentode Sharp Cutoff (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

PENTODE

Sharp-cutoff high-transconductance pentode co-designated 6AC7/1852. Manufacturer data specify substantial transconductance for Class A RF or IF amplification, making it a high-gain fixed-control signal tube.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	8
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Pentode	
PLATE RESISTANCE	750000 Ω
TRANSCONDUCTANCE	0.009 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	3 W
MAXIMUM SCREEN DISSIPATION	0.75 W
Source-derived section; promoted fields populated where applicable.	

1852 — Television Amplifier Pentode

Overview

The **1852** (also designated as the **6AC7/1852** or **RCA-1852**) is a heater-cathode metal pentode designed for high-gain amplification in radio frequency (RF) and intermediate frequency (IF) stages. It is characterized by a high ratio of transconductance to plate current, low interelectrode capacitances, and close electrode spacing. The tube is particularly suited for the RF and IF stages of picture amplifiers in experimental television receivers, the first stages of multi-stage video amplifiers, mixers, and low-voltage oscillators.

Construction and Physical Specifications

The 1852 is constructed with a metal shell envelope (MT8 outline) and a small wafer 8-pin octal base. It features a coated unipotential cathode.

The electrode assembly of the 1852 is identical to that of the 1851, but the 1852 incorporates a special shielded lead construction. This design brings the control-grid lead directly to a base pin rather than an external top cap. This modification maintains a very low grid-to-plate capacitance while simplifying circuit wiring and reducing the input inductance loop.

The tube can be mounted in any position, though a vertical orientation (base up or down) is preferred. Horizontal mounting is permissible provided that pins 2 and 7 are aligned in a vertical plane.

Physical Dimensions

- **Maximum overall height / length:** 2-5/8 inches
- **Maximum diameter:** 1-5/16 inches

Pinout and Connections

The 1852 utilizes a standard 8-pin octal base. The bottom-view pin connections are assigned as follows:

Pin	Electrode Connection
Pin 1	Metal Shell (S)
Pin 2	Heater (H)
Pin 3	Suppressor Grid (G3)
Pin 4	Control Grid (G1)
Pin 5	Cathode (K)
Pin 6	Screen Grid (<u>G2</u>)

Pin	Electrode Connection
Pin 7	Heater (H)
Pin 8	Plate (P)

Heater and Interelectrode Capacitances

The 1852 operates with a nominal heater voltage of 6.3 Volts (AC or DC) with an allowable voltage deviation of plus or minus 10 percent. The heater current is 450 mA (0.45 A).

When the metal shell is connected directly to the cathode, the direct interelectrode capacitances are:

- **Grid to Plate (G1 to P):** 0.015 uuf (maximum)
- **Input (G1 to H + K + G2 + G3 + S):** 11 uuf
- **Output (P to H + K + G2 + G3 + S):** 5 uuf

Absolute and Design-Maximum Ratings

The maximum ratings for the 1852, established under the RMA Standard MB-210, define the safe operating boundaries of the device:

Parameter	Maximum Rating
Heater Voltage	6.3 V
Heater-Cathode Voltage	90 V
Plate Voltage	300 V
Screen (Grid #2) Voltage	150 V
Screen-Supply Voltage	300 V
Plate Dissipation	3.0 W
Screen (Grid #2) Dissipation	0.38 W
Total Plate & Screen Dissipation	3.4 W

Typical Operating Conditions and Characteristics

The 1852 can be operated as a Class A1 amplifier under two primary configurations depending on the screen supply method. Condition I utilizes a fixed screen supply to achieve a sharp cut-off characteristic, while Condition II uses a series screen resistor to provide an extended cut-off characteristic.

Parameter	Condition I (Fixed Screen Supply)	Condition II (Series Screen Resistor)
Plate Voltage	300 V	300 V
Suppressor Grid (Grid #3) Voltage	0 V	0 V
Screen Grid (Grid #2) Supply Voltage	150 V	300 V
Screen Grid Series Resistor	None	60,000 Ohms
Cathode-Bias Resistor (Minimum)	160 Ohms	160 Ohms
Amplification Factor (Approximate)	6750	6750
Plate Resistance (Approximate)	0.75 to 1.0 Megohm	0.75 to 1.0 Megohm
Transconductance	9000 umhos	9000 umhos
Plate Current	10 mA	10 mA
Screen Grid Current	2.5 mA	2.5 mA
Grid Circuit DC Resistance (Maximum)	0.25 Megohm	0.5 Megohm

Installation and Operating Considerations

Suppressor Grid Connection

To minimize feedback in RF and IF stages, the suppressor grid (Grid #3) should be connected directly to ground.

Screen Voltage Supply

When operating under Condition I, the screen voltage should be obtained from a potentiometer or a low-resistance bleeder. Under Condition II, which is suitable for variable-gain applications, the screen voltage is supplied from the B-supply through a 60,000 Ohm series resistor. If screen supply voltages exceed 150 Volts, a series-dropping resistor must be used to limit the screen voltage to 150 Volts when the plate current is at its normal operating value of 10 mA.

Cathode Bias and Degeneration

The cathode-bias resistor must be adjusted to maintain a nominal plate current of 10 mA, with a minimum value of 160 Ohms.

Because of the tube's high transconductance, changes in plate current cause pronounced variations in input capacitance and input conductance. In RF or IF amplifiers, these variations can be minimized by leaving a portion of the cathode-bias resistor unby-passed. While this sacrifices some effective transconductance and slightly increases the effective grid-plate capacitance, it stabilizes the input characteristics. Alternatively, the associated circuits can be heavily loaded with resistance and capacitance.

In video amplifier stages, leaving the cathode-bias resistor unby-passed introduces degeneration, which is desirable for reducing distortion. If maximum stage gain is required without degeneration, the cathode resistor should be bypassed with a very large capacitor (350 μF).

Audio Applications

The 1852 can function as a high-gain audio amplifier, but this application is not recommended unless the heater is operated from a battery supply to minimize hum.

Circuit-Specific Examples and Components

In practical circuit designs, the following component values are utilized for optimal performance:

- **Capacitors:** $C_1 = 0.1 \mu\text{F}$, $C_2 = 350 \mu\text{F}$, $C_3 = 1.0 \mu\text{F}$, $C_4 = 12 \mu\text{F}$, $C_5 = 0.25 \mu\text{F}$, $C_6 = 0.05 \mu\text{F}$
- **Resistors:** $R_k = 160 \text{ Ohms}$ (with a tap located approximately 35 Ohms from the cathode end), $R_1 = 0.25 \text{ Megohm}$, $R_2 = 160 \text{ Ohms}$, $R_3 = 60000 \text{ Ohms}$, $R_4 = 5000 \text{ Ohms}$, $R_5 = 2000 \text{ Ohms}$, $R_6 = 1.0 \text{ Megohm}$, $R_7 = 1000 \text{ Ohms}$, $R_8 = 9000 \text{ Ohms}$, $R_9 = 250000 \text{ Ohms}$

Additionally, the 1852 can be configured as an impedance transformer to couple high-impedance circuits to low-impedance circuits, yielding an effective output impedance of 110 Ohms.

Qualitative Curve Observations

Plate Characteristics

At a screen grid voltage of 150 V, the plate current rises sharply when the plate voltage is increased from 0 to 50 V. Above 100 V, the plate current flattens out, demonstrating typical pentode saturation. With the control grid bias set to 0 V, the plate current reaches approximately 30 mA at a plate voltage of 100 V and increases only slightly to approximately 32 mA at a plate voltage of 300 V.

Control Grid Characteristics

The method of screen supply significantly alters the control grid transfer characteristics:

- **Fixed Screen Supply (150 V):** The tube exhibits a sharp cut-off characteristic, with plate current and transconductance dropping to zero near a grid bias of -4.5 V.
- **Series Screen Resistor (300 V supply with 60,000 Ohm resistor):** The tube exhibits an extended cut-off characteristic. The plate current and transconductance decrease much more gradually, approaching zero near a grid bias of -10 V. This extended cut-off is highly beneficial for automatic volume control (AVC) or variable-gain applications.

Technical Summary

The **1852** is a high-transconductance metal pentode featuring a 6.3 V, 450 mA heater, an 8-pin octal base, and a unipotential cathode. It is designed to deliver a transconductance of 9000 umhos with a plate current of 10 mA and a plate resistance of 0.75 to 1.0 Megohm. By bringing the control grid to a base pin instead of a top cap, the 1852 achieves low grid-plate capacitance (0.015 uuf max) and reduced input inductance, making it highly effective for high-gain RF, IF, and video amplification in television and high-frequency receiver designs.

SOURCE OPERATING CONDITIONS
[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE (A.C. or D.C.)	6.3 V	HEATER VOLTAGE (A.C. or D.C.) 6.3 Volts
HEATER CURRENT	450 mA	HEATER CURRENT 0.45 Ampere
PLATE VOLTAGE	300 V	PLATE VOLTAGE 300 max. Volts
SCREEN VOLTAGE	150 V	SCREEN VOLTAGE 150 max. Volts
SCREEN-SUPPLY VOLTAGE	300 V	SCREEN-SUPPLY VOLTAGE 300 max. Volts
PLATE & SCREEN DISSIPATION (Total)	3.4 W	PLATE & SCREEN DISSIPATION (Total) 3.4 max. Watts
SCREEN DISSIPATION	0.38 W	SCREEN DISSIPATION 0.38 max, Watts
Plate voitage	300 V	Plate voitage 300 300 Volts
Suppressor Voltage	0 V	Suppressor Voltage 0 0 Volts
Screen-Supply Voltage #	300 V	Screen-Supply Voltage # 150 300 Volts
Screen Ser ies Resistor	60000 ohm	Screen Ser ies Resistor - 60000 Ohms
Cathode-Bias Resistor ##	160 ohm	Cathode-Bias Resistor ## 160 min. 160 min. Ohms
Plate Current	10	Plate Current 10 10 Milliamperes
Screen Current	2.5	Screen Current 2.5 2.5 Mi liamperes
made as high as	0.5	made as high as 0.5 megohm,
#	150 V	# 5crgen—suppl{.vqltages in excess of 150 volts require use of a series dropping
resistor to limit the voltage at the screen to	150 V	resistor to limit the voltage at the screen to 150 volts when the plate cur-
rent is at its normal value of	10	rent is at its normal value of 10 mil)iamperes.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
across a	6 V	across a 6-volt battery. Under any condition of operation, the heater
voltage should not deviate more than plus or minus	2	voltage should not deviate more than plus or minus 10%2 from the
normal value of	6.3 V	normal value of 6.3 volts.
operation from a	6 V	operation from a 6-volt storage battery, the cathode circuit should
milliamperes, and also using a	60000 ohm	milliamperes, and also using a 60000-ohm series screen resistor, the
of	10	of 10 milliamperes.
changes when the	1852	changes when the 1852 is used as an r-f or i-f amplifier, a portion
potential, as shown in the circuit R-F or {-F AMPLIFIER on page	5	potential, as shown in the circuit R-F or {-F AMPLIFIER on page 5.
As an amplifier, the	1852	As an amplifier, the 1852 is especially suited for use in the
The use of the	1852	The use of the 1852asa high-gain audio amplifier is not recommended
E	0 V	E5 = 6.3 VOLTS EC)=0
SCREEN VOLTS =	130 V	SCREEN VOLTS =130 L
PLATE (Ip) OR SCREEN (	1	PLATE (Ip) OR SCREEN (1c2) MILLIAMPE RES
sla 'o CONTROL-GRID VOLTS EC)=	-1.5 V	sla 'o CONTROL-GRID VOLTS EC)=-1.5
PLATE VOLTS	4921 V	PLATE VOLTS: 92C-4921
E4=	150 V	E4=6.3 VOLTS Ec2 =150
3% / SCREEN VOLTS Ecz =100	100 V	3% / SCREEN VOLTS Ecz =100
PLATE VOLTS	4922 V	PLATE VOLTS 92c-4922
Ef=	6.3 V	Ef= 6.3 VOLTS
7'1'!-3 VOLTS	-3 V	7'1'!-3 VOLTS
VOLTS a =	300 V	VOLTS a =300 PLATE VOLTS= 300 -
SUPPRESSOR VOLTS =	0 V	SUPPRESSOR VOLTS =0 " SUPPRESSOR VOLT;; 0
1 ST RESISTOR-OHMS . 3 ® 0 ohm "0 - _F-		1 ST RESISTOR-OHMS . 3 ® "0 - _F-
<	4	<12 = =4 ° -%' <
CONTROL VOLTAGE	300	CONTROL VOLTAGE +300V.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CURRENT OF	4	CURRENT OF 10 NA. NOTE THAT THE VOLTAGE ACROSS Rg SUCKS 4 POR-
Cr=	5000 ohm	Cr=0. ϕ Rk =160 OHMS. WITH TAP AT R4 =5000 OHMS
Ca=	2000 ohm	Ca=35 U ∇ f APPROXIMATELY 35 OHMS Rg = 2000 OHMS
C3=	1	C3=1.0 B ϕ FROM CATHODE END Rg =1.0 MEGOHM
Ca=	1000 ohm	Ca=12 u ϕ R) 20,25 MEGOHM R7 =1000 OHMS
C5=	29000 ohm	C5=0.25 if R2=160 OHMS Rg 29000 OHMS
Cg=	250000 ohm	Cg=0.05 uf R3=60000 OHMS Rg = 250000 OHMS

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Amplification Factor [Approx.]	6750	Amplification Factor [Approx.] 6750 6750
Plate Resistance (Approx,)	0.7	Plate Resistance (Approx,) 0.75 0.7% Megohm
Transconductance	9000 μ S	Transconductance 9000 9000 Micromhos
## The d-c resistance of the grid circuit should not exceed	0.25	## The d-c resistance of the grid circuit should not exceed 0.25 megohm when the



SOURCE OPERATING CONDITIONS

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	750000 ohm	—
Transconductance	9000 μ S	—
Amplification Factor	6750	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	300 V	—
Maximum Screen Voltage	300 V	—
Typical Plate Current	10 mA	—
Typical Screen Current	2.5 mA	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

SOURCE PDF

1966 Tung Sol Electronic Tubes 1 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 1 OF 4

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	450 mA	—
Plate voltage	300 V	ClassA
Screen supply voltage	150 V	ClassA
Plate current	10 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	9000 μ S	ClassA

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