

ELECTRONIC TUBE REFERENCE

12SF7

Voltage - Radio Detector Converter electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
DIODE-PENTODE

Combination diode-pentode providing signal detection and voltage amplification within one receiving tube. The pentode offers useful gain and isolation while the diode supplies detector or control-voltage rectification.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7AZ	BASE PINS	7
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

7AZ - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – SH	A	SH – Internal Shield	CONNECTED
PIN2 – 1G1	A	G1 – Control Grid	CONNECTED
PIN3 – 1G3	A	G3 – Suppressor Grid	CONNECTED
PIN3 – K	A	K – Cathode	CONNECTED
PIN4 – 1G2	A	G2 – Screen Grid	CONNECTED
PIN5 – 2P	B	P – Plate (Anode)	CONNECTED
PIN6 – 1P	A	P – Plate (Anode)	CONNECTED
PIN7 – H	–	H – Heater	CONNECTED
PIN8 – H	–	H – Heater	CONNECTED

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	700000 Ω
TRANSCONDUCTANCE	0.00205 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	150 V
<i>Promoted from printed maximum/characteristic columns; additional published values retained in TUBE_SECTION_PARAMETER.</i>	

SECTION2 Diode	
<i>No fixed ratings recorded.</i>	
<i>Promoted from printed maximum/characteristic columns; additional published values retained in TUBE_SECTION_PARAMETER. The chart identifies the repeated detector-diode section(s) but does not publish separate diode electrical ratings on this row.</i>	

12SF7 — Diode Remote-Cutoff Pentode Vacuum Tube

Overview

The **12SF7** and **12SF7-GT** are receiving tubes containing a diode and a remote-cutoff pentode within a single envelope. Designed for operation with a 12.6-volt heater supply, these tubes are typically utilized in Class A amplifier service where the remote-cutoff characteristic of the pentode section is advantageous, alongside the diode section for detection or auxiliary functions.

Physical and Construction Specifications

The 12SF7 and 12SF7-GT feature an indirectly heated cathode design. The physical packaging differs between the two designations, as indicated by their respective outline drawings:

- **12SF7**: Utilizes outline drawing **8-1**.
- **12SF7-GT**: Utilizes outline drawing **9-18**.

Both variants share the **7AZ** base connection configuration.

Heater Characteristics

The heater is designed for series or parallel operation in receiving equipment. The electrical requirements for the heater are:

Parameter	Value
Heater Voltage	12.6 V
Heater Current	0.15 A
Calculated Heater Power	1.89 W

Note: The heater power of 1.89 W is a calculated value derived from the nominal voltage of 12.6 V and nominal current of 0.15 A ($12.6\text{ V} * 0.15\text{ A} = 1.89\text{ W}$).

Direct Interelectrode Capacitances

The capacitance values are identical for both the metal 12SF7 and the glass-octal 12SF7-GT. These values are specified without an external shield:

Capacitance Parameter	Value
Input Capacitance	5.5 pF
Output Capacitance	6.0 pF
Grid-to-Plate Capacitance	0.004 pF

Maximum Ratings

To ensure reliable operation, the electrical potentials applied to the pentode electrodes must be maintained within the specified maximum limits:

- **Maximum Plate Voltage:** 300 V
- **Maximum Screen (Grid No. 2) Voltage:** 150 V

Class A Amplifier Operating Points

The pentode section of the 12SF7 and 12SF7-GT is characterized for Class A amplifier service. Two distinct typical operating points are established, demonstrating the performance of the tube under different plate voltage conditions while maintaining a constant screen voltage of 100 V and a control grid bias of -1.0 V.

Parameter	Operating Point I	Operating Point II
Plate Voltage	250 V	100 V
Screen Voltage	100 V	100 V
Negative Grid Voltage	1.0 V	1.0 V
Plate Current	12.4 mA	12.0 mA

Parameter	Operating Point I	Operating Point II
Screen Current	3.3 mA	3.4 mA
Plate Resistance (Approximate)	700,000 Ω ;	200,000 Ω ;
Transconductance	2,050 μmhos	1,975 μmhos

At the higher plate voltage of 250 V (Operating Point I), the plate resistance is approximately 700,000 Ω ; with a transconductance of 2,050 μmhos . When the plate voltage is reduced to 100 V (Operating Point II) with the screen voltage held at 100 V, the plate current decreases slightly from 12.4 mA to 12.0 mA, while the screen current increases slightly from 3.3 mA to 3.4 mA. Under these lower-voltage conditions, the approximate plate resistance drops significantly to 200,000 Ω ;, and the transconductance is slightly reduced to 1,975 μmhos .

Technical Summary

The **12SF7** and **12SF7-GT** are multi-unit tubes combining a diode and a remote-cutoff pentode. Operating with a **12.6 V, 0.15 A** heater, they provide compact amplification and detection capabilities. The pentode section supports plate voltages up to **300 V** and screen voltages up to **150 V**. In typical Class A amplifier service, the tube delivers a transconductance of **1,975 to 2,050 μmhos** depending on the plate voltage configuration, with an extremely low grid-to-plate capacitance of **0.004 pF** when operated without an external shield.

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

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	5.5 pF	Section1
Output capacitance	6 pF	Section1
Grid-to-plate capacitance	0.004 pF	Section1

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA
Screen voltage	100 V	ClassA
Control-grid voltage	-1 V	ClassA
Plate current	12.4 mA	ClassA
Screen current	3.3 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	700000 Ω	Section1
Transconductance	2050 μS	Section1

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