



ELECTRONIC TUBE REFERENCE

12F5GT

Voltage - Triode (single) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TRIODE

High-mu triode for series-heater AC/DC receiver service, providing voltage amplification in transformerless radio equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	5M	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

SECTION RATINGS

SECTION 1 Triode	
PLATE RESISTANCE	12000 Ω
TRANSCONDUCTANCE	0.00115 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	300 V
<i>Published section data promoted where applicable; additional operating values retained as parameters.</i>	

12F5GT — High-Mu Triode Vacuum Tube

An octal-based, high-amplification-factor single triode designed for voltage amplification in series-heater AC-DC radio receivers.

Overview

The **12F5GT** (also designated as **12F5-GT**) is a general-purpose, high-mu single triode vacuum tube. It is engineered primarily for Class A voltage amplification in compact AC-DC receivers. The tube features an

indirectly heated, coated unipotential cathode and is housed in a T-9 glass bulb with an intermediate-shell 5-pin octal base.

Operating with a nominal heater voltage of 12.5 to 12.6 V at a low current of 0.15 A, the 12F5GT is optimized for series-string heater configurations. This low current draw reduces the overall heater power requirement of the receiver by half compared to designs utilizing 0.3 A tubes. Additionally, when paired with a small series resistance, it eliminates the need for bulky plug-in drop resistors or resistive line cords. Except for its heater ratings, the electrical characteristics of the 12F5GT are identical to those of the 6.3 V [6F5GT](#).

Mechanical Construction and Pinout

The 12F5GT is constructed in a T-9 glass envelope and is rated for operation in any mounting position.

Physical Dimensions

- **Maximum overall length:** 3 5/16 inches
- **Maximum seated height:** 2 3/4 inches
- **Maximum bulb/base diameter:** 1 5/16 inches

Base and Pin Connections

The tube utilizes an intermediate-shell 5-pin octal base with a **5M** basing arrangement. The control grid is connected to a top cap on the glass bulb, while the remaining active electrodes are routed to the octal pins. Viewed from the bottom of the base, the pin connections are as follows:

Pin Number	Connection	Description
Pin 1	NC	No Connection
Pin 2	H	Heater
Pin 4	P	Plate
Pin 7	H	Heater
Pin 8	K	Cathode
Top Cap	G	Control Grid

Heater and Electrical Ratings

The heater is designed for either AC or DC operation. The maximum ratings are interpreted according to the RMA Standard M8-210.

Parameter	Value	Unit
Heater Voltage	12.5 to 12.6	V

Parameter	Value	Unit
Heater Current	0.15	A
Maximum Plate Voltage	300	V
Heater-Cathode Voltage	As low as possible	—

Interelectrode Capacitances

The direct interelectrode capacitances of the 12F5GT vary slightly depending on the measurement conditions, particularly whether the metal shell is connected to the cathode:

- **Standard Measurement (Without External Shield):**

- Grid to Plate: 2.4 μpF
- Input (Grid to Cathode/Heater): 1.8 to 1.9 μpF
- Output (Plate to Cathode/Heater): 3.4 μpF

- **With Shell Connected to Cathode:**

- Grid to Plate: 2.8 μpF
- Grid to Cathode: 2.2 μpF
- Plate to Cathode: 3.2 μpF

Typical Operating Conditions and Characteristics

The 12F5GT is typically operated as a Class A1 voltage amplifier. The published literature documents three distinct operating points, showing how the tube's characteristics shift with grid bias:

Parameter	Point A (Zero Bias)	Point B (Bias with -1 V)	Point C (Bias with -2 V)
Plate Voltage	100 V	100 V	250 V
Control Grid Voltage	0 V	-1 V	-2 V
Plate Current	1.8 mA	0.4 mA	0.9 mA
Plate Resistance	50,000 Ω	85,000 Ω	66,000 Ω
Transconductance	1,520 μmhos	1,150 μmhos	1,500 μmhos
Amplification Factor (μ)	80	100	100

At a plate voltage of 250 V and a grid bias of -2 V, the tube achieves its full nominal amplification factor of 100, with a transconductance of 1,500 μmhos and a plate resistance of 66,000 Ω .

Resistance-Coupled Amplifier Service

For practical voltage amplifier applications, the 12F5GT is frequently operated as a zero-bias resistance-coupled Class A1 amplifier. Under these conditions, grid-leak bias is employed. The operating data for this service (which shares identical characteristics with the [6F5GT](#)) are outlined below:

Parameter	Case 1	Case 2	Case 3	Case 4
Plate Supply Voltage	100 V	100 V	300 V	300 V
Grid Leak Resistor	10 MΩ	10 MΩ	10 MΩ	10 MΩ
Load Resistance	0.25 MΩ	0.25 MΩ	0.25 MΩ	0.25 MΩ
Coupling Capacitor	0.01 to 0.005 μF	0.01 to 0.005 μF	0.01 to 0.005 μF	0.01 to 0.005 μF
Grid Resistor (Following Stage)	0.5 MΩ	1.0 MΩ	0.5 MΩ	1.0 MΩ
Voltage Gain	48	52	66	71
Voltage Output (RMS at 5% THD)	7.0 V	8.5 V	44 V	50 V

These operating examples demonstrate that with a 300 V plate supply and a 1.0 MΩ grid resistor on the following stage, the 12F5GT can deliver a high voltage gain of 71 and a peak-to-peak output voltage of up to 50 V RMS at 5% harmonic distortion.

Similar and Related Designations

The 12F5GT shares identical electrical characteristics and applications (excluding heater ratings) with several other high-μ triodes:

- **6.3 V Heater Equivalents:** [6F5](#), [6F5G](#), [6F5GT](#), [6SF5](#), and [6SF5GT](#).
- **12.6 V Heater Equivalents:** [12SF5](#) and [12SF5GT](#).
- **Other Related Types:** [7B4](#).

These relationships highlight the tube's place within a broader family of high-μ triodes, though direct physical substitution is limited by differences in basing, pinout, and heater requirements.

Technical Summary

The **12F5GT** is a single, high-μ triode vacuum tube designed for series-heater AC-DC radio receivers. Operating with a 12.5 V to 12.6 V heater at 0.15 A, it provides an amplification factor of up to 100, a

transconductance of 1,150 to 1,520 μmhos , and a plate resistance ranging from 50,000 to 85,000 Ω depending on the operating point. Its physical construction features a T-9 glass bulb, a 5-pin octal base, and a top-cap grid connection. The tube is optimized for high-gain voltage amplification and resistance-coupled amplifier circuits, offering a reliable and power-efficient solution for vintage receiver designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1939 Arcturus

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

1939 ARCTURUS

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	—
Control-grid voltage	-2 V	—
Plate current	2 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 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	1.9 pF	—
Output capacitance	3.4 pF	—
Grid-to-plate capacitance	2.4 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA
Grid voltage	-2 V	ClassA

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate current	0.9 mA	ClassA



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 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	12.6 V	Nominal
Heater current	150 mA	Nominal
Plate voltage	300 V	Typical operating conditions
Plate current	0.40.9 mA	Typical operating conditions

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