

ELECTRONIC TUBE REFERENCE

12SN7GTA

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Improved 12SN7-family medium-mu twin triode for voltage amplification, phase inversion, and driver duties, with two similar sections suited to general Class-A service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8BD	BASE PINS	8
NOMINAL HEATER	12.6 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

8BD - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	6700 Ω
TRANSCONDUCTANCE	0.003 S
AMPLIFICATION FACTOR	20
MAXIMUM PLATE VOLTAGE	450 V
MAXIMUM PLATE DISSIPATION	5 W
MAXIMUM CATHODE CURRENT	20 mA
WARM-UP TIME	11 s
<i>Published promoted fields populated semantically; identical repeated sections compressed.</i>	

SECTION2 Triode	
PLATE RESISTANCE	6700 Ω
TRANSCONDUCTANCE	0.003 S
AMPLIFICATION FACTOR	20
MAXIMUM PLATE VOLTAGE	450 V
MAXIMUM PLATE DISSIPATION	5 W
MAXIMUM CATHODE CURRENT	20 mA
<i>Second identical physical triode section; added to align rows with SectionCount.</i>	

12SN7GTA — Medium-Mu Twin Triode Vacuum Tube

The **12SN7GTA** is a glass octal, medium-mu twin triode designed for use in television receivers and general-purpose audio and radio equipment. It contains two independent triode units within a single glass envelope, sharing only a common heater. The tube is highly versatile and is commonly employed as a combined vertical oscillator and vertical-deflection amplifier, a horizontal-deflection oscillator, a multivibrator, a phase inverter, or a resistance-coupled amplifier.

Except for its heater ratings, the 12SN7GTA is electrically identical to the [6SN7GTB](#), and is also identical to the [6SN7GTA](#) except for heater characteristics.

Heater, Basing, and Mechanical Specifications

The 12SN7GTA features an indirectly heated, coated unipotential cathode. It is designed to operate with either an AC or DC heater supply.

Heater Parameter	Value
Heater Voltage (AC/DC)	12.6 V
Heater Current	0.3 A
Calculated Heater Power	3.78 W (12.6 V × 0.3 A)

The tube utilizes an intermediate shell 8-pin octal base with an **8BD** basing designation. The pin connections, viewed from the bottom of the base, are as follows:

- **Pin 1:** Grid, Triode Unit 2
- **Pin 2:** Plate, Triode Unit 2
- **Pin 3:** Cathode, Triode Unit 2
- **Pin 4:** Grid, Triode Unit 1
- **Pin 5:** Plate, Triode Unit 1
- **Pin 6:** Cathode, Triode Unit 1
- **Pin 7:** Heater
- **Pin 8:** Heater

Physical Dimensions and Mounting

- **Bulb Type:** T-9 glass
- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 2.750 inches
- **Maximum Overall Height:** 3.312 inches
- **Mounting Position:** Any

Heater-Cathode Voltage Ratings (Design-Center Values)

To prevent breakdown between the heater and cathode, specific voltage limits must be observed:

- **Heater Negative with Respect to Cathode:** 200 V maximum (Total DC and Peak)
- **Heater Positive with Respect to Cathode:** 100 V maximum (DC component), 200 V maximum (Total DC and Peak)

Direct Interelectrode Capacitances

The capacitances of the two triode units are measured without an external shield. The values for each independent section are:

Capacitance Parameter	Triode Unit 1	Triode Unit 2
Grid to Plate	4.0 pF	3.8 pF

Capacitance Parameter	Triode Unit 1	Triode Unit 2
Input (Grid to Cathode and Heater)	2.2 pF	2.6 pF
Output (Plate to Cathode and Heater)	0.7 pF	0.7 pF

Class A1 Amplifier Characteristics and Ratings

When operated as a Class A1 amplifier, each triode section exhibits the following typical characteristics and operating conditions:

Parameter	Operating Point A	Operating Point B	Operating Point C
Plate Voltage	90 V	250 V	250 V
Grid Voltage	0 V	-8 V	-12.5 V
Plate Current	10 mA	9.0 mA	1.3 mA
Plate Resistance (Approx.)	6,700 Ω	7,700 Ω	—
Transconductance	3,000 μ mhos	2,600 μ mhos	—
Amplification Factor	20	20	—
Grid Voltage for $I_b = 10 \mu$ A (Approx.)	-7.0 V	-18 V	—

Maximum Ratings (Design-Center Values, Each Unit)

- **Plate Voltage:** 450 V
- **Cathode Current:** 20 mA
- **Plate Dissipation (Either Plate):** 5.0 W
- **Plate Dissipation (Both Plates, both units operating):** 7.5 W
- **Maximum Grid-Circuit Resistance (Fixed Bias):** 1.0 M Ω
- **Maximum Grid-Circuit Resistance (Cathode Bias):** 1.0 M Ω

Television Deflection and Oscillator Service

The 12SN7GTA is highly optimized for television sweep circuits. Its ratings are categorized by specific circuit functions under a 525-line, 30-frame system.

Vertical-Deflection Amplifier (Each Unit)

In vertical-deflection amplifier service, the tube must withstand high-voltage flyback pulses.

- **DC Plate Voltage:** 450 V maximum
- **Peak Positive-Pulse Plate Voltage (Absolute Maximum):** 1,500 V (The pulse duration must not exceed 15% of a vertical scanning cycle, equivalent to 2.5 milliseconds).
- **Peak Negative-Pulse Grid Voltage:** 250 V maximum
- **Peak Cathode Current:** 70 mA maximum
- **Average Cathode Current:** 20 mA maximum
- **Plate Dissipation (Either Plate):** 5.0 W maximum
- **Plate Dissipation (Both Plates):** 7.5 W maximum
- **Maximum Grid-Circuit Resistance (Cathode Bias):** 2.2 M Ω

Oscillator Service (Each Unit)

The tube can be configured as a vertical or horizontal deflection oscillator.

Rating (Design-Center Values)	Vertical-Deflection Oscillator	Horizontal-Deflection Oscillator
DC Plate Voltage	450 V	450 V
Peak Negative-Pulse Grid Voltage	400 V	600 V
Peak Cathode Current	70 mA	300 mA
Average Cathode Current	20 mA	20 mA
Plate Dissipation (Either Plate)	5.0 W	5.0 W
Plate Dissipation (Both Plates)	7.5 W	7.5 W
Maximum Grid-Circuit Resistance	2.2 M Ω	2.2 M Ω

Note: In stages operating with grid-leak bias, an adequate cathode-bias resistor or other suitable protective means is required to safeguard the tube in the event that excitation is lost.

Resistance-Coupled Amplifier Operation

For general-purpose voltage amplification, each section of the 12SN7GTA can be configured as a resistance-coupled amplifier. The following table outlines typical operating conditions across various plate supply voltages (E_{bb}), load resistances (R_p), grid resistances (R_{g1}), and grid-leak or cathode-bias configurations:

R_p (M Ω)	R_s (M Ω)	R_{g1} (M Ω)	E_{bb} = 90 V			E_{bb} = 180 V			E_{bb} = 300 V		
			R_k (Ω)	Gain	E_o (V)	R_k (Ω)	Gain	E_o (V)	R_k (Ω)	Gain	E_o (V)
0.10	0.10	0.10	3,900	10	10	3,600	11	20	3,500	11	30
0.10	0.24	0.10	5,000	11	14	4,700	12	27	4,400	12	41
0.24	0.24	0.10	9,400	11	13	8,700	11	25	8,700	12	38
0.24	0.51	0.10	11,000	11	17	11,000	12	32	11,000	12	48
0.51	0.51	0.10	19,000	11	15	18,000	12	29	18,000	12	43
0.51	1.00	0.10	24,000	11	19	23,000	12	37	23,000	12	54
0.24	0.24	10.0	0	14	12	0	16	20	0	17	28
0.24	0.51	10.0	0	14	16	0	16	28	0	17	40
0.51	0.51	10.0	0	14	15	0	15	26	0	16	38
0.51	1.00	10.0	0	14	19	0	16	35	0	16	52

- E_o represents the maximum RMS voltage output for 5% total harmonic distortion.
- **Gain** is measured at an output level of 2.0 Volts RMS.
- For zero-bias configurations ($R_k = 0$ with a 10 M Ω grid resistor), the generator impedance is negligible.
- Coupling capacitors should be selected to achieve the desired low-frequency response, and the cathode resistor (R_k) must be adequately bypassed.

Technical Summary

The **12SN7GTA** is a versatile, medium-mu twin triode featuring an 8-pin octal base and a T-9 glass envelope. It is characterized by its 12.6 V, 0.3 A heater, which distinguishes it from its 6.3 V counterparts like the [6SN7GTB](#). Each independent triode section provides an amplification factor of 20, a transconductance of 2,600 to 3,000 μ mhos, and a plate resistance of 6,700 to 7,700 Ω under typical Class A1 operating conditions.

With robust design-center ratings including a maximum plate voltage of 450 V and a combined plate dissipation of 7.5 W, the 12SN7GTA is highly reliable for demanding television sweep applications (such as

vertical deflection and horizontal/vertical oscillation) as well as general-purpose audio amplification, multivibrator, and phase-inverter circuits.



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 · Triode

APPLICATION

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Horizontal multivibrator / phase inverter / vertical deflection	—



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	2.2 pF	Section1
Output capacitance	0.7 pF	Section1
Grid-to-plate capacitance	4 pF	Section1

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA;EachSection
Control-grid voltage	-18 V	ClassA;EachSection
Plate current	9 mA	ClassA;EachSection
Plate voltage	90 V	ClassA;EachSection

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Control-grid voltage	0 V	ClassA;EachSection
Plate current	10 mA	ClassA;EachSection
Maximum positive pulse plate voltage	1500 V	VerticalDeflection
Maximum plate dissipation	5 W	VerticalDeflection
Maximum plate dissipation	7.5 W	VerticalDeflection;Pulse
Maximum DC cathode current	20 mA	VerticalDeflection

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	7700 Ω	EachSection
Transconductance	2600 μS	EachSection
Amplification factor	20	EachSection
Plate resistance	6700 Ω	EachSection
Transconductance	3000 μS	EachSection
Amplification factor	20	EachSection


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SOURCE OPERATING CONDITIONS

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1961 Tung Sol

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1961 TUNG SOL

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	2600 μS	AlternateOperatingPoint


SOURCE DATA APPENDIX

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	EachSection
Plate current	9 mA	EachSection
Transconductance	2600 μ S	EachSection
Amplification factor	20 ratio	EachSection

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak positive plate voltage	1500 V	VerticalDeflection



SOURCE DATA APPENDIX

1966 Tung Sol Electronic Tubes 3 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum combined plate dissipation	7.5 W	EachSection
Maximum peak positive plate voltage	1500 V	EachSection
Maximum peak cathode current	70 mA	EachSection
Typical plate voltage	250 V	EachSection
Maximum plate voltage	450 V	PromotedValue
Maximum plate dissipation	5 W	PromotedValue

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum cathode current	20 mA	PromotedValue

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	3.8 pF	Section1
Input capacitance	2.8 pF	Section1
Output capacitance	0.8 pF	Section1
Grid-to-plate capacitance	4 pF	Section2
Input capacitance	3 pF	Section2
Output capacitance	1.2 pF	Section2

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	6700 ohm	PromotedValue
Transconductance	0.003 A/V	PromotedValue
Amplification factor	20	PromotedValue



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SOURCE OPERATING CONDITIONS

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1971 RCA HB3 Binder 5 of 7

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

1971 RCA HB3 BINDER 5 OF 7

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	12.6 V	—
Heater current	300 mA	—
Plate voltage	250 V	ClassA;EachSection
Grid voltage	-8 V	ClassA;EachSection
Plate current	9 mA	ClassA;EachSection
Maximum plate voltage	450 V	EachSection
Plate dissipation	5 W	EachSection

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	7700 ohm	EachSection
Transconductance	2600 uS	EachSection
Amplification factor	20	EachSection

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	3.8 pF	EachSection



TUBE TINKER
ELECTRON TUBE DATABASE

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SOURCE OPERATING CONDITIONS

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1975 RCA RC30

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

1975 RCA RC30

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warm-up Time (Average)	11 s	TypicalOperation
Peak value	200 V	TypicalOperation;PublishedValue1
Peak value	200 V	TypicalOperation;PublishedValue2
Average value	100 V	TypicalOperation;PublishedValue1
Average value	100 V	TypicalOperation;PublishedValue2
Plate Voltage	450 V	MaximumRating
Cathode Current	20 mA	MaximumRating
For either plate	5 W	MaximumRating
For both plates with both units operating	7.5 W	MaximumRating
Grid-Circuit Resistance, for fixed-bias operation	1 megohm	MaximumCircuitValue
DC Plate Voltage	450 V	MaximumRating;PublishedValue1
DC Plate Voltage	450 V	MaximumRating;PublishedValue2

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Negative-Pulse Grid Voltage	400 V	MaximumRating;PublishedValue1
Peak Negative-Pulse Grid Voltage	600 V	MaximumRating;PublishedValue2
Peak Cathode Current	70 mA	MaximumRating;PublishedValue1
Peak Cathode Current	300 mA	MaximumRating;PublishedValue2
Average Cathode Current	20 mA	MaximumRating;PublishedValue1
Average Cathode Current	20 mA	MaximumRating;PublishedValue2
For either plate	5 W	MaximumRating
For both plates with both units operating	7.5 W	MaximumRating
Grid-Circuit Resistance	2.2 megohm	MaximumCircuitValue
DC Plate Voltage	450 V	MaximumRating
Peak Positive-Pulse Plate Voltage# (Absolute maximum)	1500 V	MaximumRating
Peak Negative-Pulse Grid Voltage	250 V	MaximumRating
Peak Cathode Current	70 mA	MaximumRating
For either plate	5 W	MaximumRating
For both plates with both units operating	7.5 W	MaximumRating
Grid-Circuit Resistance, for cathode-bias operation	2.2 megohm	MaximumCircuitValue
PLATE	92 V	MaximumCircuitValue;PublishedValue1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid to Plate	4 pF	Capacitance;PublishedValue1
Grid to Plate	3.8 pF	Capacitance;PublishedValue2
Grid to Cathode and Heater	2.2 pF	Capacitance;PublishedValue1
Grid to Cathode and Heater	2.6 pF	Capacitance;PublishedValue2
Plate to Cathode and Heater	0.7 pF	Capacitance;PublishedValue1
Plate to Cathode and Heater	0.7 pF	Capacitance;PublishedValue2

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	90 V	Characteristic;PublishedValue1
Plate Voltage	250 V	Characteristic;PublishedValue2
Grid Voltage	0 V	Characteristic;PublishedValue1
Grid Voltage	-8 V	Characteristic;PublishedValue2
Plate Resistance (Approx.)	6700 ohm	Characteristic;PublishedValue1
Plate Resistance (Approx.)	7700 ohm	Characteristic;PublishedValue2
Transconductance	3000 uS	Characteristic;PublishedValue1
Transconductance	2600 uS	Characteristic;PublishedValue2
Plate Current	10 mA	Characteristic;PublishedValue1
Plate Current	9 mA	Characteristic;PublishedValue2
Plate Current (or grid voltage of –	12.5 V	Characteristic
Grid Voltage (Approx.) for plate current of	10 V	Characteristic