

ELECTRONIC TUBE REFERENCE

6SN7GT

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Medium-mu double triode for general amplification, phase inversion, oscillator service, and television vertical-oscillator/vertical-deflection amplification.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8BD	BASE PINS	8
NOMINAL HEATER	6.3 V / 600 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	300 V
MAXIMUM PLATE DISSIPATION	2.5 W
MAXIMUM CATHODE CURRENT	20 mA
<i>Published promoted fields populated from printed headings; identical repeated sections compressed.</i>	

SECTION2 Triode	
PLATE RESISTANCE	6700 Ω
TRANSCONDUCTANCE	0.003 S
AMPLIFICATION FACTOR	20
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	2.5 W
MAXIMUM CATHODE CURRENT	20 mA
<i>Second identical physical triode section; added to align rows with SectionCount.</i>	

6SN7GT — Medium-Mu Twin Triode Vacuum Tube

An indirectly heated, dual-section receiving valve for voltage amplification, phase inversion, oscillation, multivibrator circuits, resistance-coupled amplifiers, and television deflection applications.

Overview

The **6SN7GT** is a general-purpose medium-mu double triode containing two electrically independent triode systems within a single glass envelope. Each section has its own cathode, control grid, and plate (anode); the two sections share a common heater. The tube uses an eight-pin international octal base and a nominal **6.3 V, 0.6 A** heater supply.

Brimar, Ferranti, General Electric, Sylvania, and Tung-Sol variously describe the device as a low-mu double triode, medium-mu twin triode, low-impedance double triode, or twin-triode amplifier. The design combines two substantially similar triodes, each with an amplification factor near **20**, in one envelope. The independent electrode connections permit separate amplification, cascaded gain stages, phase-inverter operation, and combinations of oscillator and amplifier functions.

The documented applications include resistance-coupled and low-frequency amplification, audio amplification, phase inversion, oscillators, converters, multivibrators, and television vertical-oscillator and vertical-deflection amplifier circuits. Sylvania additionally publishes ratings for horizontal-deflection oscillator service. This does not make the 6SN7GT a horizontal-output power tube.

Construction, Heater, and Independent Sections

The cathodes are **indirectly heated, coated unipotential cathodes**. Both triodes share the heater, but their grids, plates, and cathodes have separate base connections. The cathodes are **not internally common**, so the two sections can be biased at different potentials, provided heater-to-cathode limits are observed.

Heater characteristic	Value
Nominal heater voltage	6.3 V
Nominal heater current	0.6 A
Calculated heater power	3.78 W
Heater supply	AC or DC
Heating method	Indirect
Cathodes	Separate, coated, unipotential

Brimar and Ferranti state that the electrical characteristics of each 6SN7GT triode are equivalent to those of the **6J5GT** single triode. This is a characteristic comparison, not a statement of pin-for-pin interchangeability.

Tung-Sol recommends minimizing the voltage difference between heater and cathode. Ferranti lists a 100 V heater-to-cathode limit; Sylvania distinguishes heater-positive and heater-negative conditions, including a 100 V heater-positive DC limit and 200 V limits under certain stated conditions. These figures are manufacturer- and condition-specific, not interchangeable universal ratings.

Octal Base and Physical Dimensions

The **8BD** basing arrangement provides the following connections, viewed from the underside of the base:

Pin	Connection
1	Grid, triode 2
2	Plate, triode 2
3	Cathode, triode 2
4	Grid, triode 1

Pin	Connection
5	Plate, triode 1
6	Cathode, triode 1
7	Heater
8	Heater

Sylvania describes a T-9 glass bulb with intermediate-shell or short-intermediate-shell octal base configurations. Ferranti specifies a maximum overall length of **84 mm**, maximum seated height of **70 mm**, and maximum base diameter of **33 mm**. The manufacturers permit mounting in **any position**.

Electrical Characteristics and Class A Operation

The 6SN7GT combines moderate intrinsic amplification with relatively low plate resistance. Its principal characteristics, at the manufacturers' stated operating points, are:

- **Amplification factor (μ):** approximately 20.
- **Plate resistance (r_p):** approximately 6,700–8,000 Ω .
- **Transconductance (g_m):** approximately 2.5–3.0 mA/V (2,500–3,000 μ mhos).
- **Typical plate current:** approximately 9–10.6 mA.

General Electric, Sylvania, and Tung-Sol document two closely corresponding Class A operating points:

Characteristic, per triode	Point A	Point B
Plate voltage	90 V	250 V
Grid voltage	0 V	−8 V
Plate current	10 mA	9 mA
Plate resistance	6,700 Ω	7,700 Ω
Transconductance	3,000 μ mhos	2,600 μ mhos
Amplification factor	20	20

Brimar and Ferranti also give a point near **100 V** plate voltage, **0 V** grid bias, **10.5–10.6 mA** plate current, **8,000 Ω** plate resistance, and **2.5 mA/V** transconductance.

The familiar triode relationship $\mu \approx g_m \times r_p$ is reflected in the published figures: $0.0026 \text{ S} \times 7,700 \Omega \approx 20$. The tabulated characteristics change with operating point; the amplification factor remains approximately 20 in these examples.

Ratings and Their Context

Published maximum ratings differ among manufacturers and service categories. They must be applied according to the particular rating convention and circuit service rather than merged into a single permissive set.

Rating	Manufacturer documentation
Maximum plate voltage	300 V in Brimar and Ferranti general ratings
Maximum plate dissipation	2.5 W per section in Brimar and Ferranti
Maximum cathode current	20 mA in Ferranti
Maximum average grid current	1.0 mA in Brimar
Maximum plate voltage, Tung-Sol amplifier rating	200 V under the stated RMA convention
Sylvania Class A maximum plate dissipation	3.5 W per plate, 5 W combined

Sylvania's **5 W combined** limit is important: the two plates must not simply be assumed to dissipate 3.5 W each simultaneously. Likewise, specialized pulse ratings are not continuous DC ratings.

Resistance-Coupled Voltage Amplification

Brimar and Ferranti supply detailed resistance-coupled amplifier examples for **each section**:

Parameter	Case 1	Case 2	Case 3
Anode supply	100 V	200 V	300 V
Anode load resistor	50 k Ω	100 k Ω	250 k Ω
Cathode bias resistor	2,500 Ω	3,300 Ω	6,000 Ω
Peak output	17 V	38 V	57 V
Voltage gain	13	14	14

The examples illustrate how greater supply voltage and appropriately chosen resistors allow a larger output-voltage swing while loaded stage gain remains in the neighborhood of 13–14. Stage gain is lower than the tube's intrinsic amplification factor because of the external circuit.

Tung-Sol publishes an alternative set of resistance-coupled conditions with a **100-k Ω plate resistor** and supply voltages of approximately **90, 180, and 300 V**. The associated cathode resistors are **2,940, 2,830, and 2,440 Ω** ; the published peak output voltages are **17, 34, and 56 V**, and the corresponding voltage gains approximately **13, 14, and 14**. Tung-Sol also specifies cathode-bypass and coupling components for these example circuits.

Both Brimar and Ferranti explicitly permit connecting the two triodes **in cascade** to obtain higher overall voltage gain. As a mathematical illustration, two idealized loaded stages each with gain 14 would have a

combined gain of $14 \times 14 = \mathbf{196}$, before allowing for real loading and coupling effects. This is an illustration calculated from the stage-gain figures, not a separately guaranteed manufacturer specification.

Phase Inversion, Oscillation, and Multivibrators

Brimar and Ferranti identify **phase-inverter** service as an intended application. The two independently accessible triodes can be arranged in circuits that develop related signals of opposite polarity. Actual output balance and gain depend on the circuit topology and chosen external components; the sheets do not specify one universal phase-inverter circuit.

Tung-Sol explicitly identifies **oscillator**, **converter**, **multivibrator**, and **audio-amplifier** service. The two-section construction allows oscillator and associated amplifier functions within one envelope, or two interacting triode stages in a multivibrator. The datasheets establish these applications without specifying a universal oscillator frequency range or multivibrator timing formula.

Television Vertical Deflection and Oscillator Service

Sylvania describes the 6SN7GT as suitable for a **combined vertical oscillator and vertical-deflection amplifier** in television receivers. Its ratings distinguish ordinary Class A amplification from vertical-deflection amplifier, vertical-deflection oscillator, and horizontal-deflection oscillator service.

For specified vertical-deflection amplifier operation, Sylvania gives a **1,200 V absolute maximum peak positive plate voltage**. This is a specialized pulsed limit and must **not** be interpreted as permission for 1,200 V continuous DC plate operation. The published television condition refers to a **525-line, 30-frame** scanning system and restricts pulse duty cycle to **15% of one scanning cycle**.

Sylvania also specifies different oscillator-service peak limits: vertical-deflection oscillator data include **400 V peak negative grid voltage** and **70 mA peak cathode current**; horizontal-deflection oscillator data include **600 V** and **300 mA**, respectively. These are application-specific peak ratings, not normal continuous Class A operating values.

Interelectrode and Inter-Section Capacitance

The manufacturers document capacitance within each triode and between the two assemblies. Brimar and Ferranti give approximate values **without an external shield**:

Capacitance	Triode 1	Triode 2
Input	2.6 pF	2.6 pF
Output	0.8 pF	0.8 pF
Grid to plate	4.0 pF	4.1 pF

They also specify approximately **0.5 pF plate-to-plate**, **0.1 pF grid-to-grid**, and **0.2 pF** from either grid to the opposite triode's plate. These small cross-section capacitances are relevant when the sections are

used in separate stages or high-gain cascades: the electrode circuits are galvanically independent, but not capacitively isolated.

Tung-Sol provides a different measurement condition, using a **close-fitting shield connected to the cathode**. Its approximate values are **3.8/4.0 pF grid-to-plate**, **2.8/3.0 pF grid-to-cathode**, and **0.8/1.2 pF plate-to-cathode** for the two triode units. The different conditions and definitions should be preserved when comparing capacitance tables.

The plate-to-grid capacitance also matters in amplifier design because the effective input capacitance can be affected by voltage gain. The precise circuit effect depends on gain, wiring, and external impedances.

Characteristic Curves and Design Interpretation

Brimar, Ferranti, Sylvania, and Tung-Sol include characteristic curves in their PDFs. The available sheets contain plate-current-versus-plate-voltage curves and transfer-characteristic material for the individual sections. These curves complement the tabulated operating points by showing how plate current varies with grid bias and plate voltage, rather than only at one or two specified conditions.

The tabulated values demonstrate that a 6SN7GT section can deliver moderate voltage gain with comparatively low internal plate resistance, while the curves provide the basis for selecting bias and load lines in a particular circuit. The two sections should be analyzed individually when their operating conditions differ.

Related Designations and Manufacturer Comparisons

The General Electric tables group the **6SN7-GT** with the **6SN7-WGT** for certain characteristics, while separately listing **6SN7-GTA** and **6SN7-GTB** with differing published maximum-voltage information. Those later suffixes must not be assumed to share every original 6SN7GT rating.

Sylvania compares the **6SN7GT** with the **12SN7GT**, stating that they have the same electrical characteristics except for heater requirements. The **12SN7GT** uses a **12.6 V, 0.3 A** heater rather than the 6SN7GT's **6.3 V, 0.6 A** heater.

The RCA industrial documentation compares the 6SN7-GT with the premium **5692** twin triode, including different plate ratings, heater-to-cathode limits, and controlled characteristics. The 5692 is therefore a related industrial type, not evidence that its distinct ratings apply automatically to the 6SN7GT.

Brimar, Ferranti, and Tung-Sol also relate individual 6SN7GT sections to the **6J5** family. Such comparisons are useful for understanding the underlying triode characteristic, but they do not by themselves establish unrestricted whole-tube substitution.

Technical Summary

The **6SN7GT** is an **octal, indirectly heated, medium-mu double triode** with **two separate cathodes**, a **shared 6.3 V / 0.6 A heater**, and two approximately matched low-impedance triode systems. Each section offers an amplification factor near **20**, transconductance of roughly **2,500-3,000 μ mhos**, and plate resistance of approximately **6.7-8.0 k Ω** at the published Class A operating points.

The manufacturer datasheets document a notably versatile range of service: **audio and low-frequency voltage amplification, resistance-coupled amplifier stages, cascaded amplification, phase inversion, oscillators, converters, multivibrators, television vertical oscillators, vertical-deflection amplifiers, and horizontal-deflection oscillators.** Its separate triode electrodes and documented interelectrode capacitances make it suitable for analyzing both independent-stage and coupled-stage operation.

Designers must distinguish the manufacturers' general amplifier ratings from specialized television pulse ratings and must respect individual as well as combined plate-dissipation limits. Within those constraints, the 6SN7GT provides two flexible, moderate-gain triode elements in a single eight-pin glass receiving valve.

This technical article is original synthesis based exclusively on the seven manufacturer PDF artifacts supplied through the Tube Tinker MCP. Numerical illustrations identified as calculations are derived from the published data.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1948 Brimar Radio Valve Manual

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

1948 BRIMAR RADIO VALVE MANUAL

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—



SOURCE OPERATING CONDITIONS

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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	Combined vertical oscillator and vertical-deflection amplifier	—



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1958 Brimar Radio Valve No 7

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

1958 BRIMAR RADIO VALVE NO 7

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	300 V	Published handbook rating
Plate voltage	250 V	ClassA OperatingPoint1
Control-grid bias	-8 V	ClassA OperatingPoint1
Plate current	9 mA	ClassA OperatingPoint1
Plate voltage	90 V	ClassA OperatingPoint2
Control-grid bias	0 V	ClassA OperatingPoint2
Plate current	10 mA	ClassA OperatingPoint2

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	7700 ohm	ClassA OperatingPoint1
Transconductance	2600 μ S	ClassA OperatingPoint1
Amplification factor	20	ClassA OperatingPoint1
Plate resistance	6700 ohm	ClassA OperatingPoint2
Transconductance	3000 μ S	ClassA OperatingPoint2
Amplification factor	20	ClassA OperatingPoint2
Heater voltage	6.3 V	Published heater rating

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater current	600 mA	Published heater rating


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1960 RCA Industrial and Communications Types

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

1960 RCA INDUSTRIAL AND COMMUNICATIONS TYPES

Section 1 · Triode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	General-purpose amplifier	—


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1961 Ferranti Technical Handbook

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

1961 FERRANTI TECHNICAL HANDBOOK

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	250 V	Each section
Plate Current	9 mA	Each section
Transconductance	2600 μ S	Each section
Plate Resistance	7700 ohm	Each section
Amplification Factor	20 ratio	Each section



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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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance	7700 ohm	AlternateOperatingPoint
Transconductance	2600 uS	AlternateOperatingPoint

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