ELECTRONIC TUBE REFERENCE

12B8GT

Voltage - Triode Pentode electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
PENTODE-TRIODE

Midget triode-pentode for RF/IF amplification and detector service.

General characteristics

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

Section ratings

SECTION1 Triode

PLATE RESISTANCE	37000 Ω
TRANSCONDUCTANCE	0.0024 S
AMPLIFICATION FACTOR	90

Published section data promoted where applicable; additional operating values retained as parameters.

SECTION2 Pentode

PLATE RESISTANCE	200000 Ω
TRANSCONDUCTANCE	0.0018 S
AMPLIFICATION FACTOR	360

Published section data promoted where applicable; additional operating values retained as parameters.

12B8GT — Triode-Pentode Midget Vacuum Tube

The **12B8GT** is a multi-unit midget vacuum tube combining a remote cut-off pentode and an independent high-mu triode within a single glass envelope. Designed primarily for use in compact AC-DC radio receivers where space is highly limited, this tube combines two distinct amplification systems sharing a common heater but utilizing separate, unipotential cathodes.

Physical Construction and Pinout

The 12B8GT is constructed in a T9-C glass bulb with a small wafer 8-pin octal base featuring a metal shell. The physical dimensions of the tube are compact, with a maximum overall height of 3 9/16 inches, a maximum seated height of 3 inches, and a maximum bulb diameter of 1 5/16 inches.

The tube features an 8-pin octal base configuration combined with a top cap. The control grid of the pentode section is routed to the top cap to minimize input-to-output coupling and optimize high-frequency performance. The remaining electrodes are connected to the base pins.

The pin connections, viewed from the bottom of the tube, are assigned as follows:

Pin Number	Electrode Connection
Pin 1	Triode Grid (G_T)
Pin 2	Heater (H)
Pin 3	Pentode Plate (P_P)
Pin 4	Pentode Screen Grid (G_2P / G_s)
Pin 5	Triode Plate (P_T)
Pin 6	Pentode Cathode (K_P)
Pin 7	Heater (H)
Pin 8	Triode Cathode (K_T)
Top Cap	Pentode Control Grid (G_1P)

The heater is designed for series or parallel operation in AC-DC circuits, requiring a nominal voltage of 12.6 V and a current of 0.3 A. The heater can be operated on either AC or DC. Both the triode and pentode sections utilize independent, coated unipotential cathodes, allowing them to be biased separately.

Electrical Characteristics and Operating Points

The 12B8GT operates both of its internal sections at a typical plate potential of 90 V. The electrical characteristics of each section under standard Class A1 operating conditions are detailed below.

Pentode Section

The pentode section is designed as a remote cut-off high-frequency amplifier. Under typical operating conditions, its parameters are:

Parameter	Value
Plate Voltage	90 V
Screen Grid Voltage	90 V
Control Grid Voltage	-3 V
Plate Current	7.0 mA
Screen Grid Current	2.0 mA
Plate Resistance	0.2 MΩ (200,000 Ω)
Transconductance	1800 µmhos
Amplification Factor	360
Control Grid Voltage (for g_m = 2 µmhos)	-42.5 V

The remote cut-off characteristic is demonstrated by the control grid voltage of -42.5 V required to reduce the transconductance to a nominal 2 µmhos, enabling effective automatic volume control (AVC) action.

Triode Section

The triode section is a high-mu voltage amplifier. Under typical operating conditions, its parameters are:

Parameter	Value
Plate Voltage	90 V
Grid Voltage	0 V
Plate Current	2.8 mA
Plate Resistance	37,000 Ω
Transconductance	2400 µmhos
Amplification Factor	90
Grid Voltage (approx. for plate current cut-off)	-2.5 V

The triode section features a sharp cut-off characteristic, with plate current reaching cut-off at approximately -2.5 V of grid bias.

Direct Interelectrode Capacitances

The close proximity of the two independent tube structures within a single small envelope requires careful shielding and layout. The direct interelectrode capacitances of the individual sections and the cross-coupling capacitances between the pentode and triode sections are as follows:

Pentode Section Capacitances

- **Control Grid to Plate:** 0.015 µµF
- **Input (Control Grid to Cathode):** 5.0 to 5.2 µµF
- **Output (Plate to Cathode):** 9.5 to 9.6 µµF

Triode Section Capacitances

- **Control Grid to Plate:** 2.3 to 2.4 µµF
- **Control Grid to Cathode:** 5.0 µµF
- **Plate to Cathode:** 6.3 to 6.5 µµF

Inter-Section Capacitances

- **Pentode Control Grid to Triode Grid:** 0.002 µµF
- **Pentode Control Grid to Triode Plate:** 0.003 µµF
- **Pentode Plate to Triode Plate:** 0.08 µµF
- **Pentode Plate to Triode Grid:** 0.078 µµF

These low inter-section capacitances indicate that despite sharing a single bulb, the two sections are electrostatically well-isolated, minimizing unwanted feedback or crosstalk when operated in separate stages.

Applications and Circuit Service

The 12B8GT is specifically tailored for space-saving applications in small AC-DC receivers. The dual-section design allows a single tube envelope to perform multiple critical receiver functions:

- **Pentode Section:** The remote cut-off pentode section is optimized for use as a conventional radio-frequency (RF) or intermediate-frequency (IF) amplifier. Its remote cut-off characteristic allows it to handle a wide range of signal amplitudes without severe distortion when controlled by an automatic volume control bias.
- **Triode Section:** The high-mu triode section is designed to operate as a detector. It can be configured either as a biased detector (plate detection) or as a grid-leak detector, providing efficient demodulation of the RF/IF signal.

By combining these two stages, the 12B8GT reduces the total tube count and physical footprint required for the receiver's front-end and detector stages.

Technical Summary

The **12B8GT** is a compact, indirectly heated triode-pentode vacuum tube designed for space-constrained AC-DC receiver applications. Operating from a **12.6 V, 0.3 A** heater, it houses a remote cut-off pentode (amplification factor of **360**, transconductance of **1800 µmhos**) and an independent high-mu triode (amplification factor of **90**, transconductance of **2400 µmhos**). With its small T9-C glass envelope, 8-pin octal base, and top-cap control grid connection, the 12B8GT provides a highly integrated solution for RF/IF amplification and detection in compact radio designs.

SOURCE OPERATING CONDITIONS

1939 Arcturus

SOURCE PDF

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	**90 V**	—
Plate current	**2.8 mA**	—

1939 ARCTURUS

Section 2 · Pentode

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Plate voltage	**90 V**	—
Screen-grid voltage	**90 V**	—
Control-grid voltage	**-3 V**	—
Plate current	**7 mA**	—
Screen-grid current	**2 mA**	—

SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

1961 Tung Sol

SOURCE PDF

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**
Service	**Triode amplifier**	—

Section 2 · Pentode

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Service	**Pentode amplifier**	—

Tube Tinker

An independent reference for electronic tubes, vacuum tubes, and their source documents.

Catalog Tube types Full books Blog Feedback & corrections

© 2026 Tube Tinker