



ELECTRONIC TUBE REFERENCE

18DZ8

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-TRIODE

Miniature high-mu triode and power-pentode combination designed as a complete two-stage audio-frequency amplifier.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	18 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
TRANSCONDUCTANCE	0.0014 S
AMPLIFICATION FACTOR	10
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	0.75 W
<i>High-mu triode section; Published ratings and characteristics checked against the supplied datasheet tables.</i>	

SECTION2 Pentode	
TRANSCONDUCTANCE	0.0075 S
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM SCREEN VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	6.5 W
MAXIMUM SCREEN DISSIPATION	1.5 W
MAXIMUM CATHODE CURRENT	60 mA
<i>Power pentode section; Published ratings and characteristics checked against the supplied datasheet tables.</i>	

18DZ8 — High-Mu Triode and Power Pentode Vacuum Tube

An indirectly heated, multi-unit miniature valve containing a high-mu triode and a power pentode in a single envelope, designed for compact audio-frequency amplification.

Overview

The **18DZ8** is a multi-unit vacuum tube of the miniature type, combining a high-mu triode and a power pentode within a single glass envelope. It is designed primarily for service as a two-stage audio-frequency amplifier in applications where the plate supply voltage is obtained from a single half-wave rectifier operating directly from a 120-volt AC power line. The tube features a coated unipotential cathode and is housed in a T-6 1/2 glass bulb with a 9-pin miniature base. It is designed to be mounted in any position.

The 18DZ8 is identical to the [6DZ8](#), [9DZ8](#), [12DZ8](#), and [35DZ8](#) vacuum tubes, with the sole exception of its heater ratings.

Heater and Physical Specifications

The 18DZ8 is equipped with an indirectly heated, coated unipotential cathode. The heater is designed to operate from either an AC or DC supply.

Parameter	Value
Heater Voltage	18.0 V
Heater Current	0.30 A
Bulb Type	T-6 1/2 glass
Base Type	Miniature 9-pin
Maximum Diameter	7/8 inch

Parameter	Value
Maximum Overall Length	2 5/8 inches
Maximum Seated Length	2 3/8 inches
Mounting Position	Any

Pinout Configurations

The 18DZ8 is documented with two distinct pinout configurations (viewed from the bottom of the miniature 9-pin base). Circuit designers must verify the specific pin arrangement of the physical device being utilized.

Configuration A

In this arrangement, the triode and pentode connections are distributed as follows:

- **Pin 1:** Triode Grid (G)
- **Pin 2:** Triode Cathode (K)
- **Pin 3:** Pentode Grid #2 (Screen Grid, [G2](#))
- **Pin 4:** Heater (H)
- **Pin 5:** Heater (H)
- **Pin 6:** Pentode Plate (P1)
- **Pin 7:** Pentode Cathode, Grid #3 (Suppressor Grid), and Shield (Ks)
- **Pin 8:** Pentode Grid #1 (Control Grid, G1)
- **Pin 9:** Triode Plate ([P2](#))

Configuration B

In this alternative arrangement, the pin assignments are:

- **Pin 1:** Triode Plate (Pt)
- **Pin 2:** Pentode Grid #1 (Control Grid, G1)
- **Pin 3:** Pentode Grid #2 (Screen Grid, [G2](#))
- **Pin 4:** Heater (H)
- **Pin 5:** Heater (H)
- **Pin 6:** Pentode Plate (Pp)
- **Pin 7:** Pentode Cathode, Grid #3 (Suppressor Grid, Kp, G3)
- **Pin 8:** Triode Cathode (Kt)
- **Pin 9:** Triode Grid (Gt)

Maximum Ratings (Design-Center System)

The maximum ratings for the triode and pentode sections of the 18DZ8 are defined under the Design-Center System. These limits must not be exceeded under the worst-case operating conditions.

Rating	Triode Section	Pentode Section	Units
Maximum Plate Voltage	150	150	Volts
Maximum Plate Dissipation	0.75	6.5	Watts
Maximum Grid #2 (Screen Grid) Voltage	—	135	Volts
Maximum Grid #2 Dissipation	—	1.5	Watts
Maximum DC Heater-Cathode Potential	110	110	Volts
Maximum Grid Circuit Resistance	5.0	0.5	Megohms
Maximum Cathode Current	5.0	60.0	mA
Max. Heater-Cathode Voltage (Heater negative wrt cathode)	200	200	Volts
Max. Heater-Cathode Voltage (Heater positive wrt cathode)	200	200	Volts

Typical Operating Conditions and Characteristics

The typical operating parameters for each section of the 18DZ8 demonstrate its capability as a combined voltage amplifier and power output stage. The triode section provides high voltage gain, while the pentode section is optimized for power output.

Parameter	Triode Section	Pentode Section	Units
Plate Voltage	120	145	Volts
Grid #2 Voltage	—	120	Volts
Grid #1 Voltage	0	0	Volts

Parameter	Triode Section	Pentode Section	Units
Cathode Bias Resistor	1500	180	Ohms
Plate Current	0.8	45	mA
Grid #2 Current	—	6	mA
Transconductance	1400	7500	μmhos
Load Resistance	—	2500	Ohms
Grid Cutoff Voltage (for $I_b = 20 \mu A$)	-2.5	—	Volts
Amplification Factor	100	—	—
Power Output	—	2.0	Watts

Circuit Application and Design Considerations

The 18DZ8 is specifically tailored for compact, cost-effective audio amplification systems. A typical application is a two-stage audio-frequency amplifier where the high- μ triode serves as the initial voltage preamplifier stage, and the power pentode serves as the single-ended power output stage.

Because the tube is designed to operate with plate and screen voltages that can be derived directly from a 120-volt AC power line via a simple half-wave rectifier, it eliminates the need for an expensive power transformer. In this type of line-connected power supply, the typical operating plate voltage of 120 V for the triode and 145 V for the pentode, along with a screen grid voltage of 120 V, are easily achieved. Under these conditions, the pentode section can deliver a useful power output of 2.0 Watts into a 2500-Ohm load, which is sufficient for driving a loudspeaker in small receivers or utility amplifiers.

When designing circuits with the 18DZ8, the maximum grid circuit resistance limits must be strictly observed: 5.0 Megohms for the triode section and 0.5 Megohms for the pentode section. Additionally, the heater-to-cathode voltage limits must be respected, especially in series-string heater arrangements where the potential difference between the heater and cathode can be substantial. The maximum DC heater-cathode potential is limited to 110 Volts, while the peak heater-cathode voltage (with the heater either positive or negative with respect to the cathode) must not exceed 200 Volts.

Technical Summary

The **18DZ8** is a versatile, space-saving **9-pin miniature double-unit tube** containing a **high- μ triode** (amplification factor of 100) and a **power pentode** capable of delivering **2.0 Watts** of audio output. Operating with an **18.0 V, 0.30 A** heater, it is designed for series-heater or transformerless line-operated audio equipment. By combining a high-gain voltage amplifier and a power output stage in a single T-6 1/2 envelope, the 18DZ8 enables the design of compact, low-cost two-stage audio amplifiers operating directly from rectified AC line voltages.



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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TransconductancePublished	1400 μ S	Triode

1961 TUNG SOL

Section 2 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
TransconductancePublished	7500 μ S	Pentode



SOURCE OPERATING CONDITIONS

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

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Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DIRECTLY	120 V	Published datasheet
MAXIMUM PLATE VOLTAGE	15 V	Published datasheet; section table
MAXIMUM PLATE DISSIPATION	7 W	Published datasheet
MAX fMUM GRID (	2 V	Published datasheet; section table
MAXIMUM GRID (	2 W	Published datasheet; section table

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC HEATER -CATHODE POTENTIAL	11 V	Published datasheet
MAXIMUM GRID CIRCUIT RESISTANCE jE .0 0	5 mA	Published datasheet
r .0	60 mA	Published datasheet
HEATER NEGATIVE WITH RESPECT TO CATHODE	2 V	Published datasheet
HEATER POSITIVE WITH RESPECT TO CATHODE	2 V	Published datasheet
CATHODE RESISTOR	180 ohm	Published datasheet
GRID #	2 mA	Published datasheet
TR ANSCONDUCTANCE	1400 μ S	Published datasheet
POWER OUTPUT ---	2 W	Published datasheet

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE	18 V	Published datasheet
HEATER VOLTAGE	18 V	Published datasheet
HEATER CURRENT	300 mA	Published datasheet
PLATE VOLTAGE i	2 V	Published datasheet; section table
GRID #Z VOLTAGE ---	12 V	Published datasheet
PLATE CURRENT 0	8 mA	Published datasheet; section table
LOAD RESISTANCE ---	2500 ohm	Published datasheet
GRID CUTOFF VOLTAGE FOR	2 V	Published datasheet; section table

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Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM PLATE VOLTAGE	15 V	Published datasheet; section table
MAX fMUM GRID (	135 V	Published datasheet; section table
MAXIMUM GRID (	1 W	Published datasheet; section table

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PLATE VOLTAGE i	145 V	Published datasheet; section table

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PLATE CURRENT 0	45 mA	Published datasheet; section table
GRID CUTOFF VOLTAGE FOR	2 V	Published datasheet; section table

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