

ELECTRONIC TUBE REFERENCE

12DT7

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

High-mu twin triode specifically intended as a low-noise resistance-coupled audio voltage amplifier, with operating conditions tailored to low-level signal amplification.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	6.3 V / 300 mA
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	62500 Ω
TRANSCONDUCTANCE	0.0016 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	1 W
Representative row for identical repeated diode/triode sections.	

SECTION2 Triode	
PLATE RESISTANCE	62500 Ω
TRANSCONDUCTANCE	0.0016 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	1 W
Physical triode row restored under current one-row-per-physical-section policy.	

12DT7 — High-Mu Double Triode

The **12DT7** is a miniature, heater-cathode type high-mu double triode designed specifically for use as a resistance-coupled voltage amplifier in critical audio applications. It is engineered for designs where low noise and hum are of primary consideration. In its general electrical characteristics, the 12DT7 is similar to the [12AX7](#) tube type.

Physical Construction and Basing

The 12DT7 is constructed in a T-6 1/2 glass envelope with a miniature button 9-pin base (basing designation **9A**). The tube can be mounted in any position.

Physical Dimensions

- **Maximum overall length:** 2 3/16 inches
- **Maximum seated height:** 1 15/16 inches
- **Maximum diameter:** 7/8 inch

Pin Connections

The 9A bottom-view pinout configuration provides independent connections for each triode section, alongside a center-tapped heater:

Pin	Connection
Pin 1	Plate (Unit 2)
Pin 2	Grid (Unit 2)
Pin 3	Cathode (Unit 2)
Pin 4	Heater
Pin 5	Heater
Pin 6	Plate (Unit 1)

Pin	Connection
Pin 7	Grid (Unit 1)
Pin 8	Cathode (Unit 1)
Pin 9	Heater Center Tap

Heater Characteristics

The 12DT7 features a coated unipotential cathode and a versatile heater design that can be operated in either series or parallel configurations, using either AC or DC power.

Heater Connection	Voltage	Current
Series (Pins 4 and 5)	12.6 V	0.15 A
Parallel (Pins 4/5 tied, Pin 9)	6.3 V	0.3 A

Maximum Ratings (Design Center System)

The following maximum ratings apply to each individual triode unit of the 12DT7:

- **Maximum Plate Voltage:** 300 V
- **Maximum Plate Dissipation:** 1 W
- **Maximum Grid Voltage (Negative-bias value):** 50 V
- **Maximum Grid Voltage (Positive-bias value):** 0 V
- **Maximum Heater-Cathode Voltage:**
 - **Heater positive with respect to cathode (DC):** 100 V
 - **Heater positive with respect to cathode (Total DC and Peak):** 180 V
 - **Heater negative with respect to cathode (Total DC and Peak):** 180 V
 - **Maximum Peak Heater-Cathode Voltage:** 180 V

Typical Operating Conditions and Characteristics

Under Class A1 amplifier operation, each triode unit exhibits the following typical characteristics:

Parameter	Operating Point I	Operating Point II
Plate Voltage	100 V	250 V
Grid Voltage	-1 V	-2 V
Amplification Factor (μ)	100	100
Plate Resistance	80,000 Ω	62,500 Ω

Parameter	Operating Point I	Operating Point II
Transconductance	1,250 μ mos	1,600 μ mos
Plate Current	0.5 mA	1.2 mA

Noise and Hum Performance

Because the 12DT7 is designed for critical low-noise audio applications, specific performance metrics are established for both ballistic noise and equivalent noise/hum.

Ballistic Noise Level

For each individual unit, the average ballistic noise level is **+5 dB**. This is measured under the following circuit conditions:

- **Plate Supply:** 250 V
- **Plate Load Resistor:** 220 k Ω
- **Cathode Resistor:** 3,000 Ω
- **Cathode Bypass Capacitor:** 100 μ F
- **Grid Resistor:** 20 k Ω
- **Amplifier Frequency Range:** 30 to 12,000 cps (± 2 dB)
- **Sensitivity/Output:** 20 mV input for 50 mW output (equivalent to 17 dB), tested using a hand mallet per MIL-E-1C specifications.

Equivalent Noise and Hum Voltage

With both triode units connected in parallel, the average equivalent noise and hum voltage is **-46 dB**. This is measured under the following conditions:

- **Plate Supply:** 100 V
- **Plate Load Resistor:** 110 k Ω
- **Cathode Resistor (Unbypassed):** 2,400 Ω
- **Grid Resistor:** 0 Ω
- **Amplifier Frequency Response:** ± 0.5 dB from 20 to 30,000 cps at 1 Watt output, with a gain of 110 dB.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 12DT7 are measured without an external shield:

Capacitance	Unit 1	Unit 2
Grid to Plate	1.7 μ F	1.7 μ F
Input	1.6 μ F	1.6 μ F

Capacitance	Unit 1	Unit 2
Output	0.46 μpF	0.34 μpF

Related Designations and Comparisons

While the 12DT7 is electrically similar to the [12AX7](#) and optimized for low-noise audio applications, it should not be confused with other high-mu twin triodes such as the [12DT8](#). The [12DT8](#) is a general-purpose high-mu twin triode intended for RF amplifier and combined oscillator-mixer service in FM tuners. The [12DT8](#) operates with a 12.6 V (0.15 A) heater, has a different pinout (90E basing with a shield connection on Pin 9 instead of a heater center tap), and exhibits different operating characteristics, such as an amplification factor of 60, a plate resistance of 10,900 to 15,000 Ω , and a plate dissipation rating of 2.5 W per unit.



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
Service	Low-noise resistance-coupled audio voltage amplifier	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PlateResistanceAtLowerCurrent	80000 ohm	—
TransconductanceAtLowerCurrent	1260 uS	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 2 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 2 OF 4

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE	6.3 V	HEATER VOLTAGE 6.3/12.6 VOLTS
T UN6-SOL ELECTRIO INO. ELECTRON TUBE DIVISION BLOOM FI EID, NEW JERSEY, U.S.A. MARLX	1 mA	T UN6-SOL ELECTRIO INO. ELECTRON TUBE DIVISION BLOOM FI EID, NEW JERSEY, U.S.A. MARLX 1, 1964 PLATE {E6876
PLATE VOLTAGE Z00	25 V	PLATE VOLTAGE Z00 250 VOLTS
GRID VOLTAGE —	1 V	GRID VOLTAGE —1 —2 VOLTS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PLATE RESISTANCE BQ 000	62 Ω	PLATE RESISTANCE BQ 000 62 500 OHMS
PLATE CURRENT 0	5 mA	PLATE CURRENT 0.5 1.2 MA.
CATHODE RESISTOR	3 Ω	CATHODE RESISTOR 3 000 OHMS
GRID RESISTOR	2 Ω	GRID RESISTOR 20 KI LOHMS
CATHODE RESISTOR (UNBYPASSED)	2 Ω	CATHODE RESISTOR (UNBYPASSED) 2 400 OHMS

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM PLATE VOLTAGE	3 V	MAXIMUM PLATE VOLTAGE 300 VOLTS
NEGATIVE - BIAS VALUE	5 V	NEGATIVE - BIAS VALUE 50 VOLTS
MAXIMUM PLATE DISSIPATION	1 mA	MAXIMUM PLATE DISSIPATION 1 WATT
PLATE LOAD RESISTOR	22 Ω	PLATE LOAD RESISTOR 220 KILOHMS
PLATE LOAD RESISTOR	11 Ω	PLATE LOAD RESISTOR 110 KILOHMS

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