

ELECTRONIC TUBE REFERENCE

10JT8

Voltage - Triode Pentode electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
PENTODE-TRIODE

Frame-grid television triode-pentode combining voltage-amplifier or sync-separator triode service with video-amplifier pentode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9DX	BASE PINS	9
NOMINAL HEATER	10.2 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

9DX - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – 2K	B	K – Cathode	CONNECTED
PIN2 – 2G1	B	G1 – Control Grid	CONNECTED
PIN3 – 2P	B	P – Plate (Anode)	CONNECTED
PIN4 – H	–	H – Heater	CONNECTED
PIN5 – H	–	H – Heater	CONNECTED
PIN6 – 1G3	A	G3 – Suppressor Grid	CONNECTED
PIN6 – IS	A	IS – Internal Screen	CONNECTED
PIN6 – 1K	A	K – Cathode	CONNECTED
PIN7 – 1G1	A	G1 – Control Grid	CONNECTED
PIN8 – 1G2	A	G2 – Screen Grid	CONNECTED
PIN9 – 1P	A	P – Plate (Anode)	CONNECTED

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	37000 Ω
TRANSCONDUCTANCE	0.0027 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	330 V
<i>Published ratings and characteristics promoted where clearly stated; identical repeated diode/triode sections compressed where applicable.</i>	

SECTION2 Pentode	
PLATE RESISTANCE	50000 Ω
TRANSCONDUCTANCE	0.02 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM SCREEN VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	4 W
MAXIMUM SCREEN DISSIPATION	1.1 W
<i>Published ratings and characteristics promoted where clearly stated; identical repeated diode/triode sections compressed where applicable.</i>	

10JT8 — High-Mu Triode and Sharp-Cutoff Pentode

Overview

The **10JT8** is a neonoval-type multi-section vacuum tube containing a high-mu triode and a sharp-cutoff pentode within a single envelope. Designed primarily for use in color and black-and-white television receivers, the tube's triode section is tailored for service as a voltage amplifier or sync separator, while its frame-grid pentode section is optimized for video amplifier applications.

The 10JT8 features a 10.2 V heater designed for series-string heater circuits, drawing 0.45 A. It is electrically identical to the [6JT8](#) and [8JT8](#) except for its heater voltage and current ratings.

Physical Characteristics and Basing

The 10JT8 is constructed using the 9T-9 envelope style with a 9-69 outline. It utilizes a small-button miniature 9-pin base (E9-68 designation) and requires a standard miniature 9-contact socket.

Physical Dimensions

- **Maximum Diameter:** 1.188 inches
- **Maximum Seated Height:** 2.320 inches
- **Maximum Overall Height:** 2.630 inches

Pin Connections (9DX Basing)

The 9DX basing arrangement provides the following pin connections, viewed from the underside of the base:

Pin Number	Electrode Connection
1	Triode Grid (GT)
2	Triode Cathode (KT)
3	Triode Plate (PT)
4	Heater (H)
5	Heater (H)
6	Pentode Cathode, Pentode Grid No. 3, Internal Shield (KP, G3P, IS)
7	Pentode Grid No. 1 (G1P)
8	Pentode Grid No. 2 (G2P)
9	Pentode Plate (PP)

Special Construction Note

The pentode section of the 10JT8 features an extremely close control-grid-to-cathode spacing. Because of this tight physical tolerance, the voltage between the control grid and cathode must not exceed 50 volts DC or peak AC when testing the tube in commercial tube checkers or shorts-indicating devices. This restriction is especially critical when mechanical excitation (tapping or vibration) is applied to the tube during testing.

Heater Specifications

The 10JT8 heater is designed for operation from either an AC or DC supply. It features a controlled warm-up time for series-string integration.

Parameter	Value
Heater Voltage (AC/DC)	10.2 V

Parameter	Value
Heater Current	0.45 A (450 mA)
Average Heater Warm-up Time	11 seconds

Heater-Cathode Voltage Ratings

- **Heater Negative with Respect to Cathode:**
 - Total DC and Peak: 200 V max
 - Peak Value: 200 V max
 - Average Value: 100 V max
- **Heater Positive with Respect to Cathode:**
 - DC: 100 V max
 - Total DC and Peak: 200 V max
 - Peak Value: 100 V max
 - Average Value: 100 V max

Direct Interelectrode Capacitances

The following capacitances are measured without an external shield:

Triode Section

- **Grid to Plate:** 3.2 pF
- **Input (g to h + Tk + Pk, g3, IS):** 1.7 pF
- **Output (p to h + Tk + Pk, g3, IS):** 1.6 pF

Pentode Section

- **Grid No. 1 to Plate (Max):** 0.10 pF
- **Input (g1 to h + Pk, g3, IS + g2):** 12 pF
- **Output (p to h + Pk, g3, IS + g2):** 3.0 pF

Inter-Section Coupling

- **Triode Grid to Pentode Plate (Max):** 0.02 pF
- **Pentode Grid No. 1 to Triode Plate (Max):** 0.004 pF
- **Pentode Plate to Triode Plate (Max):** 0.13 pF

Maximum Ratings (Design-Maximum System)

The maximum ratings define the absolute operating boundaries for each section under Class A1 amplifier service:

Rating	Triode Section	Pentode Section
Plate Voltage	330 V	330 V
Grid No. 2 (Screen-Grid) Supply Voltage	—	330 V
Grid No. 2 Voltage	—	See Rating Chart
Positive Grid No. 1 Voltage	0 V	0 V
Plate Dissipation	1.0 W	4.0 W
Grid No. 2 Input (up to 165 V)	—	1.1 W
Grid No. 2 Input (165 V to 330 V)	—	See Rating Chart

Maximum Circuit Values (Grid No. 1 Circuit Resistance)

- **Triode Section:**
 - Fixed Bias Operation: 0.5 MΩ max
 - Cathode Bias Operation: 1.0 MΩ max
- **Pentode Section:**
 - Fixed Bias Operation: 0.25 MΩ max
 - Cathode Bias Operation: 1.0 MΩ max

Electrical Characteristics and Typical Operation

The 10JT8 operates as a Class A1 amplifier with the following typical characteristics:

Triode Section

- **Plate Voltage:** 250 V
- **Grid No. 1 Voltage:** -2 V
- **Plate Current:** 1.5 mA
- **Transconductance:** 2700 μmhos
- **Amplification Factor (μ):** 100
- **Plate Resistance (Approx.):** 37,000 Ω
- **Grid No. 1 Voltage for $I_b = 20 \mu A$ (Approx.):** -5.3 V

Pentode Section

- **Plate Supply Voltage:** 200 V
- **Grid No. 2 Supply Voltage:** 100 V
- **Cathode Bias Resistor:** 82 Ω

- **Plate Current:** 17 mA
- **Grid No. 2 Current:** 3.5 mA
- **Transconductance:** 20,000 μmhos
- **Plate Resistance (Approx.):** 50,000 Ω
- **Grid No. 1 Voltage for $I_b = 100 \mu\text{A}$ (Approx.):** -5 V

Instantaneous Plate Knee Characteristics (Pentode Section)

Under pulsed or instantaneous operating conditions near the plate knee, the pentode section exhibits high current capability. These values are measured using a recurrent waveform method to prevent exceeding the tube's maximum dissipation ratings:

- **Plate Voltage (E_b):** 50 V
- **Grid No. 2 Voltage (E_{c2}):** 100 V
- **Grid No. 1 Voltage (E_{c1}):** 0 V
- **Plate Current (I_b):** 55 mA
- **Grid No. 2 Current (I_{c2}):** 18 mA

Related Designations

The **10JT8** belongs to a family of identical multi-section tubes that differ only in their heater configurations:

- **6JT8:** Designed for standard parallel heater circuits, requiring a **6.3 V** supply at **0.725 A**.
- **8JT8:** Designed for series-string heater circuits, requiring a **7.7 V** supply at **0.600 A** (600 mA).

These tubes share the same physical dimensions, 9DX basing, and internal electrical characteristics for both the triode and pentode sections, allowing direct circuit design translation across different heater supply topologies.

Technical Summary

The **10JT8** is a versatile, high-performance neonval double-unit tube combining a high- μ triode ($\mu = 100$) and a high-transconductance, sharp-cutoff frame-grid pentode ($g_m = 20,000 \mu\text{mhos}$) in a single 9-pin envelope. Operating with a 10.2 V, 0.45 A heater, it is optimized for series-string television receiver designs. The triode section serves effectively in voltage amplification and sync-separator roles, while the pentode section's high transconductance and robust plate dissipation rating (4.0 W) make it highly suited for video output and wideband amplification.

SOURCE OPERATING CONDITIONS

1940 RCA

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

1940 RCA

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	10.2 V	Published nominal value
Heater current	450 mA	Published nominal value
Transconductance	2700 μ S	Published operating characteristic
Amplification factor	100	Published operating characteristic

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Sync separator; voltage amplifier; video amplifier	Printed source application

1940 RCA

Section 2 · Pentode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	10.2 V	Published nominal value
Heater current	450 mA	Published nominal value
Transconductance	20000 μ S	Published operating characteristic

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate dissipation	17.6 W	Published maximum or stated design maximum

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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Cathode Current	550 mA	Published value from supplied target entry
Average Cathode Current	175 mA	Published value from supplied target entry
Plate Dissipationf	17.5 watts	Published value from supplied target entry
Grid-No	3.5 watts	Published value from supplied target entry
Grid-No.1-Circuit Resistance, for grid-resistor-bias operation	1 megohm	Published value from supplied target entry
# Pulse duration must not exceed	10	Published value from supplied target entry
may occur in television receivers. A typical value for this voltage is	30 volts	Published value from supplied target entry
Heater Voltage (ac/dc)	10.2 volts	Published value from supplied target entry
Heater Current	0.45 ampere	Published value from supplied target entry
Heater Warm-up Time (Average)	11 seconds	Published value from supplied target entry
Plate Voltage	330 volts	Published value from supplied target entry
Grid-No	2 volts	Published value from supplied target entry
Crid-No	300	Published value from supplied target entry
Grid-No.1 (Control-Grid) Voltage, Positive-bias value	0 volts	Published value from supplied target entry
Plate Dissipation	4 watts	Published value from supplied target entry
Grid-No	2	Published value from supplied target entry
For grid-No	1.1 volts	Published value from supplied target entry
For grid-No	300 volts	Published value from supplied target entry
Plate Supply Voltage	200 volts	Published value from supplied target entry
Grid-No	100 volts	Published value from supplied target entry
Grid-No.1 Voltage	0 volts	Published value from supplied target entry

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Amplification Factor	100	Published value from supplied target entry
Plate Resistance (Approx.)	50000 ohms	Published value from supplied target entry
Transconductance	20000	Published value from supplied target entry
Plate Current	17 mA	Published value from supplied target entry
Grid-No	3.5 mA	Published value from supplied target entry

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater-Cathode Voltage : $\pm$	200 volts	Published value from supplied target entry

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