

ELECTRONIC TUBE REFERENCE

19KG8

Voltage - Radio Detector Converter electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-TRIODE

Triode-pentode designed for combined oscillator and mixer service in receiving equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9LY	BASE PINS	9
NOMINAL HEATER	18.9 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

9LY - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	200000 Ω
TRANSCONDUCTANCE	0.0075 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	2.5 W
MAXIMUM SCREEN DISSIPATION	0.55 W

SECTION2 Triode	
PLATE RESISTANCE	5400 Ω
TRANSCONDUCTANCE	0.0085 S
AMPLIFICATION FACTOR	46
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	2.5 W

19KG8 — Triode-Pentode Vacuum Tube

The **19KG8** is a multi-section miniature vacuum tube containing a sharp-cutoff pentode and a triode within a single envelope. It is designed primarily for use in television and radio receivers as a combined triode oscillator and pentode mixer. The tube features a T-6 1/2 glass envelope, a small button 9-pin base, and coated unipotential cathodes. It is designed to operate in any mounting position.

Heater Characteristics and Ratings

The 19KG8 is equipped with a heater designed for series-string operation. The heater current must be maintained within tight tolerances to ensure reliable operation and tube longevity.

- **Heater Voltage (AC or DC):** 18.9 V (for a bogey tube at $I_f = 0.15$ A)
- **Heater Current:** 0.15 ± 0.01 A (150 mA)
- **Series Operation Requirement:** The heater current must be centered at the specified bogey value, and supply variations must be restricted to keep the current within the specified tolerance.

Heater-Cathode Voltage Limits

The insulation between the heater and the cathodes is rated to withstand specific voltage potentials:

- **Heater Positive with Respect to Cathode:**
 - Maximum DC Component: 100 V
 - Maximum Total DC and Peak: 200 V
- **Heater Negative with Respect to Cathode:**
 - Maximum Total DC and Peak: 200 V

Physical Dimensions and Basing Discrepancies

The 19KG8 is housed in a miniature T-6 1/2 glass envelope with an EIA 6-2 outline (also described as Outlines section 6B). It requires a standard miniature 9-contact socket.

- **Maximum Diameter:** 7/8 inches (0.875 in)
- **Maximum Overall Length:** 2 3/16 inches (2.187 in)
- **Maximum Seated Height:** 1 15/16 inches (1.937 in)

Basing and Pinout Configurations

While the tube is universally designated with a 9LY basing diagram, published technical specifications contain three completely different pinout configurations. Designers must verify which pinout corresponds to the specific physical device being utilized.

Pin	Configuration A	Configuration B	Configuration C
1	Triode Plate	Pentode Grid No. 1	Triode Grid
2	Triode Grid	Triode Grid	Pentode Grid No. 2
3	Triode Cathode	Triode Plate	Pentode Grid No. 1
4	Heater	Heater	Heater
5	Heater	Heater	Heater
6	Pentode Plate	Pentode Grid No. 3 / Internal Shield	Pentode Plate
7	Pentode Grid No. 2 (Screen)	Triode Cathode	Pentode Cathode, Grid No. 3, Internal Shield
8	Pentode Cathode, Grid No. 3, Internal Shield	Pentode Cathode	Triode Cathode
9	Pentode Grid No. 1	Pentode Grid No. 2 (Screen)	Triode Plate

Maximum Ratings

The maximum ratings for the 19KG8 are defined under the Design-Maximum Rating System. Two distinct sets of maximum ratings exist in the technical literature, representing different design limits for the tube's sections.

Rating Set 1

This set of ratings applies equal plate dissipation limits to both the triode and pentode sections:

- **Plate Voltage:** 300 V (Pentode and Triode)

- **Screen Supply Voltage:** 300 V (Pentode)
- **Positive DC Grid-Number 1 Voltage:** 0 V (Pentode and Triode)
- **Plate Dissipation:** 2.5 W (Pentode and Triode)
- **Screen Dissipation:** 0.55 W (Pentode)
- **Grid-Number 1 Circuit Resistance (Fixed Bias):** 2.2 M Ω (Pentode and Triode)
- **Grid-Number 1 Circuit Resistance (Cathode Bias):** 2.2 M Ω (Pentode and Triode)

Rating Set 2

This set of ratings permits a higher plate voltage and a higher pentode plate dissipation, but restricts the triode plate dissipation and grid circuit resistances significantly:

- **Plate Voltage:** 330 V (Pentode and Triode)
- **Screen Supply Voltage:** 330 V (Pentode)
- **Positive DC Grid-Number 1 Voltage:** 0 V (Pentode and Triode)
- **Plate Dissipation:** 3.0 W (Pentode), 0.55 W (Triode)
- **Screen Dissipation:** 0.55 W (Pentode)
- **Grid-Number 1 Circuit Resistance (Fixed Bias):** 0.25 M Ω (Pentode), 0.5 M Ω (Triode)
- **Grid-Number 1 Circuit Resistance (Cathode Bias):** 1.0 M Ω (Pentode and Triode)

Screen Grid Dissipation Derating

For both rating sets, the permissible screen dissipation is flat at 0.55 W for screen voltages from 0 V up to 150 V. For screen voltages between 150 V and 300 V, the maximum screen dissipation derates linearly down to 0 W at 300 V.

Electrical Characteristics and Typical Operation

The 19KG8 exhibits two completely different sets of typical operating characteristics depending on the manufacturer's design of the triode section. One version features a medium-mu triode with high transconductance and plate current, while the other features a high-mu triode operating at very low plate current.

Operating Point 1: Medium-Mu Triode / Sharp-Cutoff Pentode

In this operating configuration, the triode section functions as a medium-mu, low-resistance, high-current amplifier:

Parameter	Pentode Section	Triode Section
Plate Voltage	125 V	125 V
Screen Voltage	125 V	—
Grid-Number 1 Voltage	-1.0 V	-1.0 V

Parameter	Pentode Section	Triode Section
Amplification Factor	—	46
Plate Resistance (Approx.)	200,000 Ω	5,400 Ω
Transconductance	7,500 μmhos	8,500 μmhos
Plate Current	12 mA	13.5 mA
Screen Current	4.0 mA	—
Grid-Number 1 Cutoff Voltage (Approx.)	-8 V (at $I_b = 10 \mu\text{A}$)	-8 V (at $I_b = 10 \mu\text{A}$)

Operating Point 2: High-Mu Triode / Sharp-Cutoff Pentode

In this alternative configuration, the triode section behaves as a high-mu, high-resistance, low-current amplifier, and the pentode transconductance is slightly lower:

Parameter	Pentode Section	Triode Section
Plate Voltage	125 V	100 V
Screen Voltage	125 V	—
Grid-Number 1 Voltage	-1.0 V	-1.0 V
Amplification Factor	—	70
Plate Resistance (Approx.)	200,000 Ω	54,000 Ω
Transconductance	6,500 μmhos	1,300 μmhos
Plate Current	12 mA	0.8 mA
Screen Current	4.0 mA	—
Grid-Number 1 Cutoff Voltage (Approx.)	-9 V (at $I_b = 20 \mu\text{A}$)	-1.5 V (at $I_b = 50 \mu\text{A}$)

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 19KG8 vary depending on whether an external shield (EIA 315) is connected to the cathode of the section under test.

Pentode Section Capacitances

- **Grid No. 1 to Plate:** 0.01 pF maximum (with shield), 0.016 pF (unshielded)
- **Input (g_1 to $h + p_k + g_2 + g_3 + i.s.$):** 5.5 pF (both shielded and unshielded)

- **Output (p to $h + pk + g2 + g3 + i.s.$):** 3.4 pF (shielded), 2.4 pF (unshielded)
- **Heater to Cathode:** 2.8 pF (both shielded with shield grounded, and unshielded)

Triode Section Capacitances

- **Grid to Plate:** 1.7 pF (shielded, per some specifications) or 0.9 pF (both shielded and unshielded, per alternative specifications)
- **Input:**
 - Specification A (with shield): 3.2 pF
 - Specification B (with shield): 1.9 pF
 - Specification B (unshielded): 1.7 pF
- **Output:**
 - Specification A (with shield): 2.2 pF
 - Specification B (with shield): 2.6 pF
 - Specification B (unshielded): 1.7 pF
- **Heater to Cathode:** 2.8 pF (both shielded with shield grounded, and unshielded)

Technical Summary

The **19KG8** is a versatile **miniature triode-pentode** designed for series-string heater applications requiring **18.9 V / 0.15 A**. It combines a **sharp-cutoff pentode** and a **triode** in a single T-6 1/2 glass envelope with a 9-pin button base.

Depending on the specific manufacturer's design, the triode section can be either a **medium-mu (46) high-transconductance (8,500 μ mhos)** unit or a **high-mu (70) low-current (0.8 mA)** unit. Similarly, the pentode section offers a transconductance of **6,500 to 7,500 μ mhos** with a plate resistance of **200,000 Ω** .

Due to significant discrepancies in published literature regarding the **9LY pinout configuration**, maximum plate and screen ratings, and grid circuit resistance limits, circuit designers must carefully verify the specifications of the exact 19KG8 variant being employed in their application.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Pentode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid1 To Plate Capacitance	0.01 pF	—
Input Capacitance	5.5 pF	—
Output Capacitance	3.4 pF	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical Plate Voltage	125 V	—
Typical Screen Voltage	125 V	—
Typical Plate Current	12 mA	—
Typical Screen Current	4 mA	—

1968 GENERAL ELECTRIC CO

Section 2 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid To Plate Capacitance	1.7 pF	—
Input Capacitance	3.2 pF	—
Output Capacitance	2.2 pF	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical Plate Voltage	125 V	—
Typical Plate Current	13.5 mA	—

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