



ELECTRONIC TUBE REFERENCE

16GK6

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
PENTODE

High-transconductance power pentode for audio-output and television video-output stages, with approximately 13.2 W plate dissipation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9GK	BASE PINS	9
NOMINAL HEATER	16 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9GK - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	38000 Ω
TRANSCONDUCTANCE	0.0112 S
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM SCREEN VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	13.2 W
MAXIMUM SCREEN DISSIPATION	2 W
MAXIMUM CATHODE CURRENT	65 mA
Power pentode audio-amplifier section.	

16GK6 — Power Pentode

The **16GK6** is a miniature, high-transconductance power pentode (also characterized as a beam power pentode) designed for use in the output stages of high-quality audio amplifiers and the video output stages of both color and black-and-white television receivers. It features a coated unipotential cathode and is specifically engineered for series heater string operation in television and audio equipment.

The 16GK6 is electrically identical to the [6GK6](#) and [10GK6](#) vacuum tubes, differing only in its heater voltage and current ratings. This shared design allows the 16GK6 to deliver high power output with low distortion while operating under standard pentode or push-pull configurations.

Construction, Physical Specifications, and Basing

The 16GK6 is constructed in a T-6 1/2 glass envelope with a miniature 9-pin button base (designated JEDEC E9-1). The tube is designed to operate in any mounting position, providing flexibility in chassis layout.

Physical Dimensions

- **Maximum Diameter:** 0.875 inches
- **Maximum Seated Height:** 2.812 inches
- **Maximum Overall Height:** 3.062 inches

Pinout and Basing Diagram (9GK)

The tube utilizes the **9GK** basing arrangement. When viewed from the bottom of the tube, the pin connections are assigned as follows:

Pin Number	Electrode Connection
1	Grid No. 3 (Suppressor Grid), Internal Shield (G3, IS)

Pin Number	Electrode Connection
2	Grid No. 1 (Control Grid)
3	Cathode (K)
4	Heater (H)
5	Heater (H)
6	No Connection (NC)
7	Plate (P)
8	Grid No. 2 (Screen Grid)
9	Grid No. 3 (Suppressor Grid), Internal Shield (G3, IS)

The internal connection of Grid No. 3 to the internal shield, accessible via both Pin 1 and Pin 9, assists in minimizing stray capacitances and shielding the sensitive control grid from the plate.

Heater Characteristics and Ratings

The 16GK6 is designed for series heater string operation, requiring a controlled current to ensure reliable operation when wired in series with other tubes.

Heater Parameter	Value
Nominal Heater Voltage (AC/DC)	16.0 V
Nominal Heater Current	0.3 A (300 mA)
Heater Supply Limits (Current Operation)	300 ± 20 mA
Average Heater Warm-up Time	11 seconds
Maximum Peak Heater-Cathode Voltage (Heater Negative to Cathode)	100 V
Maximum Peak Heater-Cathode Voltage (Heater Positive to Cathode)	100 V

The average heater warm-up time of 11 seconds is specifically defined under controlled conditions: it represents the time required for the voltage across the heater to reach 80% of its rated voltage after applying four times the rated heater voltage to a circuit consisting of the tube heater in series with an external resistance equal to three times the nominal heater operating resistance. This controlled warm-up characteristic prevents voltage surges across individual heaters in series-string television receivers during start-up.

Direct Interelectrode Capacitances

The 16GK6 exhibits low interelectrode capacitances, which is beneficial for maintaining high-frequency performance in video output stages:

- **Grid No. 1 to Plate (Maximum):** 0.14 pF
- **Input (G1 to Cathode, Heater, G2, G3, and Internal Shield):** 10 pF
- **Output (Plate to Cathode, Heater, G2, G3, and Internal Shield):** 7 pF

Maximum Ratings (Design-Maximum Values)

The maximum ratings of the 16GK6 must be strictly observed to prevent premature failure or degradation of the tube. These values are established under the Design-Maximum Rating System:

Parameter	Maximum Limit
Plate Supply Voltage	605 V
Plate Voltage	330 V
Grid No. 2 (Screen-Grid) Supply Voltage	605 V
Grid No. 2 Voltage	330 V
Grid No. 1 (Control-Grid) Negative-Bias Value	100 V
Grid No. 1 Voltage for Grid Current Starting Point (at $I_{c1}(/tubes/C1) = 0.3 \mu A$)	-1.3 V
Average Cathode Current	65 mA
Plate Dissipation	13.2 W
Grid No. 2 Input (Peak)	4 W
Grid No. 2 Input (Average)	2 W

Vibrator Power Supply Derating

When the heater and positive voltages for the 16GK6 are obtained from a storage battery by means of a vibrator power supply, the maximum allowable ratings must be derated to protect the tube from voltage spikes and fluctuations. Under these specific conditions:

- **Maximum Plate Voltage:** 275 V
- **Maximum Grid No. 2 Voltage:** 275 V
- **Maximum Plate Dissipation:** 9.9 W

Maximum Circuit Values

- **Grid No. 1 Circuit Resistance (Fixed-Bias Operation):** 0.3 Megohm max
- **Grid No. 1 Circuit Resistance (Cathode-Bias/Self-Bias Operation):** 1.0 Megohm max

Typical Operating Conditions and Characteristics

The 16GK6 can be operated as a single-ended Class A1 amplifier, or in push-pull configurations under Class [AB1](#) or Class B operation.

Class A1 Amplifier (Single Tube)

At a typical operating point, a single 16GK6 provides a power output of 5.7 Watts with 10% total harmonic distortion:

Parameter	Value
Plate Voltage	250 V
Grid No. 2 Voltage	250 V
Cathode-Bias Resistor	135 Ohms
Mu-Factor (Grid No. 2 to Grid No. 1)	19
Plate Resistance (Approximate)	38,000 Ohms
Transconductance	11,300 μ mhos
Peak AF Grid No. 1 Voltage	7.3 V
Grid Voltage (RMS)	4.3 V
Zero-Signal Plate Current	48 mA
Maximum-Signal Plate Current	49.5 to 50.6 mA
Zero-Signal Grid No. 2 Current	5.5 mA
Maximum-Signal Grid No. 2 Current	10 to 10.8 mA
Effective Load Resistance	5,200 Ohms
Total Harmonic Distortion	10%
Maximum-Signal Power Output	5.7 W

Push-Pull Class AB1 and Class B Amplifiers (Two Tubes)

For higher power output and lower distortion, two 16GK6 tubes can be operated in push-pull. The following table outlines typical operating parameters for both Class [AB1](#) and Class B push-pull

configurations:

Parameter	Class AB1 (250 V)	Class AB1 (300 V)	Class B (250 V)	Class B (300 V)
Plate Voltage	250 V	300 V	250 V	300 V
Grid No. 2 Voltage	250 V	300 V	250 V	300 V
Grid No. 1 Voltage	—	—	-11.6 V	-14.7 V
Cathode-Bias Resistor	130 Ohms	130 Ohms	—	—
Peak AF Grid-to-Grid Voltage	22.4 V	28 V	22.4 V	28 V
Grid Voltage (RMS) Per Grid	8 V	10 V	—	—
Zero-Signal Plate Current	62 mA	72 mA	20 mA	15 mA
Maximum-Signal Plate Current	75 mA	92 mA	75 mA	92 mA
Zero-Signal Grid No. 2 Current	7.0 mA	8.0 mA	2.2 mA	1.6 mA
Maximum-Signal Grid No. 2 Current	15 mA	22 mA	15 mA	22 mA
Effective Load Resistance (Plate-to-Plate)	8,000 Ohms	8,000 Ohms	8,000 Ohms	8,000 Ohms
Total Harmonic Distortion	3%	4%	3%	4%
Maximum-Signal Power Output	11 W	17 W	11 W	17 W

Analysis of Characteristic Curves

The average plate characteristics of the 16GK6 demonstrate its high efficiency and high transconductance. When plate current (I_b) and screen current (I_{c2}) are plotted against plate voltage at a fixed screen voltage ($E_{c2} = 250$ V), several key behaviors are evident:

1. **Sharp Pentode Knee:** The plate current rises rapidly at very low plate voltages (below 50 V) before transitioning into a nearly flat, horizontal region. This sharp knee allows for a wide output voltage swing without entering the highly non-linear region of operation, which is critical for maximizing power output and minimizing distortion in audio and video applications.
2. **Screen Current Behavior:** The screen-grid current (I_{c2}) is highest when the plate voltage is near zero, as the screen grid intercepts a larger portion of the electron stream. As the plate voltage increases past the knee, the screen current drops significantly and stabilizes at a low value (typically 5.5 mA under zero-signal conditions), reducing screen dissipation and improving overall efficiency.
3. **Grid Bias Spacing:** The curves for different control-grid voltages ($E_{c1}(/tubes/C1)$) from 0 V to -10 V) are evenly spaced, indicating a highly linear transfer characteristic over a wide operating range. This linearity is reflected in the low total harmonic distortion (3% to 4%) achieved in push-pull configurations.

Technical Summary

The **16GK6** is a high-performance, miniature **power pentode** featuring a **16.0 V, 0.3 A heater** with a controlled **11-second warm-up time**, making it ideal for series heater string applications. Utilizing a **9-pin miniature button base (E9-1)** with a **9GK basing diagram**, it provides separate connections for all electrodes, including dual pins for the suppressor grid and internal shield to optimize high-frequency stability.

With a high transconductance of **11,300 μ mhos** and a plate dissipation rating of **13.2 Watts**, the 16GK6 is capable of delivering **5.7 Watts** of audio power in single-ended Class A1 service, and up to **17 Watts** in push-pull Class [AB1](#) or Class B configurations. Its excellent linearity, low interelectrode capacitances, and robust design-maximum ratings make it an exceptionally versatile tube for both high-fidelity audio output stages and television video amplifiers.

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 · Pentode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid To Plate Capacitance	0.14 pF	—
Input Capacitance	10 pF	—
Output Capacitance	7 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warmup Time	11 s	—
Plate Supply Voltage Maximum	605 V	—
Screen Supply Voltage Maximum	605 V	—
PeakScreenDissipation	4 W	—
Plate Voltage	250 V	ClassA
Screen Voltage	250 V	ClassA
Power Output	5.7 W	ClassA
Power Output	17 W	ClassAB;PushPull;TwoTubes;PlateVoltage=300V
Power Output	17 W	ClassB;PushPull;TwoTubes;PlateVoltage=300V

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current	48 mA	ClassA;ZeroSignal

1966 Tung Sol Electronic Tubes 3 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4
Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate supply voltage maximum	605 V	—
Screen supply voltage maximum	605 V	—
Peak screen dissipation	4 W	—
Typical plate voltage	250 V	ClassA
Typical screen voltage	250 V	ClassA
Typical plate current	48 mA	ClassA
Power output	5.7 W	ClassA
Push-pull power output	17 W	PushPull
Maximum plate voltage	330 V	PromotedValue
Maximum screen voltage	330 V	PromotedValue
Maximum plate dissipation	13.2 W	PromotedValue
Maximum screen dissipation	2 W	PromotedValue
Maximum cathode current	65 mA	PromotedValue

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.1 pF	—
Input capacitance	10 pF	—
Output capacitance	7 pF	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	35000 ohm	PromotedValue
Transconductance	0.0113 A/V	PromotedValue

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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 · Pentode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1-to-plate capacitance	0.14 pF	Maximum

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate supply voltage	605 V	—
Plate voltage	330 V	—
Screen-grid supply voltage	605 V	—
Screen-grid voltage	330 V	—
Cathode current	65 mA	—
Plate dissipation	13.2 W	—
Screen-grid input average	2 W	—
Plate supply voltage	250 V	ClassA
Screen-grid supply voltage	250 V	ClassA
Cathode-bias resistor	135 ohm	ClassA
Zero-signal plate current	48 mA	ClassA
Maximum-signal plate current	50.6 mA	ClassA
Effective load resistance	5200 ohm	ClassA
Maximum-signal power output	5.7 W	ClassA
Maximum-signal power output	17 W	ClassAB PushPull TwoTubes

TUBE TINKER

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

