

ELECTRONIC TUBE REFERENCE

8BQ5

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
PENTODE

Series-heater EL84-class audio power pentode for compact consumer output stages.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9CV	BASE PINS	9
NOMINAL HEATER	8 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9CV - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	38000 Ω
TRANSCONDUCTANCE	0.0113 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	12 W
MAXIMUM SCREEN DISSIPATION	2 W
MAXIMUM CATHODE CURRENT	65 mA
MAXIMUM HEATER-CATHODE VOLTAGE	200 V
<i>Published promoted fields populated semantically; identical repeated sections compressed.</i>	

8BQ5 — Controlled-Warm-Up Miniature Audio Output Pentode

An eight-volt, 600-milliampere heater version of the [6BQ5/EL84](#) power pentode, intended for high-fidelity audio output and receiver equipment with series-connected heater circuits.

Overview

The **8BQ5** is a **nine-pin miniature audio power output pentode** designed for radio and television receivers, home music systems, and medium-power high-fidelity audio amplifiers. Its distinctive feature is an **8.0 V, 0.60 A heater with controlled warm-up characteristics**, suited to equipment whose tube heaters are connected in series. Electrically, the manufacturers identify it as corresponding to the [6BQ5/EL84](#) except for heater ratings.

Westinghouse specifically describes the 8BQ5 as intended for receivers employing **series-connected heaters**, particularly television receivers in which the picture-tube heater is in series with other valve heaters. Controlled warm-up helps minimize the temporary heater-voltage surges that can occur as different heaters change resistance at different rates during starting.

The 8BQ5 is also a fully documented **audio-frequency power output valve**, not merely a heater variant with no amplifier data of its own. Tung-Sol provides detailed single-ended Class A, push-pull Class AB, push-pull Class B, and triode-connected amplifier characteristics, including plate-current curves, distortion curves, and power-output plots.

Heater, Cathode, and Warm-Up Behavior

The cathode is **coated, unipotential, and indirectly heated**. The heater may be supplied with AC or DC.

Heater characteristic	Value
Rated heater voltage	8.0 V
Rated heater current	0.60 A (600 mA)
Calculated heater power	4.8 W
Published warm-up time	11 seconds
Heater-voltage tolerance in Tung-Sol data	8.0 ± 0.7 V
Heater-to-cathode voltage limit	100 V under specified conditions

Westinghouse gives a technical definition for heater warm-up measurement: it is the time required for heater voltage to reach **80% of its rated value** in a prescribed test circuit after applying a multiple of rated voltage through a series resistance. The 11-second warm-up specification therefore concerns controlled behavior in the defined test, not a guarantee that full cathode emission begins at exactly 11 seconds in every installation.

The 600 mA heater rating is especially relevant to **600 mA series-string receivers**. It must not be confused with the **6BQ5/EL84 heater of 6.3 V at 0.76 A** or the **10BQ5 heater of 10.6 V at 0.45 A**.

Electrode Construction, Basing, and Mechanical Form

The 8BQ5 is a **single power pentode** containing a control grid (grid No. 1), screen grid (grid No. 2), suppressor grid (grid No. 3), plate, and indirectly heated cathode. It uses a **small-button E9-1 nine-pin miniature base** with **9CV** basing and a T-6½ glass envelope.

The common family basing provides control grid on pin 2, cathode and suppressor grid on pin 3, heater on pins 4 and 5, plate on pin 7, and screen grid on pin 9. The remaining positions are designated internal connections in historical manufacturer diagrams and should not be appropriated as general-purpose circuit terminals.

Sylvania gives approximate maximum dimensions of **0.875 inch diameter**, **2.812 inches seated height**, and **3.062 inches overall height**. The tube can be mounted in **any position**.

Design-Center Ratings

The principal design-center ratings for the 8BQ5 are:

Parameter	Published maximum
Plate voltage	300 V
Screen-grid voltage	300 V
Plate dissipation	12 W

Parameter	Published maximum
Screen-grid dissipation, zero signal/continuous	2 W
Screen-grid dissipation, maximum signal	4 W in Tung-Sol data
Cathode current	65 mA
Grid-1 circuit resistance, fixed bias	0.3 MΩ
Grid-1 circuit resistance, cathode bias	1.0 MΩ
Heater-to-cathode voltage	100 V

Tung-Sol, Westinghouse, RCA, and Sylvania all publish the principal 300 V / 12 W design-center rating set. A special Westinghouse and Sylvania condition reduces plate and screen voltage to **250 V** and plate dissipation to **9 W** where the supply is obtained from a storage battery using a vibrator.

The plate and screen dissipations are separate limits. Screen current can rise significantly at large signal levels; output-stage design must therefore account for screen-grid heating as well as plate dissipation.

Typical Electrical Characteristics

Tung-Sol specifies the following typical pentode operating point:

Characteristic	Value
Plate voltage	250 V
Screen-grid voltage	250 V
Control-grid voltage	−7.3 V
Plate current	48 mA
Screen-grid current	5.5 mA
Transconductance	11,300 μmhos (11.3 mA/V)
Plate resistance	Approximately 40 kΩ
Grid-1-to-grid-2 amplification factor	Approximately 19.5

The relatively high transconductance contributes to high audio power sensitivity: the output-stage current can be controlled with a comparatively modest audio drive voltage. The pentode's dynamic plate resistance is much higher than the typical effective output-transformer load.

The quoted amplification factor is a **grid-to-grid characteristic** given in the pentode sheet, not a conventional triode plate-voltage amplification factor.

Single-Ended Class A Pentode Amplification

Tung-Sol provides multiple **single-tube Class A** conditions at approximately 250 V plate voltage, varying screen voltage, cathode resistance, and output load. Representative operating conditions include:

Parameter	Higher-output example	Reduced-current example
Plate voltage	250 V	250 V
Screen voltage	250 V	210 V
Control-grid bias	−7.3 V	Approximately −6.4 V
Cathode resistor	135 Ω	160 Ω
Plate load	Approximately 5.2 k Ω	7.0 k Ω
Zero-signal plate current	48 mA	36 mA
Zero-signal screen current	5.5 mA	3.9 mA
Published maximum-signal output	5.7 W	Approximately 4.3 W
Published distortion	Approximately 10%	Approximately 10%

The data show that a 5.7 W single-ended output figure depends on a particular supply and load. Lower screen voltage or altered bias changes plate current, transconductance, output power, and distortion.

Westinghouse provides additional load choices of **4.5 k Ω** and **7 k Ω** , along with harmonic-distortion components. Its detailed tables demonstrate how second- and third-harmonic contributions change as output power and load are varied.

Class AB Push-Pull Amplification

A pair of 8BQ5 pentodes can operate in **Class AB push-pull** through an output transformer. The manufacturer examples specify an **8,000 Ω plate-to-plate load** and **130 Ω common cathode resistor**.

Parameter, two tubes	250 V operation	300 V operation
Plate supply	250 V	300 V
Screen supply	250 V	300 V
Common cathode resistor	130 Ω	130 Ω
Plate-to-plate load	8,000 Ω	8,000 Ω
Zero-signal plate current, total	62 mA	72 mA

Parameter, two tubes	250 V operation	300 V operation
Maximum-signal plate current, total	75 mA	92 mA
Zero-signal screen current, total	7 mA	8 mA
Maximum-signal screen current, total	15 mA	22 mA
Power output	11 W	17 W
Total harmonic distortion	3%	4%

These are the output figures repeatedly published for the 8BQ5 audio-output family. They describe a pair of tubes, not a single 8BQ5. The 8,000 Ω load is the full **plate-to-plate transformer impedance**, and the current values shown are totals for the two valves.

Class B Push-Pull Amplification

Tung-Sol and Westinghouse also document **Class B** operation of two 8BQ5 tubes. At plate and screen voltages of **250 V** or **300 V**, typical control-grid bias values are **-11.6 V** and **-14.7 V**, respectively. Both cases use an **8,000 Ω plate-to-plate load**, with rated outputs of **11 W** and **17 W** at approximately **3%** and **4%** total harmonic distortion.

The difference between Class B and Class AB is important even when their maximum output figures match. The operating tables specify different idle currents and bias conditions. They are separate circuit designs rather than interchangeable descriptions of the same bias setting.

Triode-Connected Audio Output

The 8BQ5 may be operated in **triode connection**, with the **screen grid connected to the plate**. This changes the effective operating characteristic while retaining the same physical pentode structure.

Tung-Sol documents a single-tube Class A triode-connected example using **250 V plate voltage**, **270 Ω cathode resistance**, and approximately **3.5 k Ω plate load**. It produces approximately **1.95 W** with **9% total harmonic distortion** under the published conditions.

For **two triode-connected 8BQ5 tubes in Class AB push-pull**, the sheet specifies a **270 Ω common cathode resistor** and **10 k Ω plate-to-plate load**. The representative outputs are **3.4 W at 250 V** and **5.2 W at 300 V**, both at approximately **2.5% distortion**.

These triode-connected examples illustrate a substantial reduction in maximum output compared with conventional pentode operation, accompanied by a different impedance and distortion characteristic.

Ultra-Linear Connection

Sylvania also publishes a **Class AB1 ultra-linear** family example with **300 V plate voltage**, **270 Ω cathode resistance per tube**, **8 k Ω plate-to-plate load**, and approximately **11 W output**. This is a distinct output-stage connection, separate from fixed-screen pentode operation and direct screen-to-plate triode connection.

Interelectrode Capacitances

The manufacturer sheets give approximate direct capacitances:

Capacitance	Value
Control-grid-to-plate	0.5 pF
Input	10.8 pF
Output	6.5 pF
Control-grid-to-heater	0.25 pF

The small grid-to-plate capacitance is relevant to signal feedback and stability. Input and output capacitance measurements include the electrode groups specified in the manufacturer's measurement definitions.

Characteristic Curves and Practical Interpretation

Tung-Sol and Westinghouse provide plate-characteristic and transfer curves, along with output-power, plate-current, screen-current, input-drive, and harmonic-distortion graphs. The sheets include separate graphical treatments for pentode and triode connection and for Class A, Class AB, and Class B operation.

These curves show why screen voltage, grid bias, transformer impedance, and input signal must be considered together. They also document that maximum-signal screen current is considerably higher than the quiescent screen current in the high-output push-pull examples.

Relationship to 6BQ5 / EL84 and 10BQ5

RCA explicitly states that the **8BQ5** and **10BQ5** correspond to the **6BQ5/EL84** except for heater ratings:

Type	Heater voltage	Heater current
<u>6BQ5</u> / <u>EL84</u>	6.3 V	0.76 A
8BQ5	8.0 V	0.60 A
<u>10BQ5</u>	10.6 V	0.45 A

The shared audio characteristics explain why these types are grouped in manufacturer output-stage tables, but the different heater requirements prevent unqualified electrical substitution. In particular, the 8BQ5's controlled warm-up characteristic and 600 mA current rating make it especially relevant to series-heater television and receiver designs.

Technical Summary

The **8BQ5** is an **8.0 V / 0.60 A controlled-warm-up, nine-pin miniature audio output pentode**, with **9CV basing, 12 W plate dissipation, 2 W continuous screen dissipation**, and approximately **11.3 mA/V transconductance** at its standard operating point.

It is documented for **single-ended Class A audio output, Class AB and Class B push-pull amplification, triode-connected output stages**, and **ultra-linear operation**. Typical manufacturer examples provide **5.7 W from one tube** and **17 W from two tubes in push-pull**, subject to the specified operating conditions and distortion.

Its combination of high power sensitivity, controlled heater warm-up, and compatibility with 600 mA series-heater arrangements distinguishes the 8BQ5 within the [6BQ5/EL84](#) family of miniature audio output valves.



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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	11300 μ S	Typical



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Amperex Condensed

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

1963 AMPEREX CONDENSED

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	AudioOutput
Screen voltage	250 V	AudioOutput
Control-grid voltage	-7.3 V	AudioOutput
Plate current	48 mA	AudioOutput
Screen current	5.5 mA	AudioOutput
Power output	17 W	PushPull;TwoTubes
Load resistance plate-to-plate	8000 Ω	PushPull;TwoTubes

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	11300 μ S	Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cutoff bias	-15 V	Section1



SOURCE OPERATING CONDITIONS

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	8 V	Rated heater condition
Heater current	600 mA	Rated heater condition
For: Plclte Voltage	250 V	For: Plclte Voltage 250 Volts
Grid 2 Voltage	250 V	Grid 2 Voltage 250 Volts
Grid 1 Voltage	3 V	Grid 1 Voltage-1.3 Volts
With RMS Input AF Voltage of . 00.3 3.4 4.3	4.7 V	With RMS Input AF Voltage of. . 00.3 3.4 4.3 4.7 Volts
Grid 2 Current	11.6 mA	Grid 2 Current 5.5 -- • - 10.8 11.6 Ma.
For: Plc[te Voltage	250 V	For: Plc[te Voltage 250 Volts
Grid 1 Voltage	7.3 V	Grid 1 Voltage - 7.3 Volts
With RMS Input AF Voltage of . 0 0.3 3.5 4.4	4.8 V	With RMS Input AF Voltage of . 0 0.3 3.5 4.4 4.8 Volts
Plate Current	50.5 mA	Plate Current 48 ---- 50.6 50.5 Ma.
For: Plate Voltage	250 V	For: Plate Voltage 250 Volts
Grid 1 Voltage	8.4 V	Grid 1 Voltage - 8.4 Volts
With RMS Input AF Voltage of . 00.3 3.5	5.5 V	With RMS Input AF Voltage of . 00.3 3.5 5.5 Volts
Grid 2 Current	14.6 mA	Grid 2 Current 4.I -- 8.5 14.6 Ma.
Plato-to-Plato Load Impedance	8000 ohm	Plato-to-Plato Load Impedance .. 8000 Ohms Plate Load Resistance 3500 Ohms
With RMS Input AF Voltage of	8 V	With RMS Input AF Voltage of 0 - 8 Volts Input AF Voltage (RMS) 6.7 Volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current	75 mA	Plate Current 62 75 Ma. Zero Signal Plate Cu.rent 34 Ma.
Grid 2 Current	5 mA	Grid 2 Current 7 '5 Ma. Maxim`um Signal Plot. Current 36 Ma.
For: Plote Voltage	300 V	For: Plote Voltage, .. 300 Volts
Grid 2 Voltage	300 V	Grid 2 Voltage •. 300 Volts PUSH- PULL TRIODE CONNECTED
Wilh RMS Inpu. AF Voltage of	8 V	Wilh RMS Inpu. AF Voltage of 0 8 Volts . Hooter worm-up time is dofinod as the time r®quiT®d for the
Plate Curr®nl	75 mA	Plate Curr®nl 20 75 Ma. voltage across the hooter to roach 8097o of its rotod value after
Grid 2 Current	15 mA	Grid 2 Current 2.2 15 Ma. applying 4 times rot®d heater voltage To a circuit consisting of
Power Output	11 W	Power Output 0 11 Watts the tube h®ator in sorios with a resistance equal to 3 times rated
Grid 2 Voltage	300 V	Grid 2 Voltage 300 Volts
Grid 1 Bias VoltAge	-14.7 V	Grid 1 Bias VoltAge, . -14.7 Volts I Power outpu. \whon grid starts to draw current.
GTid 2 Current	22 mA	GTid 2 Current, ...1.6 22 Ma.
Plate-to-Plote Load Resistance =	8000 ohm	Plate-to-Plote Load Resistance = 8000 ohms 111111

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage	8 V	Voltage.....-I..... 6.3 8.0 Volts Grid 2 Voltage. . . 300 250 max. Volts
Grid 7 Current of 0.3	4 A	Grid 7 Current of 0.3 4ampere . -I.3 max. Volts
Grid 2 Current	22 mA	Grid 2 Current d 22 Ma. Cathode Bias Resistor 270 270 Ohm s



SOURCE DATA APPENDIX

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 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum_screen_dissipation_at_max_signal	4 W	—
Plate_voltage	250 V	ClassA,OneTube
Screen_voltage	250 V	ClassA,OneTube
Power_output	5.7 W	ClassA,OneTube
Power_output	17 W	PushPull,TwoTubes,ClassAB

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate_current	48 mA	ClassA,OneTube
Screen_current	5.5 mA	ClassA,OneTube
Transconductance	11300 μ S	ClassA,OneTube
Plate_resistance	40000 ohm	ClassA,OneTube
Zero_signal_plate_current	72 mA	PushPull,TwoTubes,ClassAB
Maximum_signal_plate_current	92 mA	PushPull,TwoTubes,ClassAB

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	11 pF	—
Output capacitance	7 pF	—
Grid-to-plate capacitance	0.5 pF	—



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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage (ac/dc) 8	10.6 V	Published in approved 8BQ5 target datasheet entry; Section1
Heater Current 0.76 0.6	450 mA	Published in approved 8BQ5 target datasheet entry; Section1
Heater Warm-up Time (Average) 11	11 seconds	Published in approved 8BQ5 target datasheet entry; Section1
Plate Voltage	300 V	Published in approved 8BQ5 target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Voltage	300 V	Published in approved 8BQ5 target datasheet entry; Section1
Grid-No.1 (Control-Grid) Voltage, Positive-bias value	0 V	Published in approved 8BQ5 target datasheet entry; Section1
Cathode Current	65 mA	Published in approved 8BQ5 target datasheet entry; Section1
Plate Dissipation	12 W	Published in approved 8BQ5 target datasheet entry; Section1
Grid No.2 Input	2 W	Published in approved 8BQ5 target datasheet entry; Section1
Plate Voltage	250 V	Published in approved 8BQ5 target datasheet entry; Section1
Grid-No.2 Voltage	250 V	Published in approved 8BQ5 target datasheet entry; Section1
Grid-No. 1 (Control-Grid) Voltage	-7.3 V	Published in approved 8BQ5 target datasheet entry; Section1
Peak AF Grid No.1 Voltage	6.2 V	Published in approved 8BQ5 target datasheet entry; Section1
Zero-Signal Plate Current	48 mA	Published in approved 8BQ5 target datasheet entry; Section1
Maximum- Sign a I Plate Current	50.6 mA	Published in approved 8BQ5 target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Zero-Signal Grid-No.2 Current	5.5 mA	Published in approved 8BQ5 target datasheet entry; Section1
Maximum -Signal Grid-No.2 Current	10 mA	Published in approved 8BQ5 target datasheet entry; Section1
Plate Resistance (Approx.)	38000 Ω	Published in approved 8BQ5 target datasheet entry; Section1
Transconductance	11300 μS	Published in approved 8BQ5 target datasheet entry; Section1
Load Resistance	4500 Ω	Published in approved 8BQ5 target datasheet entry; Section1
Total Harmonic Distortion	10 %	Published in approved 8BQ5 target datasheet entry; Section1
Maximum-Signal	5.7 W	Published in approved 8BQ5 target datasheet entry; Section1
For fixed-bias operation	0.3 MΩ	Published in approved 8BQ5 target datasheet entry; Section1
For cathode-bias operation	1 MΩ	Published in approved 8BQ5 target datasheet entry; Section1
Plate Supply Voltage 250	300 V	Published in approved 8BQ5 target datasheet entry; Section1
Grid-No.2 Supply Voltage 250	300 V	Published in approved 8BQ5 target datasheet entry; Section1
Cathode-Bias Resistor 130	130 Ω	Published in approved 8BQ5 target datasheet entry; Section1
Peak AF Grid-No.1-to-Grid-No.1 Voltage 22.6	28.3 V	Published in approved 8BQ5 target datasheet entry; Section1
Zero-Signal Plate Current 62	72 mA	Published in approved 8BQ5 target datasheet entry; Section1
Maximum-Signal Plate Current 75	92 mA	Published in approved 8BQ5 target datasheet entry; Section1
Zero-Signal Grid-No.2 Current 7	8 mA	Published in approved 8BQ5 target datasheet entry; Section1
Maximum-Signal Grid-No.2 Current 15	22 mA	Published in approved 8BQ5 target datasheet entry; Section1
Effective Load Resistance (Plate-to-plate) 8000	8000 Ω	Published in approved 8BQ5 target datasheet entry; Section1
Total Harmonic Distortion 3	4 %	Published in approved 8BQ5 target datasheet entry; Section1
Maximum-Signal Power Output 11	17 W	Published in approved 8BQ5 target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to Cathode, Heater, Grid No.2, and Grid No.3	10.8 pF	Published in approved 8BQ5 target datasheet entry; Section1
Plate to Cathode, Heater, Grid No.2, and Grid No.3	6.5 pF	Published in approved 8BQ5 target datasheet entry; Section1

TUBE TINKER

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

[Catalog](#)
[Tube types](#)
[Full books](#)
[Blog](#)
[Feedback & corrections](#)

© 2026 Tube Tinker