



ELECTRONIC TUBE REFERENCE

15EA7

Power - TV Vertical Output electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Dissimilar dual triode for combined television vertical-deflection oscillator and amplifier service. Its high-mu oscillator section drives a low-mu 10 W output section capable of substantial peak current and kilovolt-level pulse voltage.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8B0	BASE PINS	8
NOMINAL HEATER	14.8 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	30000 Ω
TRANSCONDUCTANCE	0.0022 S
AMPLIFICATION FACTOR	65
MAXIMUM PLATE VOLTAGE	350 V
MAXIMUM PLATE DISSIPATION	1 W
MAXIMUM CATHODE CURRENT	20 mA
<i>Promoted from published ratings/characteristics tables; additional operating points and capacitances retained in TUBE_SECTION_PARAMETER.</i>	

SECTION2 Triode	
PLATE RESISTANCE	900 Ω
TRANSCONDUCTANCE	0.0067 S
AMPLIFICATION FACTOR	6
MAXIMUM PLATE VOLTAGE	550 V
MAXIMUM PLATE DISSIPATION	10 W
MAXIMUM CATHODE CURRENT	175 mA
<i>Promoted from published ratings/characteristics tables; additional operating points and capacitances retained in TUBE_SECTION_PARAMETER.</i>	

15EA7 — Dissimilar Double Triode

The **15EA7** is a glass-envelope, octal-base, dissimilar double triode designed primarily for use in television receivers. It is engineered to perform two distinct roles within a single envelope: Section One operates as a high-mu vertical-deflection oscillator, while Section Two serves as a low-mu, high-perveance vertical-deflection amplifier.

Except for its heater ratings and heater warm-up characteristics, the 15EA7 is electrically and structurally identical to the [6EA7](#) (and the combined [6EM7/6EA7](#) designation).

Physical Specifications and Basing

The 15EA7 is constructed with a T-9 glass bulb and utilizes an intermediate-shell 8-pin octal base (classified under designations B8-6 or B8-251). The tube can be mounted and operated in any physical position.

Physical Dimensions

- **Maximum Diameter:** 1.281 inches (approx. 1-9/32 inches)
- **Maximum Seated Height:** 2.439 inches (approx. 2-7/16 inches)
- **Maximum Overall Height:** 3.000 inches (approx. 3 inches)

Pin Connections (JEDEC 8BD Basing Diagram)

The 8BD basing arrangement provides independent connections for the two triode sections, viewed from the bottom of the base:

Pin	Connection	Description
1	1G	Grid, Section 1 (Oscillator)
2	2P	Plate, Section 2 (Amplifier)

Pin	Connection	Description
3	2K	Cathode, Section 2 (Amplifier)
4	2G	Grid, Section 2 (Amplifier)
5	1P	Plate, Section 1 (Oscillator)
6	1K	Cathode, Section 1 (Oscillator)
7	H	Heater
8	H	Heater

Heater Characteristics

The 15EA7 features a coated unipotential cathode structure. The heater is designed for series-string television receiver applications and can be operated on either AC or DC.

- **Nominal Heater Voltage:** 14.8 V (at bogey heater current). *Note: Some general tables group the 15EA7 with the 13EM7 under a 13 V heading, but specific registrations establish 14.8 V as the standard.*
- **Nominal Heater Current:** 0.45 ± 0.03 A (450 mA)
- **Average Heater Warm-up Time:** 11 seconds

Heater Warm-up Time Definition and Calculation

The heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four times the rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three times the rated heater voltage divided by the rated heater current.

Using the nominal ratings ($V_h = 14.8$ V and $I_h = 0.45$ A), the required series resistance (R_{series}) is calculated as: $R_{series} = 3 \times \frac{14.8 \text{ V}}{0.45 \text{ A}} \approx 98.7 \Omega$

Heater-Cathode Voltage Ratings (Design-Maximum System)

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

For series heater operation, equipment designers must ensure that the heater current is centered at the specified bogey value of 0.45 A, with supply variations restricted to maintain the current within specified tolerances.

Electrical Characteristics and Typical Operating Points

The two triode sections of the 15EA7 exhibit highly dissimilar characteristics. Section One is a high-mu voltage amplifier/oscillator, whereas Section Two is a low-mu, high-perveance power amplifier.

For the average plate characteristics of Section One, designers can refer to the curves of the [6DR7](#) (Unit No. 1).

Typical Class A1 Operating Conditions

Parameter	Section One (Oscillator)	Section Two (Amplifier)	Alternative Section One	Alternative Section Two
Plate Voltage	250 V	175 V	250 V	150 V
Grid Voltage	-3.0 V	-25 V	-3.0 V	-20 V
Amplification Factor	66	5.5	64	5.4
Plate Resistance (Approx.)	30,000 Ω	920 Ω	40,000 Ω	750 Ω
Transconductanc e	2,200 μmhos	6,000 μmhos	1,600 μmhos	7,200 μmhos
Plate Current	2.0 mA	40 mA	1.4 mA	50 mA

Special Operating Points

- **Section Two Instantaneous Zero-Bias Values:** At a plate voltage (E_b) of 60 V and grid voltage (E_c) of 0 V, the instantaneous plate current (I_b) is 100 mA (or 95 mA under alternative typical conditions).
- **Section Two Cutoff Characteristics:** At a plate voltage of 150 V, a grid voltage of -28 V reduces the plate current to approximately 10 mA.
- **Grid Voltage for Low Plate Currents:**
 - Section One (for $I_b = 20 \mu\text{A}$): -5.3 V (or -5.5 V for $I_b = 10 \mu\text{A}$)
 - Section Two (for $I_b = 200 \mu\text{A}$): -45 V (or -45 V for $I_b = 100 \mu\text{A}$)

Maximum Ratings and Circuit Design Constraints

The maximum ratings of the 15EA7 are defined under the Design-Maximum Rating System. These ratings are limiting values of operating and environmental conditions and must not be exceeded under the worst probable conditions.

Vertical Deflection Service Ratings (525-Line, 30-Frame System)

Rating	Section One (Oscillator)	Section Two (Amplifier)
DC Plate Voltage (Max.)	350 V	550 V
Peak Positive Pulse Plate Voltage (Abs. Max.)	—	1,500 V
Peak Negative Pulse Grid Voltage (Max.)	400 V	250 V
Plate Dissipation (Max.)	1.0 W	10 W
Average Cathode Current (Max.)	22 mA	50 mA
Peak Cathode Current (Max.)	77 mA	175 mA

Note: Some alternative tables list a maximum DC plate voltage of 330 V for both sections and a plate dissipation of 1.5 W for Section One.

Pulse and Bias Constraints

- **Pulse Duration:** The peak positive pulse plate voltage rating of 1,500 V for Section Two is an absolute maximum. The pulse duration must not exceed 15% of a single vertical scanning cycle (which corresponds to 2.5 milliseconds in a standard 525-line, 30-frame television system).
- **Grid Circuit Resistance Limits:**
 - For both Section One and Section Two, the maximum grid circuit resistance is restricted to **1.0 Megohm** under fixed-bias conditions and **2.2 Megohms** under cathode-bias (self-bias) conditions.
- **Excitation Protection:** In stages operating with grid-leak bias, an adequate cathode-bias resistor or other protective means must be employed to safeguard the tube against excessive dissipation in the absence of input excitation.

Interelectrode Capacitances

The direct interelectrode capacitances of the 15EA7 are measured approximately without an external shield:

Capacitance Parameter	Section One (Oscillator)	Section Two (Amplifier)
Grid to Plate	4.0 pF	8.0 pF
Input: Grid to (Heater + Cathode)	2.2 pF	6.0 pF

Capacitance Parameter	Section One (Oscillator)	Section Two (Amplifier)
Output: Plate to (Heater + Cathode)	0.6 pF	1.3 pF



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	Vertical deflection oscillator	—

1961 TUNG SOL

Section 2 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Vertical deflection amplifier	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical plate voltage	250 V	VerticalDeflection
Typical plate current	3.4 mA	VerticalDeflection
Maximum plate voltage	350 V	PromotedValue
Maximum plate dissipation	1 W	PromotedValue

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	4.5 pF	—
Input capacitance	2.2 pF	—
Output capacitance	0.5 pF	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	30000 ohm	PromotedValue
Transconductance	0.0022 A/V	PromotedValue
Amplification factor	65	PromotedValue

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 2 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical plate voltage	150 V	VerticalDeflection
Typical plate current	35 mA	VerticalDeflection
Maximum peak positive pulse plate voltage	1500 V	VerticalDeflection
Maximum peak cathode current	175 mA	VerticalDeflection
Maximum plate voltage	550 V	PromotedValue
Maximum plate dissipation	10 W	PromotedValue
Maximum cathode current	50 mA	PromotedValue

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	8.5 pF	—
Input capacitance	5.5 pF	—
Output capacitance	1 pF	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	900 ohm	PromotedValue
Transconductance	0.0067 A/V	PromotedValue
Amplification factor	6	PromotedValue



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 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltageNominal	14.8 V	—
HeaterOrFilamentCurrentNominal	450 mA	—



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 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage (ac/dc)	13 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	150	Published value from supplied target entry
Grid Voltage	-20 volts	Published value from supplied target entry
Amplification Factor	5.4	Published value from supplied target entry
Plate Resistance (Approx.)	750 ohms	Published value from supplied target entry
Transconductance	7200 mhos	Published value from supplied target entry
Plate Current, for plate voltage of	60 volts	Published value from supplied target entry

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Current, for grid voltage of	-28 volts	Published value from supplied target entry
For plate current of	-5.5 volts	Published value from supplied target entry
For plate current of	-45 Volts	Published value from supplied target entry
DC Plate Voltage	330 volts	Published value from supplied target entry
Peak Cathode Current	175 mA	Published value from supplied target entry
Average Cathode Current	50 mA	Published value from supplied target entry
Plate Dissipation	10 watts	Published value from supplied target entry
Grid-Circuit Resistance: Unit No.1 Unit No	2	Published value from supplied target entry
Heater Voltage (ac/dc)	6.3 volts	Published value from supplied target entry
Heater Current	0.2 ampere	Published value from supplied target entry

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Direct Intel-electrode Capacitances (Approx.) : Unit No.1 Unit No	2	Published value from supplied target entry
Grid to Plate	10 pF	Published value from supplied target entry
Grid to Cathode and Heater	7 pF	Published value from supplied target entry
Plate to Cathode and Heater	1.8 pF	Published value from supplied target entry
Grid to Plate	1 PF	Published value from supplied target entry
Plate to Cathode and Heater	2.6 PF	Published value from supplied target entry
Grid to Cathode and Heater	1 PF	Published value from supplied target entry

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