

ELECTRONIC TUBE REFERENCE

19J6

Voltage - Dual Triode (similar) electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
TRIODE-TRIODE

Medium-mu twin triode for transformerless television receivers, usable in oscillator, amplifier, and mixer service, including arrangements where one section serves as mixer and the other as oscillator.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7BJ	BASE PINS	7
NOMINAL HEATER	18.9 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	7100 Ω
TRANSCONDUCTANCE	0.0053 S
AMPLIFICATION FACTOR	38
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	1.5 W
Promoted from printed maximum-rating/characteristic columns; additional published values retained in TUBE_SECTION_PARAMETER.	

SECTION 2 Triode	
PLATE RESISTANCE	7100 Ω
TRANSCONDUCTANCE	0.0053 S
AMPLIFICATION FACTOR	38
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	1.5 W
<i>Second physical triode section; electrically identical twin section.</i>	

19J6 — Medium-Mu Twin Triode Vacuum Tube

A miniature, common-cathode double triode designed for high-frequency oscillator, amplifier, and mixer applications in television and radio receivers.

Overview

The **19J6** is a miniature medium-mu twin triode vacuum tube featuring a common unipotential cathode shared by both triode sections. Housed in a compact 7-pin glass envelope, the 19J6 is designed for high-frequency applications, including oscillator, mixer, and amplifier service. It is particularly suited for use in "transformerless" television receivers, color television systems, and AC/DC FM and AM receivers. The common-cathode configuration allows the two triode sections to be operated in parallel or in push-pull, enabling versatile circuit designs up to several hundred megacycles.

Construction and Physical Dimensions

The 19J6 is constructed with a miniature glass envelope (T-5 1/2 bulb) and a small-button miniature 7-pin base (7BF or E7-1). The physical dimensions of the tube are:

- **Maximum overall length:** 2-1/8 inches (2.125 in)
- **Maximum seated height:** 1-7/8 inches (1.875 in)
- **Length from base seat to bulb top (excluding tip):** 1-1/2" $\pm$ 3/32"
- **Maximum diameter:** 3/4 inch (0.750 in)

The tube can be mounted and operated in **any position**. Internally, the two triode sections share a single, common unipotential cathode, which is connected to a single external pin.

Heater and Electrical Ratings

The heater is designed for AC or DC operation with the following nominal ratings:

- **Heater Voltage:** 18.9 V
- **Heater Current:** 0.15 A (150 mA)

Maximum Ratings

The maximum ratings for the 19J6 are established under the Design-Center or RMA Standard M8-210 rating systems. These limits apply to each individual triode section unless otherwise specified:

Parameter	Value
Maximum Plate Voltage	300 V
Maximum Plate Dissipation	1.5 W
Maximum Plate Current	15 mA
Maximum Grid Voltage	-40 V
Maximum Grid Current	8.0 mA
Maximum Grid Circuit Resistance (Self Bias)	0.5 MΩ

The maximum heater-cathode voltage limits vary slightly across different documentation:

- Some specifications list a maximum of **90 V** (with the heater either negative or positive with respect to the cathode).
- Other specifications list a maximum of **100 V** (total DC and peak, with the heater either negative or positive with respect to the cathode).

Fixed bias operation is not recommended for the 19J6; self-bias (cathode bias) is the preferred method of operation.

Pin Connections and Basing

The 19J6 uses a 7-pin miniature base (7BF / E7-1). Two different pinout configurations are documented for this basing arrangement:

Standard Configuration

This is the most common pinout configuration for the 7BF base:

- **Pin 1:** Plate (Section 2)
- **Pin 2:** Plate (Section 1)
- **Pin 3:** Heater
- **Pin 4:** Heater
- **Pin 5:** Grid (Section 1)
- **Pin 6:** Grid (Section 2)
- **Pin 7:** Cathode (Common to both sections)

Alternative Configuration

An alternative pinout configuration is also documented:

- **Pin 1:** Plate (Section 2)
- **Pin 2:** Grid (Section 2)
- **Pin 3:** Heater
- **Pin 4:** Heater
- **Pin 5:** Plate (Section 1)
- **Pin 6:** Grid (Section 1)
- **Pin 7:** Cathode (Common to both sections)

Interelectrode Capacitances

The direct interelectrode capacitances of each triode section, measured without an external shield, are approximately:

- **Grid to Plate:** 1.5 pF to 1.6 pF
- **Grid to Cathode:** 2.0 pF to 2.2 pF
- **Plate to Cathode:** 0.4 pF

Typical Operating Conditions and Characteristics

The 19J6 can be operated in several distinct modes, including Class A1 amplification, mixer service, and Class C push-pull oscillation or RF amplification.

Class A1 Amplifier (Each Section)

When operated as a Class A1 amplifier, typical parameters per section are:

- **Plate Voltage:** 100 V
- **Cathode Bias Resistor:** 50 Ω or 150 Ω (These values are specified for both sections operating under the stated conditions)
- **Plate Current:** 8.5 mA
- **Plate Resistance (r_p):** 7,100 Ω
- **Transconductance (g_m):** 5,300 μ mhos
- **Amplification Factor (μ):** 38

Mixer Service (Each Section)

In mixer service, the 19J6 can operate under the following typical conditions:

- **Plate Voltage:** 150 V
- **Cathode Bias Resistor:** 810 Ω or 820 Ω (for both units operating)
- **Oscillator Peak Voltage:** 3 V
- **Plate Current:** 4.8 mA
- **Plate Resistance:** 10,000 Ω to 10,200 Ω
- **Conversion Transconductance:** 1,900 μ mhos

- **Short-Circuit Input Conductance (at 100 MHz):** 96 μmhos

Class C Oscillator or RF Amplifier (Push-Pull)

For Class C push-pull operation, typical operating conditions are:

- **Plate Voltage:** 150 V
- **Grid Voltage:** -10 V (obtained via a 625 Ω grid resistor or a 220 Ω cathode resistor)
- **Plate Current:** 30 mA
- **Grid Current:** 16 mA
- **Driving Power:** 0.35 W
- **Power Output:** 3.5 W

Intended Applications and Circuit Configurations

The 19J6 is designed for high-frequency applications up to several hundred megacycles.

- **Mixer Service:** With the grids connected in push-pull and the plates connected in parallel, the tube is highly effective as a mixer at frequencies as high as 600 MHz.
- **Converter Service:** In AC/DC FM and AM receivers, one triode section can be utilized as a mixer while the other section operates as the local oscillator.
- **Oscillator and RF Amplifier:** The tube is suitable as an RF amplifier or oscillator in "transformerless" television and color television receivers. It can be configured to run in parallel or push-pull.

Characteristic Curves and Behavior

The average plate characteristics of the 19J6 show typical triode behavior:

- **At zero grid bias ($E_c = 0$ V):** Plate current rises steeply, reaching 15 mA at approximately 110 V.
- **Negative grid bias:** As grid bias becomes more negative (down to -18 V or -40 V limit), the curves shift progressively to the right, showing a typical triode knee-less exponential-like onset.
- **Positive grid bias:** Under positive grid bias conditions (up to $E_c = +12$ V or +15 V), the plate current curves show a rapid initial rise at low plate voltages before flattening out. The grid current curves are highest at low plate voltages and decrease as plate voltage increases.

Technical Summary

The **19J6** is a versatile **miniature 7-pin medium-mu twin triode** featuring a **common cathode** and an **18.9 V, 150 mA heater**. It is optimized for high-frequency applications, including mixer, oscillator, and amplifier service in television and radio receivers. With an amplification factor of **38**, transconductance of **5,300 μmhos** , and plate resistance of **7,100 Ω** under typical Class A1 conditions, it provides robust performance in compact, transformerless designs. It can deliver up to **3.5 W** of power output in Class C push-pull configuration and operate as a mixer at frequencies up to **600 MHz**.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
RCA	19	RCA-19J6 is aminiature type of medium—mu twin CLASS A AMPLIFIER (Cont'd)
Plate Voltage. « « « « » « o = « » o o »	100 V	Plate Voltage. « « « « » « o = « » o o » 100 . . volts
triode unit may be used as amixer, and the other Cathode-Bias Resistor*» . ,	50 ohm	triode unit may be used as amixer, and the other Cathode-Bias Resistor*» . , ... 50¢ . . ohms
vision receivers of the "transformerless" type. Plate Current. « « « « ¢« « v ¢ « ¢« o » « v ¢ « ¢« o » «	8.5 mA	vision receivers of the "transformerless" type. Plate Current. « « « « ¢« « v ¢ « ¢« o » « 8.5 . . ma
voltage (AC OF DC) « « « o « o + « « «	18.9 V	voltage (AC OF DC) « « « o « o + « « « 18.9 . . volts Maximum Ratings, Design-Center Valuest
Current. « o+ o ¢ o s o o s v o s s o«	300 A	Current. « o+ o ¢ o s o o s v o s s o« 0.15 . . ampere PLATE VOLTAGE: « « « « » 2 « « « « « 300 max. volts
Direct Interelectrode Capacitances (Each unit approx.)o: PLATE DISSIPATION. + « « o« & & e v » s	1.5 W	Direct Interelectrode Capacitances (Each unit approx.)o: PLATE DISSIPATION. + « « o« & & e v » s 1.5 max. watts
Grid to Plate. « « « « o o s o o s « »	1.5	Grid to Plate. « « « « o o s o o s « » 1.5 . . upt PEAK HEATER-CATHODE VOLTAGE:
8% . . wut respect to cathode:. 90 max. volts	90 V	8% . . wut respect to cathode:. 90 max. volts
respect to cathode	90 V	respect to cathode. 90 max. volts
) Bulb Top (excluding tip)	150 V	) Bulb Top (excluding tip). 1=-1/2" % 3/32" Plate voltage. « « o« o o ¢ o « o o o & 150 . . volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Diameter « ¢«	810 ohm	Maximum Diameter « ¢« 4 ¢ . ¢ 4 4 4 s s . . 3/8" Cathode-Bias Resistor»», ... 810 . . ohms
BUTD o v v v a h e e e e e e s e e s e e T	3 V	BUTD o v v v a h e e e e e e s e e s e e T-5-1/2 Oscillator Peak Voltage. . « + . + + . . 3 .. volts
at	96 MHz	at 100 Mc, . . . 96 micromhos
Values are for each unit Plate Current. . ¢« « &« ¢ o o ¢ o « o &	4.8 mA	Values are for each unit Plate Current. . ¢« « &« ¢ o o ¢ o « o & 4.8 ma
PLATE VOLTAGE. . . « « « ¢« ¢ &+ « s « « »	300 V	PLATE VOLTAGE. . . « « « ¢« ¢ &+ « s « « » 300 max. volts o . .
PLATE DISSIPATION. & « o s o o o « o « +	1.5 W	PLATE DISSIPATION. & « o s o o o « o « + 1.5 max. watts With no external shield.
Heater negative with grid circuit should not exceed	0.5	Heater negative with grid circuit should not exceed 0.5 megohm with cathode
¢ ‘;gspecE to cathode	90 V	¢ ‘;gspecE to cathode. . . . 90 max. volts bias. Operation with fixed bias is not recommended.
Heater pos ré;;e:ttzo cathode	90 V	Heater pos ré;;e:ttzo cathode. . . . 90 max. volts . gglge is for both units operating at the specified con-
92CM-7061	7061	92CM-7061
92CM-7060	7060	92CM-7060

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance . . . « « « « « o o &« o	7200 ohm	Plate Resistance . . . « « « « « o o &« o 7200 . . ohms
oscillator, amplifier, or mixer service in tele— Transconductance . « « » ¢ o o o« o » » &	5300 µS	oscillator, amplifier, or mixer service in tele— Transconductance . « « » ¢ o o o« o » » & 5300 micromhos
Ba\$€ o+ + o « + o s ¢ o o Small-Button Miniature	10200	Ba\$€ o+ + o « + o s ¢ o o Small-Button Miniature 7-Pin Plate Resistance . . + » ¢« « o o « o » 10200 . , oOhms
conversion Transconductance. ,	1900 µS	conversion Transconductance. . . . , 1900 micromhos



SOURCE DATA APPENDIX

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 1 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	2 pF	EachSection
Output capacitance	0.4 pF	EachSection
Grid-to-plate capacitance	1.5 pF	EachSection

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	100 V	ClassA;EachSection
Cathode resistor	150 Ω	ClassA;EachSection
Plate current	8.5 mA	ClassA;EachSection

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	7100 Ω	EachSection
Transconductance	5300 μS	EachSection
Amplification factor	38	EachSection



TUBE TINKER
ELECTRON TUBE DATABASE

SOURCE DATA APPENDIX

1961 Tung Sol

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

1961 TUNG SOL

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	100 V	ClassA
Plate current	8.5 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Conversion transconductance	1500 uS	MixerService

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid to plate	1.5 pF	—

TUBE TINKER

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