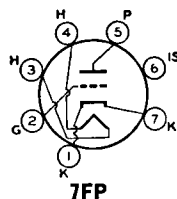


6ER5**3ER5****HIGH-MU TRIODE**

Miniature type with frame grid used in vhf tuners of color and black-and-white television receivers. Outlines section 5C; requires miniature 7-contact socket. Type 3ER5 is identical to type 6ER5 except for heater ratings.

**7FP**

	3ER5	6ER5	
Heater Voltage (ac/dc)	2.8	6.3	volts
Heater Current	0.45	0.18	ampere
Peak Heater-Cathode Voltage	±100 max	±100 max	volts
Direct Interelectrode Capacitances:	Unshielded	Shielded*	
Grid to Plate	0.38	0.36	pF
Grid to Cathode, Heater, and Internal Shield	4.4	4.4	pF
Plate to Cathode, Heater, and Internal Shield	3	4	pF
Grid to Heater	0.28 max	0.28 max	pF
Plate to Cathode	0.24	0.24	pF
Cathode to Grid	3.1	3.1Δ	pF
Heater to Cathode	2.5	2.5Δ	pF

* With external shield connected to cathode except as noted.

Δ With external shield connected to ground.

Class A₁ Amplifier**MAXIMUM RATINGS (Design-Center Values)**

Plate Voltage	250	volts
Grid Voltage, Negative-bias value	50	volts
Cathode Current	20	mA
Plate Dissipation	2.2	watts

CHARACTERISTICS

Plate Voltage	200	volts
Grid Voltage	-1.2	volts
Amplification Factor	80	
Plate Resistance (Approx.)	8000	ohms
Transconductance	10500	μmhos
Plate Current	10	mA
Grid Voltage (Approx.) for transconductance of 500 μmhos	-3.8	volts
Grid Voltage (Approx.) for transconductance of 100 μmhos	-5.6	volts

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance	1	megohm
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6ES5

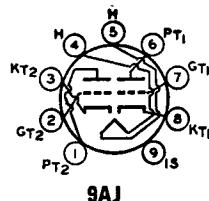
Refer to chart at end of section.

6ES8

Refer to chart at end of section.

**6ES8/
ECC189****VARIABLE-MU TWIN TRIODE**

Miniature type used as cascode-type amplifier in tuners of television receivers. Outlines section, 6B; requires miniature 9-contact socket.

**9AJ**

Heater Voltage (ac/dc)	6.3	volts	
Heater Current	0.365	ampere	
Direct Interelectrode Capacitances:	Unshielded	Shielded*	
Grid to Plate (Each Unit)	1.9	1.9	pF
Plate to Cathode (Each Unit)	0.18	0.17	pF
Heater to Cathode (Each Unit)	3	3 _A	pF
Plate of Unit No.2 to Plate of Unit No.1	0.04 max	0.015 max	pF
Plate of Unit No.2 to Grid of Unit No.1	0.003 max	0.003 max	pF
Grid of Unit No.1 to Cathode of Unit No.2	0.002 max	0.002 max	pF

* With external shield connected to cathode of unit under test except as noted.

Δ With external shield connected to ground.

Class A₁ Amplifier (Each Unit)

CHARACTERISTICS

Plate Voltage	90	90	90	volts
Grid Voltage	—1.2	—5	—9	volts
Plate Resistance (Approx.)	2500	—	—	ohms
Transconductance	12500	625	125	μ mhos
Plate Current	15	—	—	mA

Cascode-Type Amplifier

MAXIMUM RATINGS (Design-Maximum Values)

Plate Supply Voltage with plate current of 0 mA	550	volts
Plate Voltage (Each unit)	130	volts
Grid Voltage, Negative-bias value (Each unit)	50	volts
Cathode Current (Each unit)	22	mA
Plate Dissipation (Each unit)	1.8	watts
Heater-Cathode Voltage:		
Unit No.1:°		
Unit No.2:°		
RMS voltage between cathode and heater	50	volts
RMS voltage between cathode and heater*	50	volts
DC voltage between cathode and heater*	130	volts

TYPICAL OPERATION in a cascode-type circuit*

Supply Voltage	180	volts
Plate Current	15	mA
Transconductance	12500	μ mhos
Noise Figure*	6.5	dB
Grid Voltage (Approx.) for transconductance of 125 μ mhos	—9	volts
Input Voltage for cross-modulation factor of 0.01 and transconductance of 125 μ mhos	500	mV

MAXIMUM CIRCUIT VALUE

Grid-Circuit Resistance (Each unit)	1	megohm
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° Grounded-cathode input unit—pins 6, 7, and 8.

■ Grounded-grid output unit—pins 1, 2, and 3.

• Cathode positive with respect to heater.

■ With grid of output unit connected to a voltage divider.

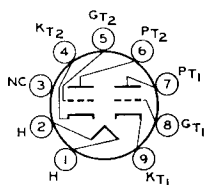
* Measured with tube operating in a television tuner.

Refer to chart at end of section.

6ET7

6EU7

HIGH-MU TWIN TRIODE



9LS

Miniature type used in high-gain, resistance-coupled, low-level audio-amplifier applications where low-hum and non-microphonic characteristics are important, such as microphone amplifiers and pre-amplifiers for phonographs. Outlines section, 6B; requires miniature 9-contact socket. For typical operation as a resistance-coupled amplifier, refer to Resistance-Coupled Amplifier section.

Heater Voltage (ac/dc)	6.3	volts
Heater Current	0.3	ampere
Heater-Cathode Voltage:		
Peak value	±200 max	volts
Average value	100 max	volts
Direct Interelectrode Capacitances (Each Unit, Approx.):		
Grid to Plate	1.5	pF
Grid to Cathode and Heater	1.6	pF
Plate to Cathode and Heater	0.2	pF
Equivalent Noise and Hum Voltage (Referenced to Grid, Each Unit):		
Average Value*	1.8 microvolts rms	

* Measured in "true rms" units under the following conditions: Heater volts (ac), 6.3; center-tap of heater transformer grounded; plate supply volts, 250; plate load resistor, 100000 ohms; cathode resistor, 2700 ohms; cathode bypass capacitor, 100 μ F; grid resistor, 0 ohms; amplifier frequency range, 25 to 10000 Hz.