AMPEREX TUBE TYPE 12AT7/ECC81

The 12AT7/ECC81 [1] is a miniature twin triode designed for use as an oscillator mixer or amplifier in TV and FM receivers. A center-tapped heater permits operation of the tube from either a 6.3 volt or a 12.6 volt heater supply.

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode	Coated, unipotential		
	Series	Parallel	
Heater Voltage, AC or DC	12.6	6.3	volts
Heater Current [2]	0.15	0.3	amps

Direct Interelectrode Capacitances	With Shield [3]	Without Shield	
Input (each section)	2.3	2.3	uuf
Output (section 1)	1.15	0.45	uuf
Output (section 2)	1.45	0.35	uuf
Grid to Plate (each section)	1.6	1.6	uuf
Heater to Cathode	2.5	2.5	uuf

MECHANICAL

Maximum Overall Dimensions	
Length	2 3/16 inches
Seated Height	1 15/16 inches
Diameter	7/8 inch
Mounting Position	any
Base	Samll button, 9 pin RETMA #9A

[1] The 12AT7/ECC81 is a direct, high-quality replacement for other brands of the 12AT7.

[2] When used in equipment which employs series-connected heaters, a current-limiting device must be inserted to limit the current when switching on.

[3] With external shield (RETMA #315) connected to cathode of section under test.

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MAXIMUM RATINGS (Each Section)

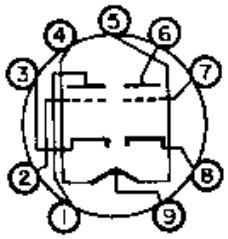
Design Center Values

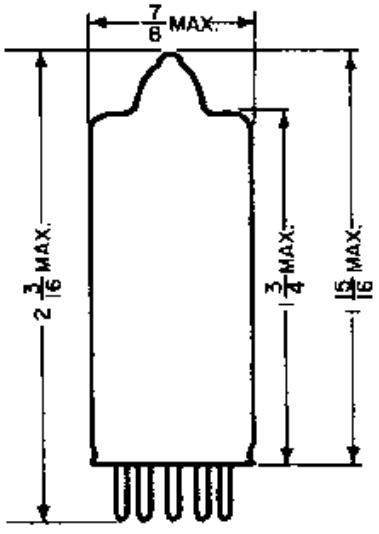
Zero Signal Plate Voltage	550	volts
Plate Voltage	300	volts
Plate Dissipation	2.5	watts
Cathode Current	15	mA
Grid Voltage	− 50	volts
Grid Voltage (Grid Current = + 0.3 uA)	− 1.3	volts
Grid Resistance[4]	1	megohm
Heater to Cathode Voltage	90	volts
Heater to Cathode Resistance	20,000	ohms

Typical Operating Conditions

Class A Amplifier (Each Section)

Plate Voltage	100	170	200	250	volts
Grid Voltage	− 1.0	− 1.0	− 1.0	− 2.0	volts
Plate Current	3.0	8.5	11.5	10.0	mA
Transconductance	3750	5900	6700	5500	micromhos
Amplification Factor	62	66	70	60	
Plate Resistance	16.5	11.0	10.5	11.0	K ohms





[4] With self bias.

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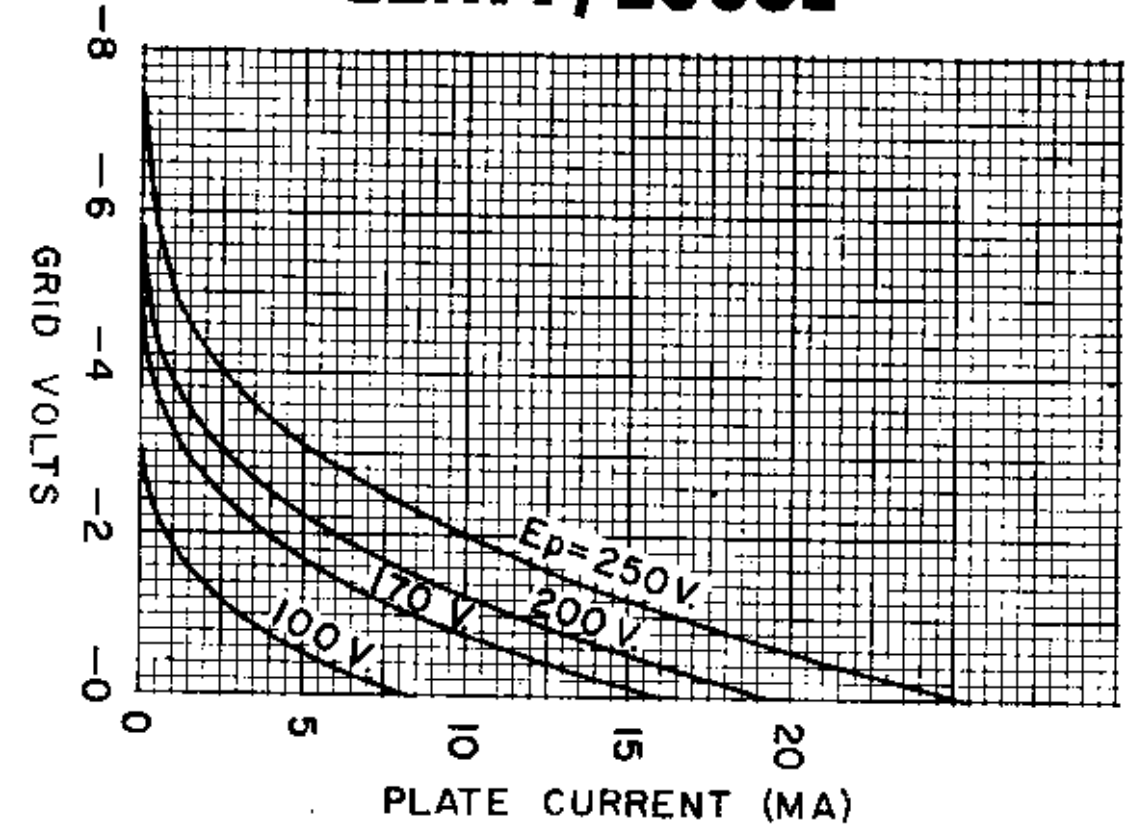
GRID VOLTS
-8
-6
-4
-2
-0
0
5
10
15
20
PLATE CURRENT (MA)
Ep=250 V.
200 V.
170 V.
100 V.

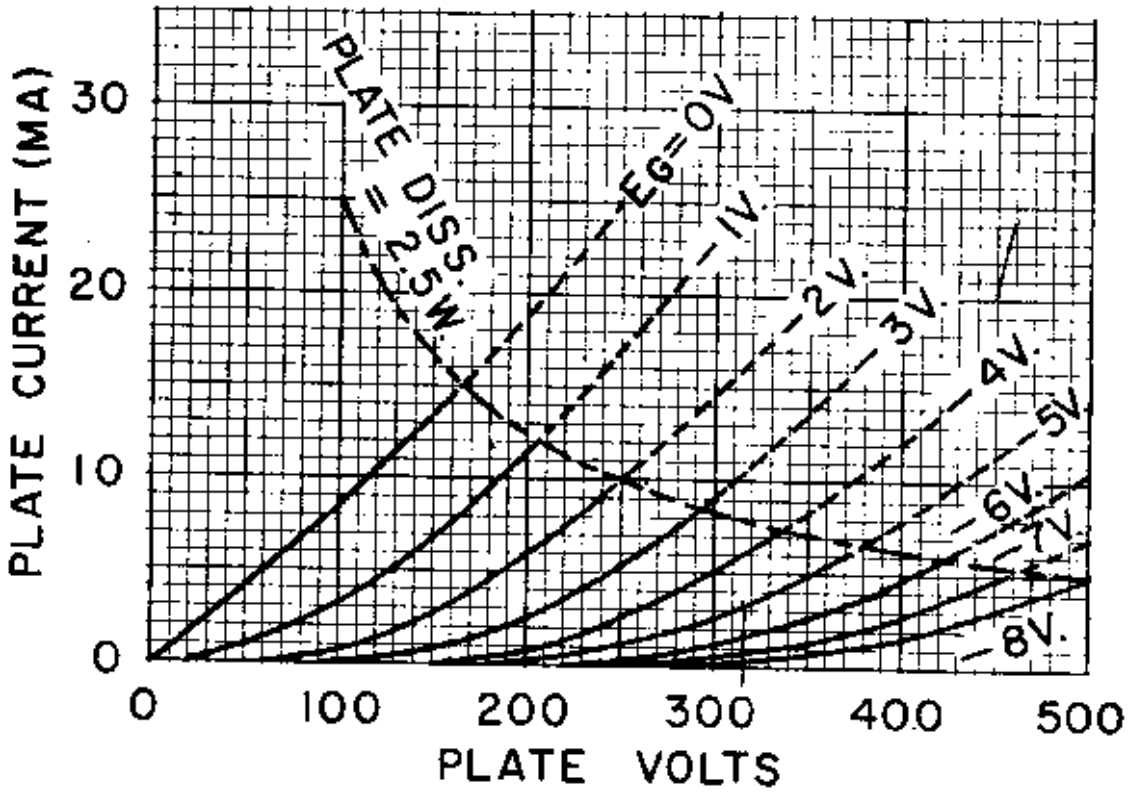
PLATE CURRENT (MA)
30
20
10
0
0
100
200
300
400
500
PLATE VOLTS
PLATE DISS. = 2.5 W.
EG=0V.
-1V.
-2V.
-3V.
-4V.
-5V.
-6V.
-7V.
-8V.

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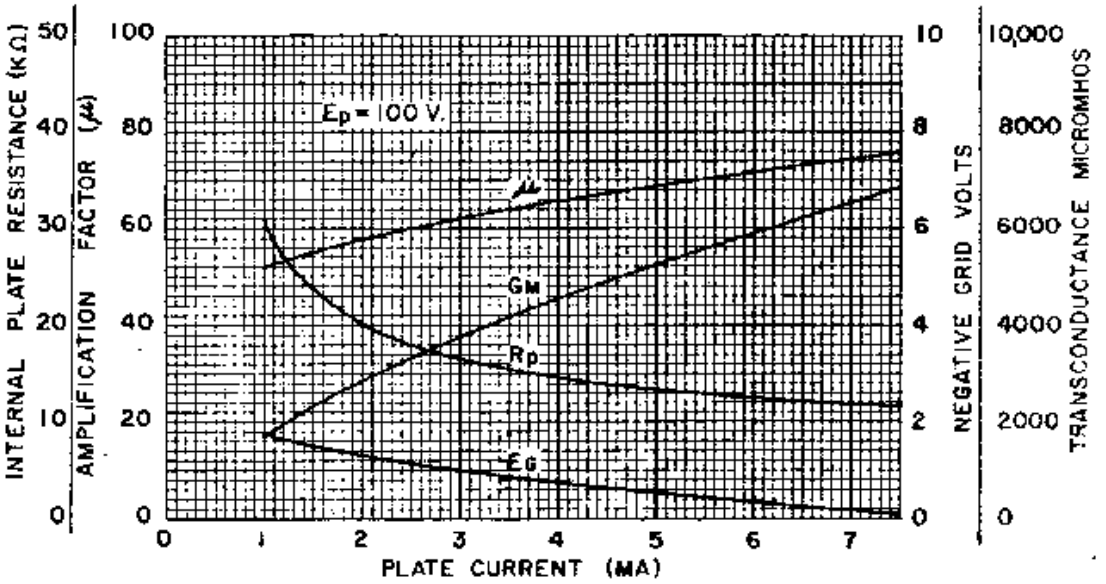
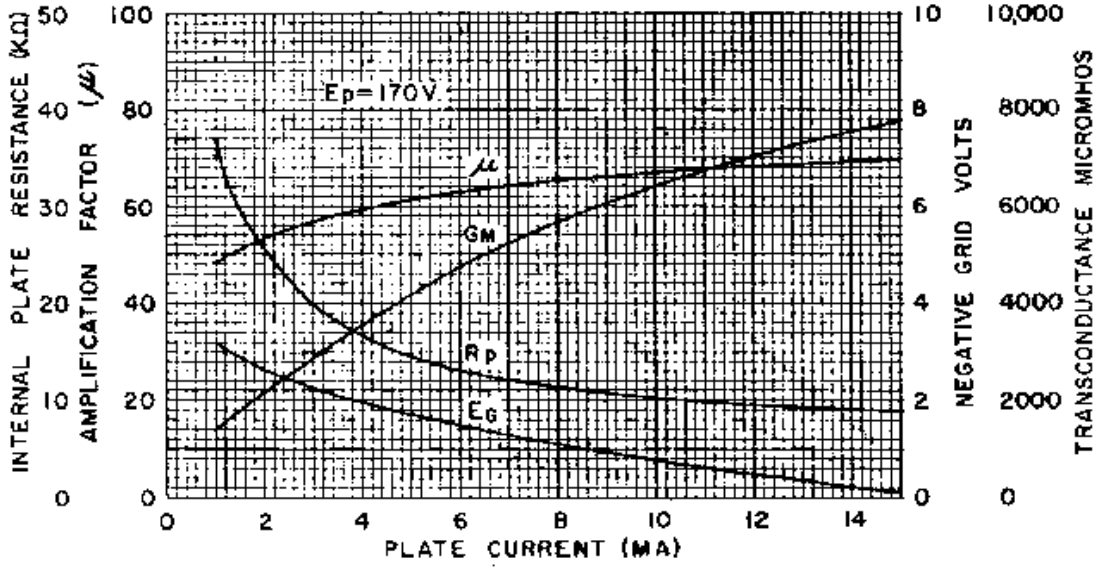

Ep = 100 V.
μ
GM
Rp
EG
INTERNAL PLATE RESISTANCE (KΩ)
AMPLIFICATION FACTOR (μ)
NEGATIVE GRID VOLTS
TRANSCONDUCTANCE MICROMHOS
PLATE CURRENT (MA)


Ep = 170 V.
μ
GM
Rp
EG
INTERNAL PLATE RESISTANCE (KΩ)
AMPLIFICATION FACTOR (μ)
NEGATIVE GRID VOLTS
TRANSCONDUCTANCE MICROMHOS
PLATE CURRENT (MA)

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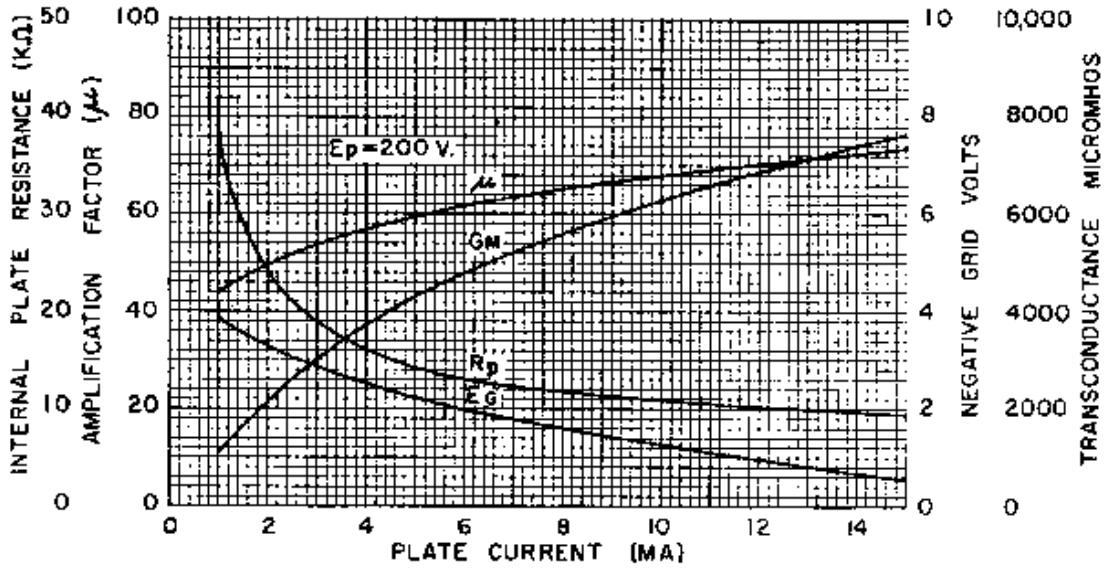
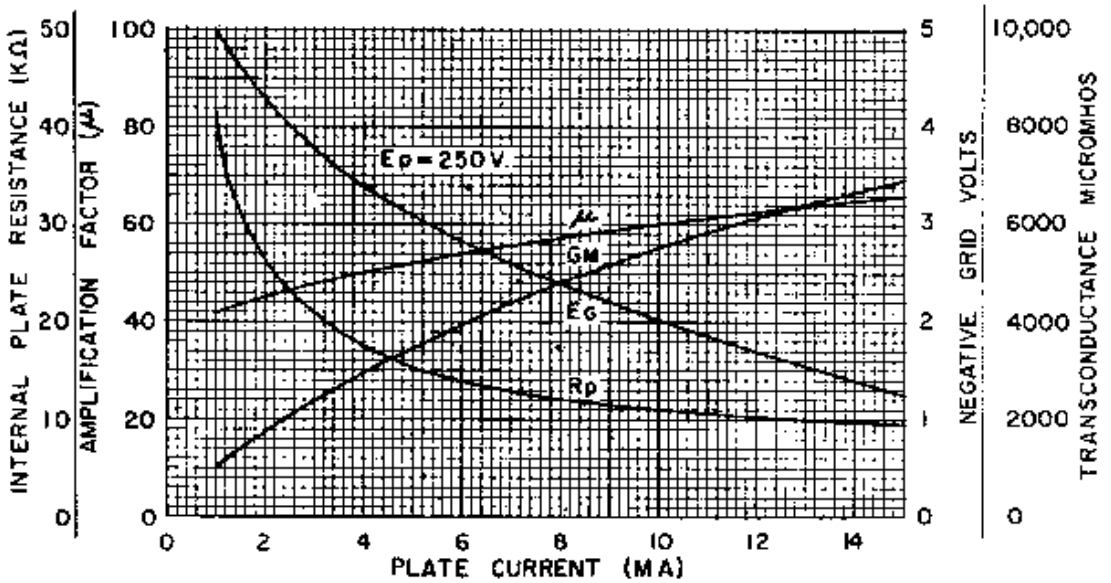

INTERNAL PLATE RESISTANCE (KΩ)
AMPLIFICATION FACTOR (μ)
NEGATIVE GRID VOLTS
TRANSCONDUCTANCE MICROMHOS
Ep=200 V.
μ
GM
Rp
EG
PLATE CURRENT (MA)


INTERNAL PLATE RESISTANCE (KΩ)
AMPLIFICATION FACTOR (μ)
NEGATIVE GRID VOLTS
TRANSCONDUCTANCE MICROMHOS
Ep=250 V.
μ
GM
EG
Rp
PLATE CURRENT (MA)

RESISTANCE COUPLED AMPLIFIER TABLES

Table A

	Ebb = 100 Volts							Ebb = 250 Volts						
Rb	0.1		0.27			0.47		0.1		0.27			0.47	
Rcf	0.27	0.47	0.27	0.47	1.0	0.47	1.0	0.27	0.47	0.27	0.47	1.0	0.47	1.0
Rk	1500	1800	3900	3900	4700	5600	6800	680	680	1800	1800	2200	3300	3900
Ib	0.54	0.51	0.23	0.23	0.22	0.150	0.141	1.62	1.62	0.69	0.69	0.65	0.41	0.40
E_{c_1}	−0.81	−0.92	−0.90	−0.90	−1.04	−0.840	−0.960	−1.10	−1.10	−1.24	−1.24	−1.43	−1.35	−1.56
Eb	45.2	48.1	37.1	37.1	39.6	28.7	32.7	86.9	86.9	62.3	62.3	75.6	55.7	59.9
Esig	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Eout	3.0	3.0	2.8	3.0	3.1	2.95	3.0	3.90	4.10	3.55	3.70	3.65	3.50	3.60
Gain	30.0	30.0	28.0	30.0	31.0	29.5	30.0	39.0	41.0	35.5	37.0	36.5	35.0	36.0
% Dist.	1.9	1.7	1.9	1.7	1.4	1.8	1.4	.54	1.0	1.0	.92	.79	.89	.75
Esig(1)	0.54	0.29	0.30	0.29	0.38	0.22	0.34	0.61	0.49	0.54	0.56	0.71	0.64	0.77
Eout	6.6	8.7	8.4	8.4	11.5	6.5	10.0	23.0	19.7	19.0	20.6	25.5	22.1	27.0
Gain	30.0	30.0	28.0	28.9	30.3	29.5	29.4	37.0	40.2	35.2	36.8	35.9	34.5	35.1
% Dist.	3.9	4.7	5.0	4.5	4.9	3.6	4.1	4.4	4.2	4.7	4.2	4.6	4.8	4.6

12AT7,6AQ8,6AB4,12AZ7
12DT8,6201,7690