

AMPEREX TUBE TYPE **ECC82 / 12AU7**

The ECC82¹ is a miniature, low-gain, medium- μ twin triode, each section of which has an individual cathode connection. The construction of the ECC82 is such that noise and microphony are reduced to a minimum. Hum is reduced by winding the heater as a bifilar twisted pair of wires. A center-tapped heater permits operation of the tube from either a 6.3 volt or a 12.6 volt supply.

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode

Coated, unipotential

<u>Series</u>	<u>Parallel</u>
---------------	-----------------

Heater Voltage, AC or DC

12.6

6.3 volts

Heater Current

0.15

0.3 amps

Direct Interelectrode Capacitances

	<u>With Shield</u> ³	<u>Without Shield</u>
--	---------------------------------	-----------------------

Grid to Plate (each section)

1.6

1.6 uuf

Input (each section)

2.0

1.8 uuf

Output (Section 1)

2.1

00.5 uuf

Output (section 2)

2.1

0.37 uuf

MECHANICAL

Maximum Overall Dimensions

Length

2 3/16 inches

Seated Height

1 15/16 inches

Diameter

7/8 inch

Mounting Position

any

Base

Small Burton, 9 pin

RETMA # 9A

The ECC82 is a direct, high-quality replacement for the type 12AU7.

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.

ECC82/12AU7

MAXIMUM RATINGS (Each Section)

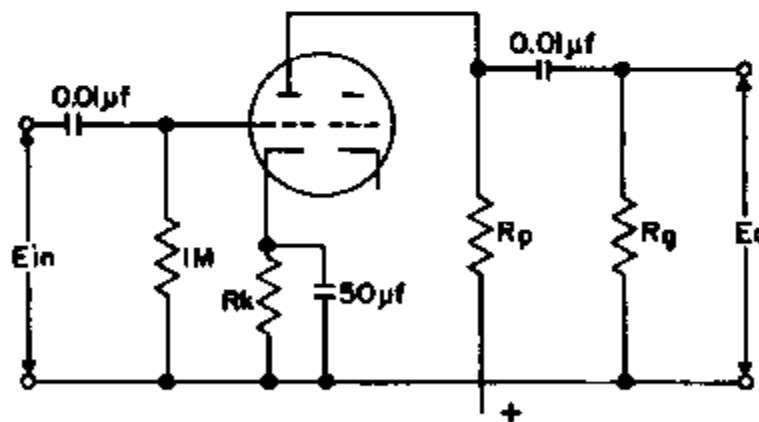
Design Center Values

Zero Signal Plate Voltage	550	volts
Plate Voltage	300	volts
Plate Dissipation	2.75	watts
Cathode Current	20	mA
Grid Voltage	-100	volts
Grid to Plate Voltage	-250	volts
Grid Voltage (Grid current = + 0.3 μ A)	-1.3	volts
Grid Resistance ⁴	1	megohm
Heater to Cathode Voltage	180	volts
Heater to Cathode Resistance	20,000	ohms
Heater to Cathode Resistance ⁵	150,000	ohms

Typical Operating Conditions

Class A Amplifier (Each Section)

Plate Voltage	100	250	volts
Grid Voltage	0	-8.5	volts
Amplification Factor	19.5	17	
Plate Resistance (approx.)	6250	7700	ohms
Transconductance	3100	2200	micromhos
Plate Current	11.8	10.5	mA



$$R_p = 0.047 \text{ M}\Omega$$

$$R_g = 0.15 \text{ M}\Omega$$

CLASS A RESISTANCE-COUPLED AMPLIFIER, EACH SECTION

⁴ With self bias.

⁵ In phase inverting circuits.

ECC82/12AU7

$$R_p = 0.047 \text{ M}\Omega$$

$$R_g = 0.15 \text{ M}\Omega$$

$$R_k = 1.2 \text{ K}\Omega$$

E_{bb} (V)	I_p (mA)	E_o (V_{eff}) ⁶	Gain	% Distortion ⁷
100	1.20	11	13.5	5.6
150	1.82	18	13.5	6.1
200	2.41	26	13.5	6.3
250	3.02	34	13.5	6.4
300	3.65	43	13.5	6.5
350	4.30	51	13.5	6.6
400	5.00	59	13.5	6.7

$$R_p = 0.1 \text{ M}\Omega$$

$$R_g = 0.33 \text{ M}\Omega$$

$$R_k = 2.2 \text{ K}\Omega$$

E_{bb} (V)	I_p (mA)	E_o (V_{eff}) ⁶	Gain	% Distortion ⁷
100	0.66	10	14	4.8
150	0.98	17	14	5.6
200	1.30	25	14	5.8
250	1.63	32	14	5.9
300	1.97	41	14	6.0
350	2.30	49	14	6.1
400	2.62	57	14	6.2

$$R_p = 0.22 \text{ M}\Omega$$

$$R_g = 0.68 \text{ M}\Omega$$

$$R_k = 3.9 \text{ K}\Omega$$

E_{bb} (V)	I_p (mA)	E_o (V_{eff}) ⁶	Gain	% Distortion ⁷
100	0.33	8	14.5	4.0
150	0.50	15	14.5	4.4
200	0.66	22	14.5	4.7
250	0.82	28	14.5	4.8
300	0.98	36	14.5	4.9
350	1.16	43	14.5	5.0
400	1.31	50	14.5	5.1

⁶ Grid current = + 0.3 μ A.

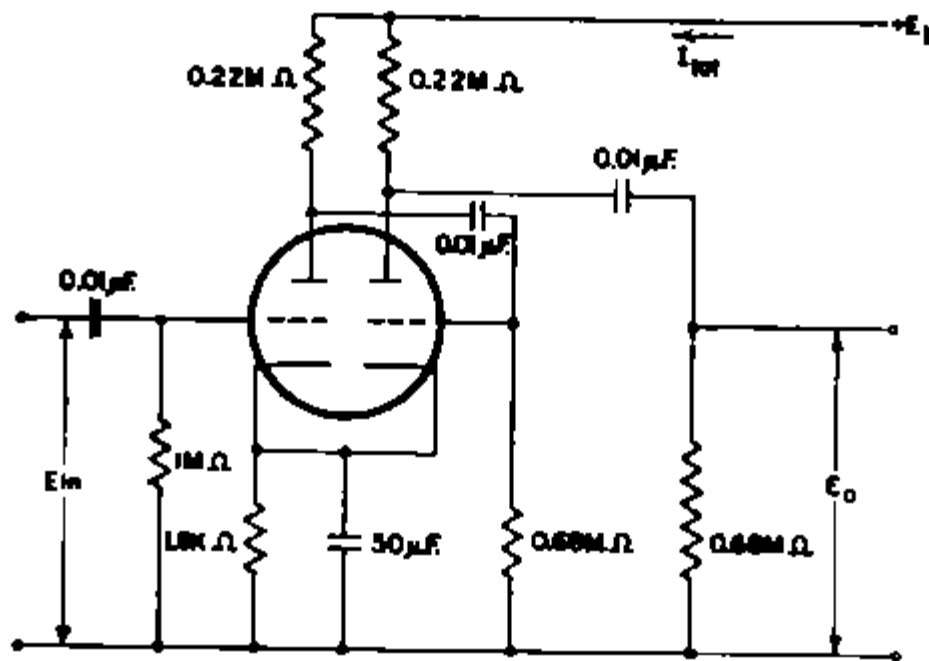
⁷ Approximately proportional to output voltage

ECC82/12AU7

Class A Resistance - Coupled Amplifier

Two Sections in Cascade

Supply Voltage	250	350 volts
Total Current	1.66	2.33 mA
Output Voltage ⁶	15	25 volts (RMS)
Gain	178	178
Total Distortion ⁷	2	2 %



APPLICATION NOTES

MICROPHONICS

The tube can be used without special precautions against microphonic effect in amplifiers in which the input voltage is higher than 50 millivolts when the tube is mounted in the near vicinity of a 5 watt loud speaker with an acoustical efficiency of 5%.

HUM

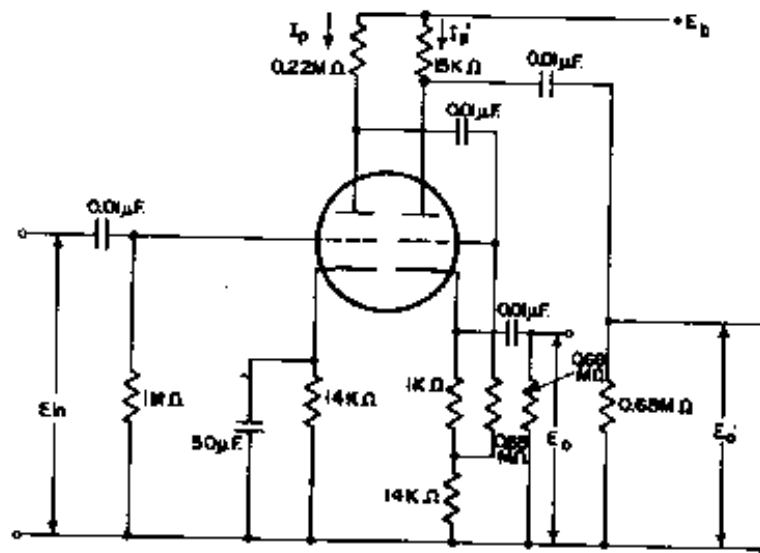
The hum and noise level will be better than -60 db when the grid circuit impedance is less than 0.3 megohms (at 60 cps), the center tap of the heater is grounded and the cathode resistor is decoupled by a capacitor of at least 100 uuf.

⁶ Grid current = + 0.3 μA.

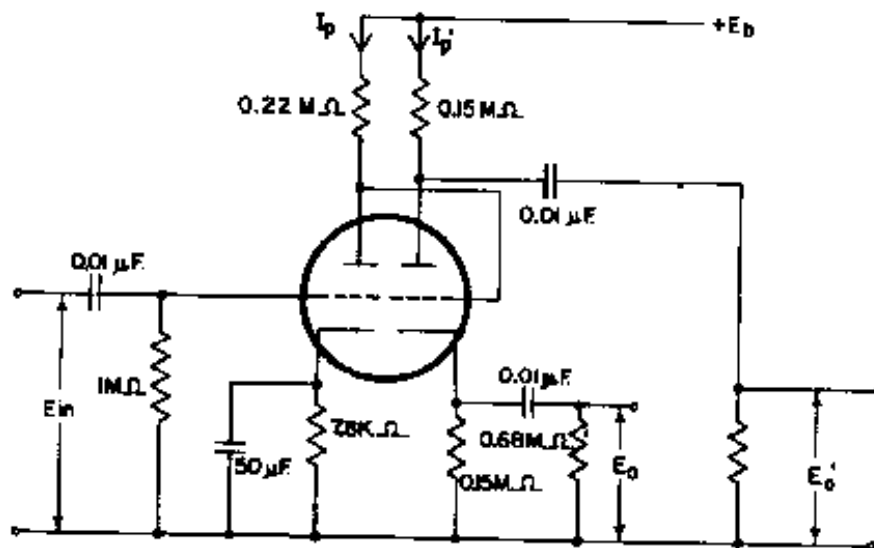
⁷ Approximately proportional to output voltage

ECC82/12AU7

Operating Characteristics as a Phase Inverter



Supply Voltage	250	350 volts
Plate Current (I_p)	0.82	1.16 mA
Plate Current (I_p')	4.5	6.3 mA
Output Voltage ^a	13	20 volts (RMS)
Voltage Gain	11	11
Percent Distortion ⁷	1.5	1.5 %

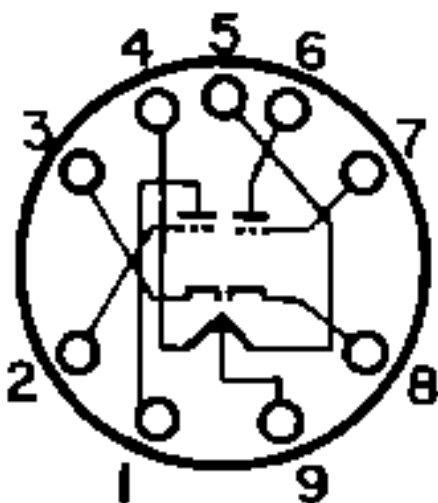


Supply Voltage	250	350 volts
Plate Current (I_p)	0.70	1.00 mA
Plate Current (I_p')	0.68	0.93 mA
Output Voltage ^a	15	24 volts (RMS)
Voltage Gain	11	11
Percent Distortion ⁷	1.0	1.0 %

^a Grid Current = + 0.3 μ A.

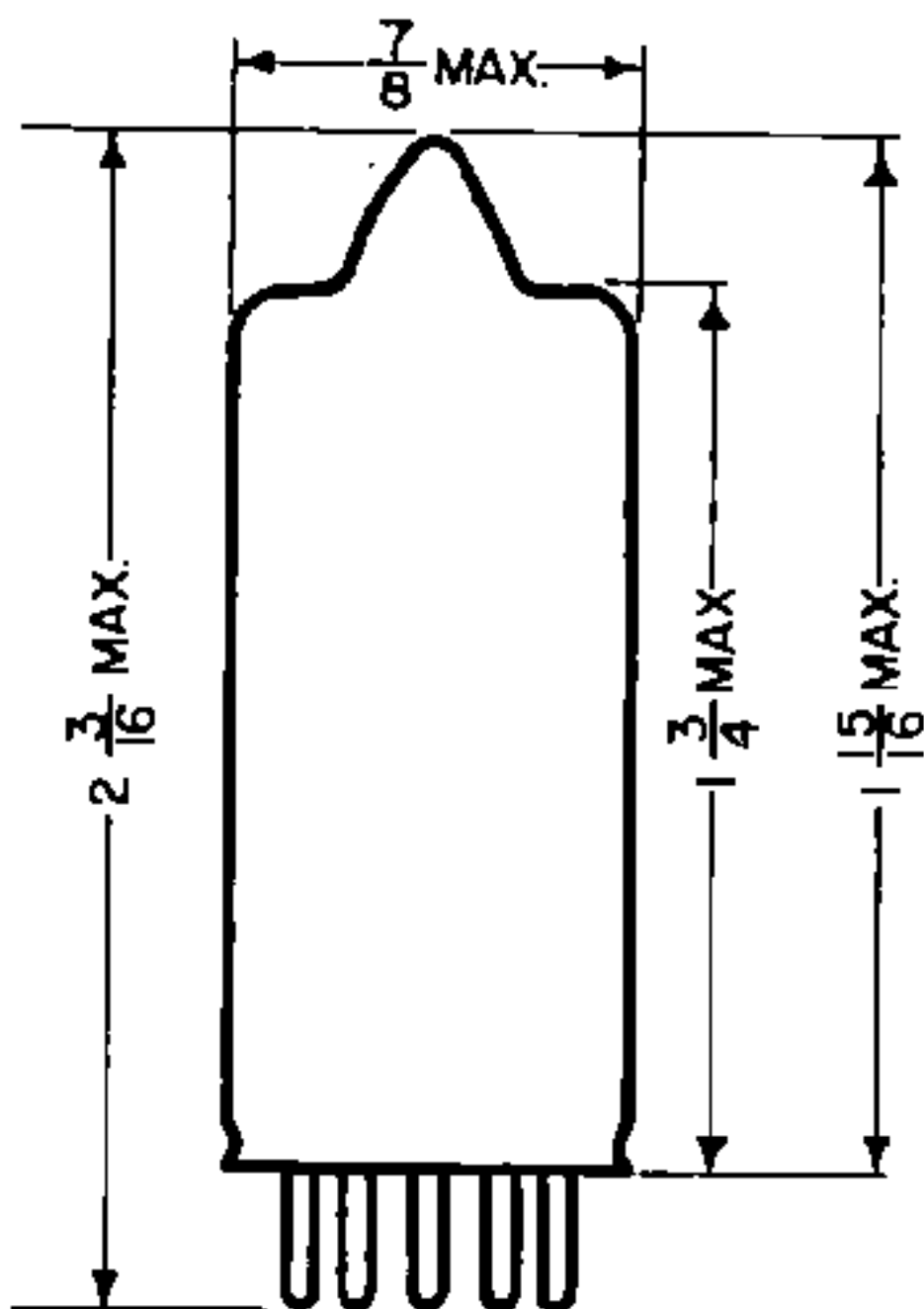
⁷ Approximately proportional to output voltage.

ECC82/12AU7

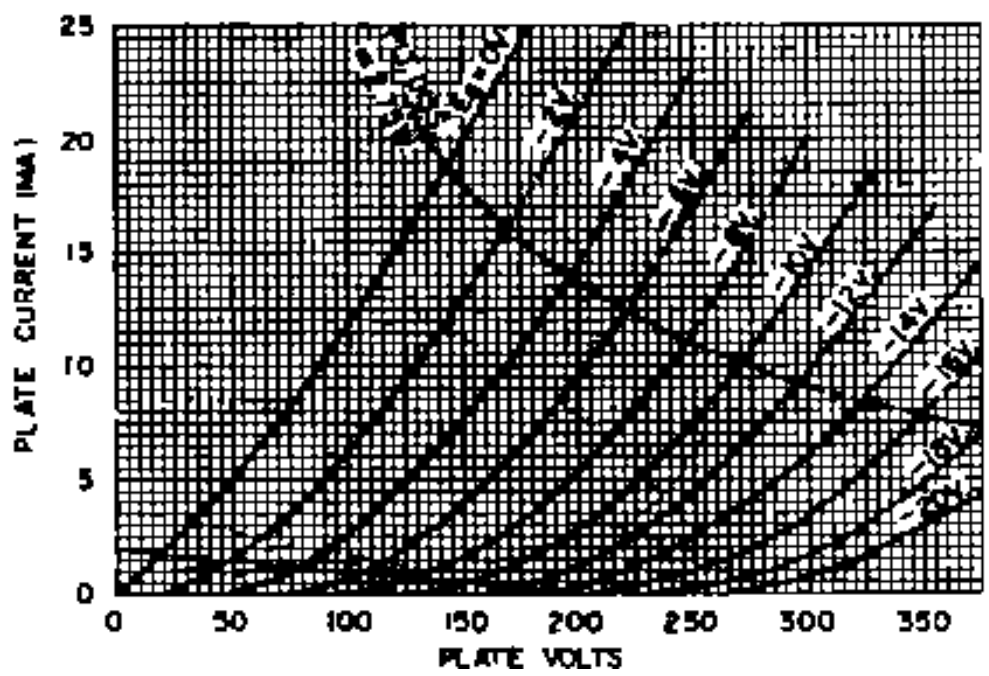
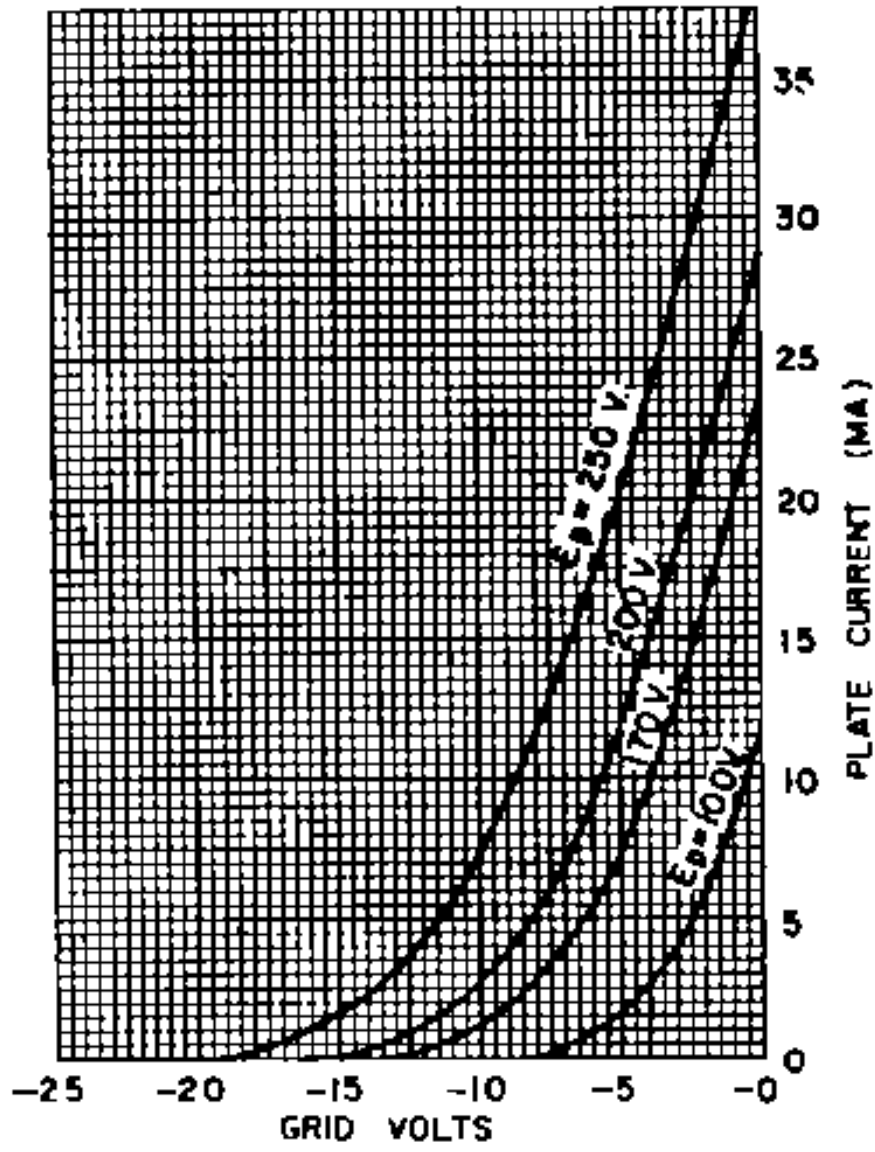


PIN CONNECTIONS

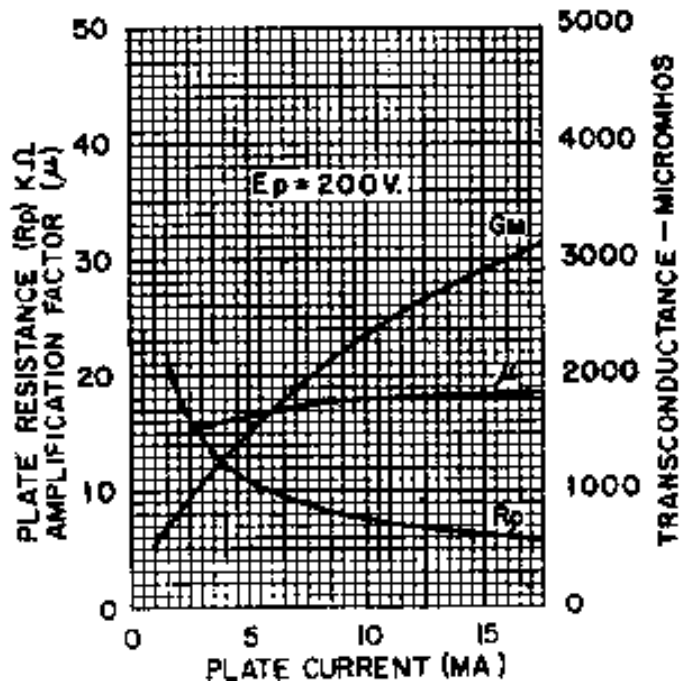
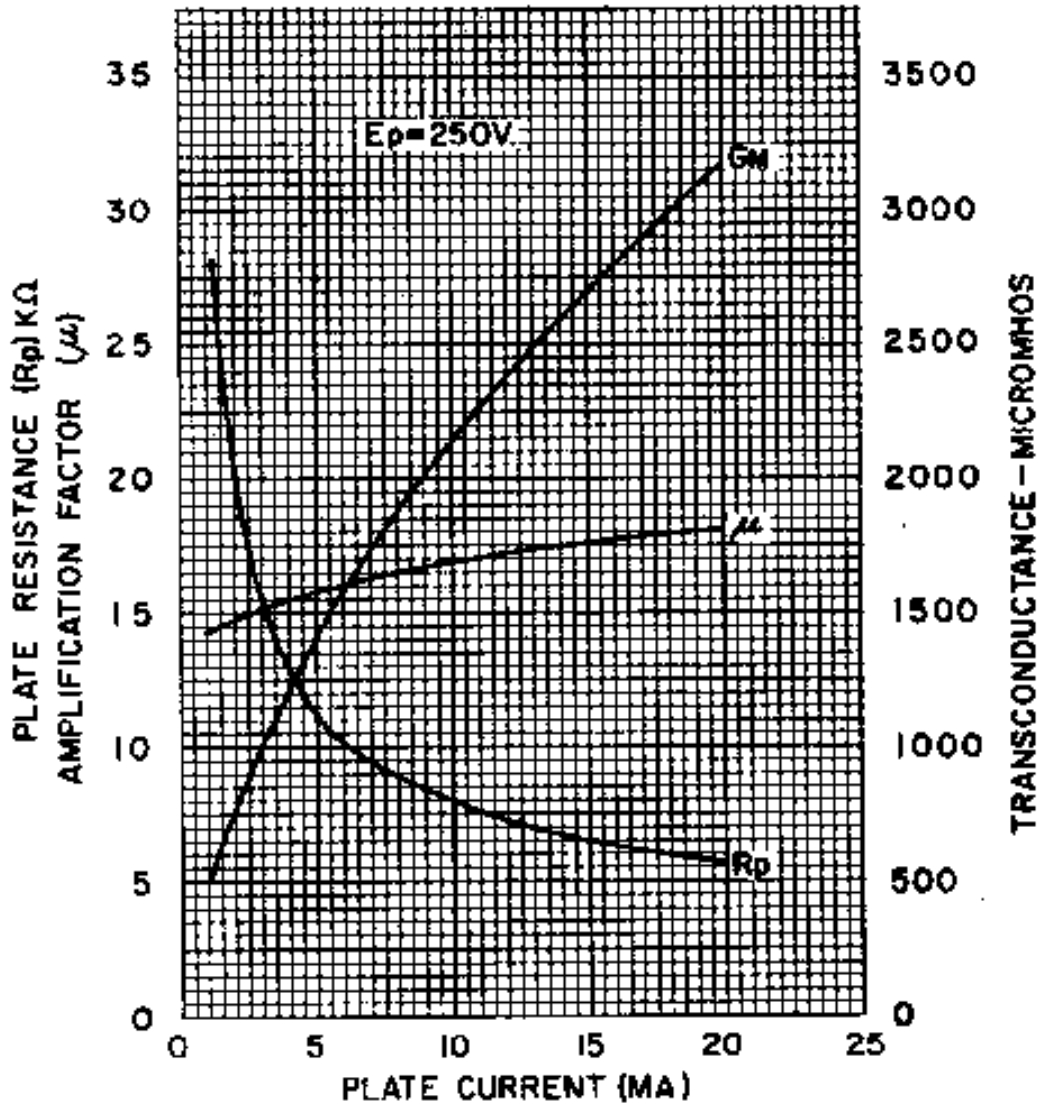
- PIN NO. 1 = PLATE NO. 1
- PIN NO. 2 = GRID NO. 1
- PIN NO. 3 = CATHODE
- PIN NO. 4 = HEATER
- PIN NO. 5 = HEATER
- PIN NO. 6 = PLATE NO. 2
- PIN NO. 7 = GRID NO. 2
- PIN NO. 8 = CATHODE
- PIN NO. 9 = HEATER CENTER TAP



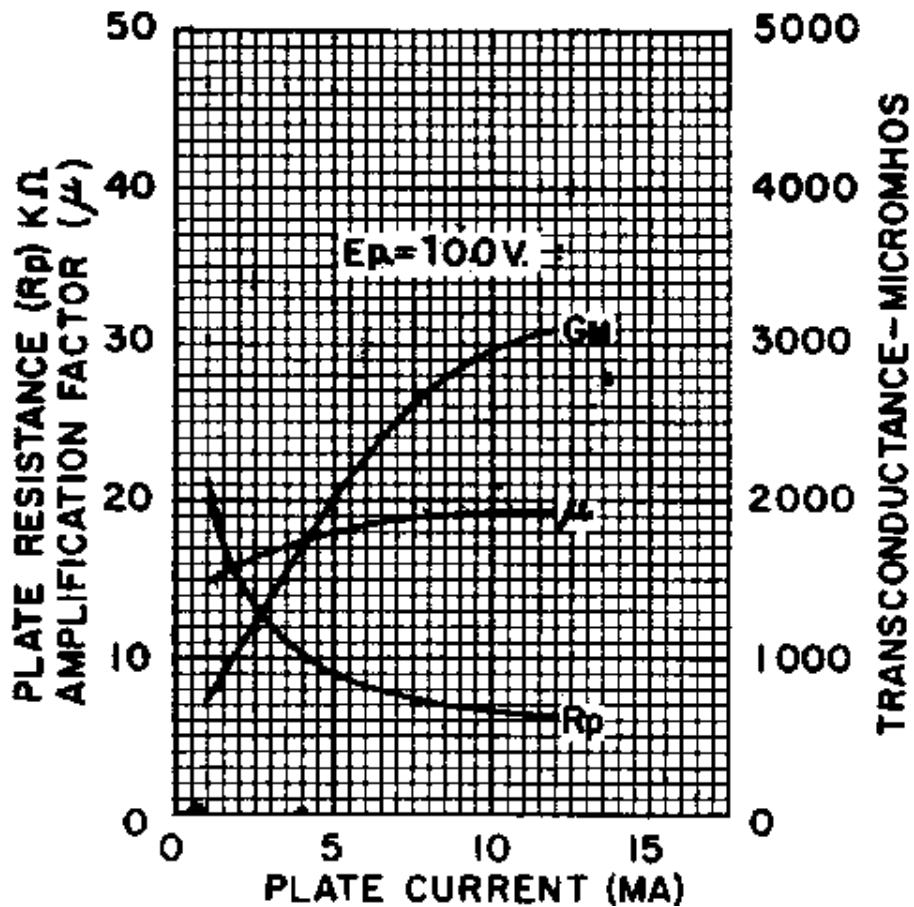
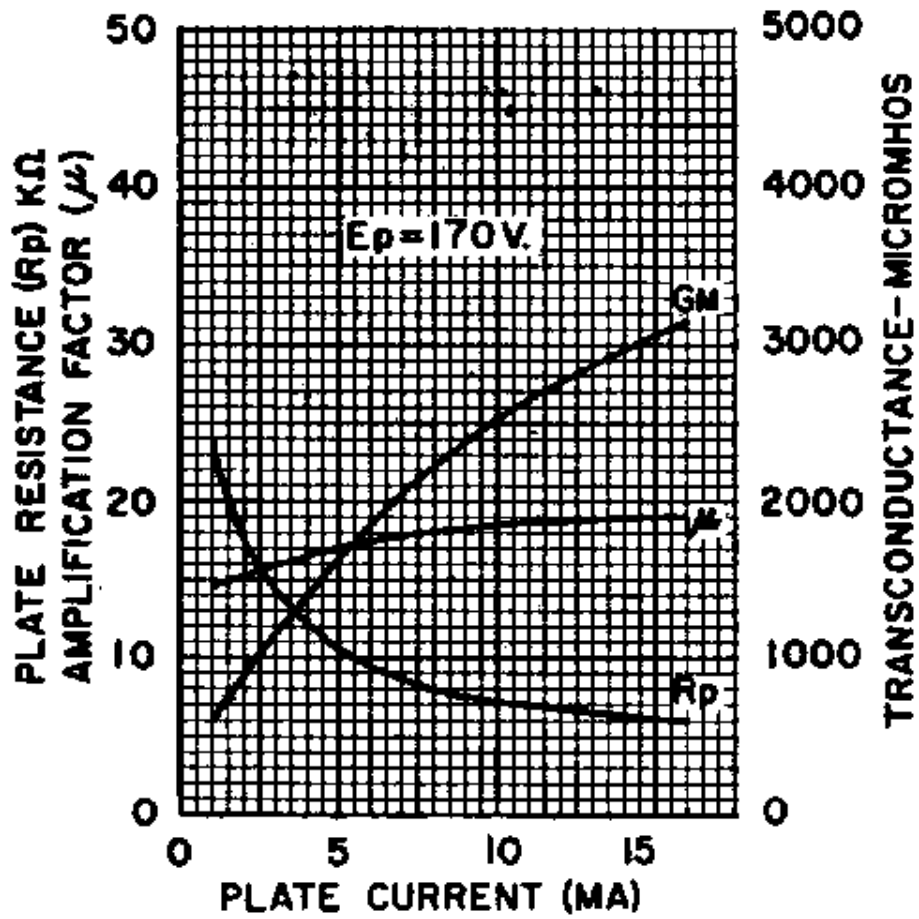
ECC82/12AU7



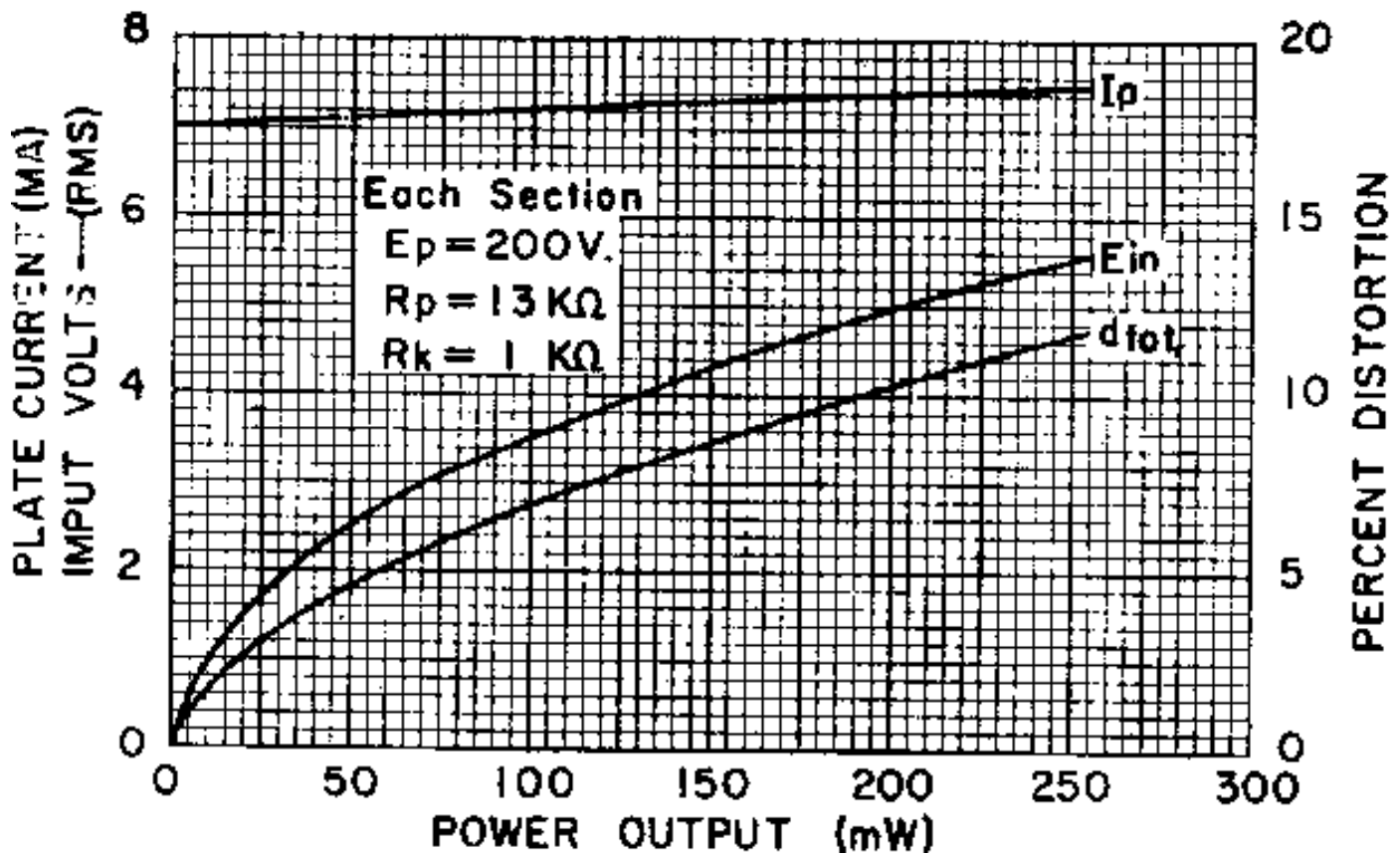
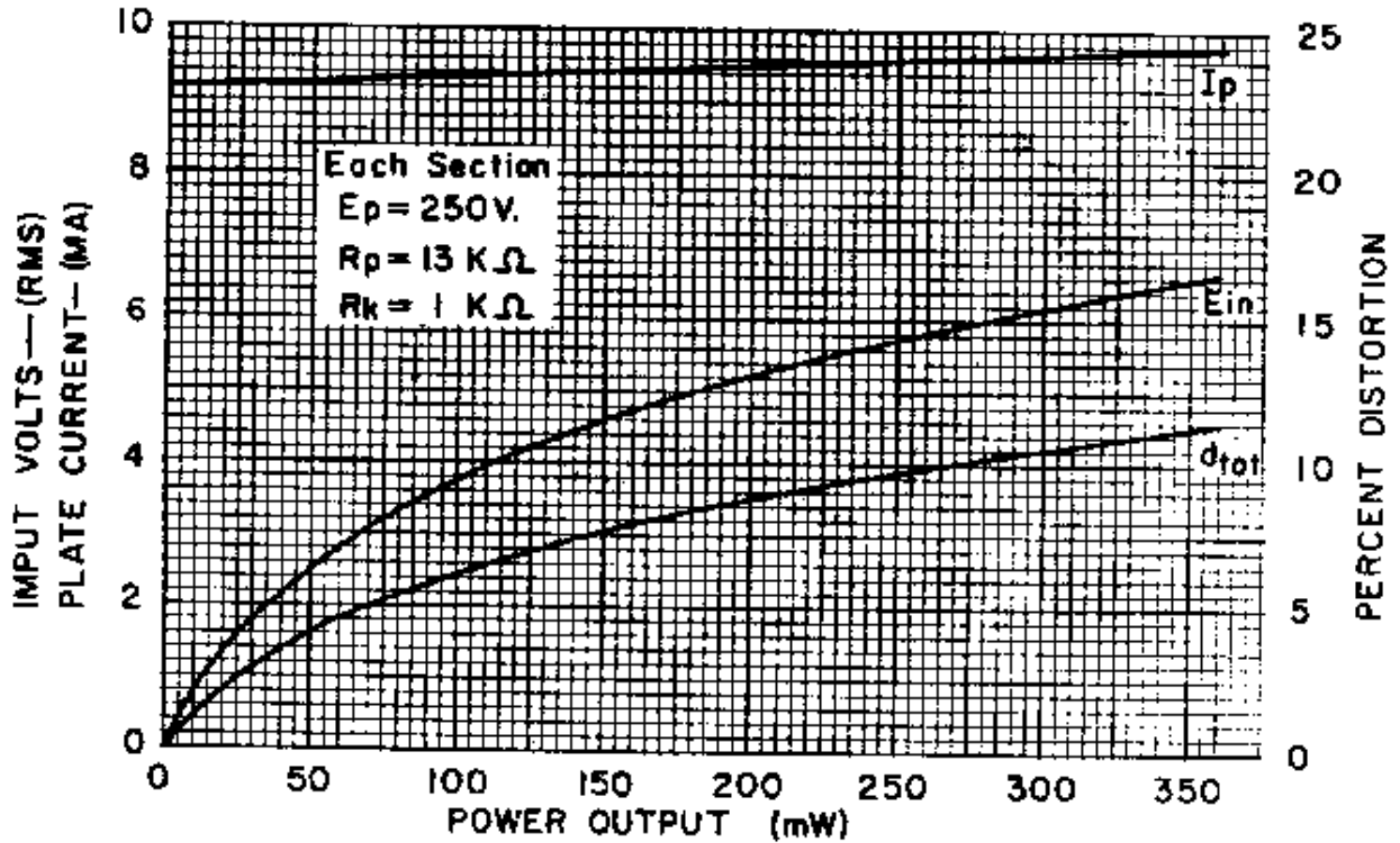
ECC82 / 12AU7



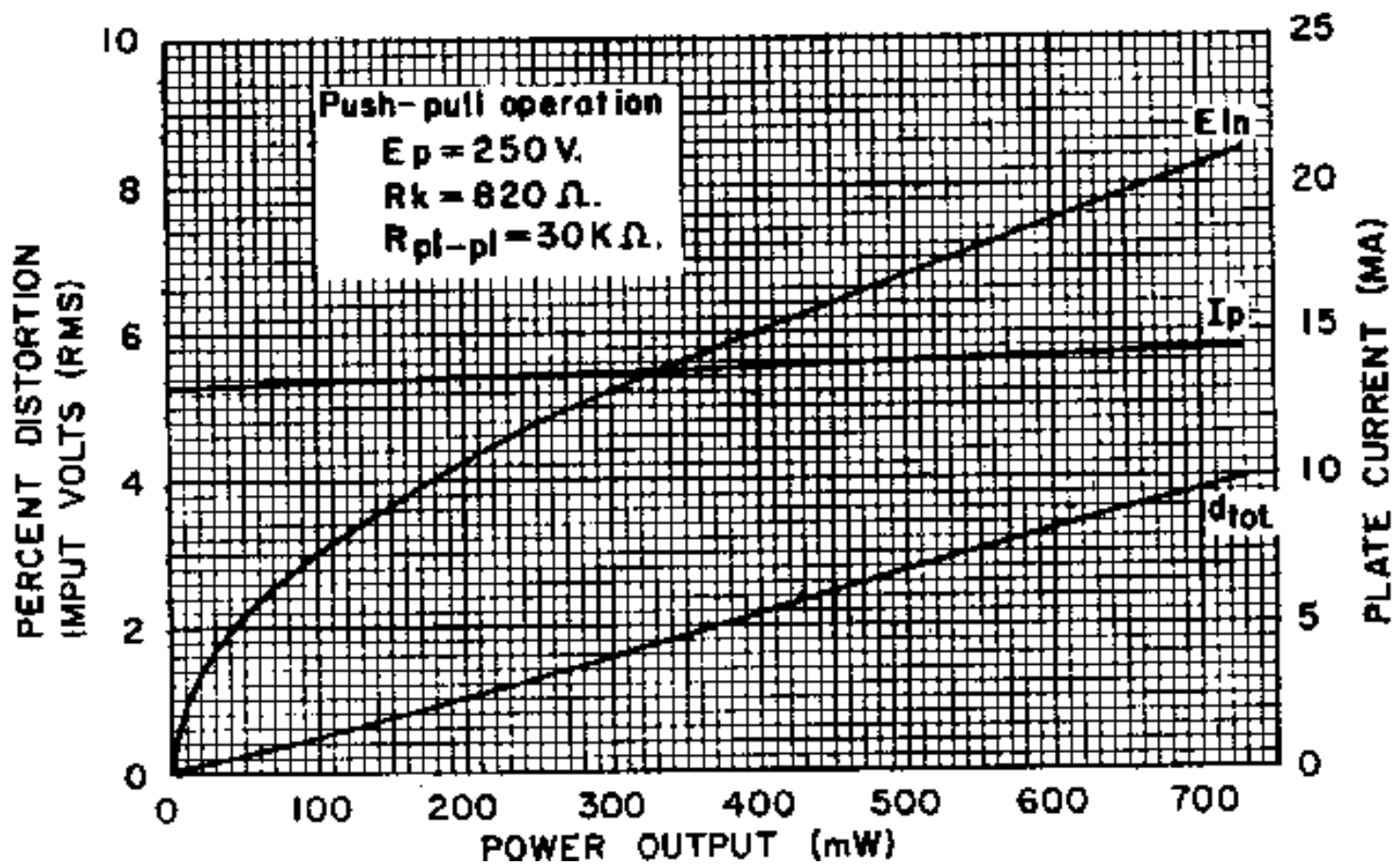
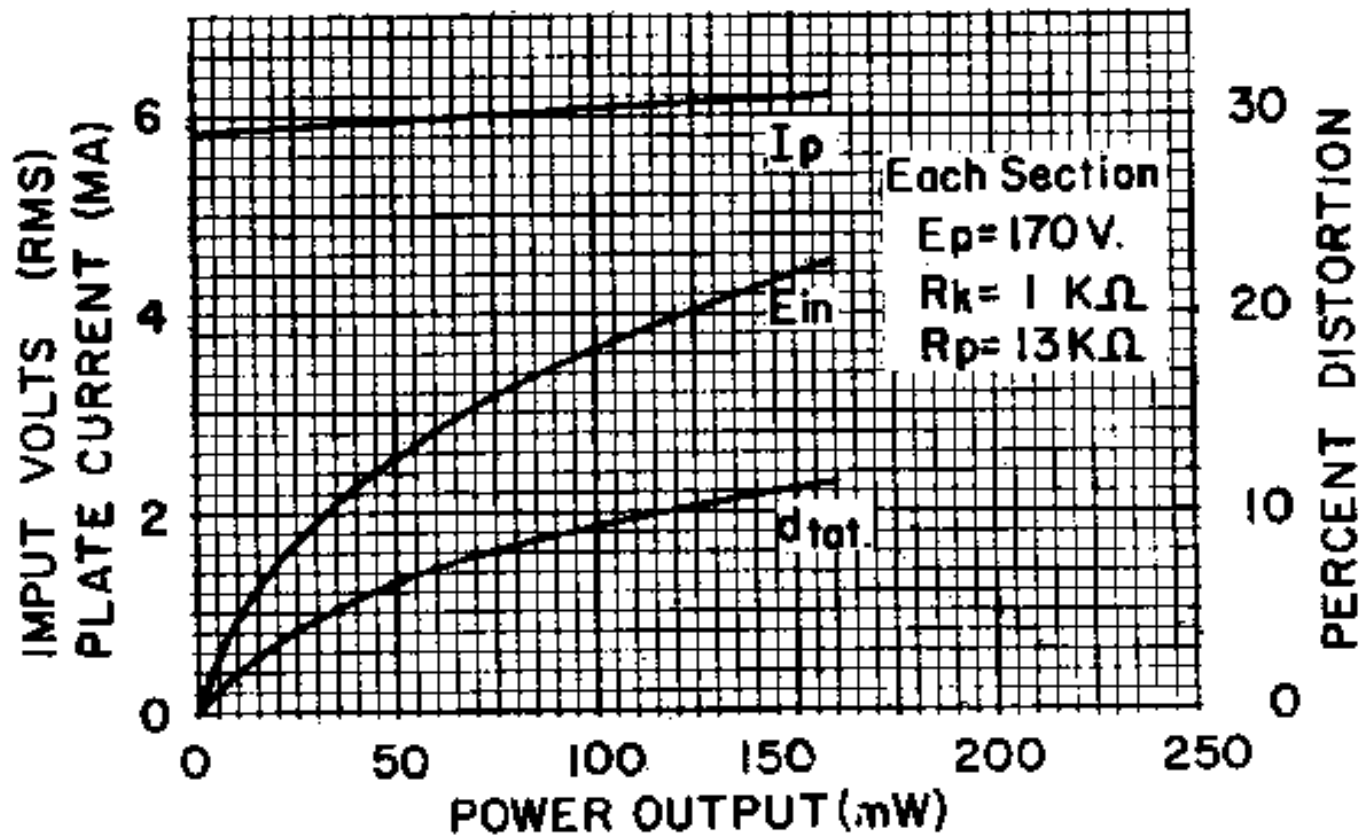
ECC82 / 12AU7



ECC82/12AU7



ECC82/12AU7



ECC82/12AU7

