Electronic TUBES

12AU7-A—12AU7—7AU7

TWIN TRIODE

DESCRIPTION AND RATING

The 12AU7-A is a miniature medium-mu twin triode intended for service in radio and television receivers or in audio amplifiers. The tube is suitable for use in a variety of stages, such as general-purpose amplifier, phase inverter, oscillator, or multivibrator.

The electrical characteristics of the 12AU7-A and 12AU7 are essentially equivalent. As compared to the 12AU7, the 12AU7-A exhibits a lower microphonic output.

Except for heater ratings, the 7AU7 is identical to the 12AU7-A. In addition, the 7AU7 incorporates a controlled heater warm-up characteristic and is specially suited for use in television receivers that employ 600-milliampere, series-connected heaters.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential

	7AU7		12AU7-A 12AU7		
	Series	Parallel	Series	Parallel	
Heater Voltage, AC or DC	7.0	3.5	12.6	6.3	Volts
Heater Current	0.3	0.6	0.15	0.3	Amperes
Heater Warm-up Time*	....	11	....	....	Seconds

Direct Interelectrode Capacitances	With Shield†	Without Shield	
Grid to Plate, Each Section	1.5	1.5	μμf
Input, Each Section	1.8	1.6	μμf
Output, Section 1	2.0	0.4	μμf
Output, Section 2	2.0	0.32	μμf

MECHANICAL

Mounting Position—Any
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

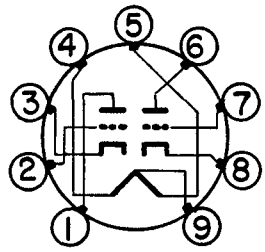
DESIGN-CENTER VALUES UNLESS OTHERWISE INDICATED, EACH SECTION

	Class A_1 Amplifier	Vertical Deflection Amplifier‡	
DC Plate Voltage	300	300	Volts
Peak Positive Pulse Plate Voltage	....	1200§	Volts
Peak Negative Grid Voltage	....	250	Volts
Plate Dissipation	2.75	2.75△	Watts
DC Cathode Current	20	20	Milliamperes
Peak Cathode Current	....	60	Milliamperes
Heater-Cathode Voltage			
Heater Positive with Respect to Cathode			
DC Component	100	100	Volts
Total DC and Peak	200	200	Volts
Heater Negative with Respect to Cathode			
Total DC and Peak	200	200	Volts
Grid Circuit Resistance			
With Fixed Bias	0.25	....	Megohms
With Cathode Bias	1.0	2.2	Megohms

GENERAL ELECTRIC

Supersedes ET-T880, dated 9-54

BASING DIAGRAM

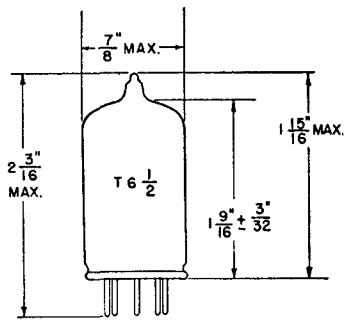


RETMA 9A

TERMINAL CONNECTIONS

Pin 1—Plate (Section 2)
Pin 2—Grid (Section 2)
Pin 3—Cathode (Section 2)
Pin 4—Heater
Pin 5—Heater
Pin 6—Plate (Section 1)
Pin 7—Grid (Section 1)
Pin 8—Cathode (Section 1)
Pin 9—Heater Center-Tap

PHYSICAL DIMENSIONS



RETMA 6-2

MAXIMUM RATINGS (Cont'd)

DESIGN-CENTER VALUES UNLESS OTHERWISE INDICATED, EACH SECTION

	Vertical-Oscillator Service‡	Horizontal Oscillator Service‡	
DC Plate Voltage	300	300	Volts
Peak Negative Grid Voltage	400	600	Volts
Plate Dissipation	2.75	2.75	Watts
DC Cathode Current	20	20	Milliamperes
Peak Cathode Current	60	300	Milliamperes
Heater-Cathode Voltage			
Heater Positive with Respect to Cathode			
DC Component	100	100	Volts
Total DC and Peak	200	200	Volts
Heater Negative with Respect to Cathode			
Total DC and Peak	200	200	Volts
Grid Circuit Resistance			
With Fixed Bias	2.2	2.2	Megohms
With Cathode Bias	2.2	2.2	Megohms

CHARACTERISTICS AND TYPICAL OPERATION

CLASS A_1 AMPLIFIER, EACH SECTION

Plate Voltage	100	250	Volts
Grid Voltage	0	−8.5	Volts
Amplification Factor	20	17	
Plate Resistance, approximate	6500	7700	Ohms
Transconductance	3100	2200	Micromhos
Plate Current	11.8	10.5	Milliamperes
Grid Voltage, approximate Ib = 10 Microamperes		−24	Volts

* The time required for the voltage across the heater to reach 80 percent of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the rated heater voltage divided by the rated heater current.

† With external shield (RETMA 315) connected to cathode of section under test.

‡ For operation in a 525-line, 30-frame television system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15 percent of one scanning cycle.

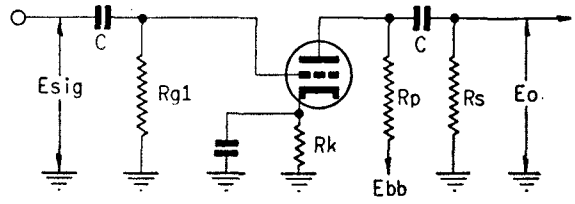
§ Value given is to be considered as an Absolute Maximum Rating. In this case, the combined effect of supply voltage variation, manufacturing variation including components in the equipment, and adjustment of equipment controls should not cause the rated value to be exceeded.

△In stages operating with grid-lead bias, an adequate cathode-bias resistor or other suitable means is required to protect the tube in the absence of excitation.

CLASS A RESISTANCE-COUPLED AMPLIFIER

EACH SECTION

Rp Meg.	Rs Meg.	Rg1 Meg.	Ebb = 90 Volts Rk	Gain	Eo	Ebb = 180 Volts Rk	Gain	Eo	Ebb = 300 Volts Rk	Gain	Eo
0.10	0.10	0.10	3900	10	10	3600	11	20	3500	11	30
0.10	0.24	0.10	5000	11	14	4700	12	27	4400	12	41
0.24	0.24	0.10	9400	11	13	8700	11	25	8700	12	38
0.24	0.51	0.10	11000	11	17	11000	12	32	11000	12	48
0.51	0.51	0.10	19000	11	15	18000	12	29	18000	12	43
0.51	1.0	0.10	24000	11	19	23000	12	37	23000	12	54
0.24	0.24	10	0	14	12	0	16	20	0	17	28
0.24	0.51	10	0	14	16	0	16	28	0	17	40
0.51	0.51	10	0	14	15	0	15	26	0	16	38
0.51	1.0	10	0	14	19	0	16	35	0	16	52

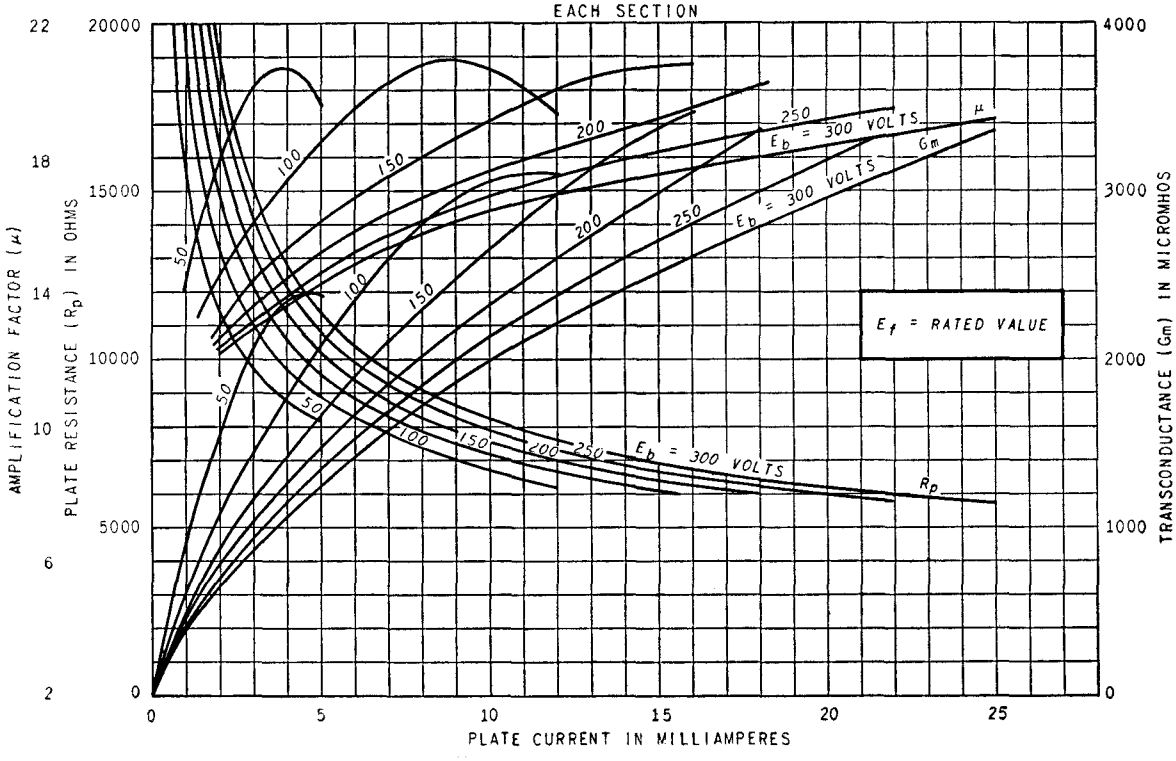


Note: Coupling capacitors (C) should be selected to give desired frequency response. Rk should be adequately by-passed.

Notes: 1. Eo is maximum RMS voltage output for five percent (5%) total harmonic distortion. 2. Gain measured at 2.0 volts RMS output. 3. For zero-bias data, generator impedance is negligible.

AVERAGE CHARACTERISTICS

EACH SECTION



AVERAGE PLATE CHARACTERISTICS

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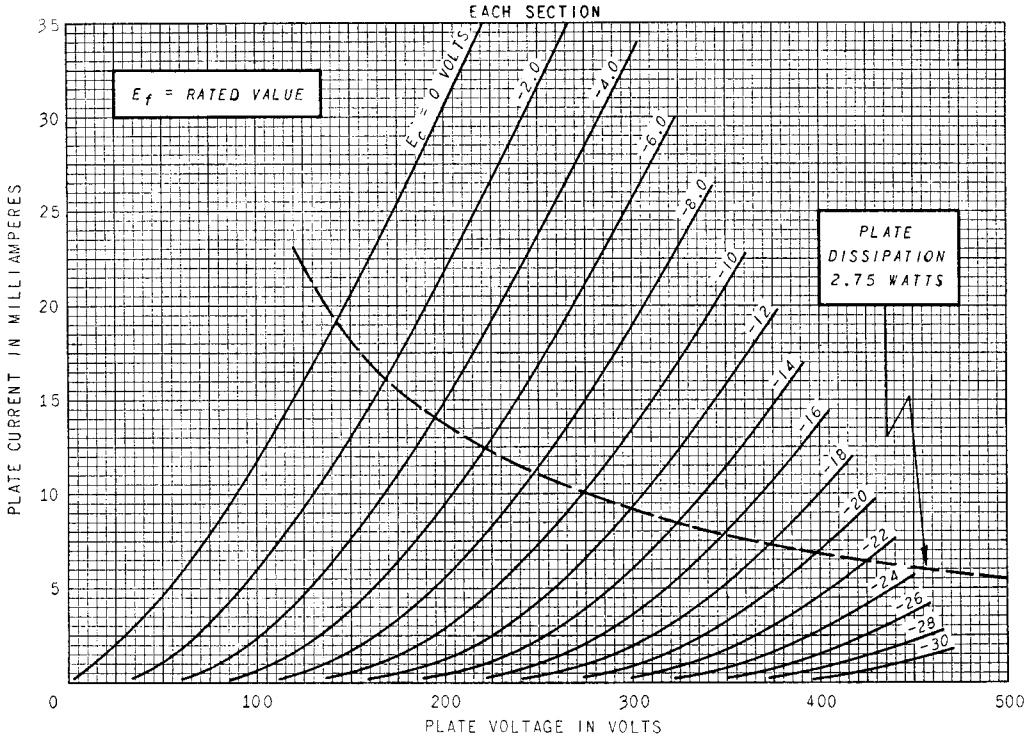

AVERAGE PLATE CHARACTERISTICS

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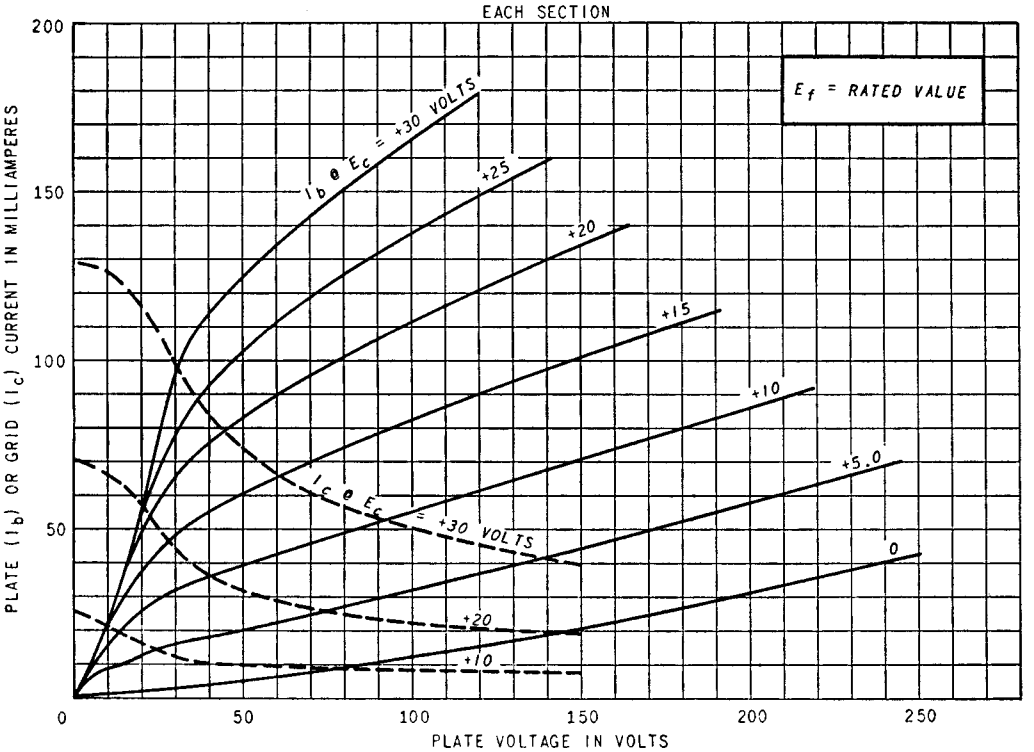
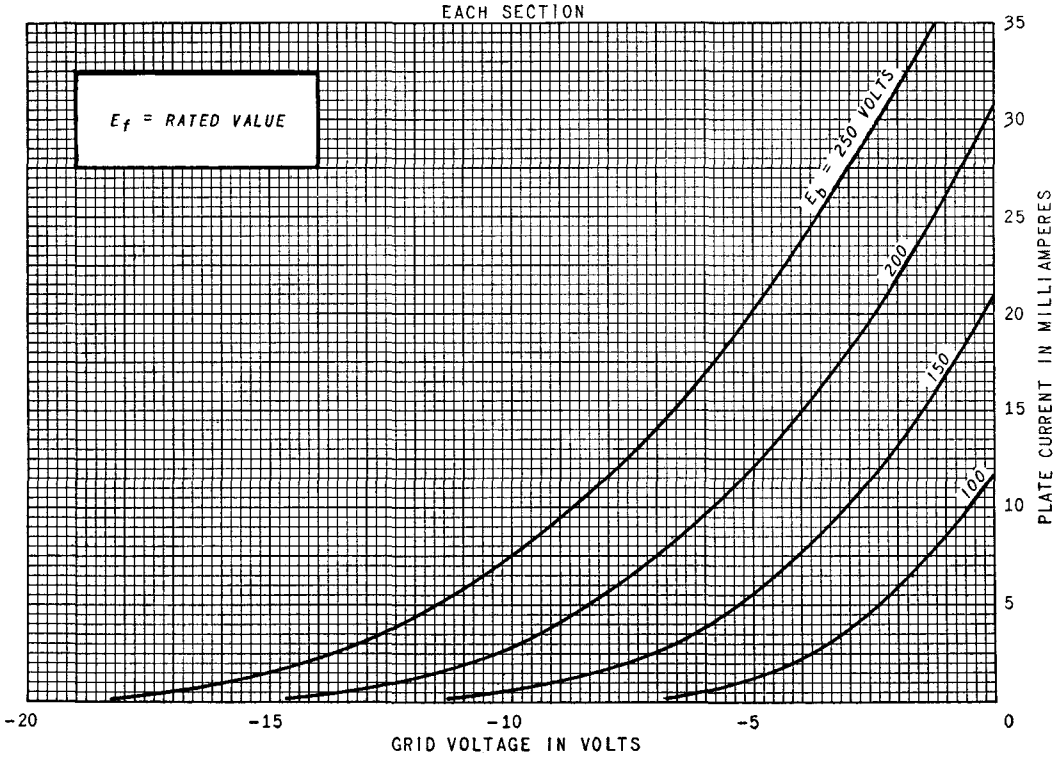


AVERAGE TRANSFER CHARACTERISTICS

EACH SECTION