NATIONAL Electronics, Inc.

—PRODUCT INFORMATION—

12AU7-A

Twin Triode

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.

GENERAL

ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings

	Series	Parallel	
Heater Voltage, AC or DC*	12.6 ± 1.3	6.3 ± 0.6	Volts
Heater Current■	0.15	0.3	Amperes

Direct Interelectrode Capacitances●

Grid to Plate: (g to p), Each Section	1.5	pf
Input: g to (h + k), Each Section	1.6	pf
Output: p to (h + k), Section 1	0.5	pf
Output: p to (h + k), Section 2	0.35	pf

MECHANICAL

Operating Position - Any
Envelope - T-6½, Glass
Base - E9-1, Small Button 9-Pin
Outline Drawing - EIA 6-2

Maximum Diameter	0.875	Inches
Maximum Over-all Length	2.187	Inches
Maximum Seated Height	1.937	Inches

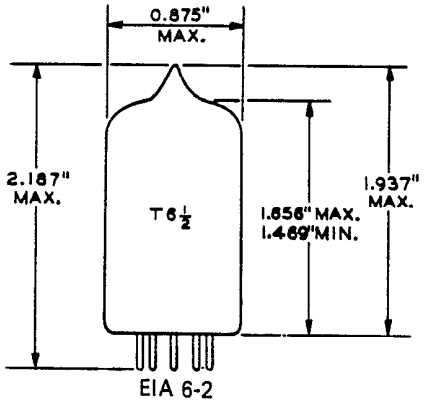
MAXIMUM RATINGS

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

PHYSICAL DIMENSIONS

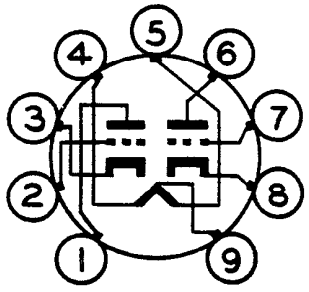


EIA 6-2

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

BASING DIAGRAM



EIA 9A

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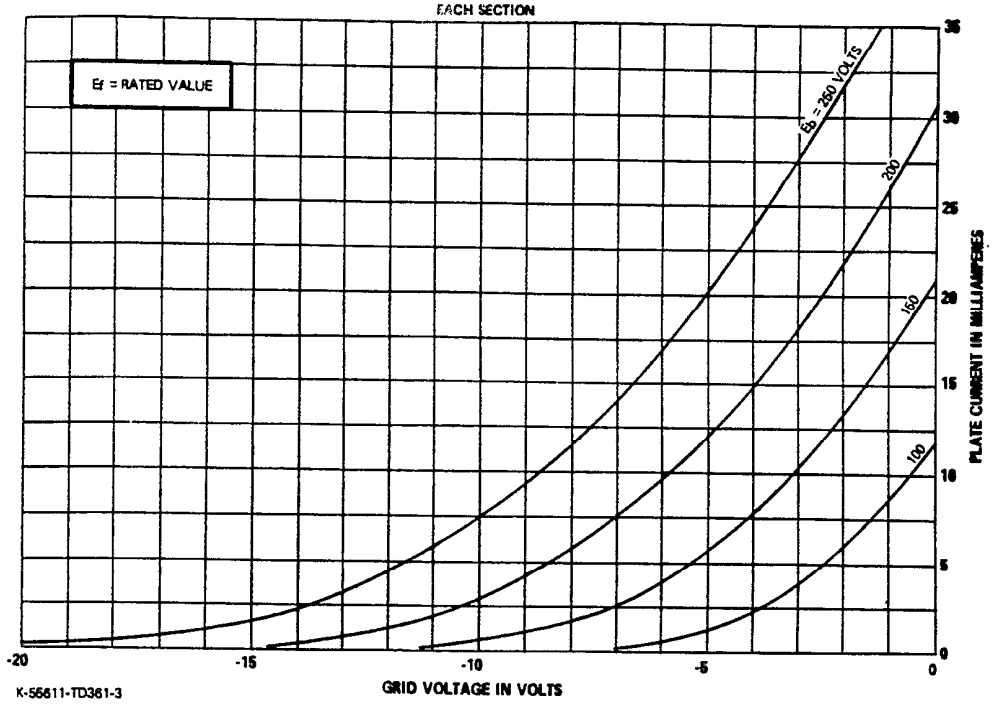
AVERAGE TRANSFER CHARACTERISTICS

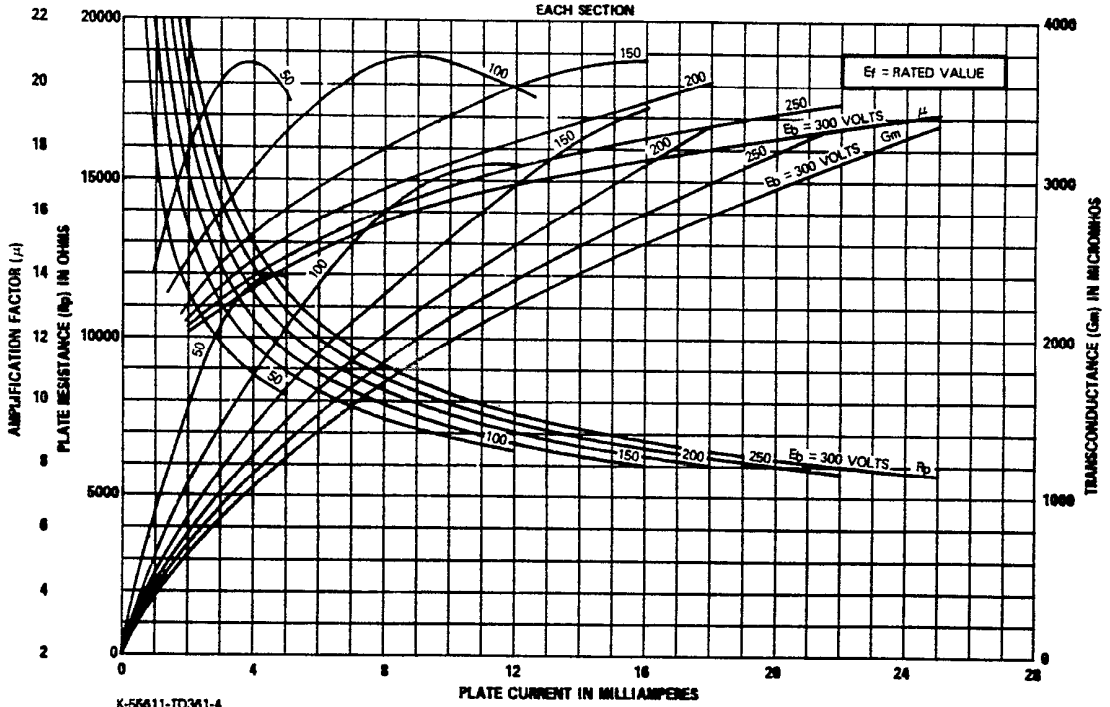
EACH SECTION



K-55611-TD361-3

AVERAGE CHARACTERISTICS

EACH SECTION



K-55611-TD361-4

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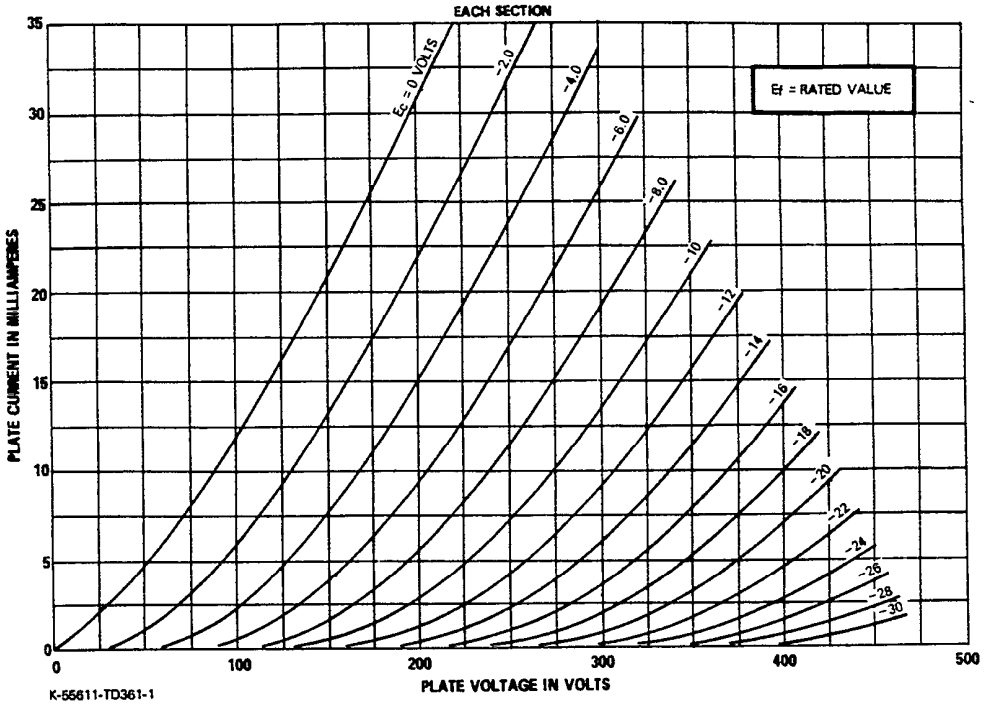
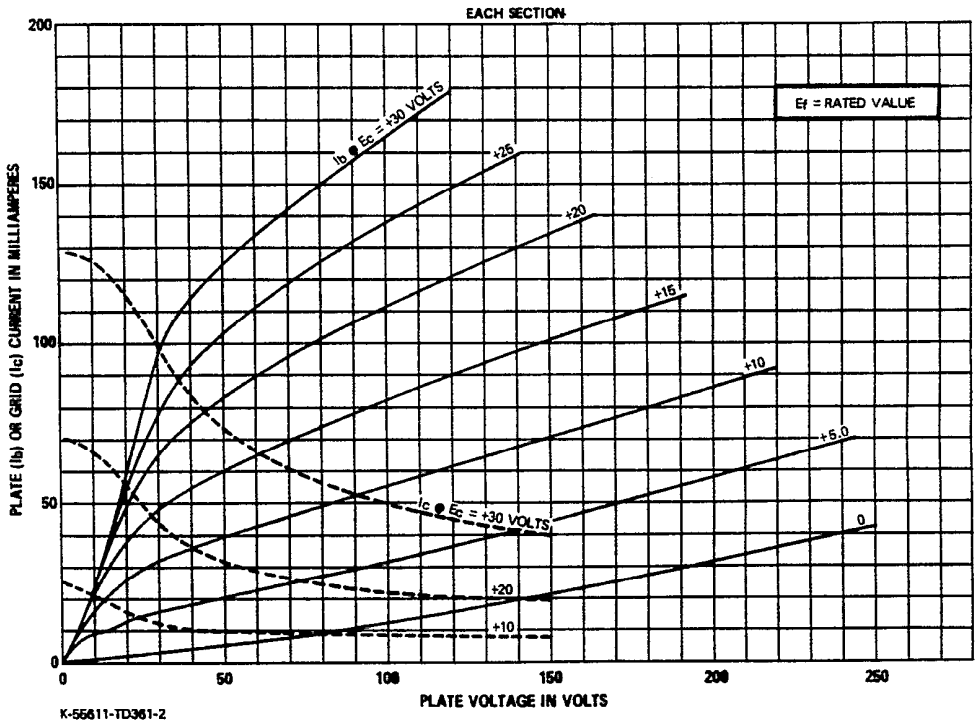
AVERAGE PLATE CHARACTERISTICS



AVERAGE PLATE CHARACTERISTICS



MAXIMUM RATINGS (Conf'd)

DESIGN-MAXIMUM VALUES UNLESS OTHERWISE INDICATED, EACH SECTION

	Class A_1 Amplifier	Vertical Deflection Amplifier⊕	Vertical Oscillator Service⊕	Horizontal Oscillator Service⊕	
DC Plate Voltage	330	330	330	330	Volts
Peak Positive Pulse Plate Voltage	---	1200♦	---	---	Volts
Peak Negative Grid Voltage	---	275	440	660	Volts
Plate Dissipation					
Each Plate	2.75	2.75▲	2.75	2.75	Watts
Both Plates	5.5	5.5▲	5.5	5.5	Watts
DC Cathode Current	22	22	22	22	Milliamperes
Peak Cathode Current	---	66	66	330	Milliamperes
Heater-Cathode Voltage					
Heater Positive with respect to Cathode					
DC Component	100	100	100	100	Volts
Total DC and Peak	200	200	200	200	Volts
Heater Negative with respect to Cathode					
Total DC and Peak	200	200	200	200	Volts
Grid Circuit Resistance					
With Fixed Bias	0.25	---	2.2	2.2	Megohms
With Cathode Bias	1.0	2.2	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

NOTES

★ The equipment designer should design the equipment so that heater voltage is centered at the specified bogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.

■ Heater current of a bogey tube at bogey heater voltage.

● Without external shield.

⊕ 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.

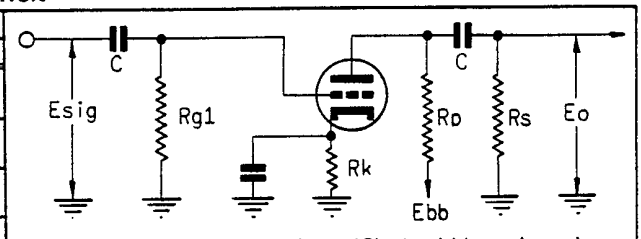
♦ Value given is to be considered as an Absolute-Maximum Rating. In this case, the combined effect of supply voltage variation, manufacturing variation including components in the equipment, and adjustment of equipment controls should not cause the rated value to be exceeded.

▲ In stages operating with grid-leak 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	1.00	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	1.00	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.