

12AY7

TWIN TRIODE

FOR LOW-LEVEL AMPLIFIER APPLICATIONS

DESCRIPTION AND RATING

The 12AY7 is a miniature medium-mu twin triode designed primarily for use in low-level stages of high-gain audio-frequency amplifiers. The tube is specially designed to exhibit low noise and low microphonic output. In addition, hiss and hum output voltages are controlled to limits consistent with the requirements of low-level amplifier applications.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential	Series	Parallel
Heater Voltage, AC or DC	12.6	6.3 Volts
Heater Current	0.15	0.3 Amperes
Direct Interelectrode Capacitances*		
Grid to Plate: (g to p), Each Section	1.3	pf
Input: g to (h+k), Each Section	1.3	pf
Output: p to (h+k), Each Section	0.6	pf

MECHANICAL

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

MAXIMUM RATINGS

DESIGN-CENTER VALUES, Each Section

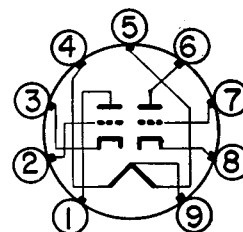
Plate Voltage	300 Volts
Plate Dissipation	1.5 Watts
DC Cathode Current	10 Milliamperes
Heater-Cathode Voltage	
Heater Positive with Respect to Cathode	90 Volts
Heater Negative with Respect to Cathode	90 Volts

Design-Center 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 normal conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube in average applications, making allowance for normal changes in operating conditions due to rated supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of the tube under consideration and of all other electron devices in the equipment.

The equipment manufacturer should design so that initially no design-center value for the intended service is exceeded with a bogey tube under normal operating conditions at the stated normal supply voltage.

BASING DIAGRAM

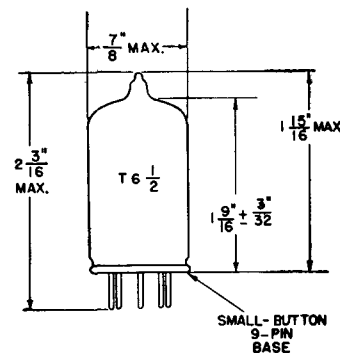


EIA 9A

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



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CHARACTERISTICS AND TYPICAL OPERATION

CLASS A₁ AMPLIFIER, Each Section

Plate Voltage	250 Volts
Grid Voltage	-4.0 Volts
Amplification Factor	44
Plate Resistance, approximate	25,000 Ohms
Transconductance	1750 Micromhos
Plate Current	3.0 Milliamperes
Grid Voltage, approximate I _b = 10 Microamperes	-8 Volts

LOW-LEVEL-AMPLIFIER SERVICE, Each Section

Heater Voltage†	6.3 Volts
Plate-Supply Voltage	150 Volts
Plate Load Resistor	20,000 Ohms
Grid Resistor	0.1 Megohms
Cathode Resistor	2700 Ohms
Cathode Capacitor	40 Microfarads
Voltage Gain	12.5

* Without external shield.

† Pin 9 connected to negative B supply.

CLASS A RESISTANCE-COUPLED AMPLIFIER

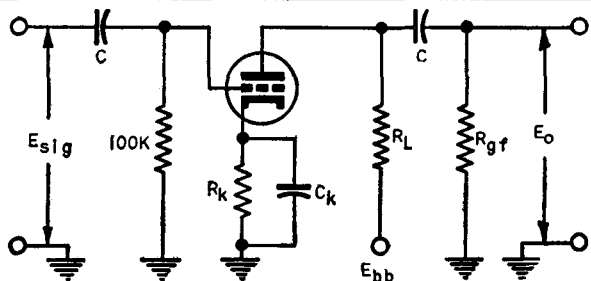
EACH SECTION

LOW IMPEDANCE DRIVE (APPROXIMATELY 200 OHMS)										
R _L	R _{gf}	E _{bb} = 90 Volts			E _{bb} = 180 Volts			E _{bb} = 300 Volts		
		R _k	E _o	Gain	R _k	E _o	Gain	R _k	E _o	Gain
0.10	0.10	1900	6.9	22	1300	18	25	1000	34	27
0.10	0.24	2100	9.6	25	1500	24	28	1300	45	29
0.24	0.24	4200	8.2	26	2700	20	28	2200	36	30
0.24	0.51	4800	11	27	3100	25	28	2700	45	31
0.51	0.51	8800	8.6	26	6000	20	29	4700	36	30
0.51	1.0	10000	11	27	7200	25	29	6000	45	31

HIGH IMPEDANCE DRIVE (APPROXIMATELY 100K OHMS)										
R _L	R _{gf}	E _{bb} = 90 Volts			E _{bb} = 180 Volts			E _{bb} = 300 Volts		
		R _k	E _o	Gain	R _k	E _o	Gain	R _k	E _o	Gain
0.10	0.10	2600	8.8	21	1600	20	24	1300	36	26
0.10	0.24	3000	12	23	1900	27	27	1600	48	28
0.24	0.24	5500	11	24	3500	24	27	2800	41	29
0.24	0.51	6200	13	25	4100	29	28	3400	51	30
0.51	0.51	11000	11	25	6800	25	28	5500	49	30
0.51	1.0	12000	14	26	8100	31	29	6700	54	30

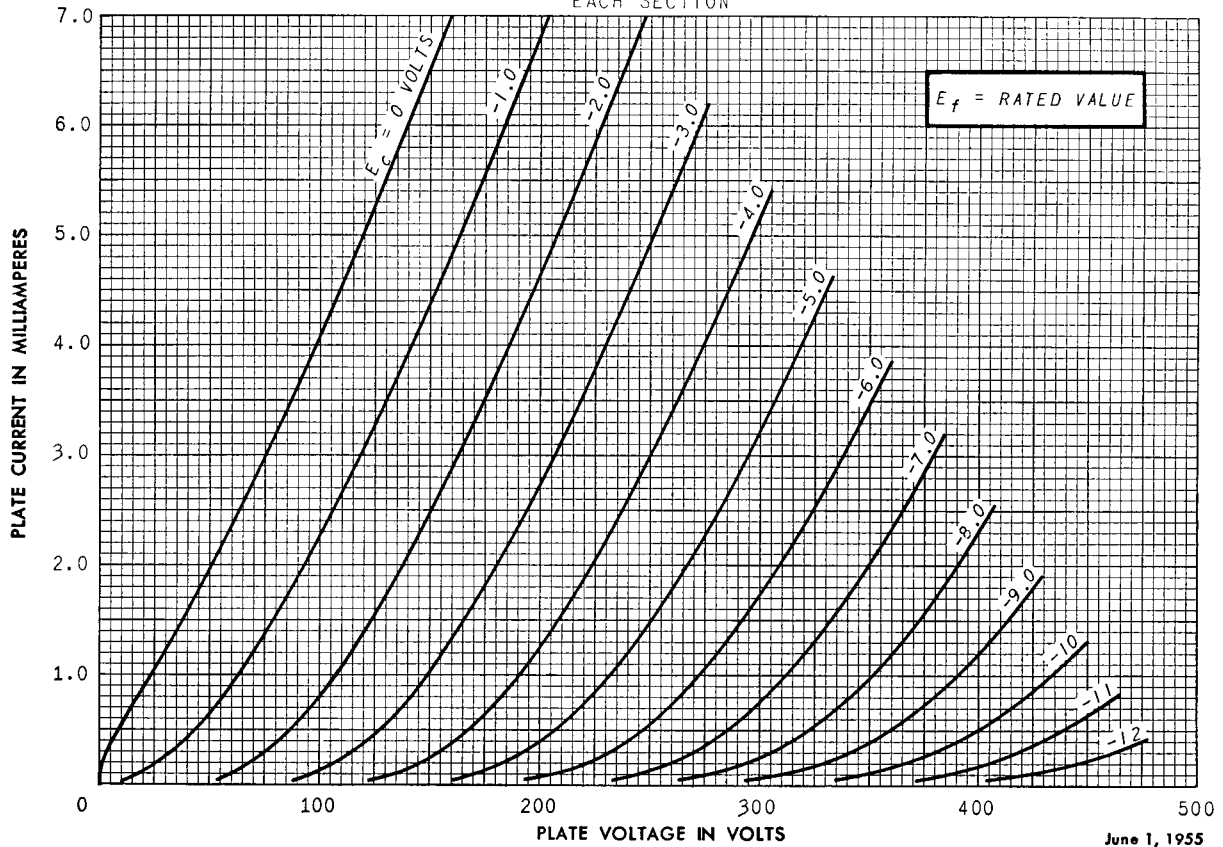
Notes:

1. E_o is maximum RMS voltage output for approximately five percent total harmonic distortion.
2. Gain is measured for an output voltage of two volts RMS.
3. R_k is in ohms; R_L and R_{gf} are in megohms.
4. Coupling capacitors (C) should be selected to give desired frequency response. R_k should be adequately by-passed.



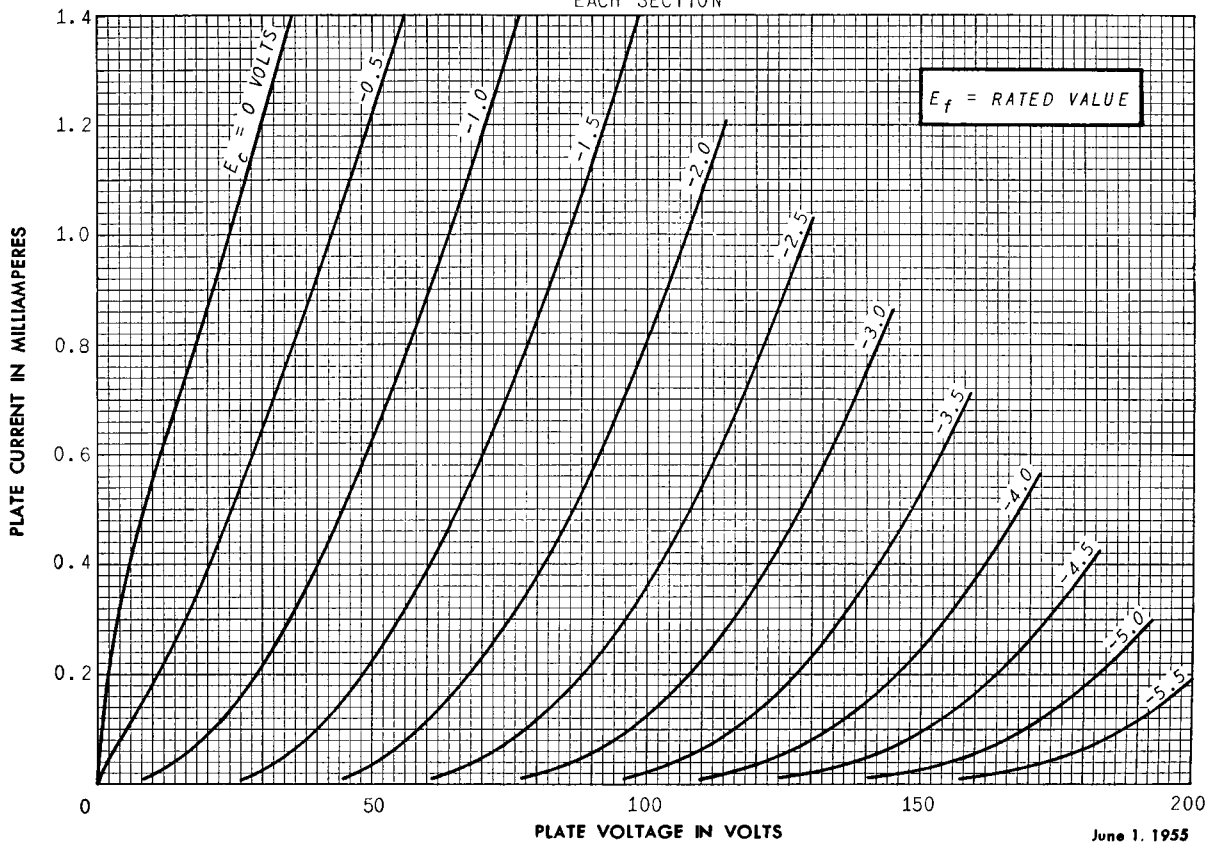
AVERAGE PLATE CHARACTERISTICS

EACH SECTION



AVERAGE PLATE CHARACTERISTICS

EACH SECTION



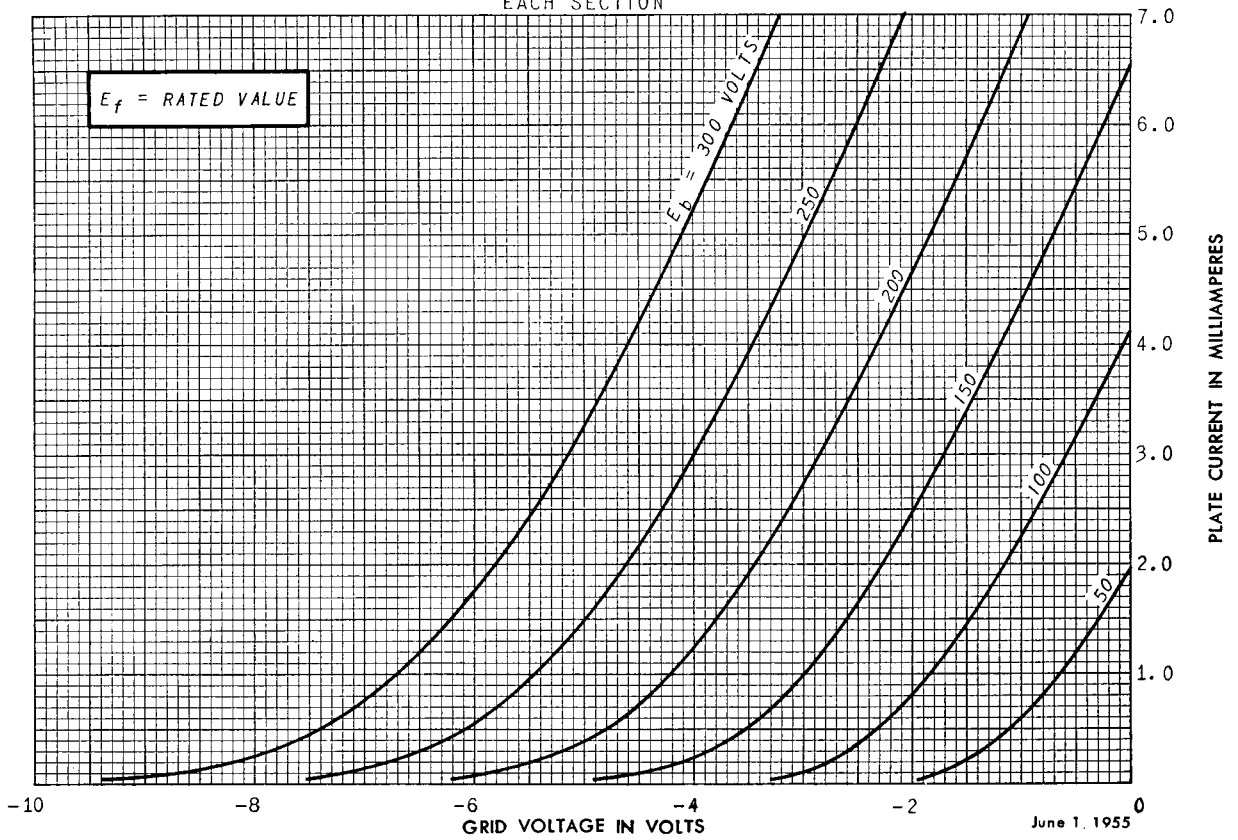
AVERAGE TRANSFER CHARACTERISTICS

EACH SECTION

12AY7

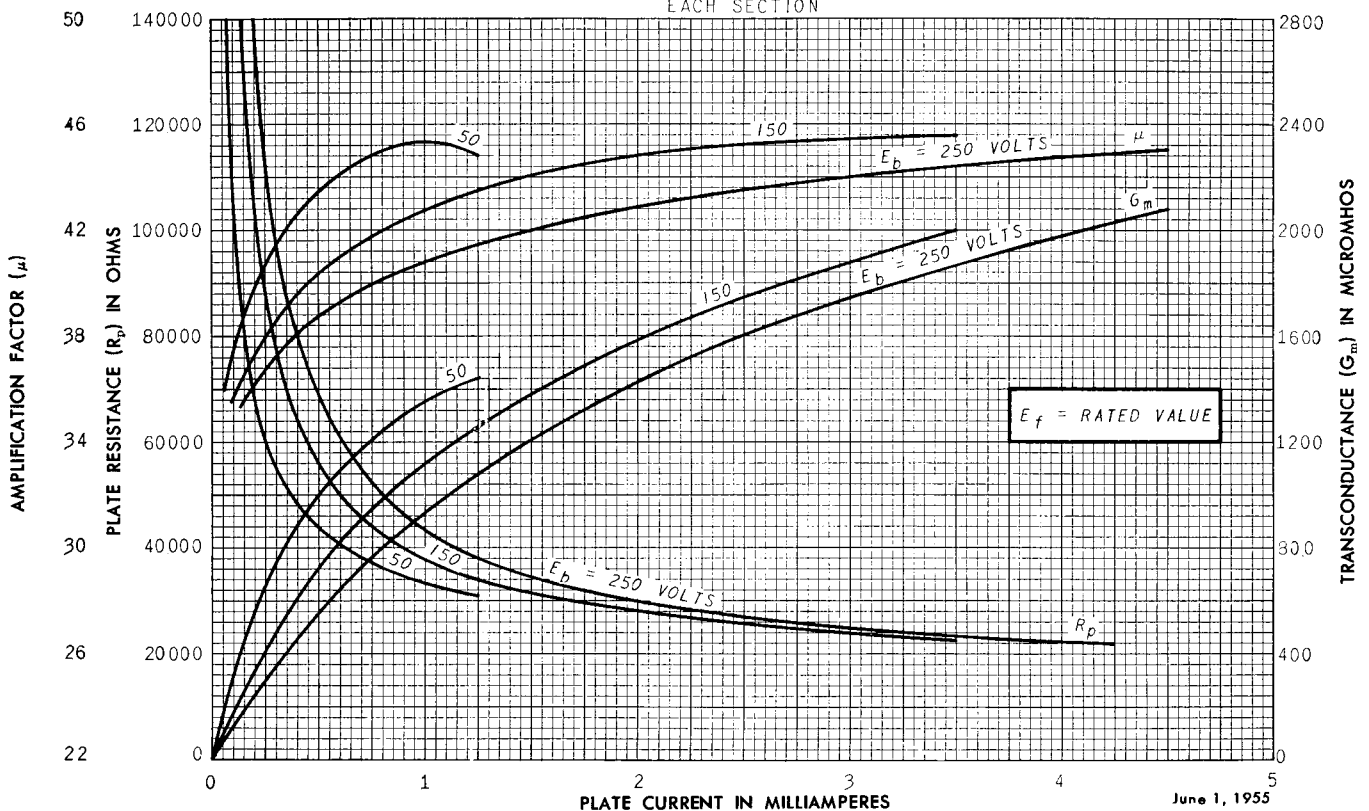
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AVERAGE CHARACTERISTICS

EACH SECTION



RECEIVING TUBE DEPARTMENT

GENERAL ELECTRIC



June 1, 1955