Electronic TUBES

# 12AX7

## TWIN TRIODE

## DESCRIPTION AND RATING

The 12AX7 is a miniature high-mu twin triode each section of which has an individual cathode connection. The 12AX7 is especially suited for use in resistance-coupled voltage amplifiers, phase inverters, multivibrators, and numerous industrial-control circuits where high voltage gain is desired. A center-tapped heater permits operation of the tube from either a 6.3-volt or a 12.6-volt heater supply.

### GENERAL

Cathode—Coated Unipotential

| | Series | Parallel |
|---|---|---|
| Heater Voltage, AC or DC | 12.6 | 6.3 Volts |
| Heater Current | 0.15 | 0.3 Amperes |

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

Direct Interelectrode Capacitances

| | With Shield* | Without Shield |
|---|---|---|
| Grid to Plate, Each Section | 1.7 | 1.7 μμf |
| Input, Each Section | 1.8 | 1.6 μμf |
| Output, Section 1 | 1.9 | 0.46 μμf |
| Output, Section 2 | 1.9 | 0.34 μμf |

### MAXIMUM RATINGS

**DESIGN-CENTER VALUES, EACH SECTION**

| | |
|---|---|
| Plate Voltage | 300 Volts |
| Positive DC Grid Voltage | 0 Volts |
| Negative DC Grid Voltage | 50 Volts |
| Plate Dissipation | 1.0 Watts |
| Heater-Cathode Voltage | |
| Heater Positive with Respect to Cathode | 180 Volts |
| Heater Negative with Respect to Cathode | 180 Volts |

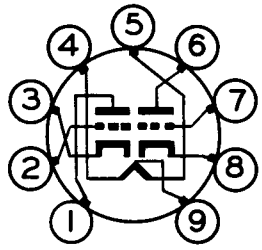
### CHARACTERISTICS AND TYPICAL OPERATION

**CLASS $A_1$ AMPLIFIER, EACH SECTION**

| | | | |
|---|---|---|---|
| Plate Voltage | 100 | 250 | Volts |
| Grid Voltage | −1 | −2 | Volts |
| Amplification Factor | 100 | 100 | |
| Plate Resistance, approximate | 80000 | 62500 | Ohms |
| Transconductance | 1250 | 1600 | Micromhos |
| Plate Current | 0.5 | 1.2 | Milliamperes |

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

**BASING DIAGRAM**

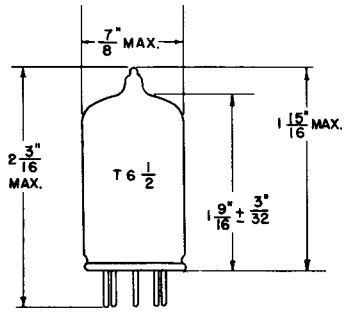



RETMA 9A
*BOTTOM VIEW*

**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

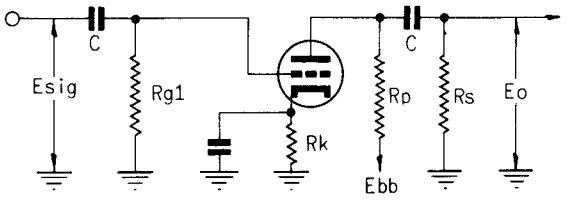
GENERAL ELECTRIC

*Supersedes ET-T509A dated 2-51*

# 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 | 0.1 | 1700 | 31 | 5.0 | 1000 | 40 | 15 | 760 | 43 | 30 |
| 0.10 | 0.24 | 0.1 | 2000 | 38 | 6.9 | 1100 | 46 | 20 | 900 | 50 | 40 |
| 0.24 | 0.24 | 0.1 | 3500 | 43 | 6.5 | 2000 | 54 | 18 | 1600 | 58 | 37 |
| 0.24 | 0.51 | 0.1 | 3900 | 49 | 8.6 | 2300 | 59 | 24 | 1800 | 64 | 47 |
| 0.51 | 0.51 | 0.1 | 7100 | 50 | 7.4 | 4300 | 62 | 19 | 3100 | 66 | 39 |
| 0.51 | 1.0 | 0.1 | 7800 | 53 | 9.1 | 4800 | 64 | 24 | 3600 | 69 | 46 |
| 0.24 | 0.24 | 10 | 0 | 37 | 3.9 | 0 | 53 | 15 | 0 | 62 | 32 |
| 0.24 | 0.51 | 10 | 0 | 44 | 5.4 | 0 | 60 | 19 | 0 | 67 | 41 |
| 0.51 | 0.51 | 10 | 0 | 44 | 5.0 | 0 | 61 | 17 | 0 | 69 | 35 |
| 0.51 | 1.0 | 10 | 0 | 49 | 6.4 | 0 | 66 | 21 | 0 | 71 | 41 |

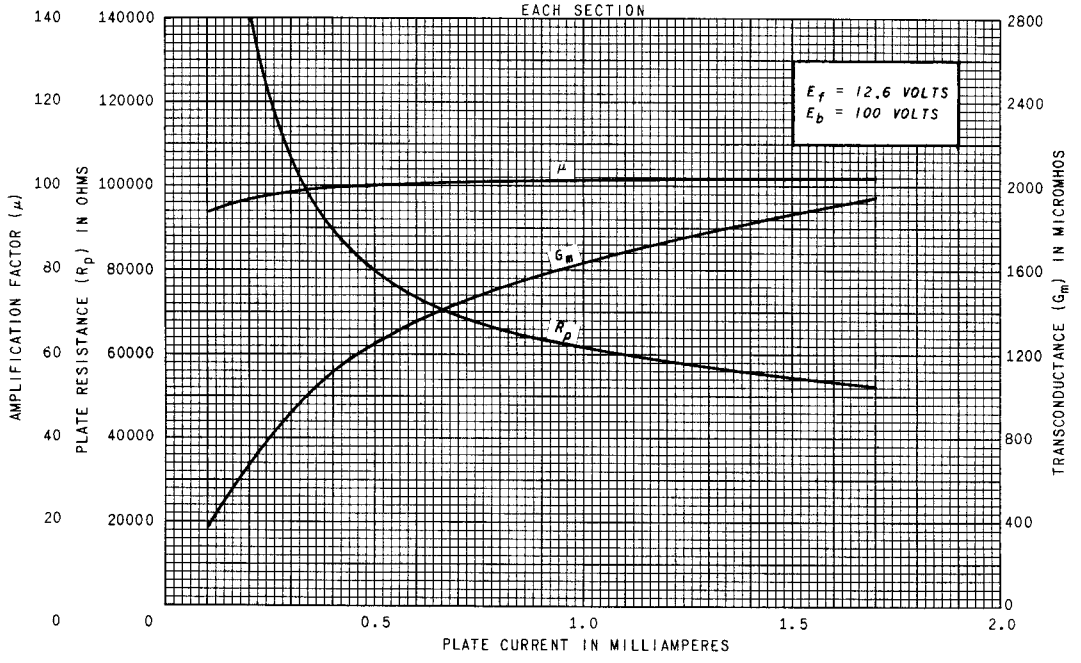



Note: Coupling capacitors (C) should be selected to give desired frequency response. Rk should be adequately by-passed.

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.

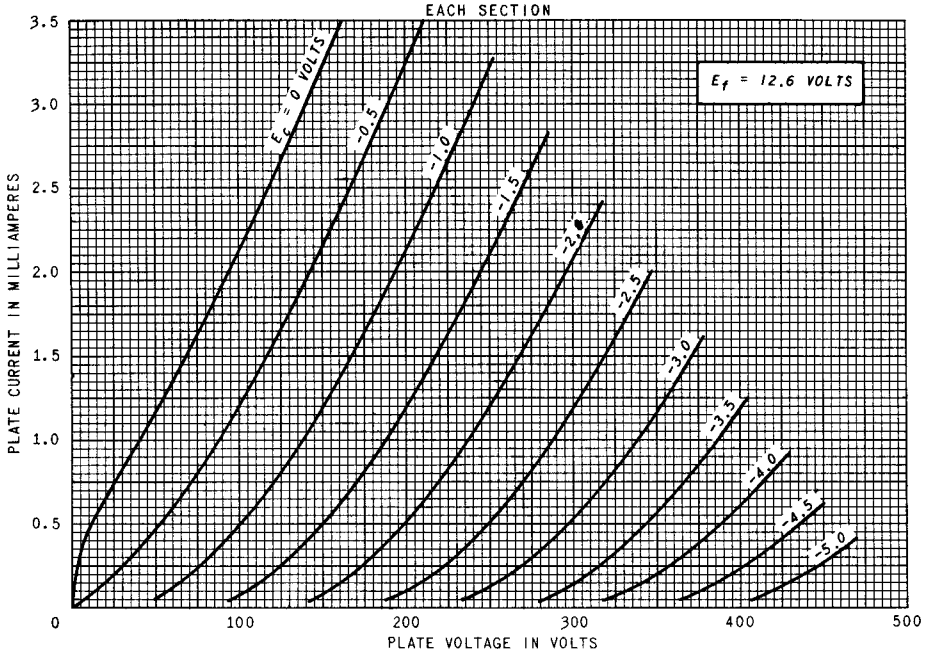
## AVERAGE CHARACTERISTICS

EACH SECTION



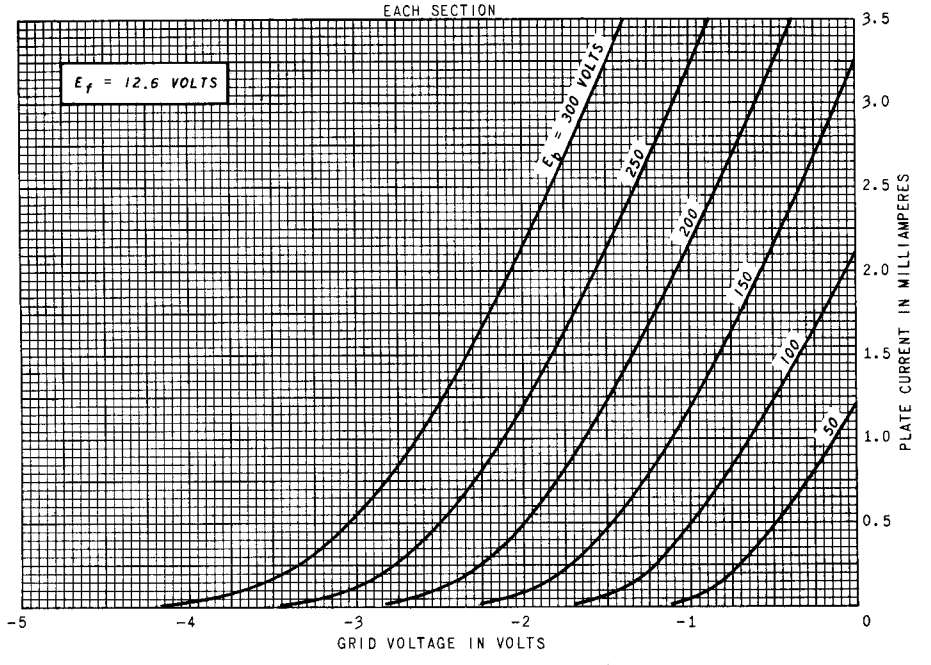
## AVERAGE PLATE CHARACTERISTICS

EACH SECTION




## AVERAGE TRANSFER CHARACTERISTICS

EACH SECTION



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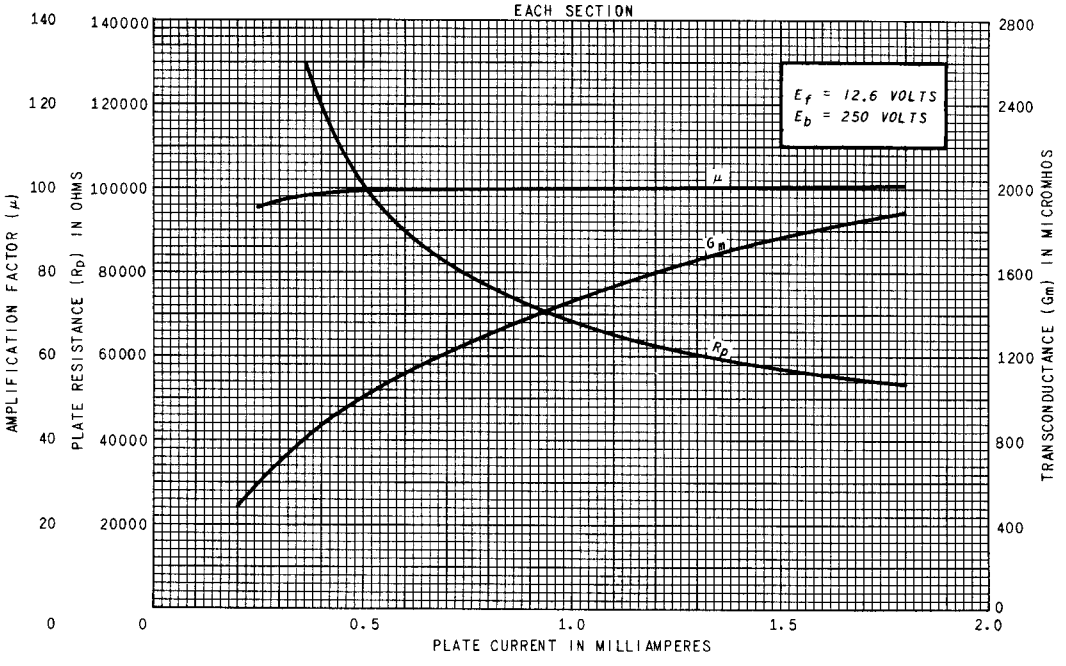
EACH SECTION

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