

## TRIODE-PENTODE

### DESCRIPTION AND RATING

The 10C8 is a miniature triode-pentode designed for use in compact, 300-milliamper, series-string television receivers. The pentode section may be used as a general-purpose amplifier or as a triode-connected vertical-deflection amplifier. The high- $\mu$  triode section is suitable for use as a vertical oscillator, AF voltage amplifier, or as a sync separator, clipper, or amplifier.

The 10C8 has a controlled heater warm-up characteristic as required for use in television receivers that employ series-connected heaters. Other features of the tube include relatively small size, low power requirements, and high performance capabilities at the low d-c supply voltages normally available in these applications.

### GENERAL

#### ELECTRICAL

Cathode—Coated Unipotential

|                               |                       |
|-------------------------------|-----------------------|
| Heater Voltage, AC or DC..... | 10.5 Volts            |
| Heater Current.....           | $0.3 \pm 6\%$ Amperes |
| Heater Warm-up Time*.....     | 11 Seconds            |

Direct Interelectrode Capacitances†

#### Pentode Section

|                                      |              |
|--------------------------------------|--------------|
| Grid-Number 1 to Plate, maximum..... | 0.04 $\mu$ f |
| Input.....                           | 7.0 $\mu$ f  |
| Output.....                          | 2.2 $\mu$ f  |

#### Triode Section

|                    |              |
|--------------------|--------------|
| Grid to Plate..... | 1.6 $\mu$ f  |
| Input.....         | 2.4 $\mu$ f  |
| Output.....        | 0.20 $\mu$ f |

|                                                     |               |
|-----------------------------------------------------|---------------|
| Pentode Grid-Number 1 to Triode Plate, maximum..... | 0.008 $\mu$ f |
| Triode Grid to Pentode Plate, maximum.....          | 0.006 $\mu$ f |
| Pentode Plate to Triode Plate, maximum.....         | 0.06 $\mu$ f  |

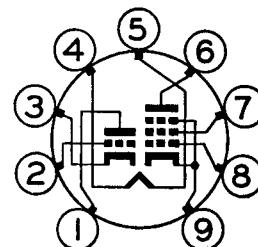
#### MECHANICAL

Mounting Position—Any

Envelope—T-6 1/2, Glass

Base—E9-1, Small Button 9-Pin

### BASING DIAGRAM

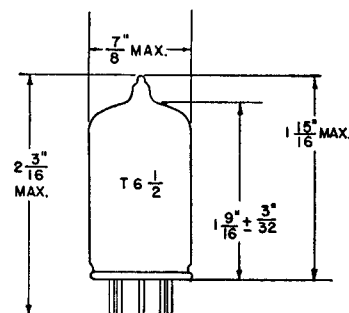


RETMA 9DA

### TERMINAL CONNECTIONS

- Pin 1—Triode Plate
- Pin 2—Triode Grid
- Pin 3—Triode Cathode
- Pin 4—Heater
- Pin 5—Heater
- Pin 6—Pentode Plate
- Pin 7—Pentode Grid Number 2 (Screen)
- Pin 8—Pentode Grid Number 1
- Pin 9—Pentode Cathode, Grid Number 3, and Internal Shield

### PHYSICAL DIMENSIONS



RETMA 6-2

## MAXIMUM RATINGS

|                                                                            | Pentode<br>Section                                                                           | Triode<br>Section                                         |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>CLASS A<sub>1</sub> AMPLIFIER SERVICE—DESIGN-MAXIMUM VALUES</b>         |                                                                                              |                                                           |
| Plate Voltage . . . . .                                                    | 300                                                                                          | 300 Volts                                                 |
| Screen-Supply Voltage . . . . .                                            | 300                                                                                          | . . . . Volts                                             |
| Screen Voltage—See Screen Rating Chart                                     |                                                                                              |                                                           |
| Positive DC Grid-Number 1 Voltage . . . . .                                | 0                                                                                            | 0 Volts                                                   |
| Plate Dissipation . . . . .                                                | 2.2                                                                                          | 2.0 Watts                                                 |
| Screen Dissipation . . . . .                                               | 0.55                                                                                         | . . . . Watts                                             |
| <b>Heater-Cathode Voltage</b>                                              |                                                                                              |                                                           |
| 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                                                 |
| <b>Grid-Number 1 Circuit Resistance</b>                                    |                                                                                              |                                                           |
| With Fixed Bias . . . . .                                                  | 0.25                                                                                         | 0.5 Megohms                                               |
| With Cathode Bias . . . . .                                                | 1.0                                                                                          | 1.0 Megohms                                               |
| <b>VERTICAL OSCILLATOR AND AMPLIFIER SERVICE<br/>DESIGN-MAXIMUM VALUES</b> |                                                                                              |                                                           |
|                                                                            | Vertical-<br>deflection<br>Amplifier†<br>(Pentode<br>Section-<br>triode<br>Con-<br>nection§) | Vertical<br>Oscillator<br>Service‡<br>(Triode<br>Section) |
| DC Plate Voltage . . . . .                                                 | 300                                                                                          | 300 Volts                                                 |
| Peak Positive Pulse Plate Voltage . . . . .                                | 1000                                                                                         | . . . . Volts                                             |
| Peak Negative Grid Voltage . . . . .                                       | 250                                                                                          | 400 Volts                                                 |
| Plate Dissipation . . . . .                                                | 2.5‡                                                                                         | 1.0 Watts                                                 |
| DC Cathode Current . . . . .                                               | 18                                                                                           | 12 Milliamperes                                           |
| Peak Cathode Current . . . . .                                             | 55                                                                                           | 35 Milliamperes                                           |
| <b>Heater-Cathode Voltage</b>                                              |                                                                                              |                                                           |
| 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                                                 |
| <b>Grid Circuit Resistance</b>                                             |                                                                                              |                                                           |
| With Fixed Bias . . . . .                                                  | . . .                                                                                        | 2.2 Megohms                                               |
| With Cathode Bias . . . . .                                                | 2.2                                                                                          | 2.2 Megohms                                               |
| With Grid-Leak Bias . . . . .                                              | 2.2                                                                                          | 2.2 Megohms                                               |

Design-Maximum Ratings are the limiting values expressed with respect to bogie tubes at which satisfactory tube life can be expected to occur for the types of service for which the tube is rated. Therefore, the equipment designer must establish the circuit design so that initially and throughout equipment life no design-maximum value is exceeded with a bogie tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, and environmental conditions.

## CHARACTERISTICS AND TYPICAL OPERATION

### AVERAGE CHARACTERISTICS

|                                     | Pentode<br>Section<br>(Triode-<br>Connection§) | Pentode<br>Section | Triode<br>Section |
|-------------------------------------|------------------------------------------------|--------------------|-------------------|
| Plate Voltage .....                 | 135                                            | 135                | 250 Volts         |
| Screen Voltage .....                |                                                | 135                | ... Volts         |
| Grid-Number 1 Voltage .....         | 0†                                             | ...                | ... Volts         |
| Cathode-Bias Resistor .....         |                                                | 100                | 390 Ohms          |
| Amplification Factor .....          |                                                | ...                | 53                |
| Plate Resistance, approximate ..... |                                                | 190000             | 12000 Ohms        |
| Transconductance .....              |                                                | 8000               | 4400 Micromhos    |
| Plate Current .....                 | 33                                             | 11.5               | 7.3 Milliamperes  |
| Screen Current .....                |                                                | 3.2                | ... Milliamperes  |
| Grid-Number 1 Voltage, approximate  |                                                |                    |                   |
| Ib = 10 Microamperes .....          |                                                | ...                | -10 Volts         |
| Ib = 50 Microamperes .....          |                                                | -6                 | ... Volts         |
| Triode Amplification Factor§ .....  |                                                | 40                 | ...               |

\* 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.

† Without external shield.

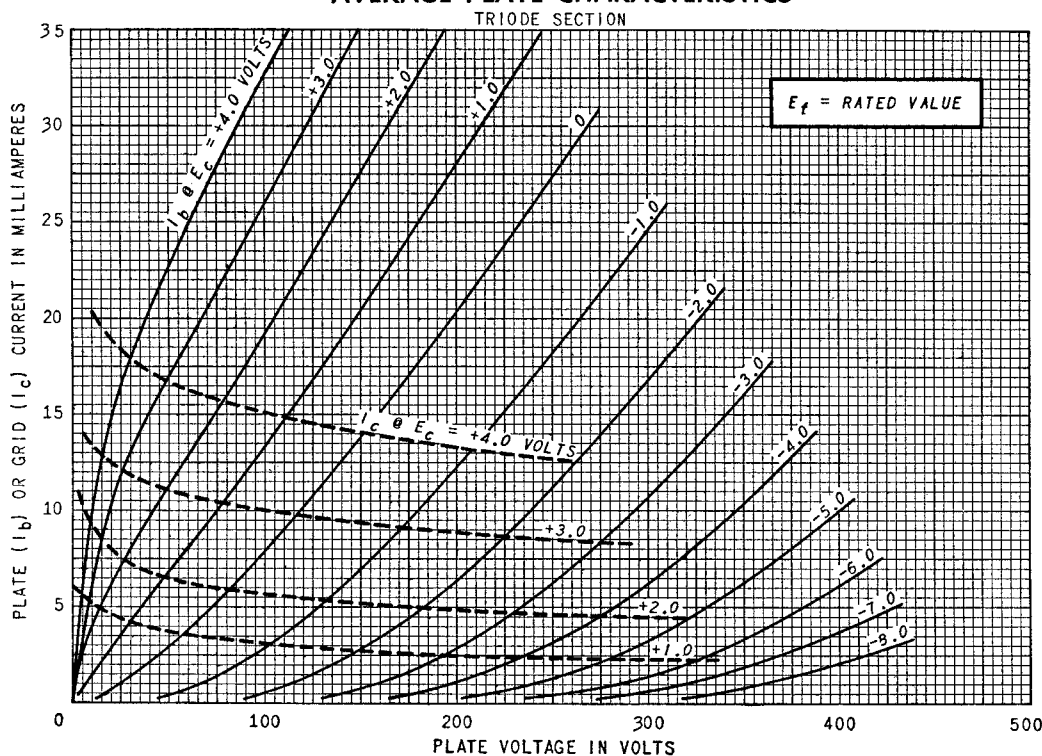
‡ For operation in a 525-line, 30-frame television system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15 percent of one scanning cycle.

§ With screen connected to plate.

♦ 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.

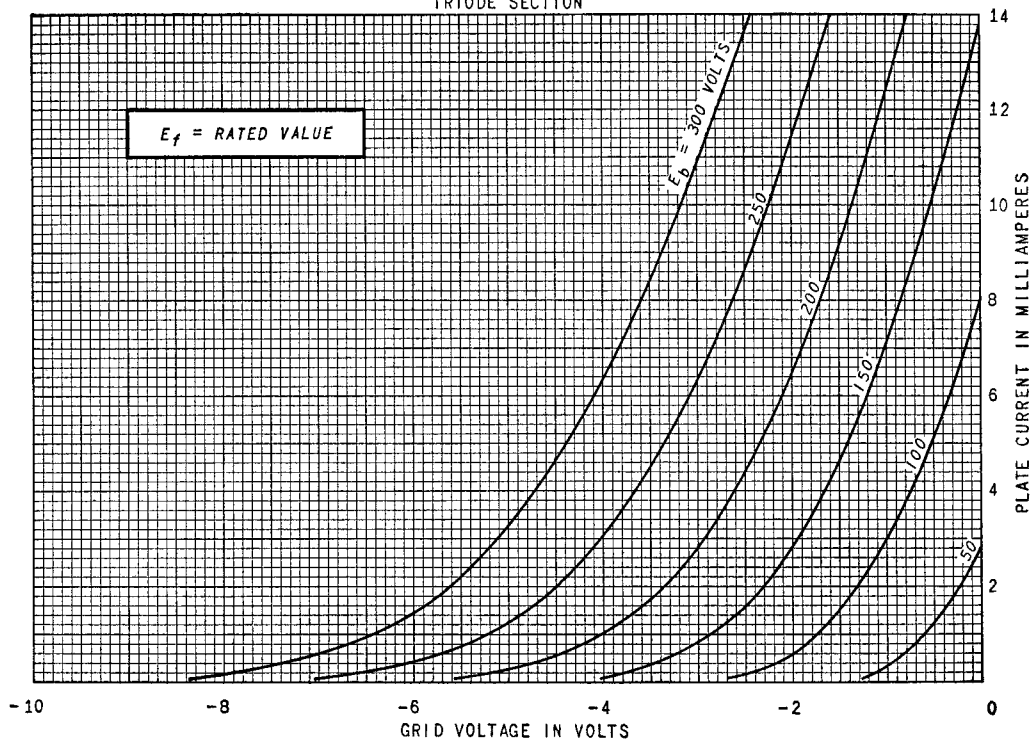
¶ Applied for short interval (two seconds maximum) so as not to damage tube.

### AVERAGE PLATE CHARACTERISTICS



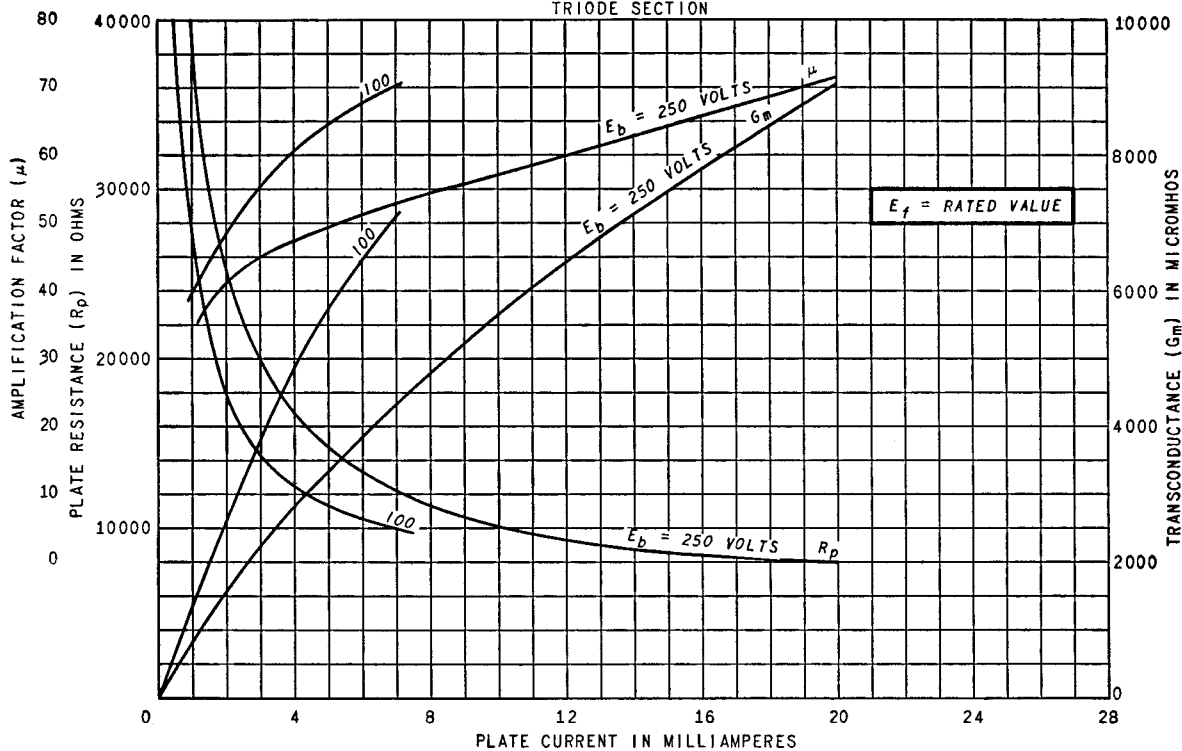
# AVERAGE TRANSFER CHARACTERISTICS

TRIODE SECTION

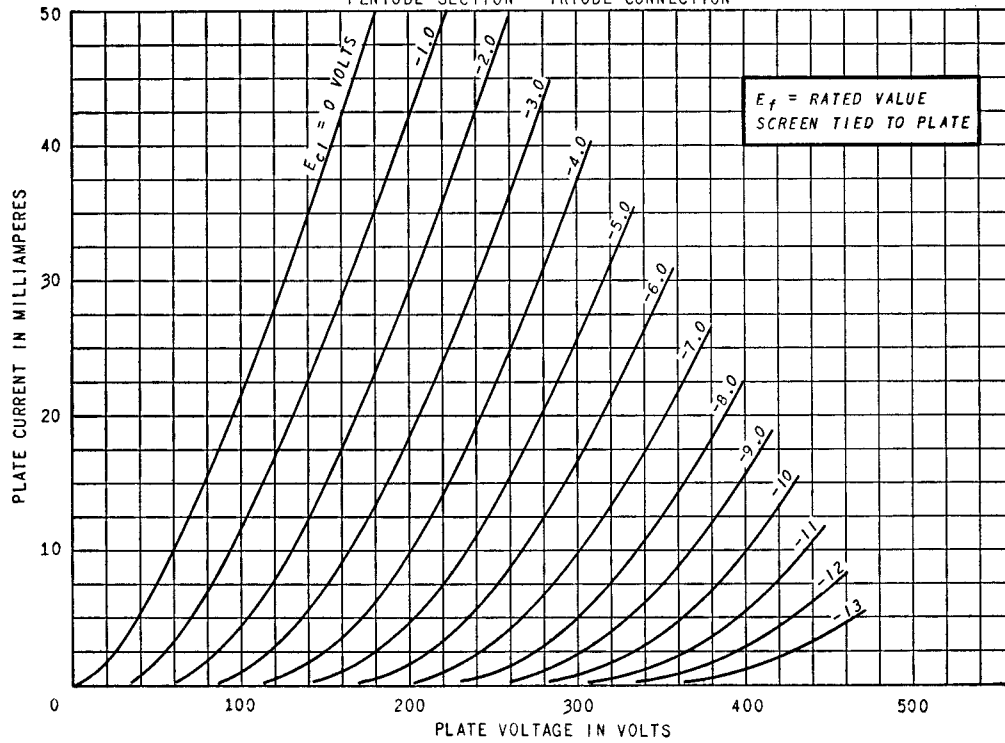


# AVERAGE CHARACTERISTICS

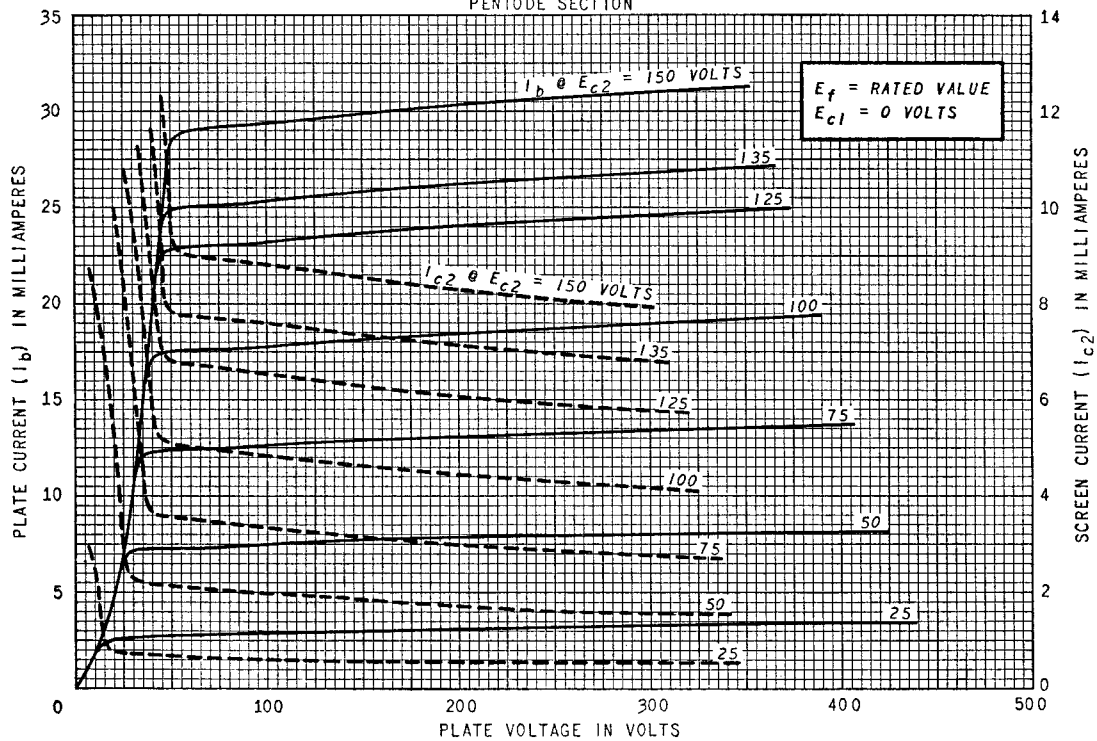
TRIODE SECTION



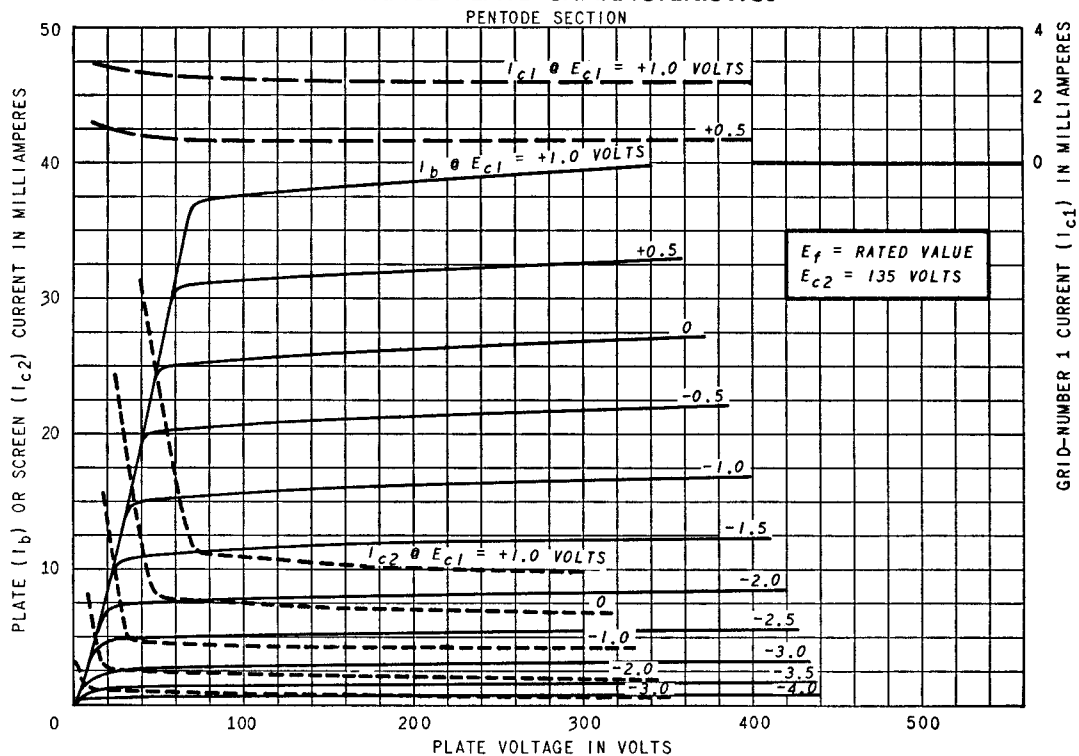
**AVERAGE PLATE CHARACTERISTICS**  
 PENTODE SECTION - TRIODE CONNECTION



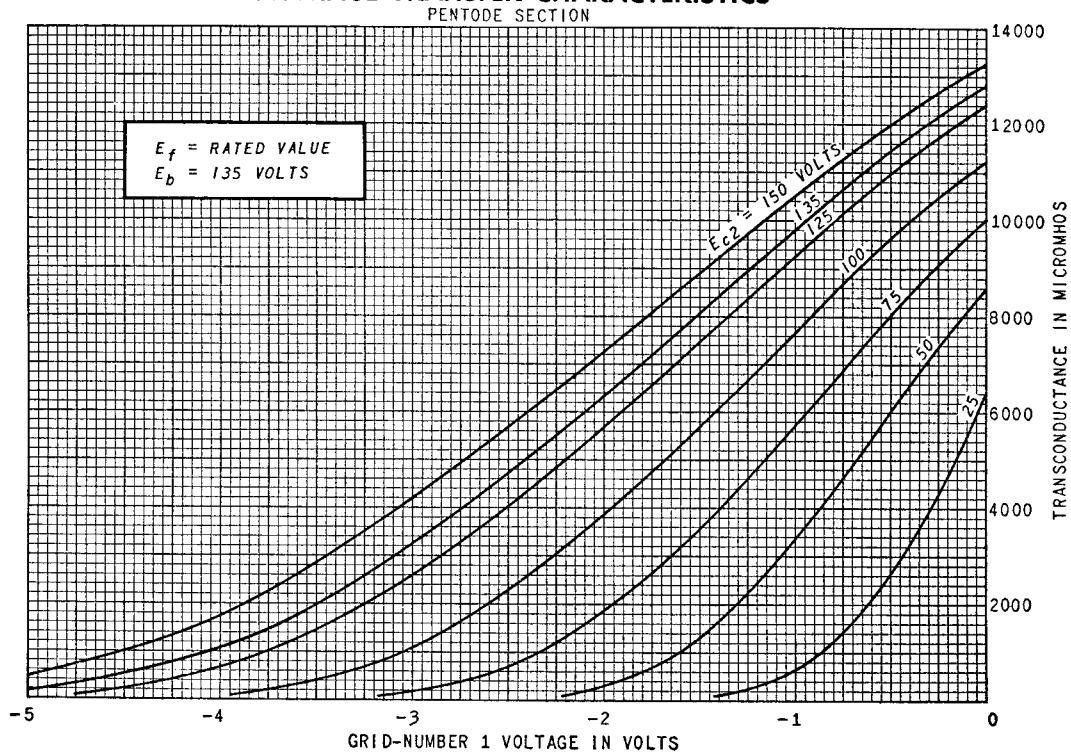
**AVERAGE PLATE CHARACTERISTICS**  
 PENTODE SECTION



## AVERAGE PLATE CHARACTERISTICS

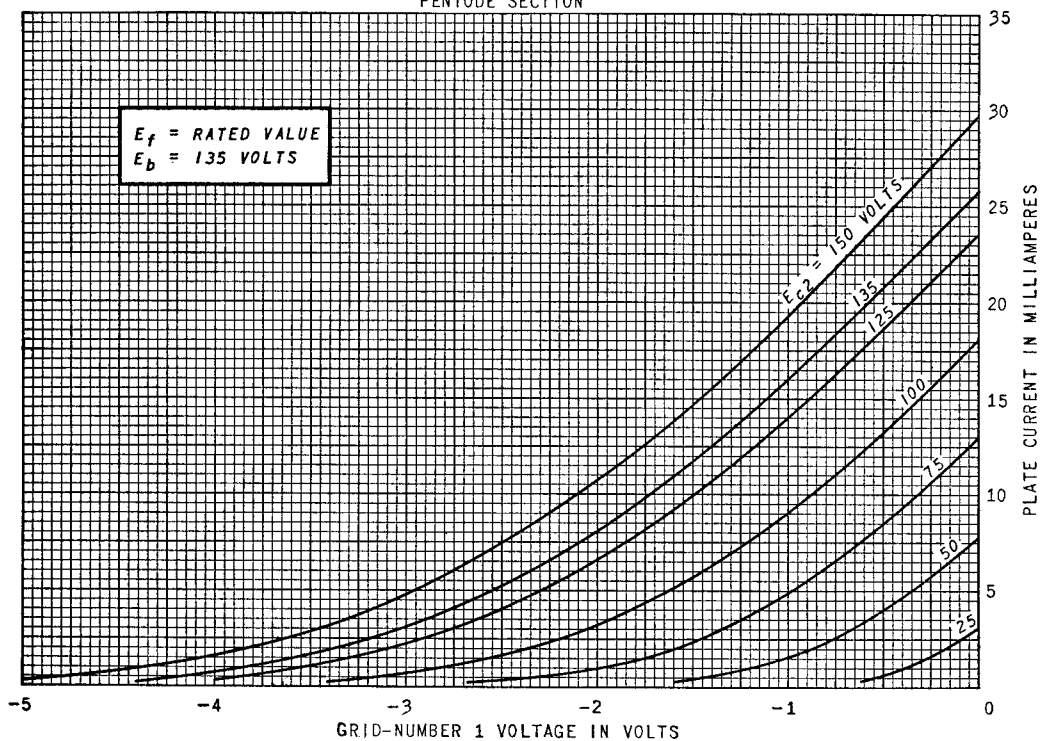


## AVERAGE TRANSFER CHARACTERISTICS



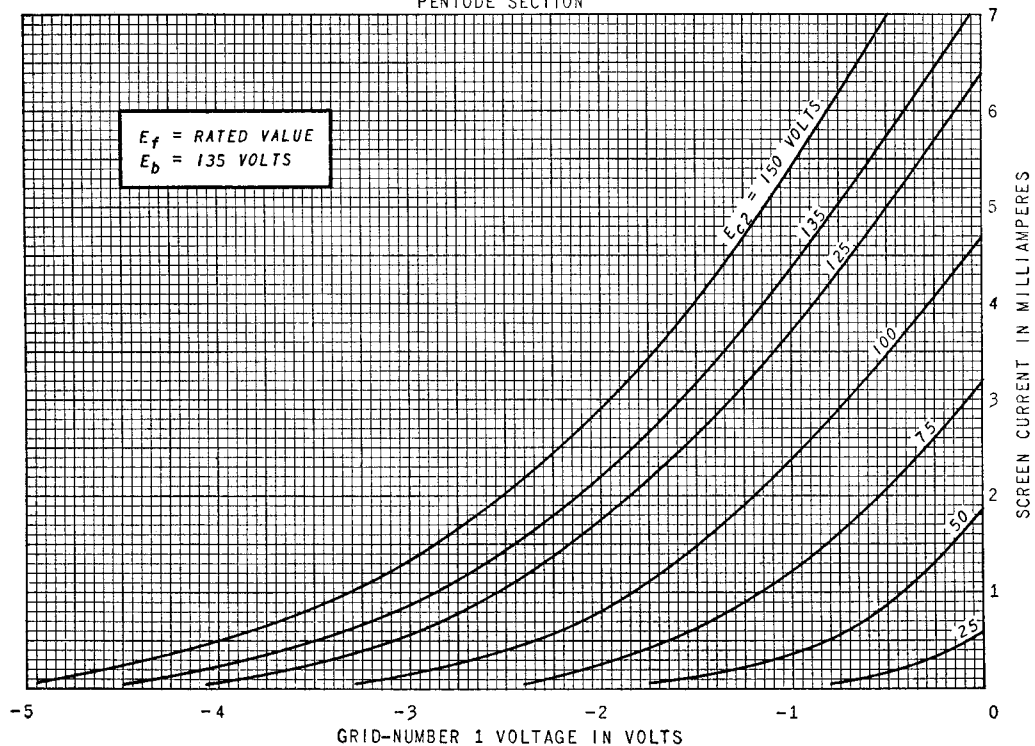
# **AVERAGE TRANSFER CHARACTERISTICS**

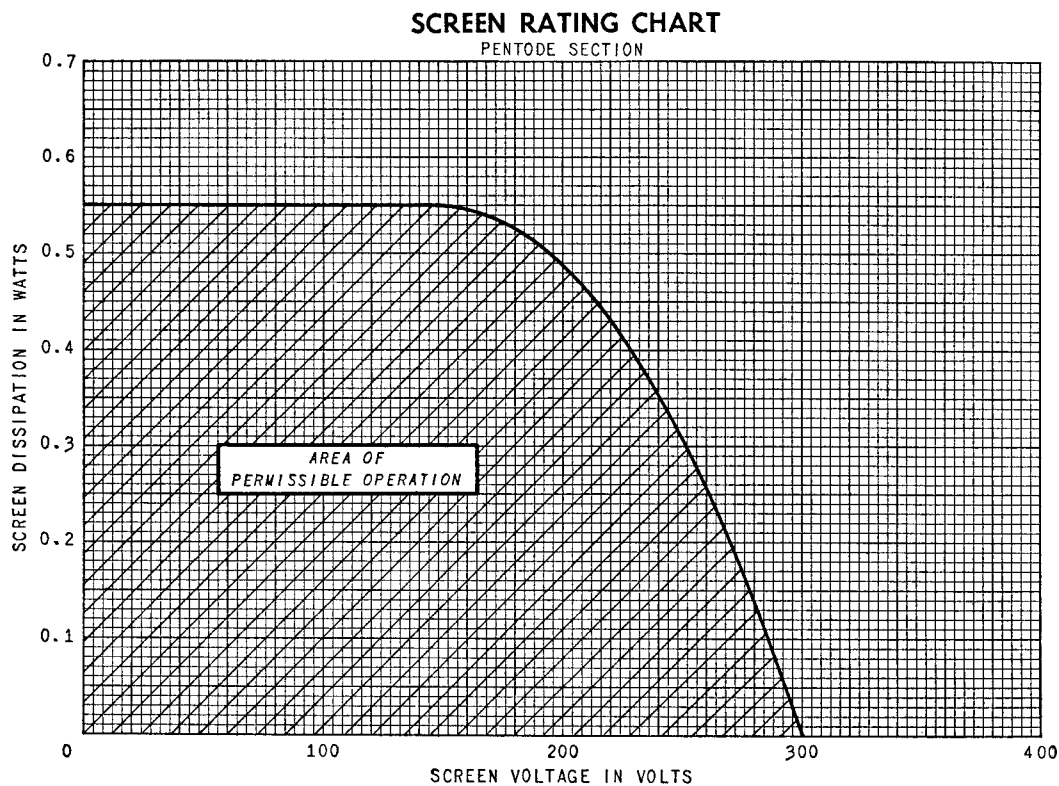
PENTODE SECTION



# **AVERAGE TRANSFER CHARACTERISTICS**

PENTODE SECTION





TUBE DEPARTMENT  
**GENERAL**  **ELECTRIC**  
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