

## Grid Voltage (Approx.):

|                                  |      |   |     |       |
|----------------------------------|------|---|-----|-------|
| For plate current of 20 $\mu$ A  | —5.3 | — | —   | volts |
| For plate current of 200 $\mu$ A | —    | — | —45 | volts |

\* This value can be measured by a method involving a recurrent waveform such that the maximum ratings of the tube will not be exceeded.

## Vertical-Deflection Oscillator and Amplifier

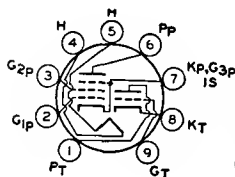
For operation in a 525-line, 30-frame system

| MAXIMUM RATINGS (Design-Maximum Values) | Unit No.1<br>Oscillator | Unit No.2<br>Amplifier |       |
|-----------------------------------------|-------------------------|------------------------|-------|
| DC Plate Voltage                        | 350                     | 550                    | volts |
| Peak Positive-Pulse Plate Voltage#      | —                       | 1500                   | volts |
| Peak Negative-Pulse Grid Voltage        | 400                     | 250                    | volts |
| Peak Cathode Current                    | —                       | 175                    | mA    |
| Average Cathode Current                 | —                       | 50                     | mA    |
| Plate Dissipation                       | 1                       | 10                     | watts |

## MAXIMUM CIRCUIT VALUES

|                                  |     |     |         |
|----------------------------------|-----|-----|---------|
| Grid-Circuit Resistance:         |     |     |         |
| For grid-resistor-bias operation | 1   | 1   | megohm  |
| For cathode-bias operation       | 2.2 | 2.2 | megohms |

# Pulse duration must not exceed 15% of a vertical scanning cycle (2.5 milliseconds).



## 9AE

MEDIUM-MU TRIODE—  
SHARP-CUTOFF PENTODE

## 6EA8

5EA8, 9EA8, 19EA8

Miniature type used as combined oscillator and mixer in color and black-and-white television receivers utilizing an intermediate frequency in the order of 40 MHz. Outlines section, 6B; requires miniature 9-contact socket. Types 5EA8, 9EA8, and 19EA8 are identical with type 6EA8 except for heater ratings.

|                               | 5EA8     | 6EA8     | 9EA8     | 19EA8    |         |
|-------------------------------|----------|----------|----------|----------|---------|
| Heater Voltage (ac/dc)        | 4.7      | 6.3      | 9.5      | 18.9     | volts   |
| Heater Current                | 0.6      | 0.45     | 0.15     | 0.15     | ampere  |
| Heater Warm-up Time (Average) | 11       | 11       | 11       | 11       | seconds |
| Heater-Cathode Voltage:       |          |          |          |          |         |
| Peak value                    | ±200 max | ±200 max | ±200 max | ±200 max | volts   |
| Average value                 | 100 max  | 100 max  | 100 max  | 100 max  | volts   |

## Unshielded Shielded

## Direct Interelectrode Capacitances:

## Triode Unit:

|                                                                                      |     |     |    |
|--------------------------------------------------------------------------------------|-----|-----|----|
| Grid to Plate                                                                        | 1.7 | 1.7 | pF |
| Grid to Cathode, Heater, Pentode Cathode,<br>Pentode Grid No.3, and Internal Shield  | 3   | 3.2 | pF |
| Plate to Cathode, Heater, Pentode Cathode,<br>Pentode Grid No.3, and Internal Shield | 1.4 | 1.9 | pF |
| Cathode to Heater                                                                    | 3   | 3*  | pF |

## Pentode Unit:

|                                                                            |          |          |    |
|----------------------------------------------------------------------------|----------|----------|----|
| Grid No.1 to Plate                                                         | 0.02 max | 0.01 max | pF |
| Grid No.1 to Cathode, Heater, Grid No.2,<br>Grid No.3, and Internal Shield | 5        | 5        | pF |
| Plate to Cathode, Heater, Grid No.2, Grid No.3,<br>and Internal Shield     | 2.6      | 3.4      | pF |
| Heater to Cathode                                                          | 3        | 3*       | pF |

\* With external shield connected to cathode of unit under test except as noted.

■ With external shield connected to ground.

Class A<sub>1</sub> Amplifier

## MAXIMUM RATINGS (Design-Maximum Values)

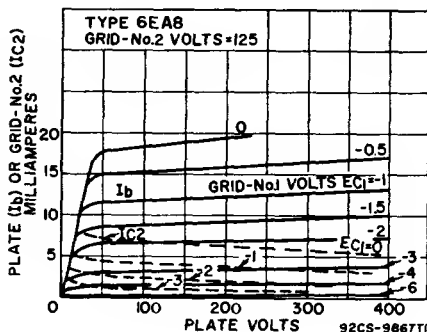
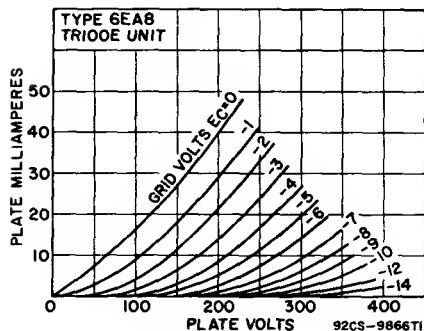
|                                                       | Triode Unit | Pentode Unit      |       |
|-------------------------------------------------------|-------------|-------------------|-------|
| Plate Voltage                                         | 330         | 330               | volts |
| Grid-No.2 (Screen-Grid) Supply Voltage                | —           | 330               | volts |
| Grid-No.2 Voltage                                     | —           | See curve page 98 |       |
| Grid-No.1 (Control-Grid) Voltage, Positive-bias value | 0           | 0                 | volts |
| Plate Dissipation                                     | 2.5         | 3.1               | watts |
| Grid-No.2 Input:                                      |             |                   |       |
| For grid-No.2 voltages up to 165 volts                | —           | 0.55              | watt  |
| For grid-No.2 voltages between 165 and 330 volts      | —           | See curve page 98 |       |

## CHARACTERISTICS

|                      |     |     |       |
|----------------------|-----|-----|-------|
| Plate Supply Voltage | 150 | 125 | volts |
| Grid-No.2 Voltage    | —   | 125 | volts |
| Grid-No.1 Voltage    | —   | —1  | volt  |

|                                                         |  |
|---------------------------------------------------------|--|
| Cathode-Bias Resistor .....                             |  |
| Amplification Factor .....                              |  |
| Plate Resistance (Approx.) .....                        |  |
| Transconductance .....                                  |  |
| Plate Current .....                                     |  |
| Grid-No.2 Current .....                                 |  |
| Grid-No.1 Voltage for plate current of 10 $\mu$ A ..... |  |

| Triode Unit | Pentode Unit |       |
|-------------|--------------|-------|
| 56          | —            | ohms  |
| 40          | —            | ohms  |
| 5000        | 200000       | ohms  |
| 8500        | 6400         | ohms  |
| 18          | 12           | mA    |
| —           | 4            | mA    |
| —12         | —9           | volts |

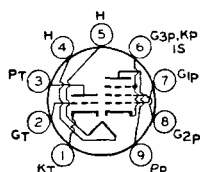


## 6EB8

8EB8

### HIGH-MU TRIODE— SHARP-CUTOFF PENTODE

Miniature type used in color and black-and-white television receiver applications. Pentode unit is used as video output amplifier; triode unit is used in sync-separator, sync-clipper, and phase-inverter circuits. Outlines section, 6E; requires miniature 9-contact socket. Type 8EB8 is identical with type 6EB8 except for heater ratings.



|                                     |               |               |         |
|-------------------------------------|---------------|---------------|---------|
| Heater Voltage (ac/dc) .....        | 6.3           | 8             | volts   |
| Heater Current .....                | 0.75          | 0.6           | ampere  |
| Heater Warm-up Time (Average) ..... | —             | 11            | seconds |
| Heater-Cathode Voltage:             |               |               |         |
| Peak value .....                    | $\pm 200$ max | $\pm 200$ max | volts   |
| Average value .....                 | 100 max       | 100 max       | volts   |

#### Direct Interelectrode Capacitances:

|                                                                               |  |           |    |
|-------------------------------------------------------------------------------|--|-----------|----|
| Triode Unit:                                                                  |  |           |    |
| Grid to Plate .....                                                           |  | 4.4       | pF |
| Grid to Cathode and Heater .....                                              |  | 2.4       | pF |
| Plate to Cathode and Heater .....                                             |  | 0.36      | pF |
| Pentode Unit:                                                                 |  |           |    |
| Grid No.1 to Plate .....                                                      |  | 0.1 max   | pF |
| Grid No.1 to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield ..... |  | 11        | pF |
| Plate to Cathode, Heater, Grid No.2, Grid No.3, and Internal Shield .....     |  | 4.2       | pF |
| Triode Grid to Pentode Plate .....                                            |  | 0.018 max | pF |
| Pentode Grid No.1 to Triode Plate .....                                       |  | 0.005 max | pF |
| Pentode Plate to Triode Plate .....                                           |  | 0.17 max  | pF |

### Class A<sub>1</sub> Amplifier

#### MAXIMUM RATINGS (Design-Maximum Values)

|                                                             | Triode Unit | Pentode Unit      |       |
|-------------------------------------------------------------|-------------|-------------------|-------|
| Plate Voltage .....                                         | 330         | 330               | volts |
| Grid-No.2 (Screen-Grid) Supply Voltage .....                | —           | 330               | volts |
| Grid-No.2 Voltage .....                                     | —           | See curve page 98 |       |
| Grid-No.1 (Control-Grid) Voltage, Positive-bias value ..... | 0           | 0                 | volts |
| Plate Dissipation .....                                     | 1           | 5                 | watts |
| Grid-No.2 Input:                                            |             |                   |       |
| For grid-No.2 voltages up to 165 volts .....                | —           | 1.1               | watts |
| For grid-No.2 voltages between 165 and 330 volts .....      | —           | See curve page 98 |       |

#### CHARACTERISTICS

|                                |     |     |       |
|--------------------------------|-----|-----|-------|
| Plate Supply Voltage .....     | 250 | 200 | volts |
| Grid-No.2 Supply Voltage ..... | —   | 125 | volts |
| Grid Voltage .....             | —2  | —   | volts |