

**CHARACTERISTICS**

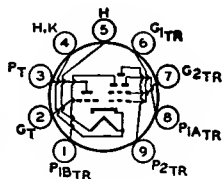
|                                                         |      |            |
|---------------------------------------------------------|------|------------|
| Plate Voltage                                           | 135  | volts      |
| Grid Voltage                                            | —1   | volts      |
| Plate Resistance (Approx.)                              | 5600 | ohms       |
| Transconductance                                        | 9000 | $\mu$ mhos |
| Amplification Factor                                    | 50   |            |
| Plate Current                                           | 11   | mA         |
| Grid Voltage (Approx.) for plate current of 100 $\mu$ A | —5.5 | volts      |

**MAXIMUM CIRCUIT VALUE**

|                                                     |   |        |
|-----------------------------------------------------|---|--------|
| Grid-Circuit Resistance, for cathode-bias operation | 1 | megohm |
|-----------------------------------------------------|---|--------|

**6FH8****MEDIUM-MU TRIODE—  
THREE-PLATE TETRODE**

Miniature type used in complex-wave generator applications and in television receiver applications. Sharp-cutoff tetrode unit has pair of additional plates. Outlines section, 6B; requires 9-contact socket.

**9KP**

|                        |      |        |
|------------------------|------|--------|
| Heater Voltage (ac/dc) | 6.3  | volts  |
| Heater Current         | 0.45 | ampere |

**Direct Interelectrode Capacitances:\***

|                                                                        |           |    |
|------------------------------------------------------------------------|-----------|----|
| <b>Triode Unit:</b>                                                    |           |    |
| Grid to Plate                                                          | 1.4       | pF |
| Grid to Cathode and Heater                                             | 2.6       | pF |
| Plate to Cathode and Heater                                            | 1         | pF |
| <b>Tetrode Unit:</b>                                                   |           |    |
| Grid No.1 to Plate No.2                                                | 0.06 max  | pF |
| Grid No.1 to Cathode, Heater, Grid No.2, Plate No.1A, and Plate No.1B  | 4.5       | pF |
| Plate No.2 to Cathode, Heater, Grid No.2, Plate No.1A, and Plate No.1B | 1.4       | pF |
| Tetrode Grid No.1 to Triode Plate                                      | 0.35 max  | pF |
| Tetrode Plate No.2 to Triode Plate                                     | 0.008 max | pF |

\* With external shield connected to cathode.

**Class A<sub>1</sub> Amplifier****Triode Unit**

|                                                         |      |            |
|---------------------------------------------------------|------|------------|
| <b>CHARACTERISTICS</b>                                  |      |            |
| Plate Voltage                                           | 100  | volts      |
| Grid Voltage                                            | —1   | volt       |
| Amplification Factor                                    | 40   |            |
| Plate Resistance (Approx.)                              | 7400 | ohms       |
| Transconductance                                        | 5400 | $\mu$ mhos |
| Plate Current                                           | 7.9  | mA         |
| Grid Voltage (Approx.) for plate current of 100 $\mu$ A | —7   | volts      |

**Tetrode Unit with Plates No.1A and No.1B Connected to Cathode at Socket**

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

|                                                                   |      |            |
|-------------------------------------------------------------------|------|------------|
| Plate-No.2 Voltage                                                | 250  | volts      |
| Grid-No.2 Voltage                                                 | 250  | volts      |
| Grid-No.1 Voltage                                                 | —2   | volts      |
| Plate-No.2 Resistance (Approx.)                                   | 0.75 | megohm     |
| Transconductance, Grid No.1 to Plate No.2                         | 4400 | $\mu$ mhos |
| Plate-No.2 Current                                                | 7.3  | mA         |
| Grid-No.2 Current                                                 | 1.4  | mA         |
| Grid-No.1 Voltage (Approx.) for plate-No.2 current of 100 $\mu$ A | —7   | volts      |

**Complex-Wave Generator****MAXIMUM RATINGS (Design-Maximum Values)**

|                                          | Triode Unit | Tetrode Unit       |       |
|------------------------------------------|-------------|--------------------|-------|
| Plate Voltage                            | 275         | —                  | volts |
| Plate-No.1A Voltage                      | —           | 200                | volts |
| Plate-No.1B Voltage                      | —           | 200                | volts |
| Plate-No.2 Voltage                       | —           | 275                | volts |
| Grid-No.2 (Screen-Grid) Supply Voltage   | —           | 275                | volts |
| Grid-No.2 Voltage                        | —           | See curve page 300 |       |
| <b>Grid-No.1 (Control-Grid) Voltage:</b> |             |                    |       |
| Negative-bias value                      | —40         | —40                | volts |
| Positive-bias value                      | 0           | 0                  | volts |
| Plate Dissipation                        | 1.7         | —                  | watts |
| Plate-No.1A Dissipation                  | —           | 0.3                | watt  |
| Plate-No.1B Dissipation                  | —           | 0.3                | watt  |
| Plate-No.2 Dissipation                   | —           | 2.3                | watts |

**Grid-No.2 Input:**

For grid-No.2 voltages up to 137.5 volts .....  
For grid-No.2 voltages between 137.5 and 275 volts .....

— 0.45 watt  
— See curve page 300

**TYPICAL OPERATION WITH SEPARATE PLATE OPERATION**

|                                             | Tetrode Unit |            |
|---------------------------------------------|--------------|------------|
| Plates-No.1A, No.1B, and No.2 Voltage ..... | 100          | volts      |
| Grid-No.2 Voltage .....                     | 50           | volts      |
| Grid-No.1 Voltage .....                     | —1           | volts      |
| Plate-No.1A Current .....                   | 0.04         | mA         |
| Plate-No.1B Current .....                   | 0.04         | mA         |
| Plate-No.2 Current .....                    | 1.6          | mA         |
| Grid-No.2 Current .....                     | 0.3          | mA         |
| Transconductance (Approx.):                 |              |            |
| Grid No.1 to Plate No.1A .....              | 70           | $\mu$ mhos |
| Grid No.1 to Plate No.1B .....              | 70           | $\mu$ mhos |
| Grid No.1 to Plate No.2 .....               | 2500         | $\mu$ mhos |

**MAXIMUM CIRCUIT VALUES**

|                                                              | Triode Unit | Tetrode Unit |
|--------------------------------------------------------------|-------------|--------------|
| Grid-No.1-Circuit Resistance, for fixed-bias operation ..... | 0.5         | 0.5 megohm   |

Refer to chart at end of section.

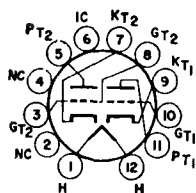
**6FJ7**

**6FM7**

13FM7/15FM7

**DUAL TRIODE**

Duodecar type used as combined vertical-deflection oscillator and vertical-deflection amplifier in color and black-and-white television receivers. Triode unit No.1 is used as an oscillator, and triode unit No.2 is used as an amplifier. Outlines section, 8C; requires duodecar 12-contact socket. Type 13FM7/15FM7 is identical with type 6FM7 except for heater ratings.



**12EJ**

|                                     | 6FM7          | 13FM7/15FM7   |         |
|-------------------------------------|---------------|---------------|---------|
| Heater Voltage (ac/dc) .....        | 6.3           | 13            | volts   |
| Heater Current .....                | 1.05          | 0.45          | amperes |
| Heater Warm-up Time (Average) ..... | —             | 11            | seconds |
| Heater-Cathode Voltage:             |               |               |         |
| Average value .....                 | $\pm 200$ max | $\pm 200$ max | volts   |
| Peak value .....                    | 100 max       | 100 max       | volts   |

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

**CHARACTERISTICS**

|                                                            | Unit No.1 | Unit No.2 |            |
|------------------------------------------------------------|-----------|-----------|------------|
| Plate Voltage .....                                        | 250       | 175       | volts      |
| Grid Voltage .....                                         | —3        | —25       | volts      |
| Amplification Factor .....                                 | 66        | 5.5       |            |
| Plate Resistance (Approx.) .....                           | 30000     | 920       | ohms       |
| Transconductance .....                                     | 2200      | 6000      | $\mu$ mhos |
| Plate Current .....                                        | 2         | 40        | mA         |
| Grid Voltage (Approx.) for plate current of 20 $\mu$ A ..  | —5.3      | —         | volts      |
| Grid Voltage (Approx.) for plate current of 200 $\mu$ A .. | —         | —45       | volts      |

**Vertical-Deflection Oscillator and Amplifier**

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

|                                          | Unit No.1<br>Oscillator | Unit No.2<br>Amplifier |       |
|------------------------------------------|-------------------------|------------------------|-------|
| MAXIMUM RATINGS (Design-Maximum Values)  |                         |                        |       |
| DC Plate Voltage .....                   | 350                     | 500                    | volts |
| Peak Positive-Pulse Plate Voltage# ..... | —                       | 1500                   | volts |
| Peak Negative-Pulse Plate 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 fixed-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).

† A bias resistor or other means is required to protect the tube in absence of excitation.