

## POWER TRIODE

Compact liquid-and-forced-air-cooled type having heater-cathode used as af power amplifier and modulator, as rf power amplifier and oscillator, and as frequency multiplier. Coaxial

# 6383

terminal arrangement facilitates use in cathode-drive circuits of the coaxial-cylinder type. This type is also useful in applications where transmitter design factors of compactness, light weight, and high power output are prime considerations. May be used with full input up to 2000 Mc. Class C Telephony maximum CCS plate dissipation, 600 watts.

### HEATER VOLTAGE (AC/DC):°

|                                     |      |         |
|-------------------------------------|------|---------|
| Average .....                       | 6.3* | volts   |
| Maximum .....                       | 6.9  | volts   |
| HEATER CURRENT (At 6.3 volts) ..... | 3.4  | amperes |
| AMPLIFICATION FACTOR .....          | 27   |         |

### DIRECT INTERELECTRODE CAPACITANCES:

|                                                |      |     |
|------------------------------------------------|------|-----|
| Grid to plate .....                            | 6    | μμf |
| Grid to cathode and heater .....               | 11   | μμf |
| Plate to cathode and heater <sup>■</sup> ..... | 0.22 | μμf |

° Because the cathode is subjected to considerable back bombardment as the frequency is increased with resultant increase in temperature, the heater voltage should be reduced depending on operating conditions and frequency to prevent overheating of the cathode and resultant short life.

\* Average heater voltage must be applied for a minimum period of one minute before the application of plate voltage.

■ With external flat shield having a maximum diameter of 7½ inches located in plane of grid terminal and perpendicular to axis of tube. Shield is connected to grid terminal.

## AF POWER AMPLIFIER AND MODULATOR—Class A

### Maximum CCS Ratings:

|                         |          |       |
|-------------------------|----------|-------|
| DC PLATE VOLTAGE .....  | 1500 max | volts |
| DC GRID VOLTAGE .....   | -300 max | volts |
| DC PLATE CURRENT .....  | 400 max  | ma    |
| DC GRID CURRENT .....   | 75 max   | ma    |
| PLATE INPUT .....       | 600 max  | watts |
| PLATE DISSIPATION ..... | 600 max  | watts |

### Typical Operation (Class A<sub>1</sub>):

|                            |      |      |       |
|----------------------------|------|------|-------|
| DC Plate Voltage .....     | 1000 | 1500 | volts |
| DC Grid Voltage .....      | -25  | -40  | volts |
| Peak AF Grid Voltage ..... | 20   | 35   | volts |
| DC Plate Current .....     | 200  | 250  | ma    |
| Load Resistance .....      | 1350 | 1550 | ohms  |
| Power Output † .....       | 20   | 60   | watts |

† Values are based on maximum power output disregarding distortion.

## PLATE-MODULATED RF POWER AMPLIFIER—Class C Telephony

*Carrier conditions per tube for use with a maximum modulation factor of 1.0*

### Maximum CCS Ratings:

|                         |          |       |
|-------------------------|----------|-------|
| DC PLATE VOLTAGE .....  | 1200 max | volts |
| DC GRID VOLTAGE .....   | -300 max | volts |
| DC PLATE CURRENT .....  | 335 max  | ma    |
| DC GRID CURRENT .....   | 75* max  | ma    |
| PLATE INPUT .....       | 400 max  | watts |
| PLATE DISSIPATION ..... | 400 max  | watts |

### Typical Operation in Cathode-Drive Circuit:

|                                       | 600 Mc | 1000 Mc | 1100 Mc | 1500 Mc |       |
|---------------------------------------|--------|---------|---------|---------|-------|
| Heater Voltage .....                  | 5.7    | 4.5     | 4.5     | 4.5     | volts |
| DC Plate-to-Grid Voltage .....        | 1340   | 1315    | 1290    | 1280    | volts |
| DC Cathode-to-Grid Voltage .....      | 140    | 115     | 90      | 80      | volts |
| From cathode resistor of* .....       | 380    | 330     | 260     | 235     | ohms  |
| Peak RF Cathode-to-Grid Voltage ..... | 200    | 175     | 145     | 130     | volts |
| DC Plate Current .....                | 335    | 335     | 335     | 335     | ma    |
| DC Grid Current (Approx.) .....       | 35     | 15      | 12      | 4       | ma    |

## RCA Transmitting Tubes

|                                                  |                  |                  |                  |                  |          |
|--------------------------------------------------|------------------|------------------|------------------|------------------|----------|
| Driver Power Output (Approx.) <sup>Δ</sup> ..... | 70               | 76               | 80               | 53               | watts    |
| Output-Circuit Efficiency (Approx.) .....        | 80               | 60               | 55               | 50               | per cent |
| Useful Power Output (Approx.) .....              | 250 <sup>□</sup> | 190 <sup>□</sup> | 160 <sup>□</sup> | 100 <sup>□</sup> | watts    |

\* For frequencies up to 900 Mc. Above 900 Mc, this value must be reduced. At 2000 Mc, rated grid current is 10 milliamperes.

Δ At frequencies below 600 Mc, it is permissible to use a combination of grid resistor and cathode resistor, but the use of a grid resistor alone is not recommended. At frequencies above 600 Mc where the value of grid current may be small, only cathode bias is recommended.

Δ In this type of service, the 6383 can be modulated 100 per cent if the rf driver stage is also modulated 100 per cent simultaneously. Care should be taken to insure that the driver-modulation and amplifier-modulation voltages are exactly in phase.

□ Measured at load of output circuit having indicated efficiency.

### RF POWER AMPLIFIER AND OSCILLATOR—Class C Telegraphy# and

### RF POWER AMPLIFIER—Class C FM Telephony

#### Maximum CCS Ratings:

|                         |      |     |       |
|-------------------------|------|-----|-------|
| DC PLATE VOLTAGE .....  | 1500 | max | volts |
| DC GRID VOLTAGE .....   | -300 | max | volts |
| DC PLATE CURRENT .....  | 400  | max | ma    |
| DC GRID CURRENT .....   | 75*  | max | ma    |
| PLATE INPUT .....       | 600  | max | watts |
| PLATE DISSIPATION ..... | 600  | max | watts |

#### Typical Operation as Amplifier in Cathode-Drive Circuit:

|                                             | 600 Mc           | 1000 Mc          | 1100 Mc          | 1500 Mc          |          |
|---------------------------------------------|------------------|------------------|------------------|------------------|----------|
| Heater Voltage .....                        | 5.7              | 4.5              | 4.5              | 4.5              | volts    |
| DC Plate-to-Grid Voltage .....              | 1640             | 1615             | 1590             | 1580             | volts    |
| DC Cathode-to-Grid Voltage .....            | 140              | 115              | 90               | 80               | volts    |
| From cathode resistor of <sup>Δ</sup> ..... | 315              | 275              | 220              | 200              | ohms     |
| Peak RF Cathode-to-Grid Voltage .....       | 210              | 185              | 155              | 140              | volts    |
| DC Plate Current .....                      | 400              | 400              | 400              | 400              | ma       |
| DC Grid Current (Approx.) .....             | 25               | 20               | 15               | 5                | ma       |
| Driver Power Output (Approx.) .....         | 90               | 95               | 80               | 85               | watts    |
| Output-Circuit Efficiency (Approx.) .....   | 80               | 60               | 55               | 50               | per cent |
| Useful Power Output (Approx.) .....         | 380 <sup>□</sup> | 285 <sup>□</sup> | 240 <sup>□</sup> | 150 <sup>□</sup> | watts    |

#### Typical Operation as Oscillator in Cathode-Drive Circuit:

|                                             | 600 Mc           | 1000 Mc          | 1100 Mc          | 1500 Mc         |          |
|---------------------------------------------|------------------|------------------|------------------|-----------------|----------|
| Heater Voltage .....                        | 5.7              | 4.5              | 4.5              | 4.5             | volts    |
| DC Plate-to-Grid Voltage .....              | 1640             | 1615             | 1590             | 1580            | volts    |
| DC Cathode-to-Grid Voltage .....            | 140              | 115              | 90               | 80              | volts    |
| From cathode resistor of <sup>Δ</sup> ..... | 315              | 275              | 220              | 200             | ohms     |
| Peak RF Cathode-to-Grid Voltage .....       | 175              | 140              | 120              | 110             | volts    |
| DC Plate Current .....                      | 400              | 400              | 400              | 400             | ma       |
| DC Grid Current (Approx.) .....             | 45               | 20               | 15               | 5               | ma       |
| Output-Circuit Efficiency (Approx.) .....   | 80               | 60               | 55               | 50              | per cent |
| Useful Power Output (Approx.) .....         | 280 <sup>□</sup> | 190 <sup>□</sup> | 150 <sup>□</sup> | 60 <sup>□</sup> | watts    |

# Key-down conditions per tube without amplitude modulation. Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

\* For frequencies up to 900 Mc. Above 900 Mc, this value must be reduced. At 2000 Mc, rated grid current is 10 milliamperes.

Δ At frequencies below 600 Mc, it is permissible to use a combination of grid resistor and cathode resistor, but the use of a grid resistor alone is not recommended. At frequencies above 600 Mc where the value of grid current may be small, only cathode bias is recommended.

□ Measured at load of output circuit having indicated efficiency.

### FREQUENCY MULTIPLIER—Class C

#### Maximum CCS Ratings:

|                         |      |     |       |
|-------------------------|------|-----|-------|
| DC PLATE VOLTAGE .....  | 1500 | max | volts |
| DC GRID VOLTAGE .....   | -300 | max | volts |
| DC PLATE CURRENT .....  | 400  | max | ma    |
| DC GRID CURRENT .....   | 75*  | max | ma    |
| PLATE INPUT .....       | 600  | max | watts |
| PLATE DISSIPATION ..... | 600  | max | watts |

#### Typical Operation as Doubler in Cathode-Drive Circuit:

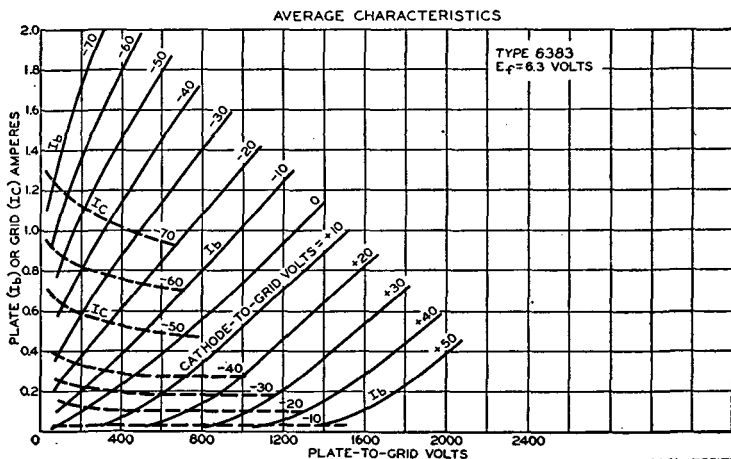
|                                | 600 Mc | 900 Mc |       |
|--------------------------------|--------|--------|-------|
| DC Plate-to-Grid Voltage ..... | 1760   | 1675   | volts |

## RCA Transmitting Tubes

|                                          |     |     |          |
|------------------------------------------|-----|-----|----------|
| DC Cathode-to-Grid Voltage.....          | 260 | 175 | volts    |
| From cathode resistor of.....            | 570 | 415 | ohms     |
| Peak RF Cathode-to-Grid Voltage.....     | 300 | 215 | volts    |
| DC Plate Current.....                    | 400 | 400 | ma       |
| DC Grid Current (Approx.).....           | 55  | 25  | ma       |
| Driver Power Output (Approx.).....       | 195 | 160 | watts    |
| Output-Circuit Efficiency (Approx.)..... | 80  | 60  | per cent |
| Useful Power Output (Approx.).....       | 280 | 225 | watts    |

\* For frequencies up to 900 Mc. Above 900 Mc, this value must be reduced. At 2000 Mc, rated grid current is 10 milliamperes.

\* At frequencies below 600 Mc, it is permissible to use a combination of grid resistor and cathode resistor, but the use of a grid resistor alone is not recommended. At frequencies above 600 Mc, where the value of grid current may be small, only cathode bias is recommended.



### OPERATING CONSIDERATIONS

Type 6383 may be mounted in any position. OUTLINE 72, *Outlines* Section.

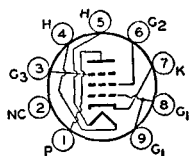
Forced-air cooling of the grid terminal, cathode terminal, and glass envelope is required. The air flow must start with the application of any voltages, and be adequate to limit the temperature of the grid terminal, cathode terminal, and glass envelope to their respective maximum values. Maximum temperatures: grid terminal, 200°C; cathode terminal, 200°C; and glass envelope, 175°C. Heater power, plate power, and air flow may be removed simultaneously.

Liquid cooling of the plate is required. The liquid flow must start before the application of any voltages. Interlocking of the liquid flow with all power supplies is recommended to prevent tube damage in case of failure of adequate liquid flow. Suitable coolants are distilled water and a high-temperature hydraulic fluid such as Monsanto OS45. Maximum plate temperature (measured on side of plate flange opposite the pipes and at junction of flange with tube body), 180°C.

### BEAM POWER TUBE

Nine-pin miniature heater-cathode type used as rf power amplifier and oscillator and as frequency multiplier. May be used with full input up to 50 Mc. Class C Telephony maxi-

imum plate dissipation, CCS 12 watts, ICAS 13.5 watts. Requires Noval nine-contact socket and may be mounted in any position. OUTLINE 9, *Outlines* Section. Heater volts (ac/dc), 12.6  $\pm$  10%; amperes, 0.375. Except for heater ratings, the 6417 is identical with type 5763.



6417