RCA-5718 is a medium-mu subminiature triode of the heater-cathode type designed primarily for use as an rf power amplifier and oscillator in uhf applications where dependable performance under shock and vibration is a major consideration. It is capable of giving a useful power output of nearly one watt at a frequency of 500 megacycles per second. Operation with full input is permissible up to 1000 megacycles per second.

The 5718 features high transconductance, a pure-tungsten heater to give long life under conditions of frequent on-off switching, and a compact design in which a special attention has been given to structural details which provide increased mount strength against shock and vibration. In addition, each tube is manufactured under rigid controls and undergoes rigorous tests to insure long and dependable performance.

Because of its high transconductance, the 5718 is suitable for use in cathode follower, multivibrator, and blocking oscillator circuits. It is also useful as a resistance-coupled amplifier.

The 5718 has been combined with and supersedes the 5897.

GENERAL DATA

Electrical:
Heater, for unipotential Cathode:
  Voltage (AC or DC) ............. 1.5 volts
  Current .................. 0.150 amperes
Direct interelectrode Capacitances:
  With External Shield ......... 0.001 µf
  Without External Shield .... 0.002 µf
  Grid to Plate ............. 1.3 µf
  Input .................. 2.4 µf
  Output .................. 0.7 µf

Mechanical:
  Operating Position ............. Any
  Maximum Bulb Length .......... 1-3/8"
  Length from Button Seal to Bulb Top (Excluding tip) .... 1.075" ± 0.010"
  Diameter .................. 0.383" ± 0.010"
  Leads, Flexible ................ 8
  Length .................. 1-1/2" to 1-3/4"
  Orientation and Diameter: See Dimensional Outline

AMPLIFIER - Class A1

Maximum Ratings, Absolute Values:
  DC PLATE VOLTAGE ......... 165 max. volts
  PLATE DISSIPATION ......... 5.5 max. watts
  PEAK HEATER-CATHODE VOLTAGE:
    Heater negative with respect to cathode .......... 200 max. volts
    Heater positive with respect to cathode .......... 200 max. volts
  BULB TEMPERATURE (At hottest point on bulb surface) .... 250 max. °C

Typical Operation as Resistance-Coupled Amplifier:
See Chart on Page 2

Maximum Circuit Values:
  Grid-Circuit Resistance .................. 1.2 max. megohms
  For fixed-bias operation: Not recommended
  Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

RF AMPLIFIER AND OSCILLATOR - CLASS C

Maximum Ratings, Absolute Values:
  DC PLATE VOLTAGE ......... 165 max. volts
  DC GRID VOLTAGE ............. -55 max. volts
  DC PLATE CURRENT .......... 22 max. ma
  DC GRID CURRENT ............. 5.5 max. ma
  PLATE DISSIPATION .......... 5.5 max. watts
  PEAK HEATER-CATHODE VOLTAGE:
    Heater negative with respect to cathode .......... 200 max. volts
    Heater positive with respect to cathode .......... 200 max. volts
  BULB TEMPERATURE (At hottest point on bulb surface) .... 250 max. °C

Maximum Circuit Values:
  Grid-Circuit Resistance:
    For cathode-bias operation .................. 1.2 max. megohms
    For fixed-bias operation: Not recommended
  Cathode-Bias Resistance - An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Note</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Current</td>
<td>1</td>
<td>0.130</td>
<td>0.162</td>
</tr>
<tr>
<td>Grid-to-Plate Capacitance</td>
<td>2</td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>2</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>2</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>1.3</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Plate Current</td>
<td>1.5</td>
<td>10</td>
<td>100 µamp</td>
</tr>
<tr>
<td>Transconductance</td>
<td>4800</td>
<td>6800 µhos</td>
<td></td>
</tr>
<tr>
<td>Transconductance</td>
<td>5.5</td>
<td>4500 µhos</td>
<td></td>
</tr>
<tr>
<td>Grid Current</td>
<td>1.6</td>
<td>10</td>
<td>0.4 µamp</td>
</tr>
</tbody>
</table>

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5718-11-52
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CHARACTERISTICS RANGE VALUES (Cont'd)

**Heater-Cathode Leakage**

- **Note**
  - heater negative with respect to cathode...
  - heater positive with respect to cathode...

**Leakage Resistance:**

- Between Grid and All Other Electrodes Tied...
- Between Plate and All Other Electrodes Tied...
- Useful Power Output...

- Each tube is stabilized before characteristics testing by continuous operation for at least 48 hours at room temperature and with dissipation values equivalent to life test conditions.

**Note:**

- 1: With 6.3 volts ac or dc on heater.
- 2: Without external shield.
- 3: With dc plate voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.
- 4: With dc plate voltage of 100 volts, and dc grid voltage of -7 volts.
- 5: With 5.5 volts ac or dc on heater.
- 6: With dc plate voltage of 100 volts, cathode resistor of 150 ohms, and grid resistor of 0.5 megohm.
- 7: With -100 volts dc between heater and cathode.
- 8: With -100 volts dc between heater and cathode.
- 9: With grid 100 volts negative with respect to all other electrodes tied together.
- 10: With plate 300 volts negative with respect to all other electrodes tied together.
- 11: In self-excited oscillator with dc plate voltage of 150 volts, grid resistor and feedback optimized to give useful power output at a plate current of 20 ma. and frequency of 500 Mc.

**SPECIAL TESTS**

**Shock Test:**

- Impact Acceleration...
- Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to the specified impact acceleration.

**Fatigue Test:**

- Vibrational Acceleration...
- Tubes are rigidly mounted to the specified maximum vibrational acceleration at 60 cycles per second for 32 hours in each of three positions.

**Uniform Acceleration Test:**

- 1000 max.

**High-Frequency Vibration Test:**

- RMS Output voltage...
- Under the following conditions: A 150-volt plate voltage supply having an impedance not exceeding that of a 40 μf capacitor, plate load resistance of 10000 ohms, cathode bypass capacitor of 1000 μf, and vibrational acceleration of 15 g at 40 cps.

**Heater-Cycling Life Test:**

- Cycles of intermittent operation...
- 2500 min. cycles
- Under the following conditions: With heater voltage of 7.5 volts cycled 1 minute on and 4 minutes off; heater-cathode voltage of 140 volts (rms), and plate and grid voltage = 0 volts.

**Average Life Test Performance:**

- The average life test performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150 ohms; and grid resistor of 1 megohm.

The 500-hour end-point limits for the 5718 with heater voltage of 6.3 volts, plate voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3500 microamperes maximum; heater-cathode leakage current, 20 microamperes maximum; and grid current not to exceed +1.0 microampere maximum or -1.0 microampere maximum.

**OPERATING NOTES**

The maximum ratings in the tabulated data for the 5718 are limiting values above which the serviceability of the 5718 may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by an amount such that the absolute values will never be exceeded under any usual condition of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

The heater supply should be well regulated because life and reliability of the 5718 are adversely affected by departures from the 6.3-volt value. The extent to which life is affected is a function of the amounts of these departures and their durations.

The flexible leads of the 5718 are usually soldered to the circuit elements. Soldering of the connections should be made as far as possible from the glass button. If this precaution is not followed, the heat of the soldering may crack the glass seals of the leads and damage the tube. **OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER**

<table>
<thead>
<tr>
<th>Plate-Supply Voltage</th>
<th>100</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Load Resistor</td>
<td>0.047</td>
<td>0.10</td>
</tr>
<tr>
<td>Grid Resistor (of following stage)</td>
<td>0.10</td>
<td>0.27</td>
</tr>
<tr>
<td>Cathode Resistor</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>Peak Output Voltage</td>
<td>8.2</td>
<td>8.5</td>
</tr>
<tr>
<td>Voltage Gain</td>
<td>16.4</td>
<td>17</td>
</tr>
</tbody>
</table>

**Note:** RMS output voltage is based on 5 per cent total harmonic distortion.

**Note:**

1. Coupling capacitors should be selected to give desired frequency response. Cathode resistor should be adequately bypassed.
Fig. 1 - Average Plate Characteristics of Type 5718.

Fig. 2 - Average Characteristics of Type 5718.
Fig. 3 - Average Characteristics of Type 5718.

FLEXIBLE LEAD CONNECTIONS

LEAD NO. 1: GRID
LEAD NO. 2: NO CONNECTION
LEAD NO. 3: HEATER
LEAD NO. 4: NO CONNECTION
LEAD NO. 5: CATHODE
LEAD NO. 6: HEATER
LEAD NO. 7: NO CONNECTION
LEAD NO. 8: ANODE

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