TUNG-SOL

TRIODE

SUBMINIATURE TYPE

COATED UNIPOTENTIAL CATHODE

HEATER
6.3±5% VOLTS 0.15 AMP.
AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW
SUBMINIATURE BUTTON 8 LEAD BASE
BDK

THE 5718 IS A SUBMINIATURE MEDIUM-MU TRIODE DESIGNED FOR USE AS A HIGH FREQUENCY OSCILLATOR OR AS A GENERAL-PURPOSE AMPLIFIER. A POWER OUTPUT OF APPROXIMATELY 0.9 WATT CAN BE OBTAINED AT A FREQUENCY OF 500 MEGACYCLES

DIRECT INTERELECTRODE CAPACITANCES

<table>
<thead>
<tr>
<th>WITH SHIELD A</th>
<th>WITHOUT SHIELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRID TO PLATE</td>
<td>1.3 µfd</td>
</tr>
<tr>
<td>INPUT</td>
<td>2.4 µfd</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>2.4 µfd</td>
</tr>
</tbody>
</table>

*A WITH EXTERNAL SHIELD OF 0.405 INCH INSIDE DIAMETER CONNECTED TO CATHODE

RATINGS

ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE 6.3±5% VOLTS
MAXIMUM PLATE VOLTAGE 165 VOLTS
MAXIMUM NEGATIVE DC GRID VOLTAGE 55 VOLTS
MAXIMUM PLATE DISSIPATION 0.9 WATTS
MAXIMUM DC PLATE CURRENT 22 MA.
MAXIMUM DC GRID CURRENT 5.5 MA.
MAXIMUM HEATER-CATHODE VOLTAGE:
HEATER POSITIVE WITH RESPECT TO CATHODE 200 VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE 200 VOLTS
MAXIMUM BULB TEMPERATURE AT HOTTEST POINT 220 C

CONTINUED ON FOLLOWING PAGE
## TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS
### CLASS A1 AMPLIFIER

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>6.315%</td>
</tr>
<tr>
<td>Heater Current</td>
<td>0.15 Amp</td>
</tr>
<tr>
<td>Plate Voltage</td>
<td>100 Volts</td>
</tr>
<tr>
<td>Cathode-Bias Resistor</td>
<td>150 Ohms</td>
</tr>
<tr>
<td>Amplification Factor</td>
<td>27</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>4650 Ohms</td>
</tr>
<tr>
<td>Transconductance</td>
<td>5800 $\mu$Hos</td>
</tr>
<tr>
<td>Plate Current</td>
<td>8.5 MA</td>
</tr>
<tr>
<td>Grid Voltage (Approx.)</td>
<td>$-7$ Volts</td>
</tr>
</tbody>
</table>

### UHF OSCILLATOR

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>150 Volts</td>
</tr>
<tr>
<td>Plate Current</td>
<td>20 MA</td>
</tr>
<tr>
<td>Frequency</td>
<td>500 Megacyc.</td>
</tr>
<tr>
<td>Power Output (Approx.)</td>
<td>0.9 Watts</td>
</tr>
</tbody>
</table>

## CLASS A RESISTANCE - COUPLED AMPLIFIER

### LOW IMPEDANCE DRIVE (APPROXIMATELY 200 OHMS)

<table>
<thead>
<tr>
<th>$R_L$</th>
<th>$R_{gf}$</th>
<th>$E_b = 90$ Volts</th>
<th>$E_b = 150$ Volts</th>
<th>$E_b = 225$ Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$R_R$ $E_o$ $GAIN$</td>
<td>$R_R$ $E_o$ $GAIN$</td>
<td>$R_R$ $E_o$ $GAIN$</td>
</tr>
<tr>
<td>0.10</td>
<td>0.10</td>
<td>2100 8.0 14</td>
<td>2300 21 16</td>
<td>1600 25 17</td>
</tr>
<tr>
<td>0.10</td>
<td>0.24</td>
<td>2700 11 15</td>
<td>2300 21 16</td>
<td>2100 33 17</td>
</tr>
<tr>
<td>0.24</td>
<td>0.24</td>
<td>5600 9.7 14</td>
<td>4700 19 16</td>
<td>4600 29 17</td>
</tr>
<tr>
<td>0.24</td>
<td>0.51</td>
<td>6800 12 15</td>
<td>6400 24 16</td>
<td>5800 37 17</td>
</tr>
<tr>
<td>0.51</td>
<td>0.51</td>
<td>12000 11 15</td>
<td>11000 20 16</td>
<td>10000 31 16</td>
</tr>
<tr>
<td>0.51</td>
<td>1.0</td>
<td>15000 14 15</td>
<td>13000 25 16</td>
<td>14000 40 16</td>
</tr>
</tbody>
</table>

### HIGH IMPEDANCE DRIVE (APPROXIMATELY 100K OHMS)

<table>
<thead>
<tr>
<th>$R_L$</th>
<th>$R_{gf}$</th>
<th>$E_b = 90$ Volts</th>
<th>$E_b = 150$ Volts</th>
<th>$E_b = 225$ Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$R_R$ $E_o$ $GAIN$</td>
<td>$R_R$ $E_o$ $GAIN$</td>
<td>$R_R$ $E_o$ $GAIN$</td>
</tr>
<tr>
<td>0.10</td>
<td>0.10</td>
<td>2700 10 14</td>
<td>2100 19 16</td>
<td>1800 30 17</td>
</tr>
<tr>
<td>0.10</td>
<td>0.24</td>
<td>3400 13 15</td>
<td>2700 25 16</td>
<td>2300 38 17</td>
</tr>
<tr>
<td>0.24</td>
<td>0.24</td>
<td>6900 12 14</td>
<td>5800 22 16</td>
<td>5000 34 17</td>
</tr>
<tr>
<td>0.24</td>
<td>0.51</td>
<td>8400 14 15</td>
<td>7000 27 16</td>
<td>6300 41 17</td>
</tr>
<tr>
<td>0.51</td>
<td>0.51</td>
<td>13000 13 15</td>
<td>12000 24 16</td>
<td>11000 37 16</td>
</tr>
<tr>
<td>0.51</td>
<td>1.0</td>
<td>17000 16 15</td>
<td>16000 29 16</td>
<td>15000 45 16</td>
</tr>
</tbody>
</table>

1. $E_o$ is maximum RMS voltage output for approximately 5% total harmonic distortion.
2. Gain is measured for an output voltage of two volts RMS.
3. $R_k$ is in Ohms; $R_L$ and $R_{gf}$ are in Megohms.
4. Coupling capacitors (C) should be selected to give desired frequency response. $R_k$ should be adequately by-passed.

CONTINUED ON FOLLOWING PAGE
CHARACTERISTICS LIMITS

HEATER CURRENT:
\( E_f = 6.3 \text{ VOLTS} \)

| INITIAL | 140 | 160 | MA. |
| 500 HR. | 138 | 164 | MA. |

PLATE CURRENT
\( E_f = 6.3 \text{ V}, \ E_b = 100 \text{ V}, \ R_k = 150 \text{ OHMS} \)

| INITIAL | 6.0 | 11 | MA. |

TRANSCONDUCTANCE CHANGE WITH HEATER VOLTAGE
DIFFERENCE BETWEEN TRANSCONDUCTANCE (1) AND TRANSCONDUCTANCE AT \( E_f = 5.7 \text{ VOLTS} \)
OTHER CONDITIONS THE SAME EXPRESSED AS A PERCENTAGE OF TRANSCONDUCTANCE (1)

| INITIAL | --- | 10 | PERCENT |
| 500 HR. | 15 | --- | PERCENT |

TRANSCONDUCTANCE (1)
\( E_f = 6.3 \text{ V}, \ E_b = 100 \text{ V}, \ R_k = 150 \text{ OHMS} \)

| INITIAL | 4800 | 6800 | \( \mu \)MHOs |

TRANSCONDUCTANCE CHANGE WITH OPERATION
DIFFERENCE BETWEEN TRANSCONDUCTANCE (1) INITIALLY AND AFTER OPERATION
EXPRESSED AS A PERCENTAGE OF INITIAL VALUE

| 500-HR. | --- | 20 | PERCENT |

AVERAGE TRANSCONDUCTANCE CHANGE WITH OPERATION
AVERAGE OF VALUES FOR 'TRANS-CONDUCTANCE CHANGE WITH OPERATION'

| 500-HR. | --- | 15 | PERCENT |

AMPLIFICATION FACTOR:
\( E_f = 6.3 \text{ V}, \ E_b = 100 \text{ V}, \ R_k = 150 \text{ OHMS} \)

| INITIAL | 23 | 31 |

PLATE CURRENT CUTOFF (1):
\( E_f = 6.3 \text{ V}, \ E_b = 100 \text{ V}, \ E_c = -7.0 \text{ VOLTS} \)

| INITIAL | --- | 100 | \( \mu \)AMPS |

PLATE CURRENT CUTOFF (2)
\( E_f = 6.3 \text{ V}, \ E_b = 100 \text{ V}, \ E_c = -4.0 \text{ VOLTS} \)

| INITIAL | 20 | --- | \( \mu \)AMPS |

RF POWER OUTPUT:
\( E_f = 6.3 \text{ V}, \ E_b = 150 \text{ V}, \ F = 500 \text{ mc,} \)

Rg ADJUSTED FOR \( I_b = 20 \text{ ma} \)

| INITIAL | 600 | --- | MW. |

CONTINUED ON FOLLOWING PAGE
CHARACTERISTICS LIMITS - cont'd.

INTERELECTRODE CAPACITANCES:
GRID TO PLATE (G TO P) INITIAL 1.1 1.8 µµf
INPUT (G TO KIH) INITIAL 1.6 2.8 µµf
OUTPUT (P TO KIH) INITIAL 0.5 0.9 µµf
(MEASURED WITHOUT EXTERNAL SHIELD)

NEGATIVE GRID CURRENT:
\[ E_1 = 6.3 \, \text{V}, \quad E_b = 150 \, \text{V}, \quad R_k = 380 \, \text{OHMS} \]
(BY-PASSED), \( R_g = 1.0 \, \text{MEG} \).
INITIAL --- 0.4 µAMPS.
500 HR. --- 0.6 µAMPS.

HEATER-CATHODE LEAKAGE CURRENT:
\[ E_1 = 6.3 \, \text{V}, \quad E_{bb} = 100 \, \text{V}, \]
HEATER POSITIVE WITH RESPECT TO CATHODE
INITIAL --- 5 µAMPS.
500 HR. --- 10 µAMPS.

HEATER NEGATIVE WITH RESPECT TO CATHODE
INITIAL --- 5 µAMPS.
500 HR. --- 10 µAMPS.

INTERELECTRODE LEAKAGE RESISTANCE:
\[ E_1 = 6.3 \, \text{V} \]
POLARITY OF APPLIED DC
INTERELECTRODE VOLTAGE IS SUCH THAT NO CATHODE EMISSION RESULTS:
GRID TO ALL AT 100 VOLTS DC
INITIAL 100 --- MEGOHMS
500 HR. 50 --- MEGOHMS

PLATE TO ALL AT 300 VOLTS DC
INITIAL 100 --- MEGOHMS
500 HR. 50 --- MEGOHMS

VIBRATIONAL NOISE OUTPUT VOLTAGE, RMS
\[ E_1 = 6.3 \, \text{V}, \quad E_{bb} = 100 \, \text{V}, \quad R_k = 150 \, \text{OHMS} \]
(BY-PASSED), \( R_L = 10,000 \, \text{OHMS} \),
VIBRATIONAL ACCELERATION = 15 G AT 40 cps
INITIAL --- 25 MILLIV.

GRID EMISSION CURRENT:
\[ E_1 = 7.5 \, \text{V}, \quad E_b = 100 \, \text{V}, \quad E_{cc} = 7.0 \, \text{V}, \quad R_g = 1.0 \, \text{MEG} \]
INITIAL --- 0.4 µAMPS.

THE INDICATED 500-HOUR VALUES ARE LIFE-TEST END POINTS FOR THE FOLLOWING CONDITIONS OF OPERATION: \( E_1 = 6.3 \, \text{VOLTS}, \ E_b = 100 \, \text{VOLTS}, \ R_k = 150 \, \text{OHMS}, \ R_g = 1.0 \, \text{MEG}, \ E_{bb} = 200 \, \text{VOLTS WITH HEATER POSITIVE WITH RESPECT TO CATHODE, AND BULB TEMPERATURE} = 220 \, \text{C MINIMUM.} \)

SPECIAL TESTS AND RATINGS

STABILITY LIFE TEST
STATISTICAL SAMPLE OPERATED FOR ONE HOUR TO EVALUATE AND CONTROL INITIAL VARIATIONS IN TRANSDUCEDANCE.

SURVIVAL RATE LIFE TEST
STATISTICAL SAMPLE OPERATED FOR ONE HUNDRED HOURS TO EVALUATE AND CONTROL EARLY-LIFE ELECTRICAL AND MECHANICAL INOPERATIVES.

HEATER-CYCLING LIFE TEST
STATISTICAL SAMPLE OPERATED FOR 2000 CYCLES TO EVALUATE AND CONTROL HEATER-CATHODE DEFECTS. CONDITIONS OF TEST INCLUDE \( E_1 = 7.0 \, \text{VOLTS CYCLED FOR ONE MINUTE ON AND FOUR MINUTES OFF}, \ E_b = 0 \, \text{VOLTS}, \) AND \( E_{bb} = 140 \, \text{VOLTS RMS}. \)

SHOCK RATING -- 450 G
STATISTICAL SAMPLE SUBJECTED TO FIVE IMPACT ACCELERATIONS OF 450 G IN EACH OF FOUR DIFFERENT POSITIONS. THE ACCELERATING FORCES ARE APPLIED BY THE NAVY-TYPE, HIGH IMPACT (FLYWEIGHT) SHOCK MACHINE FOR ELECTRONIC DEVICES OR ITS EQUIVALENT.
SECOL TESTS AND RATINGS - cont'd.

FATIGUE RATING—2.5 G
STATISTICAL SAMPLE SUBJECTED TO VIBRATIONAL ACCELERATION OF 2.5 G FOR 22 HOURS MINIMUM IN EACH OF THREE DIFFERENT POSITIONS. THE SINUSOIDAL VIBRATION IS APPLIED AT A FIXED FREQUENCY BETWEEN 25 AND 60 CYCLES PER SECOND.

ALTITUDE RATING—60,000 FEET
STATISTICAL SAMPLE SUBJECTED TO PRESSURE OF 55 MILLIMETERS OF MERCURY TO EVALUATE AND CONTROL ARCING AND CORONA.

NOTE:
The conditions for some of the indicated tests have deliberately been selected to aggrivate tube failures for test and evaluation purposes. In no sense should these conditions be interpreted as suitable circuit operating conditions.
In the design of military equipment employing this tube, reference should be made to the appropriate MIL-E-1 specification.
TENTATIVE DATA

5718

$E_f = 6.3$ Volts

Plate Milliamperes

Amplification Factor ($\mu$) - $\mu$hos

Plate Resistance (Rp) - Kilohms

Transconductance (Gm)

$E_b = 100$ V

$E_b = 150$ V