THE 6943 IS A SUBMINIATURE SHARP CUTOFF PENTODE DESIGNED FOR RADIO FREQUENCY AMPLIFIER SERVICE. THIS TYPE IS CHARACTERIZED BY EXTRAORDINARY FREEDOM FROM INTERELEMENT SHORT CIRCUITS OF SHORT TERM DURATION, BY HIGH RESISTANCE TO INTERELEMENT LEAKAGE, AND BY STABLE PERFORMANCE. IN ADDITION, VIBRATIONAL OUTPUT WHEN THE TUBE IS SUBJECT TO WIDE BAND (WHITE NOISE) VIBRATION IS HELD TO A VERY LOW VALUE. IT IS SUITABLE FOR SERVICE AT HIGH ALTITUDES AND WHERE SEVERE CONDITIONS OF MECHANICAL SHOCK, VIBRATION AND HIGH TEMPERATURE ARE ENCOUNTERED. THESE CHARACTERISTICS GIVE THE TYPE SPECIAL VALUE IN GUIDED MISSILE APPLICATIONS.

DIRECT INTERELECTRODE CAPACITANCES

GRID #1 TO PLATE (MAX.) 0.015 μF
INPUT: G1 TO (H+K+G2+G3H.S.*E.S.) 3.0 μF
OUTPUT: P TO (H+K+G2+G3H.S.*E.S.) 3.0 μF

RATINGS

ABSOLUTE VALUES

HEATER VOLTAGE 6.3 VOLTS
HEATER VOLTAGE VARIATION 6.3±10% VOLTS
INSTANTANEOUS PLATE VOLTAGE 360 VOLTS
PLATE VOLTAGE 250 VDC
GRID #2 VOLTAGE 150 VDC
PLATE DISSIPATION 1.0 W
GRID #2 DISSIPATION 0.33 W
POSITIVE GRID #1 VOLTAGE 0 VDC
NEGATIVE GRID #1 VOLTAGE 85 VDC
EXTERNAL GRID #1 CIRCUIT RESISTANCE 1.0 MEG.
AVERAGE CATHODE CURRENT 15 mA
HEATER-CATHODE VOLTAGE 200 VOLTS
BULB TEMPERATURE (AT HOTTEST POINT) 250 °C
OPERATIONAL ALTITUDE 80,000 FT.

CONTINUED ON FOLLOWING PAGE
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

**AVERAGE CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEATER VOLTAGE</td>
<td>6.3 VOLTS</td>
</tr>
<tr>
<td>HEATER CURRENT</td>
<td>0.175 AMP.</td>
</tr>
<tr>
<td><strong>CONDITIONS:</strong></td>
<td></td>
</tr>
<tr>
<td>HEATER VOLTAGE</td>
<td>6.3 VOLTS</td>
</tr>
<tr>
<td>PLATE VOLTAGE</td>
<td>100 VDC</td>
</tr>
<tr>
<td>GRID #2 VOLTAGE</td>
<td>100 VDC</td>
</tr>
<tr>
<td>GRID #3 VOLTAGE</td>
<td>0</td>
</tr>
<tr>
<td>CATHODE BIAS RESISTOR</td>
<td>150 OHMS</td>
</tr>
<tr>
<td>PLATE CURRENT</td>
<td>8.0 mA dc</td>
</tr>
<tr>
<td>GRID #2 CURRENT</td>
<td>2.3 mA dc</td>
</tr>
<tr>
<td>TRANSCONDUCTANCE</td>
<td>3600 μMhos</td>
</tr>
<tr>
<td>PLATE RESISTANCE</td>
<td>300,000 OHMS</td>
</tr>
<tr>
<td>GRID #1 VOLTAGE FOR ib = 10 μA</td>
<td>-7.5 VDC</td>
</tr>
<tr>
<td>GRID #1 VOLTAGE FOR ib = 200 μA</td>
<td>-5.5 VDC</td>
</tr>
<tr>
<td>OPERATION TIME (MAX.)</td>
<td>20 SECS.</td>
</tr>
</tbody>
</table>

**DURABILITY CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPACT ACCELERATION            3</td>
<td>100 G</td>
</tr>
<tr>
<td>VIBRATIONAL ACCELERATION FOR AN EXTENDED PERIOD</td>
<td>10 G</td>
</tr>
<tr>
<td><strong>ON-OFF HEATER CYCLES</strong></td>
<td>2000</td>
</tr>
</tbody>
</table>

**CONTROLLED DETERMINES**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERELECTRODE INSULATION (MIN)</td>
<td>250 MEG.</td>
</tr>
<tr>
<td>TOTAL GRID CURRENT (MAX.)</td>
<td>-0.1 μA dc</td>
</tr>
<tr>
<td>GRID EMISSION (MAX.)</td>
<td>-0.5 μA dc</td>
</tr>
<tr>
<td>HUM OUTPUT (MAX.)</td>
<td>15 MV, pk-pk</td>
</tr>
<tr>
<td>WHITE NOISE VIBRATION OUTPUT (MAX.)</td>
<td>350 MV, pk-pk</td>
</tr>
<tr>
<td>HEATER-CATHODE LEAKAGE (MAX.)</td>
<td>5.0 μA dc</td>
</tr>
</tbody>
</table>

**NOTES:**

1. LIMITING VALUES BEYOND WHICH NORMAL TUBE LIFE AND NORMAL TUBE PERFORMANCE MAY BE IMPAIRED.
2. TESTS PERFORMED AS A MEASURE OF THE MECHANICAL DURABILITY OF THE TUBE STRUCTURE.
3. FORCE AS APPLIED IN ANY DIRECTION BY THE NAVY TYPE HIGH IMPACT (FLYWEIGHT) SHOCK MACHINE FOR ELECTRONIC DEVICES. SHOCK DURATION = 4 MILLISECONDS.
4. VIBRATIONAL FORCES APPLIED IN ANY DIRECTION FOR A PERIOD OF SIX HOURS REPEATEDLY SWEEPING THE RANGE FROM 30 CPS TO 3000 CPS AND BACK, WITH THE PERIOD OF THE SWEEP CYCLE BEING THREE MINUTES.
5. ONE CYCLE CONSISTS OF THE APPLICATION OF EF = 7.0 V FOR ONE MINUTE AND INTERRUPTION OF THE FILAMENT VOLTAGE FOR FOUR MINUTES. A VOLTAGE OF E[kh] = 140 V is APPLIED CONTINUOUSLY.
6. MEASURED WITH EF = 6.3 V; Eb = Ee2 = -300 Vdc; E[2]-e2 = -200 Vdc; Egl-e2 = -100 Vdc; CATHODE IS POSITIVE SO THAT NO CATHODE EMISSION OCCURS.
7. MEASURED WITH EF = 6.3 V; Eb = Ee2 = 100 Vdc; Rk = 150 OHMS; Rgl = 1.0 MEG.
8. PREHEATED FOR FIVE MINUTES WITH EF = 7.5 V; Eb = 250 Vdc; Ee2 = 150 Vdc; Rk = 1000 OHMS; Rgl = 1.0 MEG; THEN TESTED WITH EF = 7.5 V; Eb = E[e2] = 100 Vdc; E[e1] = -7.5 Vdc; Rgl = 1.0 MEG. THIS IS A DESTRUCTIVE TEST AND THEREFORE MUST BE CONDUCTED ON A SAMPLE BASIS.
9. TEST WITH \( E_f = 6.3 \text{ V} \) (400 CPS), \( E_b = E_c = 100 \text{ Vdc} \); \( R_k = 150 \text{ OHMS} \); \( R_p = 30,000 \text{ OHMS} \); \( R_L = 10,000 \text{ OHMS} \). MEASURE THE HUM OUTPUT ACROSS \( R_1 \) IN THE FREQUENCY BAND FROM 20 CPS TO 5,000 CPS.

10. TEST WITH \( E_f = 6.3 \text{ V} \); \( E_b = E_c = 100 \text{ Vdc} \); \( R_k = 150 \text{ OHMS} \); \( R_p = 10,000 \text{ OHMS} \). THE WHITE NOISE VOLTAGE ACROSS \( R_p \) IS FILTERED TO ROLL OFF APPROXIMATELY 35 dB BETWEEN 10,000 CPS AND 13,000 CPS AND IS THEN MEASURED WITH BOTH A PEAK TO PEAK METER AND AN RMS READING METER. THE VIBRATIONAL FORCE APPLIED TO THE TUBE UNDER TEST IS SUCH THAT THE INSTANTANEOUS VALUES OF ACCELERATION FORM A WHITE NOISE SPECTRUM FROM 100 CPS TO 5000 CPS. ENERGY WITHIN THIS SPECTRUM IS DISTRIBUTED SUCH THAT EACH OCTAVE OF BANDWIDTH DELIVERS 2.3 G'S RMS ACCELERATION. THE DEGREE OF CLIPPING IS SUCH THAT PEAK VALUES OF ACCELERATION EXCEED 15 G'S.

11. MEASURED WITH \( E_f = 6.3 \text{ V} \); \( E_b = E_c = 100 \text{ Vdc} \).

12. CAPACITANCES ARE MEASURED WITH AN EXTERNAL SHIELD OF 0.005" LD.

13. OPERATION TIME IS THE TIME REQUIRED FOR A TUBE TO REACH A VALUE OF PLATE CURRENT EQUAL TO 85% OF THAT VALUE ATTAINED AFTER THREE MINUTES.
THE 6943 IS A SHARP-CUTOFF RF PENTODE IN THE 8 PIN SUBMINIATURE CONSTRUCTION. IT IS DESIGNED SPECIFICALLY FOR GUIDED MISSILE SERVICE. THIS TYPE IS CHARACTERIZED BY STABLE PERFORMANCE FOR OPERATION AT HIGH ALTITUDES AND WHERE SEVERE CONDITIONS OF MECHANICAL SHOCK, VIBRATION AND HIGH TEMPERATURE ARE ENCOUNTERED.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD #318 CONNECTED TO CATHODE

GRID 1 TO PLATE
INPUT
OUTPUT

0.015 pf
3.0 pf
3.0 pf

HEATER CHARACTERISTICS AND RATINGS

ABSOLUTE MAXIMUM VALUES - SEE EIA STANDARD RS-239

AVERAGE CHARACTERISTICS
6.3 VOLTS
175 mA

LIMITS OF APPLIED VOLTAGE
5.5 TO 6.9 VOLTS

HEATER-CATHODE VOLTAGE
HEATER POSITIVE WITH RESPECT TO CATHODE
200 VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE
200 VOLTS

CONTINUED ON FOLLOWING PAGE
CONTINUED FROM PRECEDING PAGE

MAXIMUM RATINGS

ABSOLUTE MAXIMUM VALUES – SEE EIA STANDARD RS-239

DC PLATE VOLTAGE 250 VOLTS
PEAK - PLATE FORWARD VOLTAGE 360 VOLTS
DC GRID 3 VOLTAGE
  POSITIVE VALUE 0 VOLTS
  NEGATIVE VALUE 20 VOLTS
DC GRID 2 VOLTAGE 150 VOLTS
DC GRID 1 VOLTAGE
  POSITIVE VALUE 0 VOLTS
  NEGATIVE VALUE 55 VOLTS
PLATE DISSIPATION 1.0 WATTS
GRID 2 DISSIPATION 0.33 WATTS
CATHODE CURRENT 15 mA
GRID 1 CIRCUIT RESISTANCE 1.0 MEGOHM
BULB TEMPERATURE 250 °C

CHARACTERISTICS

DC PLATE VOLTAGE 100 VOLTS
DC GRID 3 VOLTAGE 0 VOLTS
DC GRID 2 VOLTAGE 100 VOLTS
CATHODE RESISTOR 150 OHMS
DC PLATE CURRENT 8.0 mA
DC GRID 2 CURRENT 2.3 mA
TRANSCONDUCTANCE 3,600 µHOMS
PLATE RESISTANCE 300,000 OHMS

DC GRID 1 VOLTAGE FOR I = 100 µADC MAX. -7.5 VOLTS

SPECIAL TESTS AND RATINGS

IMPACT ACCELERATION
FATIGUE
FAILURE RATE
ALTITUDE – ABSOLUTE MAXIMUM 80,000 FT.
RADIATION – ABSOLUTE MAXIMUM
  TOTAL DOSAGE – NEUTRONS/SQ. CM 10^16 NVT
  DOSE RATE – NEUTRONS/SQ. CM/SEC 10^12 NV