Power Triode

FORCED-AIR COOLED  GROUNDING TYPE
For UHF Plate-Pulsed Oscillator and Amplifier Service

GENERAL DATA

Electrical:
Heater, for Unipotential Cathode:
  Voltage (AC or DC) .................... 6.3 volts
  Current ................................ 3.4 amp
  Minimum heating time .................. 1 minute
Amplification Factor ..................... 25
Direct Interelectrode Capacitances:
  Grid to plate .......................... 6.0 pf
  Grid to cathode ....................... 11.0 pf
  Plate to cathode^a .................... 0.19 max. pf

Mechanical:
Operating Position ....................... Any
Overall Length .......................... 3-5/16" ± 3/32"
Diameter ................................ 1.750" ± 0.010"
Weight (Approx.) ......................... 8 oz
Radiator ................................ Integral part of tube
Mounting ................................ Special
Terminal Diagram (See Dimensional Outline):

P-Plate  K-Cathode
G-Grid  H-Heater

Thermal:
Air Flow:
The specified air flow for various plate dissipations, as indicated in the tabulation below, should be delivered by a blower onto the respective terminals and seals, and through the radiator before and during the application of any voltages. Heater power, plate power, and air may be removed simultaneously.

<table>
<thead>
<tr>
<th>Plate Dissipation (watts)</th>
<th>Min. Air Flow (cfm)</th>
<th>Static Pressure (in. of water)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>5.7</td>
<td>0.16</td>
</tr>
<tr>
<td>200</td>
<td>10</td>
<td>0.4</td>
</tr>
<tr>
<td>250</td>
<td>16</td>
<td>0.85</td>
</tr>
</tbody>
</table>

The above flow and pressure values are for condition with radiator temperature held constant at 135°C rise above ambient temperature. The air flow must be adequate to limit the temperature of the radiator, grid terminal, cathode terminal, and seals to their respective maximum values.

Radiator Temperature (Measured on core at end adjacent to plate ring) .................. 180 max. °C
Grid-Terminal Temperature ....................... 150 max. °C

^a Indicates a change.
Cathode-Terminal Temperature: 150 max. °C
Seal Temperature (Plate, grid, and cathode): 150 max. °C

PLATE-PULSED OSCILLATOR & AMPLIFIER — Class C

Maximum Ratings, Absolute-Maximum Values:

For maximum "on" time of 10 μsec 100 μsec
PEAK POSITIVE-PULSE
PLATE-SUPPLY VOLTAGE: 7500 max. volts
PEAK NEGATIVE-PULSE
GRID-BIAS VOLTAGE: 600 max. volts
PEAK PLATE CURRENT
FROM PULSE SUPPLY: 4.5 max. 3.5 max. amp
PEAK RECTIFIED GRID CURRENT: 1 max. 0.75 max. amp
DC PLATE CURRENT: 0.045 max. 0.250 max. amp
DC GRID CURRENT: 0.010 max. 0.070 max. amp
PLATE INPUT: 340 max. 340 max. watts
PLATE DISSIPATION: 250 max. 250 max. watts

Typical Operation with Rectangular Wave Shape
in Oscillator Circuit at 1250 Mc:

With duty factor (d) of 0.01

Peak Positive—Pulse
Plate-Supply Voltage: 5500 7500 volts
Peak Negative—Pulse
Grid-Bias Voltage: 375 500 volts
Cathode Resistor (d): 100 100 ohms
Peak RF Grid Voltage: 625 850 volts
Peak Plate Current
From Pulse Supply: 3.5 4.5 amp
Peak Rectified Grid Current: 0.25 0.5 amp
DC Plate Current: 0.035 0.045 amp
DC Grid Current: 0.0025 0.005 amp
Useful Power Output
at Peak of Pulse (Approx.): 8000 14000 watts

(a) with external shield connected to grid.
(b) "On" time is defined as the sum of the durations of all the individual pulses which occur during the interval of 1000 microseconds. Pulse duration is defined as the time interval between the two points on the pulse at which the instantaneous value is 70 per cent of the peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.
(c) Duty factor is the product of pulse duration and repetition rate. For variable pulse durations and pulse repetition rates, the duty factor is defined as the ratio of time "on" to total elapsed time in any 500-microsecond interval.
(d) It is recommended that the entire bias be obtained from a cathode resistor. In certain applications, partial grid—resistor bias may be used.
(e) The power output at peak of pulse is obtained from the average power output using the duty factor of the peak power output pulse. This procedure is necessary since the power output pulse duty factor may be less than the applied voltage pulse duty factor because of a delay in the start of rf power output.

Indicates a change.
CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

Note: Min. Max.
Heater Current. 1 3.05 3.75 amp
Amplification Factor. 1 1.2 18 32
Grid-Plate Capacitance. 5.6 6.6 pf
Grid-Cathode Capacitance. 10.5 12.5 pf
Plate-Cathode Capacitance. 3 0.12 0.26 pf
Plate Voltage. 1.4 500 850 volts
Plate Voltage. 1.5 690 1140 volts
Grid Voltage. 1.6 165 volts
Peak Cathode Current. 1.7 12 - amp
Useful Power Output at Peak of Pulse. 1.8 12 - kw

Note 1: With 6.3 volts on heater.
Note 2: With dc grid voltage of -15 volts, and dc plate voltage adjusted to give dc plate current of 250 milliamperes.
Note 3: With external shield connected to grid terminal.
Note 4: With dc grid voltage of -10 volts, and dc plate voltage adjusted to give dc plate current of 250 milliamperes.
Note 5: With dc grid voltage of -20 volts, and dc plate voltage adjusted to give dc plate current of 250 milliamperes.
Note 6: With dc plate voltage of 1600 volts, and dc grid voltage adjusted to give dc plate current of 1 millampere.
Note 7: Represents the maximum value of cathode current (Plate current and grid current) for the tube under any condition of operation.
Note 8: With peak positive-pulse plate-supply voltage of 7500 volts, cathode-bias resistor of 100 ± 10 per cent ohms, peak plate current from pulse supply of 4.5 amperes, peak rectified grid current of 0.5 ampere, duty factor of 0.01, and frequency of 1250 Mc.

MAXIMUM RATINGS vs OPERATING FREQUENCY

<table>
<thead>
<tr>
<th>OPERATING FREQUENCY Mc</th>
<th>MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE &amp; PLATE INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plate-Pulsed Oscillator and Amplifier Service</td>
</tr>
<tr>
<td>1300</td>
<td>100</td>
</tr>
<tr>
<td>2000</td>
<td>75</td>
</tr>
</tbody>
</table>

DIMENSIONAL OUTLINE and MOUNTING ARRANGEMENT shown under Type 6161 also apply to the 5946

OPERATING NOTES

Rated heater voltage should be applied for at least one minute to allow the cathode to reach normal operating temperature before voltages are applied to the other electrodes. In circuits where the plate is grounded and the negative pulse is applied to the cathode, the heater supply must be insulated to withstand the peak-positive-pulse plate-supply voltage, and it should also present a minimum amount of capacitance loading to the pulse-supply source.

→ Indicates a change.