The EIMAC 304TL is a low-mu, power triode having a maximum plate dissipation rating of 300 watts, and is intended for use as an amplifier, oscillator or modulator, where maximum performance can be obtained at low plate voltage. It can be used at its maximum ratings at frequencies as high as 40 MHz.

Cooling of the 304TL is accomplished by radiation from the plate, which operates at a visible red color at maximum dissipation, and by means of air convection around the envelope.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**
- Filament: Thoriated tungsten
- Voltage: 5.0 or 10.0 volts
- Current: 25.0 or 12.5 amps
- Amplification Factor (Average): 12
- Direct Interelectrode Capacitances (Average):
  - Grid-Plate: 8.6 pF
  - Grid-Filament: 12.1 pF
  - Plate-Filament: 0.8 pF
- Transconductance ($I_g = 1.0$ amp, $E_0 = 3000$ V, $e_v = -175$ V) 16,700 μmhos
- Frequency for Maximum Ratings: 40 MHz

**MECHANICAL**
- Base: Special 4 pin, No. 5000B
- Socket: Johnson No. 124-213 or Equivalent
- Mounting: Vertical, base down or up
- Cooling: Convection and Radiation

**Recommended Heat Dissipating Connectors:**
- Plate: HR-7
- Grid: HR-6

**Maximum Overall Dimensions:**
- Length: 7.625 inches
- Diameter: 3.563 inches
- Net Weight: 9 ounces
- Shipping Weight (Average): 2 pounds

### RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR

Class-C Telegraphy or FM Telephony
(Key-down conditions, per tube)

<table>
<thead>
<tr>
<th>MAXIMUM RATINGS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Plate Voltage</td>
<td>-</td>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>DC Grid Voltage</td>
<td>-</td>
<td>-250</td>
<td>-300</td>
</tr>
<tr>
<td>DC Plate Current</td>
<td>-</td>
<td>665</td>
<td>600</td>
</tr>
<tr>
<td>DC Grid Current</td>
<td>-</td>
<td>90</td>
<td>85</td>
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<tr>
<td>Peak RF Grid Input Voltage</td>
<td>-</td>
<td>430</td>
<td>480</td>
</tr>
<tr>
<td>Driving Power (approx.)</td>
<td>-</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>Grid Dissipation</td>
<td>-</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Plate Power Input</td>
<td>-</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>Plate Power Output</td>
<td>-</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

*The figures show actual measured tube performance, and do not allow for circuit losses.

(Effective 6-1-67) © 1958, 1965, 1967 Varian

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AUDIO FREQUENCY POWER AMPLIFIER
AND MODULATOR
Class B (Sinusoidal wave, two tubes unless otherwise specified)

MAXIMUM RATINGS

DC PLATE VOLTAGE  3000 VOLTS
MAX-SIGNAL DC PLATE CURRENT, PER TUBE  900 mA
PLATE DISSIPATION, PER TUBE  300 WATTS

TYPICAL OPERATION, CLASS AB1
DC Plate Voltage  1500 2000 2500 3000 Volts
DC Grid Voltage  118 170 230 290 Volts
Zero-signal DC Plate Current  270 200 160 130 mA
Max-Signal DC Plate Current  572 546 483 444 mA
Effective Load, Plate-to-Plate  2540 5300 8500 12,000 Ohms
Peak AF Grid Input Voltage (per tube)  118 170 230 290 Volts
Max-Signal Peak Driving Power  0 0 0 0 Watts
Max-Signal Plate Power Output  256 490 610 730 Watts

*Adjust to give stated zero-signal plate current. The effective grid circuit resistance for each tube must not exceed 250,000 ohms.

TYPICAL OPERATION, CLASS AB2
DC Plate Voltage  1500 2000 2500 3000 Volts
DC Grid Voltage  118 170 230 290 Volts
Zero-signal DC Plate Current  270 200 160 130 mA
Max-Signal DC Plate Current  1140 1000 900 800 mA
Effective Load, Plate-to-Plate  2750 4500 6600 9100 Ohms
Peak AF Grid Input Voltage (per tube)  245 290 340 390 Volts
Max-Signal Peak Driving Power  78 87 95 110 Watts
Max-Signal Nominal Driving Power (approx.)  39 44 48 55 Watts
Max-Signal Plate Power Output  1100 1400 1650 1800 Watts

*Adjust to give stated zero-signal plate current

PLATE MODULATED RADIO FREQUENCY AMPLIFIER
Class-C Telephony (Carrier conditions, per tube)

MAXIMUM RATINGS

DC PLATE VOLTAGE  2500 VOLTS
DC PLATE CURRENT  700 mA
PLATE DISSIPATION  200 WATTS
GRID DISSIPATION  50 WATTS

TYPICAL OPERATION (Power input limited to 500 and 1000 watts)*
DC Plate Voltage  2000 2000 2500 2500 Volts
DC Plate Current  250 500 200 400 mA
Total Bias Voltage  500 500 525 550 Volts
Fixed Bias Voltage  410 275 300 300 Volts
Grid Resistor  3000 3000 12,500 5000 Ohms
DC Grid Current  30 75 18 50 mA
Peak RF Grid Input Voltage  615 690 620 715 Volts
Driving Power  18 52 11 36 Watts
Grid Dissipation  3 15 2 9 Watts
Plate Power Input  500 1000 500 1000 Watts
Plate Dissipation  90 190 75 170 Watts
Plate Power Output  410 810 425 830 Watts

*The figures are for convenience in obtaining a 500 or 1000 Watt carrier input per tube to the modulated amplifier. The output figures do not allow for circuit losses.

TYPICAL OPERATION*
DC Plate Voltage  1500 2000 2500 2500 Volts
DC Plate Current  520 525 450 mA
Total Bias Voltage  370 500 550 Volts
Fixed Bias Voltage  160 260 440 Volts
Grid Resistor  2800 3000 2000 Ohms
DC Grid Current  75 80 55 mA
Peak RF Grid Input Voltage  545 695 720 Volts
Driving Power  41 55 40 Watts
Grid Dissipation  13 15 10 Watts
Plate Power Input  780 1050 1125 Watts
Plate Dissipation  200 200 200 Watts
Power Output  580 850 925 Watts

*The figures are for one tube operating at maximum plate dissipation as a plate modulated Class C amplifier. The output figures do not allow for circuit losses.
DRIVING POWER vs. POWER OUTPUT

The three charts on this page show the relationship of plate efficiency, power output and grid driving power at plate voltages of 1500, 2000 and 3000 volts. These charts show combined grid and bias losses only. The driving power and power output figures do not include circuit losses. The plate dissipation in watts is indicated by Pp.

Points A, B, and C are identical to the typical Class C operating conditions shown on the first page under 1500, 2000, and 3000 volts respectively.