



TECHNICAL DATA

304TL

LOW-MU TRIODE

•

MODULATOR
OSCILLATOR
AMPLIFIER

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 - - - - - .8 pF

Transconductance ($I_b = 1.0$ amp, $E_b = 3000$ V, $e_c = -175$ V) 16,700 μ mhos

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

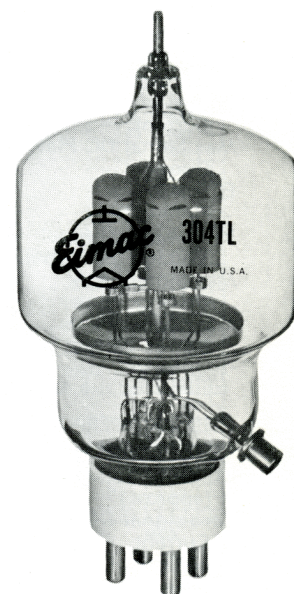
MAXIMUM RATINGS

DC PLATE VOLTAGE - - - 3000 VOLTS
DC PLATE CURRENT - - - 900 MA
PLATE DISSIPATION - - - 300 WATTS
GRID DISSIPATION - - - 50 WATTS

TYPICAL OPERATION*

	1500	2000	3000
DC Plate Voltage	- - - 1500	2000	3000 Volts
DC Grid Voltage	- - - -250	-300	-400 Volts
DC Plate Current	- - - 665	600	500 mA
DC Grid Current	- - - 90	85	80 mA
Peak RF Grid Input Voltage	- - 430	480	575 Volts
Driving Power (approx.)	- - 33	36	40 Watts
Grid Dissipation	- - 11	11	8 Watts
Plate Power Input	- - 1000	1200	1500 Watts
Plate Dissipation	- - 300	300	300 Watts
Plate Power Output	- - 700	900	1200 Watts

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



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 (approx.)*	-	—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 (approx.)*	-	—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)*

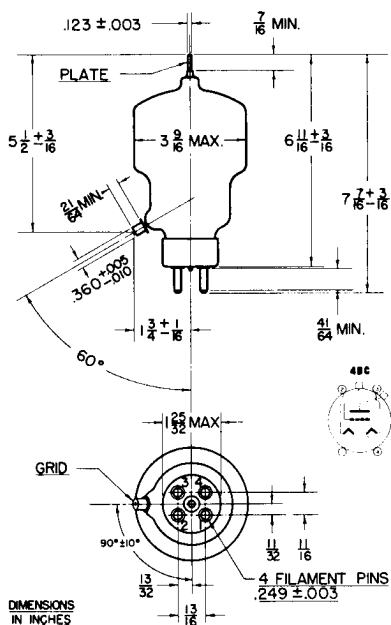
DC Plate Voltage	-	2000	2000	2500	2500 Volts
DC Plate Current	-	250	500	200	400 mA
Total Bias Voltage	-	—500	—500	—525	—550 Volts
Fixed Bias Voltage	-	—410	—275	—300	—300 Volts
Grid Resistor	-	3000	3000	12,500	5000 Ohms
DC Grid Current	-	30	75	18	50 mA
Peak RF Grid Input					
Voltage	-	615	690	620	715 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 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 P_p .

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.

