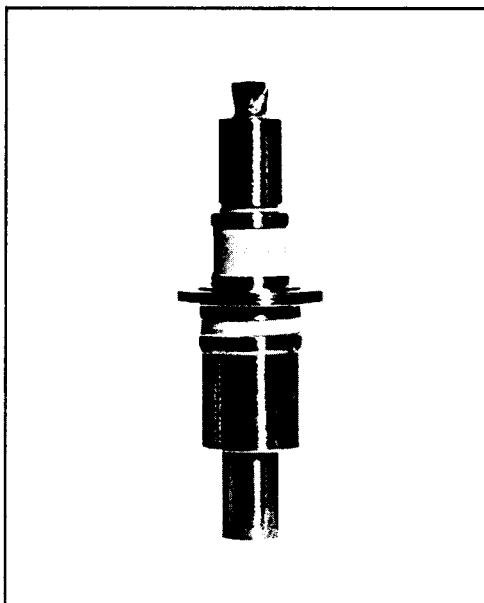




ML-6442

UHF Planar Triode

Plate Pulsed or CW
to 5 Gc



ELECTRON TUBE SPECIALIST

DESCRIPTION

The ML-6442 is a metal-ceramic envelope, medium-mu triode of the planar-electrode type designed specifically for use as a plate-pulsed oscillator and amplifier at frequencies up to about 5000 Mc. It can also be used as a c-w oscillator, r-f power amplifier or frequency multiplier at frequencies up to 2500 Mc. Features include short electron transit time, low inter-electrode capacitances and high transconductance. Lead inductances and r-f losses are minimized by a compact,

rugged metal-ceramic construction with ring type seals, making the tube ideally suited to cavity type circuits as well as for parallel line operation. The cathode is an indirectly-heated, oxide-coated disc. The heater is insulated from the cathode permitting this tube to be used in series-string circuitry. The anode is cooled by conduction and convection and is capable of dissipating 8 watts.

GENERAL CHARACTERISTICS

Electrical

Cathode	Indirectly Heated
Heater Voltage, Optimum, AC or DC*	
CW Operation	4.5 to 5.7 volts
Pulsed Operation	5.7 to 6.3 volts
Heater Current at 6.3 Volts	0.9 Amp
Cathode Heating Time for Pulse Operation, minimum	60 Seconds
Amplification Factor	50
Direct Interelectrode Capacitances, approximate	
Grid-Plate	2.3 $\mu\mu\text{f}$
Grid-Cathode, $E_h = 0$	5.10 $\mu\mu\text{f}$
Plate-Cathode, maximum, $E_h = 0$	0.045 $\mu\mu\text{f}$

Mechanical

Mounting Position	Optional
Type of Cooling	Conduction and convection
Envelope Temperature, maximum	175 °C
Net Weight, approximate	1 ounce

*The optimum heater voltage is dependent upon the back-heating or transit-time effect and is a function of frequency, grid current, grid bias, plate current, duty cycle and circuit design and adjustment. However, once dynamic operation of the tube begins, the heater voltage must be maintained within $\pm 5\%$ of the established optimum value. Selection of heater voltage depends on stability of the supply. For specific applications above 500 Mc, consult the Machlett Engineering Department for optimum heater voltage values.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Plate-Pulsed Amplifier and Oscillator — Class C

Maximum Ratings, Absolute Values

For a Maximum Conducting Period of 5 Microseconds in any 5000 Microsecond Interval.*

The tube shall not be grid pulsed beyond the Class C Telephony ratings.

Peak Positive-Pulse Plate-Supply Voltage	3000 volts
Peak Negative-Pulse Grid-Bias Voltage	100 volts
Peak Plate Current from Pulse Supply†	2.5 amps
Peak Rectified Grid Current	1.25 amps
DC Plate Current	2.5 mA
DC Grid Current	1.25 mA
Plate Input	7.5 Watts
Plate Dissipation	7.5 Watts
Pulse Duration	2.0 μ sec
Cathode Heating Time	60 Seconds
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	90 volts
Heater Positive with Respect to Cathode	90 volts
Frequency	5000 Mc
Duty Factor*	0.001

Typical Operation — With Rectangular Wave Shape

Plate Pulsed Self-Excited Oscillator at 3500 Mc	
Duty Factor	0.001
Peak Positive-Pulse Plate-Supply Voltage	3000 volts
Peak Negative-Pulse Grid Bias Voltage, approx.	75 volts
Grid Bias Resistor, approximate	50 ohms
Peak Current from Pulse Supply	2.5 amps
Peak Rectified Grid Current	1.25 amps
DC Plate Current	2.5 mA
DC Grid Current	1.25 mA
Useful Power Output at Peak of Pulse, approx.	2.0 kW
Pulse Duration	1.0 μ sec
Pulse Repetition Rate	1000 pps
Heater Voltage	6.0 Volts

* For applications above a duty factor of 0.001, contact the Machlett Engineering Department for recommendations.

† The regulation and/or series plate supply impedance shall be such as to limit the instantaneous peak current, with the tube considered as a short circuit, to a maximum of 10 times the specified maximum current rating.

Radio-Frequency Power Amplifier and Oscillator— Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values

DC Plate Voltage	275 Volts
DC Grid Voltage	—50 Volts
DC Plate Current	35 mA
DC Grid Current	15 mA
Plate Input	9.5 Watts
Plate Dissipation	6.0 Watts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	90 volts
Heater Positive with Respect to Cathode	90 volts
Frequency	2500 Mc

Radio-Frequency Power Amplifier and Oscillator— Class C Telephony

Key-down conditions per tube without amplitude modulation‡

Maximum Ratings, Absolute Values

DC Plate Voltage	350 Volts
DC Grid Voltage	—50 Volts
DC Plate Current	35 mA
DC Grid Current	15 mA
Plate Power Input	12 Watts
Plate Dissipation	8 Watts
Peak Heater-Cathode Voltage	
Heater Negative with Respect to Cathode	90 volts
Heater Positive with Respect to Cathode	90 volts
Frequency	2500 Mc

‡ Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Class A ₁ Amplifier	Min.	Max.
Plate Voltage	—	350 Volts
DC Grid Bias, approximate	—2.5	—5.75 Vdc
Amplification Factor, approximate,		
$E_c/I_b = 35$ mAdc	35	65
Transconductance	13500	19000 μ mhos
Plate Current	—	35 mAdc
Grid-Plate Capacitance	2.10	2.45 μ mf
Grid-Cathode Capacitance, $E_h = 0$	4.60	5.45 μ mf
Plate-Cathode Capacitance, $E_h = 0$	—	0.045 μ mf

APPLICATION NOTES

Before designing equipment for use with these tubes and before installing tubes in equipment, refer to the general information given in the Machlett publication entitled *Application Notes, UHF Tubes — General*.

