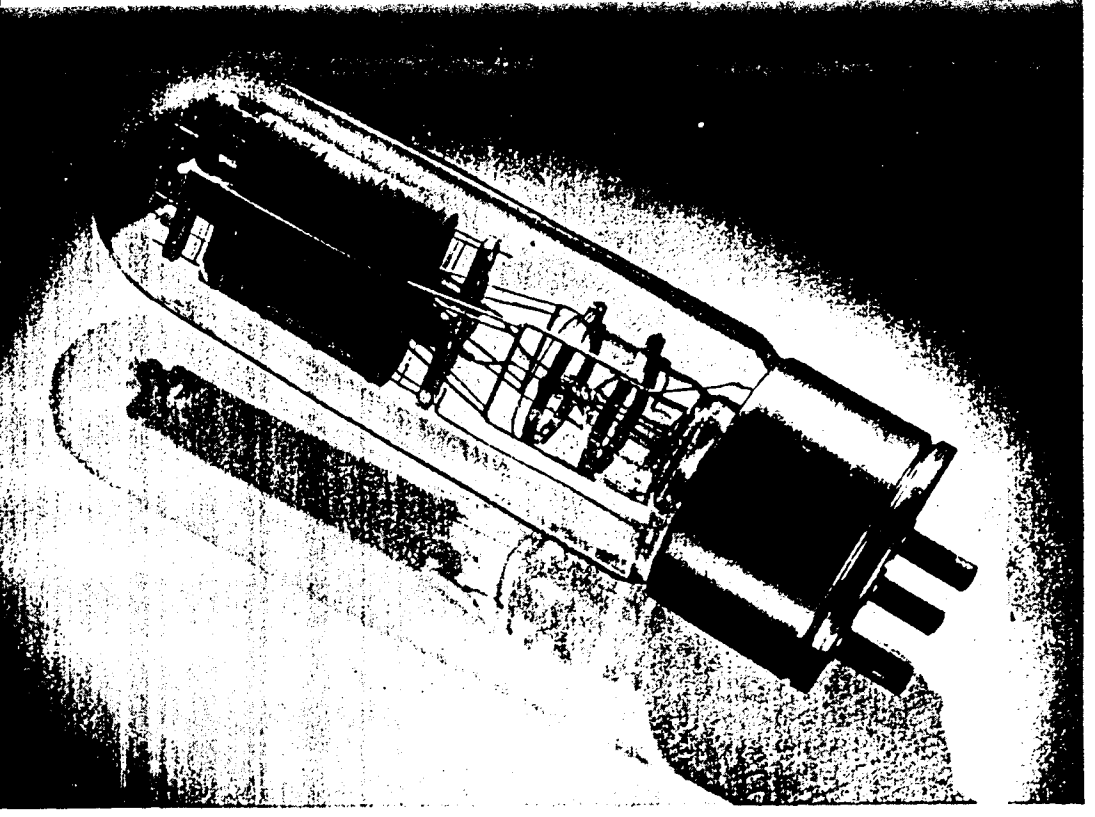


MACHLETT

ML-212E

DESCRIPTION AND RATINGS

DESCRIPTION

The ML-212E is a three-electrode tube designed for use as a modulator, amplifier, or oscillator in radio-transmitting service. The cathode is a thoriated-tungsten filament. The tube is convection cooled, the anode being capable of dissipating 275 watts. Maximum ratings of 3 kVdc and 350 milliamperes apply at frequencies up to 1.5 mc/sec; operation at 4.5 mc/sec is permissible with plate voltage reduced to 1 kVdc.

The ML-212E embodies all the techniques and skills that have been inherently a part of Machlett Laboratories, Inc., since 1897. All parts are thoroughly processed by special Machlett techniques, which prevent contamination and assure complete and permanent out-gassing. The tube is exhausted by a straight-line, high-voltage process assuring the same high standards as characterize the Machlett line of high- and super-voltage x-ray tubes.

GENERAL CHARACTERISTICS

Electrical

Filament Voltage	14 volts
Filament Current at 14 volts	6 amperes
Amplification Factor	16
Grid-Plate Transconductance	8500 uMhos
Interelectrode Capacitances	
Grid-Plate	18.8 uuf
Grid-Filament	14.9 uuf
Plate-Filament	8.6 uuf

Mechanical

Mounting Position	Vertical or Horizontal*
Type of Cooling	Convection
Base (Use with W.E. 113A socket, or equivalent)	Large 4-pin bayonet

*If mounted horizontally, the plane of the filament should be vertical.

MAXIMUM RATINGS

Direct Plate Voltage	3000 volts
Direct Plate Current	350 milliamperes
Plate Dissipation	275 watts
Direct Grid Current	75 milliamperes
R.F. Grid Current	5 amperes
Frequency	1.5 megacycles

The above are maximum ratings which do not apply simultaneously but depend on the type of service specified below.

TYPICAL OPERATING CONDITIONS

Class A Audio Amplifier or Modulator

Direct Plate Voltage	1500	1250 volts
Grid Bias	−57	−40 volts
Direct Plate Current	170	200 milliamperes
Plate Dissipation	250	250 watts
Load Impedance	5000	3000 ohms
Undistorted Output	50	40 watts

Grid Bias Modulator

Direct Plate Voltage		3000 volts
Grid Bias		−260 volts
Plate Dissipation		175 watts
Load Impedance		8000 ohms
Peak Power Output		200 watts

Class B Audio Amplifier or Modulator
(for balanced 2 tube circuit)

Direct Plate Voltage	2000	1500 volts
Grid Bias	−105	−75 volts
Direct Plate Current per tube		
No drive	40	50 milliamperes
Maximum drive	300	300 milliamperes
Plate Dissipation	250	250 watts
Load Resistance (plate-to-plate)	8000	5900 ohms
Load Resistance (per tube)	2000	1475 ohms
Approximate maximum output	650	500 watts
Recommended power for driving stage	50	50 watts

Class B Radio-Frequency Amplifier

Direct Plate Voltage	2000	1500 volts
Direct Plate Current	300	300 milliamperes
Plate Dissipation	275	275 watts
Grid Bias	−120	−90 volts
Approximate carrier watts for use with 100% modulation	200	150 watts

Class C Radio-Frequency Oscillator or Power Amplifier—Unmodulated

Direct Plate Voltage	2000	1500 volts
Direct Plate Current	300	300 milliamperes
Grid Bias	−185 to −250	−150 to −200 volts
Nominal Power Output	400	300 watts

Class C Radio-Frequency Amplifier—Plate Modulated

Direct Plate Voltage	1500	1000 volts
Direct Plate Current	300	300 milliamperes
Grid Bias	−200	−125 volts
Direct Grid Current	75	75 milliamperes
Nominal Carrier Power Output for use with 100% modulation	300	200 watts

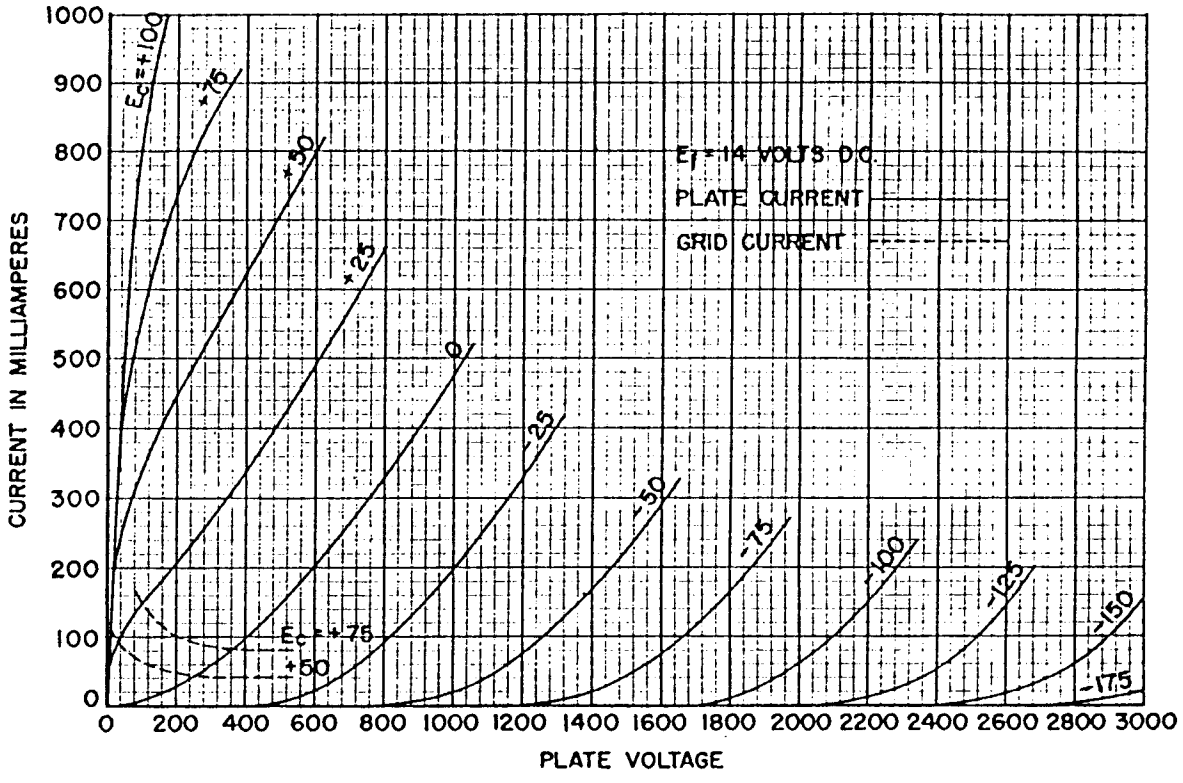
APPLICATION NOTES

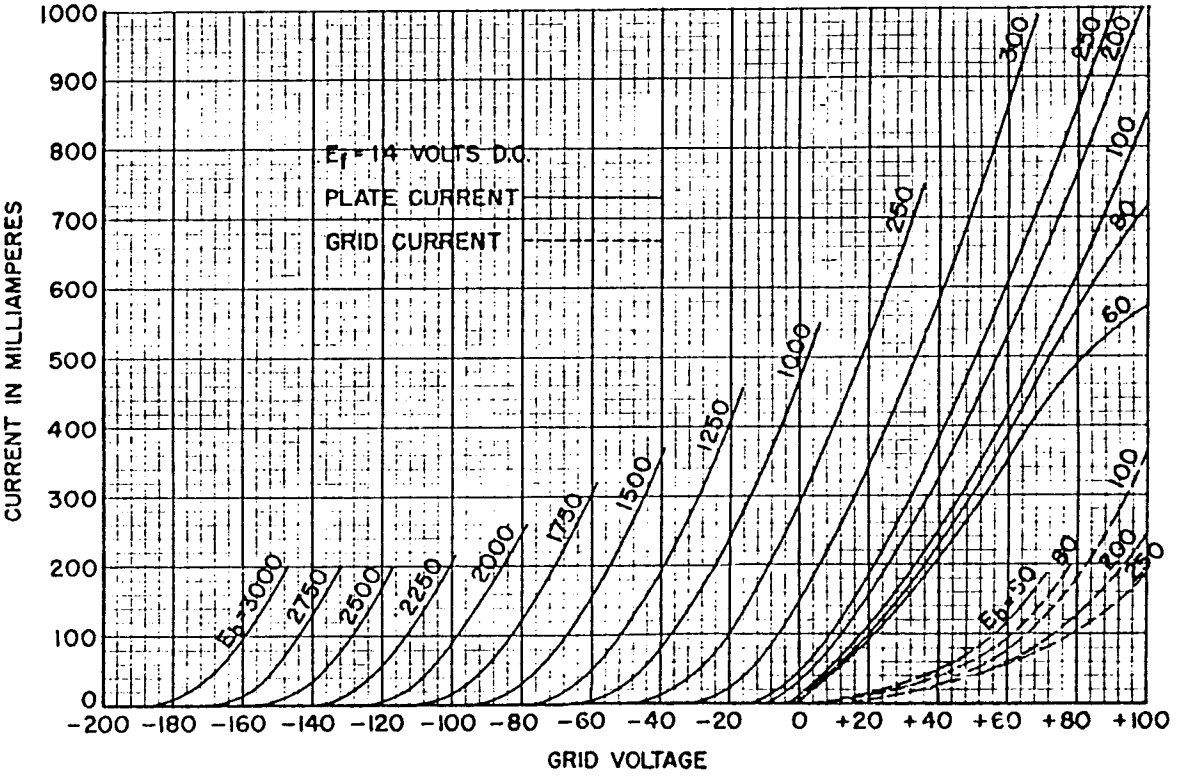
Maximum ratings apply at frequencies of 1.5 megacycles and less. The maximum plate voltage for the upper frequency limit of 4.5 megacycles is 1000 volts. The maximum plate voltage for frequencies between 1.5 and 4.5 megacycles should be proportionately reduced.

Each ML-212E vacuum tube falls within one of four impedance classes and is stamped accordingly. These classifications are #1, #2, #3 and #4, and are in no way a gradation of quality, but are to facilitate parallel operation in the ordinary system using a common grid battery. Where more than one tube is used, those of the same or adjacent classes should be employed so that the load may be evenly distributed. When only a single tube is used no one of the classes has any advantage over the other. Tubes may not be ordered according to impedance classification.

With a plate voltage of 1500 volts, a grid bias of −60 volts and a filament voltage of 14, the plate current will be as follows for each impedance class:

#1	110-129	milliamperes, inclusive
#2	130-148	" "
#3	149-167	" "
#4	168-185	" "


CURRENT IN MILLIAMPERES
PLATE VOLTAGE
E_f = 14 VOLTS D.C.
PLATE CURRENT
GRID CURRENT
E_c = +100
+75
+50
+25
0
-25
-50
-75
-100
-125
-150
-175
E_c = +75
+50
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000
0 100 200 300 400 500 600 700 800 900 1000


CURRENT IN MILLIAMPERES
GRID VOLTAGE
E_f = 14 VOLTS D.C.
PLATE CURRENT
GRID CURRENT
E_b = 3000
2750
2500
2250
2000
1750
1500
1250
1000
300
250
200
100
80
60
E_b = 50
80
100
200
250
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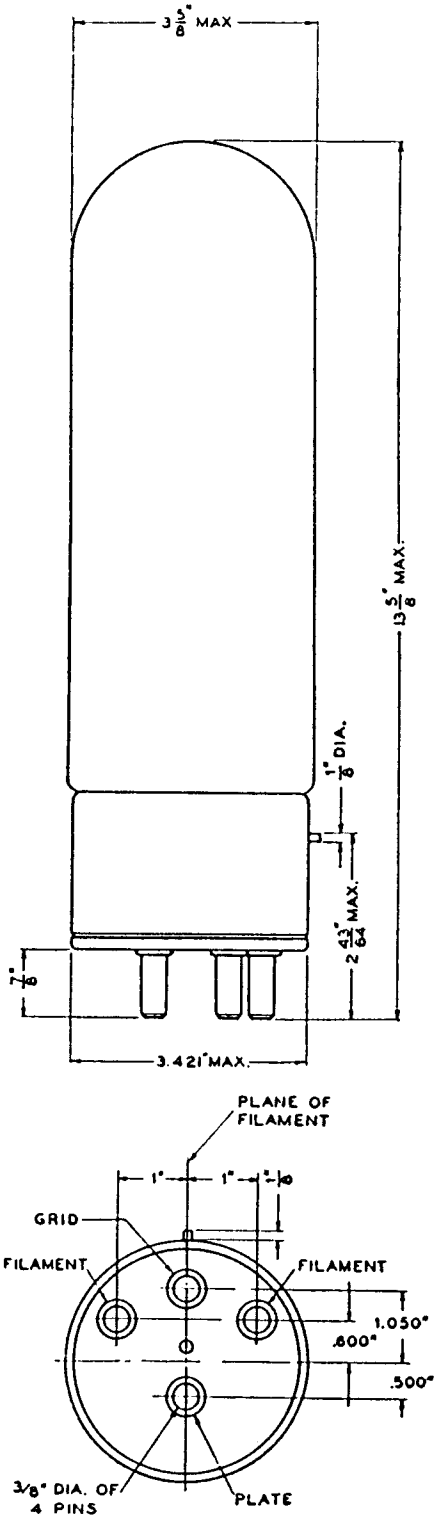
0 100 200 300 400 500 600 700 800 900 1000



DIMENSIONS—ML-212E

MACHLETT LABORATORIES, INC.

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