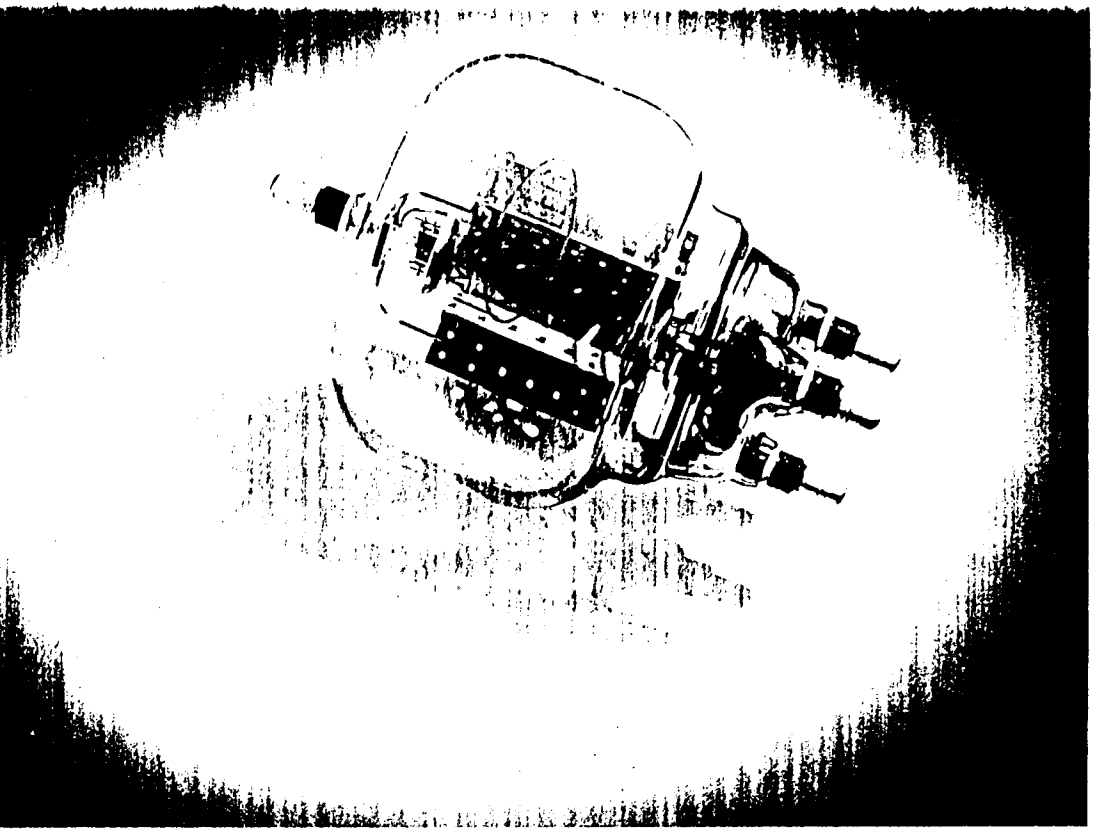


MACHLETT

ML-357B

DESCRIPTION AND RATINGS

DESCRIPTION

The ML-357B 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 air cooled and the anode is capable of dissipating 400 watts. Maximum ratings of 4 kVdc and 0.5 ampere apply at frequencies up to 100 Mc; operation at 150 Mc is permissible at reduced ratings.

The ML-357B 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 outgassing. 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	10 volts
Filament Current at 10 volts	10 amperes
Filament Starting Current, maximum	50 amperes
Filament Resistance, Cold	0.12 ohm
Amplification Factor (Ib = 200 mA, Eb = 2 kV)	30
Interelectrode Capacitances	
Grid-Plate	4.25 uuf
Grid-Filament	11.5 uuf
Plate-Filament	2.5 uuf
Maximum Usable Cathode Current	2.5 amperes

Mechanical

Mounting Position	Vertical, plate terminal up
Type of Cooling	Radiation or Forced-air
Required Air Flow on Envelope When Operated Above 40 Megacycles	40 cfm
Maximum Incoming Air Temperature	45 centigrade
Maximum Glass Temperature	200 centigrade
Net Weight, approximate	13 ounces

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Class B—Audio-Frequency Power Amplifier and Modulator

Maximum Ratings, Absolute Values

Direct Plate Voltage			4000 volts
Signal D-C Plate Current*			0.50 ampere
Signal Plate Input*			1100 watts
Plate Dissipation*			400 watts

Typical Operation (Unless otherwise specified, values are for 2 tubes)

D-C Plate Voltage	2000	3500	3000 volts
D-C Grid Voltage	−50	−110	−85 volts
Peak A-F Grid-to-Grid Voltage	490	520	345 volts
Zero Signal D-C Plate Current	0.160	0.120	0.120 ampere
Maximum Signal D-C Plate Current	1.00	0.72	0.43 ampere
Effective Load Resistance, Plate-to-Plate	4360	11500	14700 ohms
Maximum Signal Driving Power, approximate	50.0	35.0	13.5 watts
Maximum Signal Power Output	1400	1840	850 watts

Class B—Radio-Frequency Power Amplifier

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

Maximum Ratings, Absolute Values

D-C Plate Voltage		4000 volts
D-C Plate Current		0.275 ampere
Plate Input		550 watts
Plate Dissipation		400 watts

Typical Operation

D-C Plate Voltage	2000	3500 volts
D-C Grid Voltage	−60	−125 volts
Peak R-F Grid Voltage	135	136 volts
D-C Plate Current	0.260	0.150 ampere
D-C Grid Current, approximate	0.100	0.001 ampere
Driving Power, approximate†	25	8.5 watts
Power Output, approximate	175	190 watts

Class C Telephony—Plate Modulated Radio-Frequency Power Amplifier

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

Maximum Ratings, Absolute Values

D-C Plate Voltage		3000 volts
D-C Grid Voltage		−500 volts
D-C Plate Current		0.400 ampere
D-C Grid Current		0.100 ampere
Plate Input		1100 watts
Plate Dissipation		235 watts

Typical Operation

D-C Plate Voltage	2000	3000	3000 volts
D-C Grid Voltage	−310	−320	−270 volts
Peak R-F Grid Voltage	535	520	420 volts
D-C Plate Current	0.390	0.340	0.240 ampere
D-C Grid Current, approximate	0.070	0.065	0.035 ampere
Driving Power, approximate	35	35	20 watts
Power Output, approximate	550	780	550 watts

Class C Telegraphy—Radio-Frequency Power Amplifier and Oscillator

Key-down conditions per tube without amplitude modulation‡

Maximum Ratings, Absolute Values

D-C Plate Voltage		4000 volts
D-C Grid Voltage		−500 volts
D-C Plate Current		0.500 ampere
D-C Grid Current		0.100 ampere
Plate Input		1800 watts
Plate Dissipation		400 watts

Typical Operation

D-C Plate Voltage	2000	3500 volts
D-C Grid Voltage	−200	−240 volts
Peak R-F Grid Voltage	445	460 volts
D-C Plate Current	0.500	0.450 ampere
D-C Grid Current, approximate	0.085	0.070 ampere
Driving Power, approximate	35	30 watts
Power Output, approximate	780	1200 watts

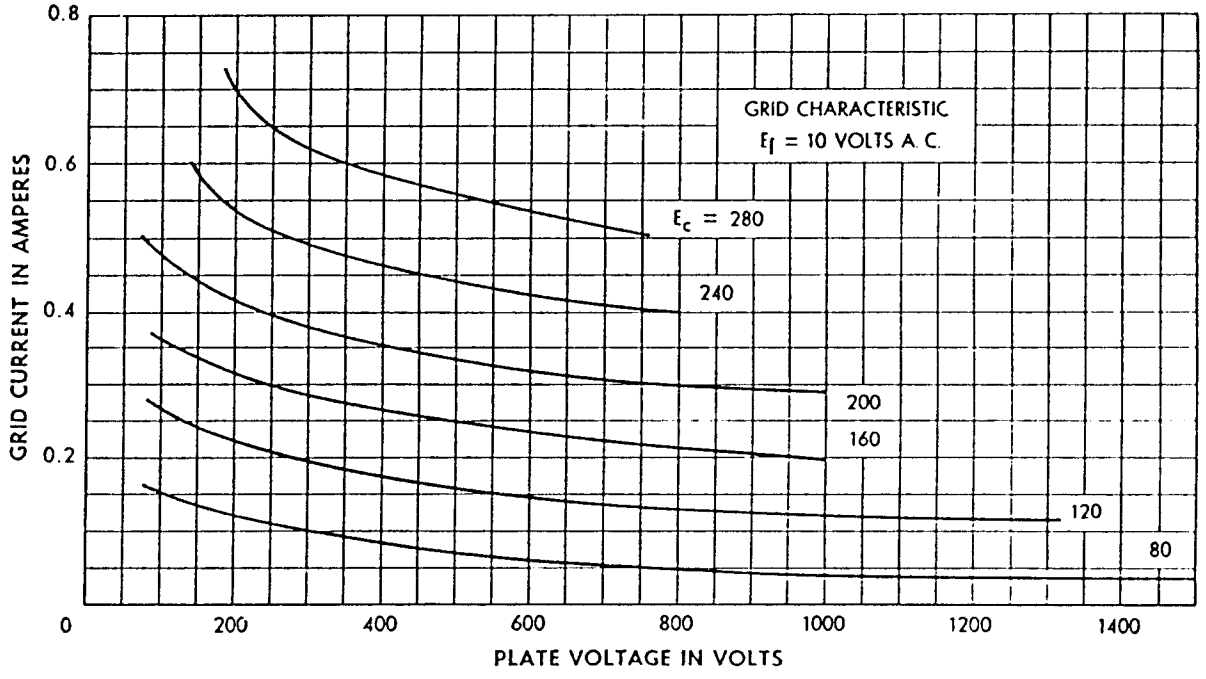
* Averaged over any audio-frequency cycle of sine wave form.
† At crest of audio-frequency cycle with modulation factor of 1.0.
‡ Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 per cent of its unmodulated value.

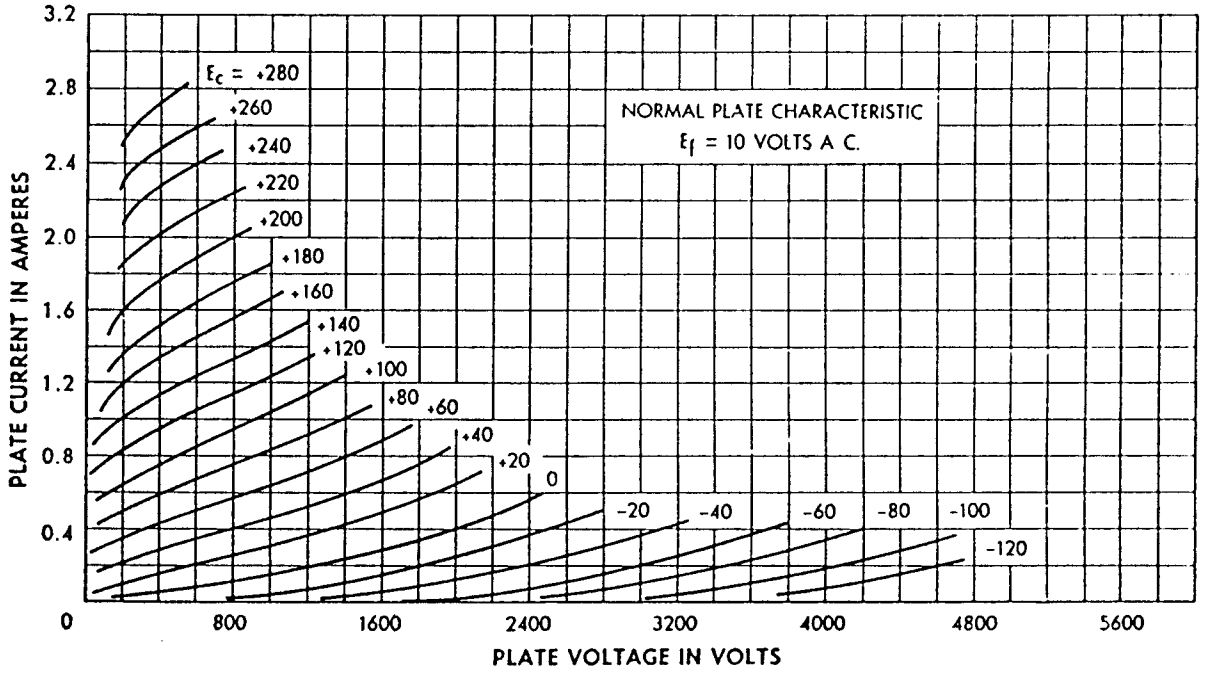
APPLICATION NOTES

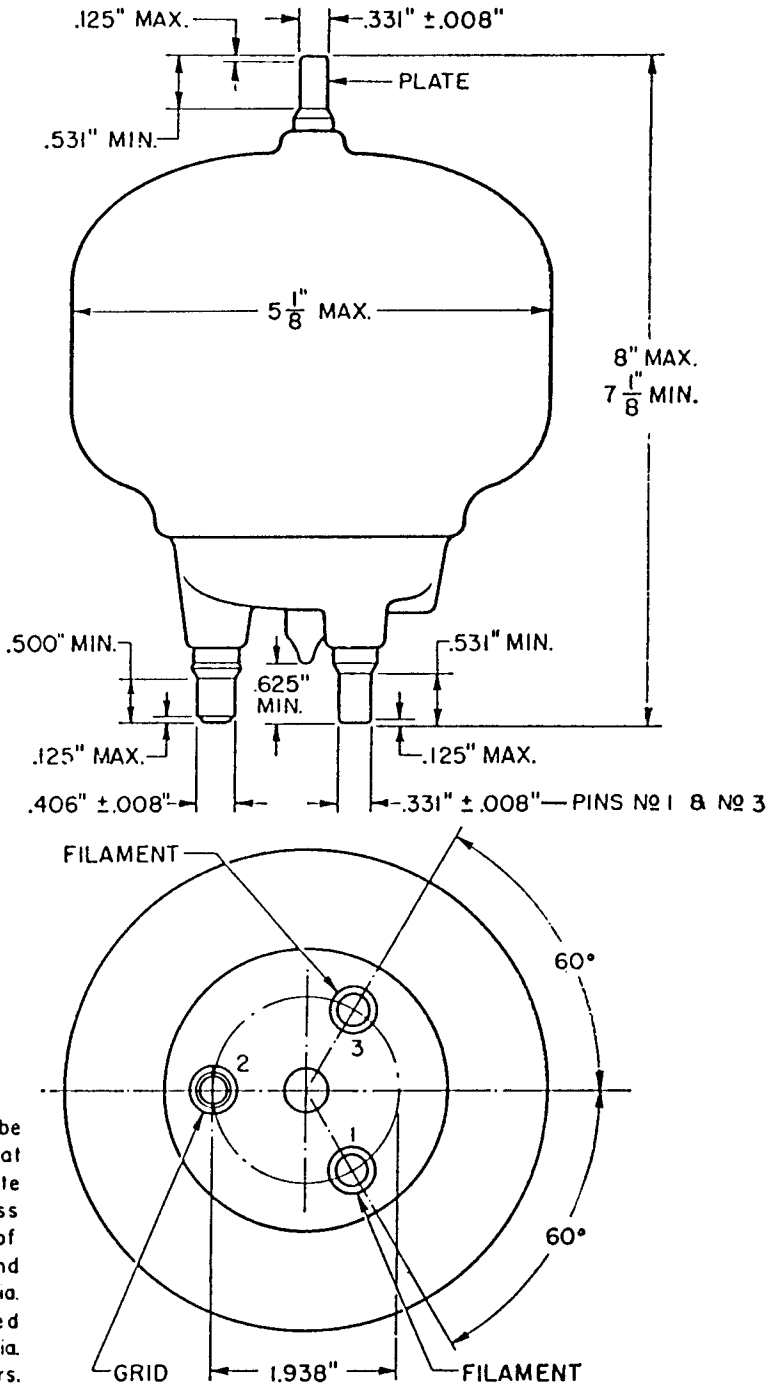
Maximum ratings apply up to 100 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and plate input are reduced according to the tabulation below. Other maximum ratings are not affected.

Frequency	100	125	150 megacycles
Percentage of maximum rated plate voltage and plate input			
Class B	100	85	70 per cent
Class C, plate modulated	100	75	50 per cent
Class C, unmodulated	100	80	60 per cent

Radiation cooling is adequate when the tube is operated below 40 megacycles and with a free circulation of air around the tube. If operated in a confined space or at a frequency above 40 megacycles, forced-air cooling is necessary. Satisfactory air cooling will be obtained from a blower delivering approximately 40 cubic feet of air per minute from a 2-inch diameter nozzle. The nozzle outlet should be placed approximately 3 inches from the tube and directed toward the central point of the envelope, midway between the plate and grid terminal.







Note:
Base pin positions shall be held to tolerances such that pins will fit a flat - plate gauge having a thickness of .250" with 2 holes of .391" ± .0005" dia. and 1 hole of .469" ± .0005" dia. All holes shall be located on a 1.938" ± .0005" dia. circle at specified centers.

DIMENSIONS—ML-357B

MACHLETT LABORATORIES, INC.

SPRINGDALE MACHLETT CONNECTICUT

U. S. A.