MICROWAVE TRIODE 416B

Planar triode for use as microwave amplifier, mixer and oscillator at frequencies of about 4000 Mc. High transconductance gives the tube a superior figure of merit. Exceptionally low noise factor makes it particularly suitable as a pre-amplifier at very high frequencies ranging from 200 Mc to 4000 Mc.
The frame grid, which is similar in principle to that described in Section A, has a lateral wire diameter of only .0065 mm.

CAPACITANCES

Grid to Plate, cold tube	1.5	$\mu\mu$F
Grid to Shell*, cold tube	10	$\mu\mu$F
Grid to Shell*, E_f = 6.1 v, E_{f_1} = O v	9	$\mu\mu$F
Plate to Shell*, cold tube	.02	$\mu\mu$F
Cathode to Shell, cold tube	45	$\mu\mu$F

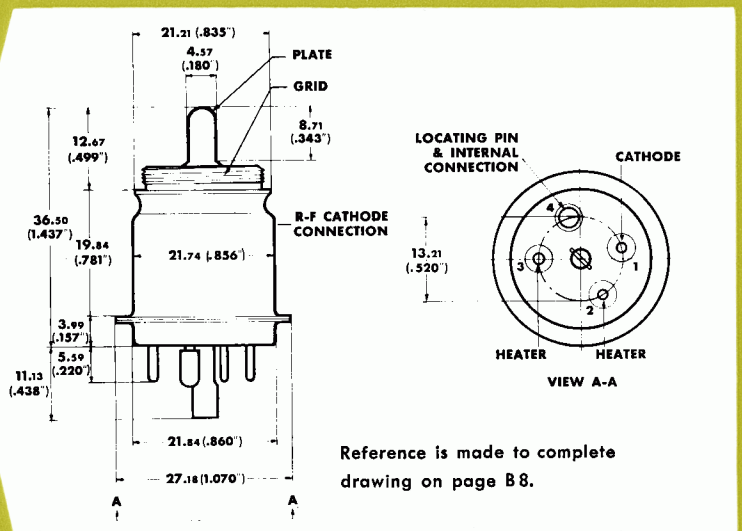
* Cathode connected to Shell through "cathode to shell" capacitance.

ABSOLUTE MAXIMUM RATINGS

Plate Voltage	270	volts
Grid Voltage, positive value	+ 1.5	volts
Grid Voltage, negative value	— 15	volts
Plate Current	33	ma
Grid Current	15	ma
Plate Dissipation	7.5	watts
Heater — Cathode Voltage	45	volts
Plate Seal Temperature	150	°C
Grid Seal Temperature	100	°C

MECHANICAL DATA

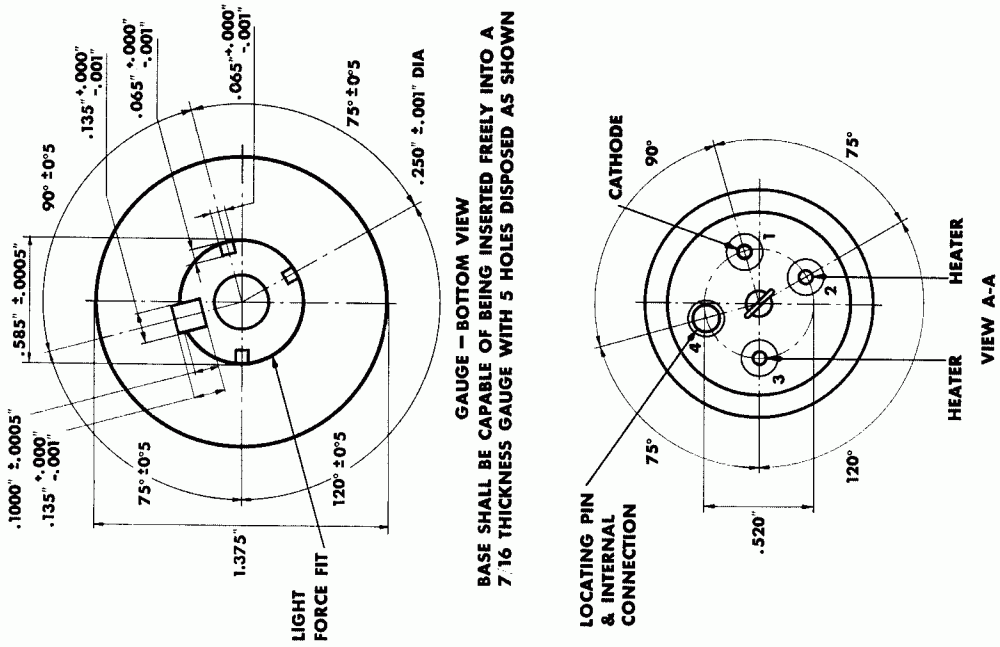
Base: See drawing
Dimensions: See drawing
Mounting Position: Any
Socket: KS 14134

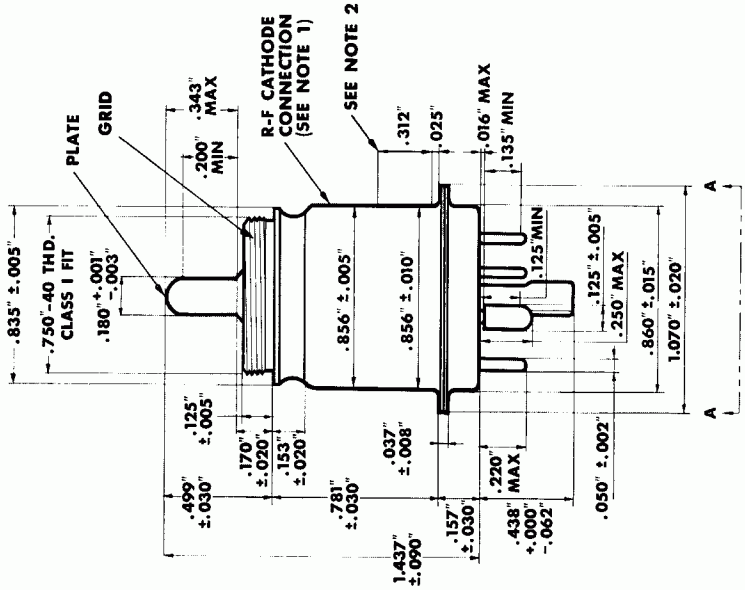


Reference is made to complete drawing on page B 8.

416B MICROWAVE TRIODE

MECHANICAL DATA





NOTE 1: Surfaces of R-F cathode, grid, anode and pin connections are gold plated.

NOTE 2: .856" ± .010" dimension applies only over the .312" length.

MICROWAVE TRIODE 416B

ELECTRICAL DATA

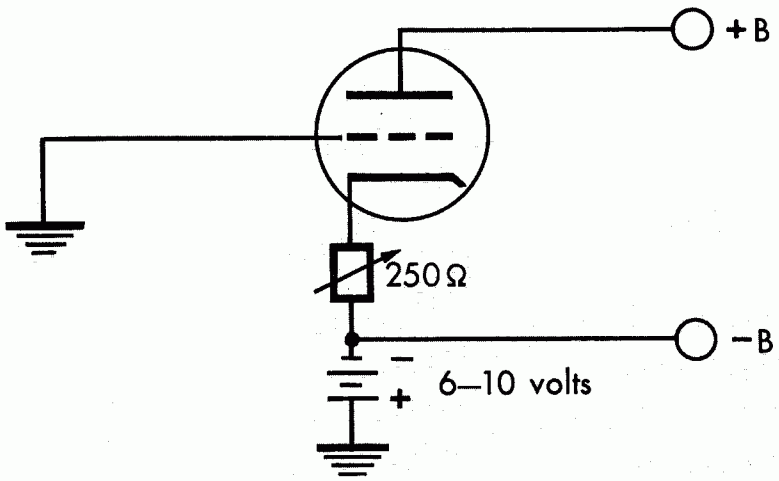
Heater Voltage	6.3	volts
Heater Current	1.18	amps
Amplification Factor	300	
Transconductance at Plate Current = 30 ma	50,000	μmhos
Noise Figure at 500 Mc	below 6	db

TYPICAL OPERATION

Heater Voltage		6.1	volts
Heater Current		1.15	amps
Plate Voltage		200	volts
Bias Circuit — see Diagram			
Frequency		4200	Mc
Gain:	MIN	AVE	
High Level (500 mw Output)	3	6	db
Low Level (50 mw Output)	8	10	db
Band Width (3 dB down)		100	Mc

SPECIAL DATA

RECOMMENDED GRID BIAS



416B MICROWAVE TRIODE

HEATER VOLTAGE

The bogie value of heater voltage is 6.3 volts. For optimum tube life, however, the heater voltage should be kept as close as possible to 6.1 volts and should not under any condition fall below 6.0 or exceed 6.6 volts.

TUBE TEMPERATURE

Sufficient conduction and convection cooling must be provided to limit the grid and plate temperatures under all operating conditions to:

Grid Terminal	max. 100° C
Anode Terminal	max. 150° C

When using the 416B in a closed cavity it is recommended that cooling air be admitted through the tube cavity to the anode terminal. Normal temperature ranges are:

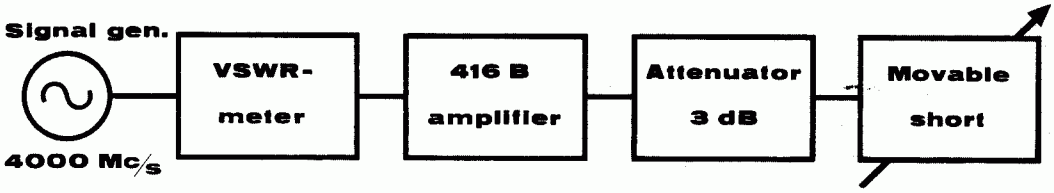
Tube Shell	55 ± 10° C
Grid Terminal	35 ± 10° C
Anode Terminal	85 ± 10° C

TESTING

Owing to the fact that the 416B will start to oscillate at a plate current of 2 ma in test circuits, where high unbypassed resistances can not be used, it is strongly recommended that the tube be tested by inserting it into a properly designed cavity with forced air cooling.

INPUT IMPEDANCE

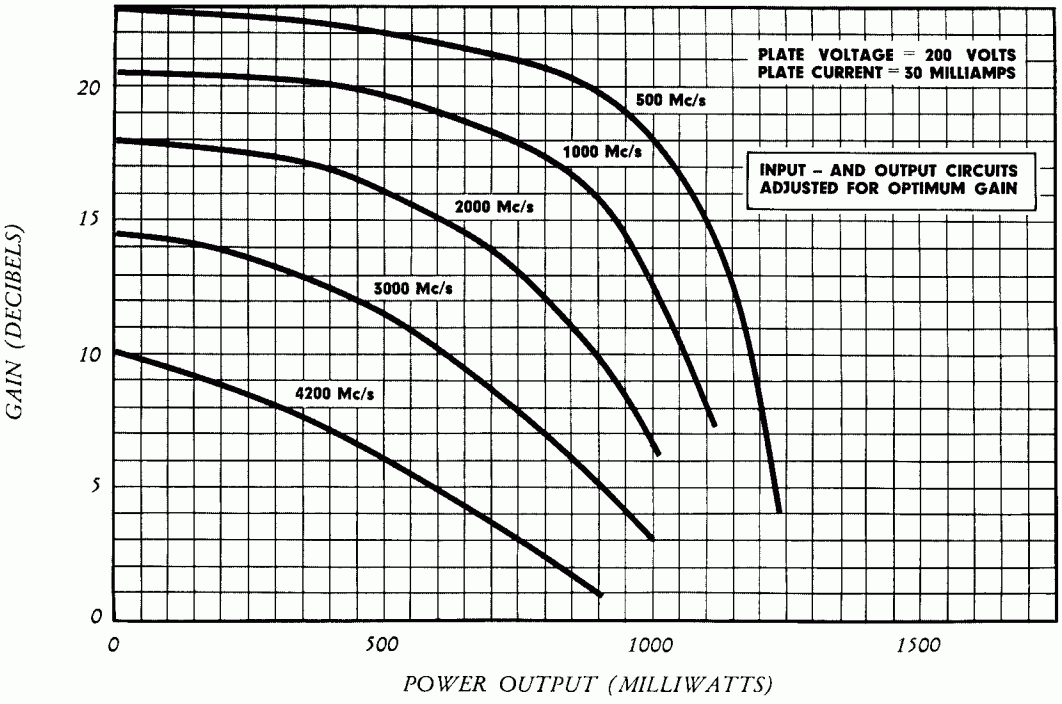
416B has an extremely high amplification factor. This means for example that the isolation is high between the input and output circuit which is an important feature when several RF-amplification stages are used in cascade. In the application shown the maximum input standing wave ratio was measured when the position of a movable short in the output line was varied through all phases. It was found that the maximum voltage standing wave ratio can be expected not to exceed 1.60.

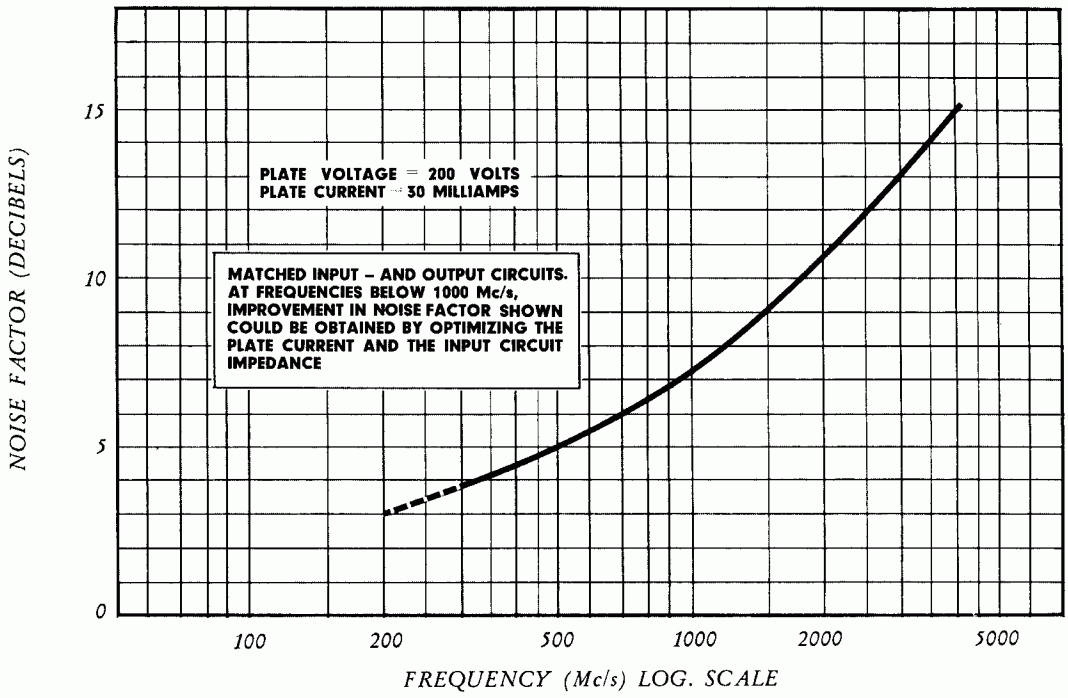


Edition 1

MICROWAVE TRIODE 416B

AVERAGE CHARACTERISTICS





416B MICROWAVE TRIODE

AVERAGE CHARACTERISTICS