

F-6997
TRAVELING
WAVE TUBE

from JETEC release #1962, July 1, 1957

GENERAL DESCRIPTION

The F-6997 is a 30 watt pulse traveling wave amplifier tube having 30 db gain and designed primarily for use in the 2700 to 2900 mc frequency range. It is constructed in a rugged metal envelope with a helix type slow wave structure. The integral matching circuit is in 50 ohm coaxial line and is provided with type "N" connectors. The tube is self aligning in the external solenoid which is required to provide a uniform magnetic field. A convergent beam gun and oxide impregnated cathode are used. Duty cycles up to .01 and pulse widths up to 10 microseconds can be used. A control grid suitable for grid pulsing is provided.

ELECTRICAL RATINGS, ABSOLUTE VALUES

Heater Voltage	6.3 (±10%) volts
Heater Current	5.0 amperes
Maximum Anode Voltage (Note 1)	2500 volts
Maximum Shell Current (Note 2)	0.2 ampere peak
Maximum Collector Voltage (Note 3)	2500 volts
Maximum Collector Dissipation	10 watts average
Maximum R-F Input Power	200 mw average
Maximum R-F Output Power	1 watt average
Maximum Duty Cycle	.01
Maximum Pulse Width (beam)	10 microseconds
Maximum Cathode Current	0.5 ampere peak
Maximum Grid Voltage	
Negative	-100 volts
Positive	+100 volts

ELECTRICAL INFORMATION

Maximum Frequency (Note 4)	3300 mc
Minimum Frequency (Note 4)	2000 mc
Minimum Cold Transmission Loss	50 db
Capacitance	
Control Grid to All Other Elements	9 μμfd

MECHANICAL INFORMATION

Type of Cathode	Oxide Impregnated Unipotential
Base, Small Shell Duodecal, 6 Pin, JETEC Designation	B6-63
Type of Envelope	Metal
Magnetic Field Strength	700 gauss
Length of Magnetic Field	9.625 inches uniform
Mounting Position	Any

Federal Telephone and Radio Company

MECHANICAL INFORMATION (continued)

Weight (not including magnet)	1 pound, 14 ounces
R-F Connections	Type N Jack UG-23B/U
Type of Cooling	Convection
Glass Temperature	160°C max.

TYPICAL OPERATION AS POWER AMPLIFIER

Frequency	2700 to 2900 mc
Anode Voltage (Note 1)	2100 volts
Cathode Current	0.25 amperes peak
Collector Voltage (tied to shell)	2100 volts
Collector Current	0.20 amperes peak
Power Output (minimum)	30 watts peak
Gain	30 db
Duty	.005
Pulse Width	2 microseconds
Grid Bias (for cut-off)	-10 volts
Grid Voltage during Pulse	+50 volts
Grid Current during Pulse	0.02 amperes peak

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Note 1: All voltages shown are with respect to cathode. Anode and helix are connected internally to the shell. The shell is normally operated at ground potential and the anode connection is made to the shell of the solenoid.

Note 2: The shell current is the difference between cathode current and collector current. Since this current in general should be minimized, it may be desirable to measure current from shell to ground. In making this measurement, care should be taken that both the tube and solenoid are completely insulated from ground. Once operating characteristics (voltage, current, and magnetic field) have been established, shell should be grounded.

Note 3: The tube may be operated with the collector tied to the shell (anode and helix) or may be operated at several hundred volts positive with respect to shell with slight improvement in beam transmission. The potential difference between collector and shell must be limited to 500 volts maximum.

Note 4: Useful gain and power output exists below 2000 mc and above 3300 mc and can be utilized by adjusting anode voltage to optimize the frequency range desired. However, bandwidth cannot be extended both upward and downward simultaneously and maximum gain and power output outside the normal bandwidth will be lower than rated values.

General Operating Instructions:

- (1) Heater warm up of one minute before applying high voltage is recommended.
- (2) High voltage must not be applied in the absence of proper grid bias and magnetic field.
- (3) Initial adjustments should be done at low duty cycle (less than .001) to prevent tube damage due to high shell (interception) current.

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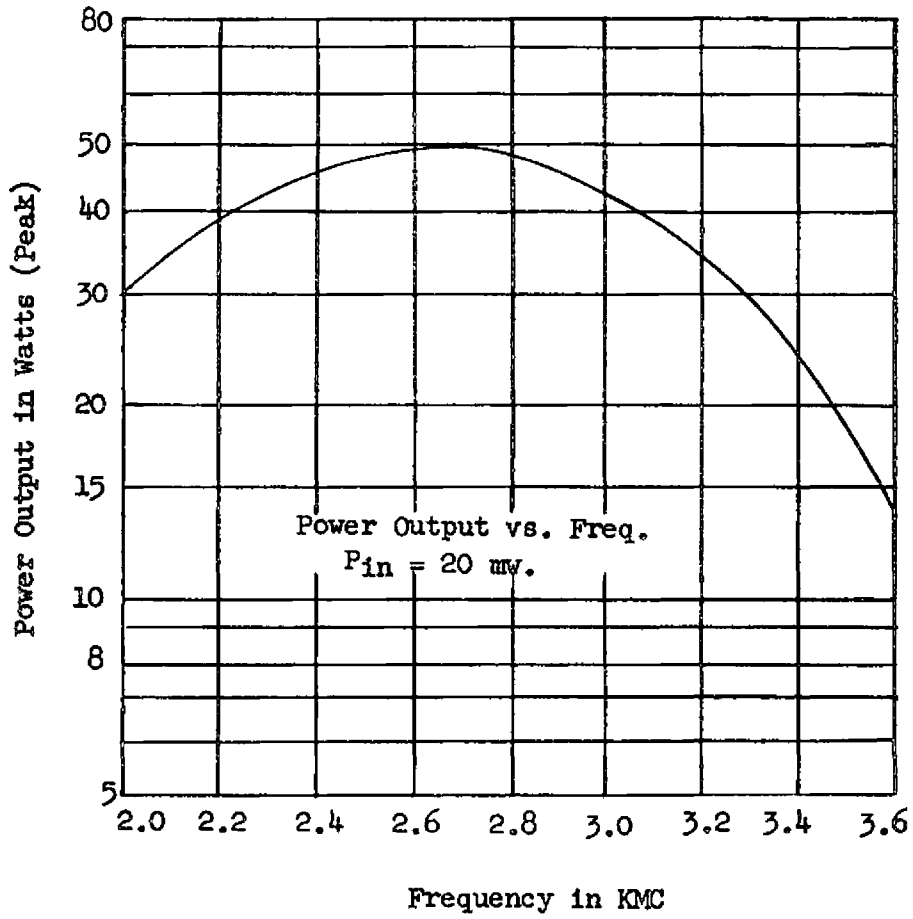
Standard solenoids to operate this tube are available, and solenoids designed for particular applications can be supplied.

Additional information for specific applications can be obtained from the Vacuum Tube Engineering Department.

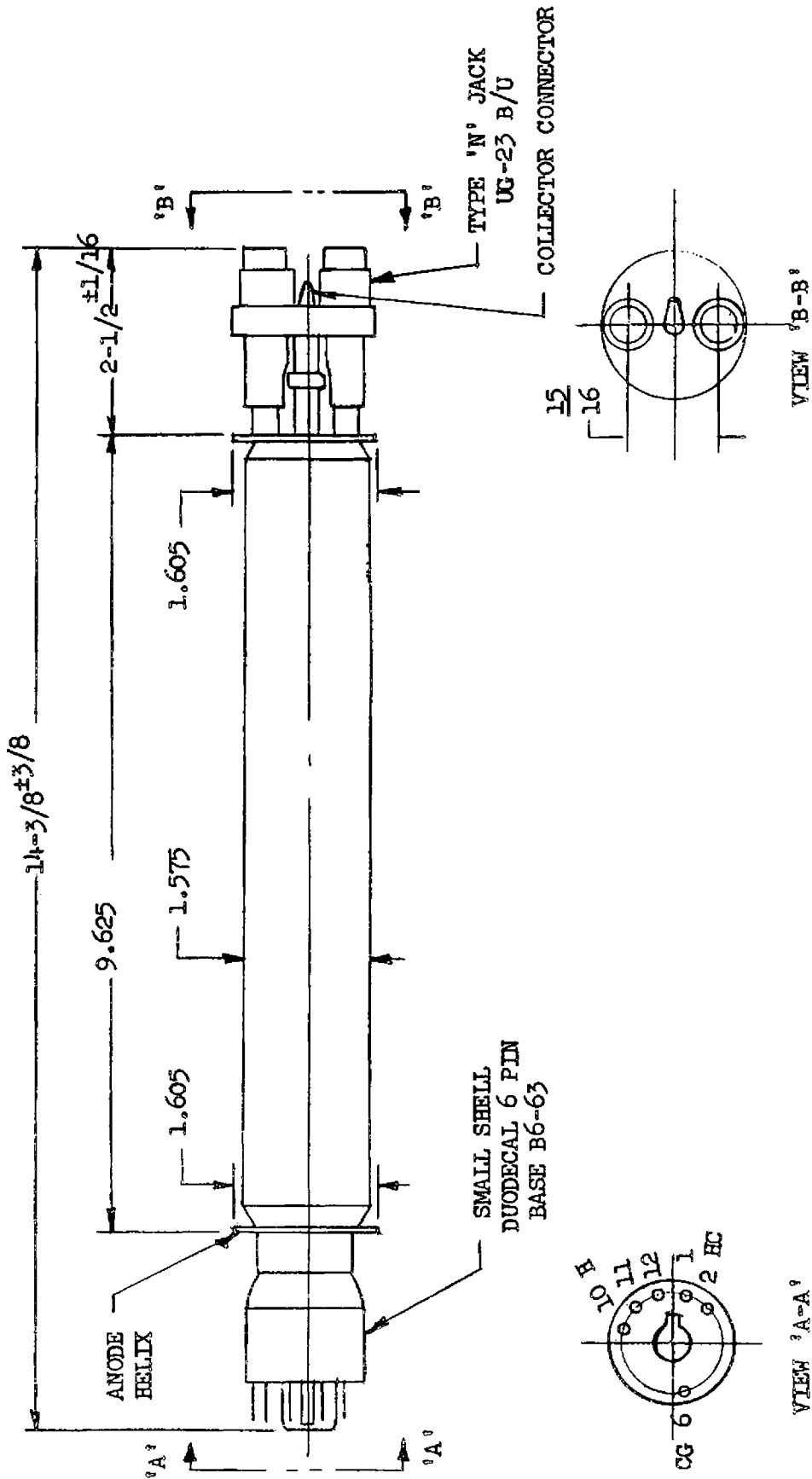
March 1, 1957

TYPICAL P_{OUT} VS. FREQUENCY CHARACTERISTIC

F-6997



Conditions - as per typical operation.



BASING

PIN	ELEMENT
1	NO CONN.
2	HEATER CATHODE
6	CONTROL GRID
10	HEATER
11	NO CONN.
12	NO CONN.

TRAVELING WAVE TUBE TYPES F-6826 and F-6997