



ELECTRON TUBE DEPARTMENT ■ **COMPONENTS DIVISION**
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION, CLIFTON, NEW JERSEY

F-7338
TRAVELING
WAVE TUBE

FORMERLY
F-6826A

TENTATIVE

DESCRIPTION:

The F-7338 is a 1 kilowatt pulse traveling wave amplifier tube having 40 db gain and 2000 to 4000 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 .005 and pulse lengths up to 10 microseconds can be used.

A control grid suitable for grid pulsing is provided.

ELECTRICAL RATINGS, ABSOLUTE VALUES:

Heater Voltage	6.3 ($\pm 10\%$) volts
Heater Current	5.0 amperes
Maximum Anode Voltage (Note 1)	8500 volts
Maximum Shell Current (Note 2)	0.5 ampere peak
Maximum Collector Voltage (Note 3)	9000 volts
Maximum Collector Dissipation (Note 4)	100 watts avg.
Maximum R-F Input Power	10 watts avg.
Maximum R-F Output Power	10 watts avg.
Maximum Duty Cycle	.005
Maximum Pulse Width (Beam)	10 μ sec.
Maximum Cathode Current	2.5 amperes peak
Maximum Grid Voltage	
Negative	-300 volts
Positive (Note 7)	+6% of anode voltage

ELECTRICAL INFORMATION:

Maximum Frequency (Note 5)	2000 mc
Minimum Frequency (Note 5)	4000 mc
Minimum Cold Transmission Loss	60 db
Capacitance - control grid to all other elements	9 μ fd

MECHANICAL INFORMATION:

Type of Cathode	Oxide Impregnated Unipotential
Base, Small Shell Duodecal, 6 Pin	JEDEC Designation B6-63
Type of Envelope	Metal
Magnetic Field Strength	1200 gauss
Length of Magnetic Field	9.625 inches uniform
Mounting Position	Any
Weight (not including magnet)	1 lb. 14 ozs.
R -F Connections	50 ohm coax with Type "N" Jack UG-23B/U
Type of Cooling	Forced Air
Air flow on Collector Radiator (Note 4)	20 cfm
Glass Temperature	160°C max.

TYPICAL OPERATION AS POWER AMPLIFIER:

Center Frequency	3000 mc
Anode Voltage (Note 1)	7800 volts
Cathode Current	1.8 amperes peak
Collector Voltage (tied to shell)	7500 volts
Collector Current	1.4 amperes peak
Power Output (at center frequency)	1.8 kw peak
Bandwidth (Note 6)	2.0 to 4.0 kmc
Gain (Note 6)	40 db
Duty	.001
Pulse Width	2 μ sec.
Grid Bias (for cut-off)	-100 volts
Grid Voltage during Pulse (Note 8)	+350 volts
Grid Current during Pulse	0.1 amperes peak

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 minimum.
- Note 4: Forced air cooling is required for average collector power in excess of 10 watts. As the collector power is increased, the air flow required increases. At the maximum collector power of 100 watts, a minimum air flow of 20 cfm through the cooling fins is required.
- Note 5: Useful gain and power output exists below 2000 mc and above 4000 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.
- Note 6: The following gain, power, bandwidth relations apply: The minimum power and gain is 1 kw at 40 db from 2400 to 3600 mc, and 500 watts at 37 db from 2000 to 4000 mc. Small signal gain is less than 50 db over the operating bandwidth. Saturated power output of at least 1 kw can be obtained from 2200 to 4000 mc. Bandwidth between 6 db small signal points is greater than 500 mc and bandwidth between 10 db small signal points is greater than 1800 mc.
- Note 7: Positive voltage must not be applied to the grid in the absence of anode voltage.
- Note 8: The positive grid voltage pulse should be the minimum consistent with normal power output.

GENERAL OPERATING INSTRUCTIONS:

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



F-7338
TRAVELING
WAVE TUBE

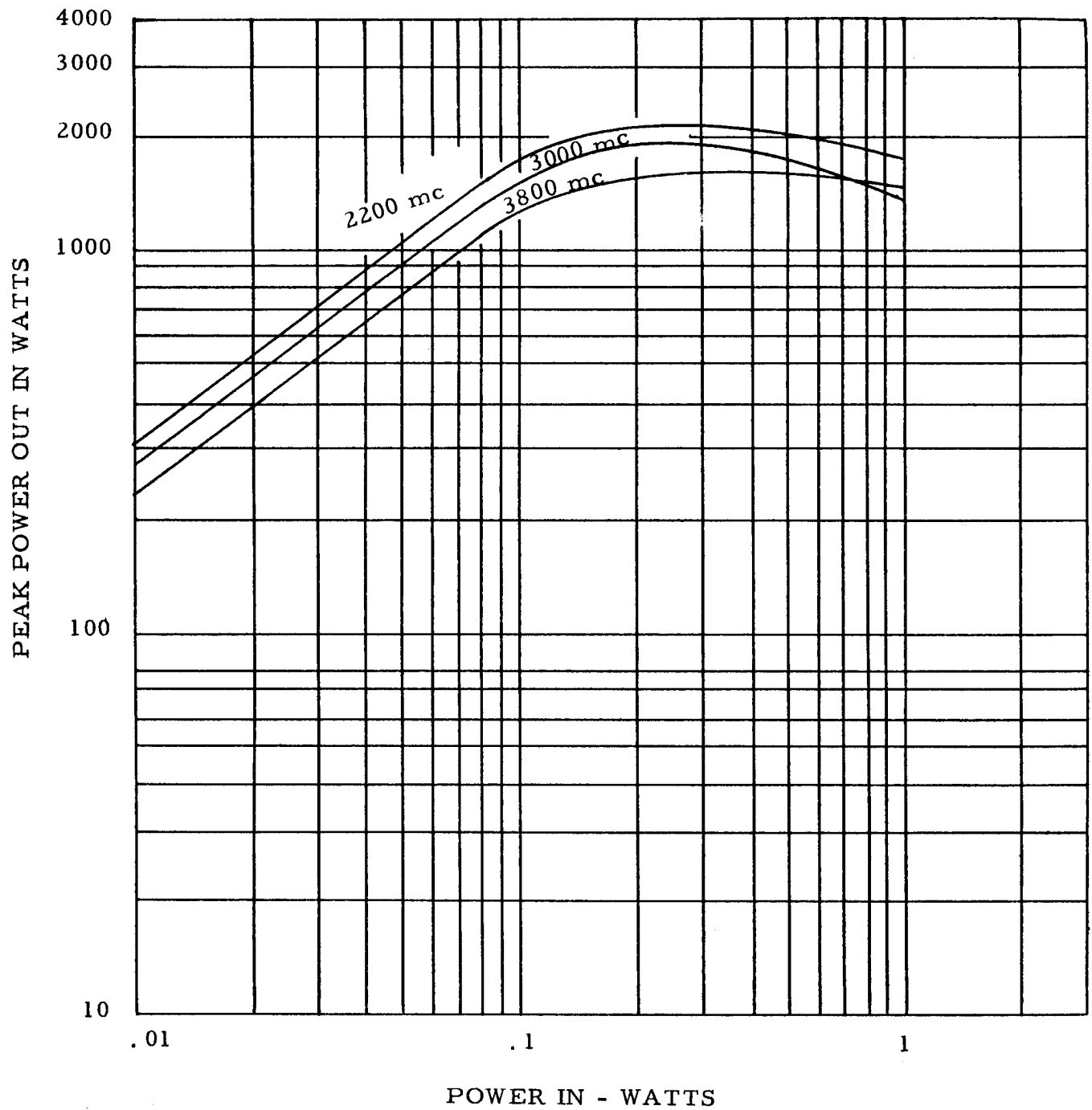
- 4 -

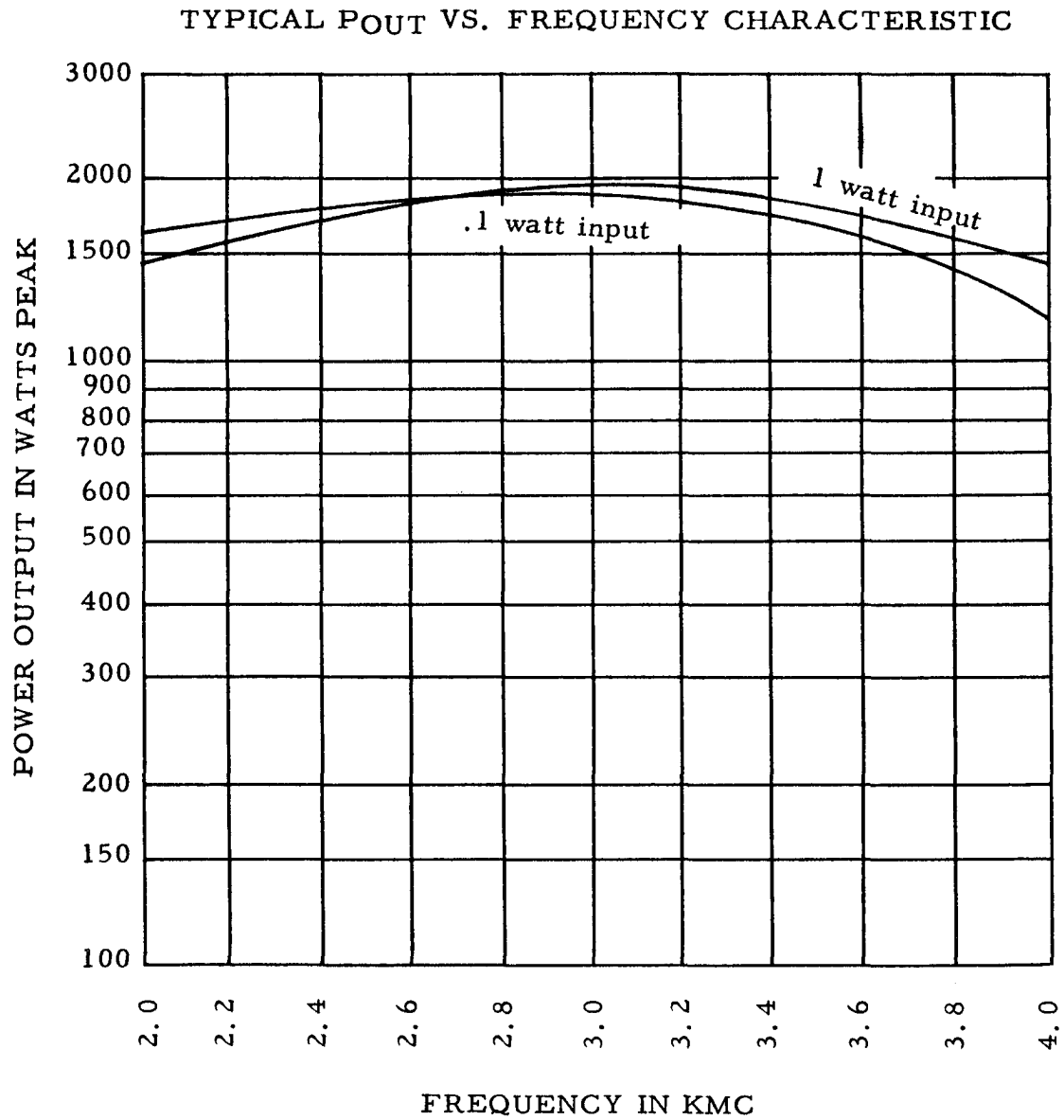
Standard solenoids to operate this tube are available, and solenoids designed for particular applications can be supplied.

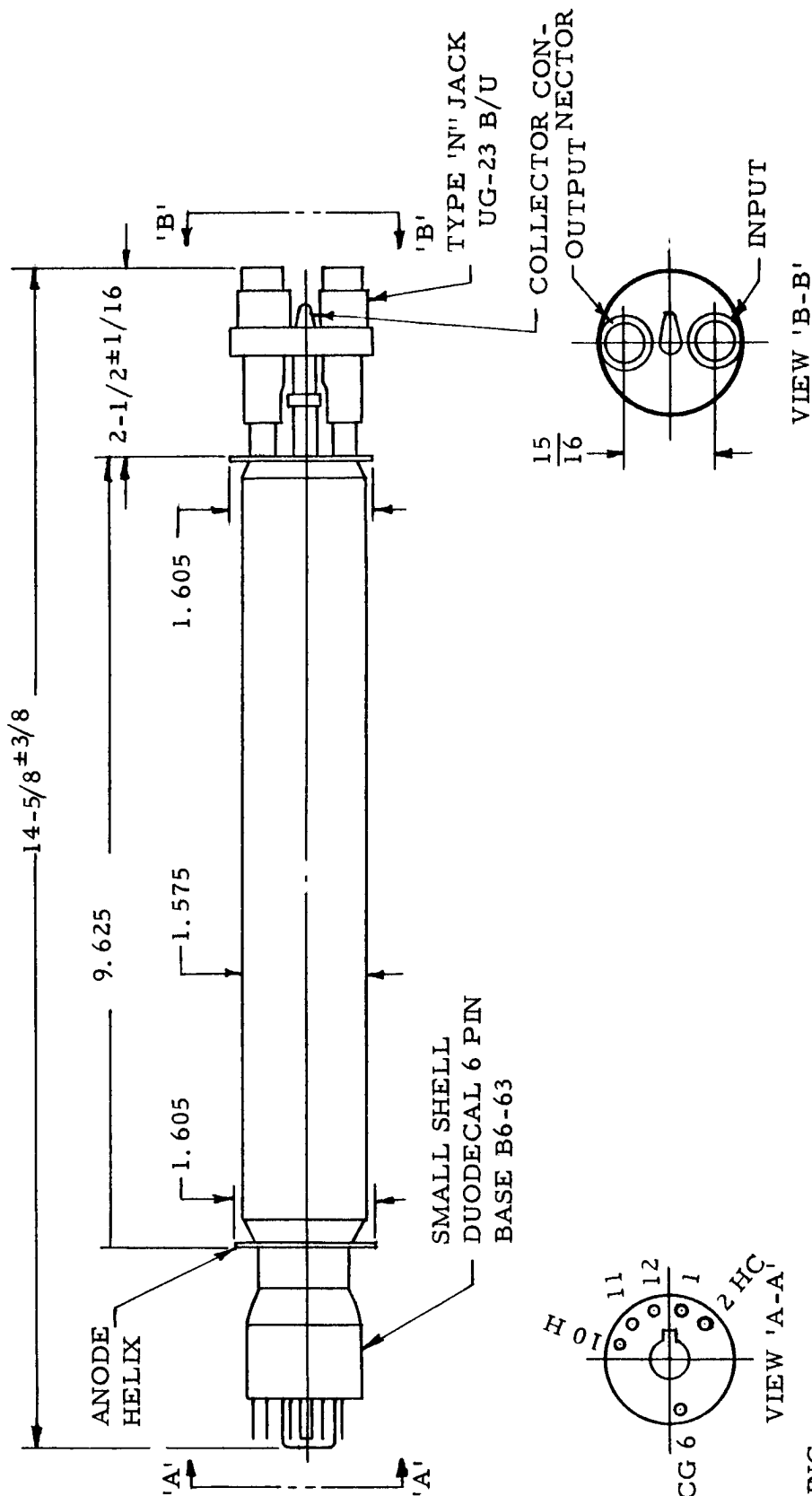
Additional information for specific applications can be obtained from the

Electron Tube Applications Section
ITT Components Division
Box 412
Clifton, New Jersey

TYPICAL POWER IN - POWER OUT CHARACTERISTIC







TRAVELING WAVE TUBE TYPE F-7338

BASING

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