from JETEC release #1532, Oct. 31, 1955

FEDERAL TELEPHONE AND RADIO COMPANY
A Division of International Telephone and Telegraph Corporation

TRAVELLING WAVE TUBE REGISTRATION

Reservation No. 6658 Manufacturer's Designation: X-232

Reservation Date: March 14, 1955 Date Bureau Designation: 6658

General Characteristics

The 6658 all metal envelope travelling wave tube employing a helical type wave propagating structure is for power, intermediate-level, or low level amplifier operation in the 2000 to 4000 mc frequency range. The power output is approximately 5 watts peak and the tube is forced air cooled. It is designed for CW service and for pulsed service with a maximum duty cycle of 0.1. The matching circuit in 50 ohm coaxial line is used. The matching circuit is integral with the tube. A uniform magnetic field is used to control the electron beam. This is not integral with the tube.

Electrical Ratings, Absolute Values

Heater Voltage	6.3 (±10%) volts
Heater Current	1.8 amperes
Maximum Anode Voltage (Note 1)	1250 volts
Maximum Shell Current (Note 2)	5 ma
Maximum Collector Voltage (Note 3)	1500 volts
Maximum Collector Dissipation (Note 4)	100 watts
Maximum Focussing Electrode Voltage (Note 5)	-200 volts
Maximum R-F Output Power	1.0 watt average

Electrical Information

Maximum Frequency	4000 mc
Minimum Frequency	2000 mc
Minimum Cold Transmission Loss	50 db

Mechanical Information

Type of Cathode	Oxide Coated Unipotential
Base, small shell duodecal, 5 pin, JETEC Designation	B5-57
Type of Envelope	Metal
Magnetic Field Strength	750 gauss
Length of Magnetic Field	6.75 inches uniform
Mounting Position	Any
Weight (not including magnet)	1 pound, 7 ounces
R-F Input and Output Impedance and Type Conductor	50 ohm coax with Type N Jack UG-23B/U
Type of Cooling	Forced Air
Maximum Glass Temperature	160°C
Cooling Air Required (See Note 4)	100 C.F.M.

Typical Operation as Power Amplifier

Center Frequency	3000 mc
Anode Voltage	1000 volts
Shell Current	3 ma
Collector Voltage	1100 volts
Collector Current	47 ma
Focussing Electrode Voltage	0 volts
Power Output	5 watts
Bandwidth to 3 db power points	2.0 to 4.0 kmc
Gain	> 23 db
Duty Cycle	
R-F	0.1
Beam	1.0
Pulse Width	10 μseconds

Typical Operation as Linear Amplifier
(Input powers less than -10 dbm)

Center Frequency	3000 mc
Anode Voltage	900 volts
Shell Current	2.5 ma
Collector Voltage	1000 volts
Collector Current	42 ma
Focussing Electrode Voltage	0 volts
Gain	> 35 db
Bandwidth to 3 db power points	2.1 to 3.7 kmc
Minimum Gain (2.0 to 4.0 kmc)	> 30 db
Noise Figure at operating Bandwidth	< 30 db
Duty Cycle	1.0

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 d-c connection is made to the shell of the solenoid.

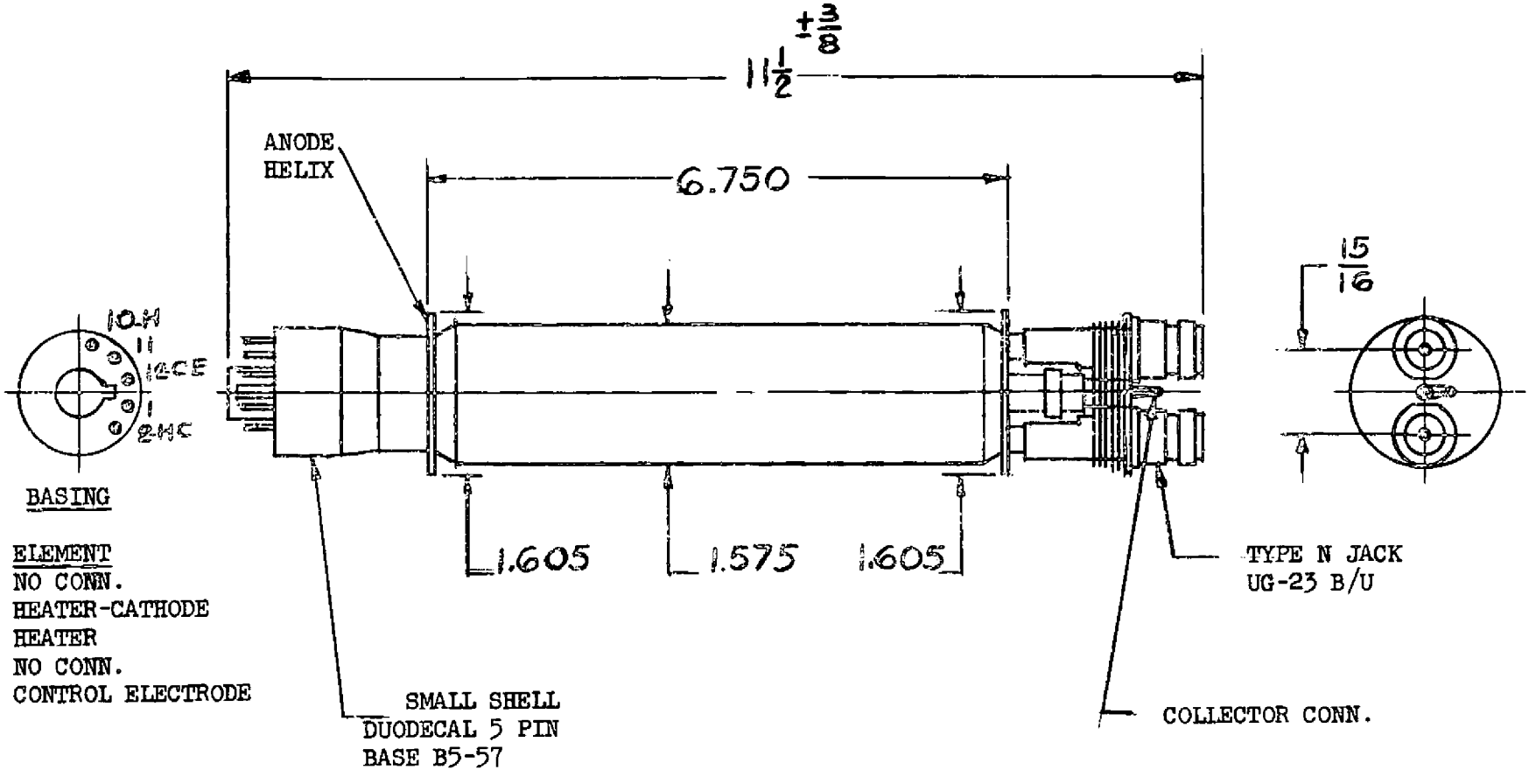
Note 2. The shell current is the difference between the cathode current and collector current. Since this current in general should be minimized, it may be desirable to measure the current from shell to ground. In making this measurement care should be taken that both the tube and solenoid are completely 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). It is generally desirable to operate the collector at 100 to 200 volts positive with respect to shell, and potential difference between collector and shell should be limited to 300 volts maximum.

Note 4. Forced air cooling of collector 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 10 cfm through the cooling fins is required.

Note 5. The control electrode may be operated fixed at cathode potential, if desired. It may also be used in the region close to cathode potential to assist in improving beam transmission (minimizing shell current) or over the range of 0 to -200 volts to adjust gain and/or power output (increasingly negative control electrode voltage reduces gain and/or power output).

WARNING: Precautions must be taken to insure that high voltage is not applied in the absence of magnetic field; otherwise the tube may be damaged.



BASING

PIN	ELEMENT
1	NO CONN.
2	HEATER-CATHODE
10	HEATER
11	NO CONN.
12	CONTROL ELECTRODE

TRAVELLING-WAVE TUBE TYPE 6658