



**ELECTRONIC
INNOVATIONS**
IN ACTION

TUBES

PRELIMINARY TECHNICAL INFORMATION

These ratings represent those of current samples of this type. Refer to the Objective Technical Information sheet for design-objective ratings.

**DEVELOPMENTAL
TYPE**

ZP-1038
PTI-162A
Page 1
9-67

This technical information is proprietary and is furnished only as a service to customers.

ZP-1038

TETRODE

**Forced-Air Cooled
Metal and Ceramic**

**Pulsed Service
Grounded-Grid Operation**

Integral Radiator

The ZP-1038 is a small-size, four-electrode transmitting tube especially designed for RF grid-pulsed or plate-and-screen pulsed amplifier service at L-band frequencies. This tetrode is particularly well suited for use in air-borne or ground-based radar equipment.

The tube is capable of providing useful output at frequencies up to approximately 1500 megacycles.

Features of the ZP-1038 include long life and reliability, long pulse width, high peak power and high gain, broad-banding capability, and resistance to shock and vibration.

These together with such design factors as an oxide-coated cathode, coaxial elements, and metal-ceramic construction make the tube well adapted to application in modern systems where high performance and reliability are important.

ELECTRICAL

	Minimum	Bogey	Maximum	
Heater Voltage (See Note 1)	—	6.3	6.8	Volts
Heater Current	—	5.6	—	Amperes
Cathode Heating Time	1	—	—	Minute
Direct Interelectrode Capacitances*				
Input	—	24	—	$\mu\mu\text{f}$
Output	—	9	—	$\mu\mu\text{f}$

MECHANICAL

Mounting Position — Any			
Net Weight		0.8	Pounds

THERMAL

Cooling — Forced Air†			
Radiator‡			
Plate Dissipation	600	400	— Watts
Air Flow, 45 C incoming air temperature,			
at sea level	9	4.5	— Min Cubic Feet per Minute
Static Pressure, approximate	0.5	0.2	— Inches-Water
Anode Hub Temperature Δ			250 Max C
Seals			
Screen and Control Grid, approximate		1	Cubic Foot per Minute
Heater and Cathode, approximate		1	Cubic Foot per Minute
Ceramic Temperature at any Point		200	Max C

Note 1: Because the temperature of the cathode is increased by back bombardment of electrons at UHF, required heater voltage for optimum life decreases with increasing frequency. The amount of heater-voltage reduction is dependent on operating conditions. However, this voltage should not be less than 5.5 volts.

RADIO-FREQUENCY POWER AMPLIFIER - CLASS B

Maximum Ratings

Plate- and Screen-Grid Pulsed, 500 Megacycles

DC Plate Voltage, during pulse	10	Kilovolts
DC Plate Current, during pulse	10	Amperes
DC Grid-No. 2 Voltage, during pulse	2000	Volts
DC Grid-No. 2 Input ♣	15	Watts
Plate Dissipation ♣	500	Watts
DC Grid-No. 1 Voltage, not pulsed	-175	Volts
DC Grid-No. 1 Current, during pulse	2.5	Amperes
Pulse Width ♥ ◇	15	Microseconds
Duty Factor ♥ ∅	0.0012	

Typical Operation

Grounded-grid Circuit, 500 Megacycles, 1/4 λ Output Circuit

DC Plate Voltage, during pulse	9	Kilovolts
DC Grid-No. 2 Voltage, during pulse	1400	Volts
DC Grid-No. 1 Voltage, not pulsed	-125	Volts
Peak RF Plate Voltage	7000	Volts
Peak RF Grid Voltage	300	Volts
DC Plate Current, during pulse	9.2	Amperes
DC Grid-No. 1 Current, during pulse	1.1	Amperes
DC Grid-No. 2 Current, during pulse	0.47	Amperes
Driving Power at Tube, during pulse	2.6	Kilowatts
Power Output, during pulse (useful)	52	Kilowatts
Pulse Width ◇	15	Microseconds
Duty Factor	0.001	

RADIO-FREQUENCY POWER AMPLIFIER - CLASS C

Maximum Ratings

Pulsed Drive, 1250 Megacycles

DC Plate Voltage	5	Kilovolts
DC Plate Current, during pulse	6	Amperes
DC Grid-No. 2 Voltage	1.1	Kilovolts
DC Grid-No. 2 Input	5	Watts
DC Grid-No. 1 Voltage	-225	Volts
DC Grid-No. 1 Current	1.5	Amperes
Plate Dissipation	500	Watts
Pulse Width ♥ ◇	15	Microseconds
Duty Factor ♥ ∅	0.01	

Typical Operation

Grounded-grid Circuit at 1100 Megacycles, 3/4 λ Output Circuit

DC Plate Voltage **	4.8	Kilovolts
DC Plate Current, during pulse	4.2	Amperes
DC Grid-No. 2 Voltage	1	Kilovolt
DC Grid-No. 2 Current, during pulse	100	Milliamperes
DC Grid-No. 1 Voltage	-200	Volts
DC Grid-No. 1 Current, during pulse	200	Milliamperes
Driving Power at Tube, during pulse	1.5	Kilowatts
Power Output, during pulse (useful)	11	Kilowatts
Pulse Width ◇	15	Microseconds
Duty Factor	0.01	

* Control grid connected directly to screen grid.

‡ Forced air cooling should be applied during the application of any voltages.

§ Provision must be made for unobstructed passage of cooling air through the radiator fins, and between the anode terminal and adjacent portion of the radiator.

Δ Measured at the base of the radiator and adjacent to the plate terminal.

♣ Maximum average value.

♥ For applications that require longer pulses or higher duty refer to the tube manufacturer for recommendations.

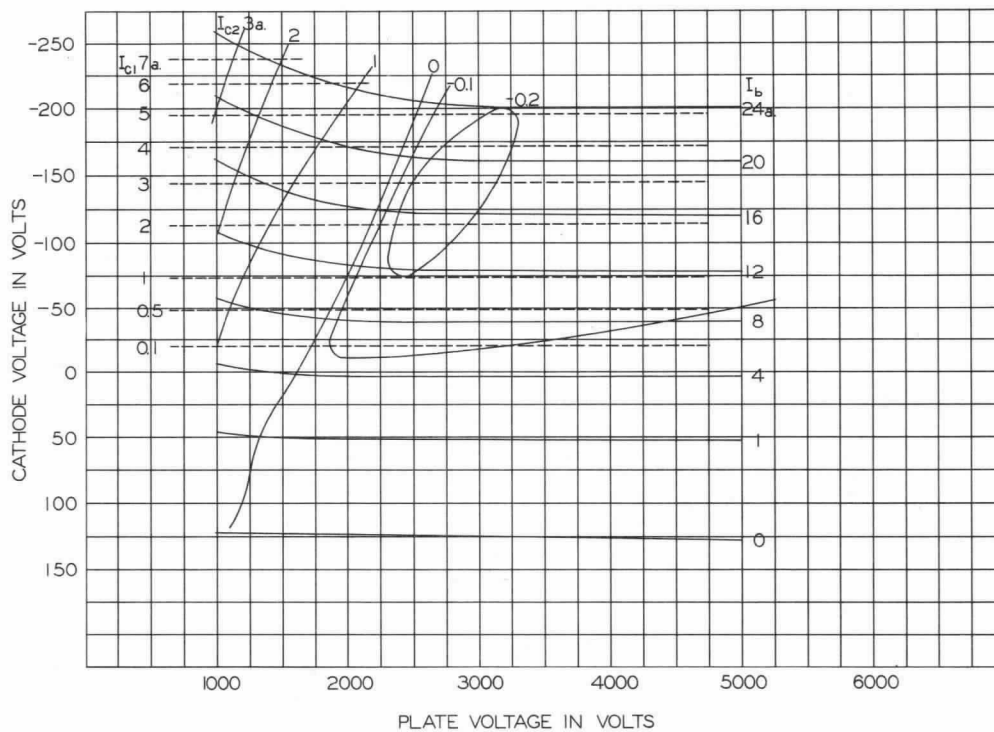
◇ Pulse duration measured between points at 70 percent of peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

∅ Maximum ratio of on-time to elapsed time during any 12.5-millisecond period.

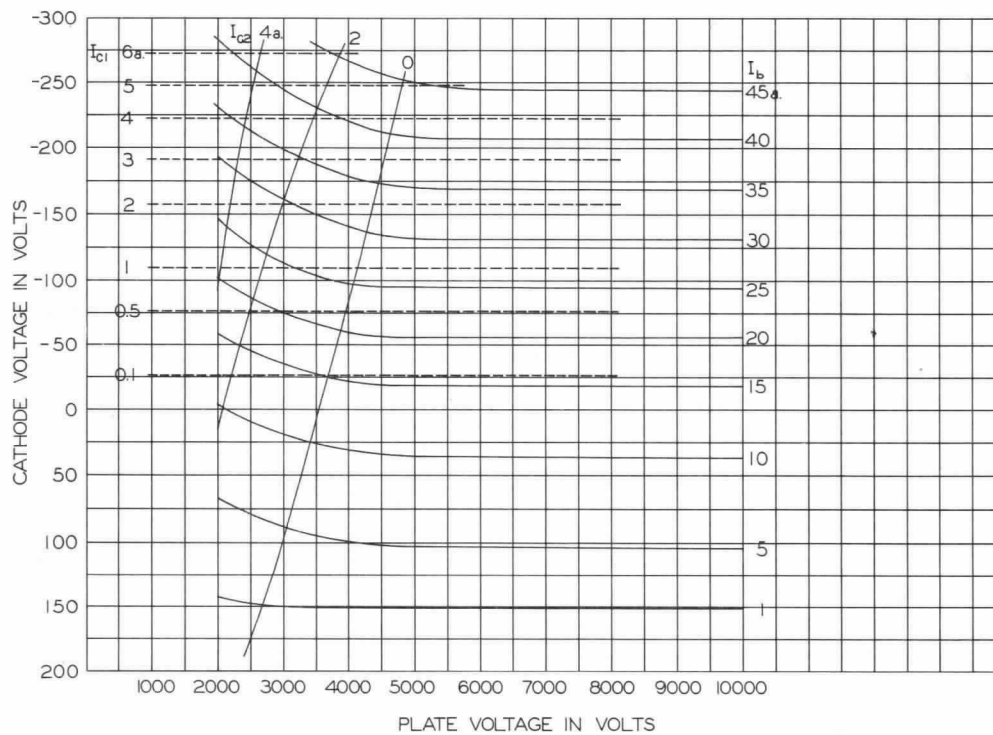
∅∅ Maximum ratio of on-time to elapsed time during any 1.5-millisecond period.

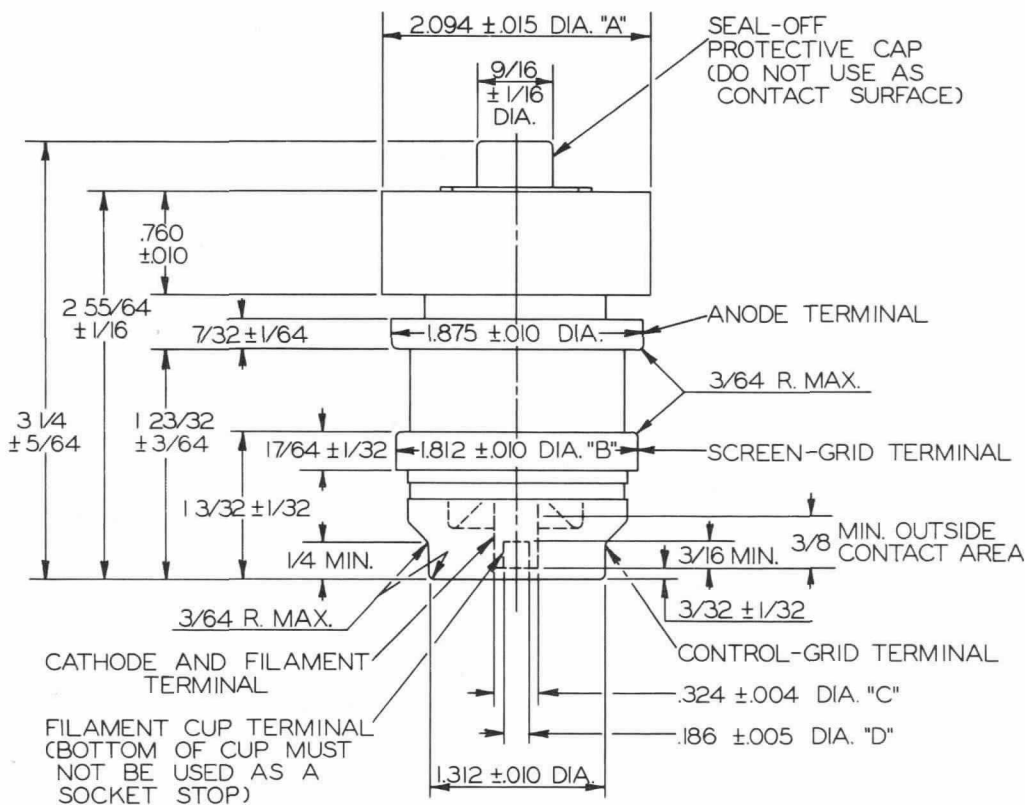
** A minimum surge-limiting resistance of 50 ohms must be placed between the plate of the tube and the B+ power supply at steady-state voltages greater than 3.5 kilovolts.

CONSTANT CURRENT CHARACTERISTIC
SCREEN VOLTAGE = 1000 VOLTS
ALL VOLTAGES REFERENCED TO CONTROL GRID



CONSTANT CURRENT CHARACTERISTIC
SCREEN VOLTAGE = 2000 VOLTS
ALL VOLTAGES REFERENCED TO CONTROL GRID





CONCENTRICITIES:

The following total indicator readings are measured with respect to a centerline determined by the centers of the anode terminal and control grid terminal.

Diameter A – 0.030 inches
Diameter B – 0.016 inches
Diameter C – 0.036 inches
Diameter D – 0.042 inches

Total indicator reading of filament cup terminal diameter (D) measured with respect to center of cathode and filament terminal diameter (C) = 0.016 inches.

TUBE DEPARTMENT

GENERAL  ELECTRIC

Schenectady, N. Y. 12305