



**ELECTRONIC  
INNOVATIONS**  
IN ACTION

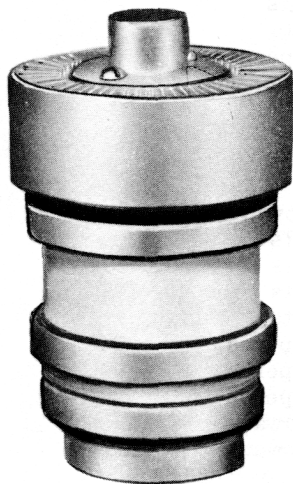
**TUBES**

## —PRODUCT INFORMATION—

ET-T2007 Page 1 11-69

# Tetrode

**GL-51038**



**PULSED SERVICE  
GROUNDED-GRID OPERATION**

**FORCED-AIR COOLED  
METAL AND CERAMIC**

### INTEGRAL RADIATOR

The GL-51038 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 airborne or ground-based radar equipment.

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

Features of the GL-51038 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  | —   | $\mu\mu f$ |
| Output . . . . .                      | — | 9   | —   | $\mu\mu f$ |

### 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,<br>at sea level . . . . . | 9   | 4.5 | —   | Min Cubic Feet per Minute |
| Static Pressure, approximate . . . . .                             | 0.5 | 0.2 | —   | Inches-Water              |
| Anode Hub Temperature $\Delta$ . . . . .                           |     |     | 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.

**GENERAL  ELECTRIC**

## 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,  $1/4\lambda$  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,  $3/4\lambda$  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.

△ 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.

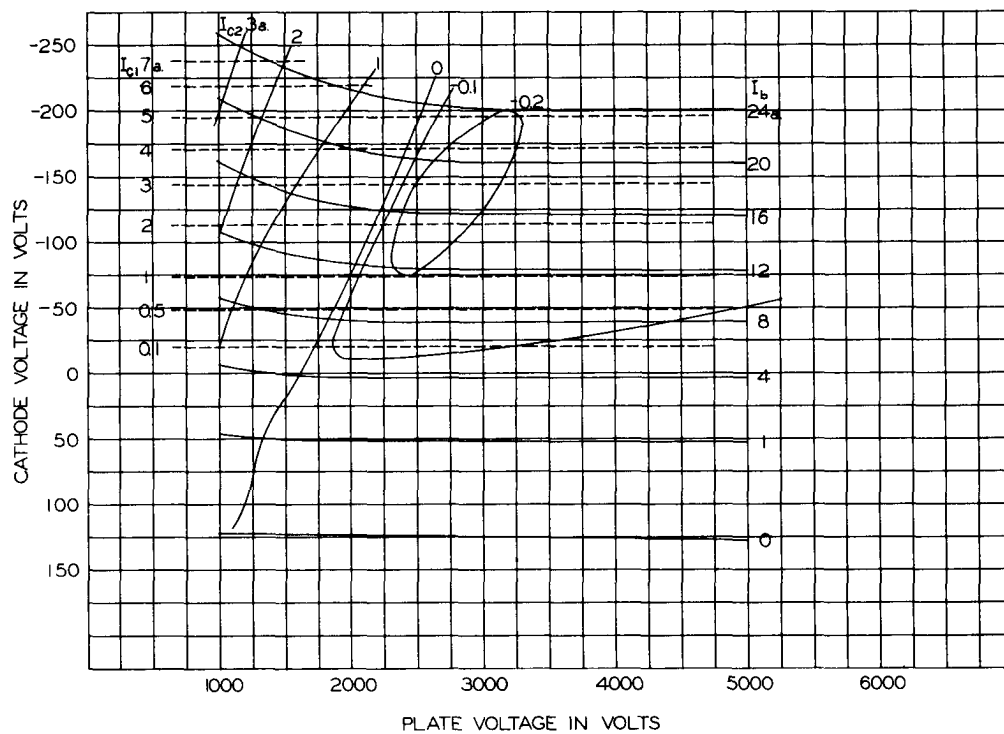
◇ Pulse duration measured between points at 70 percent of peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

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

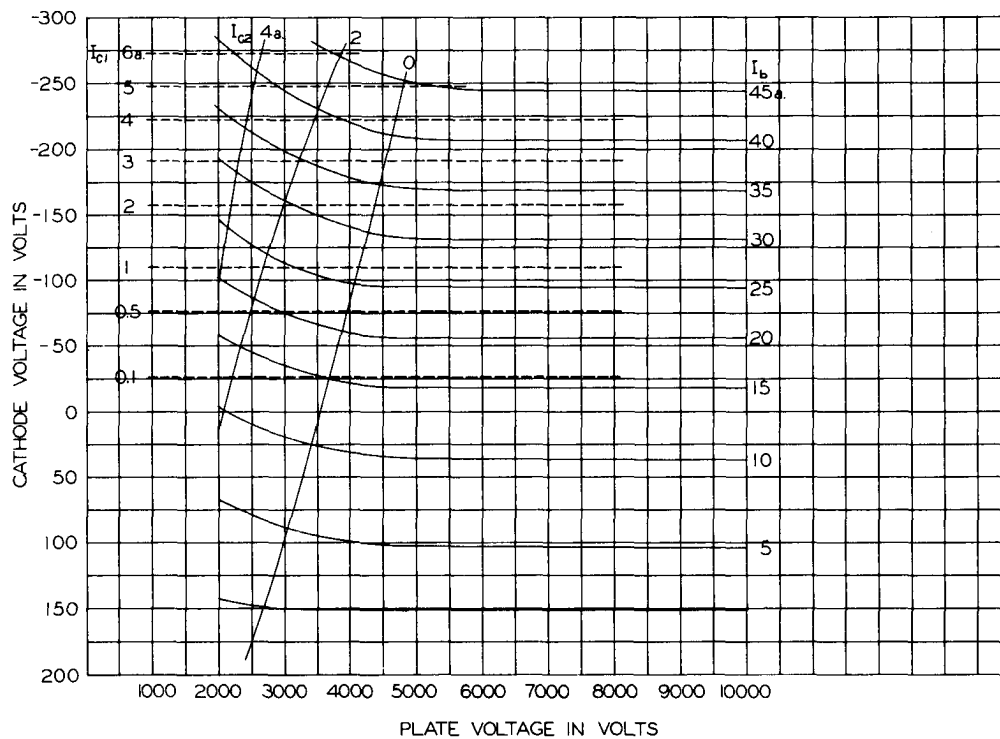
∅∅ Maximum ratio of on-time to elapsed time during any 1.5-millisecond period.

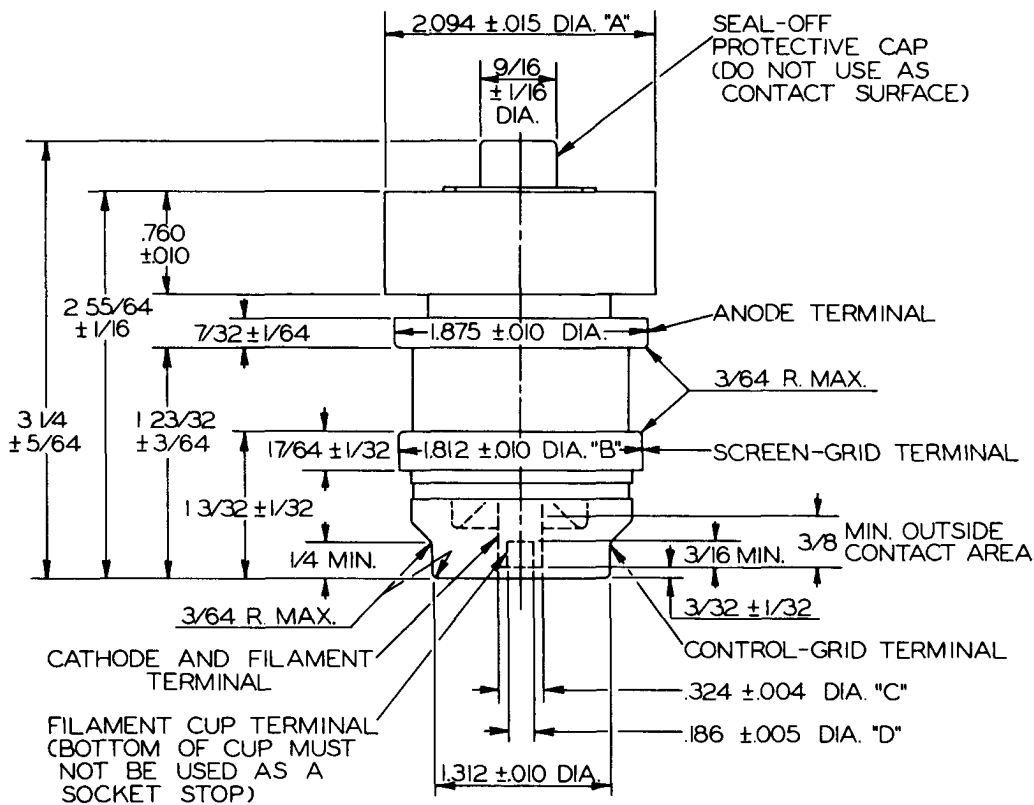
\*\* A minimum surge-limiting resistance of 50 ohms must be placed between the plate of the tube and the B+ power supply at steady-state voltages greater than 3.5 kilovolts.

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