Electronic TUBES

# 6211-A

## TWIN TRIODE

**Five-Star Tube**

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**FOR COMPUTER APPLICATIONS**

**SHARP-CUTOFF CHARACTERISTIC**
**MEDIUM MU**

**HIGH PERVEANCE**
**SEPARATE CATHODES**

## DESCRIPTION AND RATING

The 6211-A is a miniature, medium-mu twin triode for service in electronic computers. The electrical characteristics are essentially equivalent to those of the 5844. Unlike that tube, however, each section of the 6211-A has a separate cathode connection. Additional features of the tube include a heater-cathode construction designed for dependable service under conditions of intermittent operation, and a cathode designed to maintain its emission capabilities after long periods of operation under cutoff conditions.

The 6211-A, when operated under approved conditions, will exhibit a life of greater than 10,000 hours, averaged over a 100 tube lot, and based on the 10,000 hour end-of-life point shown under Special Tests and Ratings.

### GENERAL

#### ELECTRICAL

| Cathode—Coated Unipotential | Series | Parallel | |
|---|---|---|---|
| Heater Voltage, AC or DC | 12.6±5% | 6.3±5% | Volts |
| Heater Current | 0.15 | 0.3 | Amperes |
| Direct Interelectrode Capacitances, approximate† | | | |
| Grid to Plate, Each Section | | 2.22 | μμf |
| Input, Each Section | | 2.90 | μμf |
| Output, Section 1 | | 0.54 | μμf |
| Output, Section 2 | | 0.46 | μμf |
| Heater to Cathode, Each Section | | 3.25 | μμf |
| Grid to Grid, maximum | | 0.06 | μμf |
| Plate to Plate | | 0.56 | μμf |

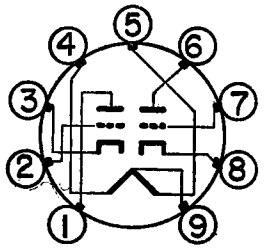
#### MECHANICAL

Mounting Position—Vertical, Base Up or Down
Horizontal, Pins 4 and 9 in Vertical Plane
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

The tube and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

GENERAL ELECTRIC

#### BASING DIAGRAM

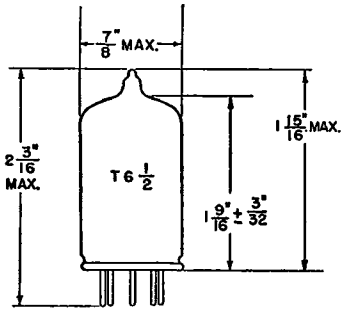



EIA 9A

#### TERMINAL CONNECTIONS

Pin 1—Plate (Section 2)
Pin 2—Grid (Section 2)
Pin 3—Cathode (Section 2)
Pin 4—Heater
Pin 5—Heater
Pin 6—Plate (Section 1)
Pin 7—Grid (Section 1)
Pin 8—Cathode (Section 1)
Pin 9—Heater Center Tap

#### PHYSICAL DIMENSIONS




EIA 6-2

## MAXIMUM RATINGS

### DESIGN-MAXIMUM VALUES, EACH SECTION

| | | |
|---|---|---|
| Plate Voltage | 200 | Volts |
| Positive DC Grid Voltage | 1.0 | Volts |
| Negative Grid Voltage | 100 | Volts |
| Peak Negative Grid Voltage | 200 | Volts |
| Plate Dissipation | 1.3 | Watts |
| DC Grid Current | 1.8 | Milliamperes |
| DC Cathode Current | 14 | Milliamperes |
| Heater-Cathode Voltage | | |
| Heater Positive with Respect to Cathode | | |
| DC Component | 90 | Volts |
| Total DC and Peak | 180 | Volts |
| Heater Negative with Respect to Cathode | | |
| Total DC and Peak | 180 | Volts |
| Grid-Circuit Resistance | | |
| With Fixed Bias | 0.1 | Megohms |
| With Cathode Bias | 0.5 | Megohms |
| Bulb Temperature at Hottest Point | 120 | C |

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey tube of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

These values are chosen by the tube manufacturer to provide acceptable serviceability of the tube, taking responsibility for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, variation in characteristics of all other tubes in the equipment, equipment control adjustment, load variation, signal variation, and environmental conditions.

## AVERAGE CHARACTERISTICS

### CLASS $A_1$ AMPLIFIER, EACH SECTION

| | | |
|---|---|---|
| Plate Voltage | 100 | Volts |
| Grid Voltage | −2.0 | Volts |
| Amplification Factor | 31 | |
| Plate Resistance, approximate | 6500 | Ohms |
| Transconductance | 4700 | Micromhos |
| Plate Current | 6.6 | Milliamperes |

### COMPUTER SERVICE, EACH SECTION

| | | | |
|---|---|---|---|
| Plate Voltage | 85 | 150 | Volts |
| Grid Voltage | — | −10 | Volts |
| Grid Current‡ | 0.2 | — | Milliamperes |
| Plate Current | 16 | — | Milliamperes |
| Plate Current, maximum | — | 0.10 | Milliamperes |

## SPECIAL TESTS AND RATINGS

| | | |
|---|---|---|
| Cathode-Interface Impedance | | |
| 1000 Hour Life-Test End Point, Maximum§ | 25 | Ohms |
| 10,000 Hour End-of-Life Point | | |
| Zero-Bias Plate Current, Each Section, Minimum¶ | 9.5 | Milliamperes |

† Without external shield.

‡ Grid tied to +85 volts through 0.425-megohm resistor.

§ Statistical sample operated for 1000 hours under the following conditions for each section: Ef = 6.3 volts, Eb = 150 volts, Ecc = −100 volts, Rk = 15,000 ohms, Ehk = −100 volts, and Rg = 0.1 megohm. Cathode-interface impedance measured under the following conditions: Ef = 5.7 volts, Eb = 75 volts, and Ec adjusted for Ib = 2.0 milliamperes.

¶ 10,000 hour end-of-life point when operated under approved conditions. Zero-bias plate current measured under the following conditions: Ef = 6.3 volts, Eb = 85 volts, Grid tied to +85 volts through 0.425-megohm resistor.

**ELECTRONIC COMPONENTS DIVISION**

**GENERAL ELECTRIC**

**Schenectady 5, N. Y.**

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