# 6211

# MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

*For "on-off" control applications involving long periods of operation under cutoff conditions*

## GENERAL DATA

### Electrical:

Heater, Pure Tungsten, for Unipotential Cathodes:

| | *Series* | *Parallel* | |
|---|---|---|---|
| Heater arrangement | | | |
| Voltage | 12.6 ± 5% | 6.3 ± 5% | ac or dc volts |
| Current | 0.15 | 0.3 | amp |

Direct Interelectrode Capacitances:[o]

| | *Unit No.1* | *Unit No.2* | |
|---|---|---|---|
| Grid to plate | 2.22 | 2.22 | μμf |
| Grid to cathode and heater | 2.90 | 2.90 | μμf |
| Plate to cathode and heater | 0.54 | 0.46 | μμf |
| Heater to cathode | 3.25 | 3.25 | μμf ← |
| Plate of unit No.1 to plate of unit No.2 | 0.56 | | μμf |
| Grid of unit No.1 to grid of unit No.2 | 0.06 max. | | μμf |

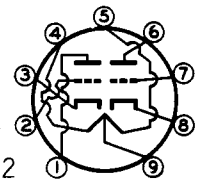
**Characteristics, Class A$_1$ Amplifier (Each Unit):**

| | | |
|---|---|---|
| Plate-Supply Voltage | 100 | volts |
| Cathode Resistor | 470 | ohms |
| Amplification Factor | 27 | |
| Plate Resistance (Approx.) | 7500 | ohms |
| Transconductance | 3600 | μmhos |
| Plate Current | 4.6 | ma |
| Grid Voltage (Approx.) for plate voltage of 150 volts and plate current of 100 μamp | -8 | volts ← |

### Mechanical:

| | |
|---|---|
| Mounting Position | Vertical, base up or down, or Horizontal with pins 1 and 5 in vertical plane ← |
| Maximum Overall Length | 2-3/16" |
| Maximum Seated Length | 1-5/16" |
| Length, Base Seat to Bulb Top (Excluding tip) | 1-9/16" ± 3/32" |
| Maximum Diameter | 7/8" |
| Dimensional Outline | *See General Section* |
| Bulb | T-6-1/2 |
| Base | Small-Button Noval 9-Pin (JETEC No.E9-1) |
| Basing Designation for BOTTOM VIEW | 9A |

Pin 1 - Plate of Unit No.2
Pin 2 - Grid Unit No.2
Pin 3 - Cathode of Unit No.2
Pins 4 & 9 - Heater of Unit No.2
Pins 5 & 9 - Heater of Unit No.1
Pin 6 - Plate of Unit No.1
Pin 7 - Grid of Unit No.1
Pin 8 - Cathode of Unit No.1
Pin 9 - Heater Mid-Tap




o Without external shield.

← Indicates a change.

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## FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

*Values are for Each Unit*

**Maximum Ratings,** *Absolute Values:*

| | | |
|---|---|---|
| PLATE VOLTAGE | 200 max. | volts |
| GRID VOLTAGE: | | |
| Negative bias value | 100 max. | volts |
| → Positive bias value | 1 max. | volt |
| → DC POSITIVE GRID CURRENT | 2 max. | ma |
| → DC CATHODE CURRENT | 16 max. | ma |
| PLATE DISSIPATION | 1 max. | watt |
| → PEAK HEATER-CATHODE VOLTAGE: | | |
| Heater negative with respect to cathode | 180 max. | volts |
| Heater positive with respect to cathode | 180▲ max. | volts |
| BULB TEMPERATURE (At hottest point on bulb surface) | 120 max. | °C |

**Maximum Circuit Values:**

| | | |
|---|---|---|
| Grid-Circuit Resistance: | | |
| For fixed-bias operation | 0.1 max. | megohm |
| For cathode-bias operation | 0.5 max. | megohm |

## → CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

| | *Note* | *Min.* | *Max.* | |
|---|---|---|---|---|
| Heater Current | 1 | 0.138 | 0.162 | amp |
| Plate Current (Each unit) | 1,2 | 4.8 | 5.5 | ma |
| Plate Current (Each unit) | 1,3 | 3.6 | 5.6 | ma |
| Plate Current (Each unit) | 1,2,4 | – | 100 | μamp |
| Transconductance | 1,2,3 | 2700 | 4500 | μmhos |
| Reverse Grid Current (Units in parallel) | 1,5 | – | 1 | μamp |
| Leakage Resistance (Each unit): | | | | |
| Between grid and all other electrodes | 1,6 | 100 | – | megohms |
| Between plate and all other electrodes | 1,7 | 100 | – | megohms |
| Heater-Cathode Leakage Current: | | | | |
| Heater negative with respect to cathode | 1,8 | – | 20 | μamp |
| Heater positive with respect to cathode | 1,8 | – | 20 | μamp |
| Difference in Grid Voltage Between Units | 1,2,9 | – | 1 | volt |
| Contact Potential | 1,10 | – | 1 | volt |
| Amplification Factor (Each unit) | 1,2 | 23 | 31 | |

Note 1: With 12.6 volts ac or dc on heater (series arrangement).

▲ The dc component must not exceed 90 volts.

→ Indicates a change.



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Note 2: With plate-supply volts = 150, plate-circuit resistance (ohms) = 20,000, and grid-circuit resistance (ohms) = 47,000. Each unit tested separately. Unit not under test connected to ground.

Note 3: With plate-supply volts = 100, cathode resistor (ohms) = 470, and cathode bypass capacitor of 1000 μf. Each unit tested separately. Unit not under test connected to ground.

Note 4: With grid volts = −10.

Note 5: With plate-supply volts = 150, cathode resistor (ohms) = 470, and grid-circuit resistance (megohm) = 0.5.

Note 6: With grid 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

Note 8: With 100 volts dc between heater and cathode and units connected in parallel.

Note 9: With grid voltage adjusted for plate current of 100 μamp.

Note 10: With plate volts = 100, grid current (μamp) = 0.1, and grid-circuit resistance (megohm) = 0.1. Each unit tested separately. Unit not under test connected to ground.

## SPECIAL RATINGS & PERFORMANCE DATA

**Heater-Cycling Life Performance:**

Cycles of Intermittent Operation. . . . . 2000 min. cycles

For conditions: Series heater arrangement, heater volts = 17, cycled 1 minute on and 4 minutes off, heater positive with respect to cathode by +100 volts dc, plate volts = 0, and grid volts = 0.

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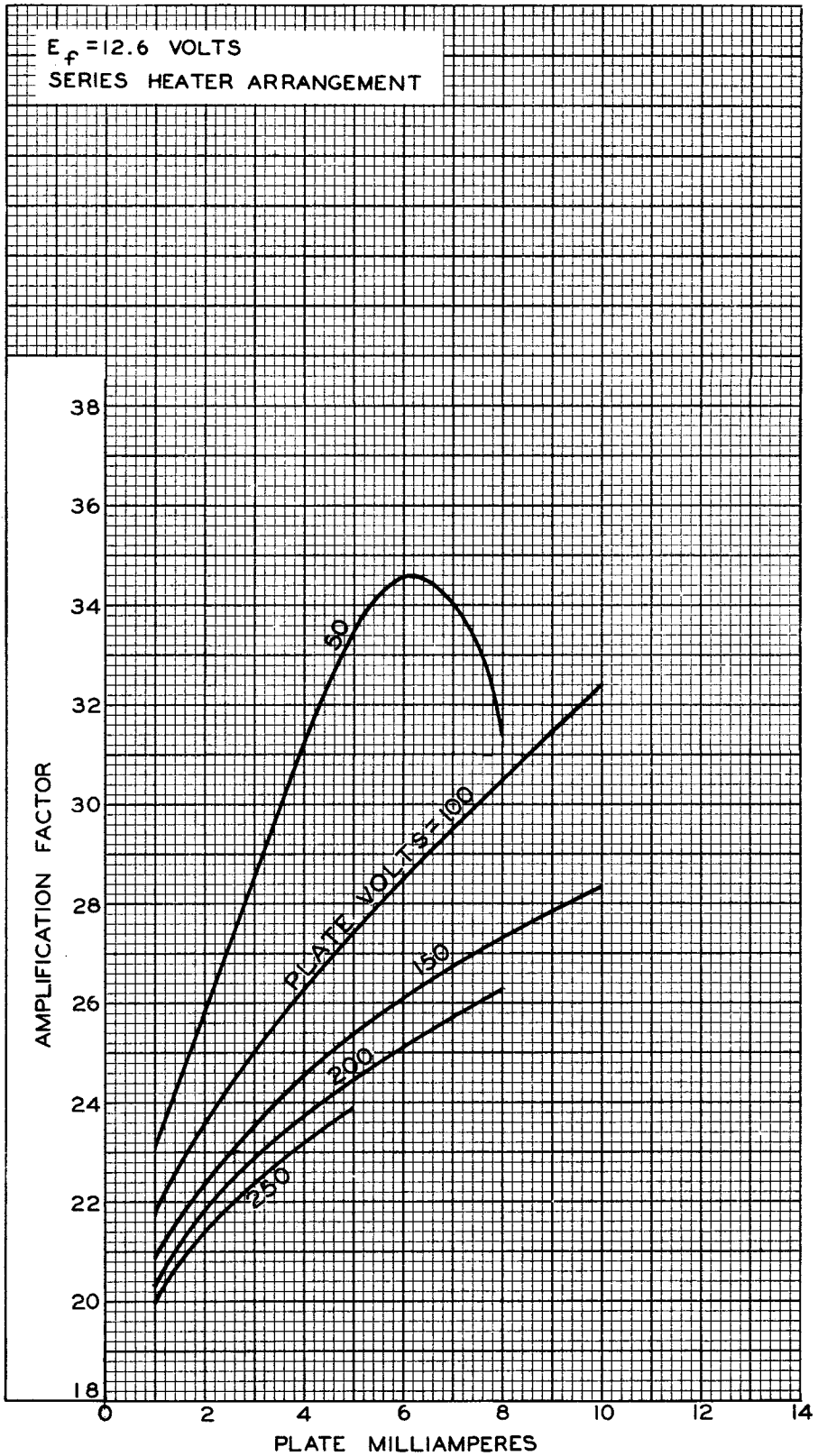
## AVERAGE CHARACTERISTICS
### FOR EACH UNIT

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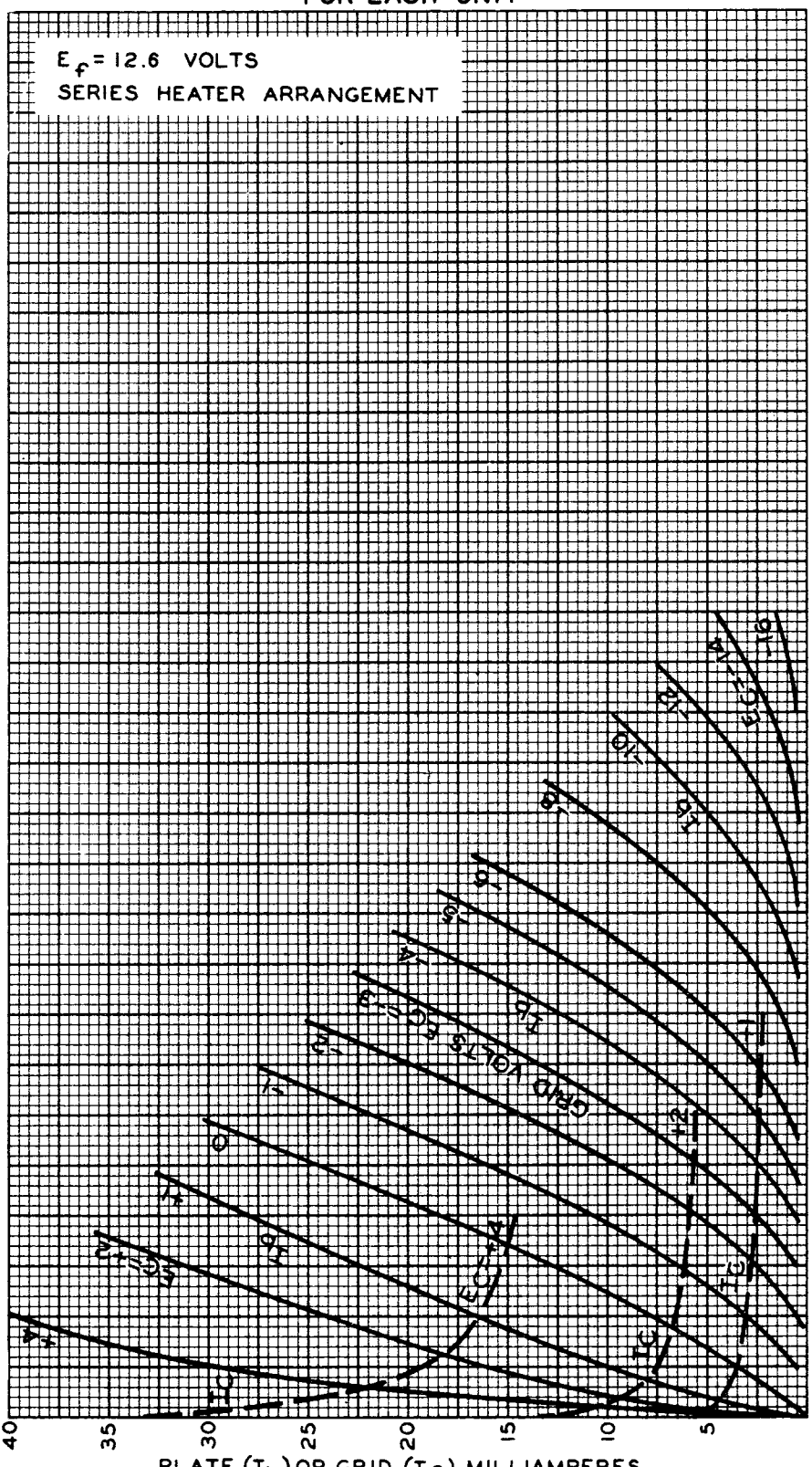
## AVERAGE PLATE CHARACTERISTICS
### FOR EACH UNIT



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## AVERAGE CHARACTERISTICS

### FOR EACH UNIT