

# High-Mu Twin Triode

## 9-PIN MINIATURE TYPE

For Use in Mobile-Communications Equipment  
Operating from 6-Cell Storage-Battery Systems

### GENERAL DATA

#### Electrical:

Heater Characteristics and Ratings (*Absolute-Maximum Values*):

Voltage (AC or DC)<sup>a</sup> . . . . . 13.5 ± 1.5 volts

Current at heater volts = 13.5 . . . . . 0.150 amp

Peak heater-cathode voltage (Each unit):

Heater negative with respect to cathode . . . . . 100 max. volts

Heater positive with respect to cathode . . . . . 100 max. volts

Direct Interelectrode Capacitances (Approx.):

	Without External Shield	With External Shield <sup>b</sup>	
<b>Grid-Drive Operation:</b>			
Grid to plate (Each unit) . . . . .	1.6	1.6	μf
Grid to cathode and heater (Each unit) . . . . .	2.5	2.5	μf
Plate to cathode and heater (Unit No.1) . . . . .	0.45	1.2	μf
Plate to cathode and heater (Unit No.2) . . . . .	0.38	1.3	μf

**Cathode-Drive Operation:**

Cathode to plate (Unit No.1) . . . . .	0.2	0.18 <sup>d</sup>	μf
Cathode to plate (Unit No.2) . . . . .	0.24	0.2 <sup>d</sup>	μf
Cathode to grid and heater (Each unit) . . . . .	5	5 <sup>d</sup>	μf
Plate to grid and heater (Unit No.1) . . . . .	1.9	2.7 <sup>d</sup>	μf
Plate to grid and heater (Unit No.2) . . . . .	1.8	2.7 <sup>d</sup>	μf
Heater to cathode (Each unit) . . . . .	2.8	2.8 <sup>c</sup>	μf
Plate to plate . . . . .	0.24	-	μf

**Characteristics, Class A<sub>1</sub> Amplifier (Each Unit):**

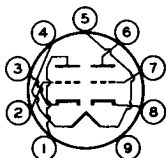
Heater Voltage . . . . .	13.5	volts
Plate Supply Voltage . . . . .	250	volts
Cathode Resistor . . . . .	200	ohms
Amplification Factor . . . . .	60	
Plate Resistance (Approx.) . . . . .	10900	ohms
Transconductance . . . . .	5500	μmhos
Plate Current . . . . .	10	ma
Grid Voltage (Approx.) for plate $\mu_a = 10$ . . . . .	-12	volts



## Mechanical:

Operating Position . . . . .	Any
Type of Cathodes . . . . .	Coated Unipotential
Maximum Overall Length . . . . .	2-3/16"
Maximum Seated Length . . . . .	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip). . . . .	1-9/16" $\pm$ 3/32"
Diameter . . . . .	0.750" to 0.875"
Dimensional Outline . . . . .	See <i>General Section</i>
Bulb . . . . .	T6-1/2
Base . . . . .	Small-Button Noval 9-Pin (JEDEC No. E9-1)
Basing Designation for BOTTOM VIEW . . . . .	9EP

- Pin 1 - Plate of Unit No.2
- Pin 2 - Grid of Unit No.2
- Pin 3 - Cathode of Unit No.2
- Pin 4 - Heater
- Pin 5 - Heater



- Pin 6 - Plate of Unit No.1
- Pin 7 - Grid of Unit No.1
- Pin 8 - Cathode of Unit No.1
- Pin 9 - Do Not Use

## AMPLIFIER — Class A<sub>1</sub>

*Values are for Each Unit*

### Maximum Ratings, Absolute-Maximum Values:

PLATE VOLTAGE . . . . .	330 max.	volts
GRID VOLTAGE:		
Negative-bias value . . . . .	55 max.	volts
Positive-bias value . . . . .	0 max.	volts
PLATE DISSIPATION . . . . .	2.75 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface) . . . . .	180 max.	°C

### Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation . . . . .	0.25 max.	megohm
For cathode-bias operation . . . . .	1 max.	megohm

- <sup>a</sup> Heater will withstand momentary excursions from 11.0 to 16.0 volts.
- <sup>b</sup> With external shield JEDEC No.315 connected to cathode of unit under test except as noted.
- <sup>c</sup> With external shield JEDEC No.315 connected to ground.
- <sup>d</sup> With external shield JEDEC No.315 connected to grid of unit under test.

## SPECIAL RATINGS AND PERFORMANCE DATA

### Heater-Cycling:

Cycles of Intermittent Operation . . . . . 1160 min. cycles  
 This test is performed on a sample lot of tubes from each production run under the following conditions: Heater volts = 19.5 cycled one minute on and two minutes off; heater 135 volts negative with respect to cathode; all other elements



connected to ground. At the end of this test, tubes are tested for heater-cathode shorts and open circuits.

#### **Low-Frequency Vibration Performance:**

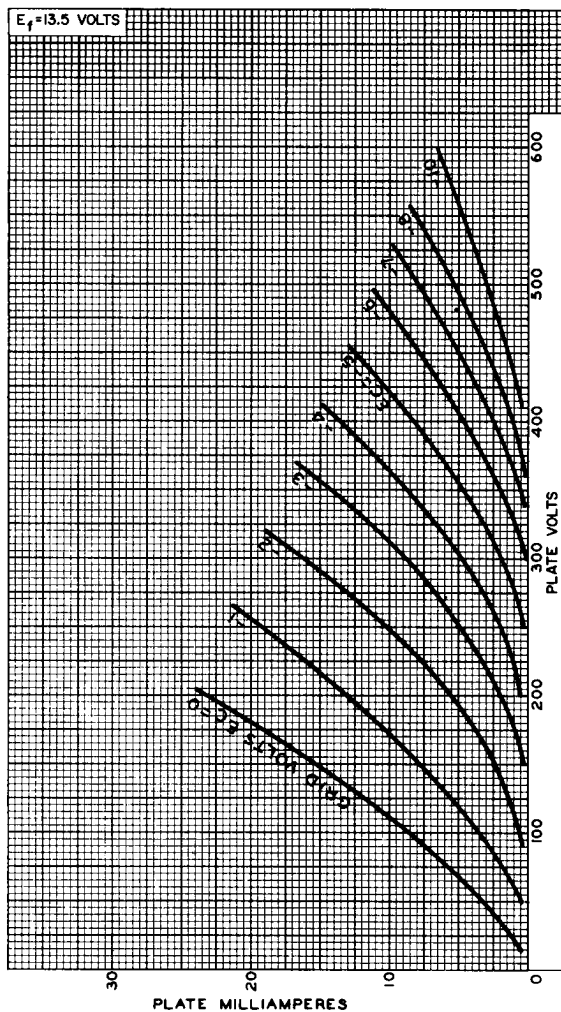
This test is performed on a sample lot of tubes from each production run under the following conditions: Units connected in parallel, heater volts = 13.5, plate-supply volts = 250, grid volts = -3, plate load resistor (ohms) = 2000, and vibrational acceleration = 2.5 g at 25 cps. In this test, the rms output voltage must not exceed 150 millivolts.

#### **500-Hour Intermittent Life Performance:**

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures. Life testing is conducted under the following conditions: Heater volts = 15.0 and maximum-rated plate dissipation.



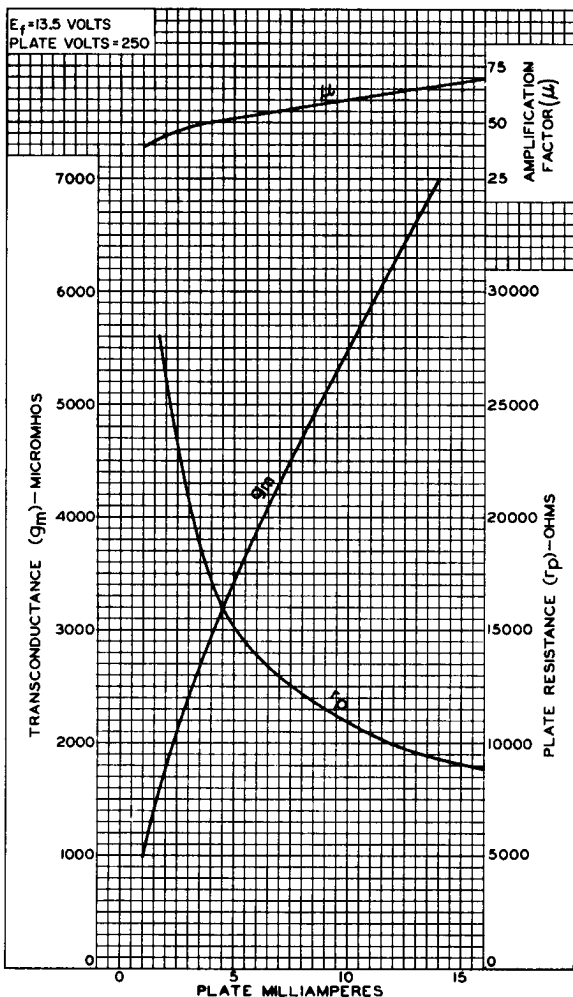
## AVERAGE PLATE CHARACTERISTICS



92CM-11467



## AVERAGE CHARACTERISTICS



92CM-11486

