

## Beam Power Tube

9-PIN MINIATURE TYPE  
Quick-Heating-Filament Type for  
Mobile-Communications Equipment

### GENERAL DATA

#### Electrical:

Filament, Coated:

Voltage (AC or DC) . . . . . 6.3 ± 10% volts

*When operated from storage-battery systems, the filament may be subjected to voltage variations as great as ± 20 per cent. Although such extremes in filament voltage may be tolerated for short periods, increased equipment reliability can be achieved with improved supply-voltage regulation.*

Current at 6.3 volts . . . . . 0.65 amp

Heating time . . . . . Less than 1 second

Direct Interelectrode Capacitances:<sup>a</sup>

Grid No.1 to plate . . . . . 0.14 max. pf

Grid No.1 to filament, grid No.3,  
and grid No.2. . . . . 8.5 pf

Plate to filament, grid No.3,  
and grid No.2. . . . . 5.5 pf

#### Characteristics, Class A<sub>1</sub> Amplifier:

Plate Voltage. . . . . 200 volts

Grid No.3. . . . . *Connected to pin 1 at socket*

Grid-No.2 Voltage. . . . . 185 volts

Grid-No.1 Voltage. . . . . -6 volts

Mu-Factor, Grid No.2 to Grid No.1. . . . . 11.5

Transconductance . . . . . 6700  $\mu$ hos

Plate Current. . . . . 36 ma

Grid-No.2 Current. . . . . 2.5 ma

#### Mechanical:

Operating Position . . . . . Vertical, base up or down,  
or Horizontal with pins 2 and 8 in vertical plane

Maximum Overall Length . . . . . 2-5/8"

Maximum Seated Length. . . . . 2-3/8"

Length, Base Seat to Bulb Top (Excluding tip). . . . . 2" ± 3/32"

Diameter . . . . . 0.750" to 0.875"

Dimensional Outline. . . . . See *General Section*

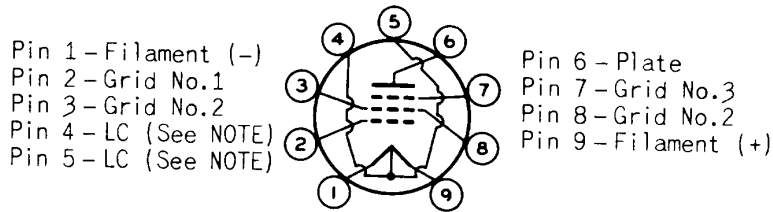
Bulb . . . . . T6-1/2

Base . . . . . Small-Button Noval 9-Pin (JEDEC No.E9-1)



# 7905

Basing Designation for BOTTOM VIEW. . . . . 9PB



NOTE: May be used only under conditions specified in *Operating Considerations*.

**RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy<sup>b</sup>**  
**and**  
**RF POWER AMPLIFIER — Class C FM Telephony**

**Maximum ICAS<sup>c</sup> Ratings, Absolute-Maximum Values:**

*Up to 175 Mc*

DC PLATE VOLTAGE. . . . .	300 max.	volts
GRID No.3 (SUPPRESSOR GRID) . . . . .	.Connect to pin 1 at socket	
DC GRID-No.2 (SCREEN-GRID)		
SUPPLY VOLTAGE. . . . .	300 max.	volts
DC GRID-No.2 VOLTAGE. . . . .	250 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE . . . . .	-125 max.	volts
DC PLATE CURRENT. . . . .	60 max.	ma
DC GRID-No.2 CURRENT. . . . .	10 max.	ma
DC GRID-No.1 CURRENT. . . . .	5 max.	ma
PLATE INPUT . . . . .	18 max.	watts
GRID-No.2 INPUT . . . . .	1.5 max.	watts
PLATE DISSIPATION . . . . .	10 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface). . . . .	225 max.	°C

**Typical ICAS<sup>c</sup> Operation:<sup>d</sup>**

*As amplifier at 175 Mc*

DC Plate Voltage. . . . .	300	300	volts
Grid No.3 . . . . .	.Connected to pin 1 at socket		
DC Grid-No.2 Voltage <sup>e</sup> . . . . .	160	185	volts
DC Grid-No.1 Voltage <sup>f</sup> from a grid-No.1 resistor of 18,000 ohms . . . . .	-36	-39	volts
Peak RF Grid-No.1 Voltage . . . . .	41	43	volts
DC Plate Current. . . . .	50	60	ma
DC Grid-No.2 Current. . . . .	2.5	4	ma
DC Grid-No.1 Current (Approx.). . . . .	2	2.2	ma
Driving Power <sup>g</sup> (Approx.). . . . .	1	1	watt
Useful Power Output <sup>h</sup> (Approx.). . . . .	5.5	7	watts

**Maximum Circuit Values:**

Grid-No.1-Circuit Resistance. . . . .	0.1 max.	megohm
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## PLATE MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use  
with a maximum modulation factor of 1

### Maximum ICAS<sup>c</sup> Ratings, Absolute-Maximum Values:

Up to 175 Mc

DC PLATE VOLTAGE. . . . .	250 max.	volts
GRID No.3 . . . . .	<i>.Connect to pin 1 at socket</i>	
DC GRID-No.2 VOLTAGE. . . . .	250 max.	volts
DC GRID-No.1 VOLTAGE. . . . .	-125 max.	volts
DC PLATE CURRENT. . . . .	60 max.	ma
DC GRID-No.2 CURRENT. . . . .	10 max.	ma
DC GRID-No.1 CURRENT. . . . .	5 max.	ma
PLATE INPUT . . . . .	15 max.	watts
GRID-No.2 INPUT . . . . .	1.4 max.	watts
PLATE DISSIPATION . . . . .	7 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface). . . . .	225 max.	°C

### Typical ICAS<sup>c</sup> Operation:<sup>d</sup>

At 175 Mc

DC Plate Voltage. . . . .	250	volts
Grid No.3 . . . . .	<i>.Connected to pin 1 at socket</i>	
DC Grid-No.2 Voltage <sup>j</sup> . . . . .	250	volts
DC Grid-No.1 Voltage <sup>f</sup> from a grid-No.1 resistor of 33,000 ohms . . . . .	-70	volts
Peak RF Grid-No.1 Voltage . . . . .	75	volts
DC Plate Current. . . . .	60	ma
DC Grid-No.2 Current. . . . .	2.5	ma
DC Grid-No.1 Current (Approx.). . . . .	2.1	ma
Driving Power <sup>g</sup> (Approx.). . . . .	1	watt
Useful Power Output <sup>h</sup> (Approx.). . . . .	6.5	w ts

### Maximum Circuit Values:

Grid-No.1-Circuit Resistance. . . . .	0.1 max.	megohm
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## FREQUENCY MULTIPLIER

### Maximum ICAS<sup>c</sup> Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE. . . . .	300 max.	volts
GRID No.3 . . . . .	<i>.Connect to pin 1 at socket</i>	
DC GRID-No.2 SUPPLY VOLTAGE . . . . .	300 max.	volts
DC GRID-No.2 VOLTAGE. . . . .	250 max.	volts
DC GRID-No.1 VOLTAGE. . . . .	-125 max.	volts
DC PLATE CURRENT. . . . .	50 max.	ma
DC GRID-No.2 CURRENT. . . . .	10 max.	ma
DC GRID-No.1 CURRENT. . . . .	5 max.	ma
PLATE INPUT . . . . .	15 max.	watts
GRID-No.2 INPUT . . . . .	1.5 max.	watts
PLATE DISSIPATION . . . . .	10 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface). . . . .	225 max.	°C



# 7905

## Typical ICAS<sup>c</sup> Operation:

*As doubler to 175 Mc*

DC Plate Voltage . . . . .	250	300	volts
Grid No.3. . . . .	<i>Connected to pin 1 at socket</i>		
DC Grid-No.2 Voltage <sup>e</sup> . . . . .	200	215	volts
DC Grid-No.1 Voltage <sup>f</sup> from a grid-No.1 resistor of 53,000 ohms. . . . .	-53	-80	volts
Peak RF Grid-No.1 Voltage. . . . .	60	87	volts
DC Plate Current . . . . .	45	50	ma
DC Grid-No.2 Current . . . . .	3.4	3.4	ma
DC Grid-No.1 Current (Approx.) . . . . .	1	1.5	ma
Driving Power <sup>g</sup> (Approx.) . . . . .	0.4	0.5	watt
Useful Power Output <sup>j</sup> (Approx.) . . . . .	2.5	3.5	watts

*As tripler to 175 Mc*

DC Plate Voltage . . . . .	250	250	volts
Grid No.3. . . . .	<i>Connected to pin 1 at socket</i>		
DC Grid-No.2 Voltage <sup>e</sup> . . . . .	180	225	volts
DC Grid-No.1 Voltage <sup>g</sup> from a grid-No.1 resistor of:			
50,000 ohms. . . . .	-90	-	volts
60,000 ohms. . . . .	-	-108	volts
Peak RF Grid-No.1 Voltage. . . . .	105	118	volts
DC Plate Current . . . . .	40	50	ma
DC Grid-No.2 Current . . . . .	2.5	3.4	ma
DC Grid-No.1 Current (Approx.) . . . . .	1.8	1.8	ma
Driving Power <sup>g</sup> (Approx.) . . . . .	0.4	0.6	watt
Useful Power Output <sup>h</sup> (Approx.) . . . . .	1.4	2	watts

## Maximum Circuit Values:

Grid-No.1-Circuit Resistance . . . . . 0.1 max. megohm

<sup>a</sup> without external shield.

<sup>b</sup> Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

<sup>c</sup> Intermittent Commercial and Amateur Service.

<sup>d</sup> Pins 4 and 5 at rf ground.

<sup>e</sup> obtained preferably from a separate source or from the plate-voltage supply with a voltage divider. If a series resistor is used, it should be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are completed.

<sup>f</sup> obtained from a grid-No.1 resistor, or from a combination of grid-No.1 resistor and either fixed supply or cathode resistor. The combination of grid-No.1 resistor and fixed supply has the advantage of not only protecting the tube from damage through loss of excitation but also of minimizing distortion by bias-supply compensation.

<sup>g</sup> Driving power includes circuit losses and is the actual power measured at the input to the grid circuit.

<sup>h</sup> Measured at load.

<sup>j</sup> obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor. It is recommended that this resistor be adjustable to permit obtaining the desired operating plate current after initial tuning adjustments are made.



## CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current . . . . .	1	0.59	0.71	amp
Transconductance . . . . .	1,2	5700	-	$\mu$ nhos
Plate Current . . . . .	1,2	27	52	ma
Plate Current . . . . .	1,3	-	75	$\mu$ a
Grid-No.2 Current . . . . .	1,2	-	5	ma
Reverse Grid-No.1 Current . . . . .	1,4	-	1	$\mu$ a
Leakage Resistance:				
Between grid No.1 and all other electrodes tied together.	1,5	100	-	megohms
Between plate and all other electrodes tied together.	1,6	100	-	megohms

Note 1: With 6.3 volts dc on filament.

Note 2: With dc plate volts = 200, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 185, and dc grid-No.1 volts = -6.

Note 3: With dc plate volts = 200, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 185, and dc grid-No.1 volts = -36.

Note 4: With dc plate volts = 215, grid No.3 connected to pin 1 at socket, dc grid-No.2 volts = 215, and dc grid-No.1 resistor = 0.1 megohm.

Note 5: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 6: With plate 300 volts negative with respect to all other electrodes tied together.

### OPERATING CONSIDERATIONS

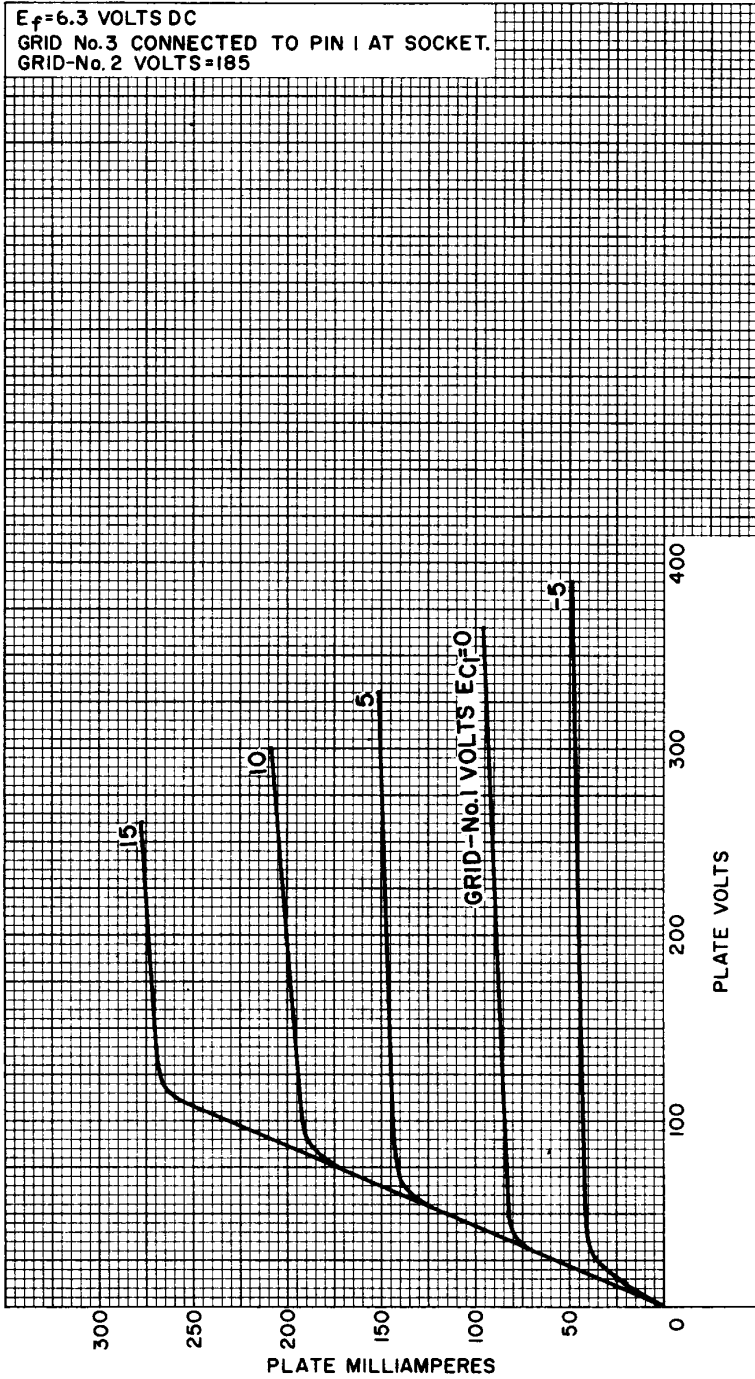
The socket connections to pins 4 and 5, which are designated LC on the basing diagram, may be used to minimize the absorption of rf power in the filament circuit by connecting pins 4 and 5 to ground through a capacitor, close to the socket. Pin 1 is directly grounded and pin 9 is bypassed by using a feedthrough capacitor when bringing this filament lead through the chassis.

Shielding of the 7905 may be used in "straight-through" rf amplifier service to minimize external feedback from the plate to grid No.1. A grounded shield crossing the terminal end of the tube socket through the space between pins 2 and 3 and the space between pins 8 and 9, is generally adequate for this purpose. No shielding is necessary for either frequency doubler or tripler operation.



# 7905

## AVERAGE PLATE CHARACTERISTICS



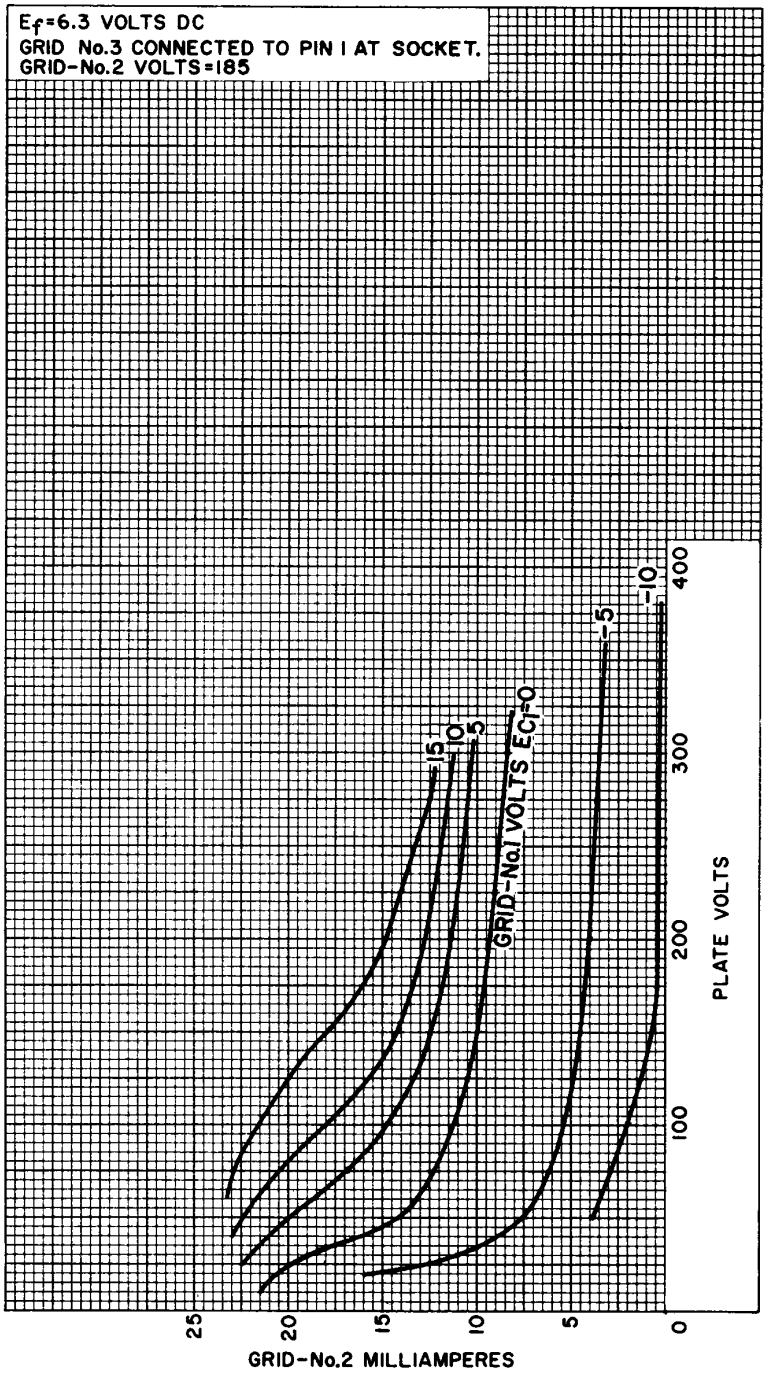
92CM-11381

RADIO CORPORATION OF AMERICA  
Electron Tube Division

Harrison, N. J.



AVERAGE CHARACTERISTICS

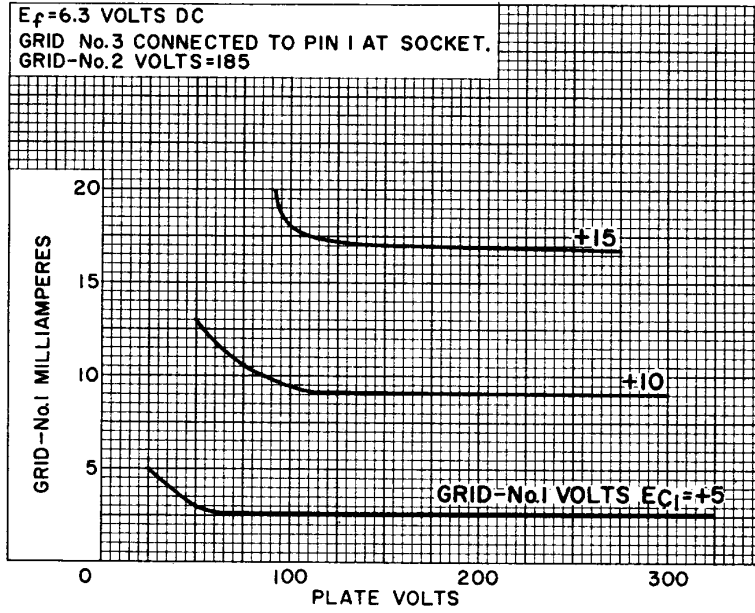


92CM-11390



# 7905

## AVERAGE CHARACTERISTICS



92CS-11383

