



# 12AQ5

## BEAM POWER AMPLIFIER

7-Pin Miniature Type

TENTATIVE DATA

RCA-12AQ5 is a beam power amplifier of the 7-pin miniature type intended primarily for use as the output amplifier of automobile radio receivers operating from a 12-volt storage battery. It may also be used in the output stage of ac-operated radio receivers.

The 12AQ5 can provide high power output because of its high power sensitivity and high efficiency. For example, in class A<sub>1</sub> amplifier service, a single 12AQ5 operated with a plate and grid-No.2 voltage of 250 volts, can deliver a maximum-signal power output of 4.5 watts with a peak driving voltage of only about 12 volts. These features together with relatively low plate-current drain make the 12AQ5 especially suitable for use in the output stage of automobile receivers.

Within its maximum ratings, the 12AQ5 is the performance equivalent of the larger glass type 12V6-GT.

### GENERAL DATA

#### Electrical:

Heater, for unipotential cathode:			
Voltage (AC or DC) . . . . .	12.6	volts	
Current . . . . .	0.225	amp	
Direct Interelectrode Capacitances (Approx., without external shield):			
Grid No.1 to Plate . . . . .	0.35	μf	
Input . . . . .	8.3	μf	
Output . . . . .	8.2	μf	

#### Mechanical:

Mounting Position . . . . .	Any	
Maximum Overall Length . . . . .	2-5/8"	
Maximum Seated Length . . . . .	2-3/8"	
Length from Base Seat to Bulb Top (Excluding Tip) . . . . .	2" ± 3/32"	
Maximum Diameter . . . . .	3/4"	
Bulb . . . . .	T-5-1/2	
Base . . . . .	Small-Button Miniature 7-Pin (JETEC No.E7-1)	

### AF POWER AMPLIFIER - Class A<sub>1</sub>

#### Maximum Ratings, Design-Center Values:

PLATE VOLTAGE . . . . .	250 max.	volts
GRID-NO.2 (SCREEN) VOLTAGE . . . . .	250 max.	volts
PLATE DISSIPATION . . . . .	12 max.	watts
GRID-NO.2 INPUT . . . . .	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . . . . .	90 max.	volts
Heater positive with respect to cathode . . . . .	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface) ●	250 max.	°C

#### Typical Operation and Characteristics:

Plate voltage . . . . .	180	250	volts
Grid-No.2 Voltage . . . . .	180	250	volts
Grid-No.1 (Control- Grid) Voltage . . . . .	-8.5	-12.5	volts
Peak AF Grid-No.1 Voltage . . . . .	8.5	12.5	volts
Zero-Signal Plate Current . . . . .	29	45	ma
Max.-Signal Plate Current . . . . .	30	47	ma
Zero-Signal Grid-No.2 Current (Approx.) . . . . .	3	4.5	ma
Max.-Signal Grid-No.2 Current (Approx.) . . . . .	4	7	ma
Plate Resistance (Approx.) . . . . .	58000	52000	ohms
Transconductance . . . . .	3700	4100	μmhos
Load Resistance . . . . .	5500	5000	ohms
Total Harmonic Distortion . . . . .	8	8	per cent
Max.-Signal Power Output . . . . .	2.0	4.5	watts

#### Maximum Circuit Values:

Grid-No.1 - Circuit Resistance:		
For fixed bias . . . . .	0.1 max.	megohm
For cathode bias . . . . .	0.5 max.	megohm

### AF POWER AMPLIFIER - Class AB<sub>1</sub>

#### Maximum Ratings, Design-Center Values:

PLATE VOLTAGE . . . . .	250 max.	volts
GRID-NO.2 (SCREEN) VOLTAGE . . . . .	250 max.	volts
PLATE DISSIPATION . . . . .	12 max.	watts
GRID-NO.2 INPUT . . . . .	2 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . . . . .	90 max.	volts
Heater positive with respect to cathode . . . . .	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface) ●	250 max.	°C

#### Typical Operation:

Unless otherwise indicated, values are for 2 tubes

Plate Voltage . . . . .	250	volts
Grid-No.2 Voltage . . . . .	250	volts
Grid-No.1 (Control-Grid) Voltage# . . . . .	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	30	volts
Zero-Signal Plate Current . . . . .	70	ma
Max.-Signal Plate Current . . . . .	79	ma
Zero-Signal Grid-No.2 Current (Approx.) . . . . .	5	ma
Max.-Signal Grid-No.2 Current (Approx.) . . . . .	13	ma
Plate Resistance (Approx. per tube) . . . . .	60000	ohms
Transconductance (per tube) . . . . .	3750	μmhos
Effective Load Resistance (Plate to plate) . . . . .	10000	ohms
Total Harmonic Distortion . . . . .	5	per cent
Max.-Signal Power Output . . . . .	10	watts

#### Maximum Circuit Values Per Tube: ▲

Grid-No.1 - Circuit Resistance: #		
For fixed bias . . . . .	0.1 max.	megohm
For cathode bias . . . . .	0.5 max.	megohm



- High ambient temperature and shielding may necessitate a reduction in operating dissipation. When tube shields are used, it is advisable to paint the inside and outside surfaces of the tube shield a dull black and to provide ventilation slots to reduce operating temperature.
- # The type of input coupling used should not introduce too much resistance in the grid-No.1 circuit. Transformer- or impedance-coupling devices are recommended.
- ▲ If the grid-No.1-circuit resistance is common to two tubes, the indicated maximum values per tube should be halved.

### OPERATING CONSIDERATIONS

The maximum ratings in the tabulated data for the 12AQ5 are working design-center maximums established according to the standard design-center system of rating electron tubes. Tubes

so rated will give satisfactory performance in storage-battery-operated equipment provided the following stipulations are observed:

When storage-battery equipment is operated without a charger, it should be designed so that the published maximum values of plate voltage, grid-No.2 voltage, and dissipations, are never exceeded for a terminal potential at the battery source of 2.0 volts per cell. When storage-battery equipment is operated with a charger, it should be designed so that 90 per cent of the same maximum values is never exceeded for a terminal potential at the battery source of 2.2 volts.

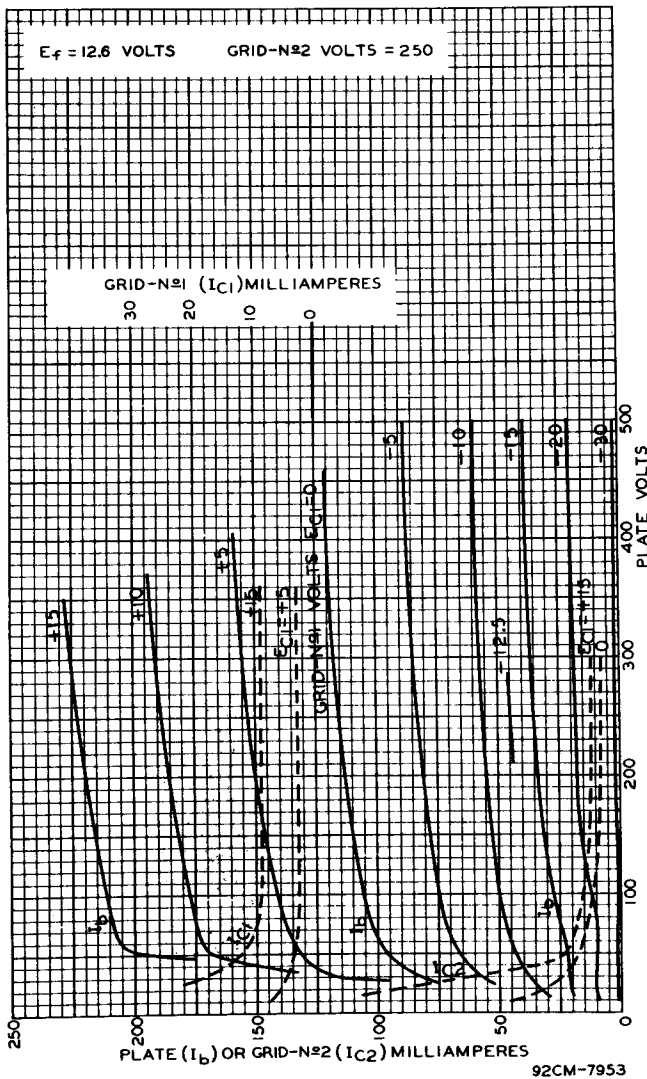


Fig. 1 - Average Plate Characteristics of Type 12AQ5

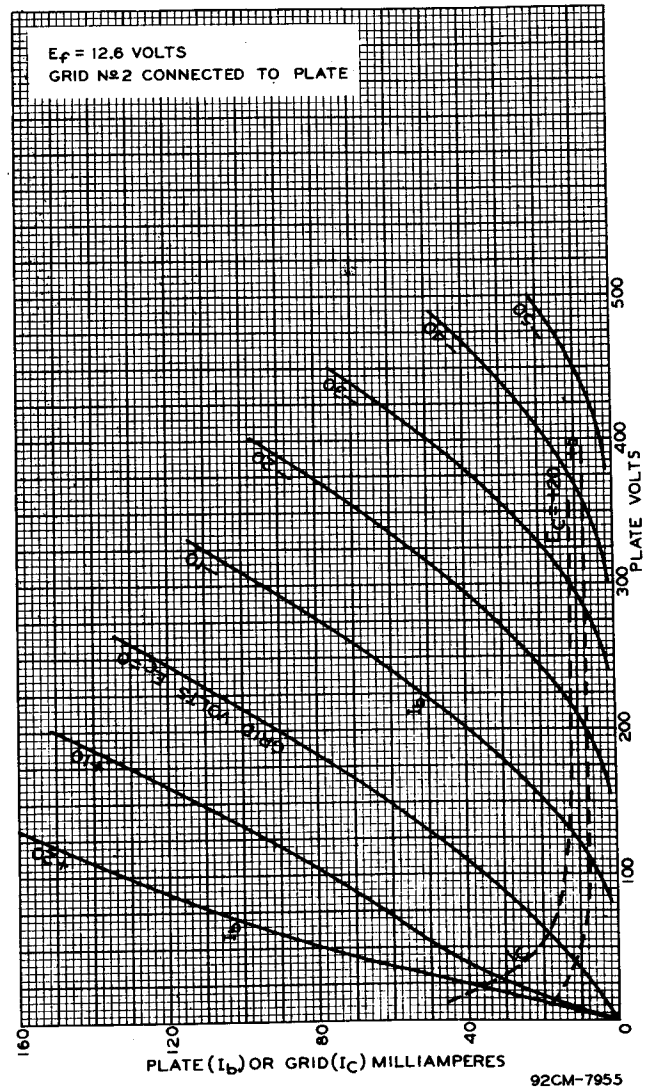
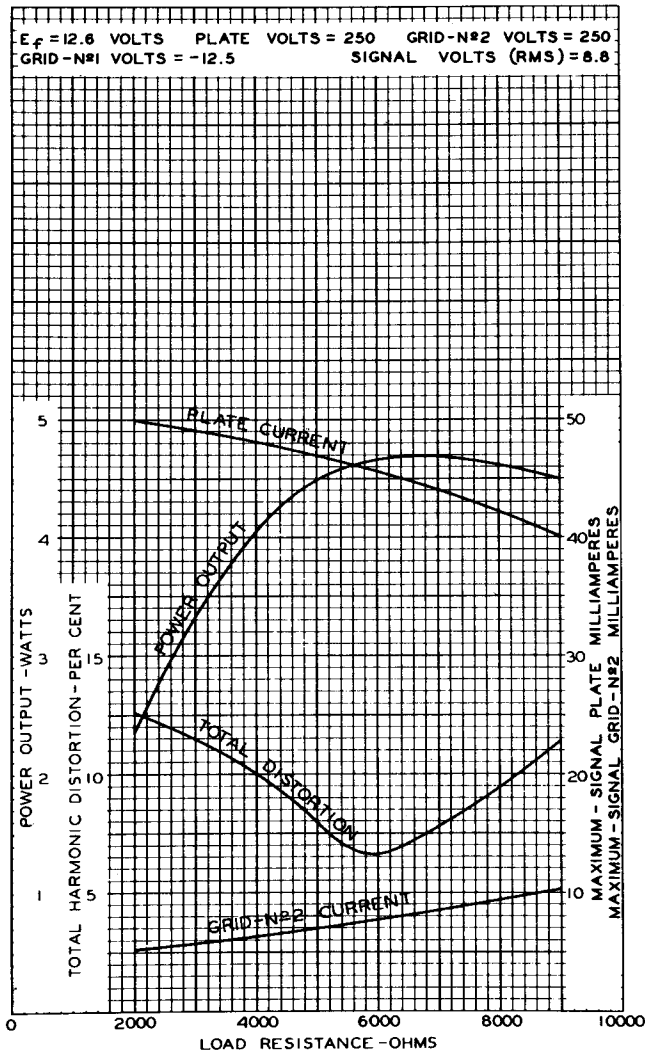


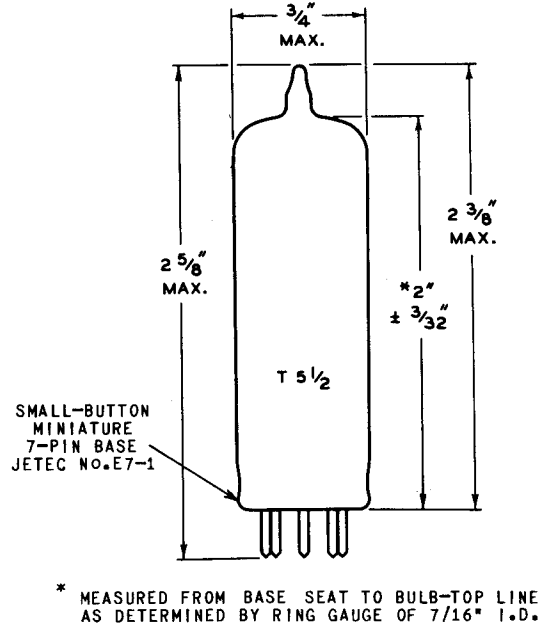
Fig. 2 - Average Plate Characteristics of Type 12AQ5 connected as Triode



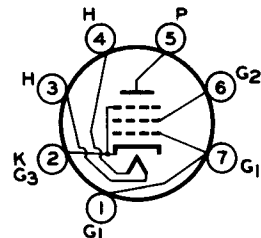
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Fig. 3 - Operation Characteristics of Type 12AQ5

DIMENSIONAL OUTLINE



SOCKET CONNECTIONS  
Bottom View



- |                    |                   |
|--------------------|-------------------|
| PIN 1 - GRID No.1  | PIN 4 - HEATER    |
| PIN 2 - GRID No.3, | PIN 5 - PLATE     |
| CATHODE            | PIN 6 - GRID No.2 |
| PIN 3 - HEATER     | PIN 7 - GRID No.1 |

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