



4-125A

# 4-125A/4D21

## VHF POWER TETRODE

### GENERAL DATA

#### Electrical:

Filament, Thoriated Tungsten:

Voltage. . . . . 5.0 . . . . . ac or dc volts

Current. . . . . 6.5 . . . . . amp

Transconductance (Approx.)

for plate current of 50 ma. 2450 . . . . .  $\mu$ hos

Mu-Factor, Grid No.2 to

Grid No.1. . . 6.2

Direct Interelectrode Capacitances:

Grid No.1 to Plate<sup>o</sup>. . . 0.05 . . . . .  $\mu$ ff

Input. . . . . 10.8 . . . . .  $\mu$ ff

Output . . . . . 3.1 . . . . .  $\mu$ ff

<sup>o</sup> with no external shielding and with base shell connected to ground.

#### Mechanical:

Mounting Position. . . . . Vertical, base up or down

Overall Length . . . . . 5-7/16"  $\pm$  1/4"

Seated Length. . . . . 4-11/16"  $\pm$  1/4"

Maximum Diameter . . . . . 2-7/8"

Cap. . . . . Skirted Small

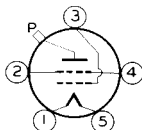
Base<sup>a</sup> . . . . . Special Metal-Shell Giant 5-Pin

Basing Designation for EOTTOM VIEW . . . . . 5BK

Pin 1-Filament

Pin 2-Grid No.2

Pin 3-Grid No.1



Pin 4-Grid No.2

Pin 5-Filament

Cap -Plate

#### Forced-Air Cooling:

Through Base Toward Bulb . . . . . 2 cfm

The specified air flow from a small fan or centrifugal blower should be applied simultaneously with filament power.

#### Of Bulb and Plate Seal:

**Continuous Service:** At frequencies below 30 Mc, relatively slow movement of air past the tube is sufficient to prevent exceeding the specified plate-seal temperature. At frequencies above 30 Mc, special attention should be given to adequate cooling of bulb and plate seal. A small fan directed toward the upper part of the bulb will generally provide sufficient cooling.

**Intermittent Service:** ("On" period does not exceed 5 minutes and is followed by "off" period of the same or greater duration): At frequencies below

<sup>a</sup> metal base shell should be grounded by means of suitable spring fingers.

← Indicates a change

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30 Mc, forced-air cooling of the bulb and plate seal is not usually required if the ambient temperature is below 30°C, provided a heat-radiating plate connector is used and free circulation of air is provided.

Plate-Seal Temperature (Measured on top of plate cap):

Continuous Service . . . . .	170 max.	°C
Intermittent Service (As defined above).	220 max.	°C

→ AF POWER AMPLIFIER & MODULATOR - Class AB<sub>1</sub>\*

**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE . . . . .	3000 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE. . . . .	600 max.	volts
MAX.-SIGNAL DC PLATE CURRENT*. . . . .	225 max.	ma
PLATE DISSIPATION* . . . . .	125 max.	watts
GRID-No.2 DISSIPATION* . . . . .	20 max.	watts

**Typical Operation:**

*Values are for 2 tubes*

DC Plate Voltage . . . . .	1500	2000	2500	volts
DC Grid-No.2 Voltage <sup>▲</sup> . . . . .	600	600	600	volts
DC Grid-No.1 (Control-Grid) Voltage <sup>⊕</sup> . . . . .	-90	-94	-96	volts
Peak AF Grid-No.1 to Grid-No.1 Voltage. . . . .	180	188	192	volts
Zero-Signal DC Plate Current . . . . .	60	50	50	ma
Max.-Signal DC Plate Current . . . . .	222	240	232	ma
Zero-Signal DC Grid-No.2 Current . . . . .	-1.0	-0.5	-0.3	ma
Max.-Signal DC Grid-No.2 Current . . . . .	17	6.4	8.5	ma
Effective Load Resistance (Plate-to-plate). . . . .	10200	13400	20300	ohms
Driving Power. . . . .	0	0	0	watts
Total Harmonic Distortion. . . . .	5	2	2.6	%
Max.-Signal Power Output (Approx.). . . . .	158	230	330	watts

\* Suscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.

⊕ Total effective grid-No.1-circuit resistance should not exceed 0.25 megohm.

AF POWER AMPLIFIER & MODULATOR - Class AE<sub>2</sub>\*

**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE . . . . .	3000 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE. . . . .	400 max.	volts
MAX.-SIGNAL DC PLATE CURRENT*. . . . .	225 max.	ma
PLATE DISSIPATION* . . . . .	125 max.	watts
GRID-No.2 DISSIPATION* . . . . .	20 max.	watts

\* Averaged over any audio-frequency cycle of sine-wave form.

▲, \*; See next page.

→ indicates a change.



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## 4-125A/4D2I

## VHF POWER TETRODE

## Typical Operation:

Values are for 2 tubes

DC Plate Voltage . . . . .	1500	2000	2500	volts
DC Grid-No.2 Voltage <sup>▲</sup> . . . . .	350	350	350	volts
DC Grid-No.1 (Control- Grid) Voltage <sup>▲▲</sup> . . . . .	-41	-45	-43	volts
Peak AF Grid-No.1 to Grid-No.1 Voltage. . . . .	282	210	178	volts
Zero-Signal DC Plate Current . . .	87	72	93	ma
Max.-Signal DC Plate Current . . .	400	300	260	ma
Zero-Signal DC Grid-No.2 Current .	0	0	0	ma
Max.-Signal DC Grid-No.2 Current .	34	5	6	ma
Effective Load Resistance (Plate-to-plate). . . . .	7200	13600	22200	ohms
Max.-Signal Av. Driving Power (Approx.) <sup>□</sup> . . . . .	2.5	1.4	1	watts
Max.-Signal Peak Driving Power (Approx.) <sup>□</sup> . . . . .	5.2	3.1	2.4	watts
Total Harmonic Distortion. . . . .	2.5	1	2.2	%
Max.-Signal Power Output (Approx.) . . . . .	350	350	400	watts

▲ obtained from source having good regulation.

★ Subscript 2 indicates that grid current flows during some part of input cycle.

▲▲ obtained from fixed supply having dc resistance not exceeding 250 ohms.

□ Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the AB<sub>2</sub> stage. The effective resistance per grid-No.1 circuit of the AB<sub>2</sub> stage should be held at a low value.

## PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0

## Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE . . . . .	2500 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE. . . . .	400 max.	volts
DC GRID-No.1 (CONTROL- GRID) VOLTAGE. . . . .	-500 max.	volts
DC PLATE CURRENT . . . . .	200 max.	ma
PLATE DISSIPATION. . . . .	85 max.	watts
GRID-No.2 DISSIPATION. . . . .	20 max.	watts
GRID-No.1 DISSIPATION. . . . .	5 max.	watts

## Typical Operation:

DC Plate Voltage . . . . .	2000	2500	volts
DC Grid-No.2 Voltage <sup>†</sup> . . . . .	350	350	volts

† obtained preferably from a separate source modulated with the plate supply, or from the modulated plate supply through a series resistor.

← Indicates a change.

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DC Grid-No.1 Voltage†† . . . . .	-220	-210	volts
Peak RF Grid-No.1 Voltage (Approx.) . . .	375	360	volts
DC Plate Current . . . . .	150	152	ma
DC Grid-No.2 Current . . . . .	33	30	ma
DC Grid-No.1 Current* . . . . .	10	9	ma
Driving Power (Approx.)* . . . . .	3.8	3.3	watts
Power Output (Approx.) . . . . .	225	300	watts

†† For high-level modulated service, the use of partial grid-resistor bias is recommended. Bypass capacitors across the grid resistor should have a reactance at the highest modulation frequency equal to at least twice the grid-resistor value.

### RF POWER AMPLIFIER & OSCILLATOR—

#### Class C Telephony or FM Telephony

*Key-down conditions per tube without amplitude modulation*

#### Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE . . . . .	3000 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE. . . . .	400 max.	volts
DC GRID-No.1 (CONTROL- GRID) VOLTAGE. . . . .	-500 max.	volts
DC PLATE CURRENT . . . . .	225 max.	ma
PLATE DISSIPATION. . . . .	125 max.	watts
GRID-No.2 DISSIPATION. . . . .	20 max.	watts
GRID-No.1 DISSIPATION. . . . .	5 max.	watts

#### Typical Operation:

DC Plate Voltage . . . . .	2000	2500	3000	volts
DC Grid-No.2 Voltage . . . . .	350	350	350	volts
DC Grid-No.1 Voltage . . . . .	-100	-150	-150	volts
Peak RF Grid-No.1 Voltage (Approx.) . . . . .	230	320	280	volts
DC Plate Current . . . . .	200	200	167	ma
DC Grid-No.2 Current . . . . .	50	40	30	ma
DC Grid-No.1 Current* . . . . .	12	12	9	ma
Driving Power (Approx.)* . . . . .	2.8	3.8	2.5	watts
Power Output (Approx.) . . . . .	275	375	375	watts

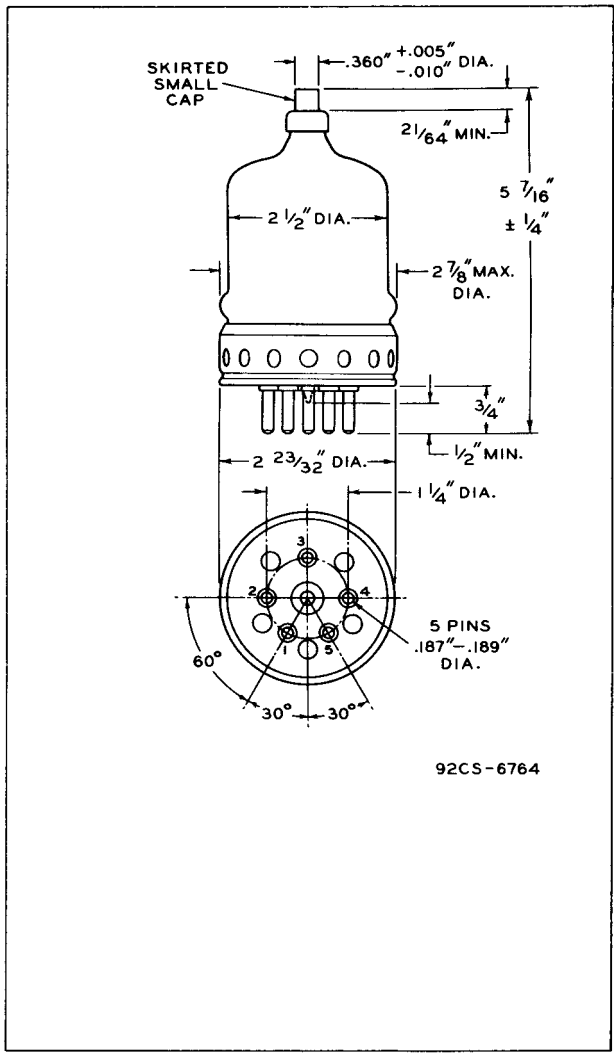
\* For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—Grid Current and Driving Power in the General Section.

Data on operating frequencies for the 4-125A/4D21 are given on the sheet TRANS. TUBE RATINGS vs FREQUENCY.

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# 4-125A/4D2I VHF POWER TETRODE



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## AVERAGE CONSTANT-CURRENT CHARACTERISTICS

