



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 μ hos

Mu-Factor, Grid No.2 to

Grid No.1. . . 6.2

Direct Interelectrode Capacitances:

Grid No.1 to Plate⁰. . . 0.05 μ ff

Input 10.8 μ ff

Output 3.1 μ ff

⁰ 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

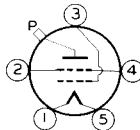
Base^a Special Metal-Shell Giant 5-Pin

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

^a 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 AB₁#

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 [▲]	600	600	600	volts
DC Grid-No.1 (Control-Grid) Voltage [⊕]	-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 AE₂*

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 [▲]	350	350	350	volts
DC Grid-No.1 (Control- Grid) Voltage ^{▲▲}	-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.) [□]	2.5	1.4	1	watts
Max.-Signal Peak Driving Power (Approx.) [□]	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 AB₂ stage. The effective resistance per grid-No.1 circuit of the AB₂ 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 [†]	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

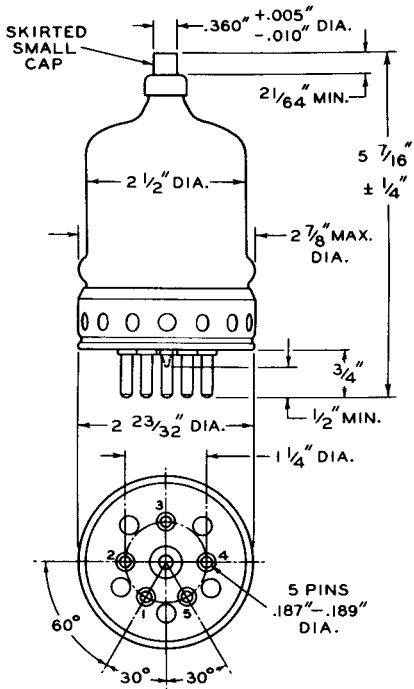
* For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—Grid Current and Driving Power in the General Section.

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



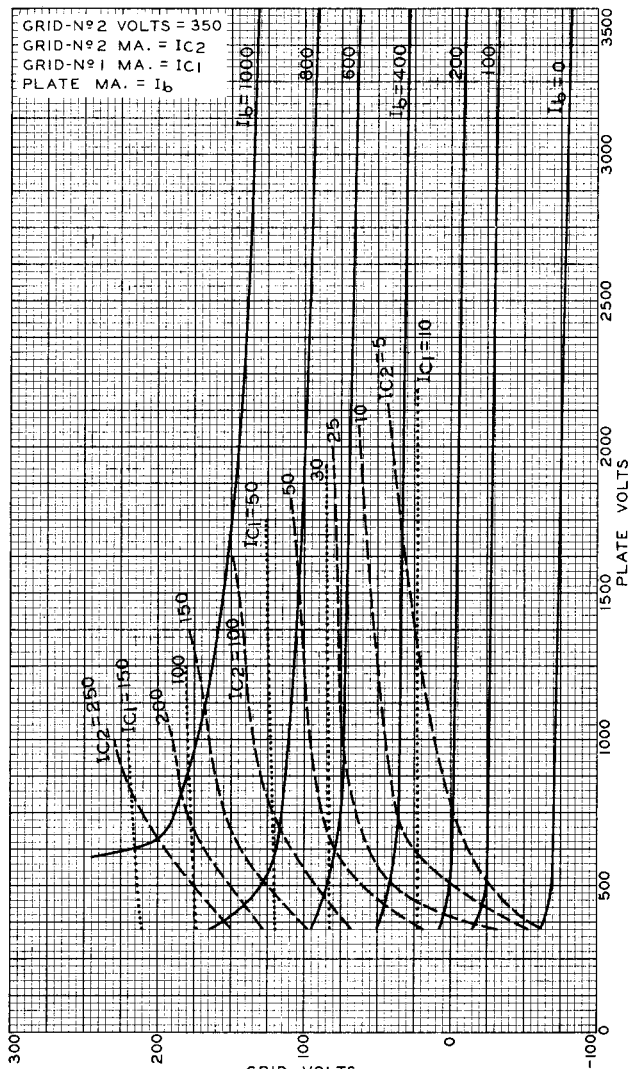
92CS-6764

4-125A



4-125A/4D2I

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



MAY 21, 1946

TUBE DEPARTMENT

92CM-6767

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

4-125A/4D21

Beam Power Tube

FORCED-AIR COOLED ABOVE 30 Mc

For use at frequencies up to 240 Mc

GENERAL DATA

Electrical:

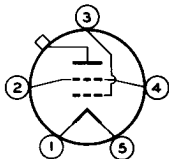
Filament, Thoriated Tungsten:

Voltage (AC or DC)	5.0 ± 5%	volts
Current at filament volts = 5.0	6.5	amp
Transconductance, for plate volts = 2500, grid-No.2 volts = 400, and plate ma. = 50.	2500	μmhos
Mu-Factor, Grid No.2 to Grid No.1	5.9	
Direct Interelectrode Capacitances: ^a		
Grid No.1 to plate.	0.05 max.	μμf
Grid No.1 to filament, grid No.2, and base shell.	11.0	μμf
Plate to filament, grid No.2, and base shell.	3.2	μμf

Mechanical:

Operating Position.	Vertical, base down or up
Maximum Overall Length.	5-11/16"
Seated Length	4-11/16" ± 1/4"
Maximum Diameter.	2-7/8"
Weight (Approx.).	6.5 oz
Cap.	Skirted Small (JEDEC No.C1-22)
Base.	Special Metal-Shell Giant 5-Pin
Basing Designation for BOTTOM 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

Thermal:

Forced-Air Cooling:

Through base toward bulb. 5 cfm

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

To bulb and plate seal:

Continuous service: At frequencies below 30 Mc, relatively slow movement of air past the bulb is sufficient to prevent exceeding the specified plate-seal temperature of 170° C. At frequencies above 30 Mc, special attention should be given to adequate cooling of bulb and plate seal. A small stream of air directed toward the upper part of the bulb will generally provide sufficient cooling.

← Indicates a change.



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Intermittent service ("On" period does not exceed 5 minutes and is followed by "off" period of the same or greater duration): In this service, a plate-seal temperature as high as 220°C is permissible. At frequencies below 30 Mc and for ambient temperatures below 30°C, forced-air cooling of the bulb and plate seal is not usually required, provided a heat-radiating plate connector is used, and free circulation of air is provided. At frequencies above 30 Mc, special attention should be given to adequate cooling to prevent exceeding the specified plate-seal temperature.

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

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

Components:

Socket. . . E.F. Johnson Co. Socket No.122-275, or equivalent
Heat-Radiating Plate Connector. . . Eimac HR-6, or equivalent

AF POWER AMPLIFIER & MODULATOR — Class AB₁^b

Maximum CCS^c Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE.	3000 max.	volts
DC GRID-No.2 VOLTAGE.	600 max.	volts
MAX.—SIGNAL DC PLATE CURRENT ^d	225 max.	ma
GRID-No.2 INPUT ^d	20 max.	watts
PLATE DISSIPATION ^d	125 max.	watts

AF POWER AMPLIFIER & MODULATOR — Class AB₂^o

Maximum Ratings, Absolute-Maximum Values:

	CCS ^c	ICAS ^f	
DC PLATE VOLTAGE.	3000 max.	3200 max.	volts
DC GRID-No.2 VOLTAGE.	400 max.	400 max.	volts
MAX.—SIGNAL DC PLATE CURRENT ^d	225 max.	250 max.	ma
GRID-No.2 INPUT ^d	20 max.	20 max.	watts
PLATE DISSIPATION ^d	125 max.	125 max.	watts

PLATE MODULATED RF POWER AMPLIFIER — Class C Telephony

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

Maximum Ratings, Absolute-Maximum Values:

	CCS ^c	ICAS ^f	
	Up to 120 Mc	Up to 30 Mc	
DC PLATE VOLTAGE.	2500 max.	3200 max.	volts
DC GRID-No.2 VOLTAGE.	400 max.	400 max.	volts
DC GRID-No.1 VOLTAGE.	-500 max.	-500 max.	volts
DC PLATE CURRENT.	200 max.	200 max.	ma
GRID-No.2 INPUT	20 max.	20 max.	watts
GRID-No.1 INPUT	5 max.	5 max.	watts
PLATE DISSIPATION	85 max.	100 max.	watts

→ Indicates a change.



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RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy^g and RF POWER AMPLIFIER — Class C FM Telephony

Maximum Ratings, *Absolute-Maximum Values*:

	CCS ^c	ICAS ^f	
	Up to 120 Mc	Up to 30 Mc	
DC PLATE VOLTAGE.	3000 max.	4000 max.	volts
DC GRID-No.2 VOLTAGE.	400 max.	400 max.	volts
DC GRID-No.1 VOLTAGE.	-500 max.	-500 max.	volts
DC PLATE CURRENT.	225 max.	225 max.	ma
GRID-No.2 INPUT	20 max.	20 max.	watts
GRID-No.1 INPUT	5 max.	5 max.	watts
PLATE DISSIPATION	125 max.	125 max.	watts

^a Without external shield.

^b Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.

^c Continuous Commercial Service.

^d Averaged over any audio-frequency cycle of sine-wave form.

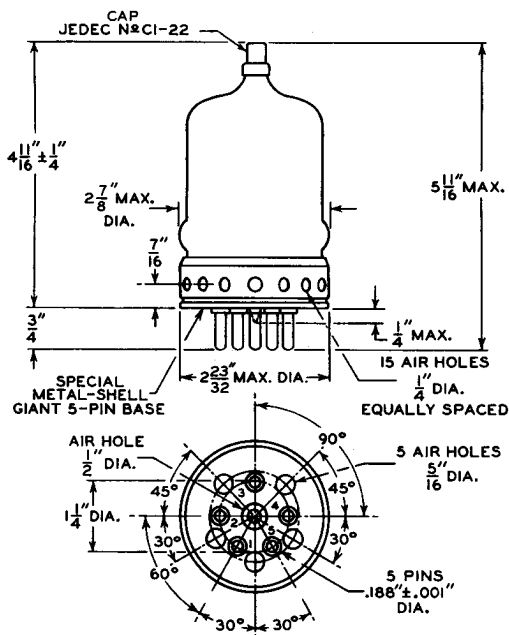
^e Subscript 2 indicates that grid-No.1 current flows during some part of the input cycle.

^f Intermittent Commercial and Amateur Service.

^g 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.



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92CS-6764R2