

Beam Power Tube

GENERAL DATA

Electrical:

Filament, Coated:

Voltage (AC or DC). $6.3 \pm 10\%$ volts

Current at filament volts = 6.3 0.65 amp

Heating time. Less than 2 seconds

Transconductance, for plate volts

= 500, grid-No.2 volts = 200, and

plate ma. = 16. 3200 μ hos

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

for plate volts and grid-No.2 volts

= 200, and plate ma. = 16 7.5

Direct Interelectrode Capacitances:^aGrid No.1 to plate. 0.11 max. μ f

Grid No.1 to filament tap & grid No.3

& internal shield, and grid No.2. 8.5 μ f

Plate to filament tap & grid No.3

& internal shield, and base sleeve. 6.5 μ f

Mechanical:

Operating Position. Vertical, or horizontal with
plane of pins 3 and 7 verticalMaximum Overall Length. $3-21/32"$ Seated Length $2-15/16" \pm 5/32"$ Maximum Diameter. $1-5/16"$

Weight (Approx.). 1.3 oz

Bulb. T9

Cap. Small (JEDEC No.C1-1)

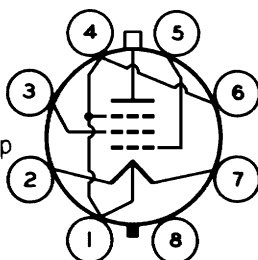
Base. Small-Micanol-Wafer Octal 8-Pin
with "640" Sleeve (JEDEC Group 1, No.B8-44)

Basing Designation for BOTTOM VIEW. 7CL

Pin 1-Grid No.3,
Internal
Shield,
Filament Tap

Pin 2-Filament

Pin 3-Grid No.2



Pin 4-Same as Pin 1

Pin 5-Grid No.1

Pin 6-Same as Pin 1

Pin 7-Filament

Pin 8-Base Sleeve

Cap-Plate

Thermal:

Bulb Temperature (At hottest

point on bulb surface). 210 max. $^{\circ}$ CAF POWER AMPLIFIER & MODULATOR — Class A₁^b

Maximum Ratings, Absolute-Maximum Values:

CCS^c

DC PLATE VOLTAGE. 300 max. volts

← Indicates a change.



	CCS ^c	
DC GRID-No.2 VOLTAGE.	200 max.	volts
GRID-No.2 INPUT	2.5 max.	watts
PLATE DISSIPATION	10 max.	watts

Typical Operation:

DC Plate Voltage.	250	volts
DC Grid-No.2 Voltage.	160	volts
DC Grid-No.1 Voltage ^d	-8	volts
Peak AF Grid-No.1 Voltage	8	volts
Zero-Signal DC Plate Current.	35	ma
Max.-Signal DC Plate Current.	40	ma
Zero-Signal DC Grid-No.2 Current.	2.6	ma
Max.-Signal DC Grid-No.2 Current.	6.8	ma
Load Resistance	6000	ohms
Total Harmonic Distortion	10	%
Power Output.	3.9	watts

→ Maximum Circuit Values:

Grid-No.1-Circuit Resistance: ^e	
With fixed bias	0.1 max. megohm
With cathode bias	0.5 max. megohm

AF POWER AMPLIFIER & MODULATOR — Class AB₂^f

Maximum Ratings, Absolute-Maximum Values:

	CCS ^c	ICAS ^g	
DC PLATE VOLTAGE.	400 max.	500 max.	volts
DC GRID-No.2 VOLTAGE.	200 max.	200 max.	volts
MAX.-SIGNAL DC PLATE CURRENT ^h	75 max.	75 max.	ma
MAX.-SIGNAL PLATE INPUT ^h	30 max.	37.5 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT ^h	2.5 max.	2.5 max.	watts
PLATE DISSIPATION ^h	10 max.	13.5 max.	watts

Typical Operation:

Values are for 2 tubes

DC Plate Voltage.	400	500	volts
DC Grid-No.2 Voltage.	125	125	volts
DC Grid-No.1 Voltage ^d	-15	-15	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	82	82	volts
Zero-Signal DC Plate Current.	18	20	ma
Max.-Signal DC Plate Current.	150	150	ma
Zero-Signal DC Grid-No.2 Current.	0.6	0.6	ma
Max.-Signal DC Grid-No.2 Current.	26	28	ma
Effective Load Resistance (Plate-to-plate).	7000	9000	ohms
Max.-Signal Driving Power (Approx.) ^j	0.43	0.46	watt
Max.-Signal Power Output (Approx.)	42	54	watts

→ Indicates a change.

Maximum Circuit Values (CCS or ICAS Conditions): ←Grid-No.1-Circuit Resistance^k 30000 max. ohms**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 ^g	
DC PLATE VOLTAGE.	400 max.	500 max.	volts
DC GRID-No.2 VOLTAGE.	200 max.	200 max.	volts
DC GRID-No.1 VOLTAGE.	-175 max.	-175 max.	volts
DC PLATE CURRENT.	60 max.	70 max.	ma
DC GRID-No.1 CURRENT.	3.5 max.	3.5 max.	ma
PLATE INPUT	20 max.	27 max.	watts
GRID-No.2 INPUT	1.7 max.	2.3 max.	watts
PLATE DISSIPATION	6.7 max.	9 max.	watts

Typical Operation:

DC Plate Voltage.	400	500	volts
DC Grid-No.2 Voltage ^m	180	180	volts
From a series resistor of	27500	40000	ohms
DC Grid-No.1 Voltage ^{d, n}	-45	-45	volts
From a grid resistor of	18000	18000	ohms
Peak RF Grid-No.1 Voltage	61	62	volts
DC Plate Current.	50	54	ma
DC Grid-No.2 Current.	8	8	ma
DC Grid-No.1 Current (Approx.).	2.5	2.5	ma
Driving Power (Approx.)	0.15	0.16	watt
Power Output (Approx.)	13.5	18	watts

Maximum Circuit Values (CCS or ICAS Conditions): ←Grid-No.1-Circuit Resistance^k 30000 max. ohms**RF POWER AMPLIFIER AND OSCILLATOR — Class C Telegraphy^p** ←
and**RF POWER AMPLIFIER — Class C FM Telephony****Maximum Ratings, Absolute-Maximum Values:**

	CCS ^c	ICAS ^g	
DC PLATE VOLTAGE.	500 max.	600 max.	volts
DC GRID-No.2 VOLTAGE.	200 max.	200 max.	volts
DC GRID-No.1 VOLTAGE.	-175 max.	-175 max.	volts
DC PLATE CURRENT.	75 max.	85 max.	ma
DC GRID-No.1 CURRENT.	3.5 max.	3.5 max.	ma
PLATE INPUT	30 max.	40 max.	watts
GRID-No.2 INPUT	2.5 max.	2.5 max.	watts
PLATE DISSIPATION	10 max.	13.5 max.	watts

← Indicates a change.



2E24

Typical Operation up to 125 Mc:

	CCS ^c		ICAS ^g	
DC Plate Voltage.	400	500	600	volts
DC Grid-No.2 Voltage ^g	200	190	195	volts
From a series resistor of	20000	29000	40500	ohms
DC Grid-No.1 Voltage ^{d, k, q}	-45	-45	-50	volts
From a grid resistor of	15000	15000	16700	ohms
Peak RF Grid-No.1 Voltage	62	65	71	volts
DC Plate Current.	75	60	66	ma
DC Grid-No.2 Current.	10	10.5	10	ma
DC Grid-No.1 Current (Approx.).	3	3	3	ma
Driving Power (Approx.)	0.19	0.2	0.21	watt
Power Output (Approx.)	20	20	27	watts

Typical Operation up to 160 Mc:

DC Plate Voltage.	-	350	volts
DC Grid-No.2 Voltage ^g	-	170	volts
From a series resistor of	-	18000	ohms
DC Grid-No.1 Voltage ^{d, k, r}	-	-50	volts
From a grid resistor of	-	16500	ohms
Peak RF Grid-No.1 Voltage	-	70	volts
DC Plate Current.	-	85	ma
DC Grid-No.2 Current.	-	10	ma
DC Grid-No.1 Current (Approx.).	-	3	ma
Driving Power (Approx.)	-	2	watts
Power Output (Approx.)	-	16.5	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-No.1-Circuit Resistance ^k	30000 max.	ohms
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- ^a Without external shield and with base sleeve connected to ground.
- ^b Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.
- ^c Continuous Commercial Service.
- ^d With ac on filament.
- ^e The type of input-coupling network used should not introduce too much resistance in the grid-No.1 circuit. Transformer or impedance coupling devices are recommended. When grid No.1 is operated in the negative region with fixed bias, the dc grid-No.1-circuit resistance should not exceed 100,000 ohms. For higher values of dc grid-No.1-circuit resistance, cathode bias is required. Under no circumstances should the total dc grid-No.1-circuit resistance exceed 0.5 megohm.
- ^f Subscript 2 indicates that grid-No.1 current flows during some part of the input cycle.
- ^g Intermittent Commercial & Amateur Service.
- ^h Averaged over any audio-frequency cycle of sine-wave form.
- ^j 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 low value.
- ^k When grid No.1 is driven positive and the 2E24 is operated at maximum ratings, the total dc grid-No.1-circuit resistance should not exceed 30,000 ohms. If additional bias is required, it must be supplied by a cathode resistor or fixed supply. For operation at less than maximum ratings, the dc grid-No.1-circuit resistance may be as high as 100,000 ohms.
- ^m Obtained preferably from a separate source modulated with the plate supply, or from the modulated plate supply through series resistor of the value shown.
- ⁿ Obtained from grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.



- ^p 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% of the carrier conditions.
- ^q Obtained preferably from a separate source, or from the plate-supply voltage with a voltage divider, or through a series resistor of the value shown. The grid-No.2 voltage must not exceed 600 volts under key-up conditions.
- ^r Obtained from fixed supply, by grid-No.1 resistor, by cathode resistor, or by combination methods.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current	1	0.59	0.71	amp
Grid No.1-Plate Capacitance . .	2	—	0.11	μ f
Input Capacitance	2	7.0	10.0	μ f
Output Capacitance	2	4.9	8.1	μ f
Plate Current	1,3	24	46	ma
Grid-No.2 Current	1,3	—	5	ma
Grid-No.1 Current	1,4	—	-5	μ a
Useful Power Output	1,5	18	—	watts

Note 1: With 6.3 volts ac on filament.

Note 2: Without external shield. Base pin No.8 grounded.

Note 3: With dc plate voltage of 200 volts, dc grid-No.2 voltage of 135 volts, and dc grid-No.1 voltage of -5 volts.

Note 4: With dc plate voltage of 500 volts, dc grid-No.2 voltage of 200 volts, and dc grid-No.1 voltage adjusted to give dc plate current of 20 ma.

Note 5: With dc plate voltage of 500 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of 0.015 megohm $\pm 10\%$, dc plate current of 60 ma., dc grid-No.1 current of 2.5 to 3.5 ma., and frequency of 15 Mc.

OUTLINE DIMENSIONS

for the 2E24 are the same as those for the 2E26

OPERATING NOTES

The 2E24 is intended for use in mobile and emergency-communications equipment. Its filament combines sturdiness and efficiency with quick heating and provides wide latitude in operating-voltage range. Although designed for intermittent operation, the filament will give reasonable life when it is operated continuously. In continuous-service applications where extremely long life is desired, it is recommended that the heater-cathode type 2E26 be used.

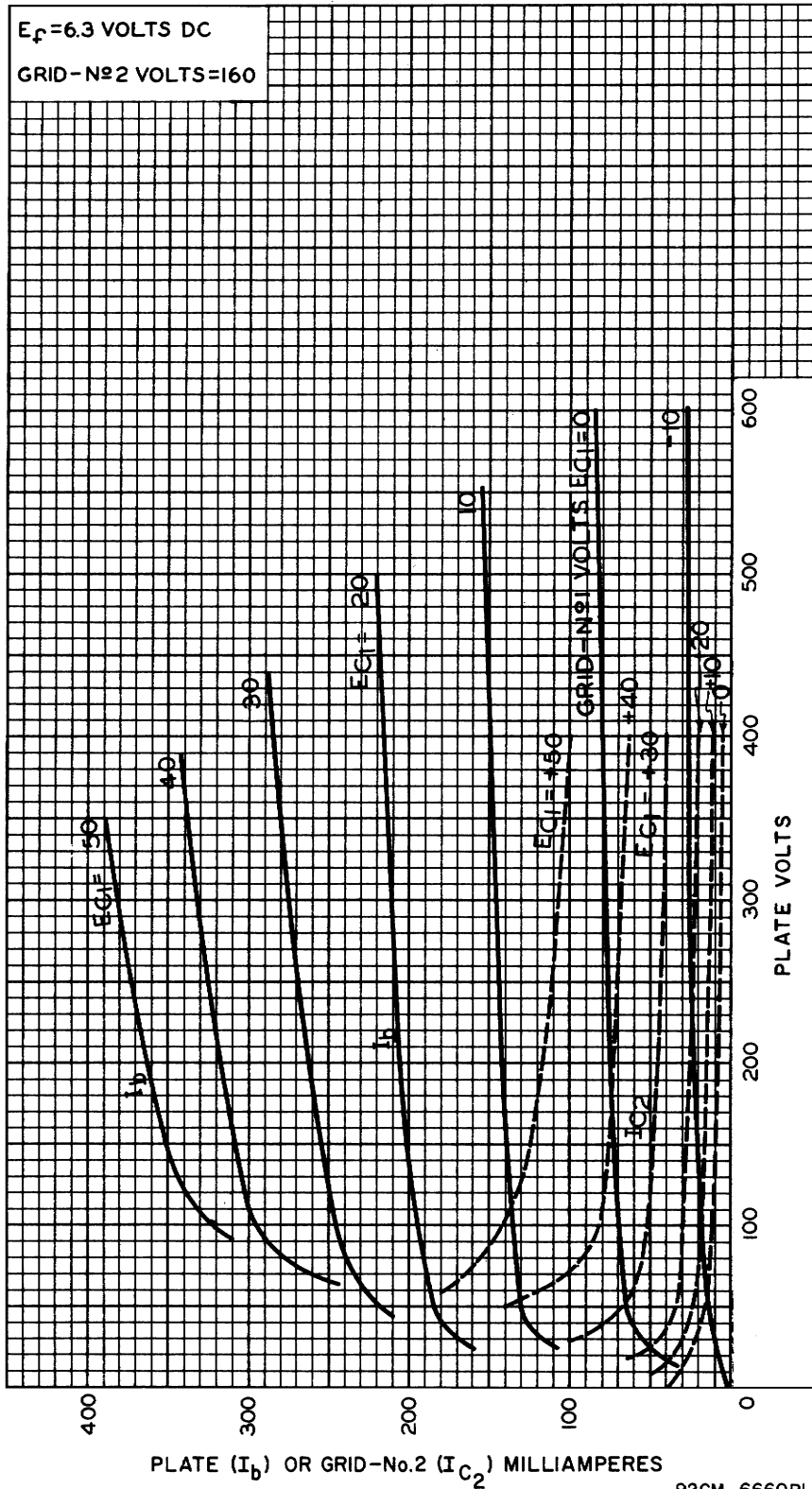
MAXIMUM RATINGS vs OPERATING FREQUENCY

FREQUENCY	125	150	160	175	Mc
MAXIMUM-PERMISSIBLE PERCENTAGE OF MAXIMUM-RATED PLATE VOLTAGE OR PLATE INPUT:					
Class C plate-modulated telephony	100	83	75	68	%
Class C telegraphy	100	83	75	68	%

← Indicates a change.



AVERAGE PLATE CHARACTERISTICS





2E24

2E24

AVERAGE PLATE CHARACTERISTICS

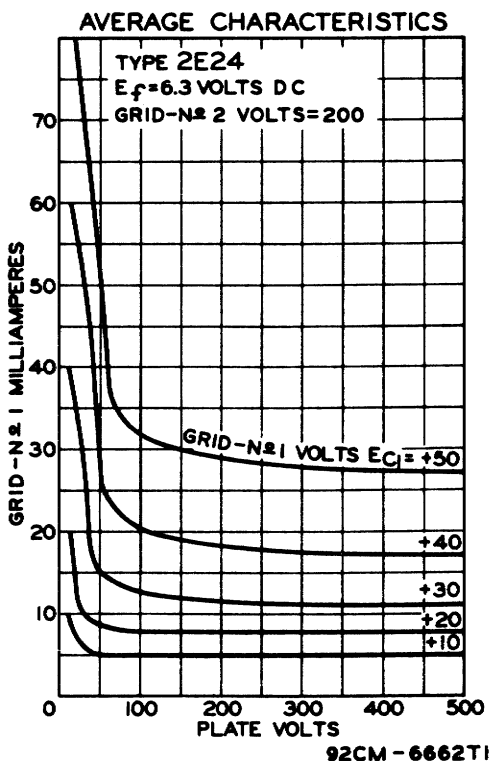
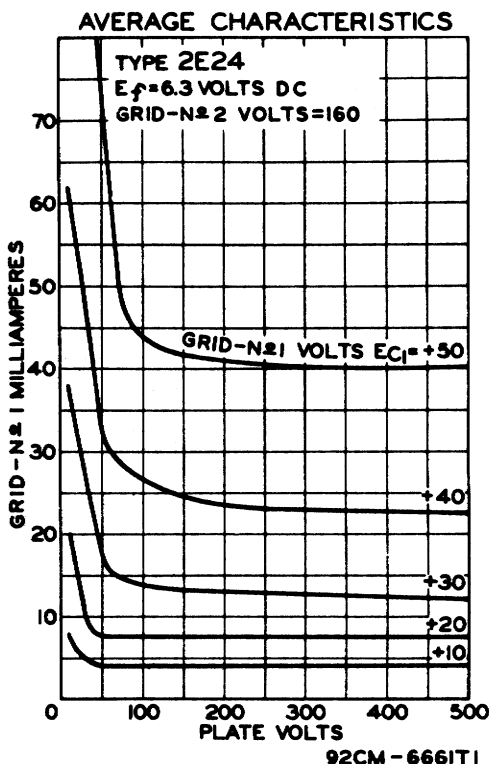


2E24



2E24

VHF BEAM POWER AMPLIFIER



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TUBE DEPARTMENT

CF-6661T1-6662T1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY