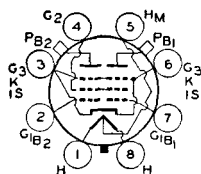


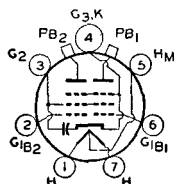
TWIN BEAM POWER TUBE



Glass-octal heater-cathode type used as push-pull rf power amplifier and oscillator in intermittent mobile-service applications. May be used with full input up to 15 Mc. **OUTLINE 25, Outlines Section.** Heater volts (ac/dc), $12.6 \pm 10\%$ (series), $6.3 \pm 10\%$ (parallel); amperes, 0.8 (series), 1.6 (parallel). Direct inter-electrode capacitances (each unit): grid No.1 to plate, 0.22 max μf ; grid No.1 to cathode, grid

3E22

No.3, internal shield, grid No.2, and heater, 14 μf ; plate to cathode, grid No.3, internal shield, grid No.2, and heater, 8.5 μf . Maximum IMS ratings as **PUSH-PULL RF POWER AMPLIFIER AND OSCILLATOR, CLASS C TELEGRAPHY** (per tube): dc plate volts, 600 max; dc grid-No.2 volts, 225 max; dc grid-No.1 volts, -175 max; dc plate milliamperes, 175 max; dc grid-No.1 milliamperes, 11 max; plate input, 100 max watts; grid-No.2 input, 6 max watts; plate dissipation, 35 max watts; peak heater-cathode volts, ± 100 max. Plates show no color when the tube is operated at maximum IMS ratings during the normal cycle of 15 seconds on, 1 minute off. The 3E22 is used principally for renewal purposes.



TWIN BEAM POWER TUBE

Heater-cathode type containing two high-perveance units used as rectangular-wave pulse modulator. Modulator Service maximum CCS plate dissipation (per tube), 15 watts. Requires Septar seven-contact socket and may be mounted in vertical position with base up or down, or in horizontal position with pins 2 and 6 in vertical plane. **OUTLINE 22, Outlines Section.** Plates show no color when the tube is operated at maximum CCS ratings.

3E29

requires Septar seven-contact socket and may be mounted in vertical position with base up or down, or in horizontal position with pins 2 and 6 in vertical plane. **OUTLINE 22, Outlines Section.** Plates show no color when the tube is operated at maximum CCS ratings.

HEATER ARRANGEMENT

HEATER VOLTAGE (AC/DC).....

HEATER CURRENT.....

TRANSCONDUCTANCE (Each unit, approx.)*.....

MU-FACTOR, Grid No.2 to Grid No.1 (Each unit)**.....

DIRECT INTERELECTRODE CAPACITANCES (Each unit):

Grid No.1 to plate (with external shield).....

Grid No.1 to cathode, grid No.3, grid No.2, and heater mid-tap.....

Plate to cathode, grid No.3, grid No.2, and heater mid-tap.....

Series..... Parallel.....

12.6°..... 6.3°.....

1.125..... 2.25.....

8500.....

9.....

0.12 max.....

14.0.....

7.0.....

volts.....

amperes.....

μhos

μf

μf

μf

* Should not deviate more than +10% or -5% from value shown.

* Plate volts, 250; grid-No.2 volts, 175; plate milliamperes, 60.

** Plate and grid-No.2 volts, 225; plate milliamperes, 60.

MODULATOR—Rectangular-Wave Modulation

Values are for both units in parallel

Maximum CCS Ratings:

For Duty Factor[■] between 0.0001 and 1.0 and Maximum Averaging Time of 1200 Microseconds in Any Interval

DC PLATE-SUPPLY VOLTAGE [▲]	5000 max	volts
INSTANTANEOUS PLATE VOLTAGE.....	5750 max	volts
DC GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE [▲]	850 max	volts
DC GRID-No.1 (CONTROL-GRID) SUPPLY VOLTAGE [▲]	-225 max	volts
INSTANTANEOUS GRID-No.1 VOLTAGE.....	-600 max	volts
PEAK POSITIVE GRID-No.1 VOLTAGE.....	250 max	volts
PEAK PLATE CURRENT.....	●max	amperes
PEAK GRID-No.2 CURRENT.....	3.5 max	amperes
PEAK GRID-No.1 CURRENT.....	4 max	amperes
PLATE INPUT.....	85 max	watts
GRID-No.2 INPUT.....	3 max	watts
GRID-No.1 INPUT.....	1 max	watt
PLATE DISSIPATION.....	15 max	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.....	100 max	volts
Heater positive with respect to cathode.....	100 max	volts

[▲] Duty factor is defined as the "on" time in microseconds divided by 1200 microseconds. Pulse dura-

tion is defined as the time interval between the two points on the pulse at which the instantaneous value is 70 per cent of the peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

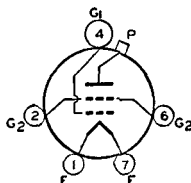
* For tube protection, it is essential that sufficient dc resistance be used in the plate-supply circuit, the grid-No.2-supply circuit, and the grid-No.1-supply circuit so that the short-circuit current is limited to 0.5 ampere in each circuit.

● For a duty factor between 0.0001 and 0.001, the rated peak plate current is 10 amperes maximum. For higher duty factors, the peak plate current must be reduced. The rated peak plate current for a duty factor of 1.0 is 0.3 ampere approx.

BEAM POWER TUBE

4-65A

Small, thoriated-tungsten-filament type used as af power amplifier and modulator and as rf power amplifier and oscillator. May be used with full input up to 50 Mc and with reduced



input up to 250 Mc. Class C Telephony maximum CCS plate dissipation, 65 watts. Requires Septar seven-contact socket and may be mounted in vertical position only, base up or down. OUTLINE 23, *Outlines* Section. Plate shows an orange-red color when the tube is operated at maximum CCS ratings.

FILAMENT VOLTAGE (AC/DC)	6.0	volts
FILAMENT CURRENT	3.5	amperes
TRANSCONDUCTANCE*	4000	μ mhos
MU-FACTOR, Grid No.2 to Grid No.1	5	
DIRECT INTERELECTRODE CAPACITANCES:		
Grid No.1 to plate	0.12 max	μ f
Grid No.1 to filament and grid No.2	8	μ f
Plate to filament and grid No.2	2.1	μ f

* Plate volts, 500; grid-No.2 volts, 250; plate milliamperes, 125.

AF POWER AMPLIFIER AND MODULATOR—Class AB₂

Maximum CCS Ratings:

DC PLATE VOLTAGE	3000 max	volts
DC GRID-NO.2 (SCREEN-GRID) VOLTAGE	600 max	volts
MAXIMUM-SIGNAL DC PLATE CURRENT**	150 max	ma
MAXIMUM-SIGNAL DC GRID-NO.2 INPUT**	10 max	watts
PLATE DISSIPATION**	65 max	watts

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

PLATE-MODULATED RF POWER AMPLIFIER—Class C Telephony

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

Maximum CCS Ratings:

DC PLATE VOLTAGE	2500 max	volts
DC GRID-NO.2 (SCREEN-GRID) VOLTAGE	400 max	volts
DC GRID-NO.1 (CONTROL-GRID) VOLTAGE	-500 max	volts
DC PLATE CURRENT	120 max	ma
GRID-NO.2 INPUT	10 max	watts
GRID-NO.1 INPUT	5 max	watts
PLATE DISSIPATION	45 max	watts

Typical Operation:

DC Plate Voltage	600	1000	1500	2000	2500	volts
DC Grid-No.2 Voltage	250	250	250	250	250	volts
DC Grid-No.1 Voltage	-120	-125	-125	-130	-135	volts
Peak AF Grid-No.2 Voltage	250	250	250	250	250	volts
Peak RF Grid-No.1 Voltage	215	220	220	225	215	volts
DC Plate Current	120	120	120	120	110	ma
DC Grid-No.2 Current (Approx.)	40	40	40	40	25	ma
DC Grid-No.1 Current (Approx.)	15	16	16	16	12	ma
Driving Power (Approx.)	3.2	3.5	3.5	3.6	2.6	watts
Power Output	45	90	140	195	230	watts

○ Obtained from unmodulated plate supply through a series resistor, by the use of an af reactor in the positive grid-No.2 supply lead, or from a separate winding on the modulation transformer. With the series-resistor or reactor method, the af variations in grid-No.2 current resulting from variations in plate voltage as the plate is modulated automatically produce the grid-No.2 modulation voltage.

* Obtained from grid-No.1 resistor or from suitable combination of grid-No.1 resistor and fixed supply.