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828

TRANSMITTING BEAM POWER AMPLIFIER

GENERAL DATA

Electrical:

Filament, Thoriated Tungsten:

Voltage	10 ± 0.5	ac or dc volts
Current	3.25	amp

Transconductance (Approx.) for plate current of 43 ma.	2700	μmhos
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Direct Interelectrode Capacitances:

Grid No.1 to Plate	0.07 max.	μmf
Input	12	μmf
Output	14	μmf

Mechanical:

Mounting Position . . . Vertical, base down; or Horizontal, pins 2 & 4 in vertical plane.

Overall Length 7-7/16" ± 1/4"

Seated Length 6-13/16" ± 1/4"

Maximum Diameter 2-1/16"

Bulb T-16

Cap. Small

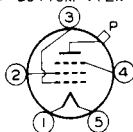
Base Medium-Shell Small 5-Pin, Micanol

Basing Designation for BOTTOM VIEW 5J

Pin 1 - Filament

Pin 2 - Grid No.2

Pin 3 - Grid No.1



Pin 4 - Grid No.3

Pin 5 - Filament

Cap - Plate

AF POWER AMPLIFIER & MODULATOR - Class AB₁*

Maximum Ratings, Absolute Values:

	<u>CCS*</u>	<u>ICAS**</u>	
DC PLATE VOLTAGE	1750 max.	2000 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLT.	100 max.	100 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE .	750 max.	750 max.	volts
MAX.-SIG. DC PLATE CURRENT* . .	150 max.	150 max.	ma
MAX.-SIG. PLATE INPUT*	225 max.	270 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT* .	16 max.	23 max.	watts
PLATE DISSIPATION*	70 max.	80 max.	watts

Typical Operation:

Values are for 2 tubes

DC Plate Voltage	1750	2000	volts
DC Grid-No.3 Voltage	60	60	volts
DC Grid-No.2 Voltage †	750	750	volts

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

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

† Zero-signal grid-No.2 voltage must not exceed 775 volts.

•, ••: See next page.

← Indicates a change.



TRANSMITTING BEAM POWER AMPLIFIER

	<u>CCS*</u>	<u>ICAS**</u>	
DC Grid-No.1 (Control-Grid) Voltage [Ⓢ]	-120 . .	-120 . .	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage.	240 . .	240 . .	volts
Zero-Signal DC Plate Current	50 . .	50 . .	ma
Max.-Signal DC Plate Current	248 . .	270 . .	ma
DC Grid-No.3 Current	9 . .	9 . .	ma
Zero-Signal DC Grid-No.2 Current.	4 . .	2 . .	ma
Max.-Signal DC Grid-No.2 Current.	43 . .	60 . .	ma
Effective Load Resistance (Plate-to-plate).	16200 . .	18500 . .	ohms
Max.-Signal Driving Power (Approx.) [Ⓢ]	0 . .	0 . .	watts
Max.-Signal Power Output (Approx.)	300** .	385 . .	watts

Ⓢ Driver stage should be capable of supplying the specified driving power at low distortion to the No.1 grids of the class AB₁ stage. The effective resistance per grid-No.1 circuit of the class AB₁ stage should be held at a low value.

** Distortion only 1% with 20 db of feedback to grid of driver.

RF POWER AMPLIFIER - Class B Telephony

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

Maximum Ratings, Absolute Values:

	<u>CCS*</u>	<u>ICAS**</u>	
DC PLATE VOLTAGE	1250 max.	1500 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLT.	100 max.	100 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE.	400 max.	400 max.	volts
DC PLATE CURRENT	100 max.	100 max.	ma
PLATE INPUT.	105 max.	120 max.	watts
GRID-No.3 INPUT.	5 max.	5 max.	watts
GRID-No.2 INPUT.	11 max.	11 max.	watts
PLATE DISSIPATION	70 max.	80 max.	watts

Typical Operation:

DC Plate Voltage	1250 . .	1500 . .	volts
DC Grid-No.3 Voltage	75 . .	75 . .	volts
DC Grid-No.2 Voltage	400 . .	400 . .	volts
DC Grid-No.1 (Control-Grid) Voltage [Ⓢ]	-50 . .	-50 . .	volts
Peak RF Grid-No.1 Voltage.	52 . .	50 . .	volts
DC Plate Current	84 . .	80 . .	ma
DC Grid-No.3 Current	4 . .	4 . .	ma
DC Grid-No.2 Current	5 . .	5 . .	ma
DC Grid-No.1 Cur. (Approx.)	0.3 . .	0.2 . .	ma

Ⓢ, **, Ⓢ, Ⓢ: See next page.



TRANSMITTING BEAM POWER AMPLIFIER

	CCS [•]	ICAS ^{••}	
Driving Power (Approx.) [□]	0.5 . .	0.4 . .	watt
Power Output (Approx.)	36 . .	41 . .	watts

[•] obtained from a source of good regulation or from suitably bypassed cathode resistor.

GRID-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:

	CCS [•]	ICAS ^{••}	
DC PLATE VOLTAGE	1250 max.	1500 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLT.	100 max.	100 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE.	400 max.	400 max.	volts
DC GRID-No.1 (CONTROL- GRID) VOLTAGE.	-300 max.	-300 max.	volts
DC PLATE CURRENT	100 max.	100 max.	ma
PLATE INPUT.	105 max.	120 max.	watts
GRID-No.3 INPUT.	5 max.	5 max.	watts
GRID-No.2 INPUT.	11 max.	11 max.	watts
PLATE DISSIPATION.	70 max.	80 max.	watts

Typical Operation:

DC Plate Voltage	1250 . .	1500 . .	volts
DC Grid-No.3 Voltage	75 . .	75 . .	volts
DC Grid-No.2 Voltage	400 . .	400 . .	volts
DC Grid-No.1 Voltage ^{***}	-150 . .	-150 . .	volts
Peak RF Grid-No.1 Voltage.	165 . .	165 . .	volts
Peak AF Grid-No.1 Voltage.	94 . .	94 . .	volts
DC Plate Current	84 . .	80 . .	ma
DC Grid-No.3 Current	4 . .	3.5 . .	ma
DC Grid-No.2 Current	5 . .	4 . .	ma
DC Grid-No.1 Cur. (Approx.).	1.6 . .	1.3 . .	ma
RF Driving Power (Approx.) ^{□ □}	2.5 . .	2.5 . .	watts
Power Output (Approx.)	36 . .	41 . .	watts

^{**} Fixed supply or cathode-resistor bias, unbypassed for audio-frequencies, is recommended.

[□] At crest of audio-frequency cycle with a modulation factor of 1.0.

^{□ □} AF driving power is generally never more than 2 watts.

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:

	CCS [•]	ICAS ^{••}	
DC PLATE VOLTAGE	1000 max.	1250 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLT.	100 max.	100 max.	volts

^{•, ••, □}: See next page.



TRANSMITTING BEAM POWER AMPLIFIER

	<u>CCS*</u>	<u>ICAS**</u>	
DC GRID-No.2 (SCREEN) VOLTAGE.	400 max.	400 max.	volts
DC GRID-No.1 (CONTROL- GRID) VOLTAGE.	-300 max.	-300 max.	volts
DC PLATE CURRENT	135 max.	160 max.	ma
DC GRID-No.1 CURRENT	15 max.	15 max.	ma
PLATE INPUT	135 max.	200 max.	watts
GRID-No.3 INPUT	5 max.	5 max.	watts
GRID-No.2 INPUT	11 max.	11 max.	watts
PLATE DISSIPATION	47 max.	70 max.	watts

Typical Operation:

DC Plate Voltage	1000 . .	1250 . .	volts
DC Grid-No.3 Voltage	75 . .	75 . .	volts
DC Grid-No.2 Voltage ^{▲▲}	{ 400 . .	{ 400 . .	volts
	{ 26000 . .	{ 30000 . .	ohms
DC Grid-No.1 Voltage ^{††*}	{ -140 . .	{ -140 . .	volts
	{ 14000 . .	{ 11700 . .	ohms
Peak RF Grid-No.1 Voltage.	230 . .	250 . .	volts
DC Plate Current	135 . .	160 . .	ma
DC Grid-No.3 Current	13 . .	15 . .	ma
DC Grid-No.2 Current	23 . .	28 . .	ma
DC Grid-No.1 Current (Approx.)	10 . .	12 . .	ma
Driving Power (Approx.)	2.1 . .	2.7 . .	watts
Power Output (Approx.)	100 . .	150 . .	watts

^{▲▲} obtained preferably from a separate source modulated with the plate supply, or from the modulated plate-supply through a series resistor of the value shown.

^{††} obtained from a grid resistor of value shown or from a combination of grid resistor with either fixed supply or cathode resistor.

RF POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation[■]

Maximum Ratings, Absolute Values:

	<u>CCS*</u>	<u>ICAS**</u>	
DC PLATE VOLTAGE.	1250 max.	1500 max.	volts
DC GRID-No.3 (SUPPRESSOR) VOLT.	100 max.	100 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE	400 max.	400 max.	volts
DC GRID-No.1 (CONTROL- GRID) VOLTAGE	-300 max.	-300 max.	volts
DC PLATE CURRENT	160 max.	180 max.	ma
DC GRID-No.1 CURRENT	15 max.	15 max.	ma
PLATE INPUT	200 max.	270 max.	watts
GRID-No.3 INPUT	5 max.	5 max.	watts
GRID-No.2 INPUT	16 max.	16 max.	watts
PLATE DISSIPATION	70 max.	80 max.	watts

*, **, ■: See next page.



TRANSMITTING BEAM POWER AMPLIFIER

Typical Operation:

	CCS*	ICAS**	
DC Plate Voltage	1250 . .	1500 . .	volts
DC Grid-No.3 Voltage	75 . .	75 . .	volts
DC Grid-No.2 Voltage**	{ 400 . .	400 . .	volts
	{ 24300 . .	39300 . .	ohms
	{ -95 . .	-100 . .	volts
DC Grid-No.1 Voltage*##	{ 7900 . .	8300 . .	ohms
	{ 415 . .	430 . .	ohms
Peak RF Grid-No.1 Voltage.	195 . .	205 . .	volts
DC Plate Current	160 . .	180 . .	ma
DC Grid-No.3 Current	22 . .	14 . .	ma
DC Grid-No.2 Current	35 . .	28 . .	ma
DC Grid-No.1 Cur. (Approx.).	12 . .	12 . .	ma
Driving Power (Approx.).	2.1 . .	2.2 . .	watts
Power Output (Approx.)	150 . .	200 . .	watts

* Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.

** obtained from a separate source, from the plate-voltage supply with a voltage divider, or through a series resistor of value shown. Series grid-no.2 resistor should be used only when the 828 is used as a buffer amplifier and is not keyed. Grid-No.2 voltage must not exceed 800 volts under key-up conditions.

obtained from fixed supply, by grid resistor (7900, 8300) or cathode resistor (415, 430).

* If preceding stage is keyed, partial fixed-bias is required.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current	1	3.10	3.40	amp
Grid No.1-Plate Capacitance	-	-	0.07	μf
Input Capacitance.	-	9.9	14.1	μf
Output Capacitance	-	10.5	17.5	μf
Plate Current.	1,2	30	56	ma
Grid-No.2 Current.	1,2	-	7	ma
Grid-No.1 Current.	1,3	21	49	ma
Plate Current.	1,4	-	10	ma
Power Output	1,5	180	-	watts

Note 1: DC filament volts = 10.0.

Note 2: With dc plate voltage of 1750 volts; dc grid-no.3 voltage of 0 volts; dc grid-no.2 voltage of 300 volts; dc grid-no.1 voltage of -25 volts.

Note 3: With dc plate voltage of 200 volts; dc grid-no.3 voltage of 200 volts; dc grid-no.2 voltage of 200 volts; and dc grid-no.1 voltage of +75 volts.

Note 4: With dc plate voltage of 1750 volts; dc grid-no.3 voltage of -180 volts; dc grid-no.2 voltage of 300 volts; and dc grid-no.1 voltage of -25 volts.

Note 5: With dc plate voltage of 1750 volts; dc grid-no.3 voltage of 100 volts; dc grid-no.2 voltage of 300 volts; plate current of 150 ma; grid-no.1 current of 10-15 ma.; grid-no.1 resistor of 10000 \pm 10% ohms and frequency of 15 Mc.

*, **, #: See next page.

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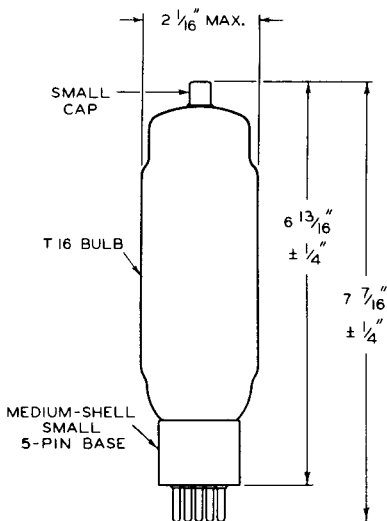


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TRANSMITTING BEAM POWER AMPLIFIER

- Continuous Commercial Service.
- Intermittent Commercial & Amateur Service.
- For ac filament supply.

Data on operating frequencies for the 828 are given on the sheet TRANS. TUBE RATINGS vs FREQUENCY.



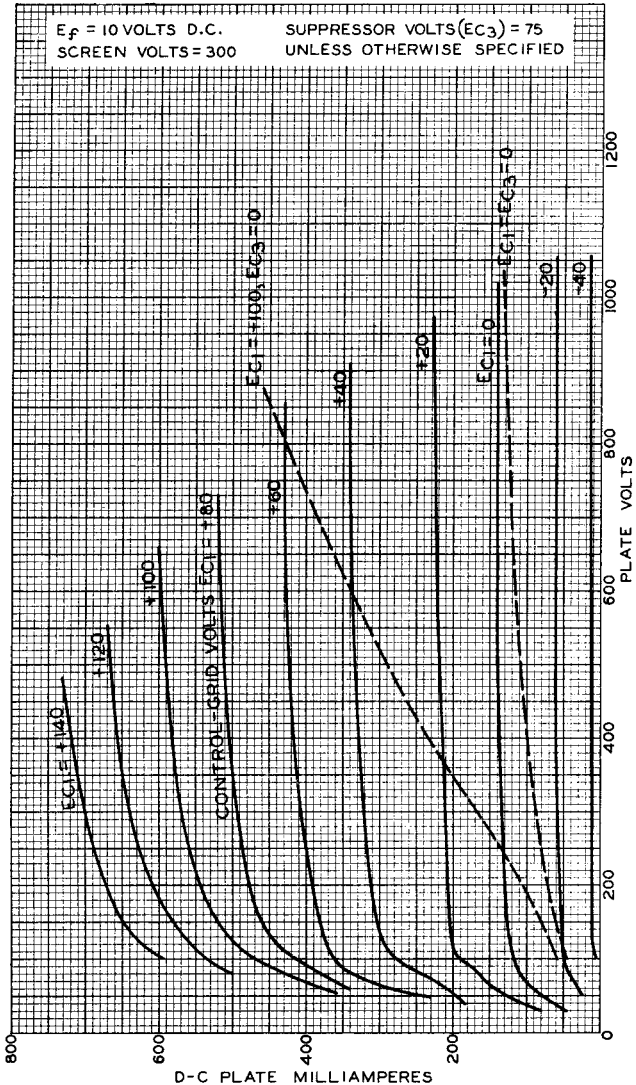
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AVERAGE PLATE CHARACTERISTICS



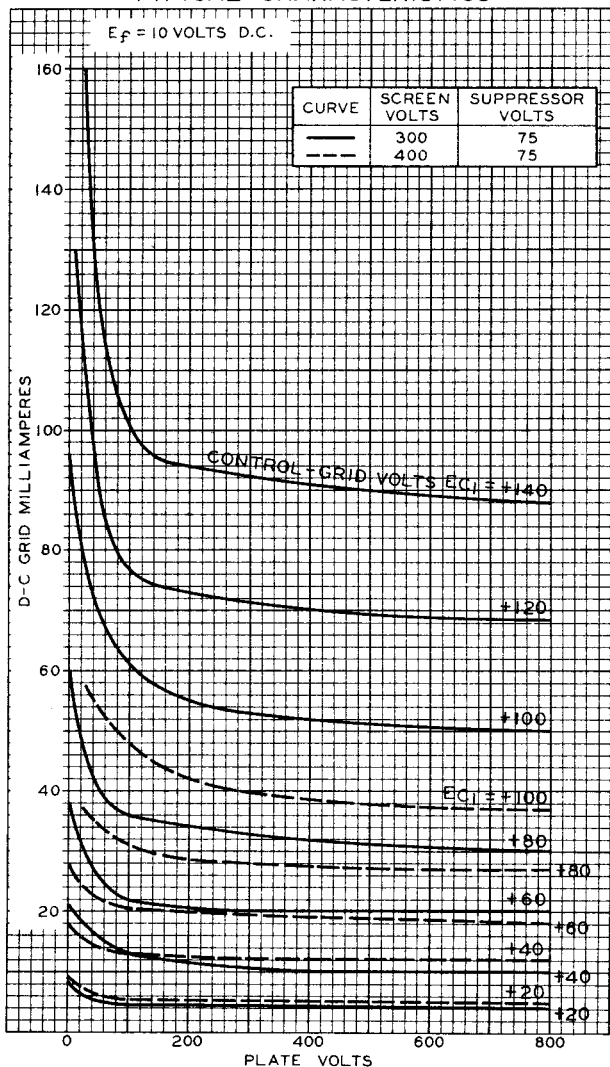
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TYPICAL CHARACTERISTICS

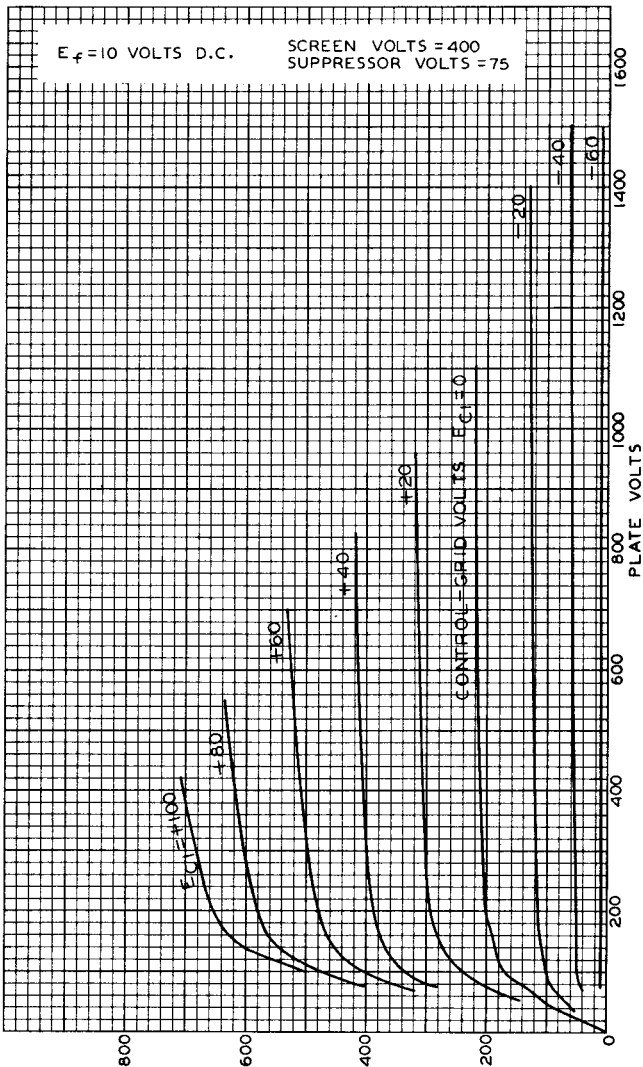




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AVERAGE PLATE CHARACTERISTICS



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AVERAGE PLATE CHARACTERISTICS

