

RCA-838

R-F Power Amplifier, Oscillator, Class B Modulator

Illustrated on page 62

RCA-838 is a three-electrode transmitting tube of the thoriated-tungsten filament type designed primarily for use as a zero-bias class B audio-frequency power amplifier. The grid is constructed so that the amplification factor of the tube varies with the amplitude of the input signal. This feature makes possible the design of class B a-f amplifiers to give high output with low distortion. In class B audio service, two tubes of this type are capable of giving an output of 260 watts with less than 5% distortion. The 838 may also be used as a radio-frequency power amplifier and oscillator at maximum ratings at frequencies as high as 30 megacycles. The maximum plate dissipation of the RCA-838 is 100 watts for class C telegraph and class B services.

CHARACTERISTICS

Filament Volts (a-c or d-c).....	10.0	Grid-Plate Capacitance	8 μ f
Filament Amperes	3.25	Grid-Filament Capacitance	6.5 μ f
		Plate-Filament Capacitance	5 μ f

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

As A-F Power Amplifier and Modulator—Class B

D-C PLATE VOLTAGE	1250 max.	Volts
MAX.-SIGNAL D-C PLATE CURRENT*	175 max.	Milliamperes
MAX.-SIGNAL PLATE INPUT*	220 max.	Watts
PLATE DISSIPATION*	100 max.	Watts

TYPICAL OPERATION:

Unless otherwise specified, values are for 2 tubes

D-C Plate Voltage	1000	1250	Volts
D-C Grid Voltage [§]	0	0	Volts
Peak A-F Grid-to-Grid Voltage	200	200	Volts
Zero-Sig. D-C Plate Current	106	148	Milliamperes
Max.-Sig. D-C Plate Current	320	320	Milliamperes
Load Resistance (Per tube)	1725	2250	Ohms
Effective Load Resistance (Plate-to-plate)	6900	9000	Ohms
Max.-Signal Driving Power (Approx.)	7	7.5	Watts
Max.-Signal Power Output (Approx.) [‡]	200	260	Watts

As R-F Power Amplifier—Class B Telephony

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

D-C PLATE VOLTAGE	1250 max.	Volts
D-C PLATE CURRENT	150 max.	Milliamperes
PLATE INPUT	150 max.	Watts
PLATE DISSIPATION	100 max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	1000	1250	Volts
D-C Grid Voltage [§]	0	0	Volts
Peak R-F Grid Voltage	70	60	Volts
D-C Plate Current	130	106	Milliamperes
D-C Grid Current (Approx.)	15	15	Milliamperes
Driving Power (Approx.) [†]	8	6	Watts
Power Output (Approx.)	40	42.5	Watts

* , § , † , ‡: see next page.

As Plate-Modulated R-F Power Amplifier—Class C Telephony*Carrier conditions per tube for use with a max. modulation factor of 1.0*

D-C PLATE VOLTAGE	1000	max.	Volts
D-C GRID VOLTAGE	-400	max.	Volts
D-C PLATE CURRENT	175	max.	Milliamperes
D-C GRID CURRENT	70	max.	Milliamperes
PLATE INPUT	175	max.	Watts
PLATE DISSIPATION	67	max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	750	1000	Volts
D-C Grid Voltage [§]	-100	-135	Volts
Peak R-F Grid Voltage	220	255	Volts
D-C Plate Current	150	150	Milliamperes
D-C Grid Current (Approx.)	60	60	Milliamperes
Grid Resistor	1670	2250	Ohms
Driving Power (Approx.)	14	16	Watts
Power Output (Approx.)	65	100	Watts

As R-F Power Amplifier and Oscillator—Class C Telegraphy*Key-down conditions per tube without modulation††*

D-C PLATE VOLTAGE	1250	max.	Volts
D-C GRID VOLTAGE	-400	max.	Volts
D-C PLATE CURRENT	175	max.	Milliamperes
D-C GRID CURRENT	70	max.	Milliamperes
PLATE INPUT	220	max.	Watts
PLATE DISSIPATION	100	max.	Watts

TYPICAL OPERATION:

D-C Plate Voltage	750	1000	1250	Volts
D-C Grid Voltage [§]	-80	-85	-90	Volts
Peak R-F Grid Voltage	190	195	200	Volts
D-C Plate Current	150	150	150	Milliamperes
D-C Grid Current (Approx.)	30	30	30	Milliamperes
Grid Resistor	2670	2835	3000	Ohms
Driving Power (Approx.)	6	6	6	Watts
Power Output (Approx.)	65	100	130	Watts

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

† Approximately 4% harmonic distortion.

§ Grid voltages are given with respect to the mid-point of filament operated on a.c. When a.c. is used, the circuit returns are made to the mid-point of the filament circuit. When a d-c supply is used, the returns are made to the negative filament terminal.

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

† At crest of audio-frequency cycle with modulation factor of 1.0.

INSTALLATION AND APPLICATION

For installation and outline drawing, refer to type 203-A.

In special cases when the 838 is operated as a class B a-f amplifier and it is desirable to keep the a-f distortion to a value lower than 4%, the use of a small amount of grid-bias voltage is advantageous. Typical operating conditions are approximately the same as those for zero-bias operation. With a plate-supply voltage of 1250 volts, the exceptions are: grid-bias voltage, -15 volts; peak a-f grid-to-grid voltage, 210 volts; and zero-signal d-c plate current, 50 milliamperes (2 tubes).

For high-frequency operation above 30 megacycles, refer to page 144.

For additional information, see chapters on INSTALLATION and APPLICATION.

Refer to type 805 for a plate family of average characteristics which also applies to this type.

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