



TYPE 838

CLASS B MODULATOR, A-F AND R-F POWER AMPLIFIER, OSCILLATOR ENGINEERING INFORMATION

GENERAL RATINGS

Number of Electrodes	3
Filament Voltage	10 volts
Current	3.25 amperes
Type	Thoriated Tungsten
Average Characteristic Values Calculated at: Ep = 1250, Ec = 0, Ef = 10 D-C	
Plate Current	0.060 amperes
Amplification Factor	100
Plate Resistance	12500 ohms
Mutual Conductance	8000 micromhos
Average Direct Interelectrode Capacities:	
Grid to Plate	8.0 uuf
Grid to Filament	6.5 uuf
Plate to Filament	5.5 uuf
Maximum Overall Dimensions:	
Length	7 7/8 inches
Diameter	2 5/16 inches
Bulb	T-18
Base	Jumbo 4-Large Pin
Type of Cooling	Air
Net Weight	7 oz.

MAXIMUM RATINGS

Maximum D-C Plate Voltage Modulated	1000	volts
Maximum D-C Plate Voltage Unmodulated	1250	volts
Maximum A-C Plate Voltage R. M. S.	1250	volts
Maximum D-C Plate Current Modulated	150	ma.
Maximum D-C Plate Current Unmodulated	175	ma.
Maximum Plate Dissipation	100	watts
Maximum D-C Grid Current	70	ma.
Maximum R-F Grid Current	7.5	amp.
Frequency Rating for Operating Conditions with Maximum Rated Power Input and Nominal Output:		
Below	30	megacycles
Above	10	meters
*Maximum Frequency Rating with Reduced Power Input and Output:		
Below	120	megacycles
Above	2.5	meters

* For operation at the higher frequencies, the plate voltage, plate current, plate dissipation, and d-c grid current should not exceed 50% of the Maximum Ratings. The R-F grid current should never exceed the maximum rated value.

INSTALLATION

The base of the UNITED 838 is designed for mounting in a standard "50 watt" socket of the four-pin, bayonet type. The tube should always be mounted vertically with ample air space provided for ventilation.

The filament of the 838 should be operated at the rated value of 10 volts. Operation at other than rated value may result in loss of filament emission and short life.

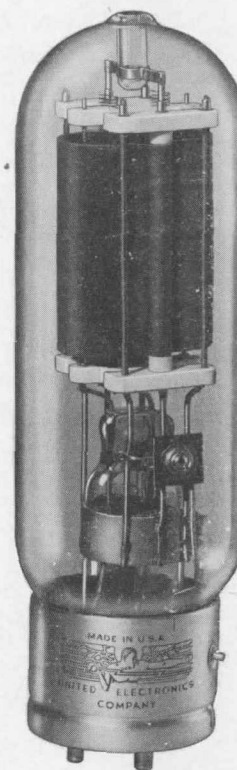
Type 838 is a high-mu triode particularly well suited for use as a zero-bias class B modulator or a-f power amplifier. In class B amplifier service type 838 will give high output with low distortion.

GRAPHITE ANODE

A graphite anode is used in this type tube because of several specific advantages over metals such as tantalum, molybdenum and nickel. The radiating area of graphite is approximately twice the projected area due to its surface porosity. Moreover, because of the black body principle, it will dissipate four times more heat than metal.

Graphite being infusible, will not warp or twist. Therefore, it maintains its exact form under all temperatures, the result being constant inter-element relationship. The low operating temperature of the graphite anode tends to keep the grid cool, reduces overload hazards, and prevents gas current. The inherent qualities of graphite over metal as outlined above, are advantages of primary importance in designing tubes of this type for long and satisfactory service life.

All ratings given are for continuous service. Higher ratings are permissible for intermittent operation. Additional data will be furnished upon request.



INTERCHANGES WITH UNITED TYPE 938

"RUGGEDIZED" construction enables type 838 to withstand unusual shock and vibration conditions such as encountered in wartime military usage.

A-F POWER AMPLIFIER AND MODULATOR—CLASS B

Maximum D-C Plate Voltage.....	1250	volts
Maximum D-C Plate Current.....	Averaged over any 175	ma.
Maximum Plate Dissipation.....	audio freq. cycle..... 100	watts
Typical Operation (2 tubes):		
Filament Voltage.....	10 10	a-c volts
D-C Plate Voltage.....	1000 1250	volts
Grid Voltage.....	0 0	volts
Zero-Signal Plate Cur. (per tube)....	53 74	ma.
Max.-Signal Plate Cur. (per tube)....	160 160	ma.
Load Resistance (per tube).....	1725 2250	ohms
Effective Load Res. (plate to plate)...	6900 9000	ohms
Power Output (2 tubes).....	200 260 approx.	watts

R-F POWER AMPLIFIER—CLASS B TELEPHONY

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage.....	1250	volts
Maximum D-C Plate Current.....	150	ma.
Maximum Plate Dissipation.....	100	watts
Maximum R-F Grid Current.....	6	amp.
Typical Operation:		
Filament Voltage.....	10 10	volts
D-C Plate Voltage.....	1000 1250	volts
Grid Voltage.....	0 0	volts
D-C Plate Current.....	130 106	ma.
Peak Power Output.....	160 170 approx.	watts
Carrier Power Output.....	40 42.5 approx.	watts

**PLATE MODULATED R-F POWER AMPLIFIER
CLASS C TELEPHONY**

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage.....	1000	volts
Maximum D-C Plate Current.....	175	ma.
Maximum Plate Dissipation.....	67	watts
Maximum R-F Grid Current.....	6	amp.
Maximum D-C Grid Current.....	70	ma.
Typical Operation:		
Filament Voltage.....	10 10	a-c volts
D-C Plate Voltage.....	750 1000	volts
Grid Voltage.....	100 —135 approx.	volts
D-C Plate Current.....	150 150	ma.
D-C Grid Current.....	60 60	ma.
Driving Power†.....	14 16	watts
Power Output.....	65 100 approx.	watts

**R-F POWER AMPLIFIER AND OSCILLATOR
CLASS C TELEGRAPHY**

(Key Down Conditions)

Maximum D-C Plate Voltage.....	1250	volts
Maximum D-C Plate Current.....	175	ma.
Maximum Plate Dissipation.....	100	watts
Maximum R-F Grid Current.....	7.5	amp.
Maximum D-C Grid Current.....	70	ma.
Typical Operation:		
Filament Voltage.....	10 10 10	a-c volts
D-C Plate Voltage.....	750 1000 1250	volts
Grid Voltage.....	80 —85 —90 approx.	volts
D-C Plate Current.....	150 150 150	ma.
D-C Grid Current†.....	30 30 30	ma.
Driving Power†.....	6 6 6	watts
Power Output.....	65 100 130 approx.	watts

† Subject to wide variations depending on the impedance of the load circuit. The driver stage should have a tank circuit of good regulation and should be capable of delivering considerably more than the required driving power.

