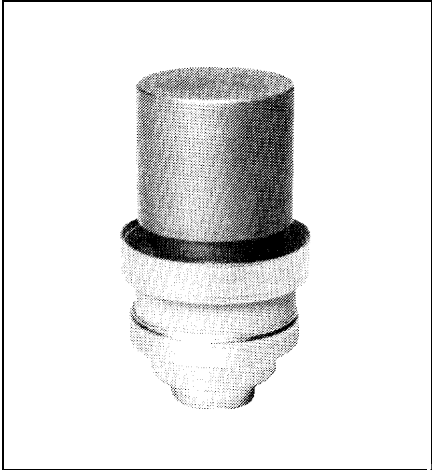


# 7843 Power Tube



## Conduction-Cooled UHF Beam Power Tube

- Cermolox® Construction
- Oxide-Coated Cathode
- Conduction Cooled
- Peak Power Output:  
400 MHz - 80 W  
1215 MHz - 40 W

BURLE 7843 is a compact, conduction-cooled UHF beam power tube designed for applications where air cooling may not be practical. The tube features Cermolox construction, a unipotential, oxide-coated cathode, and an integral aluminum alloy conduction cylinder for high thermal conductivity.

The tube is rated as an AF power amplifier and modulator, and up to 1215 MHz as a linear RF power amplifier, an anode-modulated RF power amplifier in Class C telephony service, an RF power amplifier and oscillator in Class C telegraphy service, and an RF power amplifier in Class C FM telephony service. The 7843 may also be useful in a variety of other applications such as frequency multipliers, linear RF power amplifiers (AM or television), pulse modulators, pulsed RF amplifiers, regulators, or other special services.

This data sheet gives application information unique to the BURLE 7843. Information contained in the following publications will help to assure longer tube life and safer operation:

- TP-105 Applications Guide for BURLE Power Tubes
- TP-118 Applications Guide for Forced-Air Cooling of BURLE Power Tubes
- TP-122 Screen-Grid Current Loading and Bleeder Considerations

For copies of these publications, contact your BURLE representative or write BURLE INDUSTRIES, INC., Tube Products Division, 1000 New Holland Avenue, Lancaster, PA 17601-5888.

\* Erie Speciality Products, Inc., 645 West 11th Street, Erie, Pennsylvania 16512

### General Data

#### Electrical

Heater for Oxide-Coated Unipotential Cathode:

Voltage (AC or DC) .....	26.5 ± 10%
Current at 26.5 volts .....	0.5 A
Minimum heating time .....	2 minutes
Mu-Factor, Grid No.2 to Grid No.1 .....	18

Direct Interelectrode Capacitances<sup>1</sup>:

Grid No.1 to anode .....	0.065 max.	pF
Grid No.1 to cathode & heater .....	13	pF
Anode to cathode & heater .....	.013 max.	pF
Grid No.1 to grid No.2 .....	17.5	pF
Grid No.2 to anode .....	4.7	pF
Grid No.2 to cathode & heater .....	0.45 max.	pF

#### Mechanical

Operating Position .....	Any
Overall Length .....	1.880" ± .050"
Greatest Diameter .....	1.120" max.
Terminal Connections .....	See Dimensional Outline

#### For operation up to 400 MHz

Socket, including Grid-No.2 Bypass Capacitor .....	Erie* 9819-000, or equivalent
Grid-No.2 Bypass Capacitor .....	Erie* 2929-001, or equivalent

#### For operation at high frequencies

See Preferred Mounting Arrangement .....	Page 4
Weight (Approx.) .....	2 oz.

#### Thermal

Terminal Temperature (Anode, grid No.2, grid No.1, cathode, and heater) .....	250 max.	°C
Anode-Core Temperature .....	250 max.	°C

See Dimensional Outline for temperature-measurement points

## AF Power Amplifier & Modulator-Class AB<sub>1</sub>

### Maximum CCS Ratings, Absolute-Maximum Values

DC Anode Voltage .....	1000	volts
DC Grid No.2 Voltage .....	300	volts
Max. Signal DC Anode Current .....	180	mA
Max. Signal Anode Input .....	180	watts
Max. Signal Grid No.2 Input .....	7	watts
Anode Dissipation .....	115	watts

### Maximum Circuit Values

Grid No.1 Circuit Resistance Under Any Condition:

With fixed bias .....	30,000	ohms
With cathode bias .....	Not Recommended	

### Typical CCS Operation

Values are for 2 tubes.

DC Anode Voltage .....	650	850	volts
DC Grid No.2 Voltage .....	300	300	volts
DC Grid No.1 Voltage:			
From fixed-bias source .....	-15	-15	volts
Peak AF Grid No.1 to Grid No.1 Voltage .....	30	30	volts
Zero-Signal DC Anode Current .....	80	80	mA
Max.-Signal DC Anode Current .....	200	200	mA
Zero-Signal DC Grid No.2 Current .....	0	0	mA
Max.-Signal DC Grid No.2 Current .....	20	20	mA
Effective Load Resistance (Anode to Anode) .....	4330	7000	ohms
Max.-Signal Driving Power (Approx.) .....	0	0	watts
Max.-Signal Power Output (Approx.) .....	50	80	watts

## AF Power Amplifier & Modulator - Class AB<sub>2</sub>

### Maximum CCS Ratings, Absolute-Maximum Values

DC Anode Voltage .....	1000	volts
DC Grid No.2 Voltage .....	300	volts
Max.-Signal DC Anode Current .....	180	mA
Max.-Signal DC Grid No.1 Current .....	30	mA
Max.-Signal Anode Input .....	180	watts
Max.-Signal Grid No.2 Input .....	7	watts
Anode Dissipation .....	115	watts

### Typical CCS Operation

Values are for 2 tubes.

DC Anode Voltage .....	650	850	volts
DC Grid No.2 Voltage .....	300	300	volts
DC Grid No.1 Voltage:			
From fixed-bias source .....	-15	-15	volts
Peak AF Grid No. 1 -to- Grid No.1 Voltage .....	46	46	volts
Zero-Signal DC Anode Current .....	80	80	mA
Max.-Signal DC Anode Current .....	355	355	mA
Zero-Signal DC Grid No.2 Current .....	0	0	mA
Max.-Signal DC Grid No.2 Current .....	25	25	mA
Max.-Signal DC Grid No.1 Current .....	15	15	mA
Effective Load Resistance (Anode to anode) .....	2450	3960	ohms
Max.-Signal Driving Power (Approx.) .....	0.3	0.3	watts
Max.-Signal Power Output (Approx.) .....	85	140	watts

## Anode-Modulated RF Power Amplifier - Class C Telephony

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

### Maximum CCS Ratings, Absolute-Maximum Values

Up to 1215 MHz

DC Anode Voltage .....	800	volts
DC Grid No.2 Voltage .....	300	volts
DC Grid No.1 Voltage .....	-100	volts
DC Anode Current .....	150	mA
DC Grid No.1 Current .....	30	mA
Anode Input .....	120	watts
Grid No.2 Input .....	4.6	watts
Anode Dissipation .....	75	watts

### Typical CCS Operation

At 400 MHz

DC Anode Voltage .....	400	700	volts
DC Grid No.2 Voltage .....	200	250	volts
DC Grid No.1 Voltage .....	-20	-50	volts
DC Anode Current .....	100	130	mA
DC Grid No.2 Current .....	5	10	mA
DC Grid No.1 Current .....	5	10	mA
Driver Power Output (Approx.) .....	2	3	watts
Useful Power Output (Approx.) .....	16	45	watts

### Maximum Circuit Values

Grid No.1 Circuit Resistance under Any Condition .....	30,000	ohms
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## RF Power Amplifier & Oscillator - Class C Telegraphy and

## RF Power Amplifier - Class C FM Telephony

### Maximum CCS Ratings, Absolute-Maximum Values

Up to 1215 MHz

DC Anode Voltage .....	1000	volts
DC Grid No.2 Voltage .....	300	volts
DC Grid No.1 Voltage .....	-100	volts
DC Anode Current .....	180	mA
DC Grid No. 1 Current <sup>2</sup> .....	30	mA
Anode Input .....	180	max. watts
Grid No.2 Input .....	7	watts
Anode Dissipation .....	115	watts

### Typical CCS Operation

At 400 MHz

At 1215 MHz

DC Anode Voltage .....	400	900	900	volts
DC Grid No.2 Voltage .....	200	300	300	volts
DC Grid No.1 Voltage .....	-35	-30	-22	volts
DC Anode Current .....	150	170	170	mA
DC Grid No.2 Current .....	5	1	1	mA
DC Grid No. 1 Current .....	3	10	4	mA
Driver Power Output (Approx.) .....	3	3	5	watts
Useful Power Output (Approx.) .....	23	80	40	watts

### Maximum Circuit Values

Grid No.1 Circuit Resistance under Any Condition .....	30,000	ohms
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## Linear RF Power Amplifier, Class AB

### Single-Sideband Suppressed-Carrier Service

Peak envelope conditions for a signal having a minimum peak-to-average power ratio of 2.

#### Maximum CCS Ratings, Absolute-Maximum Values

Up to 1215 MHz	
DC Anode Voltage .....	1000 volts
DC Grid No.2 Voltage .....	300 volts
DC Anode Current at Peak of Envelope <sup>3</sup> .....	250 mA
DC Grid No.1 Current .....	30 mA
Anode Input .....	180 watts
Grid No.2 Input .....	7 watts
Anode Dissipation .....	115 watts

#### Maximum Circuit Values

Grid No. 1 -Circuit Resistance Under Any Condition:	
With fixed bias .....	25,000 ohms
With fixed bias (In Class AB <sub>1</sub> operation) .....	100,000 ohms
With cathode bias .....	Not Recommended

#### Typical AB, CCS Operation with "Two-Tone" Modulation:

At 30 MHz	
DC Anode Voltage .....	660 850 volts
DC Grid No.2 Voltage .....	300 300 volts
DC Grid No.1 Voltage .....	-18.5 -18.5 volts
Zero-Signal DC Anode Current .....	40 40 mA
Effective RF Load Resistance .....	2200 3500 ohms
DC Anode Current at Peak of Envelope .....	100 100 mA
Average DC Anode Current .....	75 75 mA
DC Grid No.2 Current at Peak of Envelope .....	8.2 4.2 mA
Average DC Grid No.2 Current .....	3.6 1.7 mA
Peak-Envelope Driver Power Output (Approx.) .....	0.5 0.5 watt
Output-Circuit Efficiency (Approx.) .....	90 90 %
Distortion Products Level:	
Third Order .....	35 30 dB
Fifth Order .....	40 36 dB
Useful Power Output (Approx.):	
Average .....	12.5 20 watts
Peak envelope .....	25 40 watts

#### Characteristics Range Values

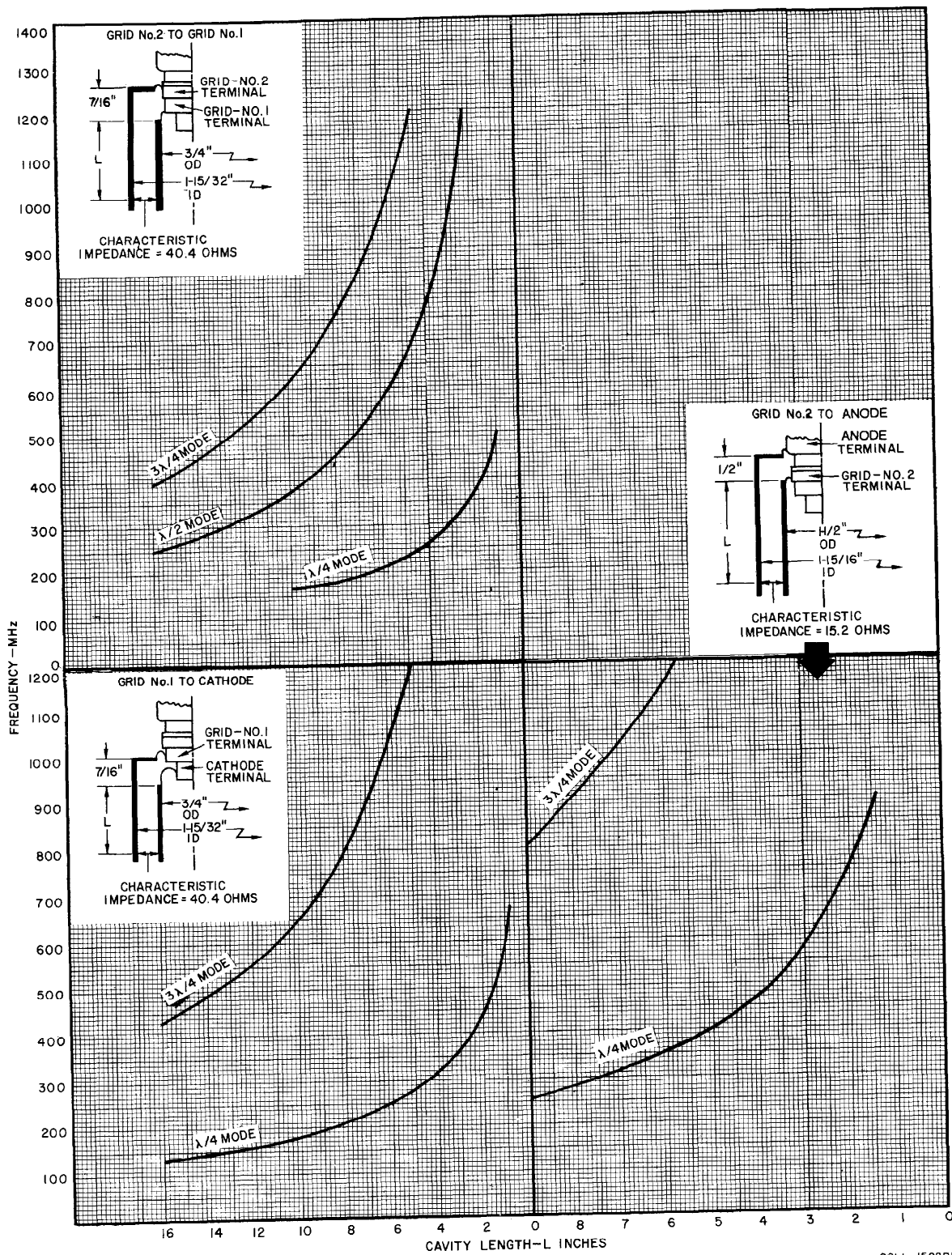
	Min.	Max.	
Heater Current <sup>4</sup> .....	0.48	0.60	A
Direct Interelectrode Capacitances:			
Grid No.1 to anode <sup>1</sup> .....	-	0.065	pF
Grid No.1 to cathode & heater <sup>1</sup> .....	11.0	15.0	pF
Anode to cathode & heater <sup>1</sup> .....	-	0.013	pF
Grid No.1 to grid No.2 <sup>1</sup> .....	15.0	20.0	pF
Grid No.2 to anode <sup>1</sup> .....	4.2	5.2	pF
Grid No.2 to cathode & heater <sup>1</sup> .....	-	0.45	pF
Grid No.1 Voltage <sup>4,5</sup> .....	-9	-18	volts
Grid No.1 Cutoff Voltage <sup>4,6</sup> .....	-	-48	volts
Grid No.1 Current <sup>4,7</sup> .....	6	-	mA
Reverse Grid No. 1 Current <sup>4,5</sup> .....	-	8	uA
Grid No. 2 Current <sup>4,5</sup> .....	-4.7	+ 2.0	mA
Peak Emission <sup>4,7</sup> .....	-	300	peak volts
Interelectrode Leakage Resistance <sup>8</sup> .....	1.0	-	megohm
Useful Power Output <sup>9</sup> .....	85	-	watts

#### Notes

- Note 1: Measured with special shield adapter.
- Note 2: In applications where the frequency is less than 80 MHz and the bias is less than -50 volts, the maximum value is 40 mA.
- Note 3: The maximum DC anode current at peak of envelope is 250 mA DC for a signal having a minimum peak-to-average power ratio of 2. During short periods of circuit adjustment under "Single-Tone" conditions, the average anode current may be as high as 250 mA. The maximum rating for a signal having a minimum peak-to-average power ratio less than 2, such as is obtained in Single-Tone operation, is 180 mA.
- Note 4: With 26.5 volts AC or DC on heater.
- Note 5: With DC anode voltage of 1000 volts, DC grid No.2 voltage of 300 volts, and DC grid No.1 voltage adjusted to give a DC anode current of 115 mA.
- Note 6: With DC anode voltage of 1000 volts, DC grid No.2 voltage of 300 volts, and DC grid No.1 voltage adjusted to give a DC anode current of 1 mA.
- Note 7: With grid No.1, grid No.2, and anode tied together; and pulse voltage source connected between anode and cathode. Pulse duration is 2 microseconds, pulse repetition frequency is 60 pps, and duty factor is 0.00012. The voltage-pulse amplitude is adjusted until a peak cathode current of 10 amperes is obtained. After 1 minute at this value, the voltage-pulse amplitude will not exceed the value specified.
- Note 8: With tube at 20° to 30 °C for at least 30 minutes without any voltages applied to the tube. The minimum resistance between any two adjacent electrodes as measured with a 200-volt Megger-type ohmmeter having an internal impedance of 1.0 megohm, will exceed the value specified.
- Note 9: In a single-tube, grid-driven coaxial-tuned amplifier circuit at 400 MHz and for conditions with 24.0 volts AC or DC on heater, DC anode voltage of 1000 volts, DC grid No.2 voltage of 300 volts, grid No. 1 voltage adjusted for DC anode current of 180 mA maximum, DC grid No.1 current 30 mA maximum and driver power output of 3.3 watts maximum.

### Warning – Personal Safety Hazards

**Electrical Shock** -- Operating voltages applied to this device present a shock hazard.



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Figure 1 - Tuning Characteristics

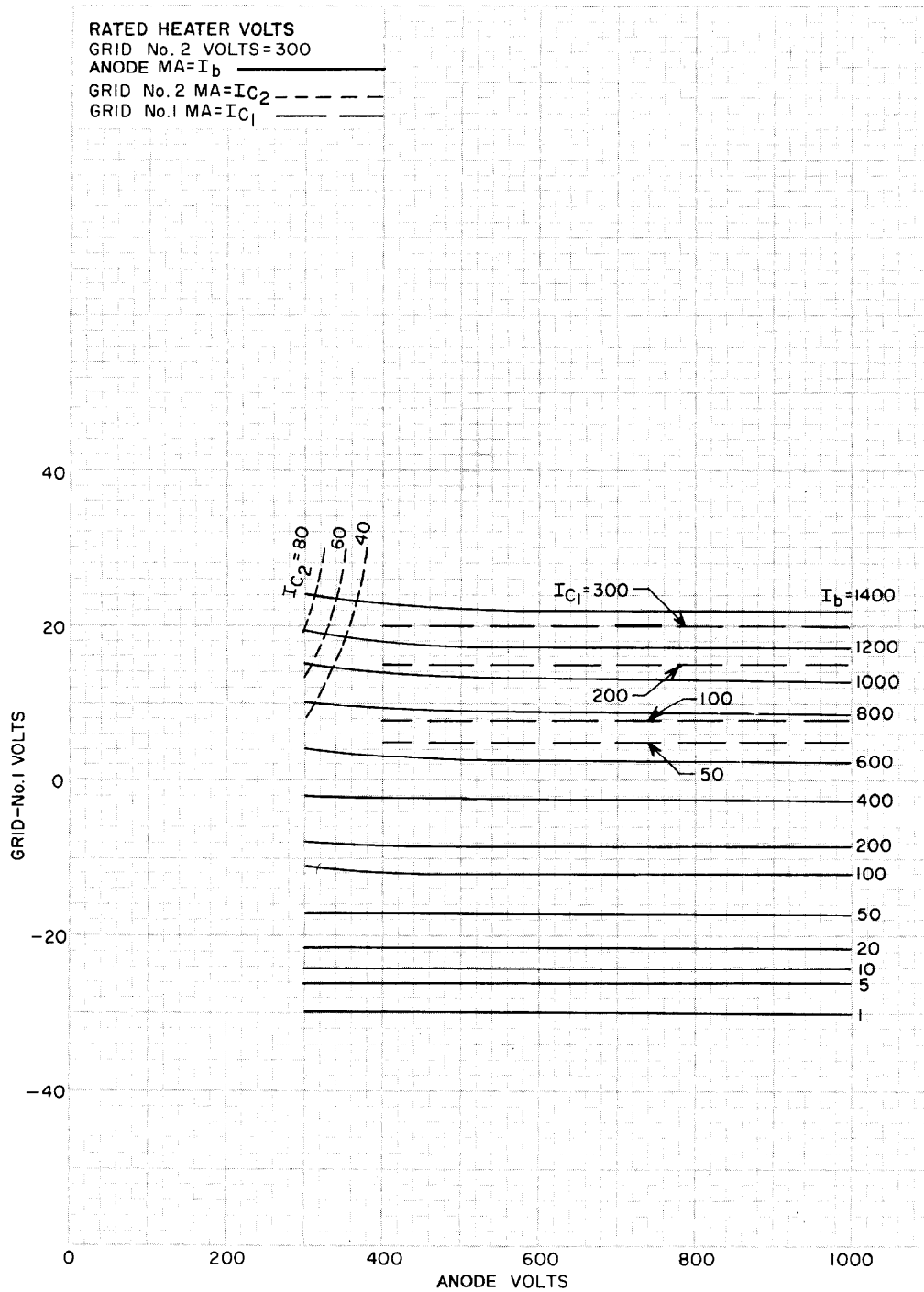
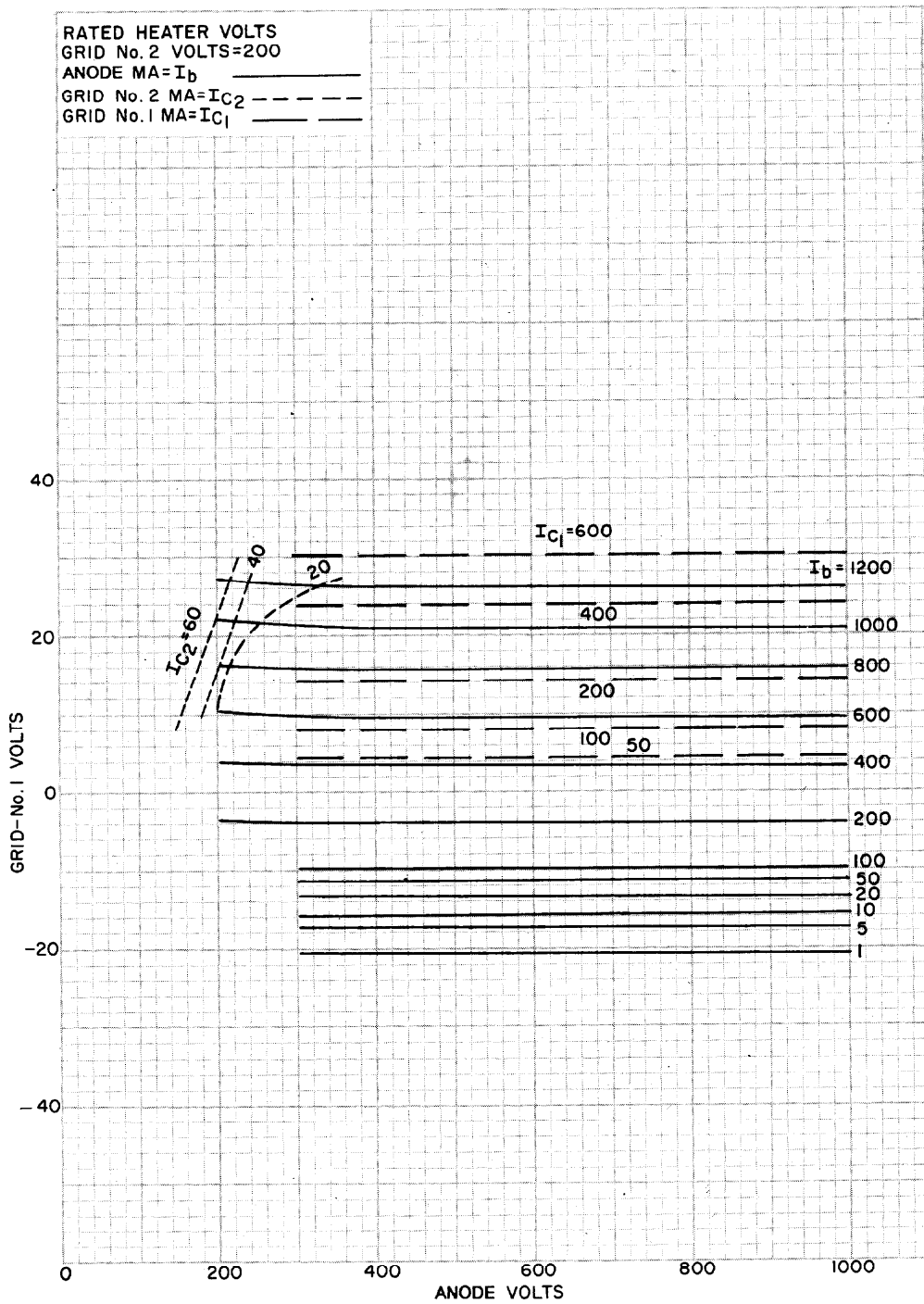


Figure 2 • Typical Constant-Current Characteristics --  
With Grid No.2 Volts = 300



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Figure 3 - Typical Constant-Current Characteristics --  
 With Grid No.2 Volts = 200



