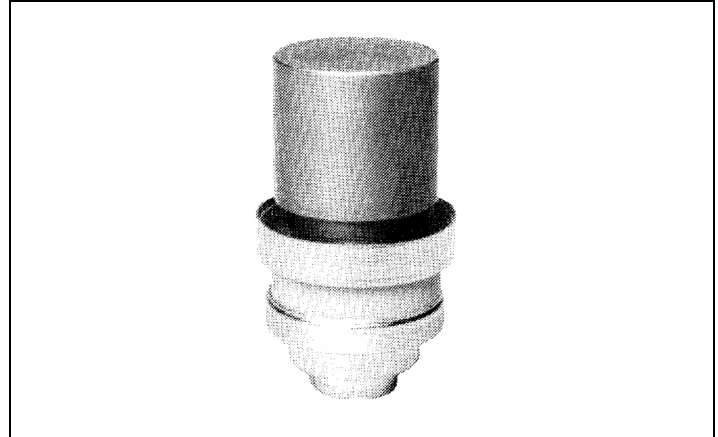


7843

Power Tube

Conduction-Cooled UHF Beam Power Tube

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



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 RE power amplifier, an anode-modulated RE power amplifier in Class C telephony service, an RE power amplifier and oscillator in Class C telegraphy service, and an RE power amplifier in Class C EM telephony service. The 7843 may also be useful in a variety of other applications such as frequency multipliers, linear RE power amplifiers (AM or television), pulse modulators, pulsed RE 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 Specialty 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 ¹ :			
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 AB1**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	50	watts

AF Power Amplifier & Modulator - Class AB2**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	-1 00	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

RF Power Amplifier & Oscillator - Class C Telegraphy**and RE 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 ²	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

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 ³	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 ₁ operation)	100,000 ohms
With cathode bias	Not Recommended

Typical AB₁ 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	36	36	dB
Useful Power Output (Approx.):			
Average	12.5	20	watts
Peak envelope	25	40	watts

Characteristics Range Values

	Min.	Max.	
Heater Current ⁴	0.48	0.60	A
Direct Interelectrode Capacitances:			
Grid No.1 to anode ¹	-	0.065	pF
Grid No.1 to cathode & heater ¹	11.0	15.0	pF
Anode to cathode & heater ¹	-	0.013	pF
Grid No.1 to grid No.2 ¹	15.0	20.0	pF
Grid No.2 to anode ¹	4.2	5.2	pF
Grid No.2 to cathode & heater ¹	-	0.45	pF
Grid No.1 Voltage ^{4,5}	-9	-18	volts
Grid No.1 Cutoff Voltage ^{4,6}	.	-48	volts

Grid No.1 Current ^{4,7}	6	mA
Reverse Grid No. 1 Current ^{4,5}	- 8	uA
Grid No. 2 Current ^{4,5}	-4.7 + 2.0	mA
Peak Emission ^{4,7}	- 300	peak volts
Interelectrode Leakage Resistance ⁸	1.0 -	megohm
Useful Power Output ⁹	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 250mA 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 0.0001 2. 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, DCgrid 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.

Figure 1- Tuning Characteristics

