

Svetlana 4CX1500A Power Tetrode



The Svetlana 4CX1500A is a high-performance ceramic/metal, forced air-cooled, power tetrode designed for use in Class AB₁ or Class C RF amplifier service. It may also be used for audio frequency modulator, pulse modulator and DC power regulator service. The 4CX1500A filament is precision fabricated in a cylindrical mesh configuration for exceptional mechanical stability and long life.

The Svetlana 4CX1500A is manufactured in the Svetlana factory in St. Petersburg, Russia, and is designed to be a direct replacement for the 4CX1500A manufactured in the United States.



Svetlana 4CX1500A

General Characteristics

Electrical

Filament: Thoriated tungsten	
Voltage	5.0 ± 0.25 V
Current, at 5.0 volts	38.5 ± 2.0 A
Transconductance (Average):	
$I_b = 1.0 \text{ Adc}, E_{c2} = 500 \text{ Vdc}$	26,000 μmhos
Amplification factor (average):	
Grid to Screen	5.5
Direct interelectrode capacitance (grounded cathode):	
Input	78 pF
Output	10.5 pF
Feedback	0.25 pF
Frequency of maximum rating:	
CW	150 MHz

Mechanical

Cooling	Forced air
Base	Ring and breechblock
Recommended air system socket	SK-831
Recommended (air) chimney	SK-806
Operating position	Axis vertical, base down or up
Maximum operating temperature	250°C
Maximum dimensions:	
Length	124.5 mm (4.9 in.)
Diameter	85.6 mm (3.37 in.)
Net weight	850 gm (30 oz.)

Radio Frequency Linear Amplifier Class C (CW conditions)

Absolute maximum ratings

Plate voltage	5000	Volts
Screen voltage	750	Volts
Plate dissipation	1500	Watts
DC plate current	1.0	Amps
Screen dissipation	75	Watts
Grid dissipation	25	Watts

Typical Operation

Frequencies	**30 MHz	**30 MHz	***220 MHz	
Plate voltage	3000	4000	3000	Vdc
Screen voltage	500	500	500	Vdc
Grid voltage	-200	-200	-116	Vdc
Plate current	800	800	1000	mAdc
Screen current	36	37	35	mAdc
Grid current	17	15	0	mAdc
Peak rf grid voltage	240	240		Volts
Calculated driving power	4.1	3.6	31.5	Watts
Plate input power	2400	3200	3000	Watts
Plate dissipation	600	700		Watts
Plate output power	1800	2500	1500	Watts
Resonant load impedance	1720	2570		ohms

*Approximate value **Calculated ***Measured

Power Tetrode

Radio Frequency Linear Amplifier, Grid Driven, Class AB₁

Absolute maximum ratings

DC plate voltage	4000	Volts
DC screen voltage	750	Volts
Plate dissipation	1500	Watts
DC plate current	1.0	Amps
Screen dissipation	75	Watts
Grid dissipation	25	Watts

Typical Operation

(Frequencies to 30 MHz)

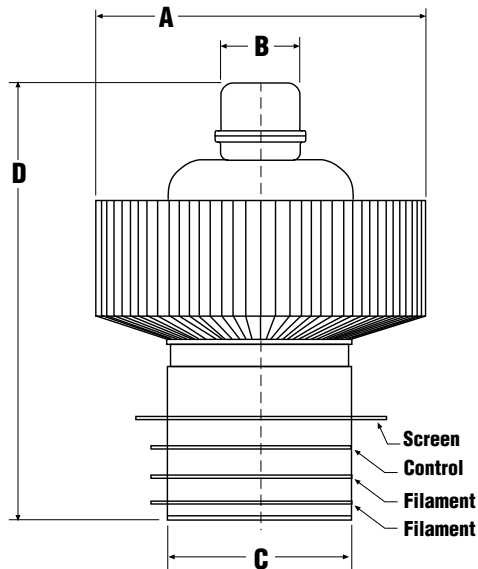
Plate voltage	2500	3900	Vdc
Screen voltage	600	600	Vdc
Grid voltage	-105	-110	Vdc
Zero signal plate current	250	200	mAdc
Max signal plate current	765	750	mAdc
Max signal screen current*	46	40	mAdc
Peak rf grid voltage	95	100	Volts
Peak driving power	0	0	Watts
Max signal plate dissipation	820	1070	Watts
Max signal useful output power	1080	1850	Watts
Resonant load impedance	1670	2900	ohms

*Approximate values



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4CX1500A Outline Drawing



Dimensional Data

Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	84.7	85.6	3.33	3.37
B	20.5	20.8	0.81	0.82
C	47.4	48.3	1.87	1.90
D	118.7	124.5	4.68	4.9

Electrical Application

Filament operation The rated filament voltage for the 4CX1500A is 5.0 volts. Filament voltage, as measured at the socket, should be maintained within $\pm 5\%$ of this value to obtain maximum tube life.

Grid operation The rated dissipation of the grid is 25 watts. This is approximately the product of DC grid current and peak positive grid voltage. Operation at bias and drive levels near those listed will insure safe operation.

Screen operation The power dissipated by the screen must not exceed 75 watts. Screen dissipation, in cases where there is no AC applied to the screen, is the simple product of the screen voltage and the screen current. If the screen voltage is modulated, the screen dissipation will depend on RMS screen current and voltage.

Screen dissipation is likely to rise to

excessive values when the plate voltage, bias voltage, or plate load are removed with filament and screen voltages applied. Suitable protective means must be provided to limit the screen dissipation to 75 watts in the event of a circuit failure.

Plate operation The plate dissipation rating of the 4CX1500A is 1500 watts. The tube and associated circuitry should be protected against surge current in the event of an arc with a current limiting resistance of 10 - 25 ohms in series with the lead from the power supply to the plate. The resistor should be capable of withstanding the surge current. It should not be used as a fuse.



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Mechanical Application

Mounting The 4CX1500A must be operated with its axis vertical. The base of the tube may be down or up at the convenience of the equipment designer.

Socket The Svetlana 4CX1500A is designed for the SK-831 socket and SK-806 chimney. The use of recommended airflow rate through the socket provides effective forced-air cooling of the tube. Air forced into the bottom of the socket passes over the tube terminals through the Air Chimney and exits through the anode cooling fins.

Cooling The maximum temperature rating for the anode core and the metal/ceramic seals of the 4CX1500A is 250°C. Sufficient forced-air circulation must be provided to keep the temperature of the anode at the base of the cooling fins and the temperature of the ceramic/metal seals below 250°C. Air-flow requirements to maintain seal temperature at 225°C in 50°C ambient air are tabulated below (for operation below 30 MHz).

The blower selected in a given application must be capable of supplying the desired air flow at a back pressure equal to the pressure drop shown above plus any drop encountered in ducts and filters.

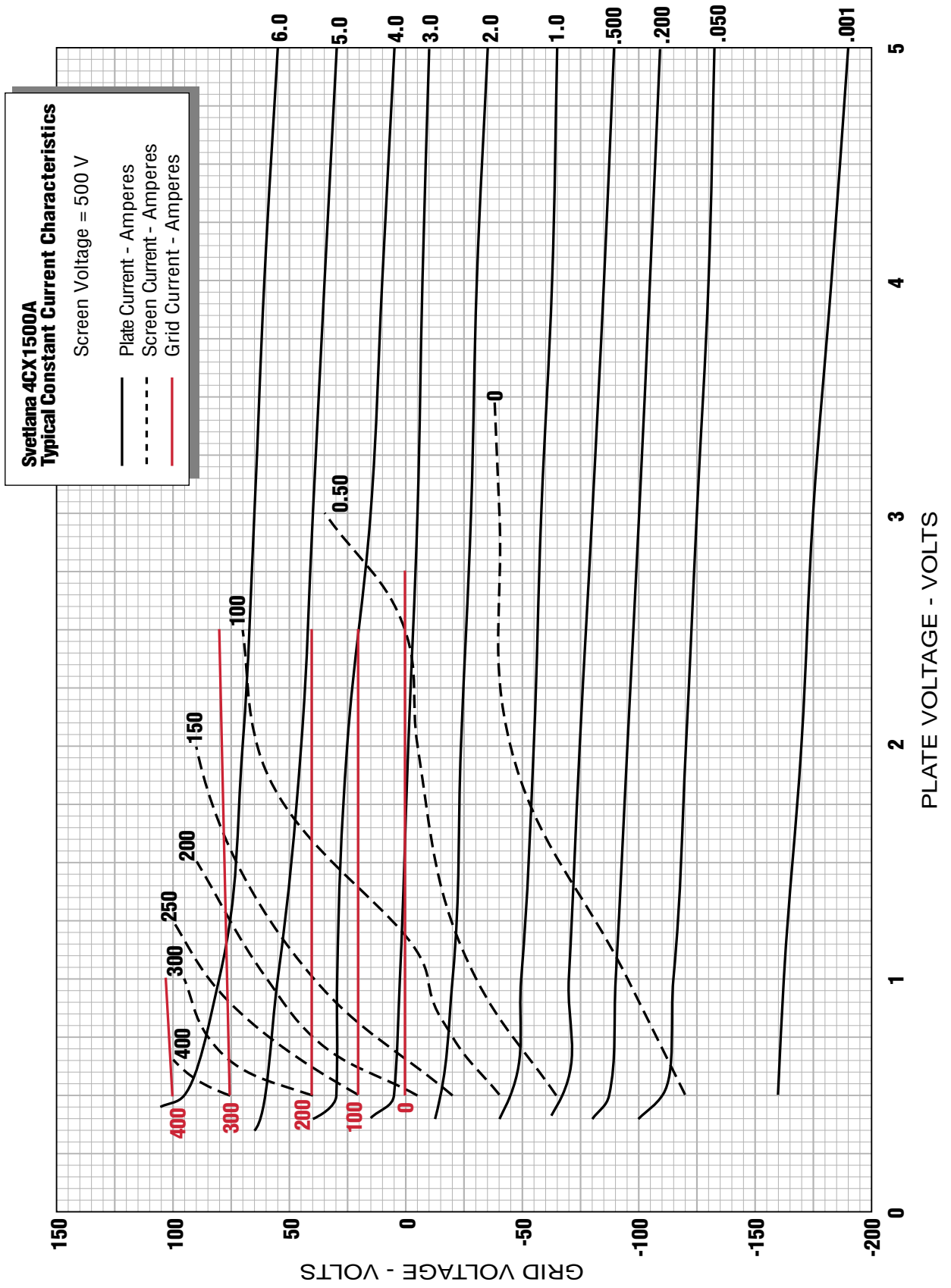
At other altitudes and ambient temperatures the flow rate must be modified to obtain equivalent cooling. The flow rate and corresponding pressure differential must be determined individually in such cases, using rated maximum temperatures as the criteria for satisfactory cooling.

Minimum Cooling Air-Flow Requirements				
	Sea Level		6,000 feet	
Plate dissipation (watts)	Air flow (CFM)	Pressure drop (Inches of water)	Air Flow (CFM)	Pressure Drop (Inches of water)
1000	27	0.33	33	0.40
1550	47	0.76	58	.95

Since the power dissipated by the filament represents about 200 watts and since grid plus screen dissipation can, under some conditions, represent another 100 watts, allowance has been made in preparing this tabulation for an additional 300 watts dissipation.



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