Svetlana YC130
Radial Beam Power Tetrode

The Svetlana YC130/9019 is designed for use in VHF FM transmitters in the Band II 88-108 MHz frequency range. The YC130/9019 is also an excellent choice for plate-modulated Class C power amplifiers or in Class AB1 audio frequency applications. The Svetlana YC130/9019 has a directly-heated thoriated tungsten mesh filament for mechanical ruggedness and good VHF electrical performance.

The Svetlana YC130/9019 is manufactured in the Svetlana factory in St. Petersburg, Russia, and is designed to be a direct replacement for the YC130/9019 manufactured in the United States.

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ELECTRON DEVICES

Svetlana YC130

General Characteristics

Electrical

Filament:	*Thoriated tungsten*
Voltage	*7.5 ± 0.37 V*
Current, at 7.5 volts	*160 A*
Amplification factor (Average):	
Grid to Screen	*4.5*
Direct interelectrode capacitance (grounded cathode):	
C in	*130 pF*
C out	*26.5pF*
C pk	*1.5 pF*
Direct interelectrode capacitance (grounded grid):	
C in	*67 pF*
C out	*27.5 pF*
C pk	*0.2 pF*
Maximum frequency for full ratings (CW)	*110 MHz*

Mechanical

Maximum dimensions:	
Length	*238 mm (9.38 in.)*
Diameter	*193mm (7.58 in.)*
Net weight	*5.8 kg (12.8 lb..)*
Operating position	*Axis vertical, base up or down*
Maximum operating temperature, ceramic/metal seals or envelope	*250˚ C*
Cooling	*Forced air*
Base	*Coaxial, designed for use with SK300 series sockets*

Radio Frequency Power Amplifier Class C FM

Absolute maximum ratings

DC Plate voltage	*10,000*	*V*
DC Screen voltage	*2,000*	*V*
DC Grid voltage	*-750*	*V*
DC Plate current	*5.0*	*A*
Plate dissipation	*18*	*kW*
Screen dissipation	*450*	*W*
Grid dissipation	*200*	*W*

Typical Operation

(Frequencies to 30 MHz)			
DC Plate voltage	*7.5*	*10.0*	*kVdc*
DC Screen voltage	*750*	*750*	*Vdc*
DC Grid voltage	*-510*	*-550*	*Vdc*
DC Plate current	*4.65*	*4.55*	*Adc*
DC Screen current	*0.59*	*0.54*	*Adc*
DC Grid current	*0.30*	*0.27*	*Adc*
Peak rf grid voltage	*730*	*790*	*V*
Calculated driving power	*220*	*220*	*W*
Plate dissipation	*8.1*	*9.0*	*kW*
Plate output power	*26.7*	*36.5*	*kW*

Plate Modulated RF Power Amplifer, Grid Driven, Class C Telephony - Carrier Conditions

Absolute maximum ratings			
DC plate voltage		8,000	V
DC screen voltage		2,000	V
DC grid goltage		-750	
DC plate current		4.0	
Plate dissipation		12	W
Screen dissipation		450	W
Grid dissipation		200	W
Typical Operation			
DC Plate voltage	6.0	8.0	kVdc
DC Screen voltage	750	750	Vdc
Peak AF screen voltge (100% mod.)	740	710	V
DC Grid bias voltage	-600	-640	Vdc
DC plate current	3.75	3.65	Adc
DC screen current	0.45	0.43	Adc
DC grid current	0.18	0.18	Adc
Peak rf grid voltage	800	840	V
Grid driving power (calculated)	150	150	W
Plate dissipation	5.1	5.8	kW
Plate output power	17.4	23.5	kW

Audio Frequency Power Amplifier or Modulator, Grid Driven, Class AB1

Absolute maximum ratings			
DC plate voltage		10.0	kV
DC screen voltage		2,000	V
DC plate current		6.0	A
Plate dissipation		18.0	kW
Screen dissipation		450	W
Grid dissipation		200	W
Typical Operation (two tubes)			
DC plate voltage	7.5	10.0	kVdc
DC screen voltage	1,500	1,500	Vdc
DC grid voltage	-350	-370	Vdc
Zero-signal plate current	1.0	1.0	Adc
Maximum signal plate current	8.8	8.5	Adc
Maximum signal screen current	0.34	0.30	Adc
Peak AF grid voltage	330	340	V
Driving power	0	0	W
Load resistance plate-to-plate	1730	2520	Ohms
Maximum signal plate dissipation	12.2	14.0	kW
Plate output power	41.6	57.0	kW

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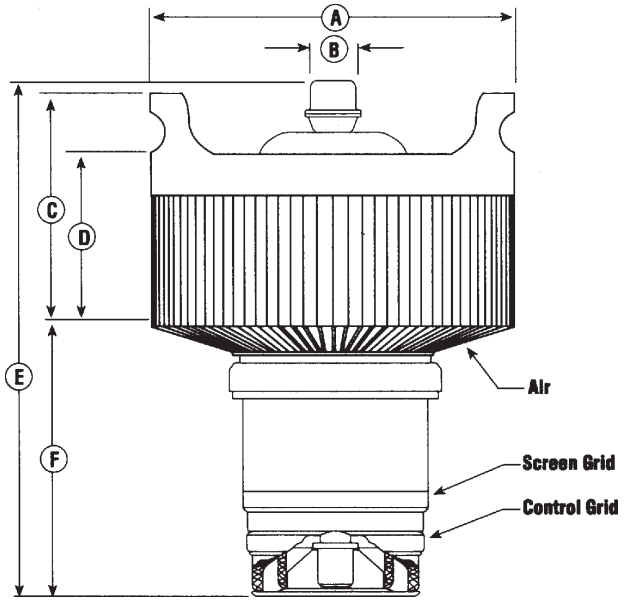
YC130/9019 Outline Drawing



Dimensional Data				
Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	189	193	7.46	7.58
B	21.7	22.7	0.855	0.895
C	90.4	93.6	3.56	3.68
D	61.3	70.8	2.41	2.79
E	22.8	23.8	9.0	9.38
F	118	122	4.66	4.78

Electrical Application

Filament operation The rated maximum plate dissipation of the tube is 18 kilowatts. This power may be safely sustained with adequate air cooling. The tube must be protected from damage which may be caused by an internal arc occurring at high plate voltage. A protective resistance should always be connected in series with each tube anode to help absorb power-supply stored energy if an internal arc should occur.

Control grid operation The maximum control grid dissipation is 200 watts, determined (approximately) by the product of the dc grid current and the peak positive grid voltage.

Screen grid operation The maximum screen grid dissipation in 450 watts. With no AC applied to the screen grid, dissipation is the product of dc screen voltage plate loading or bias voltage must never be removed while filament and screen voltages are present.

Filament operation Svetlana recommends that a new tube, or a tube which has been in storage for some period of time, be operated with filament voltage only applied for a period of from 30 to 60 minutes before full operation begins. Once normal operation has been established, a minimum filament warm-up time of four to five seconds is sufficient.

At rated nominal filament voltage, the peak emission capability of the tube is many times that needed for communication service. A reduction in filament voltage will lower the filament temperature, and this reduction will substantially increase life expectancy. The correct value of filament voltage should be determined for the particular application. Svetlana recommends that the tube be operated at full nominal voltage for an initial stabilization period of 100 to 200 hours before any action is taken to operate at reduced voltage. The voltage should gradually be reduced until there is a slight degradation in performance—such as power output or distortion. The new voltage should then be increased a few tenths of a volt above the value where performance degradation was first noted. The operating point should be rechecked after 24 hours.

Mechanical Application

Mounting The YC130/9019 must be mounted vertically, base up or down. The tube should be protected from vibration and shock

Storage If the YC130/9019 is to be stored as a spare, it should be kept in its original packaging to minimize the possibility of handling damage.

Cooling The YC130/9019 requires forced-air cooling in all applications. The tube socket should be mounted in a pressurized compartment so that the cooling air passes through the socket and is guided to the anode cooling fins by an air chimney. If cooling air is not passed around the base of the tube and through the socket, arrangements must be made to assure adequate cooling of the tube base and socket contacts.

Adequate movement of cooling air around the base of the tube keeps the tube base and the socket contact fingers at a safe operating temperature.

Although the maximum temperature rating for seals and the anode core is 250˚C, good engineering practice requires that a safety factor be allowed. The table shows cooling parameters with he cooling air at 50˚C and maximum tube anode temperature of 225˚C. The figures are for the tube with air passing in a base-to-anode direction. Pressure drop values shown are approximate and are for the tube/socket/chimney combination.

Minimum Cooling Air-Flow Requirements		
Sea Level		
Plate dissipation (watts)	Air flow (CFM)	Pressure drop (Inches of water)
1000	27	0.33
1550	47	0.76

At altitudes significantly above sea level, the flow rate must be increased for equivalent cooling. At 5,000 feet above sea level, both the flow rate and the pressure drop should be increased by a factor of 1.20, while at 10,000 feet both flow rate and pressure drop should be increased by 1.46.

Anode and base cooling should be applied before or simultaneously with filament voltage turn on and should normally continue for a brief period after shutdown to allow the tube to cool down properly.

Special Instructions If the user needs to operate this tube under conditions widely different from those given in this publication, contact any location of Svetlana Electron Devices for technical assistance.