# Svetlana 3CX2500H3 Medium-Mu Power Triode

The Svetlana™ 3CX2500H3 is a high-performance ceramic/metal power triode designed for use in amplifier, oscillator, or modulator service. The ceramic is glazed to facilitate cleaning when used in an industrial environment. A modern mesh filament is used, replacing the old-fashioned hairpin construction. The improved mesh filament design ensures better mechanical rigidity and long lasting concentricity of the filament, contributing to longer life. Flexible leads connect to the filament terminals and a flange is connected to the grid. The flange provides a convenient way to mount the tube.

The Svetlana 3CX2500H3 is manufactured in the Svetlana Electron Devices complex in St. Petersburg, Russia. Svetlana has achieved the improved performance described above with exact replacement compatibility with the 3CX2500H3 manufactured in the United States.

Svetlana

# Svetlana 3CX2500H3

## General Characteristics

### Electrical

| | |
|---|---|
| *Filament* | *Thoriated-tungsten mesh* |
| *Voltage* | *7.50 ±0.37 V* |
| *Current @ 7.50V* | *51.5 A* |
| *Amplification factor (average)* | *22* |
| *Direct interelectrode capacitances (grounded filament):** | |
| *Input* | *36.0 pF* |
| *Output* | *0.9 pF* |
| *Feedback* | *20 pF* |
| *Maximum frequency for full ratings (CW)* | *75 MHz* |

### Mechanical

| | |
|---|---|
| *Cooling* | *Forced air* |
| *Base* | *Flying leads/flange* |
| *Socketing* | *None. Mounting flange* |
| *Operating position* | *Vertical, Base up or down* |
| *Maximum operating temperature* | *250˚ C* |
| *Maximum operating temperature- Filament leads/tube base joints* | *150˚ C* |
| *Maximum dimensions:* | |
| *Length* | *46.83 cm (18.44 in.)* |
| *Diameter* | *10.79 cm (4.25 in.)* |
| *Net weight* | *2.9 kg (6.5 lb)* |

** Capacitance values are for a cold tube measured in a shielded fixture*

## RF Power Amplifier or Oscillator, Class C, FM or CW

| | | |
|---|---|---|
| *Maximum Ratings* | | |
| *DC plate voltage* | *6000* | *V* |
| *DC plate current* | *2.5* | *A* |
| *Plate dissipation* | *4000* | *W* |
| *Grid dissipation* | *150* | *W* |
| *DC grid voltage* | *-1000* | *V* |
| *DC grid current* | *0.4* | *A* |

### Typical Operation

| | | | | |
|---|---|---|---|---|
| *(Frequencies to 30MHz)* | | | | |
| *DC plate voltage* | *4000* | *5000* | *6000* | *V* |
| *DC plate current* | *2.5* | *2.5* | *2.08* | *A* |
| *DC grid voltage** | *-300* | *-450* | *-500* | *V* |
| *DC grid current** | *245* | *265* | *180* | *mA* |
| *Peak RF grid voltage** | *580* | *750* | *765* | *V* |
| *Driving Power** | *142* | *197* | *136* | *W* |
| *Grid dissipation** | *68* | *78* | *46* | *W* |
| *Plate input power* | *10,000* | *12,500* | *12,500* | *W* |
| *Plate dissipation* | *2500* | *2500* | *2500* | *W* |
| *Plate output power* | *7500* | *10,000* | *10,000* | *W* |

**Approximate values*

# Medium-Mu Power Triode

## Plate-Modulated RF Amplifier, Class C Telephony

| *Maximum Ratings* | | | | |
|---|---|---|---|---|
| *DC plate voltage* | | | *5500* | *V* |
| *DC plate current* | | | *2.0* | *A* |
| *Plate dissipation* | | | *2670* | *W* |
| *Grid dissipation* | | | *150* | *W* |
| *DC grid voltage* | | | *-1000* | *V* |

## Typical Operation

| *(Frequencies to 110MHz)* | | | | |
|---|---|---|---|---|
| *DC plate voltage* | *4000* | *4500* | *5000* | *V* |
| *DC plate current* | *1.67* | *1.47* | *1.25* | *A* |
| *DC grid voltage* | *-450* | *-500* | *-550* | *V* |
| *DC grid current** | *180* | *140* | *150* | *mA* |
| *Peak RF grid voltage** | *685* | *715* | *760* | *V* |
| *Driving power* | *125* | *100* | *115* | *W* |
| *Grid dissipation** | *43* | *30* | *32* | *W* |
| *DC plate input power* | *6670* | *6615* | *6250* | *W* |
| *Plate dissipation* | *1670* | *1315* | *950* | *W* |
| *Plate output power* | *5000* | *5300* | *5300* | *W* |

## Audio Frequency Amplifier or Modulator, Class A or B

| *Maximum Ratings (per tube)* | | | | |
|---|---|---|---|---|
| *DC plate voltage* | | | *6000* | *V* |
| *DC plate current* | | | *2.5* | *A* |
| *Plate dissipation* | | | *4000* | *W* |
| *Grid dissipation* | | | *150* | *W* |
| *DC grid voltage* | | | *-1000* | *V* |

## Typical Operation *(two tubes sinusoidal waveform)*

| *DC plate voltage* | *4000* | *5000* | *6000* | *V* |
|---|---|---|---|---|
| *Zero-signal DC plate current** | *0.6* | *0.5* | *0.4* | *A* |
| *Maximum-signal DC plate current* | *4.0* | *3.2* | *3.0* | *A* |
| *DC grid voltage ** | *-150* | *-190* | *-240* | *V* |
| *Peak AF grid voltage (per tube)** | *340* | *360* | *390* | *V* |
| *Maximum-signal peak driving power** | *340* | *230* | *225* | *W* |
| *Maximum-signal nominal driving power** | *170* | *115* | *113* | *W* |
| *Load resistance, plate-to-plate* | *2200* | *3600* | *4650* | *Ohms* |
| *Maximum-signal plate output power* | *11,000* | *11,000* | *13,000* | *W* |

** Approximate values ** Adjust to give stated zero-signal plate current*

## Range Values for Equipment Design

| | *Min.* | *Max.* | |
|---|---|---|---|
| *Filament current at 7.5V* | *48.0* | *54.0* | *A* |
| *Interelectrode capacitances (Grounded-Filament Connection)** | | | |
| *Input* | *29.2* | *40.2* | *pF* |
| *Output* | *0.6* | *1.2* | *pF* |
| *Feedback* | *16.8* | *23.2* | *pF* |
| *DC grid bias for $E_b$ =3000, $I_b$ =0.83A* | *-67* | *-100* | *V* |

**Capacitance values are for a cold tube in a shielded fixture.*

# Svetlana 3CX2500H3

## Electrical Application

**Filament Operation** The rated filament voltage for the 3CX2500H3 is 7.50 volts. Filament voltage, as measured at the filament seals, should be maintained within 5% of this value to obtain maximum tube life.

## Mechanical Application

**Mounting** The 3CX2500H3 must be mounted with its axis vertical. The base of the tube may be up or down.

**Filament Connections** The Svetlana 3CX2500H3 filament connections are made via the attached flexible leads.

**Grid Connection** The mounting flange is also the electrical connection to the grid.

**Cooling** Sufficient forced-air circulation must be provided to keep the temperature of the anode core and the temperatures of the ceramic/metal seals below 250˚C. Airflow requirements to maintain these temperatures below 225˚C with an inlet-air temperature of 40˚C are tabulated. Adequate airflow must be directed over the lead-to-tube connections for the grid and filament leads. At frequencies above 30 MHz or at higher inlet-air temperatures or higher altitudes, more airflow will be required. The joints between the filament leads and the tube surfaces must be adequately cooled.

**Dimensional Data**

| Dim. | Millimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Max. | Nom. | Min. | Max. | Nom. |
| A | 203.20 | 228.60 | — | 8.000 | 9.000 | — |
| B | 103.96 | 107.90 | — | 4.093 | 4.248 | — |
| C | 98.43 | 107.95 | — | 3.875 | 4.250 | — |
| D | 74.60 | 77.77 | — | 2.937 | 3.062 | — |
| E | 43.26 | 49.61 | — | 1.703 | 1.953 | — |
| F | — | — | 3.18 | — | — | 0.125 |
| G | 19.84 | 21.41 | — | 0.781 | 0.843 | — |
| H | 17.45 | 20.62 | — | 0.687 | 0.812 | — |
| J | 25.40 | 28.58 | — | 1.000 | 1.125 | — |
| K | 227.00 | 239.70 | — | 8.937 | 9.437 | — |
| L | 201.60 | 214.30 | — | 7.937 | 8.437 | — |
| M | — | — | 9.91 | — | — | 0.390 |
| N | 107.44 | 107.95 | — | 4.230 | 4.250 | — |
| P | 97.92 | 98.68 | — | 3.855 | 3.885 | — |
| R | — | — | 6.35 | — | — | 0.250 |
| S | 29° | 31° | — | 29° | 31° | — |

**Base-to-Anode Air Flow**

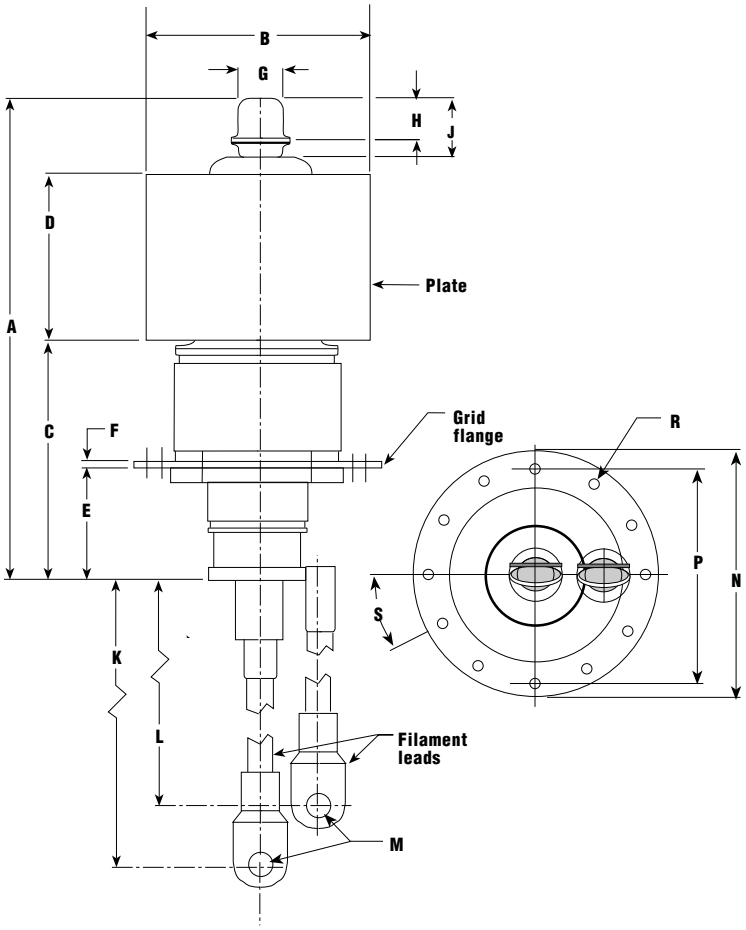
| | Sea Level | | 5000 Feet | |
|---|---|---|---|---|
| Anode Dissipation Watts | Air Flow CFM | Pressure Drop Inches of Water | Air Flow CFM | Pressure Drop Inches of Water |
| 2500 | 36 | 0.6 | 43 | 0.72 |
| 4000 | 67 | 1.20 | 80 | 1.45 |

**Anode-to-Base Air Flow**[1]

| | Sea Level | | 5000 Feet | |
|---|---|---|---|---|
| Anode Dissipation Watts | Air Flow CFM | Pressure Drop Inches of Water | Air Flow CFM | Pressure Drop Inches of Water |
| 2500 | 42 | 0.70 | 50 | 0.84 |
| 4000 | 84 | 1.70 | 101 | 2.00 |

[1] *When air is supplied in the anode-to-base direction, a minimum of 5 cfm must be directed into the filament-stem structure between the inner and outer filament terminals to maintain the base seals below 250˚ C. A separate air system is not required with base-to-anode airflow.*

## Svetlana 3CX2500H3 Outline Drawing




**Notes:**

1. There are 12 holes in grid flange.
2. Grid flange and filament leads are oriented as shown.

# Medium-Mu Power Triode