QUASIOPTICAL SOURCE

QS1-260 (OV-24) SN 143

I. TECHNICAL DATA

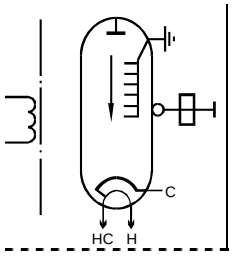
1. OPERATING RANGE, GHz ..... 163…260
2. CATHODE VOLTAGE (NEGATIVE), V..... 1150…3800
3. CATHODE CURRENT, mA ..... See section IV
4. MAGNETIC FIELD STRENGTH (min), Oe..... 6000
5. HEATER VOLTAGE (alternative), V 6.3
6. HEATER CURRENT, A..... 1.42
7. OUTPUT POWER (average)*, mW..... 30
8. MINIMUM LIFETIME (warranted), h 500

* Depends on method of measurement

II. OPERATING CONDITIONS

1. ***Water cooling system. Water consumption 1 - 1.5 liters/minute or pressure 30 PSI. Water temperature < +30 C.***
2. ***BWO tube electrical grounding.***
3. ***Gradual switching of the heater current.***
4. ***Use of standard turn on/ off procedures described in Section VIII.***

III. SCHEME OF CONNECTION OF ELECTRODES



Sign	Name of electrode	Color
HC	heater+cathode	green
H	heater	green
C	cathode	brown

Note:
HC and C electrodes are not connected inside.
Body of OV tube must be connected to the ground.

IV. NOMINAL PARAMETERS

1. Cathode voltage, V	2000±50
2. Cathode current, mA	19…23
3. Heater current, A	1.42±0.01
4. Output frequency, GHz	205.5±1

V. CALIBRATION POLYNOMINAL

1) $U(f) = (U_0 + U_1 f + U_2 f^2 + U_3 f^3)^2$,

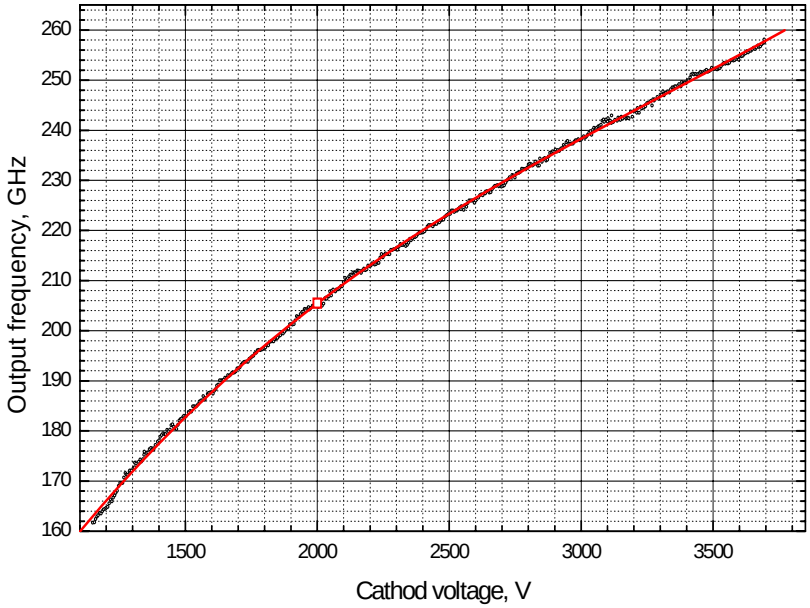
2) $f(U) = f_0 + f_1\sqrt{U} + f_2 U + f_3 U^{3/2}$,

U in Volts, f in GHz

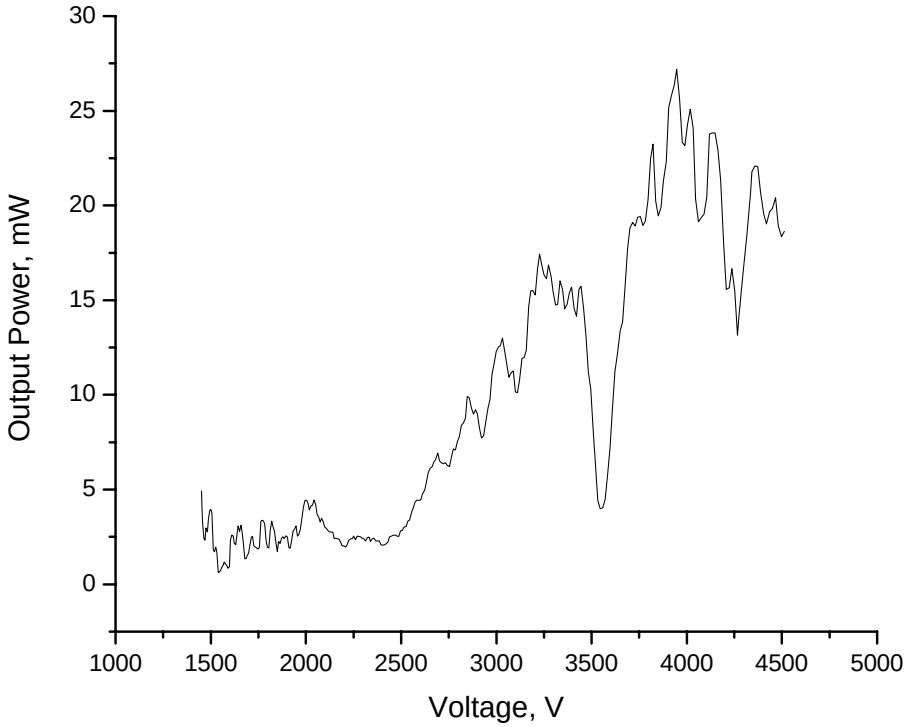
Tables of the polynomial parameters

U_0= 52,1165647700	**f_0= -103,1044969000**
U_1= -0,5447269990	**f_1= 12,2161966100**
U_2= 0,0033846958	**f_2= -0,1621109445**
U_3= -0,0000044185	**f_3= 0,0009659949**

VI. CALIBRATION CURVE



VII. OUTPUT POWER PATTERN



VIII. OPERATING INSTRUCTIONS

Turn ON Procedure:

a. Initial turn ON (required for tube installation and for a tube that was not used for more than 2 weeks)

1. Make sure that high voltage and heater potentiometers are in zero position.
2. Start water cooling system.
3. Turn on power supply.
4. Smoothly, in 3 minutes, increase the value of the heater current to about 0.05 A smaller than its nominal value.
5. Switch on high voltage. Set cathode voltage to about 2000 V by COARSE potentiometer. If OV was not in use for more than two weeks stay in this condition for about 10 minutes.
6. Set nominal cathode voltage in testing point (see IV) by COARSE potentiometers. By adjusting the heater current set the cathode current to a value 1-2 mA smaller than the nominal.
7. Make alignment of OV in magnetic field to achieve THz generation (a THz detector is required to complete this step).
8. Fine align the OV in magnetic field according to the optimal regime (maximum output power) and fix it in this position.
9. Again, by FINE adjustment of the heater current set the cathode current to its nominal value in testing point.
10. Change the cathode voltage to choose the output frequency required.

b. Regular turn ON (recommended for a tube that is aligned in the magnet and was used in the last 2 weeks)

1. Make sure that high voltage and heater potentiometers are in zero position.
2. Start water cooling system.
3. Turn on power supply.
4. Smoothly, in 3 minutes, increase the value of the heater current to about 0.05 A smaller than its nominal value.
5. Switch on high voltage. By COARSE potentiometer set nominal cathode voltage. By fine adjustment of the heater current set the cathode current to its nominal value in testing point.
6. Change the cathode voltage to choose the output frequency required.

Turn OFF procedure:

1. Set the cathode voltage to zero.
2. Switch off the cathode voltage.
3. During 3 minutes slowly turn off the heater current down to zero.
4. Switch off water cooling system.

Note:

It is allowed to leave a quasi-optical source with the heater current turned on and cathode voltage turned off for the period of several hours without significant reducing of its lifetime.

5. Turn off power supply.

Warning: **Please follow recommended Turn ON/OFF procedures to prevent damage of quasi-optical sources.**