Tube ГС-23B

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1 General Information

This is a metal-ceramic tetrode with a heated cathode and external anode. It requires forced air cooling of the anode and tube body. It is designed for generation and amplification of high frequency oscillations at radio frequencies.

2 Technical Information

G1: control grid; G2: screen grid

2.1 Electrical specifications measured at time of manufacture:

Parameter and units	**MIN**	**TYP**	**MAX**	**TEST**	**NOTE**
Current on G2 (mA)	-50	-	25	-12	1
Reverse current on G1 (μA)	-	-	60	3.0	2
Filament current (A)	5.9	6.25	6.6	6.3	3
Absolute voltage on G1 (V)	2	12	22	8	1
Output power (W)	500	-	-	600	4
Output power with minimum filament voltage (W)	400	-	-	580	5
Characteristic slope (mA/V)	40	55	70	60	1
Power gain coefficient	8	-	-	9.8	4

Notes:

1. Filament voltage 6.3 V, anode voltage 1.25 kV, anode current 0.9 A, G2 voltage 400 V.

2. Filament voltage 6.3 V, anode voltage 1.25 kV, anode current 1 A, G2 voltage 400 V.

3. Filament voltage 6.3 V.

4. Filament voltage 5.7 V, anode voltage 2.1 kV, anode current 1 A, G2 voltage 400 V, frequency 960 MHz.

5. Filament voltage 5.1 V, anode voltage 2.1 kV, G2 voltage 400 V, frequency 960 MHz.

2.2 Degradation with use:

Output power will not decrease below 400 W.

2.3 Degradation with storage:

Reverse current on G1 will not exceed 180 μA.

2.4 Critical limits:

Parameter and units	**MIN**	**MAX**	**NOTE**
Long-pulse anode voltage (V)	-	4500	3
Constant anode voltage (V)	-	3500	
Constant G2 voltage (V)	-	500	
Negative G1 voltage (V)	-	-150	
Filament voltage (V)	5.7	7.0	1
Cathode current (A) for power factor = 1:			
Constant	-	1.2	
Long-pulse	-	1.45	3
Anode power dissipation (W)	-	1500	
G2 power dissipation (W)	-	12	
G1 power dissipation (W)			
Constant	-	1.5	
Long-pulse	-	3	3
Operating frequency (MHz)	-	1000	
Cathode warm-up time (min)	4	-	
Temperature (K/C)	-	473/200	
Air flow for anode cooling (m^3/hr)	190	-	2
Air flow for tube body cooling (m^3/hr)	20	-	2

Notes:

1. Filament voltage should be lowered to 5.7 V at frequencies of 965 MHz or more.

2. Air flow is for input temperatures of 303 ± 5 K (30 ± 5 C).

3. Long-pulse mode is defined as a pulse with duration of not more than 1 second at 16.6% duty cycle.

2.5 Break-in time:

1000 hours minimum. Tube can be stored in factory packaging in an unheated environment for 8 years. A regulated moisture environment increases storage lifetime to 12 years.

2.6 Dimensions:

Maximum height (mm)	120
Maximum diameter (mm)	91
Maximum weight (kg)	1.1

2.7 Precious metal content:

Gold in grids (gm)	0.9934832
Silver in anode and tube body (gm)	23.57088
Platinum in grids (gm)	0.003823

2.8 Other metal content:

Cobalt and alloys in cathode, tube body (gm)	47.3
Copper and alloys in anode, cathode, tube body (gm)	776.7
Molybdenum and alloys in anode, grids (gm)	5.6
Nickel and alloys in cathode, grids, tube body (gm)	16
Tantalum in cathode, tube body (gm)	1.5

3 Application notes

1. Tube can be operated in any orientation.

2. Cooling must be supplied at turn-on and must be maintained until all voltages are off.

3. Electrode connections must be maintained with spring-loaded contacts to assure continuous and steady current flow. Excessive mechanical force should not be applied when installing and removing the tube.

4. Appearance of burn marks on contact surfaces indicates a bad contact, which can lead to loss of output power, inconsistent performance, and failure.

5. Grid power supplies must accommodate negative currents.

6. It is recommended to install fast-acting interrupts in the anode and other circuit paths to protect the tube from damage during flashover.

7. The lifetime of the tube can be extended by:

   - Stabilizing the filament voltage (± 5 % of its nominal value)
   - Maintaining the temperature of anode and metal-ceramic welds in the range 323–343 K (50–70 C)

8. After more than three months of non-use, the tube should be re-conditioned as follows:

   (a) Supply adequate cooling.

   (b) Apply filament voltage for 10–15 minutes.

   (c) Apply reduced bias voltages (0.5–0.6 of working voltage) without rf excitation or anode voltage and maintain for 10-15 minutes.

   (d) Increase bias voltages in gradual steps until nominal working voltage is reached. Maintain for 10–15 minutes.

   (e) Apply full anode voltage and maintain for for 10–15 minutes.

   If flashover is observed, repeat steps (c–e).