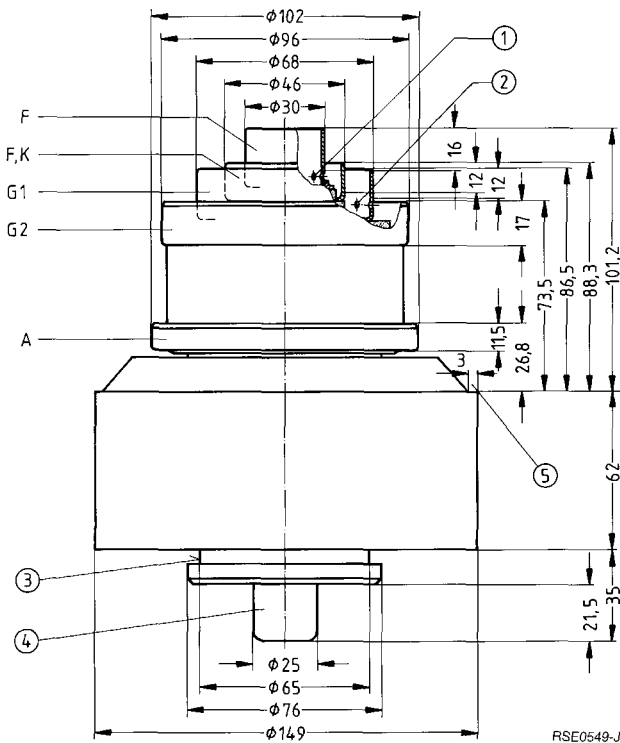


For frequencies up to 110 MHz

Ordering code Q51-X2064

Coaxial metal-ceramic tetrode, forced-air-cooled, for frequencies up to 110 MHz, particularly suitable for FM transmitters in grounded control-grid screen-grid circuit.



- ① 8 holes 3 mm dia. (8 × 45°)
- ② 12 holes 3 mm dia. (12 × 30°)
- ③ Accommodation for tube filter
- ④ Do not use as terminal
- ⑤ Free for anode support

Dimensions in mm

Approx weight 5,5 kg

The radiator and the terminals are of concentric design with the following diameters:

Radiator	Ø 153,0	Control grid terminal	Ø 69,0
Screen grid terminal	Ø 97,0	Heater, cathode terminal	Ø 46,6
		Heater terminal	Ø 30,6

Heating

Heater voltage	U_F	9,0	V
Heater current	I_F	≈ 112	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 300 \text{ V}$	I_{em}	40	A
Amplification factor of screen grid at $U_A = 2 \text{ kV}$, $U_{G2} = 600 \text{ to } 1000 \text{ V}$, $I_A = 3 \text{ A}$	μ_{g2g1}	7,0	
Transconductance at $U_A = 2 \text{ kV}$, $U_{G2} = 800 \text{ V}$, $I_A = 2 \text{ to } 4 \text{ A}$	S	80	mA/V

Capacitances

Cathode/control grid	C_{kg1}	≈ 82	pF
Cathode/screen grid	C_{kg2}	$\approx 6,0$	pF
Cathode/anode	C_{ka}	$\approx 0,07$	pF ¹⁾
Control grid/screen grid	C_{g1g2}	≈ 128	pF
Control grid/anode	C_{g1a}	$\approx 0,78$	pF ¹⁾
Screen grid/anode	C_{g2a}	≈ 21	pF

Accessories

Upon request

¹⁾ Measured by means of a 50 cm diameter screening plate in the screen grid terminal plane.

**RF amplifier,
class B operation, grounded control-grid screen-grid circuit****Maximum ratings**

Frequency	f	110	MHz
Anode voltage (dc)	U_A	12	kV
Screen grid voltage (dc)	U_{G2}	1000	V
Control grid voltage (dc)	U_{G1}	– 250	V
Cathode current (dc)	I_K	6,0	A
Peak cathode current	$I_{K M}$	35	A
Anode dissipation	P_A	10	kW
Screen grid dissipation	P_{G2}	270	W
Control grid dissipation	P_{G1}	70	W

Operating characteristics

Frequency	f	≤ 110	MHz
Output power	P_2	$11,2 + 0,16^2)$	kW ¹⁾
Power gain	V_p	18,5	dB
Anode voltage (dc)	U_A	9,0	kV
Screen grid voltage (dc)	U_{G2}	600	V
Control grid voltage (dc)	U_{G1}	– 130	V
Peak control grid voltage (ac)	$U_{g1 m}$	110	V
Anode current (dc)	I_A	1,7	A
Screen grid current (dc)	I_{G2}	70	mA
Anode input power	$P_{B A}$	15,3	kW
Drive power	P_1	160	W ¹⁾
Anode dissipation	P_A	4,1	kW
Screen grid dissipation	P_{G2}	42	W
Efficiency	η	73	%
Anode load resistance	R_A	3000	Ω

1) Circuit losses are not included.

2) Power transition of grounded control-grid screen-grid circuit.

Tube mounting

Axis vertical, anode up or down.

Maximum tube surface temperature

The temperature of the tube's metal-ceramic seals must not exceed 220 °C at any point and the temperature of the internal cathode terminal must not exceed 250 °C. These requirements can be met without additional cooling of the terminals, if an appropriate air duct and sufficient space between the individual contact springs is provided so that enough cooling air can pass through.

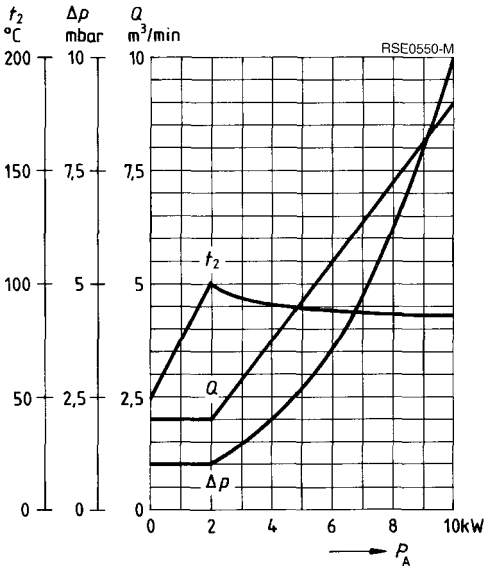
Forced-air cooling

The minimum air flow rate required for maximum anode dissipation is given in the cooling air diagram valid for 25 °C inlet temperature at a normal air pressure of 1 bar (sea level). The cooling air must be supplied from the side of the electrode terminals. For further information on forced-air cooling refer to "Explanations on Technical Data".

Safety precautions

The section "Safety precautions" under "Explanations on Technical Data" describes how the tube is to be protected against damage due to electric overload or insufficient cooling. A copper wire with 0,20 mm diameter should be used to test the anode overcurrent trip circuit.

Cooling air diagram



The cooling air is supplied from the electrode terminal side.

Air pressure = 1 bar

$t_1 = 25$ °C

$U_{G1} = f(U_A)$
 $U_{G2} = 600\text{ V}$
Parameter = I_A _____
Parameter = I_{G2}
Parameter = I_{G1} - - - - -

