For frequencies up to 1000 MHz

Coaxial metal-ceramic tetrode, forced-air-cooled or vapor-condensation-cooled. The tube is especially suitable for TV transmitters, band IV/V.
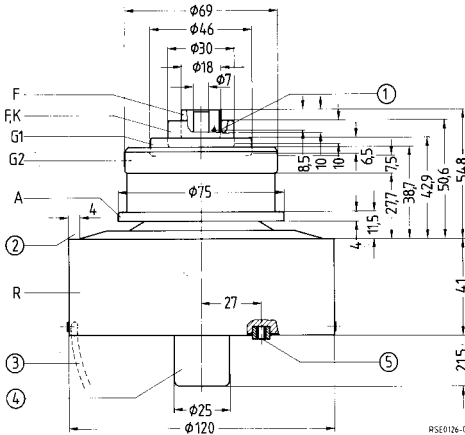
Forced-air-cooled version

RS 1054 L

Ordering code Q51-X1054
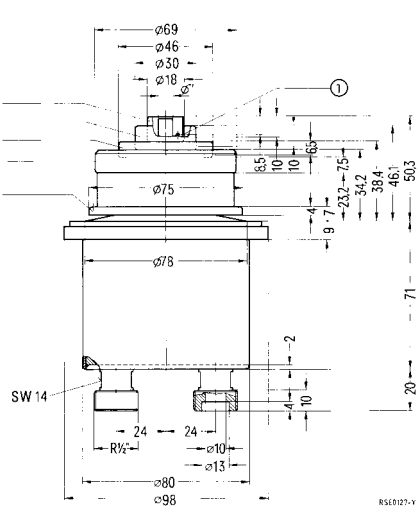
Vapor-condensation-cooled version

RS 1054 SK

Ordering code Q53-X1054

① 6 tapholes Ø 3 (6 × 60°)
② Free for anode support
③ Handle, swingable
④ Do not use as terminal
⑤ Taphole M4 for tube fuse RöSich2

Approx. weight 1,9 kg

Approx. 1,9 kg

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

Radiator	Ø 121,5	G1 terminal	Ø 46,6
Anode terminal	Ø 76,0	Heater/cathode terminal	Ø 30,6
G2 terminal	Ø 69,8	Heater terminal	Ø 18,4

Heating

Heater voltage	U_F	2,8	V
Heater current	I_F	≈ 135	A
Heating: direct			
Cathode: thoriated tungsten			

Characteristics

Emission current at $U_A = U_{G2} = U_{G1} = 200$ V	I_{em}	25	A
Amplification factor of screen grid at $U_A = 2$ kV, $U_{G2} = 500$ to 800 V, $I_A = 1$ A	μ_{g2g1}	9,0	
Transconductance at $U_A = 2$ kV, $U_{G2} = 500$ V, $I_A = 0,8$ to 1,2 A	s	60	mA/V

Capacitances

Cathode/control grid	c_{kg1}	≈ 57	pF
Cathode/screen grid	c_{kg2}	≈ 3,8	pF
Cathode/anode	c_{ka}	≈ 0,02	pF [1]
Control grid/screen grid	c_{g1g2}	≈ 112	pF
Control grid/anode	c_{g1a}	≈ 0,25	pF [1]
Screen grid/anode	c_{g2a}	≈ 14	pF [2]

Accessories RS 1054 L   Ordering code

Socket wrench for tube fuse		RöZub10	Q81-X2110
Tube fuse		RöSich2	Q81-X1402
Pull switch for tube fuse		RöKt11	Q81-X1311
Cavity band IV/V,	3,5 kW vision	TK9201	Q94-X4492
	2,0 kW vision/sound	TK9201	Q94-X4492
Cavity band III,	3,5 kW vision	TK9601	Q94-X4495
	2,0 kW vision/sound	TK9601	Q94-X4495

RS 1054 SK

Tube extractor		RöZub154SK	Q81-X2118
LL electrolytic target for 1/2″-hose		RöEl5	Q81-X365
Cavity band IV/V,	3,5 kW vision	TK9243 or	Q94-X9243
		TK9246	Q94-X9246
	2,0 kW vision/sound	TK9243 or	Q94-X9243
		TK9246	Q94-X9246
	2,0 kW sound	TK9253 or	Q94-X9253
		TK9256	Q94-X9256

1) Measured by a screening plate 30 cm × 30 cm in the screen-grid terminal plane.
2) Measured by a Ø 50 cm screening plate in the anode ceramic plane.

TV vision transmitter,
grounded control-grid screen-grid circuit, negative modulation, standard G

Maximum ratings

Frequency	f	1000	MHz
Anode voltage (dc)	U_A	5,0	kV
Screen grid voltage (dc)	U_{G2}	900	V
Control grid voltage (dc)	U_{G1}	– 150	V
Cathode current (dc)	I_K	3,0	A
Peak cathode current	I_{KM}	15	A
Anode dissipation	P_A	5,0	kW
Screen grid dissipation	P_{G2}	80	W
Control grid dissipation	P_{G1}	30	W

Operating characteristics

Frequency	f	170 … 230	470 … 860	MHz
Bandwidth (1 dB)	B	9,0	9,0	MHz
Output power, sync level	$P_{2 SY}$	4,6	4,6	kW [1]
Output power, black level	$P_{2 SW}$	2,5	2,5	kW [1] [2]
Gain	V_p	≥ 16	≥ 16	dB
Anode voltage (dc)	U_A	4,8	4,8	kV
Screen grid voltage (dc)	U_{G2}	800	800	V
Control grid voltage (dc)	U_{G1}	– 77	– 77	V
Peak control grid voltage (ac), sync level	$U_{g1 m SY}$	75	75	V
Zero-signal anode current (dc)	I_{A0}	0,8	0,8	A
Anode current (dc), black level	$I_{A SW}$	1,52	1,52	A
Screen grid current (dc), black level	$I_{G2 SW}$	45	45	mA
Anode input power, black level	$P_{B A SW}$	7,3	7,3	kW
Drive power, sync level	$P_{1 SY}$	100	100	W
Anode dissipation, black level	$P_{A SW}$	4,8	4,8	kW
Screen grid dissipation, black level	$P_{G2 SW}$	36	36	W
Anode load resistance	R_A	1,5	1,5	kΩ

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[1] Without taking circuit losses into account.
[2] Black level with gated sync. pulses.

**TV sound transmitter,
class B operation, grounded control-grid screen-grid circuit, standard G**

Maximum ratings

Frequency	f	1000	MHz
Anode voltage (dc)	U_A	5,0	kV
Screen grid voltage (dc)	U_{G2}	900	V
Control grid voltage (dc)	U_{G1}	− 150	V
Cathode current (dc)	I_K	3,0	A
Peak cathode current	I_{KM}	15	A
Anode dissipation	P_A	5,0	kW
Screen grid dissipation	P_{G2}	80	W
Control grid dissipation	P_{G1}	30	W

Operating characteristics

Frequency	f	170 … 230	470 … 860	MHz
Bandwidth (3 dB)	B	5,0	5,0	MHz
Output power	P_2	3,1	3,1	kW [1])
Gain	V_p	≥ 19	≥ 18	dB
Anode voltage (dc)	U_A	4,7	4,7	kV
Screen grid voltage (dc)	U_{G2}	650	650	V
Control grid voltage (dc)	U_{G1}	− 62	− 62	V
Zero-signal anode current (dc)	I_{A0}	0,6	0,6	A
Anode current (dc)	I_A	1,21	1,38	A
Screen grid current (dc)	I_{G2}	30	30	mA
Anode input power	P_{BA}	5,7	6,5	kW
Drive power	P_1	40	50	W
Anode dissipation	P_A	2,7	3,4	kW
Anode load resistance	R_A	1,9	1,7	kΩ

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1) Without taking circuit losses into account.

**TV sound transmitter (2 tone),
class B operation, grounded control-grid screen-grid circuit**

Maximum ratings

Frequency	f	1000	MHz
Anode voltage (dc)	U_A	5,0	kV
Screen grid voltage (dc)	U_{G2}	900	V
Control grid voltage (dc)	U_{G1}	– 150	V
Cathode current (dc)	I_K	3,0	A
Peak cathode current	I_{KM}	15	A
Anode dissipation	P_A	5,0	kW
Screen grid dissipation	P_{G2}	80	W
Control grid dissipation	P_{G1}	30	W

Operating characteristics

Frequency	f	170 … 230	470 … 860	MHz
Bandwidth (3 dB)	B	4,0	4,0	MHz
Output power, tone 1 + tone 2	P_2	1,6 + 0,32	1,6 + 0,32	kW [1] [2]
Gain	V_p	≥ 18	≥ 17	dB
Anode voltage (dc)	U_A	4,7	4,7	kV
Screen grid voltage (dc)	U_{G2}	650	650	V
Control grid voltage (dc)	U_{G1}	– 62	– 62	V
Zero-signal anode current (dc)	I_{A0}	0,6	0,6	A
Anode current (dc)	I_A	1,0	1,14	A
Screen grid current (dc)	I_{G2}	30	30	mA
Anode input power	P_{BA}	4,8	5,3	kW
Drive power, tone 1 + tone 2	P_1	25 + 5	32 + 6,4	W
Anode dissipation	P_A	2,9	3,4	kW
Anode load resistance	R_A	1,7	1,5	kΩ

[1] Without taking circuit losses into account.
[2] 242 kHz carrier spacing.

Amplifier for TV transmitters with common vision and sound carrier transmission, grounded control-grid screen-grid circuit, vision-to-sound ratio 10:1, standard G

Maximum ratings

Frequency	f	1000	MHz
Anode voltage (dc)	U_A	5,0	kV
Screen grid voltage (dc)	U_{G2}	900	V
Control grid voltage (dc)	U_{G1}	– 150	V
Cathode current (dc)	I_K	3,0	A
Peak cathode current	I_{KM}	15	A
Anode dissipation	P_A	5,0	kW
Screen grid dissipation	P_{G2}	80	W
Control grid dissipation	P_{G1}	30	W

Operating characteristics

Frequency	f	170 … 230	470 … 860	MHz
Bandwidth (1 dB)	B	9,0	9,0	MHz
Output power, sync level	$P_{2\,SY}$	2,7/0,27	2,6/0,26	kW [1]
Gain	V_p	≥ 18	≥ 16	dB
3-tone intermodulation ratio	a_{IM3}	≥ 52	≥ 52	dB
Anode voltage (dc)	U_A	4,7	4,6	kV
Screen grid voltage (dc)	U_{G2}	650	800	V
Control grid voltage (dc)	U_{G1}	– 54	– 75	V
Peak control grid voltage (ac), sync level	$U_{g1\,m\,SY}$	40	68	V
Zero-signal anode current (dc)	I_{A0}	1,1	0,8	A
Anode current (dc), black level	$I_{A\,SW}$	1,45	1,5	A
Screen grid current (dc), black level	$I_{G2\,SW}$	35	35	mA
Anode input power, black level	$P_{B\,A\,SW}$	6,8	6,9	kW
Drive power, sync level	$P_{1\,SY}$	43	65	W
Drive power, sound	$P_{1\,Ton}$	4,3	6,5	W
Anode dissipation, black level	$P_{A\,SW}$	4,95	4,9	kW
Anode load resistance	R_A	1,2	1,0	kΩ

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1) Without taking circuit losses into account.

Tube mounting

Axis vertical, anode up or down.

Spring contact rings are suitable connectors for cathode, control grid, screen grid and anode. The spring tension must be dimensioned such that the required power for inserting and withdrawing the tube remains below 120 N. Recommended pull-off power per spring contact ring is approx. 16 N. For further details see "Explanations on Technical Data".

Maximum tube surface temperature

The temperature of the electrode terminals and ceramic insulators must not exceed 220 °C. For keeping below this maximum temperature an air flow is required to cool the terminal rings. For this purpose the terminal contacts must be designed for providing a uniform cooling effect.

Forced-air cooling (RS 1054 L)

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

Vapor condensation cooling (RS 1054 SK)

The cooling water diagram gives the minimum water flow rate (distilled or deionized water) for maximum anode dissipation, as well as pressure drop and water outlet temperature at 70 °C water inlet temperature. The diagram applies to a hermetically sealed cooling system with 1,5 bar overpressure at the tube's cooling water outlet and with a maximum permissible water outlet temperature of 100 °C.

Operation with open cooling cycle (without overpressure) is also possible if the maximum outlet temperature remains below 70 °C (sea level, air pressure ≈ 1 bar) with lower inlet temperature and, if required, increased water flow rate.

For more information on vapor condensation cooling refer to "Explanations on Technical Data".

Automatic heating power regulation

Recommendations for automatic heating power stabilization are contained in the instruction "UHF TV Tetrodes, Heating Power Adjustment", which is supplied upon request.

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 Ø 0,12 mm should be used to test the anode overcurrent trip circuit.

For protecting RS 1054 L against thermal anode overload the tube fuse RöSich2 is recommended. In conjunction with pull switch RöKt11 it disconnects the voltages at the tube in case of overload (accessories).

Transmitter off-periods

Frequent switching of the heating reduces lifetime. So the heating (and cooling) should be left on during transmitter off-periods of up to two hours. Continuous heating with reduced power (black heating) should be provided for longer off-periods. Refer to "Explanations on Technical Data".
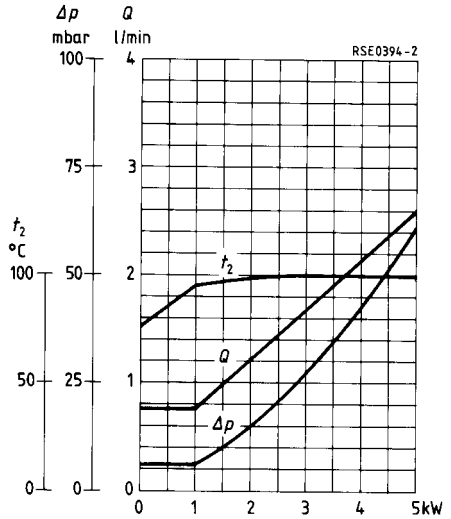
Cooling air diagram (RS 1054 L)

RSE 0128-7

Cooling water diagram (RS 1054 SK)

RSE 0394-2
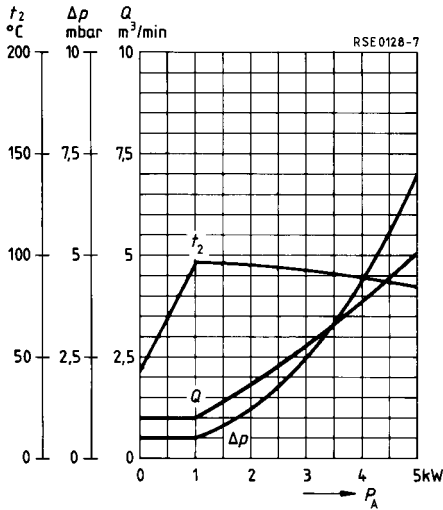
The cooling air is supplied from the electrode terminal side.
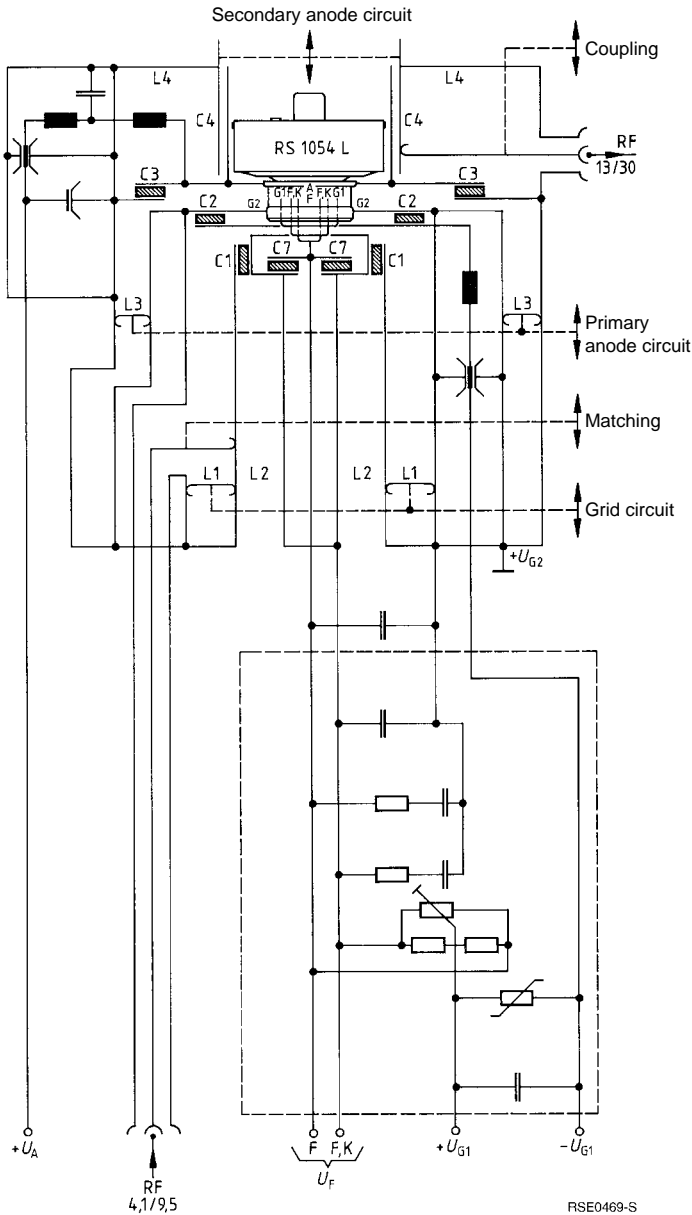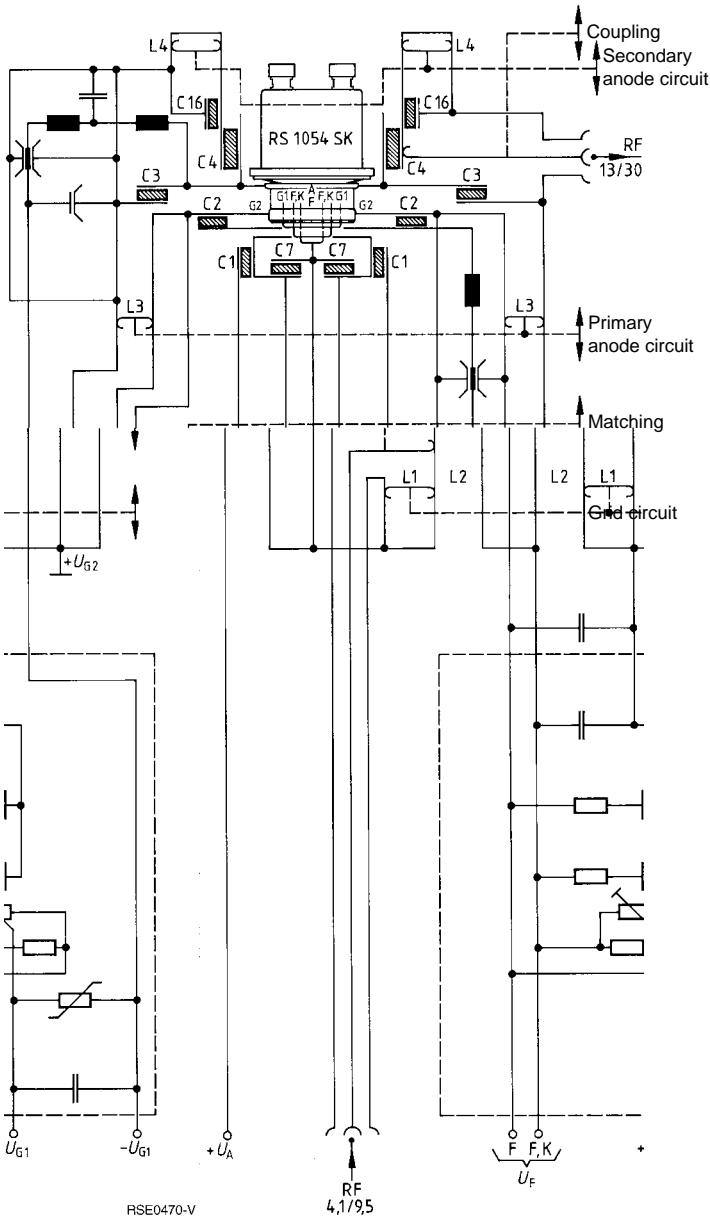
Air pressure = 1 bar
$t_1 = 25\ °C$

Closed cooling cycle with distilled water.

Overpressure = 1,5 bar
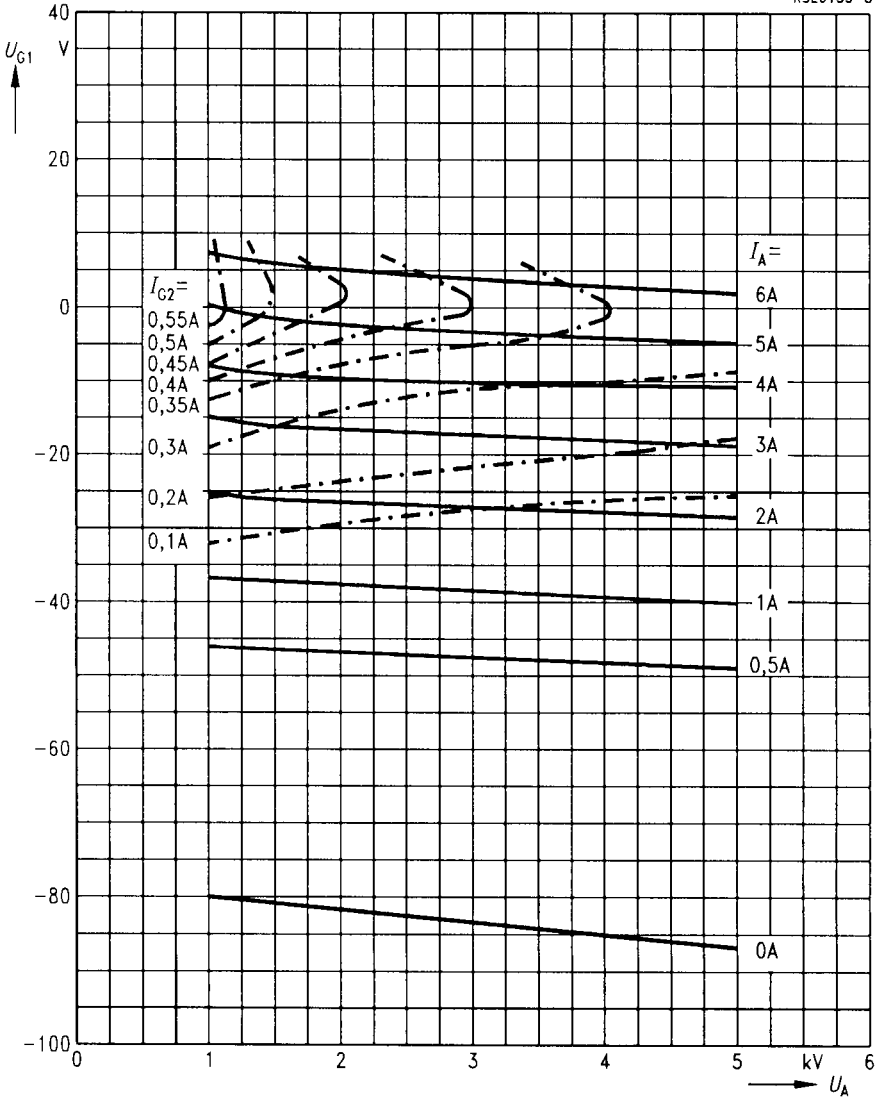$t_1 = 70\ °C$

Basic circuit diagram of final-stage cavity

Secondary anode circuit

Coupling

L4   C4   RS 1054 L   C4   L4

RF
13/30

C3   C2   G2   G1 F,K A F K G1   G2   C2   C3

C1   C7   C7   C1

L3   L3   Primary
anode circuit

Matching

L1   L2   L2   L1   Grid circuit

$+U_{G2}$

$+U_A$

RF
4,1/9,5

F   F,K
U_F

$+U_{G1}$ $-U_{G1}$

RSE0469-S

Basic circuit diagram of final-stage cavity

RSE0470-V

$U_{G1} = f(U_A)$ Parameter = I_A
$U_{G2} = 500$ V   Parameter = I_{G2}

RSE0133-8

$U_{G1} = f(U_A)$ Parameter $= I_A$

$U_{G2} = 800$ V   Parameter $= I_{G2}$

RSE0134-G