SIEMENS

YL 1055
Metal-Ceramic Tetrode

A forced-air cooled power tetrode
for 250 W translators up to 860 MHz

Properties

The YL 1055 is a forced-air cooled metal-ceramic power tetrode with coaxial control grid, screen grid and cathode terminals. One particular application for this tube is as grounded control grid/screen grid amplifier in television translators for concurrent vision and sound transmission up to 860 MHz. Under these conditions it delivers a peak synchron power of 250 W. The high gain of the YL 1055 generally allows the use of solid state drivers. The highest intermodulation product is more than 56 dB below the peak synchron power level.

The YL 1055 features a rugged electrode construction especially resistant to vibration. The use of seamless drawn molybdenum tubes with punched apertures for the control and screen grids allows precise grid manufacture. A suitable combination of grid apertures and stiffening struts produces a structure much more stable than the wire grid. These design features result in constant characteristic curves and consequently very low spreads.

An indirectly a.c. or d.c. heated matrix oxide is used in the YL 1055. This mechanically rugged cathode has proved especially suitable for low and medium power gridded tubes. It has high emission, exhibits long life, and offers other important advantages in terms of tube technology.

Use of metal-ceramic techniques in the manufacture of the YL 1055 results in further advantages: The low dielectric losses of ceramic permit the fabrication of high frequency tubes capable of operation at high alternating plate voltages.

Ceramic also has an appreciably higher thermal conductivity than glass. Temperature gradients are therefore balanced out much quicker in ceramic tubes, thereby reducing the danger of tube damage due to thermal stresses.

Ceramic is very rugged.

Ceramic tubes can be manufactured to very close tolerances, which keeps the characteristic curve spreads within narrow limits.

Application

The YL 1055 is used for example in the Siemens 100/200 W UHF amplifier type LV 4040 with the cavity TK 4430 as shown in fig. 2. The amplifier is intended for band IV/V TV translators.

The air cooled cavity amplifier can be tuned over the frequency band 470 to 860 MHz (TV bands IV and V), and with the YL 1055 delivers a sync output power of 250 W.

50 or 60 Ω connectors are used for the RF input and output. The output circuit is a three-circuit bandpass filter with two secondary circuits. Its 1 dB bandwidth can be adjusted from 7 to 9.5 MHz.

The principles of the cavity amplifier are explained with the aid of the schematic in fig. 3.

From the RF input (1) of the cavity, the signal to be amplified is fed through a capacitance to the inner conductor of the input circuit. The inner and outer conductors form a coaxial line with a characteristic impedance of 50 or 60 Ω. The two coaxial rings (2) and (2 a) are adjusted independently in the axial direction to obtain optimum matching.

The plate circuit consists of a $\lambda/4$ circuit tuned by the plunger (3). Two secondary circuits tuned by the plungers (5) and (6) complete the three-circuit bandpass filter. The three circuits are capacitively coupled together by the probes (7) and (8). The amplified signal is coupled out by the probe (9).

Dimensions

A	11.2±0.9
B	7.1±0.7
C	44.7±0.7
D	8.9±0.8
E	28.7±0.8
F	101.4±1.6
G	min 6.2
H	min 6.8
J	min 6.8
K	32.0±1.2
L	max 27
M	max 22
N	95.0±0.3
P	50.0±0.2
Q	53.8±0.2
R	45.9±0.3
S	30.0±0.1
T	18.0±0.1
U	16.7±0.2
V	min 15.5
W	max 5
AA	min 5.2
AB	min 4.7
AC	min 2.7
AD	min 5.6
AE	min 3.7

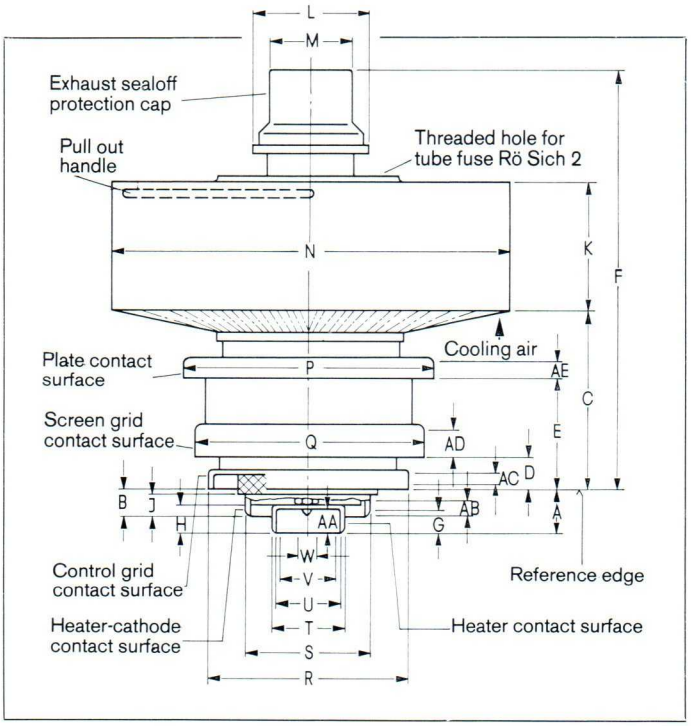


Fig. 1 Outline drawing
Dimensions in mm

Technical data YL 1055

General data

Heater

E_f	3.8 V
I_f	20.5 ± 2 A
Preheating time	3 min
Heating:	indirect, a. c. or d. c.
Cathode:	matrix oxide type

Characteristic data

E_b	2500	V
E_{c2}	400	V
I_b	500	mA
S	70000	μmhos
μ_{g1g2}	12	

Capacitances (nominal values)

C_{kg1}	45	pF
C_{kg2}	1.7	pF
C_{ka}	5	mpF
C_{g1g2}	60	pF
C_{g1a}	50	mpF
C_{g2a}	8.5	pF

Air cooling (sea level, 45° C inlet temperature)

Plate dissipation	P_p	1.6	0.8	kW
Air flow rate	V	1.5	0.61	m³/min
		53	21.6	cfm
Pressure drop	Δ_p	12.5	2.8	mm H_2O
		0.5	0.11	in H_2O
Air outlet temperature	T_0	103	117	°C

Concurrent vision and sound amplifier for television translators – grounded control grid/screen grid circuit

Maximum ratings

F	max	860	MHz
E_b	max	2700	V
P_b	max	1.6	kW
E_{c2}	max	800	V
P_{c2}	max	20	W
E_{c1}	max	−100	V
P_{c1}	max	3	W
I_k	max	900	mA

Operating data

F	470 to 790	790 to 860	MHz
$P_{o\,syn}$	220	220	W [1]
G_{min}	16	16	dB
$IM_{3\,min}$	59	59	dB [2]
B (1 dB)	8.5		MHz [3]
E_b	2500	2750	V
E_{c2}	500	500	V
I_{b0}	400	400	mA
$I_{b\,approx}$	600	600	mA
Linearity min	0.95		

[1] Power at the output of the cavity with 85 % circuit efficiency

[2] Measured with the following carrier levels: vision −8 dB; sideband −16 dB; sound −10 dB referenced to peak sync

[3] Bandpass filter coupling

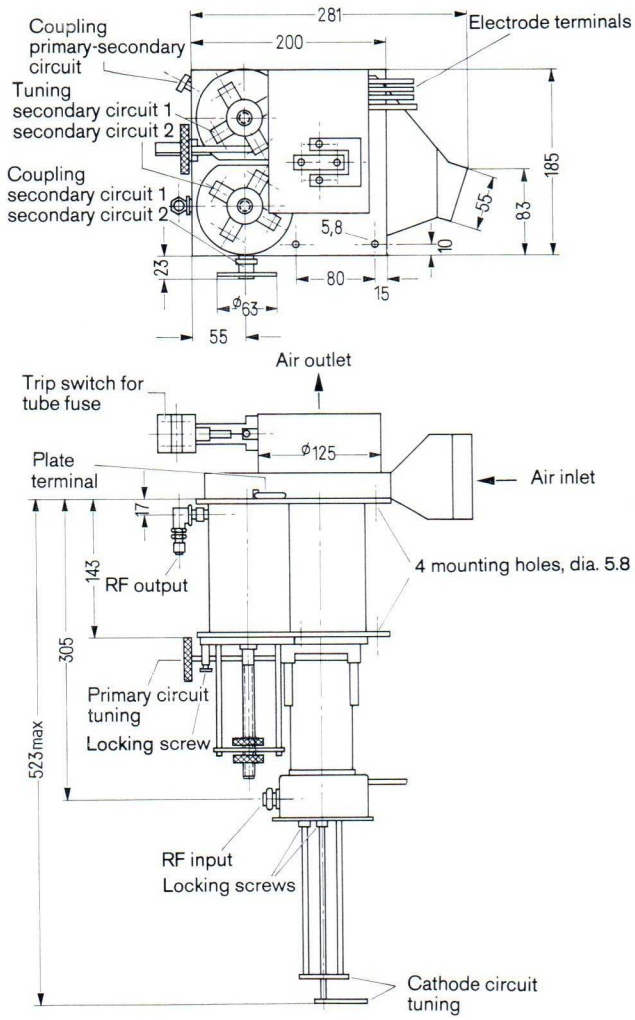
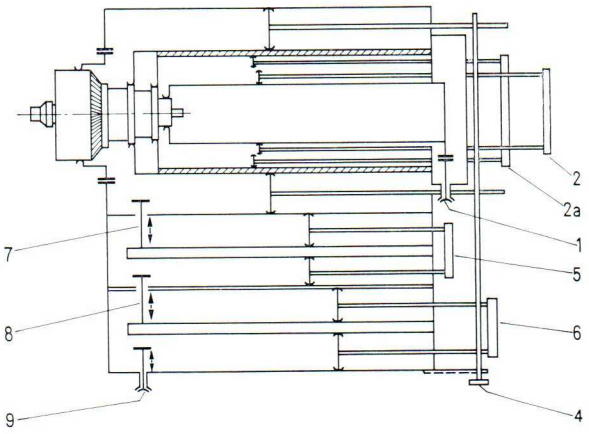


Fig. 2 UHF cavity amplifier TK 4430, 250 W, for television translators

Fig. 3 Schematic of the cavity amplifier type TK 4430
Dimensions in mm



1 RF input
2 Cathode circuit, frequency
2a and matching
3 Plate circuit frequency
4 Plate circuit tuning plunger drive mechanism
5 Frequency of the second bandpass filter circuit
6 Frequency of the third bandpass filter circuit
7 Coupling between plate and second bandpass filter circuit
8 Coupling between second and third bandpass filter circuits
9 Output coupling

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