AIR COOLED V.H.F. POWER TETRODE

Forced air cooled coaxial power tetrode in metal-ceramic construction primarily intended for use as a linear broad-band amplifier in T V transmitters in the bands I and III. This type is also very suitable for A.M. and F.M. broadcast, A.F. modulator applications, and in T V transposer service.

QUICK REFERENCE DATA			
Class AB linear amplifier (vision)			
Frequency	f	175, 25	MHz
Anode voltage	V_a	3	kV
Output power in load	W_ℓ	1, 55	kW
Power gain	G	26	
Class B amplifier			
Frequency	f	260	MHz
Anode voltage	V_a	3, 5	kV
Output power in load	W_ℓ	2, 4	kW
Power gain	G	26	
TV transposer service			
Frequency	f	175 to 225	MHz
Anode voltage	V_a	2, 5	kV
Output power in load	W_ℓ	0, 55	kW
Power gain	G	30	

HEATING: direct; filament thoriated tungsten, mesh type.

Filament voltage	V_f	4, 2	V ± 5%
Filament current	I_f	53	A
Filament peak starting current	I_{fp} max.	300	A
Cold filament resistance	R_{f_o}	8, 5	mΩ
Waiting time	T_w min.	1	s

TYPICAL CHARACTERISTICS

Anode voltage	V_a	4	kV
Grid no. 2 voltage	V_{g2}	500	V
Anode current	I_a	0, 4	A
Transconductance	S	25	mA/V
Amplification factor	μ_{g2g1}	16	

CAPACITANCES

	grounded cathode		grounded grid		
					pF
Input	$C_{g1(a)}$	47	$C_{f(a)}$	24	pF
Output	$C_{a(g1)}$	9	$C_{a(f)}$	9	pF
Anode to grid no. 1	C_{ag1}	0,1			pF
Anode to filament			C_{af}	< 0,1	pF

TEMPERATURE LIMITS

Absolute max. envelope temperature	t_{env}	max.	240	°C
Recommended max. seal temperature	t	max.	200	°C

COOLING

See curves
Direction of air flow: see drawing.

ACCESSORIES

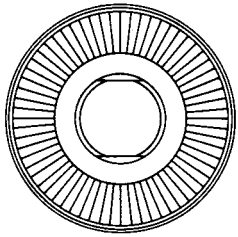
Band I amplifier circuit assembly (vision)	type 40755
Band I amplifier circuit assembly (sound)	type 40756
Band III amplifier circuit assembly (vision)	type 40743
Band III amplifier circuit assembly (sound)	type 40744

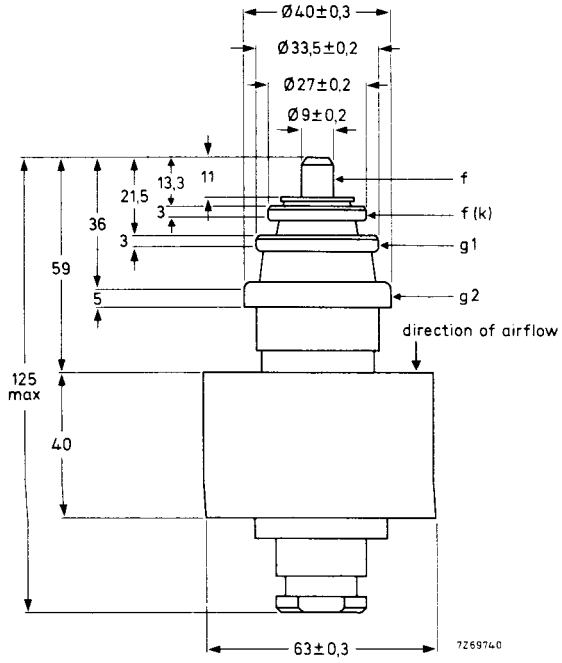
MECHANICAL DATA

Dimensions in mm

Net mass : approx. 0,55 kg

Mounting position: vertical with anode up or down.





R.F. CLASS B SERVICE

Unless otherwise specified the voltages are given with respect to the cathode.

LIMITING VALUES (Absolute max. rating system)

Frequency	f	up to	260	MHz
Anode voltage	V_a	max.	4	kV
Grid no. 2 voltage	V_{g2}	max.	700	V
Grid no. 1 voltage	$-V_{g1}$	max.	100	V
Anode current	I_a	max.	1,2	A
Anode input power	W_{i_a}	max.	4	kW
Anode dissipation	W_a	max.	1,5	kW
Grid no. 2 dissipation	W_{g2}	max.	50	W
Grid no. 1 dissipation	W_{g1}	max.	30	W
Cathode current	I_k	max.	1,5	A
Grid no. 1 circuit resistance	R_{g1}	max.	10	kΩ

OPERATING CONDITIONS grounded grid

Frequency	f	up to	260	MHz
Anode voltage	V_a		3,5	kV
Grid no. 2 voltage	V_{g2}		600	V
Grid no. 1 voltage	V_{g1}		-30	V [2)]
Anode current, no signal condition	I_a		100	mA
Anode current	I_a		980	mA
Grid no. 2 current	I_{g2}		70	mA
Grid no. 1 current	I_{g1}		120	mA
Anode input power	W_{i_a}		3,43	kW
Anode dissipation	W_a		0,9	kW
Output power in load	W_ℓ		2,4	kW
Efficiency, total	η		70	%
Driving power	W_{dr}		90	W
Power gain	$\frac{W_\ell}{W_{dr}}$		≈ 26	

[2)] See page 8

R.F. CLASS AB LINEAR AMPLIFIER FOR TELEVISION SERVICE

Negative modulation, positive synchronization (C.C.I.R. system).
Unless otherwise specified the voltages are given with respect to the cathode.

LIMITING VALUES (Absolute max. rating system)

Frequency	f	up to	260	MHz
Anode voltage	V_a	max.	4	kV
Grid no. 2 voltage	V_{g2}	max.	700	V
Grid no. 1 voltage	$-V_{g1}$	max.	100	V
Anode current, black	$I_{a\ black}$	max.	1	A
Anode input power, black	$W_{i\,a\ black}$	max.	4	kW
Anode dissipation	W_a	max.	1,5	kW
Grid no. 2 dissipation	W_{g2}	max.	50	W
Grid no. 1 dissipation	W_{g1}	max.	30	W
Cathode current	I_k	max.	1,5	A
Grid no. 1 circuit resistance	R_{g1}	max.	10	kΩ

OPERATING CONDITIONS grounded grid.

Frequency of vision carrier	f		175,25	MHz	
Bandwidth (-1 dB)	B	7	8	MHz	1)
Anode voltage	V_a	3	2,5	kV	
Grid no. 2 voltage	V_{g2}	500	500	V	
Grid no. 1 voltage	V_{g1}	-23	-14	V	2)
Anode current, no signal condition	I_a	200	400	mA	
Anode current, black	$I_{a\ black}$	700	600	mA	3)
Grid no. 2 current, black	$I_{g2\ black}$	50	40	mA	3)
Grid no. 1 current, black	$I_{g1\ black}$	60	30	mA	3)
Output power in load, sync	$W_{\ell\ sync}$	1550	700	W	
black	$W_{\ell\ black}$	930	420	W	3)
Driving power, sync	$W_{dr\ sync}$	60	30	W	
black	$W_{dr\ black}$	32,5	17	W	
Gain, sync	G_{sync}	26	23		
black	G_{black}	28,6	24,7		
Sync compression	sync in/out	28/25	27/25		4)
Diferential phase		< 3	< 3	o	5)
Differential gain		≥ 85	≥ 85	%	
Anode resistance	$R_{a\ \sim}$	1,8	1,6	kΩ	1)

Notes: see page 8
+ Detailed information on definitions of terms and application suggestions are available on request.

OPERATING CONDITIONS (continued)

Frequency of vision carrier	f		55,25		MHz	
Bandwidth (−1 dB)	B	7	7	6	MHz	1)
Anode voltage	V_a	2,5	2	2,5	kV	
Grid no. 2 voltage	V_{g2}	600	600	600	V	
Grid no. 1 voltage	V_{g1}	−21	−20	−21	V	2)
Anode current, no signal condition	I_a	200	200	200	mA	
Anode current, black	$I_{a\ black}$	820	650	900	mA	3)
Grid no. 2 current, black	$I_{g2\ black}$	45	40	50	mA	3)
Grid no. 1 current, black	$I_{g1\ black}$	80	50	90	mA	3)
Output power in load, sync	W_{ℓ} sync	1170	670	1500	W	
black	W_{ℓ} black	700	400	900	W	3)
Driving power, sync	W_{dr} sync	83	42	94	W	
black	W_{dr} black	46	24	50	W	
Gain, sync	G_{sync}	14	16	16		
black	G_{black}	15,2	16,6	18		
Sync compression	sync in/out	28/25	27/25	30/25		4)
Differential phase		< 3	< 3	< 3	o	5)
Differential gain		≥ 85	≥ 85	≥ 85	%	
Anode resistance	$R_{a\sim}$	0,9	0,9	1,05	kΩ	1)
Frequency of vision carrier	f		83,25		MHz	
Bandwidth (−1 dB)	B	7		7	MHz	1)
Anode voltage	V_a	2,5		2	kV	
Grid no. 2 voltage	V_{g2}	600		600	V	
Grid no. 1 voltage	V_{g1}	−21		−20	V	2)
Anode current, no signal condition	I_a	200		200	mA	
Anode current, black	$I_{a\ black}$	900		610	mA	3)
Grid no. 2 current, black	$I_{g2\ black}$	50		45	mA	3)
Grid no. 1 current, black	$I_{g1\ black}$	90		45	mA	3)
Output power in load, sync	W_{ℓ} sync	1500		670	W	
black	W_{ℓ} black	900		400	W	3)
Driving power, sync	W_{dr} sync	94		39	W	
black	W_{dr} black	50		22	W	
Gain, sync	G_{sync}	16		17		
black	G_{black}	18		18		
Sync compression	sync in/out	30/25		28/25		4)
Differential phase		< 3		< 3	o	5)
Differential gain		≥ 85		≥ 85	%	
Anode resistance	$R_{a\sim}$	1,05		1,05	kΩ	1)

Notes: see page 8

R.F. CLASS AB AMPLIFIER FOR TELEVISION TRANSPOSER SERVICE , grounded grid

LIMITING VALUES

See page 5

OPERATING CONDITIONS , grounded grid

Negative modulation, positive synchronization, combined sound and vision (CCIR standard G)

Frequency	f	175 to 225	MHz
Bandwidth (−1 dB)	B	8	MHz
Anode voltage	V_a	2,5	kV
Grid no. 2 voltage	V_{g2}	600	V
Grid no. 1 voltage [2]	V_{g1}	−13,5	V
Anode current, no signal condition	I_a	550	mA
Anode current [6]	I_a	730	mA
Grid no. 2 current [6]	I_{g2}	50	mA
Grid no. 1 current [6]	I_{g1}	35	mA
Driving power, sync	W_{dr}	18	W
Output power in load, sync	W_f	0,55	kW
Power gain	G	30	-
Intermodulation products [7]	d	−52	dB

Notes: see page 8

NOTES

1) With double tuned circuit.

2) To be adjusted for the stated no signal anode current..

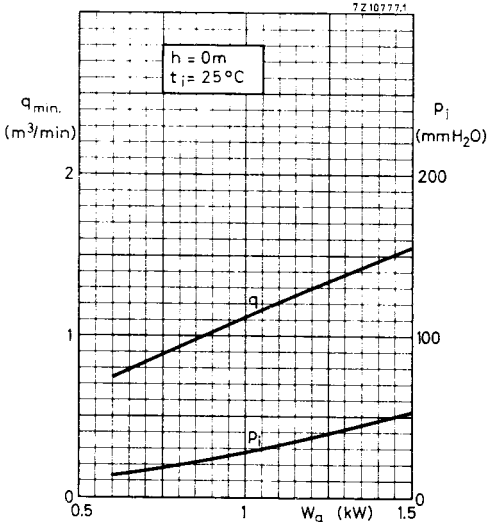
3) Black signal including line sync pulses.

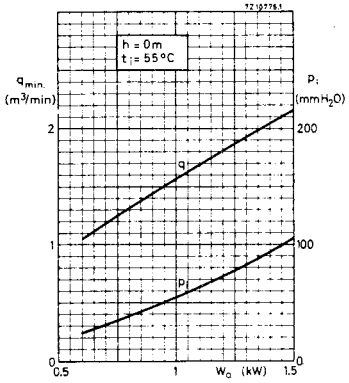
4) A picture/sync ratio of 75/25 for the outgoing signal requires a ratio of max. 70/30 for the incoming signal in which case the sync compression sync in/out = 30/25.

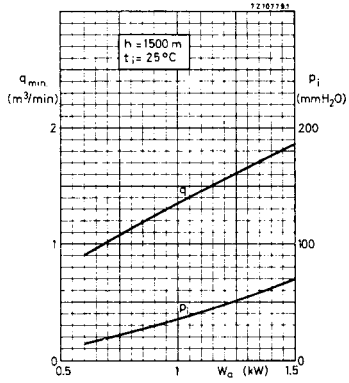
5) Measured with a saw tooth amplitude, running from 17 % to 75 % of the peak sync value, with superimposed a 4,43 MHz sine wave with a 10 % peak to peak value.

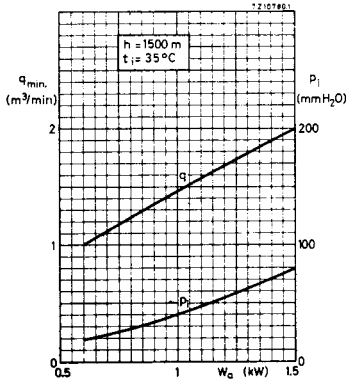
6) At c.w. output power = 550 W

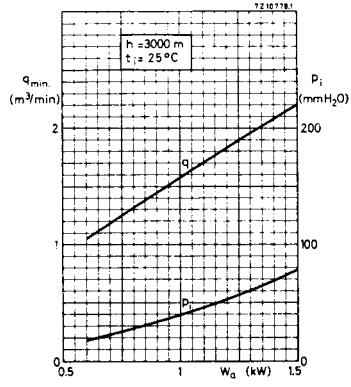
7) Three-tone test method (vision carrier −8 dB, sound carrier −7 dB, sideband signal −17 dB with respect to peak sync = 0 dB).

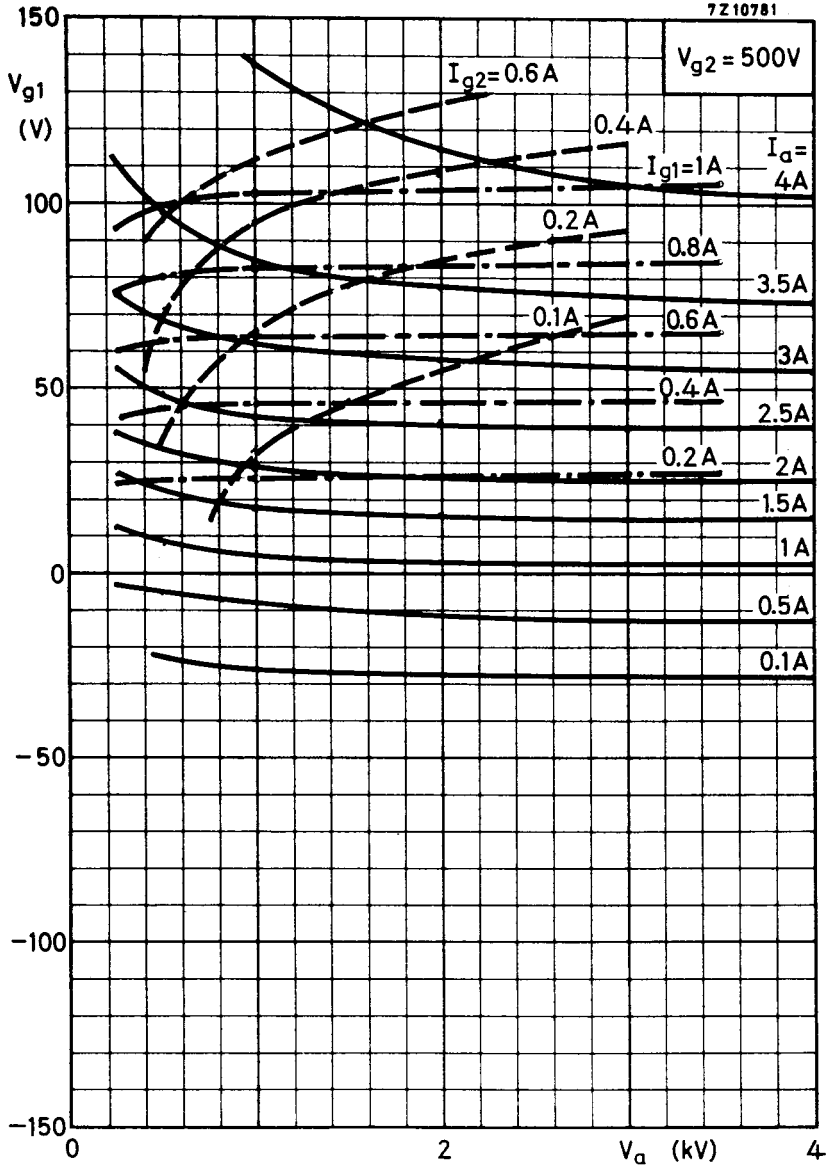


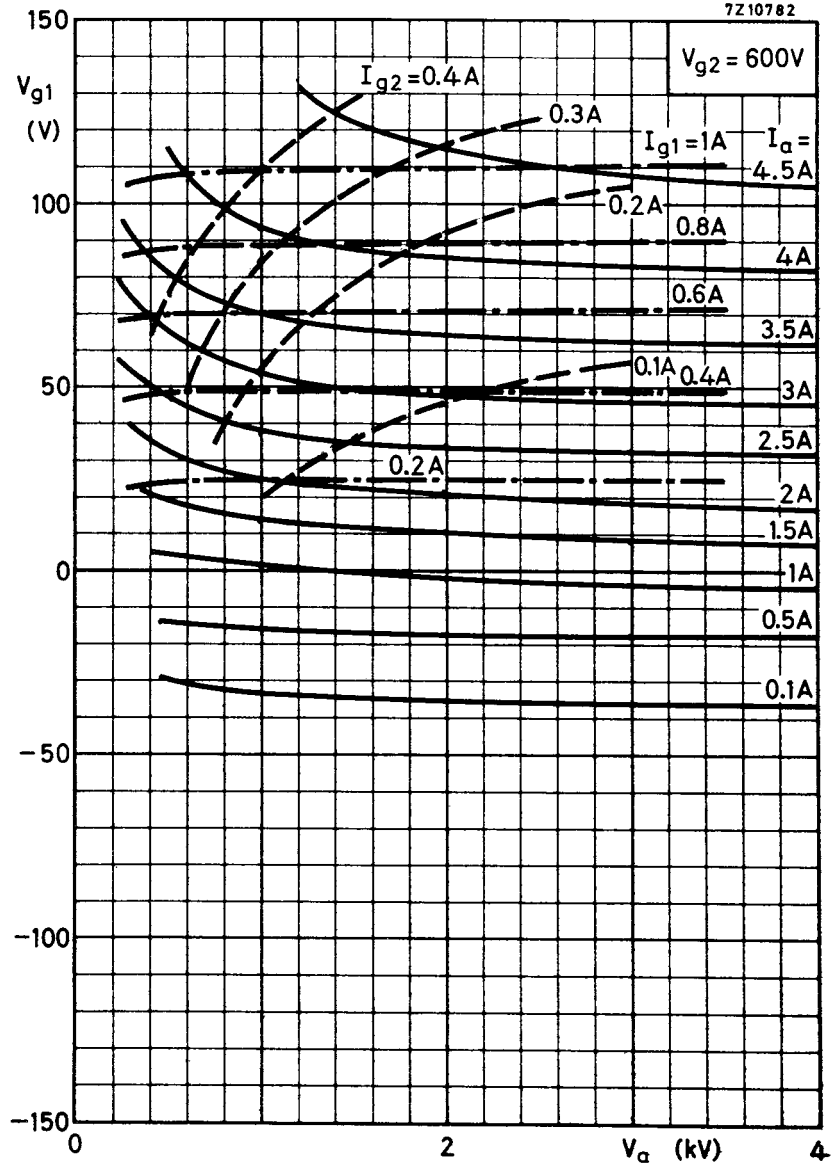

h = 0 m
t_i = 55 °C
q_min. (m³/min)
P_i (mmH₂O)
q
P_i
W_a (kW)

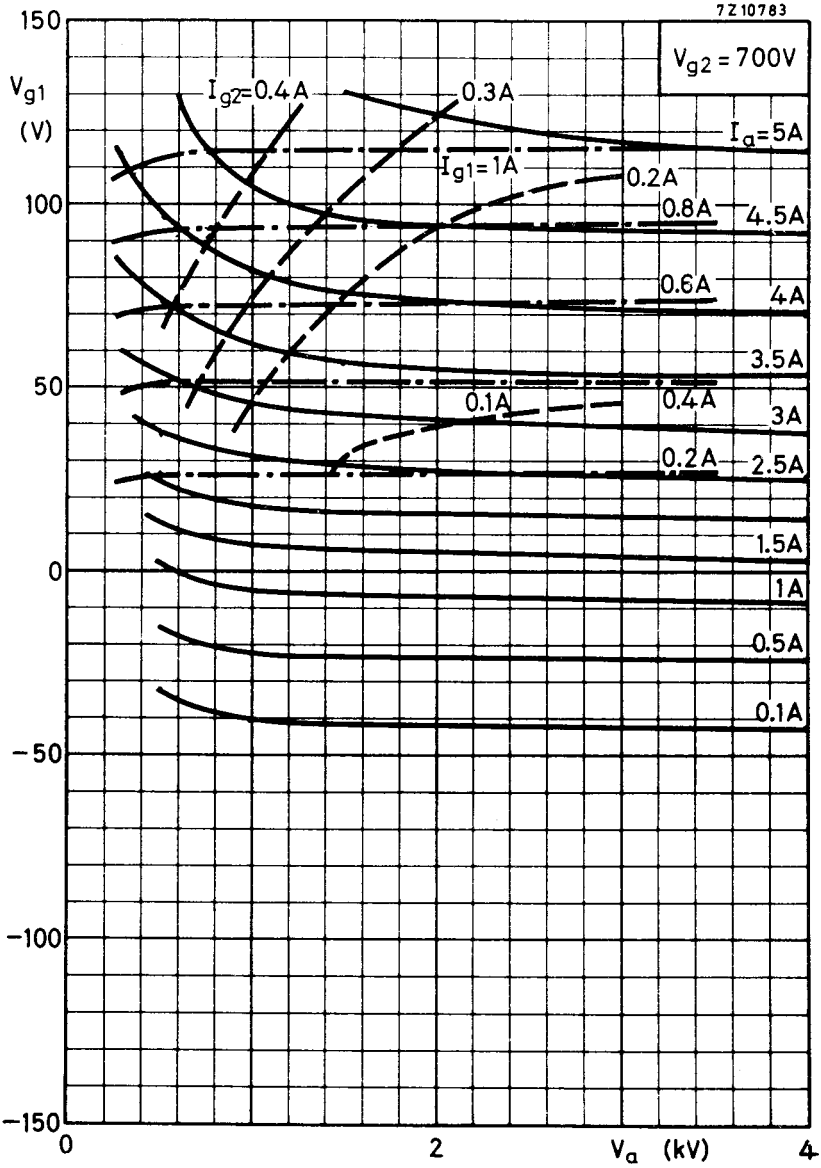

h = 1500 m
t_i = 25 °C
q_min. (m³/min)
P_i (mmH₂O)
q
P_i
W_a (kW)


h = 1500 m
t_i = 35 °C
q_min. (m³/min)
P_i (mmH₂O)
q
P_i
W_a (kW)


h = 3000 m
t_i = 25 °C
q_min. (m³/min)
P_i (mmH₂O)
q
P_i
W_a (kW)


7Z10781
V_{g2} = 500V
I_{g2}= 0.6A
0.4A
I_{g1}=1A
I_a=
4A
0.2A
0.8A
3.5A
0.1A
0.6A
3A
0.4A
2.5A
0.2A
2A
1.5A
1A
0.5A
0.1A
V_{g1}
(V)
150
100
50
0
−50
−100
−150
0
2
V_a (kV)
4


7Z10782
V_{g2} = 600V
I_{g2} = 0.4A
0.3A
0.2A
0.1A
I_{g1} = 1A
I_a =
4.5A
0.8A
4A
0.6A
3.5A
0.4A
3A
2.5A
0.2A
2A
1.5A
1A
0.5A
0.1A
V_{g1} (V)
150
100
50
0
−50
−100
−150
0
2
4
V_a (kV)


7Z10783
V_{g2} = 700V
V_{g1} (V)
150
100
50
0
−50
−100
−150
0
2
4
V_a (kV)
I_{g2}=0.4A
0.3A
I_{g1}=1A
0.2A
I_a=5A
0.8A
4.5A
0.6A
4A
3.5A
0.1A
0.4A
3A
0.2A
2.5A
1.5A
1A
0.5A
0.1A