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	5	kV
Output power in load	W_ℓ	8, 6	kW
Power gain	G	24	
Class B amplifier			
Frequency	f	260	MHz
Anode voltage	V_a	7	kV
Output power in load	W_ℓ	10, 5	kW
Power gain	G	32	
R.F. Class C telegraphy or F.M. telephony			
Frequency	f	260	MHz
Anode voltage	V_a	7	kV
Output power in load	W_ℓ	11	kW
Power gain	G	32	
TV transposer service			
Frequency	f	175 to 225	MHz
Anode voltage	V_a	4	kV
Output power in load	W	2, 5	kW
Power gain	G	30	

HEATING: direct; filament thoriated tungsten, mesh type

Filament voltage	V_f	6, 3	V ± 5%
Filament current	I_f	120	A
Filament peak starting current	I_{fp}	max. 750	A
Cold filament resistance	R_{fo}	6	mΩ
Waiting time	T_w	min. 1	s

TYPICAL CHARACTERISTICS

Anode voltage	V_a	5	kV
Grid No. 2 voltage	V_{g2}	600	V
Anode current	I_a	1, 45	A
Transconductance	S	30	mA/V
Amplification factor	μ_{g2g1}	7, 5	

CAPACITANCES

	(grounded cathode)		(grounded grid)		
Input	$C_{g1(a)}$	90	$C_{f(a)}$	48	pF
Output	$C_{a(g1)}$	16	$C_{a(f)}$	16, 4	pF
Anode to grid No. 1	C_{ag1}	0, 55			pF
Anode to filament			C_{af}	0, 15	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.

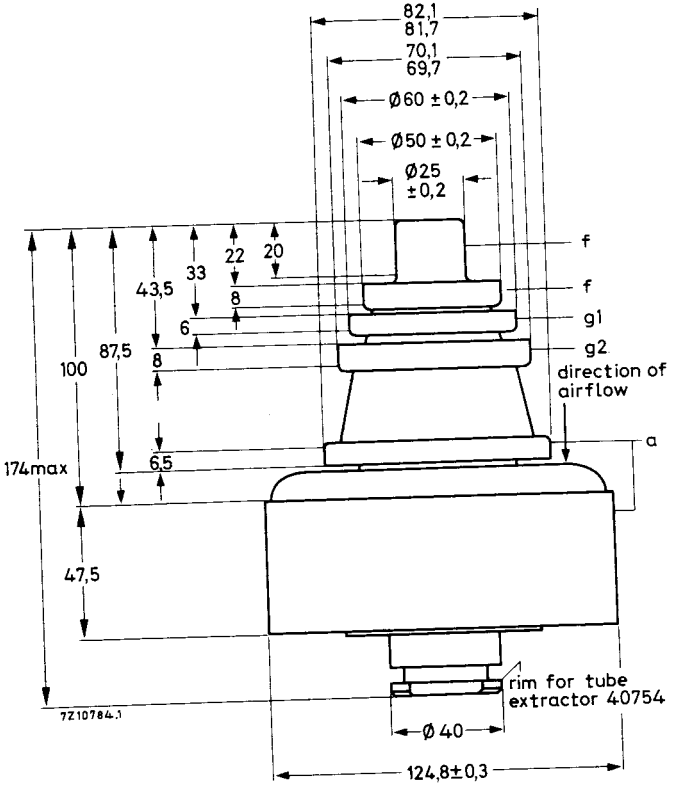
ACCESSORIES

Band I amplifier circuit assembly (vision)	type 40757
Band I amplifier circuit assembly (sound)	type 40758
Band III amplifier circuit assembly (vision)	type 40745
Band III amplifier circuit assembly (sound)	type 40746

MECHANICAL DATA

Dimensions in mm

Net weight: approx. 3,1 kg
Mounting position: Vertical with anode up or down.



R.F. CLASS B SERVICE

Unless otherwise stated the voltages are specified with respect to cathode

LIMITING VALUES (Absolute max. rating system)

Frequency	f	up to	260	MHz
Anode voltage	V_a	max.	8,5	kV
Grid no. 2 voltage	V_{g2}	max.	1	kV
Grid no. 1 voltage	$-V_{g1}$	max.	500	V
Anode current	I_a	max.	4	A
Anode input power	W_{ia}	max.	18,5	kW
Anode dissipation	W_a	max.	6	kW
Grid no. 2 dissipation	W_{g2}	max.	80	W
Grid no. 1 dissipation	W_{g1}	max.	40	W
Cathode current	I_k	max.	4,5	A

OPERATING CONDITIONS : grounded grid

Frequency	f up to	260	MHz
Anode voltage	V_a	7	kV
Grid no. 2 voltage	V_{g2}	600	V
Grid no. 1 voltage	V_{g1}	-120	V [1]
Anode current, no signal condition	I_a	0,2	A
Anode current	I_a	2,2	A
Grid no.2 current	I_{g2}	80	mA
Grid no. 1 current	I_{g1}	125	mA
Anode input power	W_{ia}	15,4	kW
Anode dissipation	W_a	4,3	kW
Output power in load	W_ℓ	10,5	kW
Efficiency, total	η	68	%
Driving power	W_{dr}	325	W
Power gain	$\frac{W_\ell}{W_{dr}}$	32	

Note see page 8

R.F. CLASS AB AMPLIFIER FOR TELEVISION SERVICE +

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

LIMITING VALUES (Absolute max. rating system)

Frequency	f	up to	260	MHz
Anode voltage	V_a	max.	6,5	kV
Grid no. 2 voltage	V_{g2}	max.	1	kV
Anode current, black	$I_{a\ black}$	max.	2,25	A
Anode input power, black	$W_{ia\ black}$	max.	12	kW
Anode dissipation	W_a	max.	6	kW
Grid no. 2 dissipation	W_{g2}	max.	80	W
Grid no. 1 dissipation	W_{g1}	max.	40	W
Cathode current	I_k	max.	4,5	A

OPERATING CONDITIONS , grounded grid

Frequency of vision carrier	f	175,25	175,25	MHz	
Bandwidth (−1 dB)	B	7	7	MHz	2)
Anode voltage	V_a	5	4	kV	
Grid no. 2 voltage	V_{g2}	600	600	V	
Grid no. 1 voltage	V_{g1}	−75	−65	V	1)
Anode current, no signal condition	I_a	650	750	mA	
Anode current, black	I_{abl}	2,1	1,9	A	3)
Grid no. 2 current, black	I_{g2bl}	20	30	mA	3)
Grid no. 1 current, black	I_{g1bl}	75	55	mA	3)
Output power in load, sync	$W_{\ell\ sync}$	8,6	6,25	kW	
black	$W_{\ell\ black}$	5,15	3,75	kW	
Driving power, sync	$W_{dr\ sync}$	350	260	W	
black	$W_{dr\ black}$	200	140	W	
Gain, sync	G_{sync}	24	24		2)
black	G_{black}	25,8	26,7		
Sync compression	sync in/out	27/25	29/25		4)
Differential phase		< 3	< 3	o	5)
Differential gain		≥ 85	≥ 85	%	5)
Anode resistance	R_a	1100	900	Ω	2)

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	83,25	55,25	MHz	
Bandwidth (−1 dB)	B	7	7	MHz	2)
Anode voltage	V_a	4	4	kV	
Grid no. 2 voltage	V_{g2}	600	600	V	
Grid no. 1 voltage	V_{g_1}	−65	−65	V	1)
Anode current, no signal condition	I_a	750	750	mA	
Anode current, black	I_{ab1}	2,1	2,3	A	3)
Grid no. 2 current, black	I_{g2b1}	45	45	mA	3)
Grid no. 1 current, black	I_{g1b1}	75	85	mA	3)
Output power in load, sync	W_ℓ sync	6,25	6,25	kW	
black	W_ℓ black	3,75	3,75	kW	
Driving power, sync	W_{dr} sync	340	385	W	
black	W_{dr} black	180	210	W	
Gain, sync	G sync	18,5	16		2)
black	G black	21,5	18		2)
Sync compression	sync in/out	30/25	29/25		4)
Differential phase		< 3	< 3	o	5)
Differential gain		≥ 85	≥ 85	%	5)
Anode resistance	$R_{a\sim}$	810	690	Ω	2)

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	4	kV
Grid no. 2 voltage	V_{g2}	700	V
Grid no. 1 voltage 1)	V_{g1}	−65	V
Anode current, no signal condition	I_a	1	A
Anode current 6)	I_a	1,65	A
Grid no. 2 current 6)	I_{g2}	25	mA
Grid no. 1 current 6)	I_{g1}	10	mA
Driving power, sync	W_{dr}	85	W
Output power in load, sync	W_ℓ	2,5	kW
Power gain	G	30	-
Intermodulation products 7)	d	−52	dB

Notes: see page 8

R.F. CLASS C TELEGRAPHY or F.M. TELEPHONY

LIMITING VALUES (Absolute max. rating system)

Frequency	f	up to	260	MHz
Anode voltage	V_a	max.	8,5	kV
Grid no. 2 voltage	V_{g_2}	max.	1	kV
Grid no. 1 voltage	$-V_{g_1}$	max.	500	V
Anode current	I_a	max.	4	A
Anode input power	W_{ia}	max.	18,5	kW
Anode dissipation	W_a	max.	6	kW
Grid no. 2 dissipation	W_{g_2}	max.	80	W
Grid no. 1 dissipation	W_{g_1}	max.	40	W
Cathode current	I_k	max.	4,5	A

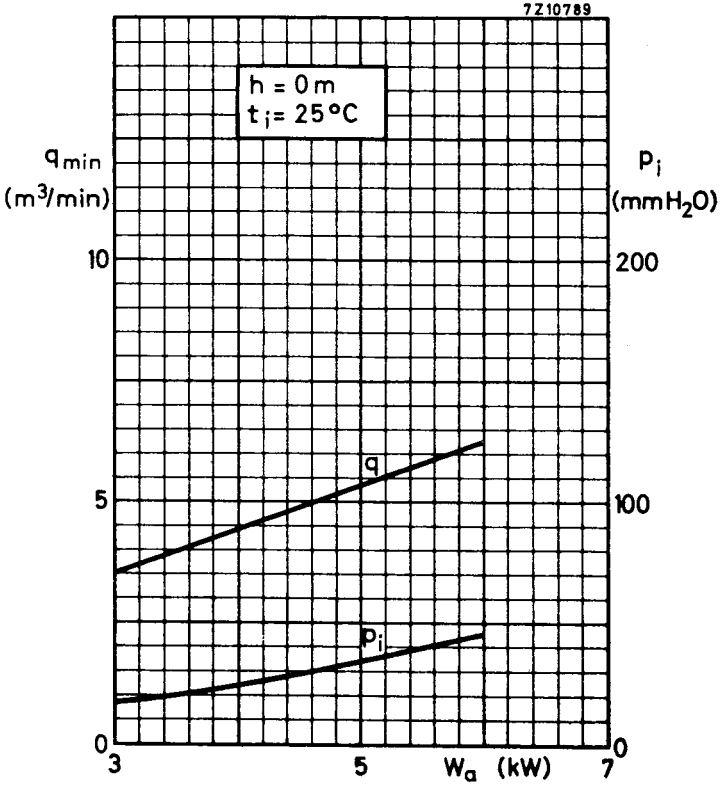
OPERATING CONDITIONS

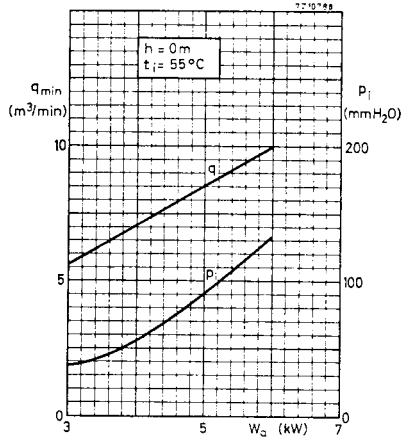
Frequency	f	260	MHz
Anode voltage	V_a	7	kV
Grid no. 2 voltage	V_{g_2}	600	V
Grid no. 1 voltage	V_{g_1}	-120	V [1]
Anode current, no signal condition	I_a	200	mA
Anode current	I_a	2,3	A
Grid no. 2 current	I_{g_2}	80	mA
Grid no. 1 current	I_{g_1}	150	mA
Anode input power	W_{ia}	16,1	kW
Anode dissipation	W_a	5	kW
Output power in load	W_ℓ	11	kW
Efficiency, total	η	68	%
Driving power	W_{dr}	325	W
Power gain	$\frac{W_\ell}{W_{dr}}$	32	

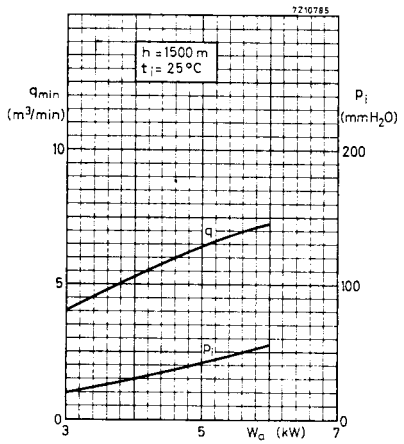
[1]) See page 8

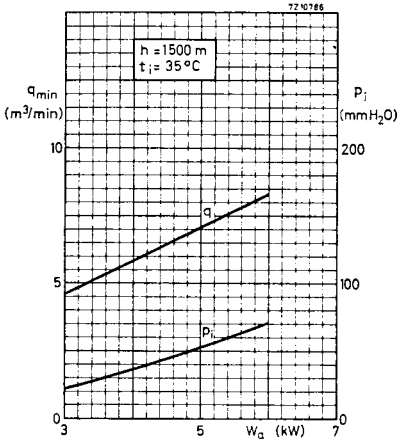
NOTES

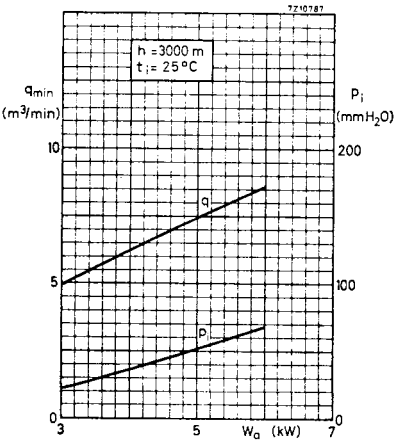
1) To be adjusted for the stated no signal anode current.
2) With double tuned circuit.
3) Black signal including line sync pulses
4) A picture/sync ratio of 75/25 for the outgoing signal requires a ratio of max. 70/30 for the incoming signal in which case the sync compression sync in/out = 30/25.
5) 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 = 2,5 kW
7) Three-tone test method (vision carrier −8 dB, sound carrier −7 dB, sideband signal −17 dB with respect to peak sync = 0 dB).

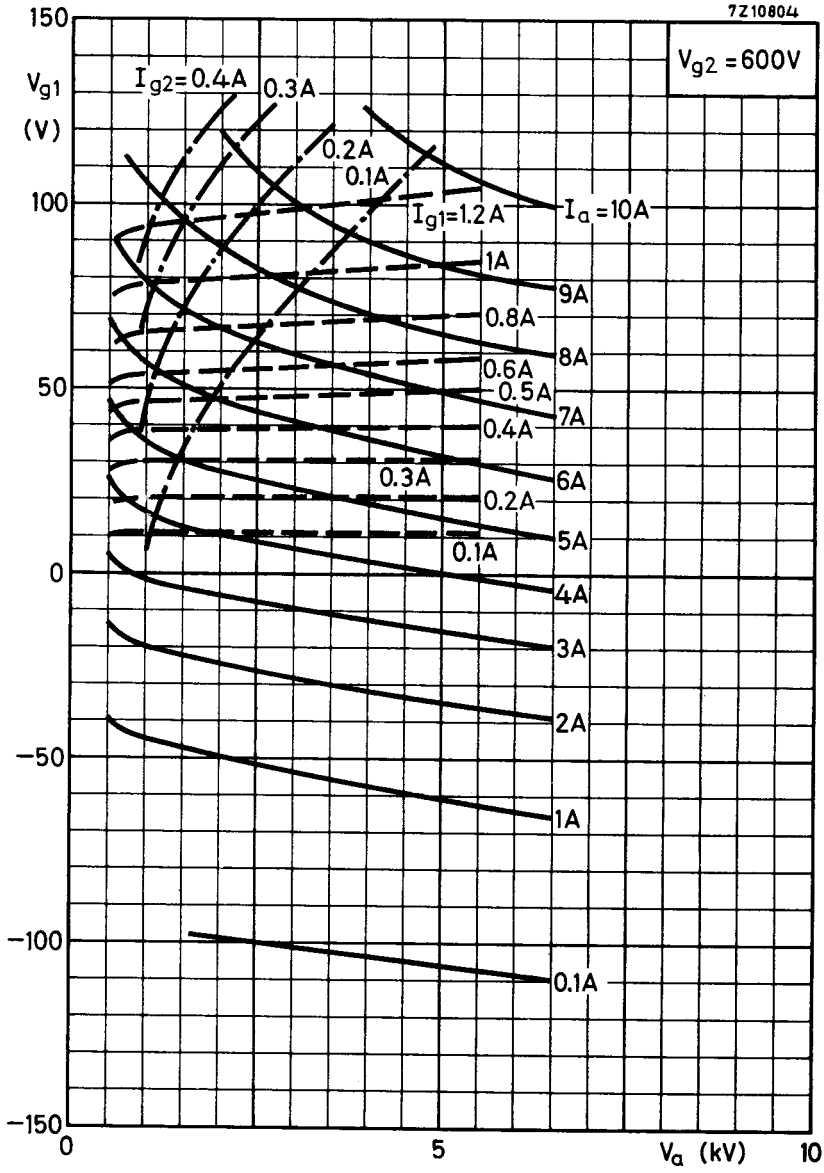


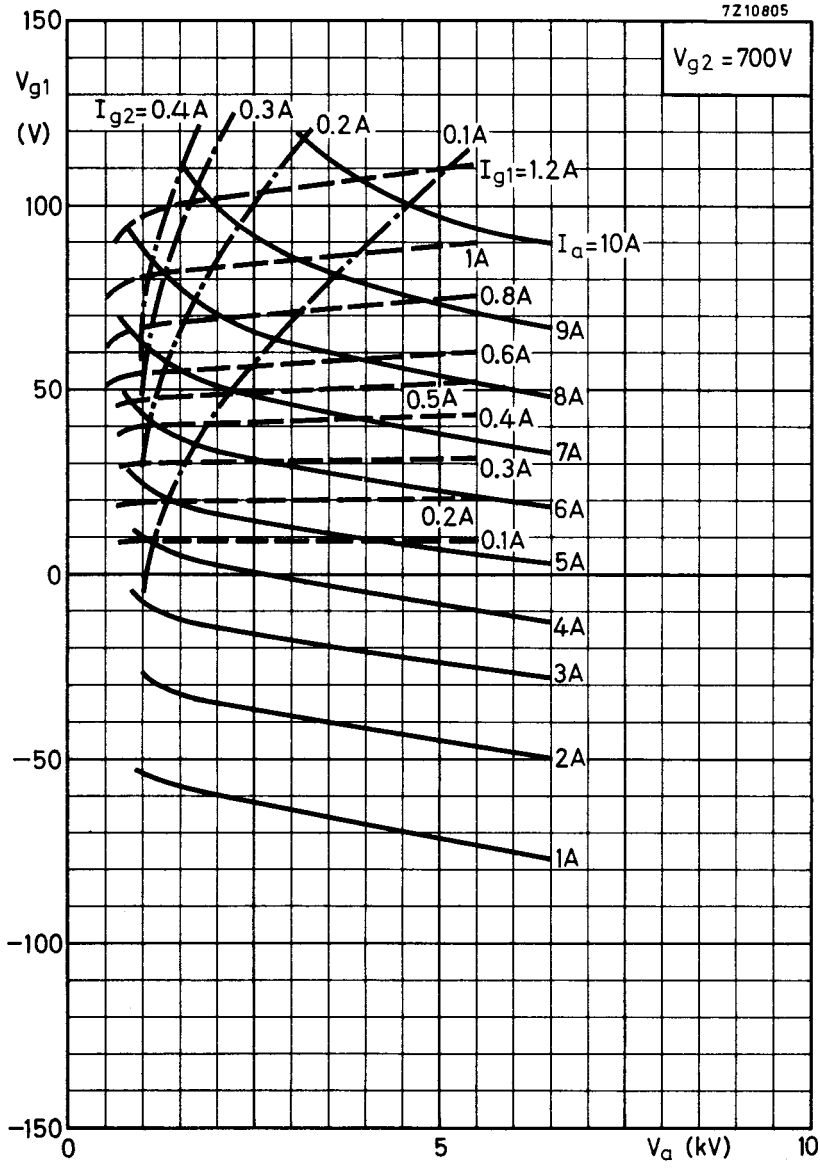

7Z10788
h = 0 m
t_i = 55 °C
q_{min} (m^3/min)
P_i (mmH_2O)
q
P_i
W_a (kW)

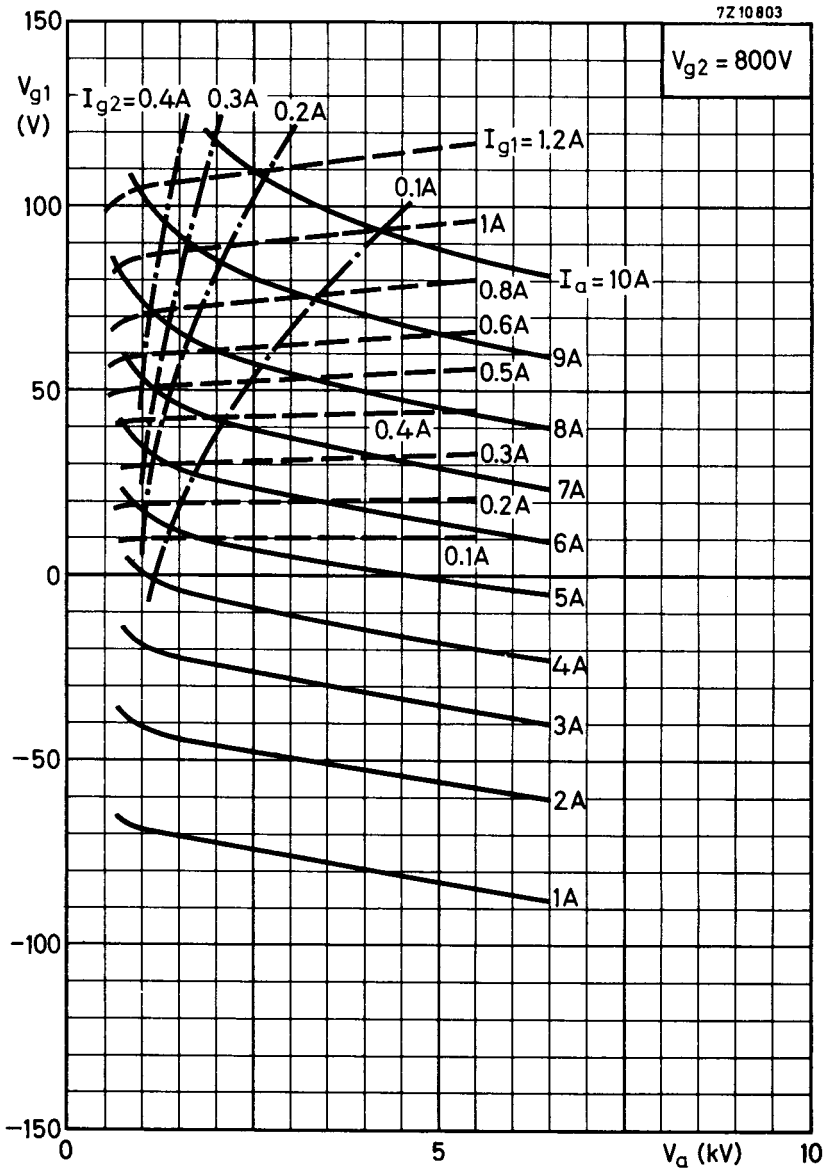

7Z10785
h = 1500 m
t_i = 25 °C
q_{min} (m^3/min)
P_i (mmH_2O)
q
P_i
W_a (kW)


7Z10786
h = 1500 m
t_i = 35 °C
q_{min} (m^3/min)
P_i (mmH_2O)
q
P_i
W_a (kW)


7Z10787
h = 3000 m
t_i = 25 °C
q_{min} (m^3/min)
P_i (mmH_2O)
q
P_i
W_a (kW)


7Z10804
V_{g2} = 600V
V_{g1} (V)
150
100
50
0
−50
−100
−150
0
5
10
V_a (kV)
I_{g2}=0.4A
0.3A
0.2A
0.1A
I_{g1}=1.2A
I_a=10A
1A
9A
0.8A
8A
0.6A
0.5A
7A
0.4A
6A
0.3A
0.2A
5A
0.1A
4A
3A
2A
1A
0.1A


7Z10805
V_{g2} = 700V
V_{g1} (V)
150
100
50
0
−50
−100
−150
0
5
10
V_a (kV)
I_{g2}=0.4A
0.3A
0.2A
0.1A
I_{g1}=1.2A
I_a=10A
1A
0.8A
9A
0.6A
0.5A
8A
0.4A
7A
0.3A
6A
0.2A
0.1A
5A
4A
3A
2A
1A


7Z10803
V_{g2} = 800V
V_{g1} (V)
150
100
50
0
−50
−100
−150
0
5
10
V_a (kV)
I_{g2}=0.4A
0.3A
0.2A
0.1A
I_{g1}= 1.2A
1A
0.8A
0.6A
0.5A
0.4A
0.3A
0.2A
0.1A
I_a = 10A
9A
8A
7A
6A
5A
4A
3A
2A
1A