

R.F. POWER TETRODE

QUICK REFERENCE DATA							
For communication							
λ	Freq.	C telegr.		C_{ag2} mod		C_{g1} mod	
(m)	(MHz)	V_a (V)	W_o (W)	V_a (V)	W_o (W)	V_a (V)	W_o (W)
5	60	5000 4000	1760 1410	4000	1200	4500 4000	400 330
λ	Freq.	B single side band			B_{mod} ¹⁾		
(m)	(MHz)	V_a (V)	W_o (W)		V_a (V)	W_o (W)	
10	30	5000	900		5000 4000	2220 2250	
For industrial application R.F. class C							
λ	Freq.	Δ ²⁾		Δ ³⁾			
(m)	(MHz)	V_{tr} (V _{RMS})	W_o (W)	V_{tr} (V _{RMS}) ⁴⁾	W_o (W)		
5	60	4800	750	4250	1110		

HEATING direct; thoriated tungsten filament

Filament voltage

$V_f = 10 \text{ V}$

Filament current

$I_f = 9.9 \text{ A}$

TYPICAL CHARACTERISTICS at $I_a = 120 \text{ mA}$

Amplification factor of grid No.2

with respect to grid No.1

$\mu_{g2g1} = 9.5$

Mutual conductance

$S = 7 \text{ mA/V}$

¹⁾ Two tubes

²⁾ Δ = selfrectification

³⁾ Δ = two phase half wave rectification without filter

⁴⁾ Each phase

CAPACITANCES

Grid No.1 to all other elements except anode	C_{g1}	=	24	pF
Anode to all other elements except grid No.1	C_a	=	8.3	pF
Anode to grid No.1	C_{ag1}	=	0.25	pF

COOLING: radiation/low-velocity air flow

In order to keep the temperatures below the maximum permitted values it may be necessary to direct an air flow to the seals

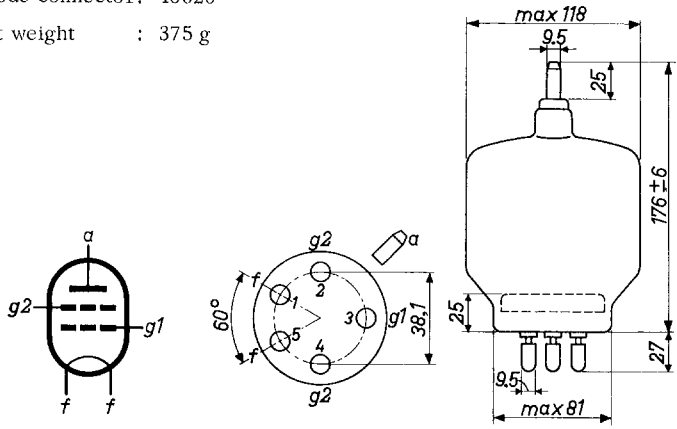
TEMPERATURE LIMITS (Absolute limits)

Bulb temperature	=	max.	250	°C
Temperature of anode seal	=	max.	220	°C
Temperature of pin seals	=	max.	180	°C

MECHANICAL DATA

Base	:	Super giant
Socket	:	2422 512 00001
Anode connector:		40626
Net weight	:	375 g

Dimensions in mm



Mounting position: vertical with base up or down

R.F. CLASS C TELEGRAPHY**LIMITING VALUES** (Absolute limits)

Frequency	f	up to	75	up to	110 ¹⁾	MHz
Anode voltage	V_a	=	max. 5	max.	4.5	kV
Anode input power	W_{ia}	=	max. 2250	max.	1800	W
Anode dissipation	W_a	=	max. 500			W
Anode current	I_a	=	max. 450			mA
Grid No.2 voltage	V_{g2}	=	max. 700			V
Grid No.2 dissipation	W_{g2}	=	max. 65			W
Negative grid No.1 voltage	$-V_{g1}$	=	max. 500			V
Grid No.1 dissipation	W_{g1}	=	max. 25			W

OPERATING CONDITIONS

Frequency	f	≤	60	60	60	60	MHz
Anode voltage	V_a	=	5	5	4	4	kV
Grid No.2 voltage	V_{g2}	=	600	700	600	700	V
Grid No.1 voltage	V_{g1}	=	-200	-200	-200	-200	V
Anode current	I_a	=	440	440	450	450	mA
Grid No.2 current	I_{g2}	=	80	75	90	85	mA
Grid No.1 current	I_{g1}	=	35	25	39	27	mA
Peak grid No.1 voltage	V_{g1p}	=	350	340	350	340	V
Anode input power	W_{ia}	=	2200	2200	1800	1800	W
Grid No.1 input power	W_{ig1}	=	12	8	14	8.5	W
Grid No.2 dissipation	W_{g2}	=	48	52.5	54	59.5	W
Anode dissipation	W_a	=	440	440	390	390	W
Output power	W_o	=	1760	1760	1410	1410	W
Efficiency	η	=	80	80	78	78	%

¹⁾ See page E57.

R.F. CLASS C ANODE AND SCREEN GRID MODULATION

Screen grid modulated via a choke of 2 H

LIMITING VALUES (Absolute limits)

Frequency	f	up to	75	MHz
Anode voltage	V_a	= max.	4	kV
Anode input power	W_{ia}	= max.	1600	W
Anode dissipation	W_a	= max.	330	W
Anode current	I_a	= max.	400	mA
Grid No.2 voltage	V_{g2}	= max.	700	V
Grid No.2 dissipation	W_{g2}	= max.	50	W
Negative grid No.1 voltage	$-V_{g1}$	= max.	500	V
Grid No.1 dissipation	W_{g1}	= max.	25	W

OPERATING CONDITIONS

Frequency	f	≤	60	MHz
Anode voltage	V_a	=	4	kV
Grid No.2 voltage	V_{g2}	=	600	V
Grid No.1 voltage	V_{g1}	=	-240	V
Peak grid No.2 voltage	V_{g2p}	=	340	V
Peak grid No.1 voltage	V_{g1p}	=	415	V
Anode current	I_a	=	380	mA
Grid No.2 current	I_{g2}	=	80	mA
Grid No.1 current	I_{g1}	=	20	mA
Anode input power	W_{ia}	=	1520	W
Grid No.1 input power	W_{ig1}	=	7.5	W
Grid No.2 dissipation	W_{g2}	=	48	W
Anode dissipation	W_a	=	320	W
Output power	W_o	=	1200	W
Efficiency	η	=	79	%
Modulation factor	m	=	100	%
Modulation power	W_{mod}	=	760	W

R.F. CLASS C CONTROL GRID MODULATION

LIMITING VALUES (Absolute limits)

Frequency	f	up to	75	MHz
Anode voltage	V_a	= max.	5000	V
Anode input power	W_{ia}	= max.	1000	W
Anode dissipation	W_a	= max.	500	W
Anode current	I_a	= max.	225	mA
Grid No.2 voltage	V_{g2}	= max.	700	V
Grid No.2 dissipation	W_{g2}	= max.	50	W
Negative grid No.1 voltage	$-V_{g1}$	= max.	500	V

OPERATING CONDITIONS

Frequency	f	<	60	60	MHz
Anode voltage	V_a	=	4500	4000	V
Grid No.2 voltage	V_{g2}	=	600	600	V
Grid No.1 voltage ¹⁾	V_{g1}	=	-180	-180	V
Grid No.1 circuit resistance	R_{g1}	=	1400	1400	Ω
Peak grid No.1 voltage	V_{g1p}	=	220	210	V
Anode current	I_a	=	200	200	mA
Grid No.2 current	I_{g2}	=	5	5	mA
Grid No.1 current	I_{g1}	=	6.5	6.5	mA
Grid No.1 input power	W_{ig1}	=	1.3	1.2	W
Anode input power	W_{ia}	=	900	800	W
Anode dissipation	W_a	=	500	470	W
Grid No.2 dissipation	W_{g2}	=	3	3	W
Output power	W_o	=	400	330	W
Efficiency	η	=	44.5	41	%
Modulation factor	m	=	100	100	%
Peak grid No.1 modulation voltage	$V_{g1 modp}$	=	100	100	V
Grid No.1 current ²⁾	I_{g1}	=	26	27	mA
Grid No.1 input power ²⁾	W_{ig1}	=	5	5	W

¹⁾ With -170 V from fixed bias supply included²⁾ At crest of modulation

R.F. CLASS B SINGLE SIDE BAND AMPLIFIER

LIMITING VALUES (Absolute limits)

Frequency	f	up to	30	MHz
Anode voltage	V_a	= max.	5000	V
Anode input power	W_{ia}	= max.	2250	W
Anode dissipation	W_a	= max.	500	W
Anode current	I_a	= max.	450	mA
Grid No.2 voltage	V_{g2}	= max.	700	V
Grid No.2 dissipation	W_{g2}	= max.	65	W
Grid No.1 circuit resistance	R_{g1}	= max.	50	k Ω

OPERATING CONDITIONS

Frequency	f	$\leq$	30	MHz
Anode voltage	V_a	=	5000	V
Grid No.2 voltage	V_{g2}	=	700	V
Grid No.1 voltage	V_{g1}	=	-90	V
			zero signal	single tone signal
Peak grid No.1 voltage	V_{g1p}	=	0	130 V
Anode current	I_a	=	56	280 mA
Grid No.2 current	I_{g2}	=	0	25 mA
Grid No.1 current	I_{g1}	=	0	1 mA
Grid No.1 input power	W_{ig1}	=	0	1 W
Anode input power	W_{ia}	=	280	1400 W
Anode dissipation	W_a	=	280	500 W
Grid No.2 dissipation	W_{g2}	=	0	18 W
Output power	W_o	=	0	900 W
Efficiency	η	=	-	64.5 %

R.F. CLASS C AMPLIFIER FOR INDUSTRIAL USE with self rectification

LIMITING VALUES (Absolute limits)

Frequency	f	up to	75	MHz
Anode transformer voltage ¹⁾	$V_{tr a}$	= max.	5600	V(RMS)
Anode input power	W_{ia}	= max.	1460	W
Anode dissipation	W_a	= max.	500	W
Anode current	I_a	= max.	240	mA
Grid No.2 transformer voltage ¹⁾	$V_{tr g2}$	= max.	780	V(RMS)
Grid No.2 dissipation	W_{g2}	= max.	65	W
Negative grid No.1 voltage	$-V_{g1}$	= max.	500	V
Grid No.1 current	I_{g1}	= max.	25	mA
Grid No.1 circuit resistance	R_{g1}	= max.	50	k Ω

OPERATING CONDITIONS ²⁾

Frequency	f	$\leq$	60	MHz
Anode transformer voltage ¹⁾	$V_{tr a}$	=	4800	V(RMS)
Grid No.2 transformer voltage ¹⁾	$V_{tr g2}$	=	670	V(RMS)
Grid No.1 resistor	R_{g1}	=	16	k Ω
Peak grid No.1 voltage	$V_{g1 p}$	=	350	V
Anode current	I_a	=	200	mA
Grid No.2 current	I_{g2}	=	32	mA
Grid No.1 current	I_{g1}	=	11	mA
Grid No.1 input power	W_{ig1}	=	3.5	W
Anode input power	W_{ia}	=	1060	W
Anode dissipation	W_a	=	310	W
Grid No.2 dissipation	W_{g2}	=	24	W
Output power	W_o	=	750	W
Efficiency	η	=	71	%

1) $V_{tr a}$ and $V_{tr g2}$ are the anode transformer secondary voltage per phase and the screen grid transformer secondary voltage per phase respectively.

2) Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the tube must, however, not be exceeded.

R.F. CLASS C AMPLIFIER FOR INDUSTRIAL USE

with anode voltage from two-phase half-wave rectifier without filter

LIMITING VALUES (Absolute limits)

Frequency	f	up to	75	MHz
Anode transformer voltage ¹⁾	$V_{tr a}$	=	max. 5000	V(RMS)
Anode input power	W_{ia}	=	max. 2250	W
Anode dissipation	W_a	=	max. 500	W
Anode current	I_a	=	max. 400	mA
Grid No.2 transformer voltage ¹⁾	$V_{tr g_2}$	=	max. 700	V(RMS)
Grid No.2 dissipation	W_{g_2}	=	max. 65	W
Negative grid No.1 voltage	$-V_{g_1}$	=	max. 500	V
Grid No.1 dissipation	W_{g_1}	=	max. 25	W
Grid No.1 current	I_{g_1}	=	max. 45	mA
Grid No.1 circuit resistance	R_{g_1}	=	max. 50	kΩ

OPERATING CONDITIONS²⁾

Frequency	f	Λ	60	MHz
Anode transformer voltage ¹⁾	$V_{tr a}$	=	4250	V(RMS)
Anode voltage D.C. value	V_a	=	3825	V
Grid No.2 transformer voltage ¹⁾	$V_{tr g_2}$	=	600	V(RMS)
Grid No.2 voltage D.C. value	V_{g_2}	=	540	V
Grid No.1 resistor	R_{g_1}	=	14	kΩ
Peak grid No.1 voltage	$V_{g_1 p}$	=	300	V
Anode current	I_a	=	325	mA
Grid No.2 current	I_{g_2}	=	20	mA
Grid No.1 current	I_{g_1}	=	15	mA
Grid No.1 input power	W_{ig_1}	=	4	W
Anode input power	W_{ia}	=	1535	W
Anode dissipation	W_a	=	425	W
Grid No.2 dissipation	W_{g_2}	=	13.3	W
Output power	W_o	=	1110	W
Efficiency	η	=	72	%

¹⁾ $V_{tr a}$ and $V_{tr g_2}$ are the anode transformer secondary voltage per phase and the screen grid transformer secondary voltage per phase respectively.

²⁾ Under these conditions normal deviations of voltages and load are permissible. The absolute limiting values of the tube must, however, not be exceeded.

A.F. CLASS B AMPLIFIER AND MODULATOR**LIMITING VALUES** (Absolute limits)

Anode voltage	V_a	=	max.	5000	V
Anode input power	W_{ia}	=	max.	2250	W
Anode dissipation	W_a	=	max.	500	W
Anode current	I_a	=	max.	450	mA
Grid No.2 voltage	V_{g2}	=	max.	700	V
Grid No.2 dissipation	W_{g2}	=	max.	65	W
Negative grid No.1 voltage	$-V_{g1}$	=	max.	500	V
Grid No.1 current	I_{g1}	=	max.	45	mA
Grid No.1 circuit resistance	R_{g1}	=	max.	50	k Ω

OPERATING CONDITIONS, two tubes

V_a	=	5000	4000	4000	V
V_{g2}	=	600	600	600	V
V_{g1}	=	-62.5	-62.5	-60	V
R_{aa}	=	26	20	16	k Ω
V_{g1g1p}	=	0 260	0 254	0 305	V
I_a	=	2x50 2x290	2x45 2x285	2x55 2x366	mA
I_{g2}	=	0 2x43	0 2x40	0 2x60	mA
I_{g1}	=	0 2x13	0 2x13.5	0 2x18	mA
W_{ig1}	=	0 2x1.5	0 2x1.5	0 2x2.5	W
W_{ia}	=	2x250 2x1450	2x180 2x1140	2x220 2x1465	W
W_a	=	2x250 2x340	2x180 2x300	2x220 2x340	W
W_{g2}	=	0 2x26	0 2x24	0 2x36	W
W_o	=	0 2220	0 1680	0 2250	W
d_{tot}	=	- 5	- 4.7	- 5	%
η	=	- 76.5	- 74	- 76.5	%

