

R.F. POWER TETRODE



 Products approved to CECC 45 003-006

QUICK REFERENCE DATA

freq MHz	C telegr.		C _{ag2} mod.		B S.S.B		V _a V	B A.F.	
	V _a V	W _o W	V _a V	W _o W	V _a V	W _o W		W _o (W)**	
								I _{g1} > 0	I _{g1} = 0
30			3650	765*			4000	1750	1540
75	4000	1100	3000	630			3500	1650	1330
	3000	800	2500	510			3000	1375	1110
	2500	640	2000	380			2500	1110	850
100	4000	800							
	3500	650							
110					4000	650			
					3500	600			
					3000	500			

HEATING: direct; thoriated tungsten filament

Filament voltage

$$V_f = 5 \text{ V}$$

Filament current

$$I_f = 14,1 \text{ A}$$

CAPACITANCES

Grid 1 to all other elements except anode

$$C_{g1} = 12,7 \text{ pF}$$

Anode to all other elements except grid 1

$$C_a = 4,9 \text{ pF}$$

Anode to grid 1

$$C_{ag1} = 0,12 \text{ pF}$$

TYPICAL CHARACTERISTICS

Anode voltage

$$V_a = 2500 \text{ V}$$

Grid 2 voltage

$$V_{g2} = 500 \text{ V}$$

Anode current

$$I_a = 100 \text{ mA}$$

Mutual conductance

$$S = 4,0 \text{ mA/V}$$

Amplification factor of grid 2
with respect to grid 1

$$\mu_{g2g1} = 5,1$$

* Intermittent service, ICAS.

** Two tubes.

COOLING: radiation and forced air

At anode dissipations up to 250 W a low-velocity air flow directed on the anode seal and the base generally will provide sufficient cooling. At higher dissipations the glass chimney should be used for circulating forced air along the bulb. At 400 W anode dissipation at least 0,4 m³/min air should be passed through the chimney. For this purpose the static pressure below the chassis should be min. 50 Pa if cooling is arranged in the recommended way (see figure below).

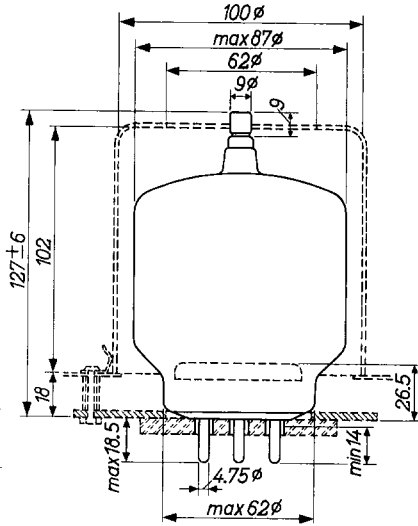
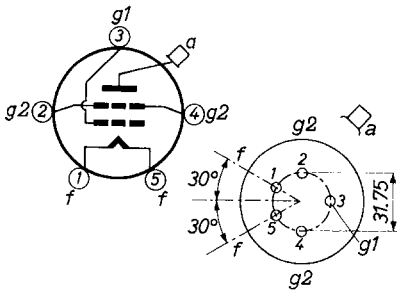
TEMPERATURE LIMITS

Absolute maximum rating system

Bulb temperature	max.	350 °C
Temperature of anode seal	max.	220 °C
Temperature of pin seals	max.	180 °C

MECHANICAL DATA

Base	giant 5 p
Socket	2422 512 01001
Anode connector	40712
Chimney	40666
Net mass	190 g



Mounting position

vertical with base up or down

R.F. CLASS C TELEGRAPHY

LIMITING VALUES (Absolute limits)

Frequency	f	up to	110	MHz
Anode voltage	V_a	= max.	4000	V
Anode input power	W_{ia}	= max.	1400	W
Anode dissipation	W_a	= max.	400	W
Anode current	I_a	= max.	350	mA
Grid No.2 voltage	V_{g2}	= max.	600	V
Grid No.2 dissipation	W_{g2}	= max.	35	W
Negative grid No.1 voltage	$-V_{g1}$	= max.	500	V
Grid No.1 current	I_{g1}	= max.	25	mA

OPERATING CONDITIONS

Frequency	f	=	75	75	75	100	100	MHz
Anode voltage	V_a	=	4000	3000	2500	4000	3500	V
Grid No.2 voltage	V_{g2}	=	500	500	500	500	500	V
Grid No.1 voltage	V_{g1}	=	-220	-220	-200	-170	-170	V
Anode current	I_a	=	350	350	350	270	250	mA
Grid No.2 current	I_{g2}	=	25	30	35	16	17	mA
Grid No.1 current	I_{g1}	=	6	6	6.5	9.5	9	mA
Peak grid No.1 A.C. voltage	V_{g1p}	=	305	305	290	240	235	V
Grid No.1 input power	W_{ig1}	=	1.8	1.8	1.8	2	1.8	W
Grid No.2 dissipation	W_{g2}	=	12.5	15	17.5	8	8.5	W
Anode input power	W_{ia}	=	1400	1050	875	1080	875	W
Anode dissipation	W_a	=	300	250	235	280	225	W
Output power	W_o	=	1100	800	640	800	650	W
Efficiency	η	=	78.5	76	73	74	74	%



R.F. CLASS C ANODE AND SCREEN GRID MODULATION

CCS = continuous service

ICAS = intermittent service

LIMITING VALUES (Absolute limits; carrier conditions with $m = \text{max. } 100\%$)

Frequency	f	CCS		ICAS	
		up to	75	30	MHz
Anode voltage	V_a	= max.	3200	4000	V
Anode input power	W_{ia}	= max.	880	1100	W
Anode dissipation	W_a	= max.	270	270	W
Anode current	I_a	= max.	275	275	mA
Grid No.2 voltage	V_{g2}	= max.	600	600	V
Grid No.2 dissipation	W_{g2}	= max.	35	35	W
Negative grid No.1 voltage	$-V_{g1}$	= max.	500	500	V
Grid No.1 current	I_{g1}	= max.	25	25	mA

OPERATING CONDITIONS Grid No.2 modulated with transformer

Frequency	f	CCS			ICAS	
		75	75	75	30	MHz
Anode voltage	V_a	= 3000	2500	2000	3650	V
Grid No.2 voltage	V_{g2}	= 500	500	500	500	V
Grid No.1 voltage	V_{g1}	= -220	-220	-220	-225	V
Anode current	I_a	= 275	275	275	275	mA
Grid No.2 current	I_{g2}	= 36	38	40	30	mA
Grid No.1 current	I_{g1}	= 6	6	6	6	mA
Peak grid No.1 A.C. voltage	V_{g1p}	= 305	308	305	308	V
Grid No.1 input power	W_{ig1}	= 1.6	1.7	1.6	1.7	W
Grid No.2 dissipation	W_{g2}	= 18	19	20	15	W
Anode input power	W_{ia}	= 825	688	550	1000	W
Anode dissipation	W_a	= 195	178	170	235	W
Output power	W_o	= 630	510	380	765	W
Efficiency	η	= 76	74	69	76.5	%
Modulation depth	m	= 100	100	100	100	%
Peak grid No.2 A.C. voltage	V_{g2p}	= 400	400	400	400	V
Modulation power	W_{mod}	= 413	344	275	500	W

R.F. CLASS B SINGLE SIDE BAND AMPLIFIER

LIMITING VALUES (Absolute limits)

Frequency	f	up to	110	MHz
Anode voltage	V_a	= max.	4000	V
Anode input power	W_{ia}	= max.	1400	W
Anode dissipation	W_a	= max.	400	W
Anode current	I_a	= max.	350	mA
Grid No.2 voltage	V_{g2}	= max.	850	V
Grid No.2 dissipation	W_{g2}	= max.	35	W

OPERATING CONDITIONS

Frequency	f	=	60	MHz		
Anode voltage	V_a	=	4000	V		
Grid No.1 voltage	V_{g1}	=	-130	V		
Grid No.2 voltage	V_{g2}	=	705	V		
			zero signal	single tone signal	double tone signal	
Peak grid No.1 A.C. voltage	V_{g1p}	=	0	130	-	V
Anode current	I_a	=	65	250	175	mA
Grid No.2 current	I_{g2}	=	-	10	7	mA
Grid No.1 current	I_{g1}	=	0	0	0	mA
Grid No.2 dissipation	W_{g2}	=	-	7.05	4.95	W
Anode input power	W_{ia}	=	260	1000	700	W
Anode dissipation	W_a	=	260	350	375	W
Output power	W_o	=	0	650	325	W
Efficiency	η	=	-	65	46.5	%



R.F. CLASS B SINGLE SIDE BAND AMPLIFIER

OPERATING CONDITIONS (continued)

f	=	60			60			MHz
V _a	=	3500			3000			V
V _{g1}	=	-135			-140			V
V _{g2}	=	750			810			V
		zero	single	double	zero	single	double	
		signal	tone	tone	signal	tone	tone	
			signal	signal		signal	signal	
V _{g1p}	=	0	135	-	0	140	-	V
I _a	=	75	280	200	90	300	215	mA
I _{g2}	=	-	12	8.4	-	15	10.5	mA
I _{g1}	=	0	0	0	0	0	0	mA
W _{g2}	=	-	9	6.3	-	12.2	8.5	W
W _{ia}	=	263	980	700	270	900	645	W
W _a	=	263	380	400	270	400	395	W
W _o	=	0	600	300	0	500	250	W
η	=	-	61.2	43	-	55.5	38.8	%

A.F. CLASS B AMPLIFIER

LIMITING VALUES (Absolute limits)

Anode voltage	V _a	= max.	4000	V
Anode dissipation	W _a	= max.	400	W
Anode current	I _a	= max.	350	mA
Grid No.2 voltage	V _{g2}	= max.	800	V ¹⁾
Grid No.2 dissipation	W _{g2}	= max.	35	W
Grid No.1 current	I _{g1}	= max.	25	mA

1) V_{g2} = max. 1000 V if the pin seal temperature is kept below 120 °C

A.F. CLASS B AMPLIFIER (continued)

OPERATING CONDITIONS with grid current (two tubes)

Anode voltage	$V_a =$	4000	3500	3000	2500	V
Grid No.2 voltage	$V_{g2} =$	500	500	500	500	V
Grid No.1 voltage	$V_{g1} =$	-90	-85	-80	-75	V
Load resistance	$R_{aa} \sim$	15000	11300	10000	8000	Ω
Peak grid to grid						
A.C. voltage	$V_{g1g1p} =$	0	0	0	0	290 V
Anode current	$I_a =$	2x80	2x80	2x90	2x95	2x350 mA
Grid No.2 current	$I_{g2} =$	-	-	-	-	2x30 mA
Grid No.1 current	$I_{g1} =$	0	0	0	0	2x7 mA
Grid No.2 dissipation	$W_{g2} =$	-	-	-	-	2x15 W
Grid No.1 input power	$W_{ig1} =$	0	0	0	0	2x0.91 W
Anode input power	$W_{ia} =$	2x320	2x280	2x270	2x238	2x875 W
Anode dissipation	$W_a =$	2x320	2x280	2x270	2x238	2x320 W
Output power	$W_o =$	0	0	0	0	1110 W
Efficiency	$\eta =$	-	-	-	-	63.5 %



A.F. CLASS B AMPLIFIER (continued)

OPERATING CONDITIONS without grid current (two tubes)

Anode voltage	V_a	=	4000	3500	3000	2500	V
Grid No. 2 voltage	V_{g2}	=	750	750	750	750	V
Grid No. 1 voltage	V_{g1}	=	-150	-145	-137	-130	V
Load resistance	R_{aa}	=	14500	11500	8900	6800	Ω
Peak grid to grid A.C. voltage	V_{g1g1p}	=	0	0	0	0	260 V
Anode current	I_a	=	2x60	2x70	2x80	2x95	2x318 mA
Grid No. 2 current	I_{g2}	=	-	-	-	-	2x11.6 mA
Grid No. 2 dissipation	W_{g2}	=	-	-	-	-	2x8.7 W
Anode input power	W_{ia}	=	2x240	2x1170	2x240	2x955	2x795 W
Anode dissipation	W_a	=	2x240	2x245	2x240	2x238	2x370 W
Output power	W_o	=	0	0	0	0	850 W
Efficiency	η	=	-	66	-	58	53.5 %

