

RF POWER TRIODE

QUICK REFERENCE DATA									
λ (m)	Freq. (MHz)	C telegr.		C grounded grid		B teleph.		C _a mod.	
		V _a (V)	W _o (W)	V _a (V)	W _o (W)	V _a (V)	W _o (W)	V _a (V)	W _o (W)
2	150	2500	390			2500	65		
		2000	295			2000	64	2000	205
		1500	210			1500	59	1500	154
		1000	126					1000	96
3	100			2500	910				
				2000	700				
				1500	516				
				1000	332				
		C osc. industrial						B mod. two tubes	
		V _a \approx (V)	W _o (W)	V _a \approx (V)	W _o (W)			V _a (V)	W _o (W)
6	50	2000	290	2500	170			2500	700
								1000	274

HEATING: direct; filament thoriated tungsten

Filament voltage

$$V_f = 6.3 \text{ V}$$

Filament current

$$I_f = 5.8 \text{ A}$$

CAPACITANCES

Anode to all other elements except grid

$$C_a = 0.1 \text{ pF}$$

Grid to all other elements except anode

$$C_g = 4.9 \text{ pF}$$

Anode to grid

$$C_{ag} = 5.0 \text{ pF}$$

TYPICAL CHARACTERISTICS

Anode voltage

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

Anode current

$$I_a = 60 \text{ mA}$$

Amplification factor

$$\mu = 25$$

Mutual conductance

$$S = 2.8 \text{ mA/V}$$

TEMPERATURE LIMITS

Absolute maximum rating system

Temperature of anode seal = max. 220 °C

Bottom temperature = max. 180 °C

It is recommended to direct a low-velocity air flow on bottom and top seal if the tube is used at or near the limiting values at frequencies above 50 MHz.

MECHANICAL DATA

Base	giant 5 p
Socket	2422 512 01001
Anode connector	40624
Net mass	125 g

Dimensions in mm

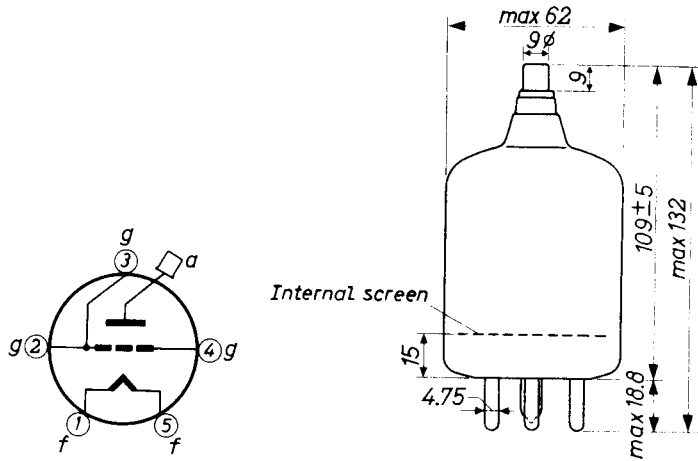


Fig. 1 Mechanical outline.

Mounting position vertical with base up or down

COOLING

Radiation/low-velocity air flow.

RF CLASS C TELEGRAPHY

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	3000	V
Anode current	I_a	= max.	255	mA
Anode dissipation	W_a	= max.	150	W
Anode input power	W_{ia}	= max.	512	W
Negative grid voltage	$-V_g$	= max.	300	V
Grid current	I_g	= max.	45	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	$M\Omega$
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	$M\Omega$

OPERATING CONDITIONS

Frequency	f	=	150	150	150	150	MHz
Anode voltage	V_a	=	2500	2000	1500	1000	V
Grid voltage	V_g	=	-200	-150	-110	-80	V
Anode current	I_a	=	205	205	205	205	mA
Grid current	I_g	=	40	40	40	40	mA
Peak grid AC voltage	V_{gp}	=	390	340	300	260	V
Grid input power	W_{ig}	=	14	13	11	10	W
Anode input power	W_{ia}	=	512	410	308	205	W
Anode dissipation	W_a	=	122	115	98	79	W
Output power	W_o	=	390	295	210	126	W
Efficiency	η	=	76	72	68	61.5	%

RF CLASS B TELEPHONY

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	3000	V
Anode current	I_a	= max.	170	mA
Anode dissipation	W_a	= max.	150	W
Anode input power	W_{ia}	= max.	200	W
Grid current	I_g	= max.	55	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	$M\Omega$
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	$M\Omega$

OPERATING CONDITIONS

Frequency	f	=	150	150	150	MHz
Anode voltage	V_a	=	2500	2000	1500	V
Grid voltage	V_g	=	-87	-67	-45	V
Anode current	I_a	=	77	97	120	mA
Peak grid AC voltage	V_{gp}	=	100	100	100	V
Anode input power	W_{ia}	=	193	194	180	W
Anode dissipation	W_a	=	128	130	121	W
Output power	W_o	=	65	64	59	W
Efficiency	η	=	34	33	33	%
Modulation factor	m	=	100	100	100	%
Grid current	I_g	=	20	28	52	mA
Grid input power	W_{ig}	=	3.6	5.1	9.4	W

RF CLASS C ANODE MODULATION

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	2400	V
Anode current	I_a	= max.	170	mA
Anode dissipation	W_a	= max.	100	W
Anode input power	W_{ia}	= max.	340	W
Negative grid voltage	$-V_g$	= max.	300	V
Grid current	I_g	= max.	45	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	$M\Omega$
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	$M\Omega$

OPERATING CONDITIONS

Frequency	f	=	150	150	150	MHz
Anode voltage	V_a	=	2000	1500	1000	V
Grid voltage	V_g	=	-225	-180	-130	V
Anode current	I_a	=	128	128	128	mA
Grid current	I_g	=	40	40	40	mA
Peak grid AC voltage	V_{gp}	=	415	370	320	V
Grid input power	W_{ig}	=	15	14	12	W
Anode input power	W_{ia}	=	256	192	128	W
Anode dissipation	W_a	=	51	38	32	W
Output power	W_o	=	205	154	96	W
Efficiency	η	=	80	80	75	%
Modulation factor	m	=	100	100	100	%
Modulation power	W_{mod}	=	128	96	64	W

RF CLASS C TELEGRAPHY, grounded grid

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	3000	V
Anode current	I_a	= max.	205	mA
Anode dissipation	W_a	= max.	150	W
Anode input power	W_{ia}	= max.	512	W
Negative grid voltage	$-V_g$	= max.	300	V
Grid current	I_g	= max.	45	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	M Ω
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	M Ω

OPERATING CONDITIONS, two tubes

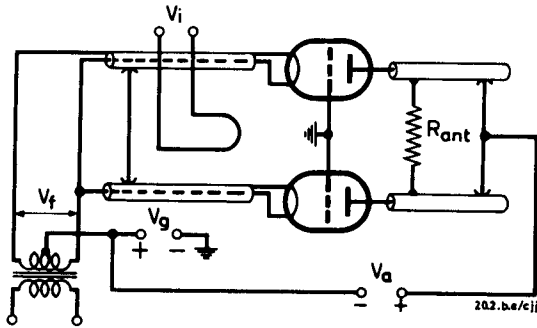


Fig. 2 Grounded grid configuration.

Frequency	f	=	100	100	100	100	MHz
Anode voltage	V_a	=	2500	2000	1500	1000	V
Grid voltage	V_g	=	-200	-150	-110	-80	V
Anode current	I_a	=	410	410	410	410	mA
Grid current	I_g	=	80	80	80	80	mA
Peak grid A.C. voltage	V_{gp}	=	390	340	300	260	V
Grid input power	W_{ig}	=	158	136	118	100	W
Anode input power	W_{ia}	=	1025	820	615	410	W
Anode dissipation	W_a	=	245	230	195	158	W
Output power	W_o	=	780+130	590+110	420+96	252+80	W 1)
Efficiency	η	=	76	72	68	61.5	% 2)

1) Power transferred from driving stage included

2) Pure tube efficiency

RF CLASS C OSCILLATOR for high-frequency heating and diathermy generators, with anode voltage from single-phase full-wave rectifier without filter

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	2700	V ¹⁾
Anode current	I_a	= max.	180	mA
Anode dissipation	W_a	= max.	150	W
Anode input power	W_{ia}	= max.	512	W
Negative grid voltage	$-V_g$	= max.	300	V
Grid current	I_g	= max.	40	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	MΩ
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	MΩ

OPERATING CONDITIONS

Frequency	f	=	50	MHz
Anode voltage	V_a	=	2000	V ¹⁾
Anode current	I_a	=	170	mA
Grid current	I_g	=	34	mA
Grid resistor	R_g	=	3750	Ω
Anode input power	W_{ia}	=	420	W
Anode dissipation	W_a	=	120	W
Grid input power	W_{ig}	=	10	W
Output power	W_o	=	290	W
Efficiency	η	=	69	%

¹⁾ Mean value

RF CLASS C OSCILLATOR for industrial use with self-rectification. Phase shift of 180° between V_a and V_g

LIMITING VALUES (Absolute limits)

Frequency	f	up to	150	MHz
Anode voltage	V_a	= max.	2825	V_{RMS}
Anode current	I_a	= max.	110	mA
Anode dissipation	W_a	= max.	150	W
Anode input power	W_{ia}	= max.	340	W
Negative grid voltage	$-V_g$	= max.	300	V
Grid current	I_g	= max.	35	mA
Grid circuit resistance with fixed grid bias	R_g	= max.	0.1	$M\Omega$
Grid circuit resistance with automatic grid bias	R_g	= max.	0.2	$M\Omega$

OPERATING CONDITIONS

Frequency	f	=	50	MHz
Anode voltage	V_a	=	2500	V_{RMS}
Anode current	I_a	=	90	mA
Grid current	I_g	=	20	mA
Grid resistor	R_g	=	1700	Ω
Grid voltage	V_g	=	85	V_{RMS}
Anode input power	W_{ia}	=	255	W
Anode dissipation	W_a	=	85	W
Output power	W_o	=	170	W
Efficiency	η	=	67	%

AF CLASS B AMPLIFIER AND MODULATOR

LIMITING VALUES (Absolute limits)

Anode voltage	V_a	=	max.	3000	V
Anode current	I_a	=	max.	210	mA
Anode dissipation	W_a	=	max.	150	W
Anode input power	W_{ia}	=	max.	512	W
Grid current	I_g	=	max.	45	mA

OPERATING CONDITIONS, two tubes

Anode voltage	V_a	=	2500	1000	V		
Grid voltage	V_g	=	-86	-23	V		
Load resistance	$R_{aa\sim}$	=	18.2	5.0	k Ω		
Peak grid to grid voltage	V_{ggp}	=	0	412	0	295	V
Anode current	I_a	=	2x30	2x178	2x30	2x210	mA
Grid current	I_g	=	0	2x42	0	2x40	mA
Grid input power	W_{ig}	=	0	2x7.8	0	2x5.4	W
Anode input power	W_{ia}	=	2x75	2x445	2x30	2x210	W
Anode dissipation	W_a	=	2x75	2x95	2x30	2x73	W
Output power	W_o	=	0	700	0	274	W
Total harmonic distortion	d_{tot}	=	-	5.0	-	2.2	%
Efficiency	η	=	-	78.5	-	65	%

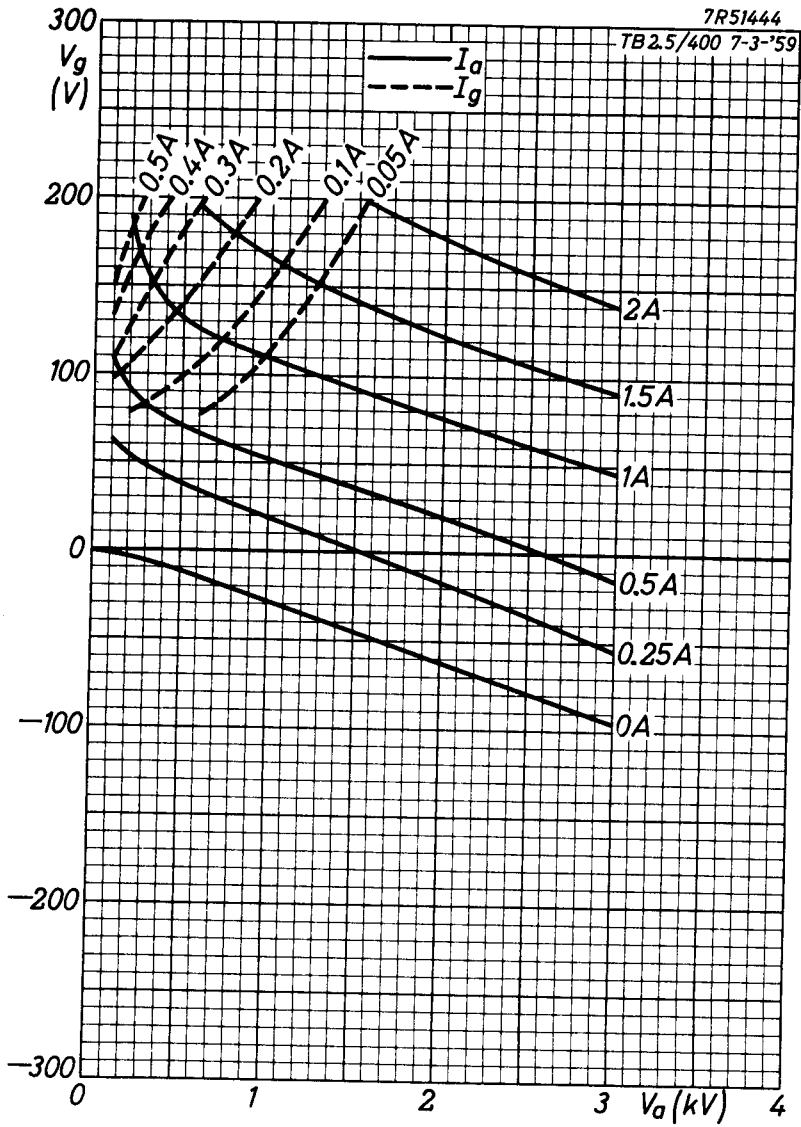


Fig. 3 Constant current characteristics.

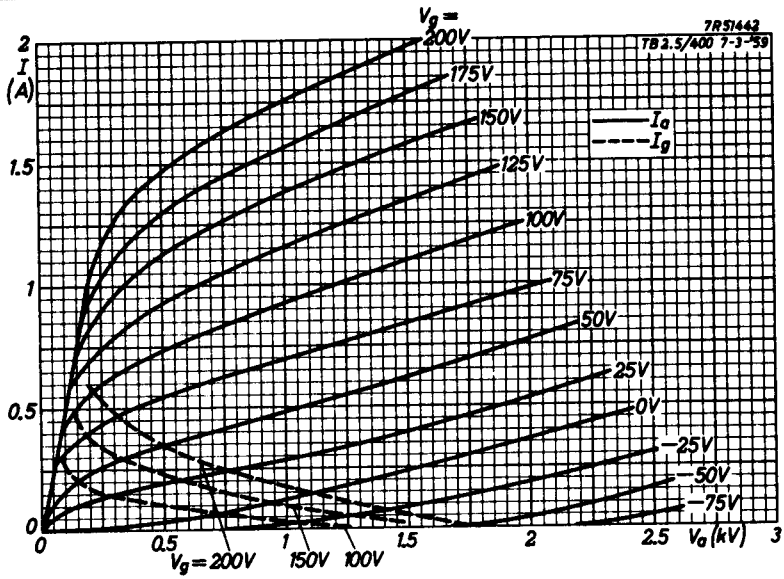


Fig. 4 I_g/V_a characteristics.

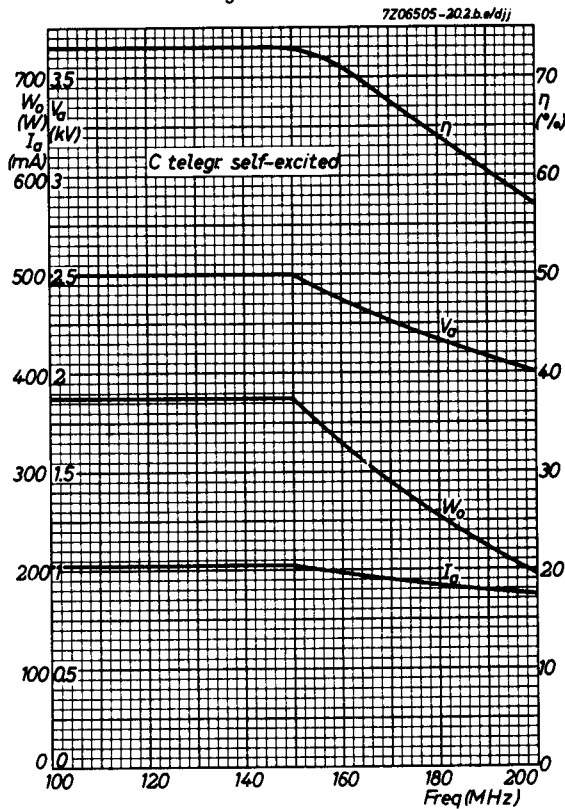


Fig. 5 Operating characteristics at higher frequencies.

PHILIPS

Data handbook



Electronic
components
and materials

TB2.5/400

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