RF POWER TRIODE

QUICK REFERENCE DATA									
λ (m)	Freq. (MHz)	C telegr.		C grounded grid		C_a mod.		B mod. [2])	
		V_a (V)	W_o (W)	V_a (V)	W_o[1]) (W)	V_a (V)	W_o (W)	V_a (V)	W_o (W)
3	100	4000	1690	4000	1950	3000	1050	4000	2290
		3500	1430	3500	1650			3500	2440
		3000	1175	3000	1375			3000	2310
		2500	950	2500	1120			2500	2000

HEATING: direct; filament thoriated tungsten

Filament voltage $\qquad$ V_f = 10 V

Filament current $\qquad$ I_f = 9.9 A

CAPACITANCES

Anode to all other elements except grid $\qquad$ C_a = 0.17 pF

Grid to all other elements except anode $\qquad$ C_g = 8.0 pF

Anode to grid $\qquad$ C_{ag} = 7.0 pF

TYPICAL CHARACTERISTICS

Amplification factor $\qquad$ μ = 28

Mutual conductance $\qquad$ $S (I_a = 125 \text{ mA})$ = 4.5 mA/V

TEMPERATURE LIMITS (Absolute limits)

Temperature of anode seal $\qquad$ = max. 220 ^oC

Temperature of bottom pin seals $\qquad$ = max. 180 ^oC

Bulb temperature $\qquad$ = max. 250 ^oC

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[1]) Power transferred from driving stage included
[2]) Two tubes

COOLING

In general cooling of the tube is not necessary at normal ambient temperature at frequencies below 50 MHz.

When the tube is used at or near the limiting values at frequencies above 50 Mc/s, it will be necessary to direct a low-velocity air flow on the anode seal and the bottom of the envelope.

MECHANICAL DATA

Dimensions in mm

Socket : 2422 512 00001

Anode connector: 40626

Net mass : 420 g
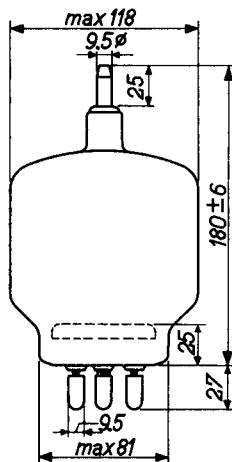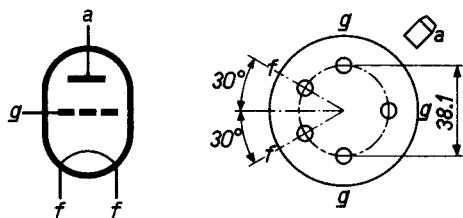
Fig. 1 Mechanical outline.

Mounting position: vertical with base up or down

RF CLASS C TELEGRAPHY

LIMITING VALUES (Absolute limits)

Frequency	f		up to	100	MHz
Anode voltage	V_a	=	max.	4000	V
Anode dissipation	W_a	=	max.	450	W
Grid dissipation	W_g	=	max.	50	W
Grid current	I_g	=	max.	115	mA
Cathode current	I_k	=	max.	650	mA

OPERATING CONDITIONS (controlled)

Wavelength	λ	=	3	3	3	3	m
Anode voltage	V_a	=	4000	3500	3000	2500	V
Grid voltage	V_g	=	−350	−300	−250	−200	V
Anode current	I_a	=	535	535	535	535	mA
Grid current	I_g	=	115	115	115	115	mA
Peak grid AC voltage	V_{gp}	=	580	520	460	405	V
Grid input power	W_{ig}	=	60	54	48	42	W
Anode input power	W_{ia}	=	2140	1880	1600	1340	W
Anode dissipation	W_a	=	450	450	425	390	W
Output power	W_o	=	1690	1430	1175	950	W
Efficiency	η	=	79	76	73.5	71	%

OPERATING CONDITIONS (self excited)

Wavelength	λ	=	3	3	3	3	m
Anode voltage	V_a	=	4000	3500	3000	2500	V
Grid resistor	R_g	=	3000	2600	2200	1800	Ω
Anode current	I_a	=	535	535	535	535	mA
Grid current	I_g	=	115	115	115	115	mA
Peak grid AC voltage	V_{gp}	=	580	520	460	405	V
Grid input power	W_{ig}	=	60	54	48	42	W
Anode input power	W_{ia}	=	2140	1880	1600	1340	W
Anode dissipation	W_a	=	450	450	425	390	W
Output power	W_o	=	1630	1376	1127	908	W
Efficiency	η	=	76.5	73	70.5	67.5	%

OPERATING CONDITIONS RF CLASS C TELEGRAPHY   (continued)

Grounded grid circuit, two tubes
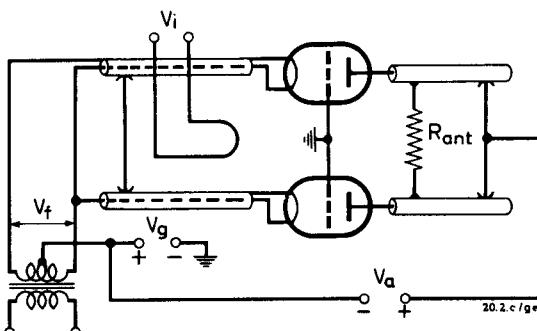
Fig. 2 Grounded grid configuration.

Wavelength	λ	=	3	3	3	3	m
Anode voltage	V_a	=	4000	3500	3000	2500	V
Grid voltage	V_g	=	−350	−300	−250	−200	V
Anode current	I_a	=	2x535	2x535	2x535	2x535	mA
Grid current	I_g	=	2x115	2x115	2x115	2x115	mA
Peak grid voltage	V_{gp}	=	580	520	460	405	V
Grid input power	W_{ig}	=	2x320	2x274	2x248	2x212	W
Anode input power	W_{ia}	=	2x2140	2x1880	2x1600	2x1340	W
Anode dissipation	W_a	=	2x450	2x450	2x425	2x390	W
Output power	W_o	=	3380+520	2860+440	2350+400	1900+340	W[1])
Efficiency	η	=	79	76	73.5	71	%[2])

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[1]) Power transferred from driving stage included

[2]) Pure tube efficiency

* See Fig. 6 for operation above 100 MHz.

RF CLASS C ANODE MODULATION

LIMITING VALUES (Absolute limits)

Frequency	f		up to	100	MHz
Anode voltage	V_a	=	max.	3000	V
Anode dissipation	W_a	=	max.	300	W
Grid dissipation	W_g	=	max.	50	W
Grid current	I_g	=	max.	115	mA
Cathode current	I_k	=	max.	550	mA

OPERATING CONDITIONS

Wavelength	λ	=	3	m
Anode voltage	V_a	=	3000	V
Grid voltage	V_g	=	−375	V
Anode current	I_a	=	450	mA
Grid current	I_g	=	85	mA
Peak grid AC voltage	V_{gp}	=	580	V
Grid input power	W_{ig}	=	42	W
Anode input power	W_{ia}	=	1350	W
Anode dissipation	W_a	=	300	W
Output power	W_o	=	1050	W
Efficiency	η	=	78	%
Modulation factor	m	=	100	%
Modulation power	W_{mod}	=	675	W

AF CLASS B AMPLIFIER AND MODULATOR

LIMITING VALUES (Absolute limits)

Anode voltage	V_a	= max.	4000	V
Anode dissipation	W_a	= max.	450	W
Grid dissipation	W_g	= max.	50	W
Cathode current	I_k	= max.	700	mA
Peak cathode current	I_{kp}	= max.	5	A
Grid current	I_g	= max.	130	mA
Grid circuit resistance	R_g	= max.	50	kΩ

OPERATING CONDITIONS, two tubes

Anode voltage	V_a	=	4000		3500		V
Grid voltage	V_g	=	−135		−114		V
Load resistance	$R_{aa\sim}$	=	14.5		10.2		kΩ
Peak grid to grid voltage	V_{ggp}	=	0	566	0	563	V
Anode current	I_a	=	2x70	2x368	2x70	2x442	mA
Grid current	I_g	=	0	2x93	0	2x115	mA
Grid input power	W_{ig}	=	0	2x24	0	2x29	W
Anode input power	W_{ia}	=	2x280	2x1474	2x245	2x1550	W
Anode dissipation	W_a	=	2x280	2x329	2x245	2x330	W
Output power	W_o	=	0	2290	0	2440	W
Total distortion	d_{tot}	=	−	5	−	5	%
Efficiency	η	=	−	77.7	−	78.8	%
Anode voltage	V_a	=	3000		2500		V
Grid voltage	V_g	=	−94		−75		V
Load resistance	$R_{aa\sim}$	=	7.5		5.2		kΩ
Peak grid to grid voltage	V_{ggp}	=	0	560	0	530	V
Anode current	I_a	=	2x70	2x500	2x70	2x555	mA
Grid current	I_g	=	0	2x130	0	2x126	mA
Grid input power	W_{ig}	=	0	2x33	0	2x30	W
Anode input power	W_{ia}	=	2x210	2x1500	2x175	2x1387	W
Anode dissipation	W_a	=	2x210	2x345	2x175	2x387	W
Output power	W_o	=	0	2310	0	2000	W
Total distortion	d_{tot}	=	−	5	−	3.5	%
Efficiency	η	=	−	77	−	72	%

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE with anode voltage from two-phase half-wave rectifier without filter

LIMITING VALUES (Absolute limits)

Frequency	f		up to	100	MHz
Anode voltage	V_a	=	max.	3600	V
Negative grid voltage	$-V_g$	=	max.	320	V
Anode current	I_a	=	max.	475	mA
Grid current	I_g	=	max.	100	mA
Anode input power	W_{ia}	=	max.	2200	W
Anode dissipation	W_a	=	max.	450	W
Grid dissipation	W_g	=	max.	50	W

OPERATING CONDITIONS

Transformer voltage	V_{tr}	=	4000[1]	3350[2]	V_{RMS}	
Anode voltage	V_a	=	3600	3000	V	[3]
Anode current	I_a	=	450	400	mA	
Grid current	I_g	=	100	85	mA	
Grid resistor	R_g	=	3.0	3.0	kΩ	
Anode input power	W_{ia}	=	2000	1480	W	
Anode dissipation	W_a	=	450	400	W	
Output power	W_o	=	1500	1040	W	
Efficiency	η	=	75	70	%	

[1]) Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.

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

[3]) DC value.

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE with anode voltage from three-phase half-wave rectifier without filter

LIMITING VALUES (Absolute limits)

Frequency	f		up to	100	MHz
Anode voltage	V_a	=	max.	4000	V
Negative grid voltage	$-V_g$	=	max.	500	V
Anode current	I_a	=	max.	535	mA
Grid current	I_g	=	max.	115	mA
Anode input power	W_{ia}	=	max.	2200	W
Anode dissipation	W_a	=	max.	450	W
Grid dissipation	W_g	=	max.	50	W

OPERATING CONDITIONS

Transformer voltage	V_{tr}	=	3400[1]	2900[2]	V_{RMS}
Anode voltage	V_a	=	4000	3400	V [3]
Anode current	I_a	=	535	450	mA
Grid current	I_g	=	115	100	mA
Grid resistor	R_g	=	3.0	3.0	kΩ
Anode input power	W_{ia}	=	2140	1530	W
Anode dissipation	W_a	=	450	390	W
Output power	W_o	=	1630	1090	W
Efficiency	η	=	76.5	71	%

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[1] Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.

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

[3] DC value.

R F CLASS C OSCILLATOR FOR INDUSTRIAL USE with self rectification

LIMITING VALUES (Absolute limits)

Frequency	f		up to	100	**MHz**
Transformer voltage	V_{tr}	=	max.	4500	V_{RMS}
Negative grid voltage	$-V_g$	=	max.	500	V
Anode current	I_a	=	max.	280	mA
Grid current	I_g	=	max.	55	mA
Anode input power	W_{ia}	=	max.	1450	W
Anode dissipation	W_a	=	max.	450	W
Grid dissipation	W_g	=	max.	50	W

OPERATING CONDITIONS

Transformer voltage	V_{tr}	=	4500[1])	3800[2])	V_{RMS}
Anode current	I_a	=	280	240	mA
Grid current	I_g	=	55	47	mA
Grid resistor	R_g	=	3.4	3.4	kΩ
Anode input power	W_{ia}	=	1400	1010	W
Anode dissipation	W_a	=	350	295	W
Output power	W_o	=	1000	670	W
Efficiency	η	=	71.5	66	%

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[1]) Care must be taken that under these operating conditions the absolute limiting values are not exceeded by variation of the supply voltage or the load or by tolerances in the circuit elements.

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

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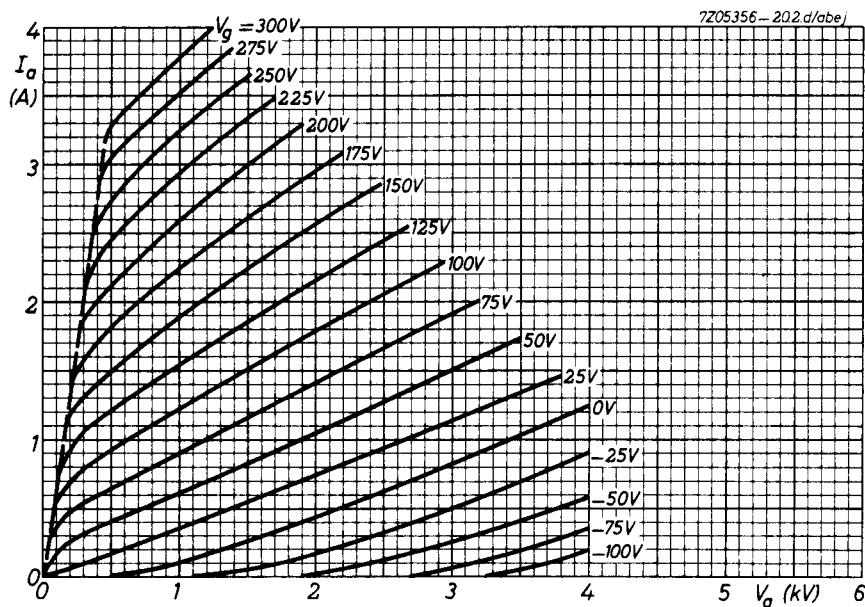
Fig. 3 I_a/V_a characteristics.

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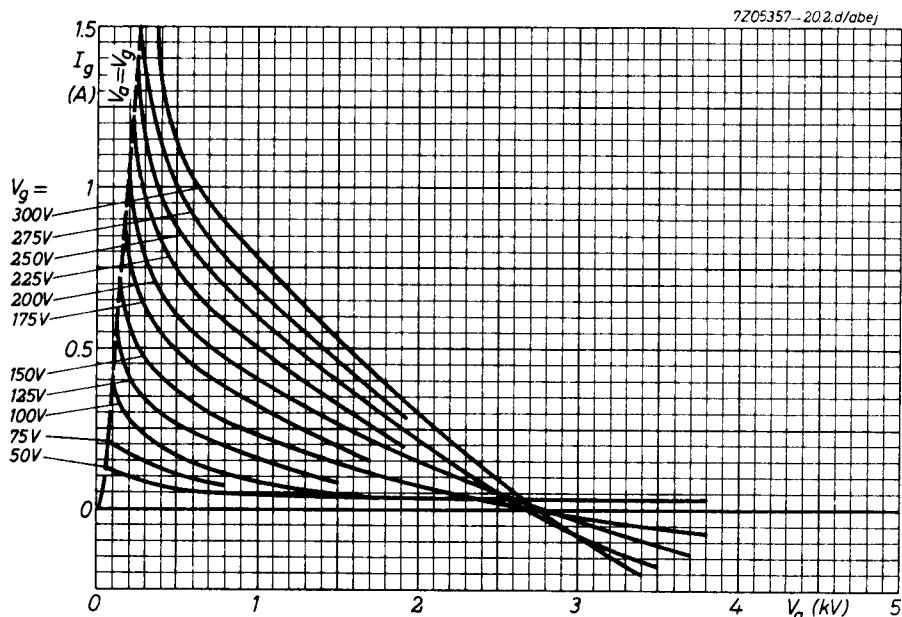
Fig. 4 I_a/V_a characteristics.

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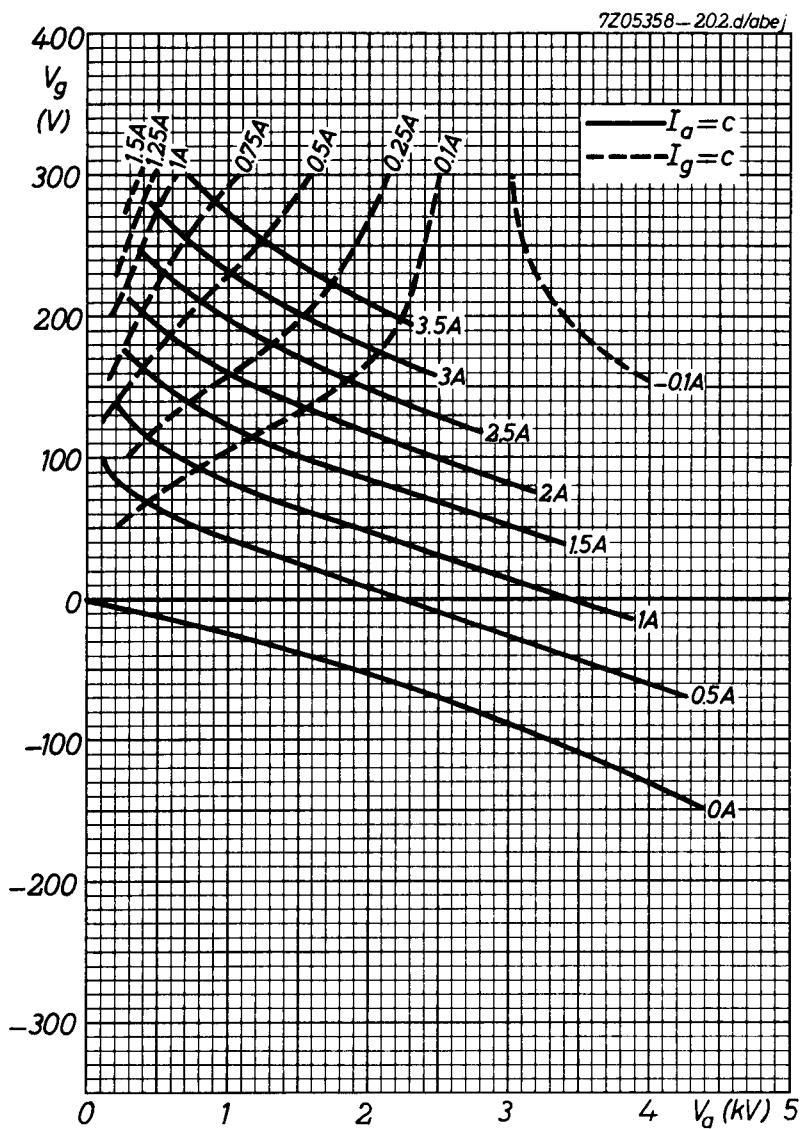
Fig. 5 Constant current characteristics.

7Z05359—20.2.d/abej

2 x TB 4/1250
C telegr. Self excited
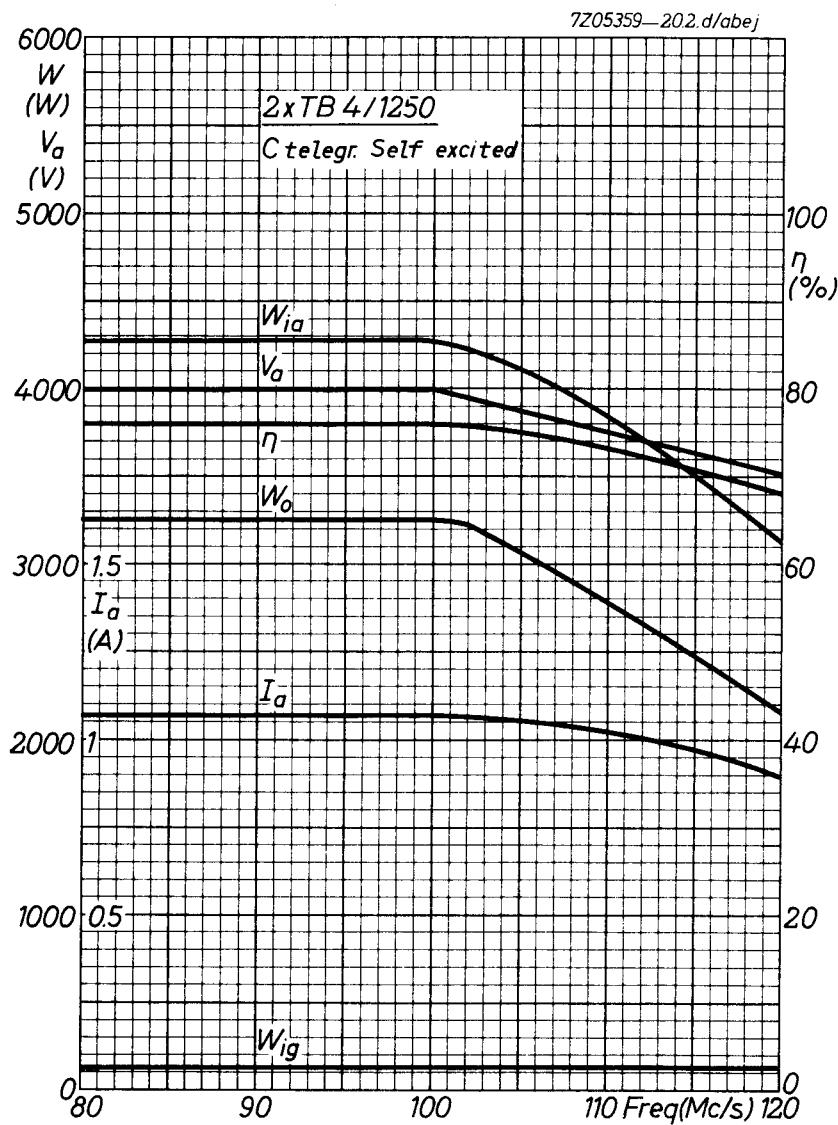
Fig. 6 Characteristics at frequencies above 100 MHz.

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