RF POWER TRIODE

Radiation cooled triode of glass construction intended for use as an industrial oscillator

QUICK REFERENCE DATA				
Oscillator output power (W_o - W_{feedb}), typical	W_{osc}		2.73	kW
Frequency for full ratings	f	max.	50	MHz

To be read in conjunction with "General Operational Recommendations"

A. RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

with anode voltage from a three-phase rectifier

OPERATING CONDITIONS, continuous service

Frequency	f	50	50	50	50	MHz
Oscillator output power (W_o-W_{feedb})	W_{osc}	2.73	2.61	2.04	1.44	kW
Anode voltage	V_a	6	5	4	3	kV
Anode current	I_a	600	700	700	700	mA
Anode input power	W_{ia}	3600	3500	2800	2100	W
Anode dissipation	W_a	760	780	640	540	W
Anode output power	W_o	2840	2720	2160	1560	W
Anode efficiency	η_a	79	78	77	74	%
Oscillator efficiency	η_{osc}	76	75	73	69	%
Feedback ratio	V_{gp}/V_{ap}	13	17	20	25	%
Grid resistor	R_g	3	2.5	2	1.5	kΩ
Grid current, on load	I_g	150	160	180	200	mA
Grid voltage, negative	$-V_g$	450	400	360	300	V
Grid dissipation	W_g	43	46	55	60	W
Grid resistor dissipation	W_{Rg}	67	64	65	60	W

Recommended grid blocking capacitor at high frequencies about 100 pF
at 1 MHz about 1000 pF

LIMITING VALUES (Absolute max. rating system)

Frequency for full ratings	f	up to	50	MHz
Anode voltage	V_a	max.	7	kV
Anode current	I_a	max.	750	mA
Anode input power	W_{ia}	max.	4000	W
Anode dissipation	W_a	max.	800	W
Grid voltage	$-V_g$	max.	1250	V
Grid current, on load	I_g	max.	300	mA
off load	I_g	max.	400	mA
Grid dissipation	W_g	max.	150	W
Grid circuit resistance	R_g	max.	10	kΩ
Cathode current, mean	I_k	max.	1.2	A
peak	I_{kp}	max.	4.3	A
Envelope temperature	T_{env}	max.	350	°C
Seal temperature	t	max.	220	°C

B. RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

with anode voltage from a three-phase rectifier

OPERATING CONDITIONS , intermittent service

Frequency	f	50	50	MHz
Oscillator output power ($W_o - W_{feedb}$)	W_{osc}	4.25	3.24	kW
Anode voltage	V_a	6	5	kV
Anode current	I_a	950	900	mA
Anode input power	W_{ia}	5700	4500	W
Anode dissipation	W_a	1300	1125	W
Anode output power	W_o	4400	3375	W
Anode efficiency	η_a	77	75	%
Oscillator efficiency	η_{osc}	74	72	%
Feedback ratio	V_{gp}/V_{ap}	17	20	%
Grid resistor	R_g	2.5	2	kΩ
Grid current, on load	I_g	190	190	mA
Grid voltage, negative	$-V_g$	475	380	V
Grid dissipation	W_g	63	63	W
Grid resistor dissipation	W_{Rg}	90	72	W

LIMITING VALUES (Absolute max. rating system)

Frequency for full ratings	f	max.	50	MHz
Anode voltage	V_a	max.	7	kV
Anode current	I_a	max.	1000	mA
Anode -input power	W_{ia}	max.	7000	W
Anode dissipation	W_a	max.	See Fig. 2	
Grid voltage	$-V_g$	max.	1250	V
Grid current, on load	I_g	max.	300	mA
off load	I_g	max.	400	mA
Grid dissipation	W_g	max.	150	W
Grid circuit resistance	R_g	max.	10	kΩ
Cathode current, mean	I_k	max.	1.4	A
peak	I_{kp}	max.	4.3	A
Envelope temperature	T_{env}	max.	350	°C
Seal temperature	t	max.	220	°C

C. RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

with anode voltage from single-phase rectifier without filter

OPERATING CONDITIONS , continuous service

Frequency	f	50	50	MHz
Oscillator output power ($W_o - W_{feedb}$)	W_{osc}	2655	2451	W
Anode voltage	V_a	5.4	4.5	kV
Anode current	I_a	530	600	mA
Anode input power	W_{ia}	3520	3320	W
Anode dissipation	W_a	770	770	W
Anode output power	W_o	2750	2550	W
Anode efficiency	η_a	78	77	%
Oscillator efficiency	η_{osc}	75	74	%
Feedback ratio	V_{gp}/V_{ap}	13	15.5	%
Grid resistor	R_g	3	2.5	kΩ
Grid current, on load	I_g	140	150	mA
Grid voltage, negative	$-V_g$	420	375	V
Grid dissipation	W_g	36	43	W
Grid resistor dissipation	W_{Rg}	59	56	W

LIMITING VALUES (Absolute max. rating system)

Frequency for full ratings	f	up to	50	MHz
Anode voltage	V_a	max.	6.3	kV
Anode current	I_a	max.	670	mA
Anode input power	W_{ia}	max.	4000	W
Anode dissipation	W_a	max.	800	W
Grid voltage	$-V_g$	max.	1250	V
Grid current, on load	I_g	max.	270	mA
off load	I_g	max.	400	mA
Grid dissipation	W_g	max.	150	W
Grid circuit resistance	R_g	max.	10	kΩ
Cathode current, mean	I_k	max.	1.0	A
peak	I_{kp}	max.	3.3	A
Envelope temperature	T_{env}	max.	350	°C
Seal temperature	t	max.	220	°C

D. RF CLASS C OSCILLATOR FOR INDUSTRIAL USE

with self rectification

OPERATING CONDITIONS

Frequency	f	50	MHz
Oscillator output power ($W_o - W_{feedb}$)	W_{osc}	1.49	kW
Transformer voltage, RMS	V_{tr}	5.2	kV
Anode current	I_a	360	mA[1)]
Anode input power	W_{ia}	2080	W
Anode dissipation	W_a	520	W
Anode output power	W_o	1560	W
Anode efficiency	η_a	75	%
Oscillator efficiency	η_{osc}	72	%
Feedback ratio	V_{gp}/V_{ap}	17	%
Grid resistor	R_g	1.8	kΩ
Grid current, on load	I_g	100	mA[1)]
Grid voltage, negative	$-V_g$	180	V
Grid dissipation	W_g	54	W
Grid resistor dissipation	W_{Rg}	18	W
Recommended grid blocking capacitor	at high frequencies about	100	pF
	at about 1 MHz about	1000	pF

LIMITING VALUES (Absolute max. rating system)

Frequency for full ratings	f	up to	50	MHz
Transformer voltage, RMS	V_{tr}	max.	5.6	kV
Anode current	I_a	max.	400	mA[1)]
Anode input power	W_{ia}	max.	2250	W
Anode dissipation	W_a	max.	800	W
Grid voltage, at peak of mains frequency sine wave	$-V_g$	max.	1250	V
Grid current, on load	I_g	max.	160	mA[1)]
off load	I_g	max.	210	mA[1)]
Grid dissipation	W_g	max.	150	W
Grid circuit resistance	R_g	max.	10	kΩ
Cathode current, mean	I_k	max.	610	mA[1)]
peak	I_{kp}	max.	4.3	A
Envelope temperature	T_{env}	max.	350	°C
Seal temperature	t	max.	220	°C

1) Averaged over any mains frequency cycle

HEATING : direct; filament thoriated tungsten

Filament voltage	Vf	6.3	V
Filament current	If	32.5	A

The filament is designed to accept temporary fluctuations of +5 % and −10 %.

CAPACITANCES

Anode to filament	Caf	0.25	pF
Grid to filament	Cgf	10.5	pF
Anode to grid	Cag	6.2	pF

CHARACTERISTICS measured at V_a = 4 kV, I_a = 190 mA

Transconductance	S	5.1	mA/V
Amplification factor	μ	22	

COOLING

In general cooling of the tube is not necessary at matched load. When the tube is mounted in a small cabinet adequate ventilation must be provided.

At non-matched load or at high anode voltages, combined with the highest operating frequencies a low-velocity air flow directed on the tube is necessary. A small fan will suffice; it is recommended to mount the fan underneath the tube socket.

ACCESSORIES

Socket	catalogue nr.	2422 511 05001
Anode connector	type	40665

MECHANICAL DATA

Dimensions in mm

Mounting positions: vertical

Net weight: approx. 600 g

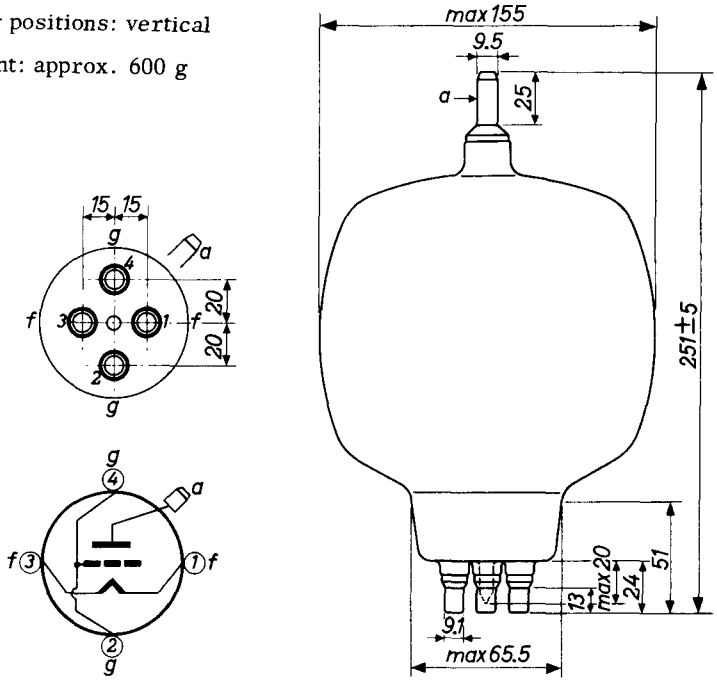

Fig. 1 Mechanical outline.

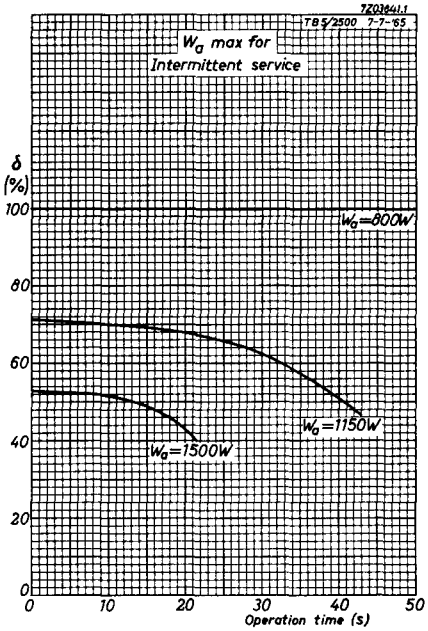

Fig. 2 Intermittent service. Limits of anode dissipation and cooling.

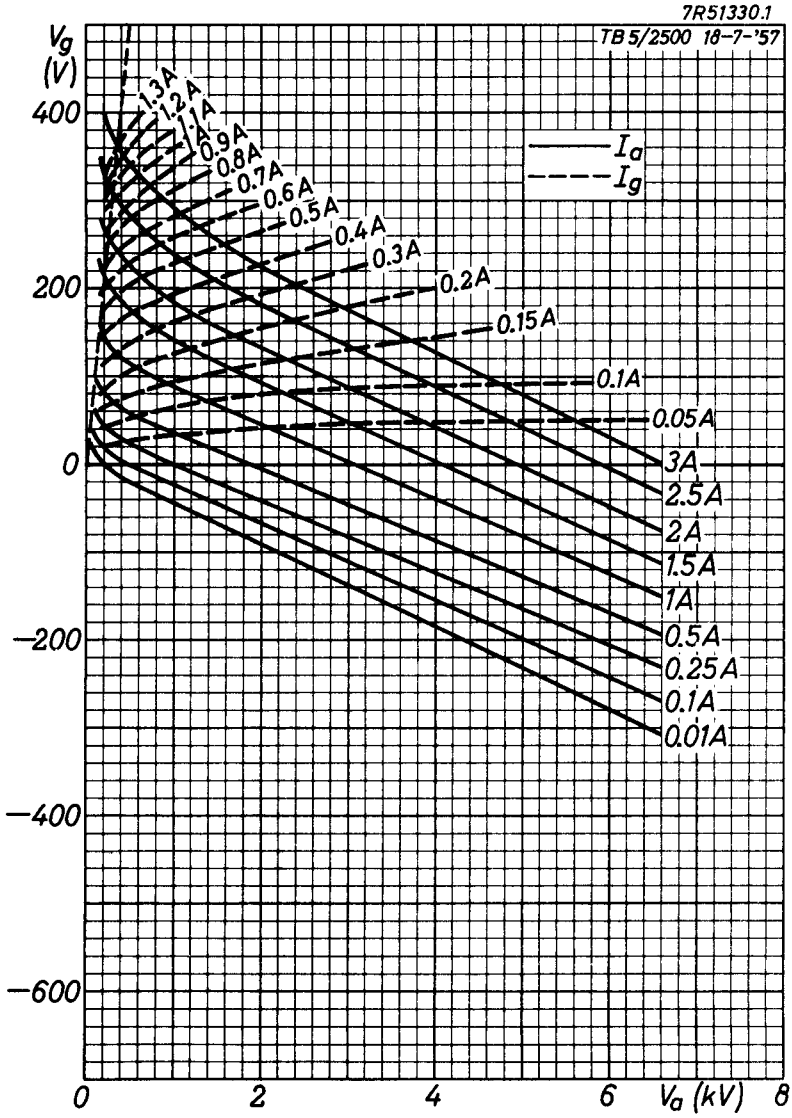

Fig. 3 Constant current characteristics.

PHILIPS

Data handbook

Electronic components and materials

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