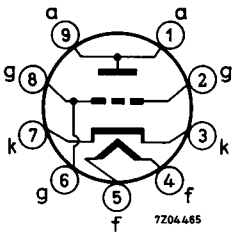
S.Q. TUBE

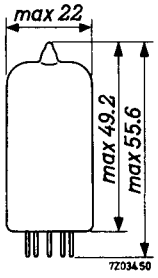
Special quality U.H.F. triode designed for use as oscillator, amplifier and self-oscillating mixer (max. frequency 800 MHz).

QUICK REFERENCE DATA			
Life	10 000 hours		
Low interface resistance			
Mechanical quality	Shock and vibration resistant		
Base	Noval. Gold plated pins.		
Heating	Indirect A.C. or D.C.; Parallel supply		
Heater voltage	V_f	6.3	V
Heater current	I_f	165	mA
Anode current	I_a	12	mA
Mutual conductance	S	14	mA/V

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Noval





CHARACTERISTICS

Column I Nominal value or setting of the tube
II Range values for equipment design: Initial spread
III Range values for equipment design: End of life

		I	II	III	
Heater voltage	V_f	6.3			V
Heater current	I_f	165	155 - 175		mA
Anode supply voltage	V_{ba}	185			V
Grid supply voltage	$+V_{bg}$	8			V
Cathode resistor	R_k	800			Ω
Anode current	I_a	12	11.2 - 12.8	min. 10.5	mA
Mutual conductance	S	14	11.5 - 17	min. 9.5	mA/V
Amplification factor	μ	68			
Negative grid current	$-I_g$		max. 0.5	max. 1.0	μA
Cut-off voltage Anode current I_a = 0.1 mA	$-V_g$		max. 5		V
Equivalent noise resistance	R_{eq}	250			Ω
Input resistance Frequency = 100 MHz	r_g	2			kΩ
Phase angle of slope Frequency = 100 MHz	φ_s	-7			o
Leakage current between cathode and heater Voltage between cathode and heater V_{kf} = 100 V	I_{kf}		max. 10		μA
Insulation resistance between anode and other electrodes Voltage between anode and other electrode = 300 V	R_{ins}		min. 100		MΩ
Insulation resistance between grid and other electrode Voltage between grid and other electrode = 100 V	R_{ins}		min. 100		MΩ

CAPACITANCES

		I	II	
Anode to grid	C_{ag}	2	1.7 - 2.3	pF
Anode to cathode	C_{ak}	0.2	0.16 - 0.24	pF
Grid to cathode	C_{gk}	3.6	3.0 - 4.2	pF
Grid to heater	C_{gf}		max. 0.3	pF
Cathode to grid and heater	$C_{k/gf}$	6.6	5.5 - 7.7	pF
Anode to grid and heater	$C_{a/gf}$	2.1	1.75 - 2.45	pF
Grid to cathode and heater	$C_{g/kf}$	3.9	3.3 - 4.5	pF
Anode to cathode and heater	$C_{a/kf}$	0.3	0.25 - 0.35	pF
Grid to cathode	C_{gk}	5.6		pF
Anode current I_a = 12 mA				
With external shield				
Anode to grid and shield	$C_{a/gs}$	3.1	2.8 - 3.4	pF
Grid and shield to cathode and heater	$C_{gs/kf}$	4.2	3.6 - 4.8	pF
Anode to cathode and heater	$C_{a/kf}$	0.25	0.2 - 0.3	pF

SHOCK AND VIBRATION RESISTANCE

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.

Shock

The tube is subjected 5 times in each of 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of 30°.

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

LIFE

Production samples are tested to be within the end of life values (column III) during 10000 hours.

Heater voltage: The average heater voltage should be 6.3 V. Variations of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life. The tolerance of heater current (column II) should be taken into account.

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a_o}	max. 440	V
	V_a	max. 250	V
Anode dissipation	W_a	max. 2.4	W
Grid voltage	$-V_g$	max. 50	V
Grid dissipation	W_g	max. 20	mW
Grid resistor	R_g	max. 1.2	MΩ
Cathode current	I_k	max. 20	mA
Voltage between cathode and heater	V_{kf}	max. 100	V
Bulb temperature	t_{bulb}	max. 165	°C
Frequency (as amplifier)	f	up to 800	MHz

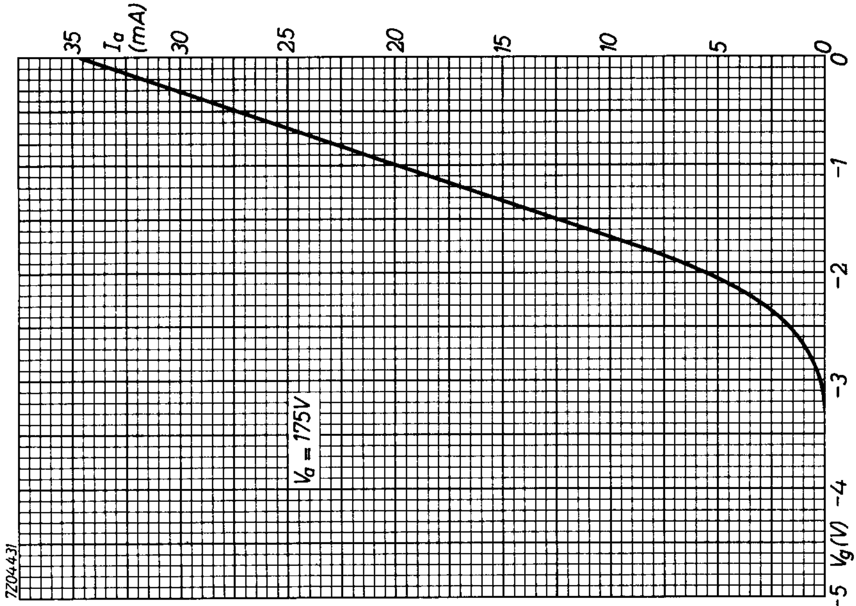
OPERATING CHARACTERISTICS

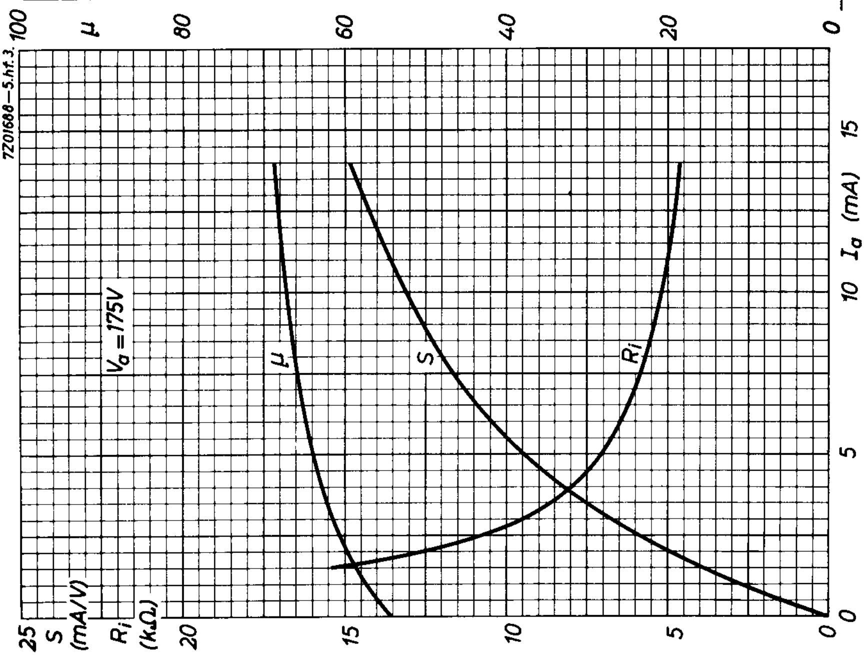
As R.F. amplifier, grounded grid

Anode supply voltage	V_{ba}	185	175	V
Grid supply voltage	V_{bg}	8	0	V
Cathode resistor	R_k	800	125	Ω
Anode current	I_a	12	12	mA
Mutual conductance	S	14	14	mA/V

As mixer

Anode supply voltage	V_{ba}	220	V
Anode resistor	R_a	5.6	kΩ
Grid resistor	R_g	47	kΩ
Anode current	I_a	12	mA
Grid current	I_g	50	μA


7Z04431
I_a (mA)
35
30
25
20
15
10
5
0
$V_a = 175V$
V_g(V)
−5
−4
−3
−2
−1
0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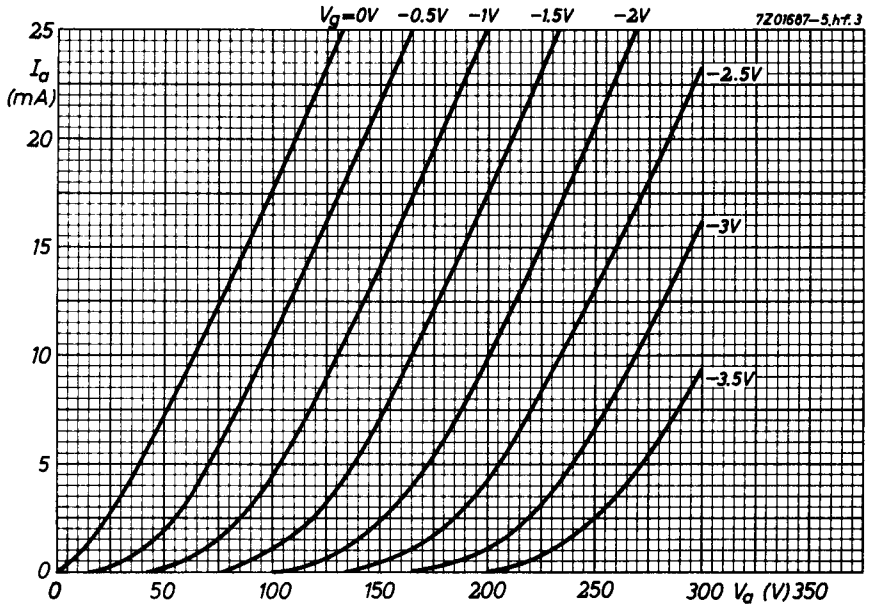
100
μ
80
60
40
20
0
25
S
(mA/V)
R_i
(kΩ)
20
15
10
5
0
$V_a = 175V$
μ
S
R_i
I_a (mA)
0
5
10
15


V_g=0V
-0.5V
-1V
-1.5V
-2V
7Z01687-5.hf.3
-2.5V
-3V
-3.5V
25
I_a
(mA)
20
15
10
5
0
0
50
100
150
200
250
300
V_a (V)
350

PHILIPS

Data handbook

Electronic components and materials

E86C

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