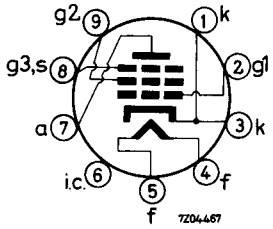
S.Q. TUBE

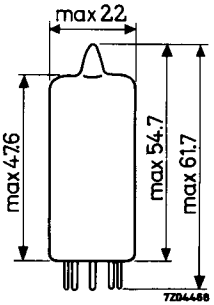
Special quality pentode designed for use as wide band amplifier for frequencies up to 250 MHz

QUICK REFERENCE DATA			
Life test	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	350	mA
Anode current	I_a	35	mA
Mutual conductance	S	26	mA/V
Equivalent noise resistance	R_{eq}	200	Ω
Noise factor at 100 MHz	F	7	dB

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	350			mA
Anode supply voltage	V_{ba}	125			V
Grid No.2 supply voltage	V_{bg_2}	125			V
Grid No.3 voltage	V_{g_3}	0			mA/V
Grid No.1 supply voltage	$+V_{bg_1}$	12			V
Cathode resistor	R_k	300			Ω
Anode current	I_a	35	33 - 37	min. 31	mA
Grid No.2 current	I_{g_2}	11	9.9 - 12.1		mA
Mutual conductance	S	26	22 - 30	min.17.5	mA/V
Amplification factor	$\mu_{g_2g_1}$	27			
Equivalent noise resistance	R_{eq}	200			Ω
Noise factor at 100 MHz	F	7			dB
Adapted to minimum noise					
Negative grid current	$-I_{g_1}$		max. 0.3	max. 1.0	μA
Anode supply voltage	V_{ba}	135			V
Grid No.2 supply voltage	V_{bg_2}	125			V
Grid No.3 voltage	V_{g_3}	0			V
Grid No.1 supply voltage	$+V_{bg_1}$	12			V
Cathode resistor	R_k	360			Ω
Anode current	I_a	30			mA
Grid No.2 current	I_{g_2}	9.5			mA
Mutual conductance	S	25			mA/V
Amplification factor	$\mu_{g_2g_1}$	27			
Equivalent noise resistance	R_{eq}	200			Ω

CHARACTERISTICS (continued)

As triode (grid No. 2 connected to anode)
(grid No. 3 connected to cathode)

		I	II	
Anode supply voltage	V_{ba}	125		V
Grid No. 3 supply voltage	V_{bg_3}	0		V
Grid No. 1 supply voltage	$+V_{bg_1}$	12		V
Cathode resistor	R_k	350		Ω
Anode current	I_a	40		mA
Mutual conductance	S	32		mA/V
Amplification factor	μ	25.5		
Internal resistance	R_i	800		Ω
Equivalent noise resistance	R_{eq}	100		Ω
Leakage current between cathode and heater	I_{kf}		max. 5	μA
Voltage between cathode and heater V_{kf} = 100 V				
Insulation resistance				
Anode to other electrodes (V = 300 V)	R		min. 100	MΩ
Grid No. 1 to other electrodes (V = 50 V)	R		min. 100	MΩ

CAPACITANCES

		I	II	
Grid No. 1 to grid No. 2, grid No. 3 cathode, heater and screen	C_{g_1/g_2g_3kfs}	10		pF
Grid No. 1 to grid No. 2, grid No. 3 cathode, heater and screen	C_{g_1/g_2g_3kfs}	16		pF
Cathode current I_k = 46 mA				
Anode to grid No. 2, grid No. 3 cathode, heater and screen	C_{a/g_2g_3kfs}	2.6		pF
Anode to grid No. 1	C_{ag_1}		max. 50	mpF
Anode to cathode	C_{ak}		max. 50	mpF
Cathode to heater	C_{kf}	4.7		pF
Grid No. 1 to heater	C_{g_1f}		max. 50	mpF
Anode to heater	C_{af}		max. 100	mpF

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^{o}.

Vibration

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

LIFE

Production samples are tested to be within the end of life values (column III) during 10 000 hours.

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a_o}	max.	400	V
	V_a	max.	200	V
Anode dissipation	W_a	max.	4.2	W
Grid No.2 voltage	$V_{g_{2o}}$	max.	400	V
	V_{g_2}	max.	150	V
Grid No.2 dissipation [1])	W_{g_2}	max.	1.4	W
Grid voltage	$-V_g$	max.	50	V
Grid resistor, automatic bias	R_{g_1}	max.	0.5	MΩ
Cathode current	I_k	max.	50	mA
Voltage between cathode and heater	V_{kf}	max.	100	V
Bulb temperature	t_{bulb}	max.	180	^{o}C

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 should be taken into account.

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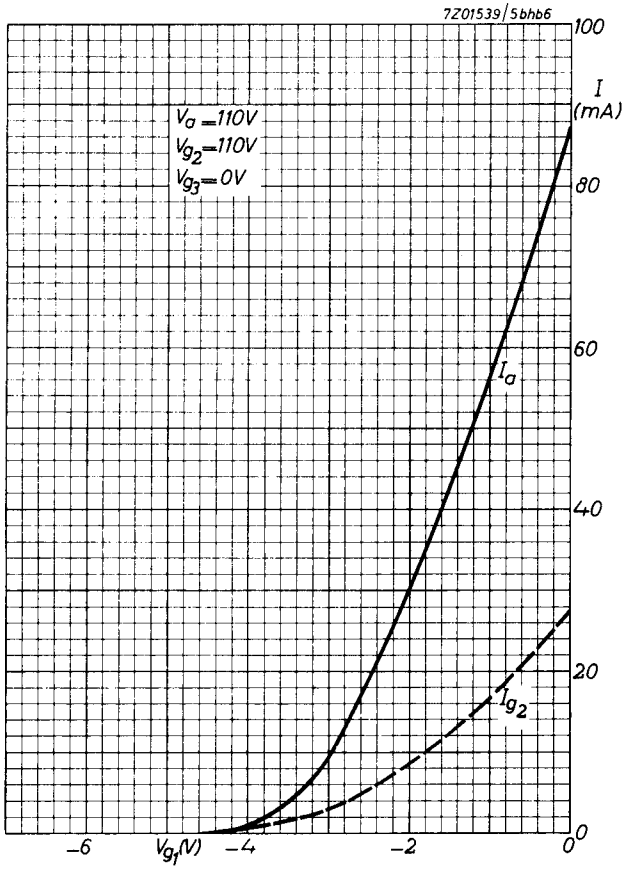
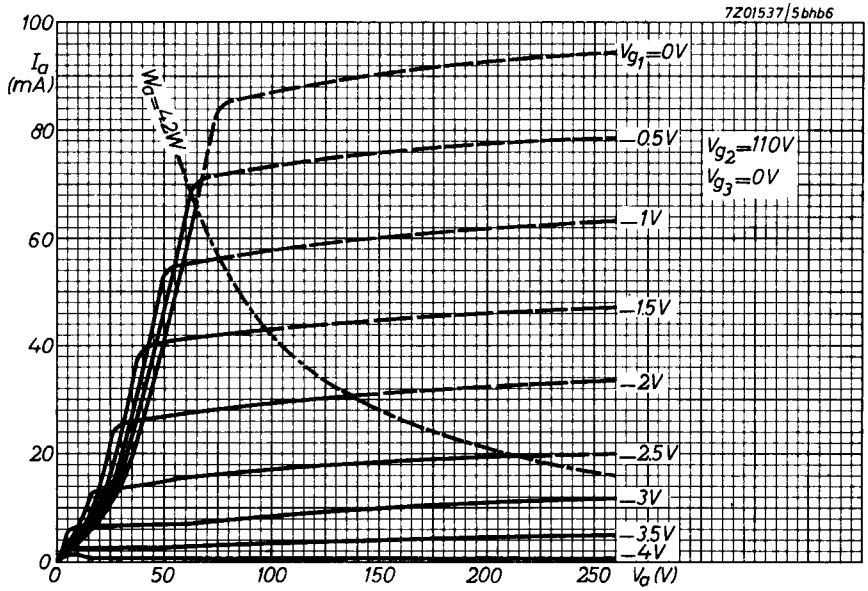
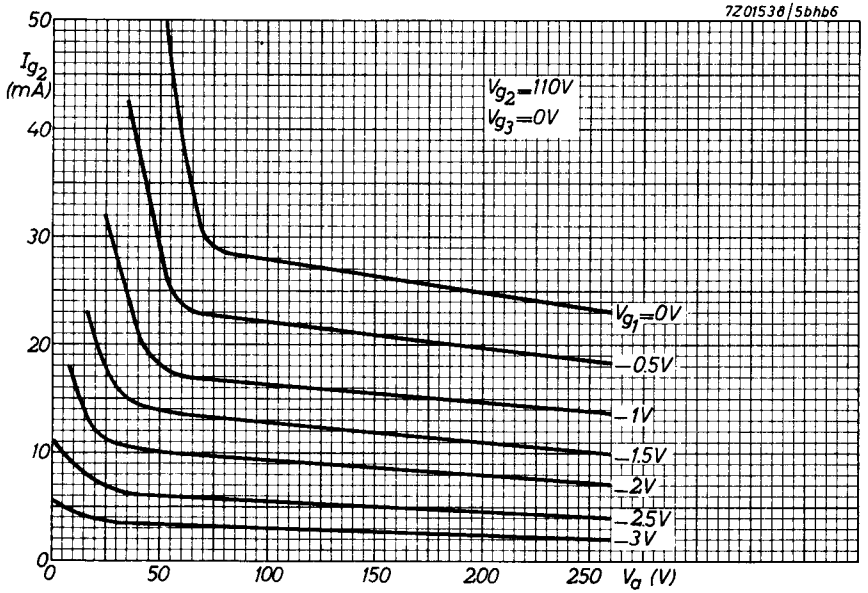
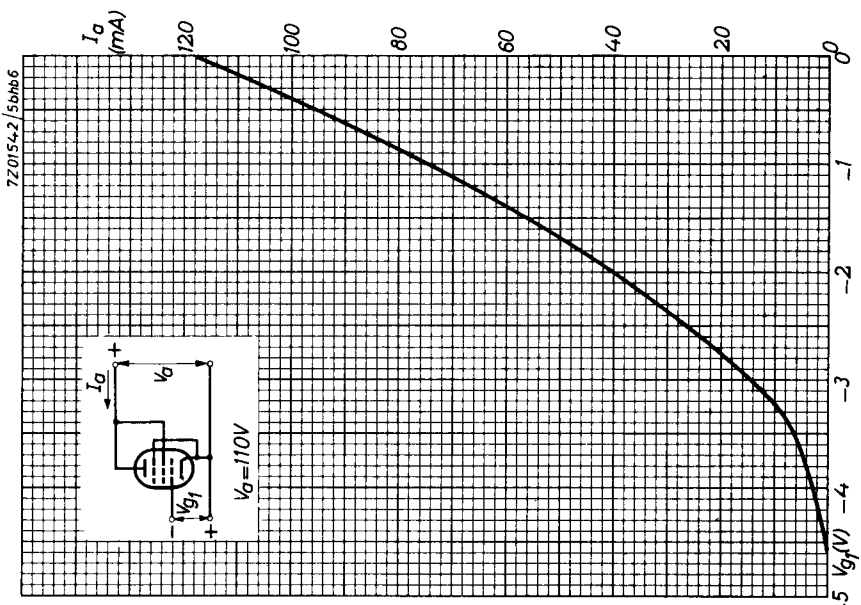
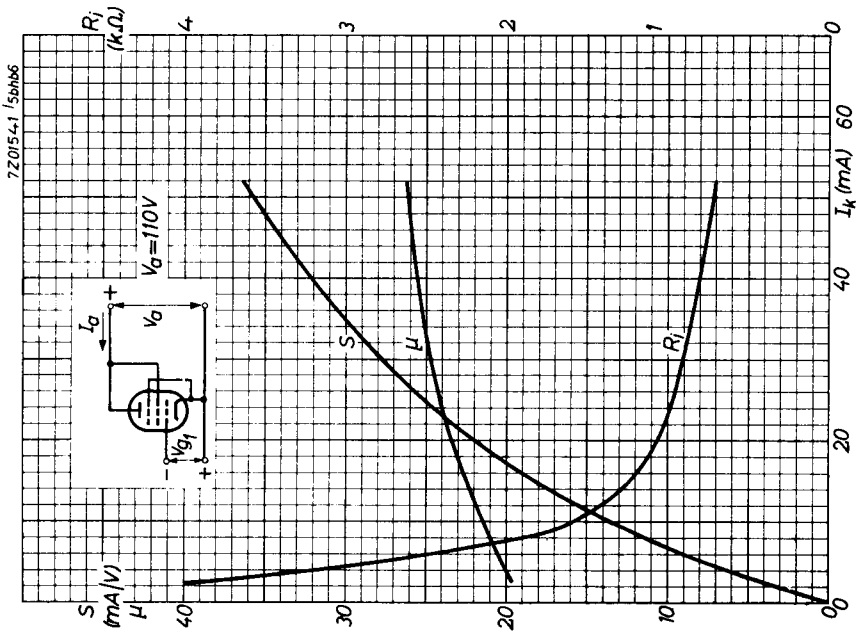
[1]) Grid No.2 dissipation : Care should be taken not to exceed the limiting value during switching in of positive voltages. If the cathode resistor is shunted by more than 10 μF a grid No.1 series resistor of minimum 1 kΩ should be applied.

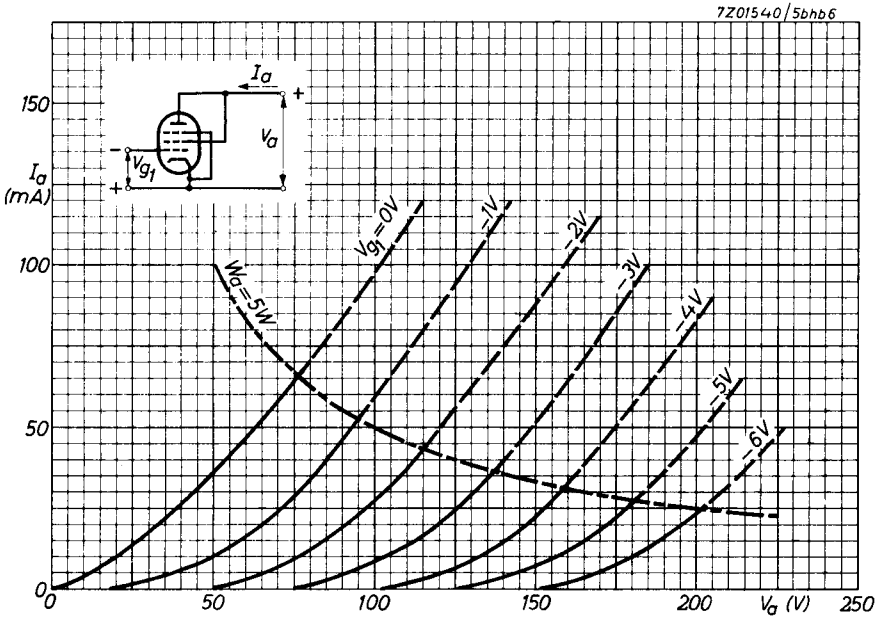

7Z01539/5bhb6
100
I
(mA)
80
60
40
20
0
V_a =110V
V_{g_2}=110V
V_{g_3}=0V
I_a
I_{g_2}
−6
V_{g_1}(V)
−4
−2
0


7Z01537/5bhb6
100
I_a (mA)
80
60
40
20
0
0
50
100
150
200
250
V_a (V)
V_{g_1}=0V
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V
−3.5V
−4V
V_{g_2}=110V
V_{g_3}=0V
$-V_{g_1}$=4.7V


7Z01538/5bhb6
50
I_{g_2} (mA)
40
30
20
10
0
0
50
100
150
200
250
V_a (V)
V_{g_2}=110V
V_{g_3}=0V
V_{g_1}=0V
−0.5V
−1V
−1.5V
−2V
−2.5V
−3V


7Z01542/5bhb6
I_a (mA)
120
100
80
60
40
20
0
-1
-2
-3
-4
-5
V_{g1}(V)
I_a
V_a
V_{g1}
V_a=110V


7Z01541/5bhb6
R_i (kΩ)
4
3
2
1
0
I_k (mA)
60
40
20
0
S (mA/V)
μ
40
30
20
10
0
S
μ
R_i
I_a
V_a
V_{g1}
V_a=110V


7Z01540/5bhb6
I_a
V_a
V_{g_1}
I_a (mA)
150
100
50
0
W_a=5W
V_{g_1}=0V
-1V
-2V
-3V
-4V
-5V
-6V
0
50
100
150
200
V_a (V)
250

PHILIPS

Data handbook

Electronic components and materials

E282F

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