

ELECTRONIC TUBE REFERENCE

ECL86

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-TRIODE

Combination valve incorporating a power-output pentode with diode or triode sections for audio-frequency amplification, detection, or driver service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9LZ	BASE PINS	9
NOMINAL HEATER	6.3 V / 660 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Dissimilar

9LZ - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1	B	G1 – Control Grid	CONNECTED
PIN2	B	K – Cathode	CONNECTED
PIN3	A	G2 – Screen Grid	CONNECTED
PIN4	–	H – Heater	CONNECTED
PIN5	–	H – Heater	CONNECTED
PIN6	A	P – Plate (Anode)	CONNECTED
PIN7	A	G3 – Suppressor Grid	CONNECTED
PIN7	A	K – Cathode	CONNECTED
PIN7	–	IS – Internal Screen	CONNECTED
PIN8	A	G1 – Control Grid	CONNECTED
PIN9	B	P – Plate (Anode)	CONNECTED

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	50000 Ω
TRANSCONDUCTANCE	0.0016 S
AMPLIFICATION FACTOR	100
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	0.5 W
MAXIMUM CATHODE CURRENT	4 mA
<i>Published electrical section from supplied RCA data sheet.</i>	

SECTION2 Pentode	
PLATE RESISTANCE	48000 Ω
TRANSCONDUCTANCE	0.01 S
AMPLIFICATION FACTOR	21
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	9 W
MAXIMUM SCREEN DISSIPATION	1.8 W
MAXIMUM CATHODE CURRENT	55 mA
<i>Published electrical section from supplied RCA data sheet.</i>	

Triode-pentode for high-quality audio voltage amplification and output-power stages.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Amperex Condensed

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1963 AMPEREX CONDENSED

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Published heater rating
Heater current	700 mA	Published heater rating
Triode amplification factor	100	TriodeSection AFAmplifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Triode plate voltage	250 V	TriodeSection AFAmplifier
Triode control-grid bias	-1.7 V	TriodeSection AFAmplifier
Triode plate current	1.2 mA	TriodeSection AFAmplifier

1963 AMPEREX CONDENSED

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pentode plate voltage	250 V	PentodeSection AFAmplifier
Pentode screen voltage	250 V	PentodeSection AFAmplifier
Pentode control-grid bias	-7 V	PentodeSection AFAmplifier
Pentode plate current	36 mA	PentodeSection AFAmplifier
Pentode screen current	5.5 mA	PentodeSection AFAmplifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pentode plate resistance	45000 ohm	PentodeSection AFAmplifier
Pentode transconductance	10000 μ S	PentodeSection AFAmplifier



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Philips Electron Tubes Handbook V1a

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1963 PHILIPS ELECTRON TUBES HANDBOOK V1A

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Published heater rating
Heater current	700 mA	Published heater rating
OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Triode plate voltage	250 V	TriodeSection
Triode grid bias	-1.9 V	TriodeSection
Triode plate current	1.2 mA	TriodeSection
Pentode plate voltage	250 V	PentodeSection
Pentode screen voltage	250 V	PentodeSection
Pentode grid bias	-7 V	PentodeSection



SOURCE OPERATING CONDITIONS

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1967 Mullard Receiving and Amplifying Valves

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1967 MULLARD RECEIVING AND AMPLIFYING VALVES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
c ap - gt <	0.006 pF	Published in approved ECL86 target datasheet entry; Section1
c at - gl <	0.2 pF	Published in approved ECL86 target datasheet entry; Section1
(cgt - gl <	0.02 pF	Published in approved ECL86 target datasheet entry; Section1
c at - ap <	0.15 pF	Published in approved ECL86 target datasheet entry; Section1
cin	10 pF	Published in approved ECL86 target datasheet entry; Section1
ca - gl <	0.4 pF	Published in approved ECL86 target datasheet entry; Section1
c in 2	3 pF	Published in approved ECL86 target datasheet entry; Section1
cout 2	5 pF	Published in approved ECL86 target datasheet entry; Section1
ca - g 1	4 pF	Published in approved ECL86 target datasheet entry; Section1
cg - h < 6	0 pF	Published in approved ECL86 target datasheet entry; Section1
gm	10 mA	Published in approved ECL86 target datasheet entry; Section1
gm 1	6 mA	Published in approved ECL86 target datasheet entry; Section1
Yin (r .m. s .) (Po ut =	50 mW	Published in approved ECL86 target datasheet entry; Section1
Yin (r .m .s .) (P out =	50 mW	Published in approved ECL86 target datasheet entry; Section1
Yin (r .m .s .) (P out = 50 mW) 480	520 mV	Published in approved ECL86 target datasheet entry; Section1

1967 MULLARD RECEIVING AND AMPLIFYING VALVES

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
c ap - gt <	0.006 pF	Published in approved ECL86 target datasheet entry; Section2

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
c at - gl <	0.2 pF	Published in approved ECL86 target datasheet entry; Section2
(cgt - gl <	0.02 pF	Published in approved ECL86 target datasheet entry; Section2
c at - ap <	0.15 pF	Published in approved ECL86 target datasheet entry; Section2
cin	10 pF	Published in approved ECL86 target datasheet entry; Section2
ca - gl <	0.4 pF	Published in approved ECL86 target datasheet entry; Section2
c in 2	3 pF	Published in approved ECL86 target datasheet entry; Section2
c out 2	5 pF	Published in approved ECL86 target datasheet entry; Section2
ca - g 1	4 pF	Published in approved ECL86 target datasheet entry; Section2
cg - h < 6	0 pF	Published in approved ECL86 target datasheet entry; Section2
gm	10 mA	Published in approved ECL86 target datasheet entry; Section2
gm 1	6 mA	Published in approved ECL86 target datasheet entry; Section2
Yin (r .m. s .) (Po ut =	50 mW	Published in approved ECL86 target datasheet entry; Section2
Yin (r .m .s .) (P out =	50 mW	Published in approved ECL86 target datasheet entry; Section2
Yin (r .m .s .) (P out = 50 mW) 480	520 mV	Published in approved ECL86 target datasheet entry; Section2



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1968 Mazda Belvu

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1968 MAZDA BELVU

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	700 mA	Nominal
Maximum Plate Voltage	300 V	—
Maximum Plate Dissipation	1 W	—
Maximum Cathode Current	12 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	1600 μ S	Typical
Amplification Factor	100	Typical
Plate Resistance	50000 ohm	Typical

1968 MAZDA BELVU

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	700 mA	Nominal
Maximum Plate Voltage	550 V	—
Maximum Screen Voltage	300 V	—
Maximum Plate Dissipation	9 W	—
Maximum Screen Dissipation	2.5 W	—
Maximum Cathode Current	65 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	10000 μ S	Typical
Amplification Factor	10	Typical
Plate Resistance	20000 ohm	Typical



SOURCE DATA APPENDIX

1971 RCA HB3 Binder 5 of 7

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1971 RCA HB3 BINDER 5 OF 7

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage nominal	6.3 V	—
Heater current nominal	660 mA	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage (AC or DC)	6.3 V	Published source row
Current at heater volts =	6.3 V	Published table column
Peak heater–cathode voltage	100 V	Published source row

1971 RCA HB3 BINDER 5 OF 7

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage nominal	6.3 V	—
Heater current nominal	660 mA	—
Plate Supply Voltage	550 V	Published source row
Plate Supply Voltage (value 2)	550 V	Published source row
Plate Voltage	300 V	Published source row
Plate Voltage (value 2)	300 V	Published source row
Grid-No	2 V	Published source row
Grid-No (value 2)	550 V	Published source row
Grid-No	2 V	Published source row
Grid-No (value 2)	300 V	Published source row
Average Cathode Current	4 mA	Published source row
Average Cathode Current (value 2)	55 mA	Published source row

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No	2 W	Published source row
Grid-No (value 2)	1.8 W	Published source row
Plate Dissipation	0.5 W	Published source row
Plate Dissipation (value 2)	9 W	Published source row
Grid-No.1 Voltage at grid No	1 V	Published source row
Grid-No.1 Voltage at grid No (value 2)	0.3 V	Published source row
Grid-No.1 Voltage at grid No (value 3)	-1.3 V	Published source row
Grid-No	1	Published source row

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage (AC or DC)	6.3 V	Published source row
Current at heater volts =	0.66 V	Published table column
Peak heater-cathode voltage	100 V	Published source row
Plate Voltage	250 V	Published source row
Plate Voltage (value 2)	250 V	Published source row
Grid No	2 V	Published source row
Grid No (value 2)	250 V	Published source row
Grid No	1 V	Published source row
Grid No (value 2)	-1.9 V	Published source row
Grid No (value 3)	-7 V	Published source row
Plate Resistance (Approx.)	48000 ohm	Published source row
Transconductance	1600 μ S	Published source row
Transconductance (value 2)	10000 μ S	Published source row
Plate Current	1.2 mA	Published source row
Plate Current (value 2)	36 mA	Published source row
Grid-No	2 mA	Published source row
Grid-No (value 2)	6 mA	Published source row



SOURCE DATA APPENDIX

1972 Philips Receiving Tubes

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1972 PHILIPS RECEIVING TUBES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	660 mA	Nominal
Maximum Plate Voltage	300 V	—
Maximum Plate Dissipation	0.5 W	—
Maximum Cathode Current	12 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	1600 μS	Typical
Amplification Factor	100	Typical
Plate Resistance	50000 ohm	Typical

1972 PHILIPS RECEIVING TUBES

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	660 mA	Nominal
Maximum Plate Voltage	550 V	—
Maximum Screen Voltage	300 V	—
Maximum Plate Dissipation	9 W	—
Maximum Screen Dissipation	2.5 W	—
Maximum Cathode Current	65 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	10000 μS	Typical

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Amplification Factor	10	Typical
Plate Resistance	20000 ohm	Typical



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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1973 Mazda Valves Binder 2

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1973 MAZDA VALVES BINDER 2

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage Vh	63 V	—
Heater Current Ih	660 mA	—
Maximum Anode Dissipation pa(max) 05	90 W	—
Maximum Screen Grid Dissipation Pga(max) —	18 W	—
Maximum Anode Supply Voltage (Ia = 0) Va(b)max 550	550 V	—
Maximum Anode Voltage Va(max) 300	300 V	—
Maximum Screen Grid Supply Voltage (I\$ 2 = 0) Vga(b)max	550 V	—
Maximum Screen Grid Voltage Vg2(max)	300 V	—
Maximum Heater to Cathode Voltage Vh-k(max) 100	100 V	—
Maximum Cathode Current Ik(max) 4.0	55 mA	—
Grid 1 to Heater Cg1-h <	0.24 pF	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
For speech and music —	3 W	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pentode input cin(p)	10 pF	—
Grid 1 to Anode Pentode Cgs-ap <	0.4 pF	—
Triode Input Cin(t)	2.3 pF	—
Triode Output Cout(t)	2.5 pF	—
Grid Triode to Anode Triode Cgt-at	1.4 pF	—



SOURCE OPERATING CONDITIONS

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1975 RCA RC30

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1975 RCA RC30

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Supply Voltage 550	550 V	Published in approved ECL86 target datasheet entry; Section1
Plate Voltage 300	300 V	Published in approved ECL86 target datasheet entry; Section1
Grid-No.2 (Screen-Grid) Supply Voltage	550 V	Published in approved ECL86 target datasheet entry; Section1
Grid-No.2 Voltage	300 V	Published in approved ECL86 target datasheet entry; Section1
Cathode Current 4	55 mA	Published in approved ECL86 target datasheet entry; Section1
Plate Dissipation 0.5	9 W	Published in approved ECL86 target datasheet entry; Section1
Grid-No.2 Input	1.5 W	Published in approved ECL86 target datasheet entry; Section1
Plate Voltage 250	250 V	Published in approved ECL86 target datasheet entry; Section1
Grid-No. 1-Circuit Resistance, for fixed-bias operation 1	0.5 MΩ	Published in approved ECL86 target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage (ac/dc)	6.3 V	Published in approved ECL86 target datasheet entry; Section1
Heater Current	400 mA	Published in approved ECL86 target datasheet entry; Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.1 Voltage	-1.9 V	Published in approved ECL86 target datasheet entry; Section1
Plate Current 1.2	36 mA	Published in approved ECL86 target datasheet entry; Section1

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
andInternal Shield	2.3 pF	Published in approved ECL86 target datasheet entry; Section1
Grid No.1 to Plate	0.005 pF	Published in approved ECL86 target datasheet entry; Section1
Internal Shield	3.3 pF	Published in approved ECL86 target datasheet entry; Section1
Grid No.1 to Grid No.2	1.6 pF	Published in approved ECL86 target datasheet entry; Section1

1975 RCA RC30

Section 2 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Supply Voltage 550	550 V	Published in approved ECL86 target datasheet entry; Section2
Plate Voltage 300	300 V	Published in approved ECL86 target datasheet entry; Section2
Grid-No.2 (Screen-Grid) Supply Voltage	550 V	Published in approved ECL86 target datasheet entry; Section2
Grid-No.2 Voltage	300 V	Published in approved ECL86 target datasheet entry; Section2
Cathode Current 4	55 mA	Published in approved ECL86 target datasheet entry; Section2
Plate Dissipation 0.5	9 W	Published in approved ECL86 target datasheet entry; Section2

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.2 Input	1.5 W	Published in approved ECL86 target datasheet entry; Section2
Plate Voltage 250	250 V	Published in approved ECL86 target datasheet entry; Section2
Grid-No. 1-Circuit Resistance, for fixed-bias operation 1	0.5 MΩ	Published in approved ECL86 target datasheet entry; Section2
Heater Voltage (ac/dc)	6.3 V	Published in approved ECL86 target datasheet entry; Section2
Heater Current	400 mA	Published in approved ECL86 target datasheet entry; Section2

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.1 Voltage	-1.9 V	Published in approved ECL86 target datasheet entry; Section2
Plate Current 1.2	36 mA	Published in approved ECL86 target datasheet entry; Section2

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
andInternal Shield	2.3 pF	Published in approved ECL86 target datasheet entry; Section2
Grid No.1 to Plate	0.005 pF	Published in approved ECL86 target datasheet entry; Section2
Internal Shield	3.3 pF	Published in approved ECL86 target datasheet entry; Section2
Grid No.1 to Grid No.2	1.6 pF	Published in approved ECL86 target datasheet entry; Section2



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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1999 Philips E-Z

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1999 PHILIPS E-Z

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode current I	1.2 mA	Published datasheet value
Transconductance S	1.6 mA/V	Published datasheet value
Anode current Ia	36 mA	Published datasheet value
Transconductance S	10 mA/V	Published datasheet value
Output power Wy	4 W	Published datasheet value
Heater voltage V _h	6.3 V	Published datasheet value
Heater current I _h	660 mA	Published datasheet value

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode to all except grid Ca(g)	2.5 pF	Published datasheet value
Grid to all except anode Cg(a)	2.3 pF	Published datasheet value
Anode to grid Cag	1.4 pF	Published datasheet value
Grid to heater Cgt max	0.006 pF	Published datasheet value
Grid No.1 to all except anode Cgl(a)	10 pF	Published datasheet value
Anode to grid No.1 Cagl max	0.4 pF	Published datasheet value
Grid No.1 to heater Cglf max	0.24 pF	Published datasheet value
Anode triode to grid No.1 pentode CaTgIP max	0.2 pF	Published datasheet value
Grid triode to grid No.1 pentode CnglP max	0.02 pF	Published datasheet value

TUBE TINKER

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