



ELECTRONIC TUBE REFERENCE

ECH81

Voltage - Triode (with diode, heptode or hexode) electronic tube

CONSOLIDATED TECHNICAL
DATA

2 SECTIONS
CONSTRUCTION
HEXODE-TRIODE

Widely used triode-heptode frequency changer for AM and FM receivers. The triode normally serves as local oscillator while the heptode performs mixing and conversion with good circuit isolation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B9A	BASE PINS	9
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
PLATE RESISTANCE	19000 Ω
TRANSCONDUCTANCE	0.0038 S
AMPLIFICATION FACTOR	22
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	0.8 W
MAXIMUM CATHODE CURRENT	6.5 mA
<i>Published maximum ratings/characteristics promoted from source.</i>	

SECTION2 Hexode	
PLATE RESISTANCE	3000000 Ω
TRANSCONDUCTANCE	0.000775 S
AMPLIFICATION FACTOR	25
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	100 V
MAXIMUM PLATE DISSIPATION	2 W
MAXIMUM SCREEN DISSIPATION	1 W
MAXIMUM CATHODE CURRENT	12.5 mA
<i>Published maximum ratings/characteristics promoted from source.</i>	

Triode-heptode for oscillator and frequency-converter service in radio receivers.

SOURCE OPERATING CONDITIONS

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1953 La Radiotechnique

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1953 LA RADIOTECHNIQUE

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Chauffage : Indirect (cathode isolee du filament). vf	63 V	Triode
Alimentation du filament en serie ou en parallele. If	300 mA	Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Tension de l'anode	100 V	Triode
Tension de la grille	2 V	Triode
Courant anodique	73 mA	Triode
Tension de l'anode	250 V	Triode
Puissance dissipee sur l'anode	8 W	Triode
Resistance du circuit de grille	3 Mohm	Triode
Courant cathodique	6.5 mA	Triode
Tension entre filament et cathode. V _{kf}	100 V	Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
00es Cor	42 pF	Triode
Capacite de l'anode	3.9 pF	Triode
Capacite anode-grille	0 a	Triode
00 Caror	1 pF	Triode

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Capacite d'entree de l'heptode	68 pF	Triode

1953 LA RADIOTECHNIQUE

Section 2 · Hexode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Haute tension	250 V	Heptode
Resistance du circuit de lagrille3	47 kohm	Heptode
Tension de la grille 4	29 V	Heptode
Tension des grilles 2 et 4	250 V	Heptode
Resistance interne	3 Mohm	Heptode
Capacite de la grille 1	62 pF	Heptode
Capacite de la grille 3	5.2 pF	Heptode
Capacite anode-grille 14.11.02s cnc en n Caug, < 0,01 pF	0.01 pF	Heptode
Tension des grilles 2 et 4	125 V	Heptode
Tension des grilles 2 et 4 (I _a < 1mA) V _g (a+ 00	300 V	Heptode
Courant cathodique	12.5 mA	Heptode



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1953 RFT Rundfunk Technik

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1953 RFT RUNDFUNK TECHNIK

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	250 V	—
Maximum Plate Dissipation	1.5 W	—
Maximum Cathode Current	15 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	3800 μ S	Typical
Amplification Factor	22	Typical
Plate Resistance	19000 ohm	Typical

1953 RFT RUNDFUNK TECHNIK

Section 2 · Hexode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal
Maximum Plate Voltage	300 V	—
Maximum Screen Voltage	250 V	—
Maximum Plate Dissipation	1.5 W	—
Maximum Screen Dissipation	1 W	—
Maximum Cathode Current	25 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	775 μ S	Typical
Plate Resistance	1000000 ohm	Typical



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1955 Marconi

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1955 MARCONI

Section 1 · Triode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Oscillator section function	Local oscillator	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Oscillator anode voltage	250 V	—

1955 MARCONI

Section 2 · Hexode

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Mixer section identity	Heptode	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Mixer anode voltage	250 V	—
Mixer screen voltage	100 V	—

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Frequency-changer service	Explicit	—



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195X Tesla

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195X TESLA

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	250 V	—
Maximum Plate Dissipation	1.5 W	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	3800 μ S	Typical
Amplification Factor	22	Typical

195X TESLA

Section 2 · Hexode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal
Maximum Plate Voltage	300 V	—
Maximum Screen Voltage	100 V	—



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SOURCE OPERATING CONDITIONS

1961 Ferranti Technical Handbook

SOURCE PDF

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

1961 FERRANTI TECHNICAL HANDBOOK

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	300 mA	—

1961 FERRANTI TECHNICAL HANDBOOK

Section 2 · Hexode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Frequency changer RF or IF amplifier	—

SOURCE OPERATING CONDITIONS

1963 Amperex Condensed

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1963 AMPEREX CONDENSED

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical plate voltage	250 V	Section1
Typical grid voltage	0 V	Section1
Typical plate current	13.5 mA	Section1

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Amplification factor	22	Section1
Plate resistance	33 k0hm	Section1
Transconductance	2400 uS	Section1

1963 AMPEREX CONDENSED

Section 2 · Hexode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical plate voltage	250 V	Section2
Typical screen voltage	100 V	Section2
Typical control-grid voltage	-2 V	Section2
Typical plate current	6.5 mA	Section2
Typical screen current	3.8 mA	Section2

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	650 uS	Section2



SOURCE OPERATING CONDITIONS

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1963 Philips Electron Tubes Handbook V1a

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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	300 mA	Published heater rating
Triode transconductance	3700 μS	TriodeSection
Triode amplification factor	22	TriodeSection
Conversion transconductance	650 μS	Converter

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Triode plate voltage	100 V	TriodeSection
Triode plate current	13.5 mA	TriodeSection
Oscillator triode plate current	4.5 mA	TriodeSection Oscillator



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1967 Mullard Receiving Tubes for Maintenance

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1967 MULLARD RECEIVING TUBES FOR MAINTENANCE

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	100 V	—
Plate current	13.5 mA	—
Grid voltage	0 V	—
Transconductance	3.7 mA/V	—
Amplification factor	22	—
Plate resistance	6 kΩ	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Supply voltage	250 V	RF Oscillator
Oscillator plate current	4.5 mA	RF Oscillator
Effective transconductance	650 μA/V	RF Oscillator
Maximum plate voltage	250 V	—
Maximum plate dissipation	0.8 W	—
Maximum cathode current	6.5 mA	—

1967 MULLARD RECEIVING TUBES FOR MAINTENANCE

Section 2 · Hexode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	160 V	—
Screen-grid voltage	100 V	—
Control-grid voltage	-0.5 V	—
Plate current	11 mA	—
Screen-grid current	7 mA	—
Transconductance	4.5 mA/V	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	300 V	—
Maximum plate dissipation	2 W	—
Maximum screen-grid voltage	125 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum screen-grid dissipation	0.8 W	—
Maximum cathode current	18 mA	—



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1968 Mazda Belvu

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1968 MAZDA BELVU

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Published nominal value
Heater current	300 mA	Published nominal value

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate dissipation	0.8 W	Published maximum rating

1968 MAZDA BELVU

Section 2 · Hexode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	Published nominal value
Heater current	300 mA	Published nominal value

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate dissipation	2 W	Published maximum rating
Application	Oscillator-frequency converter	Printed source application



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1972 Philips Receiving Tubes

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1972 PHILIPS RECEIVING TUBES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal
Maximum Plate Voltage	550 V	—
Maximum Plate Dissipation	0.8 W	—
Maximum Cathode Current	15 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	3700 µS	Typical
Amplification Factor	22	Typical
Plate Resistance	6000 ohm	Typical

1972 PHILIPS RECEIVING TUBES

Section 2 · Hexode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	300 mA	Nominal
Maximum Plate Voltage	550 V	—
Maximum Screen Voltage	250 V	—
Maximum Plate Dissipation	2 W	—
Maximum Screen Dissipation	0.8 W	—
Maximum Cathode Current	25 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	4500 µS	Typical

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Amplification Factor	25	Typical
Plate Resistance	800000 ohm	Typical



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1973 Mazda Valves Binder 2

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1973 MAZDA VALVES BINDER 2

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage Vi,	63 V	—
Heater Current Ih	3 A	—
Maximum Anode Dissipation pa(max) 08	17 W	—
Maximum Screen Grids Dissipation pB2 +\$4(max) —	1 W	—
Maximum Anode Voltage Va(max) 250	300 V	—
Maximum Screen Grids Voltage V\$2 +84(max) —	125 V	—
Maximum Screen Grids Voltage (l a <1mA) —	300 V	—
Maximum Mean Cathode Current Ik(av)max 65	125 mA	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Output Cout 21	79 pF	—
Input (g1) Cin(g1) 26	48 pF	—
Input (g3) Ci^(ga) —	6 pF	—
Grid 1 to Anode Cg1-a 1 <	6 pF	—
Grid 1 to Grid 3 cgl-g3 — <	3 pF	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid 1 to Grid 3, Grid Triode agl-g3gt <	45 pF	—
Grid 1 to Grid Triode Cgl-gt <	17 pF	—



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1999 Philips E-Z

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1999 PHILIPS E-Z

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode current I _y	13.5 mA	Published datasheet value
Transconductance S	3.7 mA/V	Published datasheet value
Anode current I _y	11 mA	Published datasheet value
Transconductance S	4.5 mA/V	Published datasheet value
Heater voltage V _s	6.3 V	Published datasheet value
Heater current I _g	300 mA	Published datasheet value

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid to all except anode C _{g(a)}	2.6 pF	Published datasheet value
Anode to all except grid C _{a(g)}	2.1 pF	Published datasheet value
Anode to grid C _{ag}	1 pF	Published datasheet value
Grid to heater C _{gf} max	0.02 pF	Published datasheet value
Grid No.1 to all except anode C _{gl(a)}	4.8 pF	Published datasheet value
Anode to all except grid No.1 C _{a(gl)}	7.9 pF	Published datasheet value
Anode to grid No.1 C _{ag}	1 ma	Published datasheet value

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to heater Cg1f max	0.17 pF	Published datasheet value
Grid No.3 to all Cgs	6 pF	Published datasheet value

TUBE TINKER

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and their source documents.

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