

ELECTRONIC TUBE REFERENCE

6939

Power - Pentode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-RECTIFIER

Industrial twin power pentode for push-pull RF amplification or frequency multiplication at frequencies extending to approximately 500 MHz.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9HL	BASE PINS	9
NOMINAL HEATER	12.6 V / 300 mA	PARALLEL HEATER	6.3 V / 600 mA
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9HL - TERMINAL PINOUT

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

SECTION RATINGS

SECTION1 Pentode	
PLATE RESISTANCE	30000 Ω
TRANSCONDUCTANCE	0.0075 S
AMPLIFICATION FACTOR	31
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	7 W
MAXIMUM SCREEN DISSIPATION	1.5 W
MAXIMUM CATHODE CURRENT	50 mA
<i>Representative row for two identical internally neutralized RF power pentodes.</i>	

SECTION2 Rectifier	
PLATE RESISTANCE	30000 Ω
TRANSCONDUCTANCE	0.0075 S
AMPLIFICATION FACTOR	31
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	300 V
MAXIMUM PLATE DISSIPATION	7 W
MAXIMUM SCREEN DISSIPATION	1.5 W
MAXIMUM CATHODE CURRENT	50 mA
<i>Identical second physical Pentode section; duplicated from representative section per physical-section-row policy.</i>	

Industrial twin power pentode for push-pull RF power amplification or frequency multiplication to 500 MHz.



SOURCE OPERATING CONDITIONS

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1938 Raytheon

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

1938 RAYTHEON

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal
HeaterCurrentNominal	600 mA	Nominal
Maximum Plate Voltage	250 V	—
Maximum Screen Voltage	200 V	—
Maximum Cathode Current	60 mA	—
MaximumCathodeCurrentPerSection	60 mA	Telegraph intermittent service
Heater Voltage Series	12.6 V	Series
Heater Voltage Parallel	6.3 V	Parallel

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	10500 μ S	Typical



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1940 RCA

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1940 RCA

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterVoltageNominal	6.3 V	Nominal

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterCurrentNominal	600 mA	Nominal
Maximum Plate Voltage	250 V	—
Maximum Screen Voltage	200 V	—
Maximum Plate Dissipation	7.5 W	—
Maximum Cathode Current	120 mA	—
Maximum Frequency	500 MHz	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	10500 μ S	Typical
Amplification Factor	31	Typical
Useful Power Output	6 W	PushPull; ICAS; 500 MHz



SOURCE DATA APPENDIX

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1959 Telefunken

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1959 TELEFUNKEN

Section 1 · Pentode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	RF amplifier / oscillator / frequency multiplier	—

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Internal neutralization	Yes	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Class-C operation	Published	ClassC

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1963 Amperex Condensed

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1963 AMPEREX CONDENSED

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate dissipation CCS	6 W	TwinTube CCS
Maximum plate dissipation ICAS	7.5 W	TwinTube ICAS
Plate voltage	180 V	CCS ClassC
Plate current per section	27 mA	CCS ClassC
Power output	5.8 W	CCS ClassC
Grid voltage	-20 V	CCS ClassC
Grid current	0.75 mA	CCS ClassC
Screen voltage	180 V	CCS ClassC
Plate voltage	200 V	ICAS ClassC
Plate current per section	30 mA	ICAS ClassC
Power output	7.5 W	ICAS ClassC
Grid voltage	-20 V	ICAS ClassC
Grid current	0.75 mA	ICAS ClassC
Screen voltage	200 V	ICAS ClassC

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum frequency	500 MHz	FullInput
Grid-to-plate capacitance per section	0.15 pF	PerSection
Input capacitance per section	6.4 pF	PerSection

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Output capacitance per section	1.6 pF	PerSection



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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1971 RCA HB3 Binder 3 of 7

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

1971 RCA HB3 BINDER 3 OF 7

Section 1 · Pentode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage series	12.6 V	—
Heater current series	300 mA	—
Heater voltage parallel	6.3 V	—
Heater current parallel	600 mA	—
Class C plate voltage ICAS	300 V	PushPull;RF
Class C plate current ICAS	50 mA	EachSection
Class C grid current	10 mA	EachSection
CW plate input ICAS	14 W	UpTo500MHz
Operating frequency	500 MHz	FullRFPower

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	150 V	EachSection
Screen voltage	150 V	EachSection
Plate current	25 mA	EachSection
Transconductance	7500 uS	EachSection

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-to-plate capacitance	0.02 pF	InternallyNeutralized

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 · Pentode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No.1 to Plate	0.15 pF	Capacitance
Grid No.1 to Cathode & Grid No.3, Grid No.2, and Heater	6.4 pF	Capacitance
Plate to Cathode & Grid No.3, Grid No.2, and Heater	1.6 pF	Capacitance
No. 2 volts = 150, and dc plate mA = 25	10500 V	Capacitance
= 150, dc grid No.2 volts = 150, and dc plate mA = 25	31 V	Capacitance

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC Plate Voltage	250 V	MaximumRatings;PublishedValue1
DC Plate Voltage	250 V	MaximumRatings;PublishedValue2
DC Grid-No.2 (Screen-Grid) Voltage	200 V	MaximumRatings;PublishedValue1
DC Grid-No.2 (Screen-Grid) Voltage	200 V	MaximumRatings;PublishedValue2
DC Grid-No.1 (Control-Grid) Voltage	-100 V	MaximumRatings;PublishedValue1
DC Grid-No.1 (Control-Grid) Voltage	-100 V	MaximumRatings;PublishedValue2
DC Plate Current	90 mA	MaximumRatings;PublishedValue1
DC Plate Current	100 mA	MaximumRatings;PublishedValue2
DC Grid-No.1 Current	8 mA	MaximumRatings
DC Cathode Current	100 mA	MaximumRatings;PublishedValue1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC Cathode Current	120 mA	MaximumRatings;PublishedValue2
Plate Input	12 W	MaximumRatings;PublishedValue1
Plate Input	14 W	MaximumRatings;PublishedValue2
Grid-No.2 Input	3 W	MaximumRatings;PublishedValue1
Grid-No.2 Input	3.5 W	MaximumRatings;PublishedValue2
Grid-No.1 Input	0.2 W	MaximumRatings;PublishedValue1
Grid-No.1 Input	0.24 W	MaximumRatings;PublishedValue2
Plate Dissipation	6 W	MaximumRatings;PublishedValue1
Plate Dissipation	7.5 W	MaximumRatings;PublishedValue2
DC Plate Voltage	180 V	TypicalOperation;PublishedValue1
DC Plate Voltage	200 V	TypicalOperation;PublishedValue2
DC Grid-No.2 Voltage	180 V	TypicalOperation;PublishedValue1
DC Grid-No.2 Voltage	200 V	TypicalOperation;PublishedValue2
DC Grid-No.1 Voltage	-20 V	TypicalOperation;PublishedValue1
DC Grid-No.1 Voltage	-20 V	TypicalOperation;PublishedValue2
From grid resistor for each grid No.1	27000 ohm	TypicalOperation;PublishedValue1
From grid resistor for each grid No.1	27000 ohm	TypicalOperation;PublishedValue2
Peak-to-Peak RF Grid-No.1 Voltage	50 V	TypicalOperation;PublishedValue1
Peak-to-Peak RF Grid-No.1 Voltage	50 V	TypicalOperation;PublishedValue2
DC Plate Current	55 mA	TypicalOperation;PublishedValue1
DC Plate Current	60 mA	TypicalOperation;PublishedValue2
DC Grid-No.2 Current	12.5 mA	TypicalOperation;PublishedValue1
DC Grid-No.2 Current	14 mA	TypicalOperation;PublishedValue2
DC Grid-No.1 Current	1.5 mA	TypicalOperation;PublishedValue1
DC Grid-No.1 Current	1.5 mA	TypicalOperation;PublishedValue2
Driver Power Output (Approx.)	1.2 W	TypicalOperation;PublishedValue1
Driver Power Output (Approx.)	1.2 W	TypicalOperation;PublishedValue2
Useful Power Output (Approx.)*	5 W	TypicalOperation;PublishedValue1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Useful Power Output (Approx.)*	6 W	TypicalOperation;PublishedValue2
DC Plate Voltage	200 V	MaximumRatings;PublishedValue1
DC Plate Voltage	200 V	MaximumRatings;PublishedValue2