



ELECTRONIC TUBE REFERENCE

6SA7

Voltage Radio Detector Converter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

HEPTODE

Widely used pentagrid oscillator-converter for superheterodyne receivers. Its multi-grid structure combines local oscillation and mixing in one tube, making it a common receiver frequency changer.

GENERAL CHARACTERISTICS

BASE DESIGNATION	RETMA 8R	BASE PINS	8
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Heptode	
PLATE RESISTANCE	500000 Ω
TRANSCONDUCTANCE	0.00045 S
MAXIMUM PLATE VOLTAGE	300 V
MAXIMUM SCREEN VOLTAGE	100 V
MAXIMUM PLATE DISSIPATION	1 W
MAXIMUM SCREEN DISSIPATION	1 W
MAXIMUM CATHODE CURRENT	14 mA
<i>Conversion and oscillator characteristics are preserved as parameters rather than promoted as generic transconductance.</i>	

Single-ended pentagrid converter for oscillator and mixer frequency-conversion service.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · Heptode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE (A.C. or D.C.)	6.3 V	HEATER VOLTAGE (A.C. or D.C.) 6.3 Volts
HEATER CURREN	300 mA	HEATER CURREN 0.3 Ampere
Plate to All Other Electrodes (Mnxer Qutput) ©	12 pF	Plate to All Other Electrodes (Mnxer Qutput) © 12 puf
Grid #3 to Plate © 0.13 max, uuf	0.13 pF	Grid #3 to Plate © 0.13 max, uuf
Grid #1 to Grid #3 © 0,15 max., uuf	15 pF	Grid #1 to Grid #3 © 0,15 max., uuf
Grid f1 to Plate© 0.06 max. puf	0.06 pF	Grid f1 to Plate© 0.06 max. puf
PLATE VOLTAGE 250 max, Volts	250 V	PLATE VOLTAGE 250 max, Volts
GRIDS #2 & #UI VOLTAGE 100 max. Volts	100 V	GRIDS #2 & #UI VOLTAGE 100 max. Volts
TOTAL CATHODE CURRENT 14 max, Milliamperes	14 mA	TOTAL CATHODE CURRENT 14 max, Milliamperes
Heater vVoltageD 6.3 6.3 6.3	6.3 V	Heater vVoltageD 6.3 6.3 6.3 6.3 volts
Plate voltage 100 250 100	250 V	Plate voltage 100 250 100 250 volts
Grids #f2 & i4 voltage 100 100 100	100 V	Grids #f2 & i4 voltage 100 100 100 100 Volts
Volta3 0 0 -2	-2 V	Volta3 0 0 -2 -2 Volts
Shell & Grid ¥5 Voltage 0 0 0	0 V	Shell & Grid ¥5 Voltage 0 0 0 0 Volts
Grid #1 Resistor 20000 20000 20000	20000 ohm	Grid #1 Resistor 20000 20000 20000 20000 ohms
Conversion Yranscond, 425 450 125	450 µS	Conversion Yranscond, 425 450 125 450 Micromhos

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
= 5 micromhos -35 -35 -35	-35 V	= 5 micromhos -35 -35 -35 -35 volts
Plate Current 3.2 3.4 3.2	3.4 mA	Plate Current 3.2 3.4 3.2 3.4 Milliamperes
Grids #2 & #4 Current 8 8 8	8 mA	Grids #2 & #4 Current 8 8 8 8 Milliamperes
Grid #1 Current 0.5 0.5 0.5	0.5 mA	Grid #1 Current 0.5 0.5 0.5 0.5 Milliampere
(not osciltating) is approximately 4500 micromhos under the following	4500 μS	(not osciltating) is approximately 4500 micromhos under the following
3 at	0 V	3 at 0 volts
2 & Fu } at	100 V	2 & Fu } at 100 volts
feedback of approximately 2 volts peak in the cathode circuit	2 V	feedback of approximately 2 volts peak in the cathode circuit.
MA X	5 mA	MA X 25/5"
grid toplate: (g3 to D) mBR. , . & . φ 4o φ « o o a φ o s o o o 0,	25 pF	grid toplate: (g3 to D) mBR. , . & . φ 4o φ « o o a φ o s o o o 0,25 puf
Oscillator grid to plate: (gL t0 D) MBX. . v « o o o o o 2 o o o o » 0,	6 pF	Oscillator grid to plate: (gL t0 D) MBX. . v « o o o o o 2 o o o o » 0,06 uuf
tP)e « φ o o φ o o o s o φ o +	3 pF	tP)e « φ o o φ o o o s o φ o + 3 puf.
(BC OF GC). 4 φ o o o o o φ o o oo s s s s s s o o s o	6.3 V	(BC OF GC). 4 φ o o o o o φ o o oo s s s s s s o o s o 6.3 volts
Maximum heater-cathode vOlta8g6 . . o« φ« φ o « « o o o v o o φ « o = » o	90 V	Maximum heater-cathode vOlta8g6 . . o« φ« φ o « « o o o v o o φ « o = » o 90 volts
Mumphtevoltageo '.....'~...;.o' _	300 V	Mumphtevoltageo '.....'~...;.o' _.....300 v°lt5
Maximum grids #2 and #4 vOltAZE., . v.. v & φ « o o o o « o » o o o »	100 V	Maximum grids #2 and #4 vOltAZE., . v.. v & φ « o o o o « o » o o o » 100 vOlts
Maximum grids #2 and #k4 supply VOltBEE . . v « φ « o « o « = &+ o « « o	300 V	Maximum grids #2 and #k4 supply VOltBEE . . v « φ « o « o « = &+ o « « o 300 vOlts
Minimum negative φ grid #3 VOLLABEE. + o φ o « o o o o o o o o o =	50 V	Minimum negative φ grid #3 VOLLABEE. + o φ o « o o o o o o o o o =50 vOlts
Maximum positive dc grid #3 VOltBEe.v o o « o o o oo o o o o o o o «	0 V	Maximum positive dc grid #3 VOltBEe.v o o « o o o oo o o o o o o o « 0 volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate dissipation, ... P e	1 W	Maximum plate dissipation, ... P e 1.0 watts
Maximum grids #2 and #4 dissipation.~. e s o o s 0 o s e e o e ees 1,	0 W	Maximum grids #2 and #4 dissipation.~. e s o o s 0 o s e e o e ees 1,0 watts
Heater voltage, ... 6.3	6.3 V	Heater voltage, ... 6.3 6.3 volts
Heater current,	300 mA	Heater current, ... 300 ma
Plate voltage	100 V	Plate voltage 100 volts

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance (Approx.) 0.5 0.8 0.5	0.8 ohm	Plate Resistance (Approx.) 0.5 0.8 0.5 0.8 Megohm


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Heptode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Primary application	Pentagrid frequency converter	—


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1953 RFT Rundfunk Technik

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

1953 RFT RUNDFUNK TECHNIK

Section 1 · Heptode

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	—
Maximum Plate Dissipation	1 W	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transconductance	450 μ S	Typical
Plate Resistance	1000000 ohm	Typical



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

SOURCE PDF

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Heptode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	300 mA	—
Plate voltage	300 V	Typical operating conditions
Plate current	3.33.53.33.5 mA	Typical operating conditions



SOURCE DATA APPENDIX

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO
Section 1 · Heptode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Voltage	250 V	Converter
Screen Voltage	100 V	Converter

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate Resistance	1 Mohm	Converter
Conversion Transconductance	450 uS	Converter
Oscillator Amplification Factor	14	Oscillator
Oscillator Transconductance	4500 uS	Oscillator



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 · Heptode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage	6.3 V	Published datasheet value; multiple values represent separate source-table limits or conditions.
Current	300 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid 83 to Al l Other Et ect codes lR-F Input) 9.5~ – published value 1	83	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid 83 to Al l Other Et ect codes lR-F Input) 9.5~ – published value 2	9.5	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid NI to Al l – published value 1	7	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid NI to Al l – published value 2	8	Published datasheet value; multiple values represent separate source-table limits or conditions.
Electrodes except Cathode	4.4	Published datasheet value; multiple values represent separate source-table limits or conditions.
Cathode h Grid aM5	5	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid 81 to Cathode – published value 1	81	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid 81 to Cathode – published value 2	26	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid #I to Cathode 6 Grid #5 – published value 1	6 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid #I to Cathode 6 Grid #5 – published value 2	5 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid #I to Cathode 6 Grid #5 – published value 3	3 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
Electrodes except Grid kl	5 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
Cathode and Grid 4'5 to Al l Other – published value 1	4	Published datasheet value; multiple values represent separate source-table limits or conditions.
Cathode and Grid 4'5 to Al l Other – published value 2	5	Published datasheet value; multiple values represent separate source-table limits or conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
El ect codes except Grid 1M1 – published value 1	1 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
El ect codes except Grid 1M1 – published value 2	14 pF	Published datasheet value; multiple values represent separate source-table limits or conditions.
f6SA7,Shell,Grid #5 – published value 1	5	Published datasheet value; multiple values represent separate source-table limits or conditions.
f6SA7,Shell,Grid #5 – published value 2	8	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 2 -Heater	2	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 3 -Plate	3	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 4 -Grids #2 d #4 – published value 1	4	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 4 -Grids #2 d #4 – published value 2	2	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 4 -Grids #2 d #4 – published value 3	4	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 5 -Grid #1 – published value 1	5	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 5 -Grid #1 – published value 2	1	Published datasheet value; multiple values represent separate source-table limits or conditions.
Ping 6SA7,Cathode – published value 1	6	Published datasheet value; multiple values represent separate source-table limits or conditions.
Ping 6SA7,Cathode – published value 2	0	Published datasheet value; multiple values represent separate source-table limits or conditions.
6SA7-GT/G,Cathode h	6	Published datasheet value; multiple values represent separate source-table limits or conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid #5	5	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 7 -Heater	7	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 8 -Grid #3 – published value 1	8	Published datasheet value; multiple values represent separate source-table limits or conditions.
Pin 8 -Grid #3 – published value 2	3	Published datasheet value; multiple values represent separate source-table limits or conditions.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid JFS to Plate – published value 1	0.13 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid JFS to Plate – published value 2	0.5 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid ~LS to Grid NI – published value 1	0 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid ~LS to Grid NI – published value 2	15 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid ~LS to Grid NI – published value 3	0.4 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid k1 to Plate – published value 1	0.06 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.
Grid k1 to Plate – published value 2	0.2 mA	Published datasheet value; multiple values represent separate source-table limits or conditions.