



ELECTRONIC TUBE REFERENCE

17C8

Voltage - Pentode or Tetrode (with diode) electronic tube

CONSOLIDATED TECHNICAL DATA

3 SECTIONS

CONSTRUCTION

DIODE-DIODE-PENTODE

Double-diode remote-cutoff pentode designed for RF, IF, or AF amplification together with receiver detection functions.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	17 V / 100 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Capable
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Diode	
MAXIMUM CATHODE CURRENT	0.8 mA
PEAK INVERSE VOLTAGE	350 V
PEAK FORWARD CURRENT	5 mA
<i>Rogers 17C8 first detector diode of double-diode remote-cutoff pentode. Shared unipotential cathode with both diodes and pentode, using 17 V 100 mA series heater. Maximum mean anode current per diode 0.8 mA, maximum peak forward current 5 mA and peak inverse voltage 350 V. These peak values are not unconditional forward DC plate-voltage ratings. Manufacturer publishes individual capacitances.</i>	

SECTION2 Diode	
MAXIMUM CATHODE CURRENT	0.8 mA
PEAK INVERSE VOLTAGE	350 V
PEAK FORWARD CURRENT	5 mA
<i>Rogers 17C8 second physical detector diode, common cathode with first diode and remote-cutoff amplifier pentode. Each diode rated 0.8 mA mean current, 5 mA peak forward current, 350 V peak inverse anode voltage. Heater 17 V 0.1 A, appropriate for series string; published interelectrode capacitances. Peak current and reverse voltage limits must be kept separate from continuous current.</i>	

SECTION3 Pentode	
PLATE RESISTANCE	1000000 Ω
TRANSCONDUCTANCE	0.0022 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	1.5 W
MAXIMUM SCREEN DISSIPATION	0.3 W
MAXIMUM CATHODE CURRENT	10 mA
<i>Rogers 17C8 remote-cutoff RF/IF/AF amplifier pentode with two detector diodes, common cathode. Maximum operating plate 250 V, plate dissipation 1.5 W, screen dissipation 0.3 W, cathode 10 mA. Screen voltage max 250 V only when plate current below 2 mA; at 5 mA plate current max screen 125 V. No-current 550 V limits are not continuous operating limits. Typical gm 2.2 mA/V and $\sim 1\text{ M}\Omega$ plate resistance in manufacturer 200 V plate/supply circuit with 68 kΩ screen resistor. 17 V 100 mA series heater.</i>	

17C8 — Double Diode-Remote Cutoff Pentode

The **17C8** is a multi-unit vacuum tube containing a remote-cutoff pentode and two independent diodes within a single envelope. Sponsored by Rogers Majestic Electronics, Ltd. and registered under JETEC release number 1865 on March 11, 1957, this tube is designed for use as a radio-frequency (RF), intermediate-frequency (IF), or audio-frequency (AF) amplifier.

Mechanical Specifications and Pinout

The 17C8 features a T6 glass bulb and utilizes an E9-1 base with a 9T RETMA basing designation. The tube is constructed with a coated unipotential cathode. The pin connections are assigned as follows:

Pin Number	Electrode Connection
1	Grid No. 2 (Screen Grid)
2	Grid No. 1 (Control Grid)

Pin Number	Electrode Connection
3	Cathode, internal shield
4	Heater
5	Heater
6	Pentode plate
7	Diode No. 1 plate
8	Diode No. 2 plate
9	Grid No. 3 (Suppressor Grid)

Heater and Maximum Ratings

The heater is designed for series or parallel operation with a nominal voltage of 17 V and a current of 100 mA.

Heater Specifications

- **Heater Voltage:** 17 V
- **Heater Current:** 100 mA
- **Calculated Heater Power:** 1.7 W (calculated as $17\text{ V} \times 0.1\text{ A}$)

The maximum ratings are established separately for the pentode and diode sections. These limits represent the absolute boundaries for safe and reliable operation.

Pentode Section Maximum Ratings

- **Plate Voltage (without current):** 550 V
- **Plate Voltage:** 250 V
- **Plate Dissipation:** 1.5 W
- **Screen Grid (Grid No. 2) Voltage (without current):** 550 V
- **Screen Grid (Grid No. 2) Voltage (plate current < 2 mA):** 250 V
- **Screen Grid (Grid No. 2) Voltage (plate current = 5 mA):** 125 V
- **Screen Grid Dissipation:** 0.3 W
- **Cathode Current:** 10 mA
- **Voltage between Heater and Cathode:** 150 V
- **External Resistance between Heater and Cathode:** 20,000 Ω
- **Maximum Grid No. 1 External Resistance (with cathode bias):** 3 M Ω
- **Maximum Grid No. 1 External Resistance (with grid current biasing only):** 22 M Ω

Diode Sections Maximum Ratings (Each Diode)

- **Peak Plate Inverse Voltage:** 350 V
- **Plate Current:** 0.8 mA
- **Peak Plate Current:** 5 mA
- **Voltage between Heater and Cathode:** 150 V
- **External Resistance between Heater and Cathode:** 20,000 Ω

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the 17C8 determine its performance in high-frequency circuits. The capacitance values are specified as follows:

Pentode Section Capacitances

- **Pentode Grid No. 1 to all other elements:** 4.2 pF
- **Pentode Plate to all other elements:** 4.9 pF
- **Between Pentode Plate and Grid No. 1:** max. 0.0025 pF
- **Between Pentode Grid No. 1 and Heater:** max. 0.07 pF

Diode Sections Capacitances

- **Between Diode No. 1 Plate and Cathode:** 2.2 pF
- **Between Diode No. 2 Plate and Cathode:** 2.35 pF
- **Between Diode Plates:** max. 0.35 pF
- **Between Diode No. 1 Plate and Heater:** max. 0.02 pF
- **Between Diode No. 2 Plate and Heater:** max. 0.005 pF

Cross-Section Capacitances

- **Between Diode No. 1 Plate and Grid No. 1:** max. 0.0008 pF
- **Between Diode No. 2 Plate and Grid No. 1:** max. 0.001 pF
- **Between Diode No. 1 Plate and Pentode Plate:** max. 0.2 pF
- **Between Diode No. 2 Plate and Pentode Plate:** max. 0.05 pF

RF and IF Amplifier Operating Characteristics

When operated as an RF or IF amplifier, the suppressor grid (Grid No. 3) is connected to 0 V. The remote-cutoff characteristic of Grid No. 1 allows for automatic volume control (AVC) or manual gain control over a wide range. Typical operating conditions under three supply voltages are detailed below:

Parameter	Condition A	Condition B	Condition C
Plate and Supply Voltage	200 V	170 V	100 V

Parameter	Condition A	Condition B	Condition C
Grid No. 3 Voltage	0 V	0 V	0 V
Grid No. 2 Series Resistor	68,000 _Ω	47,000 _Ω	47,000 _Ω
Cathode Resistor	295 _Ω	295 _Ω	295 _Ω
Grid No. 1 Voltage	-2 to -31.5 V	-2 to -26.5 V	-1.15 to -15.5 V
Plate Current	5.0 mA to —	5.0 mA to —	2.8 mA to —
Grid No. 2 Current	1.75 mA to —	1.75 mA to —	1.0 mA to —
Transconductance	2200 to 22/mhos	2200 to 22/mhos	1900 to 19/mhos
Plate Resistance	1.0 to >10 M _Ω	0.9 to >10 M _Ω	0.9 to >10 M _Ω
Amplification Factor (g_2 to g_1)	18	18	18
Equivalent Noise Resistance	6,200 _Ω	6,200 _Ω	4,600 _Ω

Resistance-Coupled AF Amplifier Operation

The pentode section of the 17C8 can also be configured as a resistance-coupled audio-frequency amplifier. It can be operated either in a standard pentode connection or in a triode connection where Grid No. 2 is tied directly to the plate.

Microphonics Considerations

In circuits incorporating a loudspeaker with an acoustical efficiency of 5%, the 17C8 can be utilized without special anti-microphonic precautions, provided that the input voltage required to produce a 50 mW output from the power stage is greater than 25 mV.

Pentode Connection Operating Points

Under a pentode configuration, the operating parameters for supply voltages (E_{bb}) of 170 V and 100 V are as follows:

E_{bb} (V)	R_p (M)	$[g_2]R$ (/tube s/(M))	R_{g1} (M)	R_k (Ω)	R'_{g1} (M)	I_p (mA)	$[g_2]I$ (/tubes /(mA))	Voltage Gain (E_o/E_i)	Distortion (%) at E_o (r.m.s.) = 3V / 5V / 8V
170	0.22	0.68	1	2700	0.68	0.56	0.20	85	1.2 / 1.5 / 1.8
170	0.10	0.27	1	1000	0.33	1.25	0.50	70	1.2 / 1.6 / 2.0
170	0.22	0.82	10	0	0.68	0.56	0.19	140	0.8 / 1.0 / 1.4
170	0.10	0.33	10	0	0.33	1.16	0.46	100	0.8 / 1.4 / 2.0
100	0.22	0.68	1	2700	0.68	0.32	0.12	82	1.4 / 1.9 / —
100	0.10	0.27	1	1000	0.33	0.73	0.29	67	1.4 / 1.8 / —
100	0.22	0.82	10	0	0.68	0.32	0.11	100	2.8 / 3.0 / —
100	0.10	0.33	10	0	0.33	0.66	0.25	70	1.7 / 3.2 / —

Triode Connection Operating Points

When Grid No. 2 is connected to the plate, the pentode section behaves as a triode. The operating characteristics under this configuration are:

E_{bb} (V)	R_p (M)	R_{g1} (M)	R_k (Ω)	R'_{g1} (M)	I_p (mA)	Voltage Gain (E_o / E_i)	Distortion (%) at E_o (r.m.s.) = 3V / 5V / 8V
170	0.1	1	1800	0.33	1.25	11	2.1 / 3.5 / 4.8
170	0.047	1	1800	0.15	2.4	11	1.8 / 3.1 / 4.6
170	0.1	10	0	0.33	1.4	14	2.5 / 3.8 / 5.0
170	0.047	10	0	0.15	2.8	14	2.1 / 3.4 / 4.7
100	0.1	1	1800	0.33	0.74	11	3.2 / 4.9 / —
100	0.047	1	1000	0.15	1.4	11	3.0 / 4.8 / —
100	0.1	10	0	0.33	0.8	12	3.0 / 4.7 / —
100	0.047	10	0	0.15	1.5	12	3.0 / 4.8 / —

Qualitative Curve Analysis

The electrical behavior of the 17C8 is characterized by several key relationships:

- **Plate Current vs. Grid No. 1 Bias:** The transfer characteristics exhibit a smooth remote-cutoff behavior. For plate voltages ranging from 100 V to 200 V, the plate current decreases gradually as the negative bias on Grid No. 1 is increased, extending down to a cutoff region near -40 V.
- **Transconductance vs. Grid No. 1 Bias:** The transconductance curve confirms a wide dynamic control range. At a low bias of -2 V, the transconductance is approximately 2200 μmhos, which smoothly decreases to 1 μmhos as the bias is increased to -40 V.
- **Plate Characteristics:** The family of plate current curves displays standard pentode behavior, featuring a sharp knee below 50 V plate voltage. A boundary curve on the plate characteristic plot represents the maximum plate dissipation limit of 1.5 W.
- **Grid No. 2 Characteristics:** The screen grid characteristics show Grid No. 2 current as a function of Grid No. 2 voltage across various Grid No. 1 bias levels. These curves are bounded by the maximum screen grid dissipation limit of 0.3 W.

Technical Summary

The **17C8** is a versatile double diode-remote cutoff pentode housed in a T6□ bulb with an E9-1 base. Designed for RF, IF, or AF amplification, it features a 17 V, 100 mA heater and a coated unipotential cathode. The pentode section offers a remote-cutoff characteristic with a transconductance range of 2200 to 22/mhos under typical RF/IF operating conditions, and an amplification factor (g_2 to g_1) of 18. The dual diode sections are rated for a peak inverse plate voltage of 350 V and a continuous plate current of 0.8 mA per diode. With its flexible operating points in both pentode and triode connections, the 17C8 provides a compact solution for multi-stage signal processing and amplification.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1959 Rogers

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

1959 ROGERS

Section 1 · Diode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltage	17 V	—
HeaterOrFilamentCurrent	100 mA	—

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Section 3 · Pentode

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CutoffCharacteristic	Remote cutoff	—

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