



ELECTRONIC TUBE REFERENCE

15F4P

Voltage Triode Pentode electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

PENTODE-TRIODE

Triode-pentode for television and radio receivers, designed for video-output, low-frequency amplifier, and automatic-control circuits; pentode dissipation is about 4 watts.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	9
NOMINAL HEATER	15 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Triode	
TRANSCONDUCTANCE	0.004 S
AMPLIFICATION FACTOR	65
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	1 W
English-primary bilingual extraction; published electrical table values retained in parameters.	

SECTION2 Pentode	
PLATE RESISTANCE	130000 Ω
TRANSCONDUCTANCE	0.0104 S
MAXIMUM PLATE VOLTAGE	250 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM PLATE DISSIPATION	4 W
MAXIMUM SCREEN DISSIPATION	1.7 W
English-primary bilingual extraction; published electrical table values retained in parameters.	

15F4P — Triode-Pentode Vacuum Tube

The **15F4P** (also designated as **15Φ4Π**) is an indirectly heated, oxide-coated triode-pentode vacuum tube. It is designed for use in the output stages of video amplifiers, low-frequency amplifiers, and automatic control circuits of television and radio broadcast receivers. The tube is specifically optimized for applications utilizing a series connection of heater wires.

Construction, Pinout, and Physical Dimensions

The 15F4P is housed in a glass envelope with a mass of at most 18 g. Its physical dimensions include a maximum outer diameter of 22.5 mm, a maximum overall height of 67 mm, and a maximum seated height of 60 mm. The main bulb height is specified at 50 ± 2.5 mm.

The tube features a nine-pin base with the following electrode-to-pin connections:

Pin	Connection
1	Triode grid
2	Triode anode
3	Triode cathode
4	Heater
5	Heater
6	Pentode anode
7	Pentode cathode, screen, grid 3
8	Pentode grid 1
9	Pentode grid 2

Heater and Service Conditions

The 15F4P is designed to operate under robust environmental and mechanical conditions. Its service limits include:

- **Vibration:** Acceleration up to 2.5 g.
- **Ambient Temperature:** From -45 to +70 °C.
- **Relative Humidity:** Up to 98% at temperatures up to 25 °C.

The heater is designed for series-string operation with the following nominal electrical parameters:

Heater Parameter	Nominal Value	Minimum Limit	Maximum Limit
Heater Voltage	15 V	13.5 V	16.5 V
Heater Current	300 mA	285 mA	315 mA

Electrical Characteristics and Operating Points

The 15F4P contains two distinct sections: a triode and a pentode. The typical electrical parameters for each section are specified under an anode voltage of 200 V.

Triode Section

At an anode voltage of 200 V, the triode section exhibits the following typical characteristics:

- **Anode Current:** 3 mA (with a tolerance range of +1.2 to -1.1 mA)
- **Grid Current Cutoff Voltage:** -1.3 V
- **Anode Cutoff Current:** $\leq 60 \mu\text{A}$
- **Resistance in Cathode Circuit:** 570 M Ω (as documented)
- **Transconductance:** $4 \pm 1 \text{ mA/V}$
- **Inverse Grid Current:** $\leq 0.5 \mu\text{A}$
- **Amplification Factor:** 65 ± 13

Pentode Section

At an anode voltage of 200 V and a grid 2 voltage of 200 V, the pentode section exhibits the following typical characteristics:

- **Anode Current:** 18 mA (with a tolerance range of +4.8 to -4.5 mA)
- **Grid 2 Current:** 3 mA (with a tolerance range of +1.7 mA)
- **Grid 1 Current Cutoff Voltage:** -1.3 V
- **Anode Cutoff Current (at grid 1 voltage of -15 V):** $\leq 0.7 \text{ mA}$
- **Resistance in Cathode Circuit:** 140 Ω
- **Internal Resistance:** 130 k Ω (with a tolerance of -40 k Ω)
- **Transconductance:** 10.4 mA/V (with a tolerance range of +3.1 to -2.4 mA/V)

- **Inverse Grid 1 Current:** $\leq 1 \mu\text{A}$

Interelectrode Capacitances

The internal capacitances of the 15F4P are documented for both individual sections and between the sections to prevent unwanted coupling:

Section / Path	Capacitance Parameter	Value
Triode Section	Input Capacitance	$3.8 \pm 0.8 \text{ pF}$
	Output Capacitance	$2.3 \pm 0.4 \text{ pF}$
	Transfer Capacitance	$2.7 \pm 0.5 \text{ pF}$
	Grid-to-Heater Capacitance	$\leq 0.1 \text{ pF}$
Pentode Section	Input Capacitance	$8.7 \pm 1.7 \text{ pF}$
	Output Capacitance	$4.2 (+0.8 / -0.7) \text{ pF}$
	Transfer Capacitance	$\leq 0.1 \text{ pF}$
Inter-Section	Pentode Grid 1-to-Triode Anode	$\leq 0.01 \text{ pF}$
	Pentode Grid 1-to-Triode Grid	$\leq 0.01 \text{ pF}$

Maximum Ratings and Operating Limits

To ensure reliable operation, designers must adhere to the following absolute maximum and minimum limit values:

Parameter	Limit Value
Anode Voltage (Triode & Pentode)	250 V max
Anode Voltage on Cold Start (Triode & Pentode)	550 V max
Triode Anode Pulse Voltage (at $\leq 0.1 \text{ mA}$ anode current, $\leq 18 \mu\text{s}$ pulse duration)	600 V max
Grid 2 Voltage	250 V max
Grid 2 Voltage on Cold Start	550 V max
Voltage between Cathodes and Heater (heater negative)	200 V max

Parameter	Limit Value
Voltage between Triode Cathode and Heater (heater positive)	150 V max
Cathode Current (Triode)	12 mA max
Cathode Current (Pentode)	40 mA max
Anode Power Dissipation (Triode)	1 W max
Anode Power Dissipation (Pentode)	8 W max
Grid 2 Power Dissipation (Pentode)	2.5 W max

Grid Circuit Resistance Limits

The maximum allowable resistance in the grid circuits depends on the biasing method:

- **Triode Grid Circuit:**
 - With fixed bias: 1 M Ω max
 - With automatic bias: 3 M Ω max
- **Pentode Grid 1 Circuit:**
 - With fixed bias: 0.5 M Ω max
 - With automatic bias: 1 M Ω max

Lifetime and Reliability

The electrical parameters of the 15F4P are specified to maintain a high level of performance over a minimum operating lifetime of 800 hours. Under these extended operating conditions, the following limits apply:

- **Inverse Grid Current:**
 - Pentode Grid 1: $\leq 2 \mu\text{A}$
 - Triode Grid: $\leq 1 \mu\text{A}$
- **Transconductance:**
 - Pentode Section: $\geq 6.4 \text{ mA/V}$
 - Triode Section: $\geq 2.4 \text{ mA/V}$

Technical Summary

The **15F4P** is a versatile, indirectly heated triode-pentode vacuum tube featuring a 15 V / 300 mA heater designed for series-string configurations. Combining a high- μ triode (amplification factor of 65) and a high-transconductance pentode (10.4 mA/V) in a single compact 9-pin glass envelope, it is highly suited for television and radio receiver applications, including video output stages, low-frequency amplification, and automatic control circuits. Designers must respect the distinct power dissipation limits of 1 W for the

triode anode and 8 W for the pentode anode, alongside the specified grid resistance and heater-to-cathode voltage limits to ensure stable operation over its 800-hour rated lifetime.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

195X Russian

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

195X RUSSIAN

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Source symbol HU3KOH	4 A	HU3KOH 4acTOTbI M UENsX aBTOMATHYECKOTO Pperyaupo- amplifiers and automatic control circuits of television
Published electrical parameter	67 mA	67max
Published electrical parameter	60 mA	60max
Published electrical parameter	5 mA	φ22 5max
Source symbol B0	3 A	OTHocuTenbHAA BJIAXHOCTL BO3ayXxa A0 98Y npu Tem-
Published electrical parameter	15+1.5 h	 15+1,5 Heater voltage, V 15f1.5
Source symbol it	300 h	TOK HAKAMA, MA ...ttt iie it 300 Heater current, mA 300
Source symbol Tpuoauas	4 A	Tpuoauas 4acts
Source symbol e	200 V	AHOMA - oo emee et e e 200 Voltage, V: ‘
Published electrical parameter	-1.3 A	. -1,3 anode ... 200
Published electrical parameter	60 A	aHONA B HAYANE XAPAKTEPHCTHKH =60 anode ...l 31”
Published electrical parameter	570 A	Conpotuenenue B ueny karoga, MOM 570 anode, cutoff, =60
Source symbol 0	6 pA	O6paTHbIA TOK CETKH, MKA ccuon .. =0,5 Transconductance, mA/V 4+1
Source symbol ttt	200 V	CETKH BTOPOM ..o\ttt 200 Voltage, V:
Source symbol covnnnnn..	-1.3 A	OTCEYKH TOKA MEPBOM CETKH covnnnnn.. -1.3 anode ...l 200

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Published electrical parameter	140 A	ConpoTusneHune B uenu xaroga, OM 140 anode, cutoff, at grid 1 voltage —15V, mA =0.7
Source symbol grid	1 V	ConpoTusneHune B uenu xaroga, OM 140 anode, cutoff, at grid 1 voltage —15V, mA =0.7
Published electrical parameter	15 V	ConpoTusneHune B uenu xaroga, OM 140 anode, cutoff, at grid 1 voltage —15V, mA =0.7
Published electrical parameter	0.1 Ω	OPOXOOHAA ..ottt =0.1 QUIDUL ..o 42798
Source symbol KPYTH	3 h	KPYTH3HA XapaKTepHCTHKH, MA/B: transconductance, mA/V:
Source symbol Hpeuenbuue	3 h	Hpeuenbuue 3HAYEHHA QONYCTHMBIX Limit Values of Operating
Published electrical parameter	13.5 h	HAKAMIA .. ove e ieneenn 16,5 13,5 heater 16.5 13.5
Published electrical parameter	250 A	aHONOB TPOHOJA U MEHTONA 250 anodes of triode and pentode ... 250
Source symbol Gonee	0.1 mA	Toke agoma He Gonee 0,1 MA u
Source symbol most	0.1 mA	current at most 0.1 mA and pulse
Source symbol e	1 A	TPOHOHA . . oo ove e 1 at pentode anode 8
Source symbol ann	8 A	MEHTOMR .. oo oo ann 8 atpentodegrid2 2.5
Source symbol cmewweHuu	0.5 W	npu puxCHposanHHom cmewweHuu 0,5 with fixed bias 0.5