JJ ELECTRONIC

Excellence with every decibel

Dear Customers,

Ten years ago, JJ Electronic was born from the tradition of Tesla manufacturing.
Since then, we have strived to fulfill your requests for audiophile and music amplification tubes.
Every year we introduced new types of tubes, and today, we have the widest tubes selection in the market.
We remain committed to satisfying your needs and recently made significant investments into production quality and customer service.
It is my hope that JJ Electronic tubes will continue to delight you with the pleasure of perfect sound for years to come.

Mr. Jan Jurco, Ceo/Owner

About JJ ELECTRONIC

JJ ELECTRONIC currently employs 150 people. Four of the company leaders have been involved in vacuum tubes research, development and manufacturing since 1972.

We have successfully applied our extensive vacuum tubes experience to the design and production of tube amplifiers which we introduced in 1997.

In 1999 we began development and production of electrolytic capacitors and transformers. The transformers' core is custom made to our specifications.

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Assembly

The tube's internal electrode system is assembled in a clean-room environment. The components are made from pure materials and manufactured with high precision (+/- 0,02 mm). Before assembly, all parts are cleaned in an ultrasonic bath and de-gassed in a reducing atmosphere. The control grid is gold plated, the screen grid is plated with copper and graphite. Specially designed fixtures are used during assembly to prevent electrode deformation. Spot welding is used to electrically connect the internal subassembly to the contacts of the tube base. A complete mechanical and electrical inspection is performed on every system.

Sealing

The tube's internal systems are thoroughly cleaned again and inserted into a clean glass envelope. The envelope is then hermetically sealed to the base. The seal between the envelope and the base is thermally stress relieved (tempered).

Evacuation

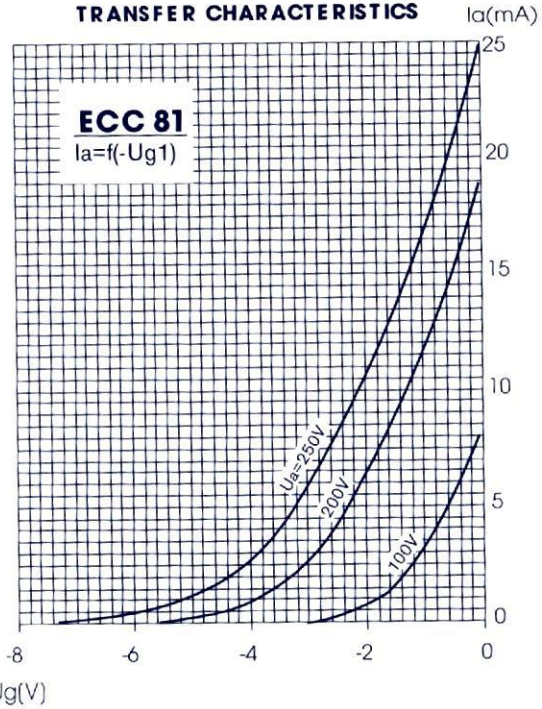
Assembled tubes are evacuated on an automated pumping machine with mechanical and diffusion pumps. During this process, the cathode is electrically heated and its emission substance is activated. All internal parts are heated by high frequency coils, the getter rings are ignited absorbing the residual gas inside the tube. The final vacuum reaches 10-6 Torr - the level required for proper tube operation.

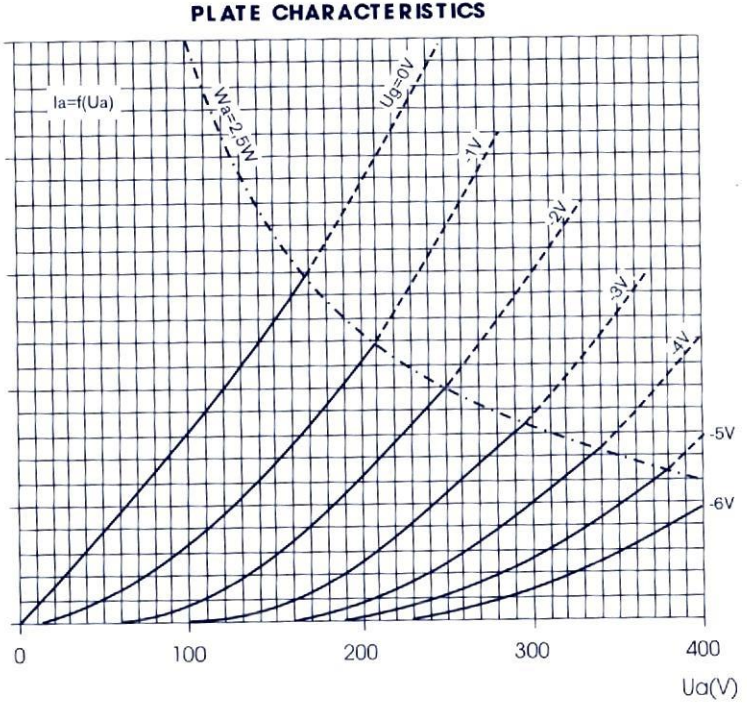
Stabilization burn-in

The evacuated tubes are equipped with sockets. The cathodes are activated and the electrodes' potentials stabilized in a special burn-in unit. Here, the tubes are exposed to electrical conditions reaching up to 300 % of the nominal operating levels.

Testing

Every tube is electrically tested for parameters such as isolation characteristics, the electrode's current levels covering the entire operating curve, the condition of the vacuum, cathode emission capability, filament voltage and current levels. A microphonic test is performed on every tube. All tubes are then further burned-in for a period of 24 hours at the nominal specified operating voltage and current levels. Every month, a random sample is taken from the production to perform a life test of 5000 hours at nominal operating conditions or 1000 hours at maximum specified levels.





Excellence with every decibel

CC81

A. F. DOUBLE TRIODE
Base: NOVAL

U_f = 6,3 or 12,6 V
I_f = 300 or 150 mA

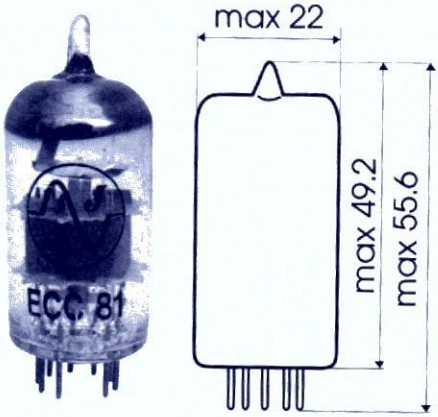
Typical characteristic:

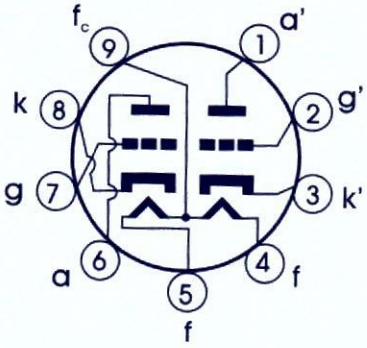
U_a = 250 V
I_a = 10 mA
U_g = -2 V
S = 5,5 mA/V
μ = 60
R_i = 11 kΩ

Limiting values:

U_a = 300 V
W_a = 2,5 W
I_k = 15 mA
U_g = -50 V
$U_{k/f}$ = 90 V
R_g = 1 MΩ

Dimension and connections:





TRANSFER CHARACTERISTICS

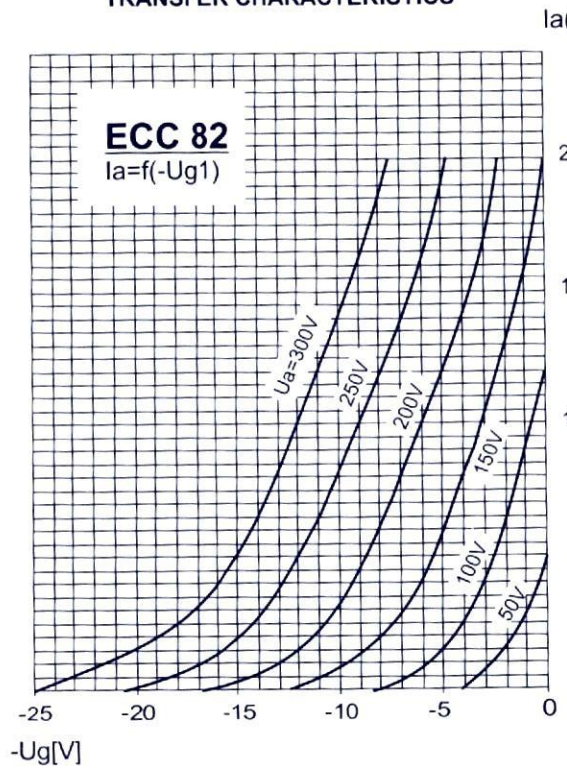
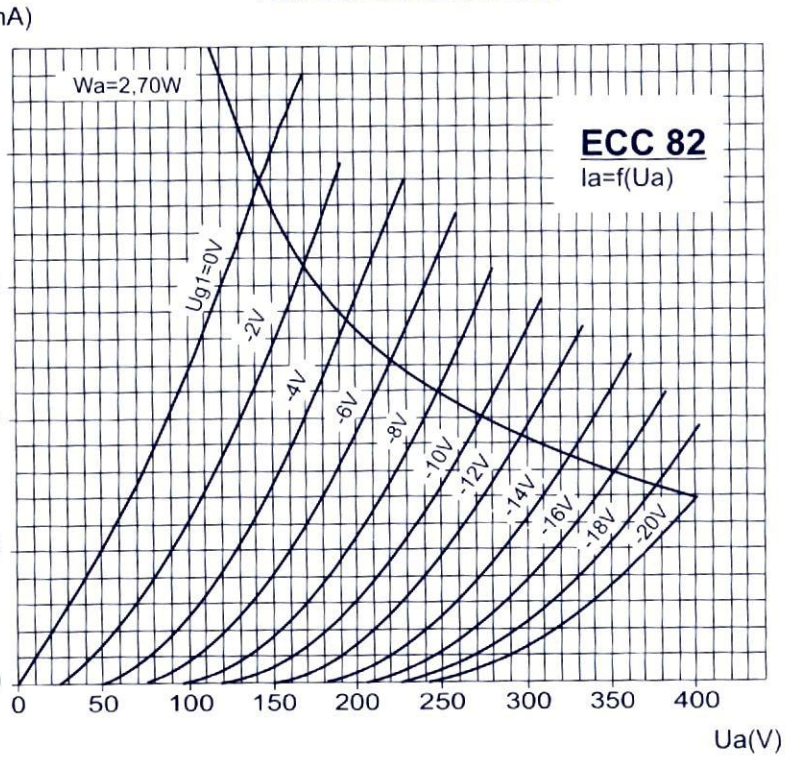


PLATE CHARACTERICTICS



CC82

R. F. DOUBLE TRIODE
Base: NOVAL

U_f = 6,3/12,6 V
I_f = ca.300/150 mA

Typical characteristic:

U_a = 250 V
U_g = -8,5 V
I_a = 10,5 mA
S = 2,2 mA/V
R_i = 7,7 kΩ
μ = 17

Limiting values:

U_a = 300 V
W_a = 2,75 W
I_k = 20 mA
U_g = -50 V
R_g = 1 MΩ
$U_{k/f}$ = 180 V
$R_{k/f}$ = 150 kΩ

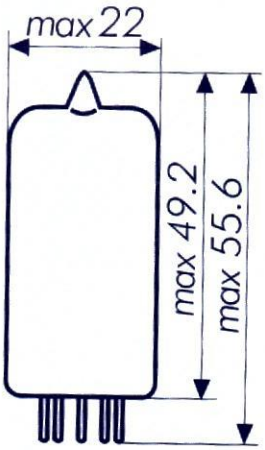
Capacitances:

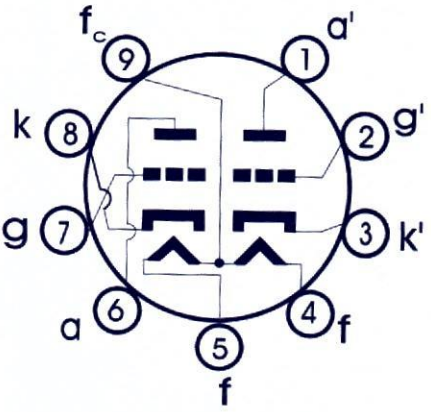
	system I.	*system II.*
$C_{g/k}$	= 1,9	1,9 pF
C_a	= 1,9	1,8 pF
$C_{g/a}$	= 1,63	1,63 pF

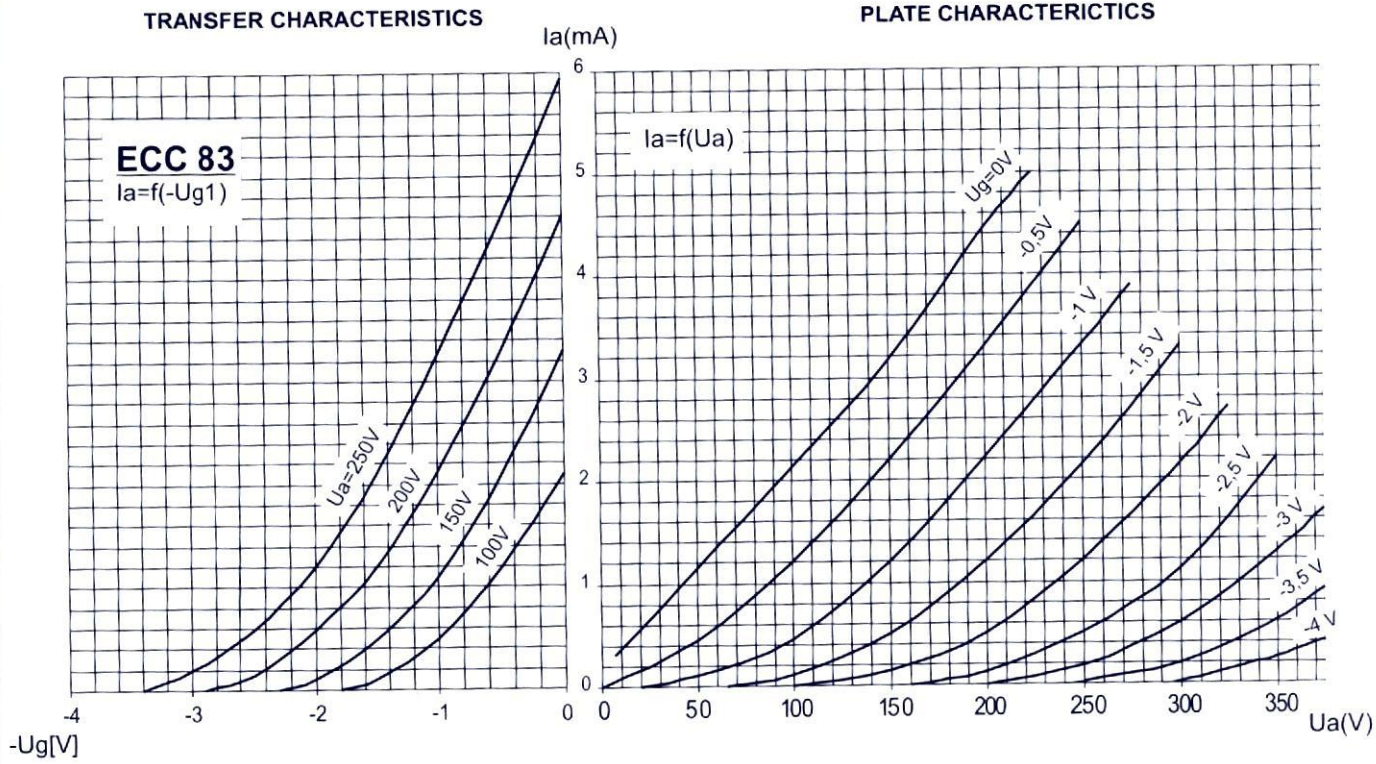
As phase inverter:

U_b	= 250	350 V
I_a	= 0,7	1,0 mA
$I_{a'}$	= 0,68	0,93 mA
U_o/U_{g1}	= 11	11
U_o	= 15	24 V_{RMS}
d_{tot}	= 1	1 %

Dimension and connections:







CC83 S

R. F. DOUBLE TRIODE
Base: NOVAL

U_f = 6,3/12,6 V
I_f = ca.300/150 mA

Typical characteristic:

U_a = 250 V
U_g = -2 V
I_a = 1,2 mA
S = 1,6 mA/V
R_i = 62,5 kΩ
μ = 100

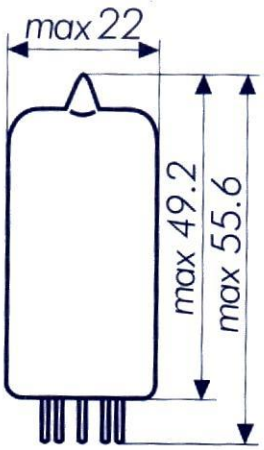
Limiting values:

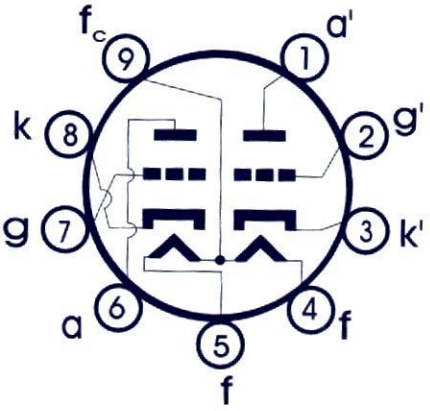
U_a = 300 V
W_a = 1 W
I_k = 8 mA
U_g = -50 V
R_g = 2,2 MΩ
$U_{k/f}$ = 180 V
$R_{k/f}$ = 150 kΩ

Capacitances:

	system I.	*system II.*
$C_{g/k}$	1,6	1,6 pF
C_a	0,33	0,33 pF
$C_{g/a}$	1,7	1,7 pF

Dimension and connections:



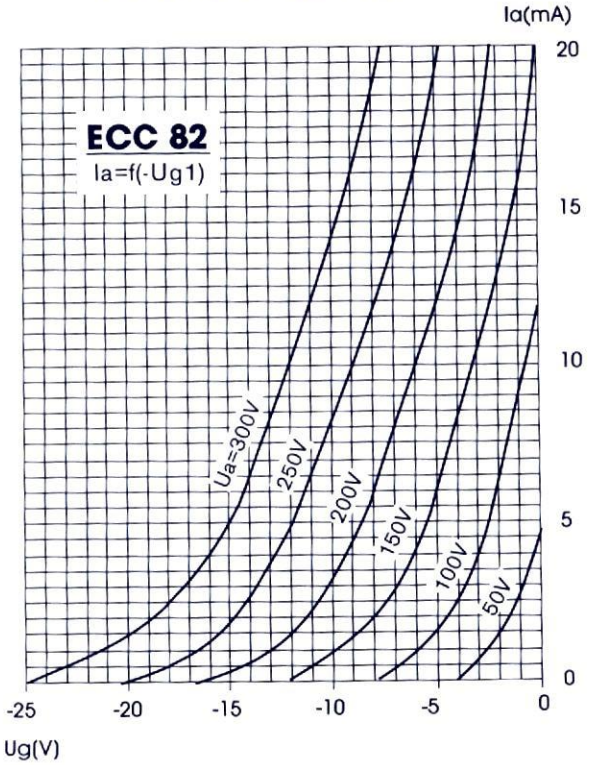


Operating characteristics:

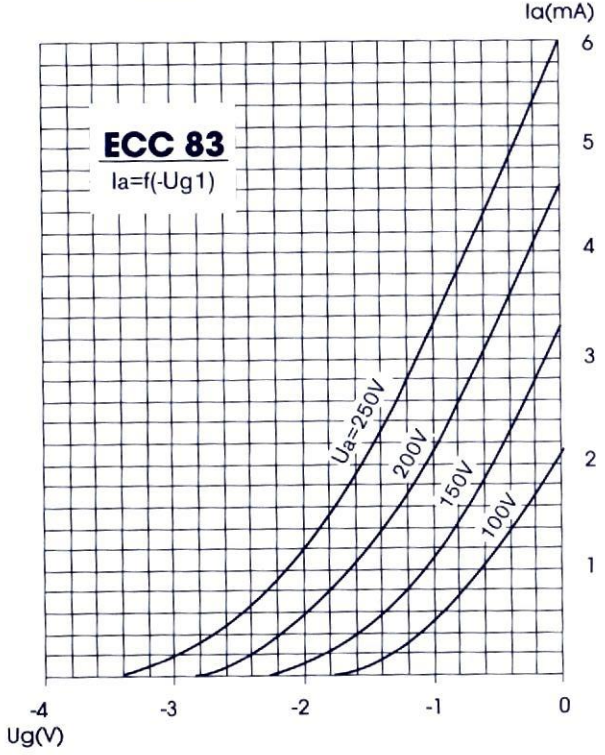
Resistance - coupled amplifer
cathode grid bias

U_b =	250	400	250	400	250	400	V
R_a =	47	47	100	100	220	220	kΩ
R_g =	150	150	330	330	680	680	kΩ
R_k =	1,2	0,68	1,5	0,82	2,7	1,2	kΩ
I_a =	1,18	2,45	0,86	1,72	0,48	1,02	mA

TRANSFER CHARACTERISTICS



TRANSFER CHARACTERISTICS



ECC832

Combinated double triode for special purposes
Base: NOVAL

U_f = 6,3 or 12,6 V
I_f = 300 or 150 mA

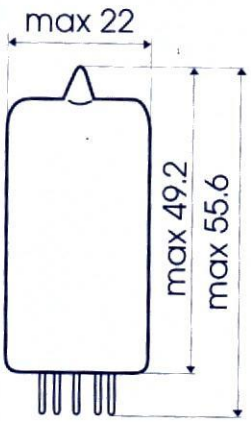
Typical characteristic:

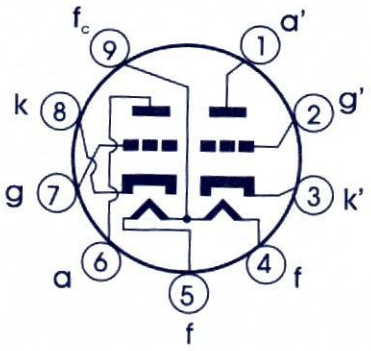
		system I. (pin 6,7,8)	*system II. (pin 1,2,3)*
U_a	=	250 V	250 V
U_g	=	-2 V	-8,5 V
I_a	=	1,2 mA	10,5 mA
S	=	1,6 mA/V	2,2 mA/V
R_i	=	62,5 kΩ	7,7 kΩ
μ	=	100	17

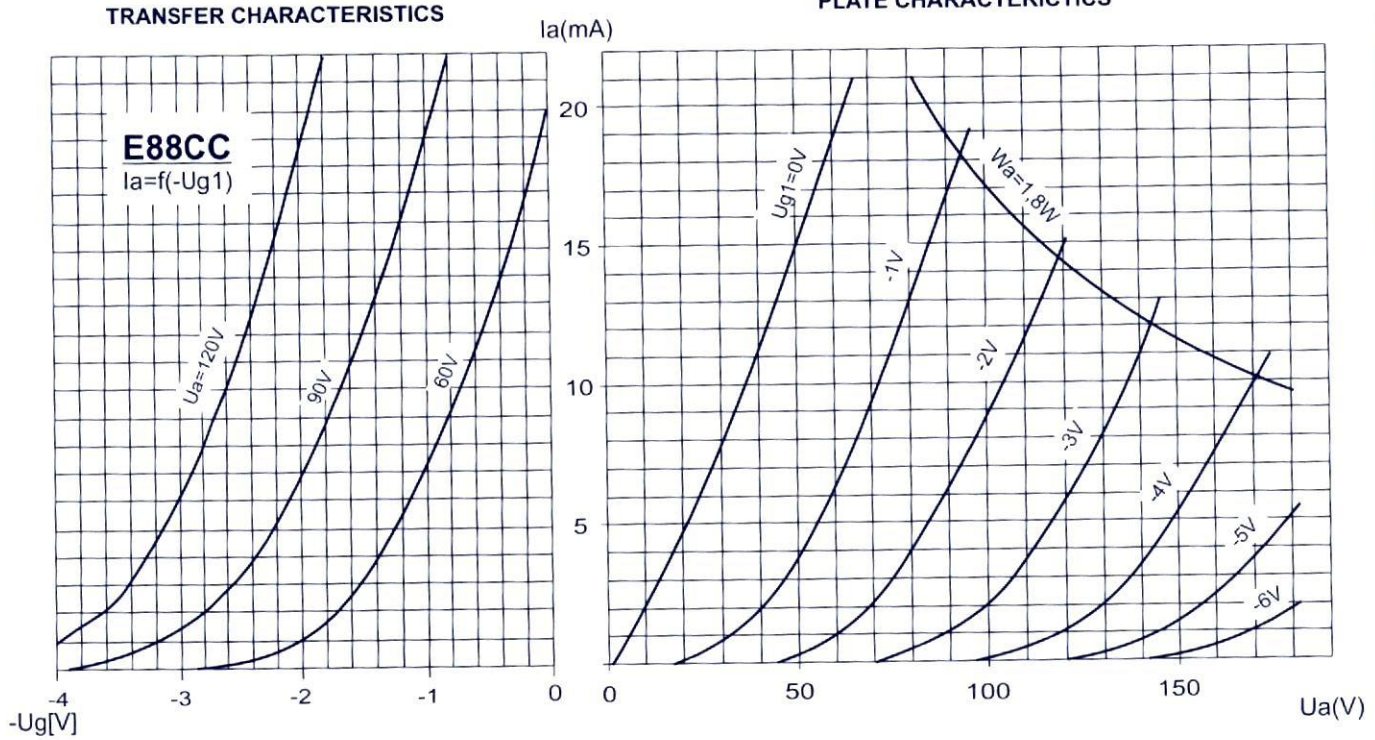
Limiting values:
Capacitances:
Please, refer to specs. of ECC 83 (for system I) or ECC 82 (for system II)

Note: ECC 823
Possibility to supply this tube „on reqest" of customer with reverse pin order pin # 1, 2, 3 - ECC 83, pin # 6, 7, 8 - ECC 82. There is not international equivalent of this tube. In JJ catalogues is under ECC 823.

Dimension and connections:







E88CC

R. F. DOUBLE TRIODE
Base: NOVAL

U_f = 6,3 V
I_f = 365 mA

Typical characteristic:

U_a = 90 V
U_g = -1,3 V
I_a = 15 mA
S = 12,5 mA/V
R_i = 2,6 kΩ
μ = 33

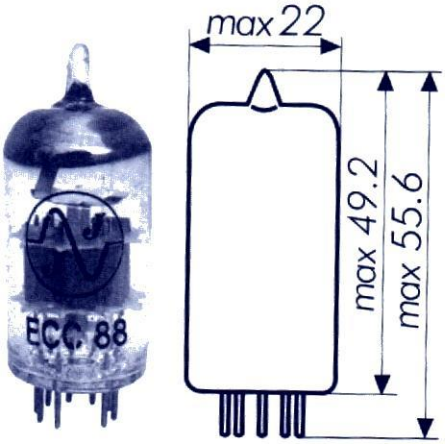
Limiting values:

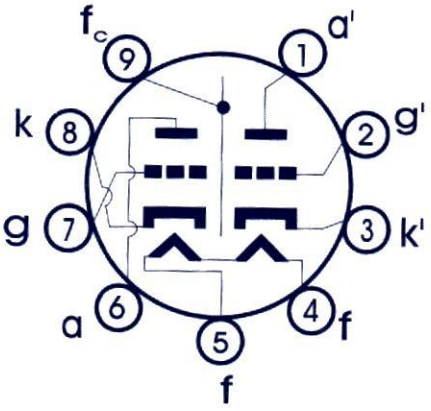
U_{a0} = 550 V
$U_{a(Ia=0)}$ = 400 V
U_a = 220 V
$U_{a(W_{ar}<0,8\ W)}$ = 250 V
P_{aR} = 1,5 W
W_{g1R} = 0,03 W
I_k = 20 mA
U_g = -100 V
R_g = 1 MΩ
$U_{+k/f-}$ = 120 V
$U_{-k/f+}$ = 60 V
$R_{k/f}$ = 20 kΩ

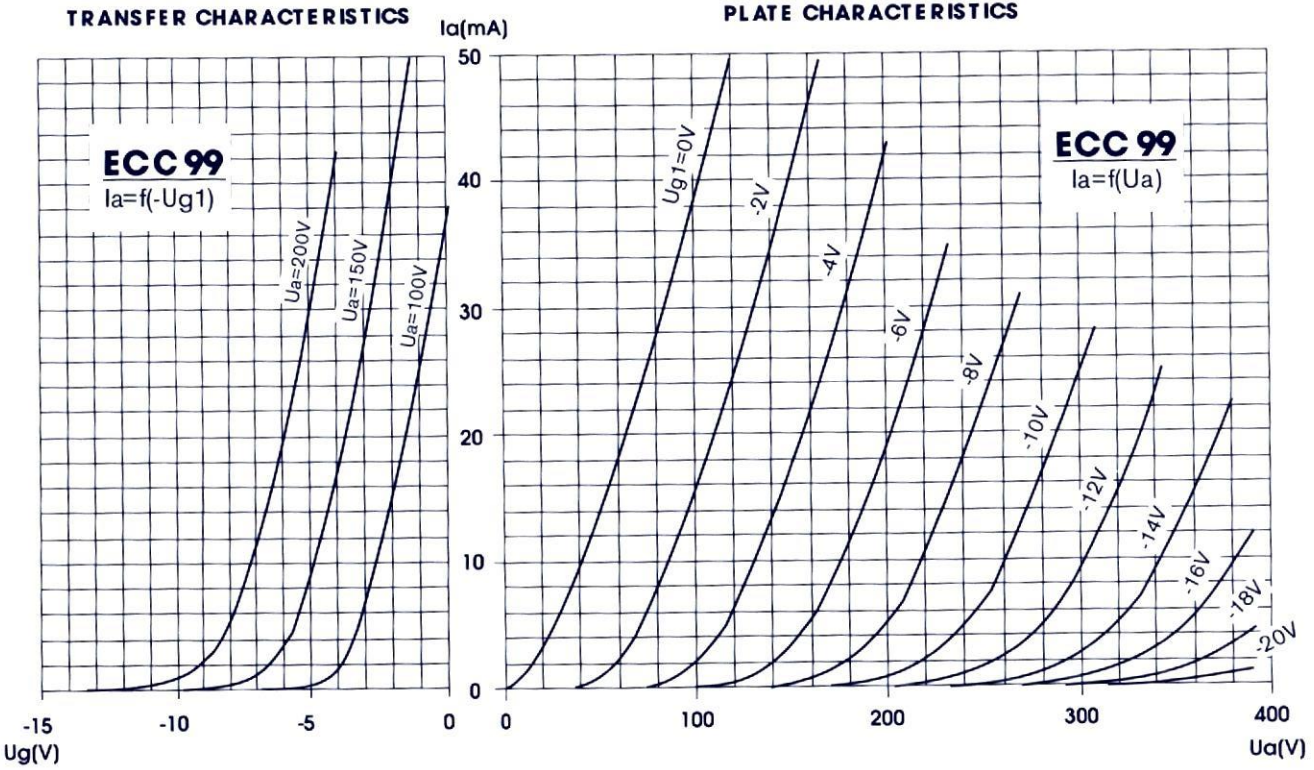
Capacitances:

	system I.	system II.
$c_{g/k}$	3,1	3,1 pF
c_a	0,18	0,18 pF
$c_{g/a}$	1,4	1,4 pF

Dimension and connections:






TRANSFER CHARACTERISTICS
ECC 99
Ia=f(-Ug1)
Ua=200V
Ua=150V
Ua=100V
Ia(mA)
50
40
30
20
10
0
-15
-10
-5
0
Ug(V)
PLATE CHARACTERISTICS
ECC 99
Ia=f(Ua)
Ug1=0V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
-18V
-20V
0
100
200
300
400
Ua(V)

CC99

R. F. DOUBLE TRIODE
Base: NOVAL

U_f = 6,3 or 12,6 V
I_f = 800 or 400 mA

Typical characteristic:

U_a = 150 V
U_g = -4 V
I_a = 18 mA
S = 9,5 mA/V
R_i = 2,3 kΩ
μ = 22

Limiting values:

U_a = 400 V
I_k = 60 mA
$U_{k/f}$ = 200 V
W_a = 5 W

Capacitances:

	system I.	*system II.*
$C_{g/k}$	= 5,8	5,8 pF
C_a	= 0,91	0,81 pF
$C_{g/a}$	= 5,1	5,1 pF

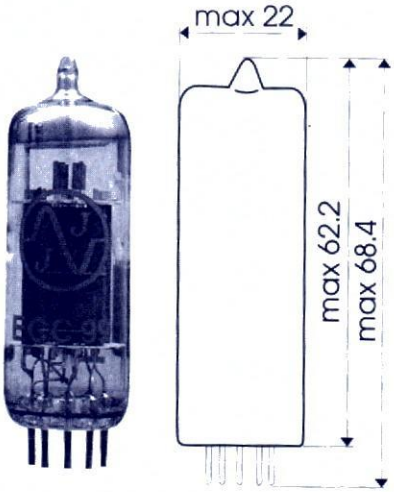
Recommanded use:

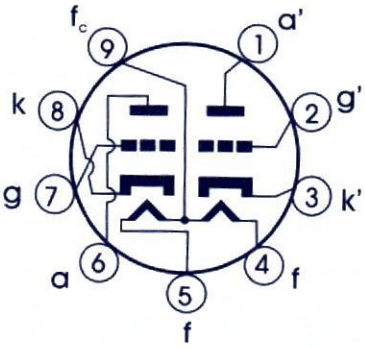
Driver of power triodes such as 300 B, 2A3..., Output stage headphone amplifiers, preamplifiers, power stage little P-P triode amplifiers (10W-4xECC99) and parallel voltage power supplies. Can be used instead of 5687, E182CC, 6840, 6BL7.

Note:

Outlets on some of these types, could have different set-up.

Dimension and connections:





TRANSFER CHARACTERISTICS

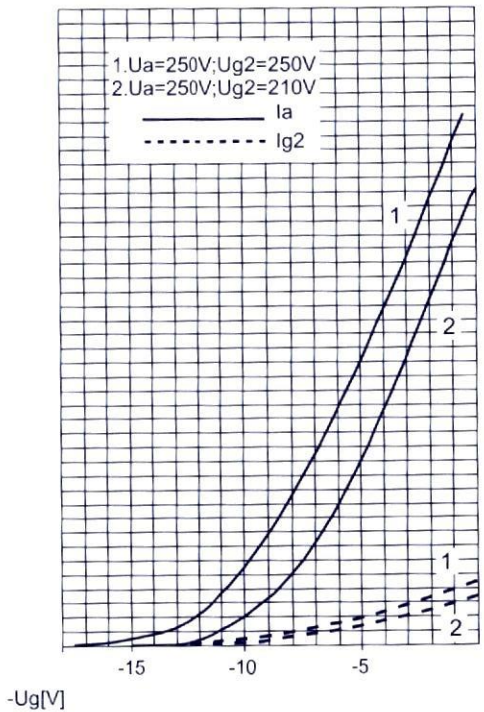
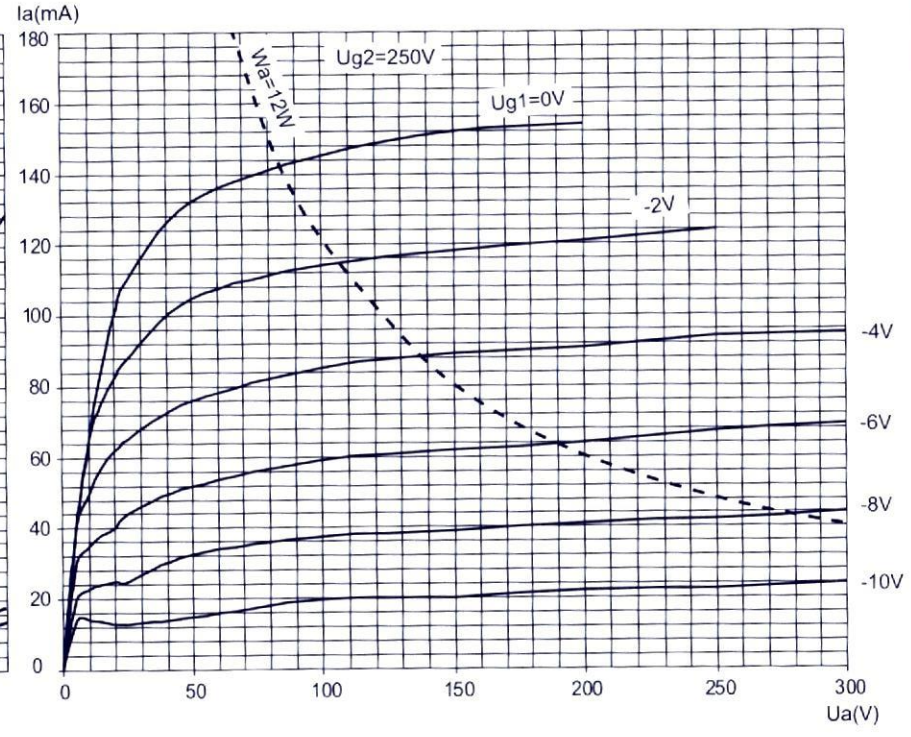


PLATE CHARACTERICTICS



L84

R. F. OUTPUT PENTODE

Base: NOVAL

U_f = 6,3 V
I_f = 0,760 mA

Typical characteristic:

U_a = 250 V
U_{g2} = 250 V
U_{g1} = -7,3 V
I_a = 48 mA
I_{g2} = 5,5 mA
S = 11,3 mA/V
R_i = 40 kΩ
$\mu_{g1/g2}$ = 19

Class A_1 amplifier:

U_a = 250 V
U_{g2} = 250 V
R_k = 135 Ω
I_a = 48 mA
I_{g2} = 5,5 mA
R_a = 5,2 kΩ
$U_{g1eff\ (50mW)}$ = 0,3 V
$U_{g1eff(N)}$ = 4,3 V
N (10%)[1] = 5,7 W
N [2] = 6 W

[1] U_{g1} fest fixed grid bias
[2] I_{g1} +0,3 μA

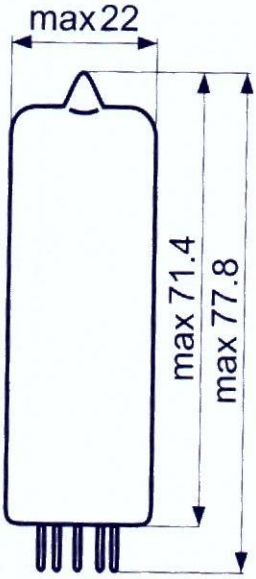
Limiting values:

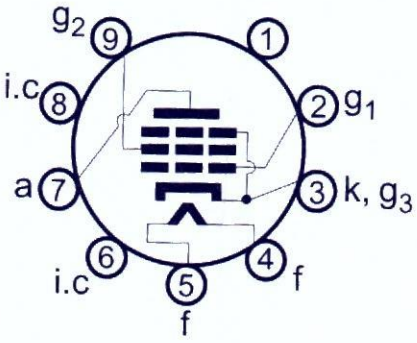
U_a = 300 V
W_a = 12 W
U_{g2} = 300 V
W_{g2} = 2 W
U_{g1} = -100 V
I_k = 65 mA
R_{g1} = 1 MΩ for automatic bias
R_{g1} = 0,3 MΩ for fixed bias
$U_{k/f}$ = 100 V

Capacitances:

$C_{g/k}$ = 10 pF
C_a = 5,1 pF
$C_{g/a}$ = 0,6 pF
C_{g1f} = 0,15 pF

Dimension and connections:





TRANSFER CHARACTERISTICS

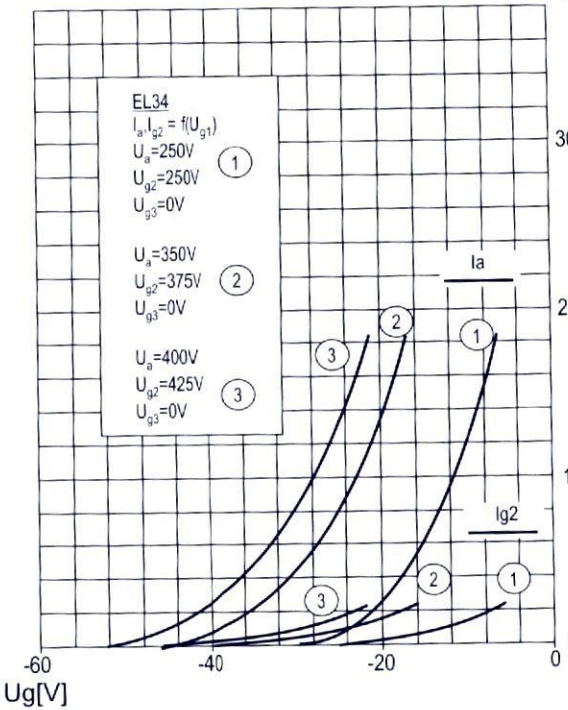
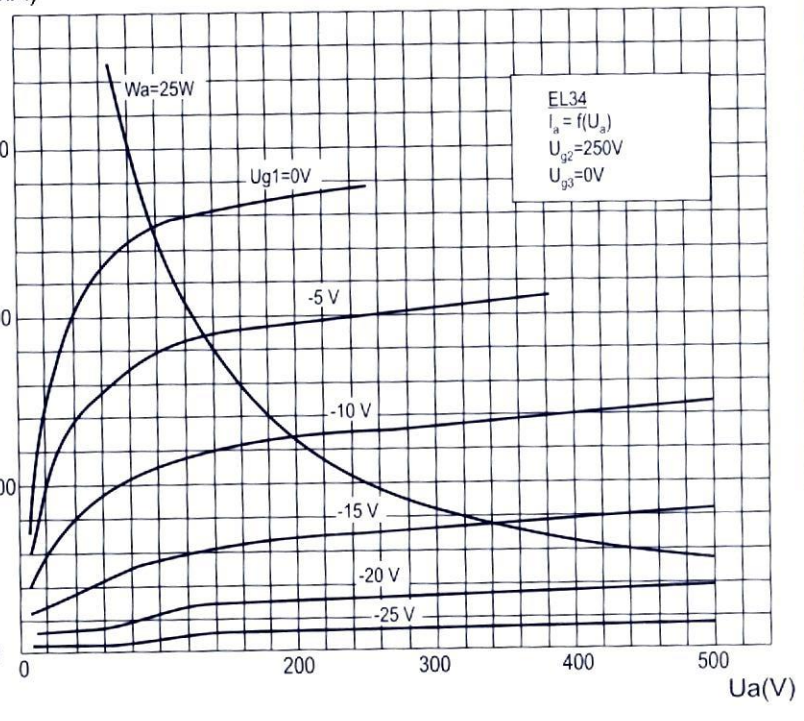


PLATE CHARACTERICTICS



EL34, E34L

A. F. OUTPUT PENTODE

Base: OCTAL

U_f = 6,3 V

I_f = c_a 1,5 A

Typical characteristic:

U_a	=	250 V
U_{g3}	=	0 V
U_{g2}	=	265 V
U_{g1}	=	-10 V; -13,5 V (for EL34)
		-13,5 V; -16,5 V (for E34L)
I_a	=	100 mA
I_{g2}	=	14,9 mA
S	=	11 mA/V
R_i	=	15 kΩ
$\mu_{g2/g1}$	=	11

I_{az} (U_{g1} = -30 V) < 7 mA

Limiting values:

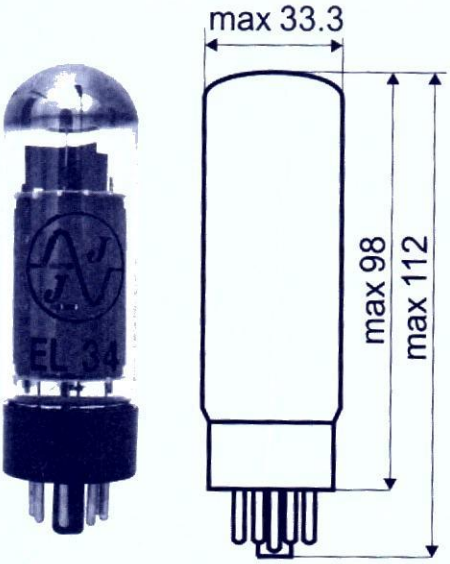
U_{a0}	=	2000 V
U_a	=	800 V
$W_{a(max)}$	=	25 W
U_{g20}	=	800 V
U_{g2}	=	450 V
$W_{g2(max)}$	=	8 W
I_k	=	150 mA
$U_{k/f}$	=	100 V
$R_{k/f}$	=	20 kΩ

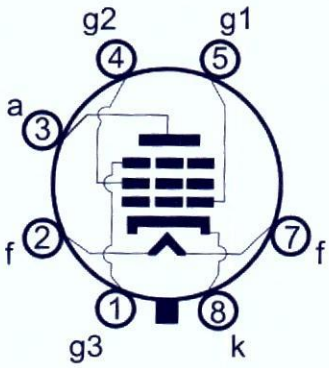
Capacitances:

c_{g1}	=	15,5 pF
c_a	=	10 pF
$c_{a/g1}$	=	1,3 pF

Red/Blue versions available

Dimension and connections:





TRANSFER CHARACTERISTICS

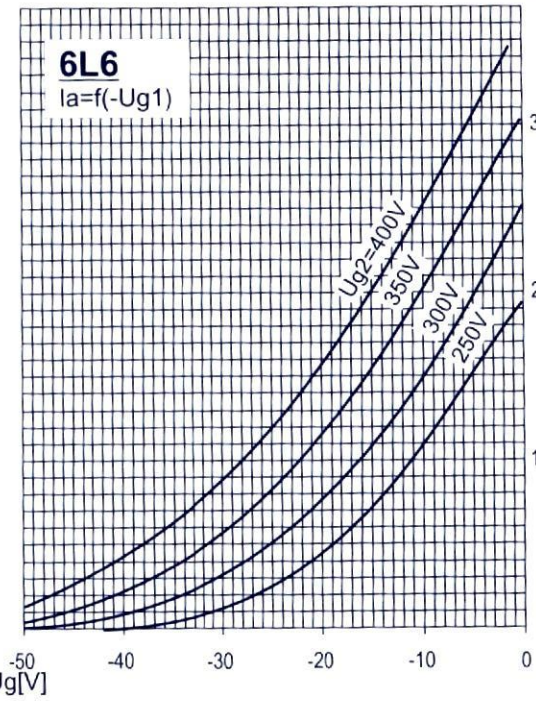
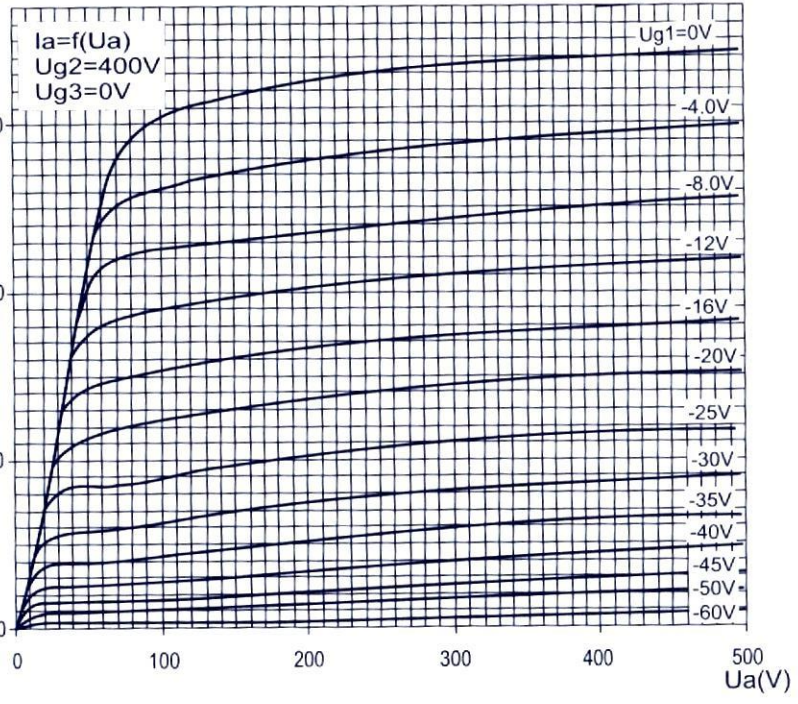


PLATE CHARACTERICTICS



L6 GC

A. F. BEAM PENTODE
Base: OCTAL

U_f = 6,3 V
I_f = c_a 0,9 A

Typical characteristic: Class A1

		Singl tube	*Push-Pull*
U_a	=	250 V	270 V
U_{g2}	=	250 V	270 V
U_{g1}	=	-14 V	-17,5 V
I_a	=	72 mA	134 mA
I_{g2}	=	5 mA	11 mA
R_a	=	22,5 kΩ	-
R_{a-a}	=	-	5 kΩ
N	=	6,5 W	17,5 W

Limiting values:

Triode

U_a = 450 V
U_{g2} = 450 V
W_a = 30 W

Pentode

U_a = 500 V
U_{g2} = 450 V
W_a = 30 W

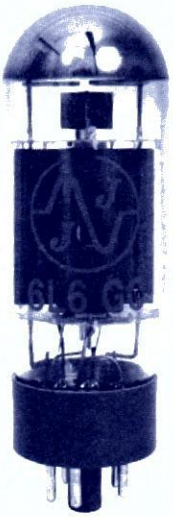
Grid No 1 Circuit Resistence

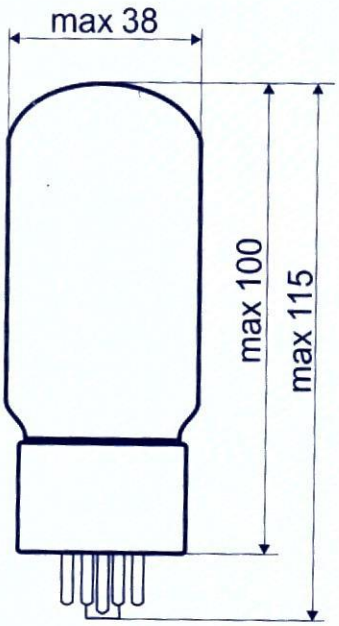
Fixed Bias	0,1 MΩ	0,1 MΩ
Self Bias	0,5 MΩ	0,5 MΩ

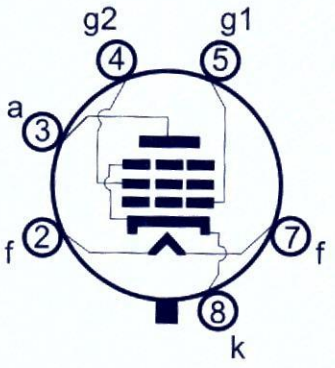
Capacitances:

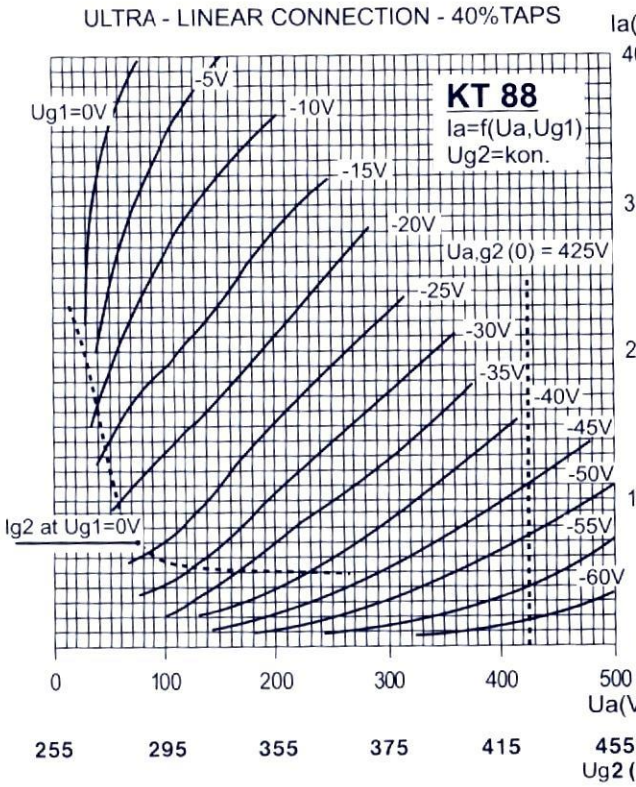
c_{g1} = 12,5 pF
c_a = 10 pF
$c_{a/g1}$ = 1,5 pF

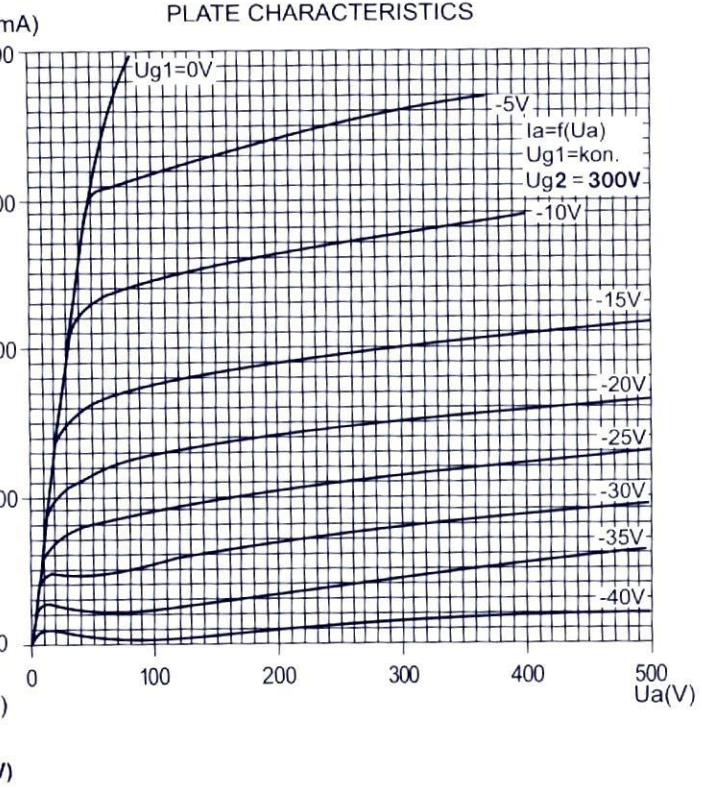
Dimension and connections:











KT 88

A. F. BEAM PENTODE

Base: OCTAL

U_f = 6,3 V

I_f = c_a 1,6 A

Typical characteristic:

U_a = 250 V

U_{g2} = 250 V

I_a = 140 mA

I_{g2} = max. 7 mA

$-U_{g1}$ = 15 V

S = 11,5 mA/V

R_i = 12 kΩ

μ_{g1-g2} = 8

Triode Conncected

$U_{a, g2}$ = 250 V

I_{a+g2} = 147 mA

$-U_{g1}$ = 15 V

S = 12 mA/V

R_i = 670 Ω

μ = 8

Limiting values:

U_a = 800 V

U_{g2} = 600 V

$U_{a, g2}$ = 600 V

$-U_{g1}$ = 200 V

W_a = 42 W

W_{g2} = 8 W

W_{a-g2} = 46 W

I_k = 230 mA

$U_{k/f}$ = 250 V

R_{g1-k} (catode bias)

$W_{a+g2} \leq 35$ W 470 kΩ

$W_{a+g2} > 35$ W 270 kΩ

R_{g1-k} (fixed bias)

$W_{a-g2} \leq 35$ W 220 kΩ

$W_{a+g2} > 35$ W 100 kΩ

Capacitances:

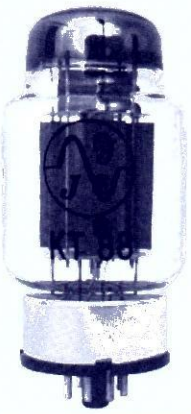
c_{g1} = 16,5 pF

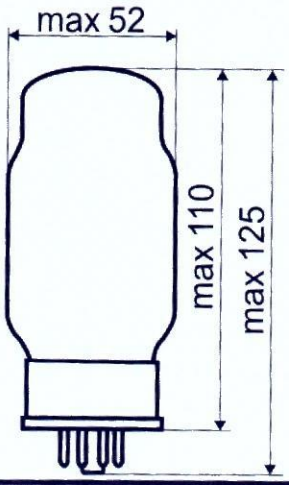
c_a = 10 pF

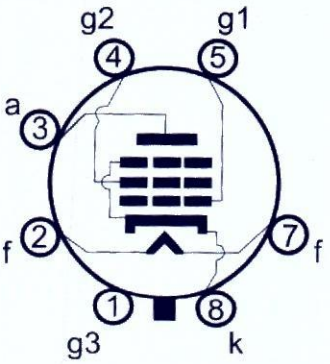
c_{g1-a} = 2,3 pF

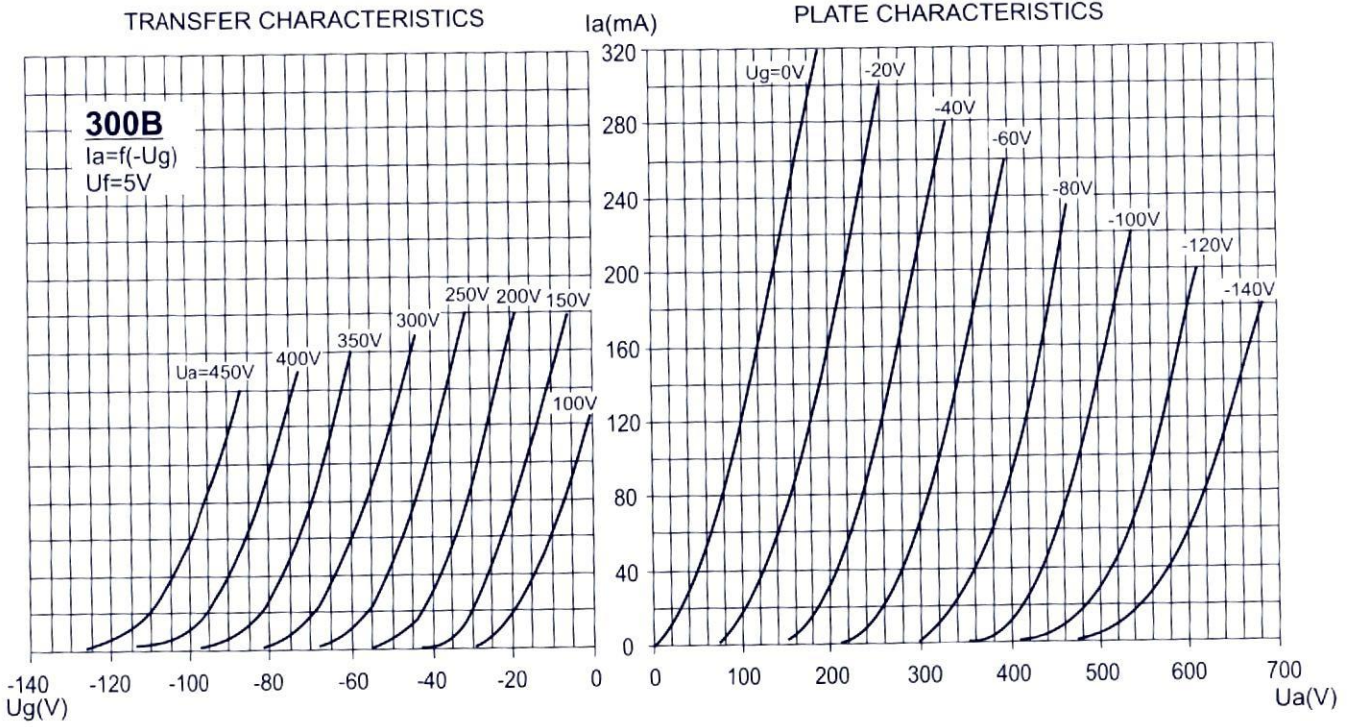
Red/Blue versions available

Dimension and connections:









00 B

R. F. TRIODE
Base: 4-PIN CERAMIC BASE

U_f = 5 V
I_f = ca 1,3 A

Typical characteristic:

U_a = 300 V
U_{g1} = -61 V
I_a = 60 mA
S = 5,5 mA/V
R_i = 700 Ω
μ = 3,85

Limiting values:

U_a = 450 V
W_a = 40 W

Maximum plate curent of everage tube for fixed bias

I_a = 70 mA

Maximum plate curent for manually adjusted grid bias or self-biasing

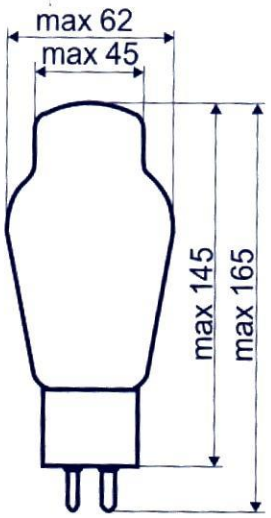
I_a = 100 mA

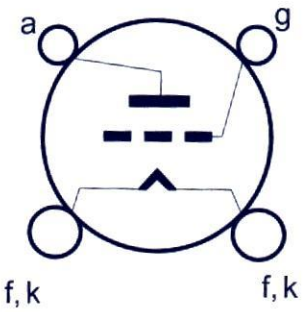
Capacitances:

C_{g1} = 17 pF
C_a = 11 pF
C_{g1-a} = 7,5 pF

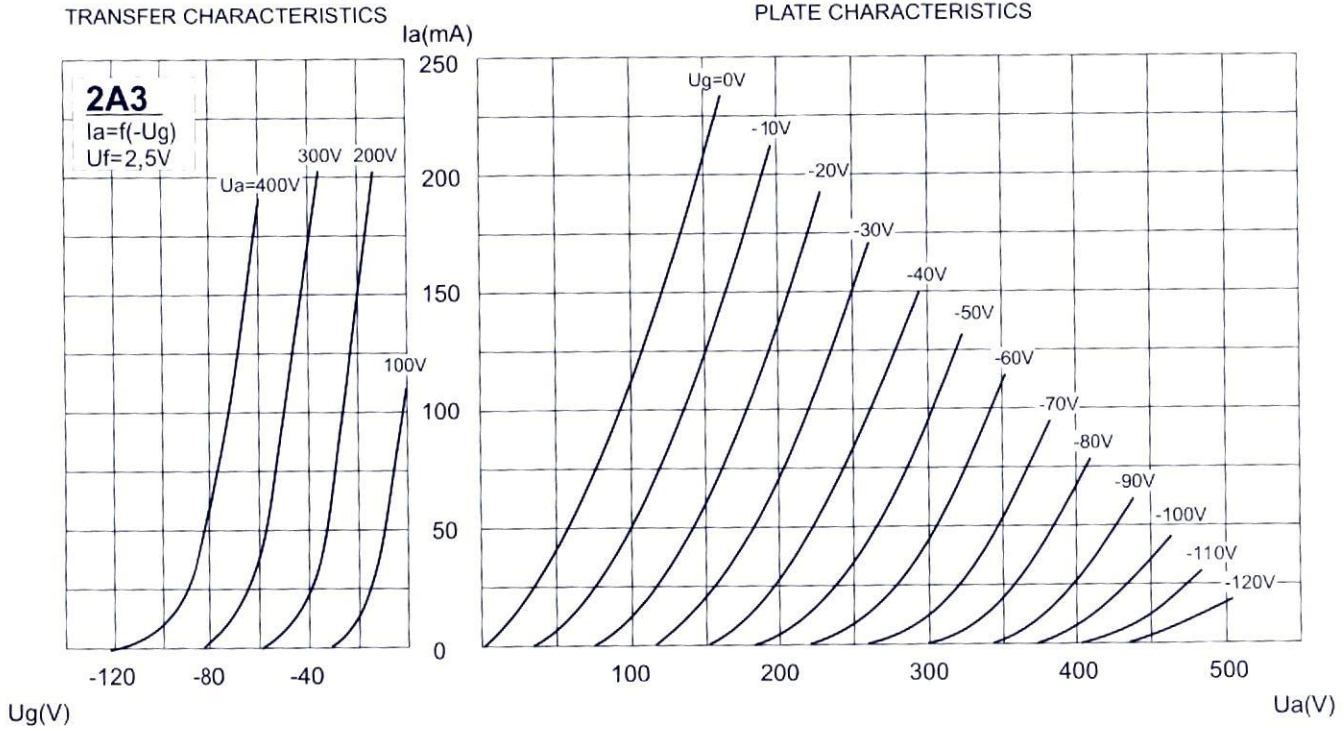
Dimension and connections:

Moderate power, filamentary triodes for Class A service.





Excellence with every decibel



2A3 - 40 W

A. F. TRIODE
Base: 4-PIN CERAMIC BASE

U_f = 2,5 V
I_f = 2,5 A

Typical characteristic:

U_a = 250 V
U_g = -45 V
I_a = 60 mA
S = 5,25 mA/V
m = 4,2
R_i = 800 Ω

Limiting values:

U_a = 450 v
W_a = 40 W

Maximum plate curent of everage tube for fixed bias

I_a = 70 mA

Maximum plate curent for manually adjusted grid bias or self-biasing

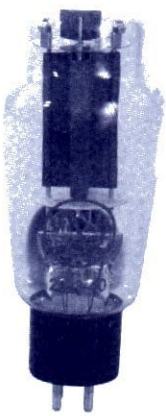
I_a = 100 mA

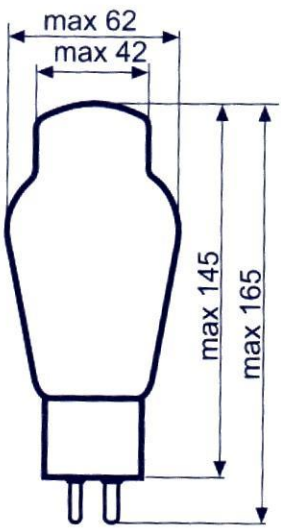
Capacitances:

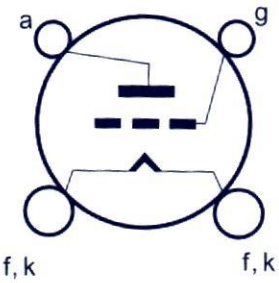
C_{g1} = 17 pF
C_a = 11 pF
C_{g1-a} = 7,5 pF

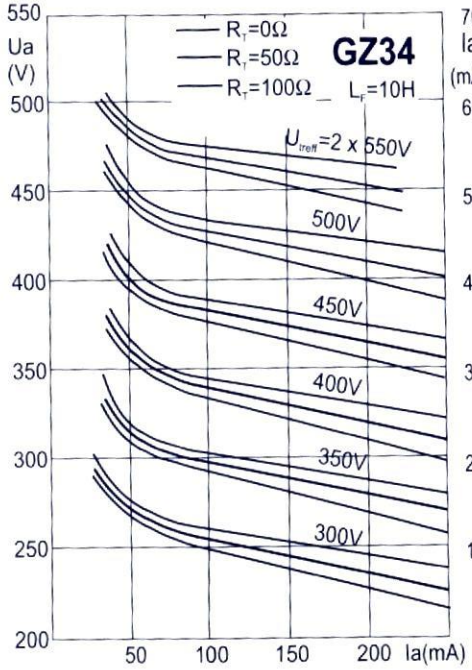
Dimension and connections:

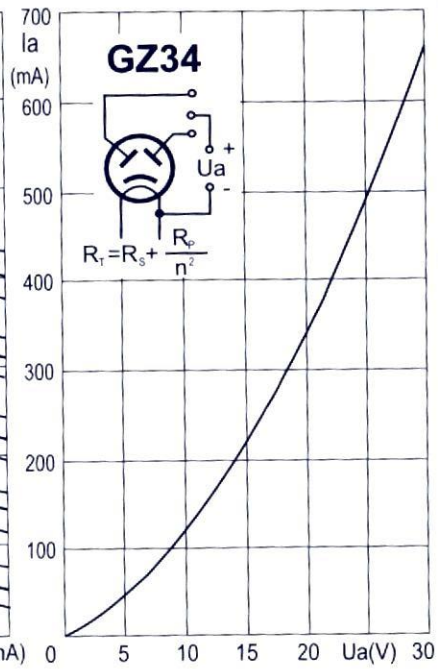
Moderate power, filamentary triodes for Class A service.

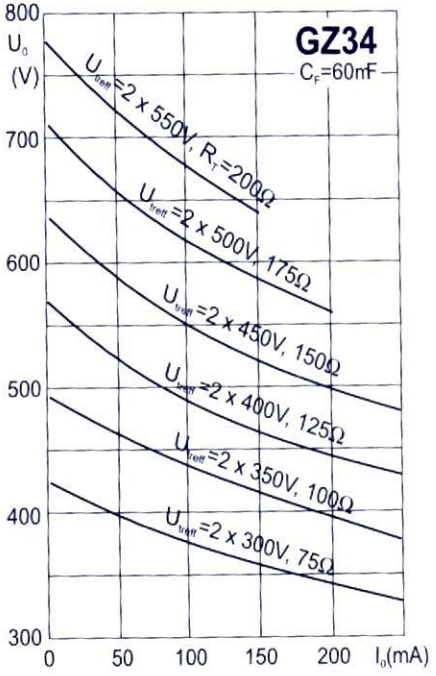












Excellence with every decibel

Excellence with every decibel

Z 34 S

DOUBLE ANODE RECTIFYING TUBE

Base: OCTAL

U_f = 5 V
I_f = 1,9 A

Typical characteristic:

Capacitor input

f	=	50 Hz				
Utreff	=	2x300	2x400	2x500	2x550	V
$I_{\sim}$	=	250	250	200	160	mA
C	=	60	60	60	60	µF
Rt	=	2x75	2x125	2x175	2x200	Ω
$U_{\sim}$	=	330	430	560	640	V

Choke input

f	=	50 Hz				
Utreff	=	2x300	2x400	2x500	2x550	V
$I_{\sim}$	=	250	250	250	225	mA
L	=	10	10	10	10	H
Rt	=	0	0	0	0	Ω
$U_{\sim}$	=	250	330	420	465	V

Limiting values:

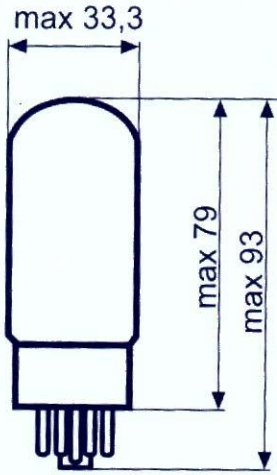
Capacitor input

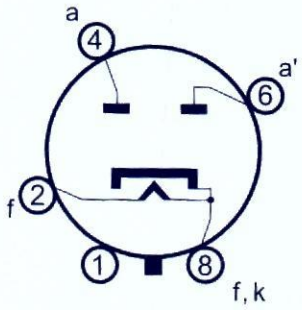
f	=	50Hz		
-Ua invp	=	1500 V		
Ia invp	=	750 mA		
C	=	60 µF		
Utreff	=	2x300	2x550	V
$I_{\sim}$	=	250	160	mA
Rt	=	2x50	2x175	Ω

Choke input

f	=	50Hz		
-Ua invp	=	1500 V		
Ia invp	=	750 mA		
Utreff	=	2x300	2x550	V
$I_{\sim}$	=	250	225	mA

Dimension and connections:





Obsah:

JJ 322

Stereo single - ended tube ampifier

JJ 239

Mono Block, use 2A3 - 40 W tube

JJ 828

Integrated power tube stereo amplifier

JJ 243

Tube pre amplifier

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