Nutube

* Patent pending

6P1

Twin Triode

The Nutube 6P1 is a directly-heated twin triode (preamp tube), and although it is a vacuum tube, can operate at low voltages, and with low power consumption.

A small glass tube that is extremely high quality and, when compared with conventional vacuum tubes, achieves exceptionally low power consumption, suppressed heat generation and a long service life by means of its internal, directly-heated type construction.

Nutube delivers exceptional linearity.

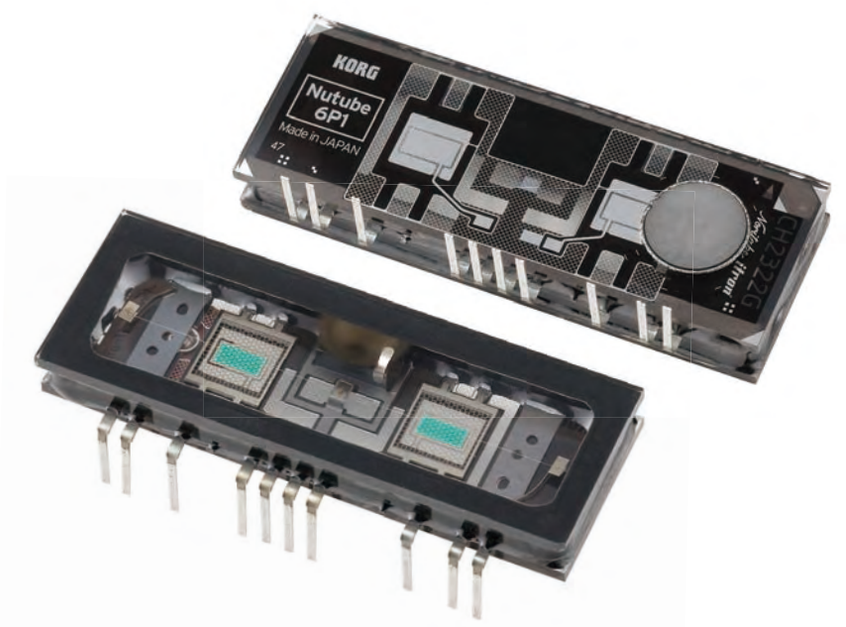
The unique vacuum tube sound, laden with rich overtones, ensures high sound quality.

Even when using distortion circuits, Nutube has responsive distortion tones that retain the characteristic pleasant overtones of a vacuum tube.

Automated assembly eliminates early failures and ensures there is minimal variation between finished products.

Anode operating voltage: 5v to 80v.

A genuine Noritake Itron vacuum tube produced at the Noritake Mie factory in Japan.



DC-Heating
Directly-Heated
Connected in Parallel

Filament Voltage	Vf	0.7V
Filament Current	If	*17mA

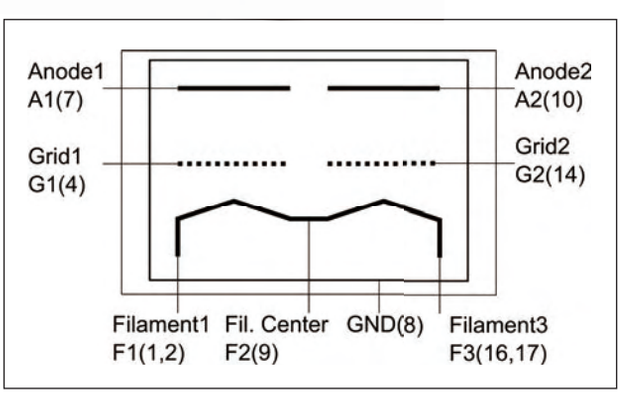
*Per each channel

Electrical Specifications

Anode Voltage	Va	10V
Grid Voltage	Vg	2V
Anode Current	Ia	10~34uA
Transconductance	gm	40uA/V
Amplification Factor	u	12
Anode Resistance	rp	300kΩ
Grid Current	Ig	≦14uA

Maximum Ratings

Filament Voltage	Vf	0.8V
Anode Voltage	Va	80V
Anode Dissipation	Na	1.7mW
Operating Temperature	Ta	-40℃≦Ta≦80℃ no condensation

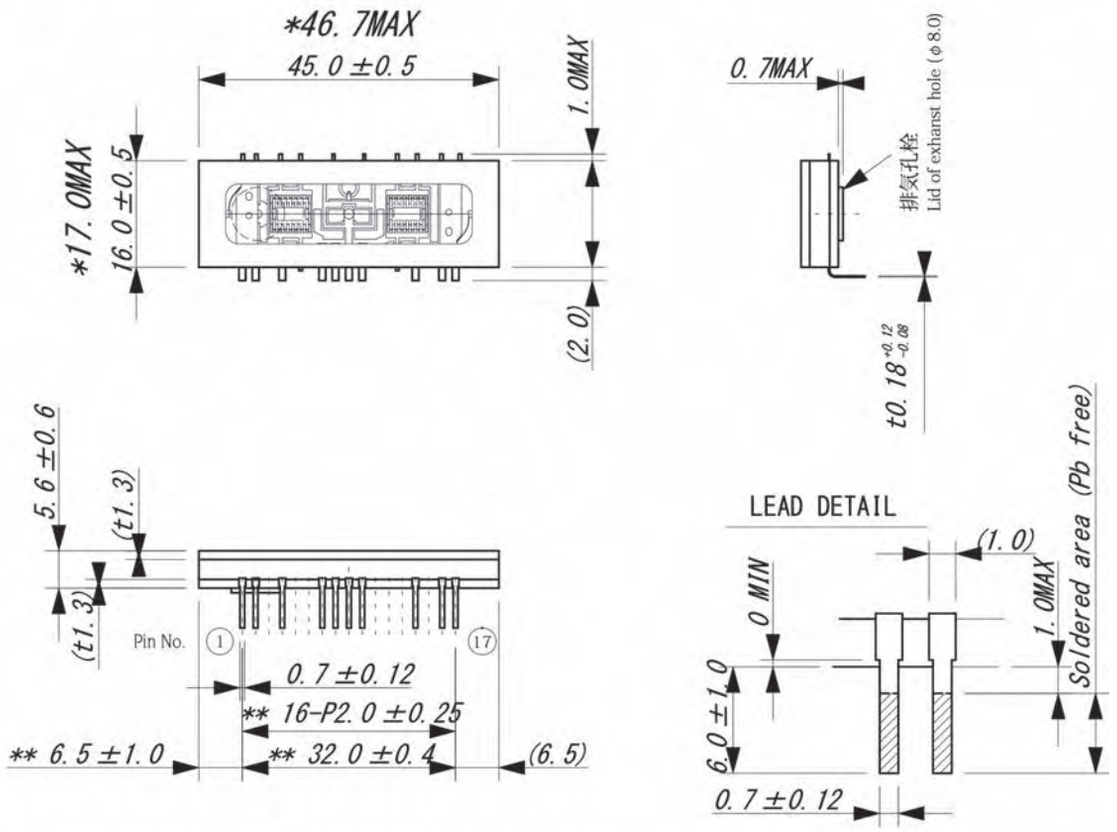


Noritake itron®

KORG

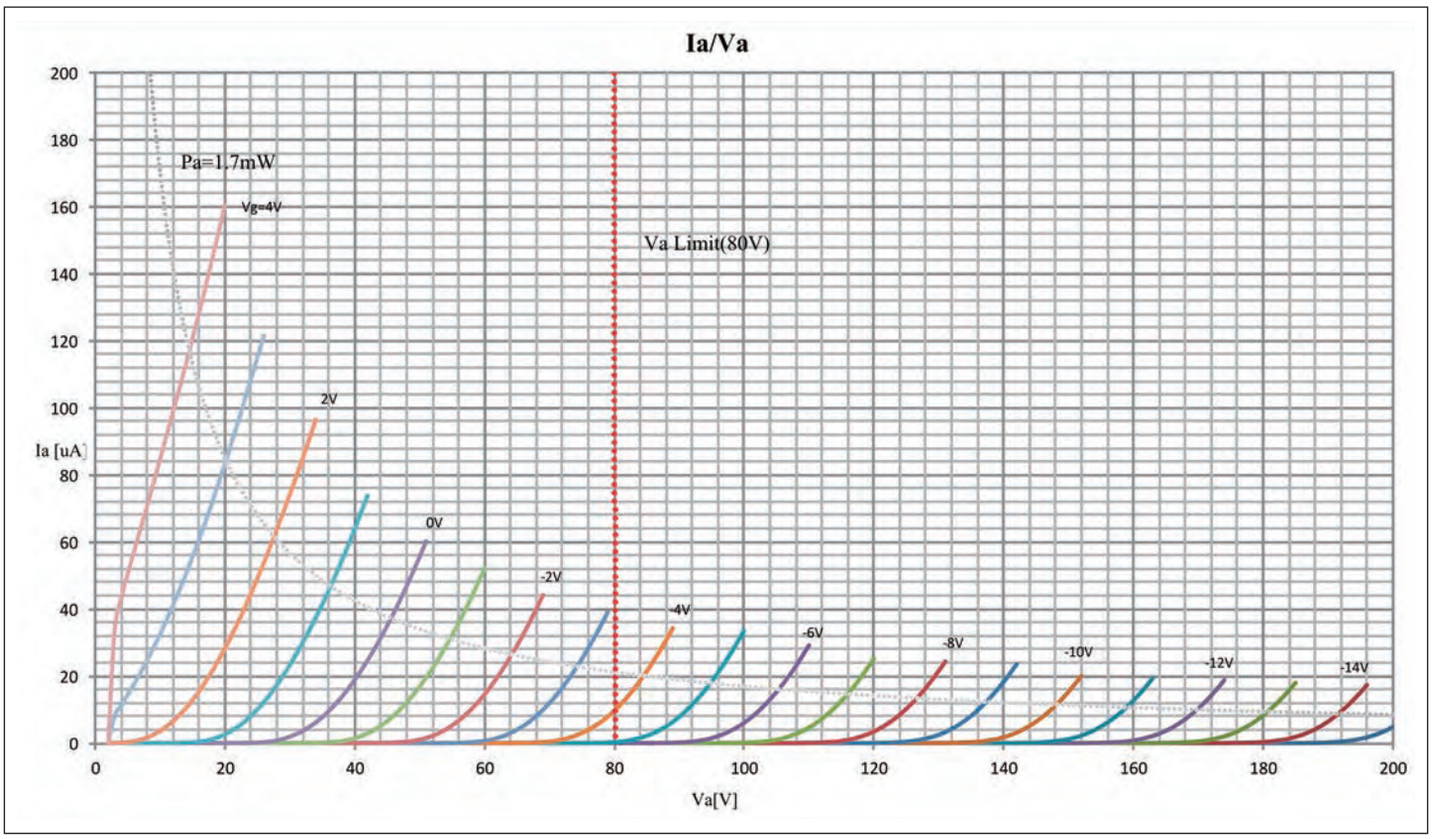
Nutube 6P1 : Outer dimension

Scale 1:1 Unit : mm
( ):Reference only ( ):参考寸法



PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Assignment	F1	F1	NP	G1	NP	NP	A1	GND	F2	A2	NP	NP	NP	G2	NP	F3	F3

Notes * フリットガラスのはみだしを含む。 Included extra frit grass.
** ガラス底面から3mmの位置の値とする。 Within 3mm from bottom of the glass substrate.



http://www.korgnutube.com

DC-Heating
Directly-Heated
Connected in Parallel

KORG

Nutube
6P1
Twin Triode

1. Ratings

Parameter	Symbol	MIN	TYP	MAX	Unit
Operating Temp.	To	-40	-	+85	℃
Storage Temp.	Ts	-50	-	+85	℃
Filament Voltage	Ef #1	0.6	0.7	0.8	V
Grid Voltage	Eg #2	-	-	5.0	V
Anode Voltage	Ea #2	5.0	-	80.0	V
Anode Power Dissipation	Na	-	-	1.7	mW
Insulation Resistance(Anode-Other)	-	3	-	-	MΩ
Insulation Resistance(Grid-Other)	-	3	-	-	MΩ
Color of Illumination	Green				

2. Electrical Characteristics

Parameter	Symbol	Test Condition		MIN	TYP	MAX	Unit
Filament Current	If	Ef=0.7Vdc #1	Eg=Ea=0V	16.0	17.0	20.0	mAdc
Bias Voltage	Bias		Ia=18.2μA #5#6 Vin=0Vrms #5	1.5	2.5	3.5	Vdc
Voltage Amplification (Vout / Vin)	A		Ia=18.2μA #5#6 Vin=0.245Vrms, 1kHz	3.7	5.0	6.4	-
Resonance Frequency	Fr #7		Ia=18.2μA #5#6 Vin=0Vrms #5	-	5.8	-	kHz
Anode Current	Ig #3		Eg=2.0Vdc #2	-	32.0	-	μAdc
Grid Current	Ia #4		Ea=12.0Vdc	-	6.0	-	μAdc
Amplification Factor	μ			-	14.5	-	-
Transconductance	gm			-	54	-	-
Anode Resistance	Ra			-	330	-	kΩ

#1 Per each filament
#2 See Fig.1
#3 Per each grid
#4 Per each anode
#5 See Fig.2
#6 Ia adjusted by 'Bias'

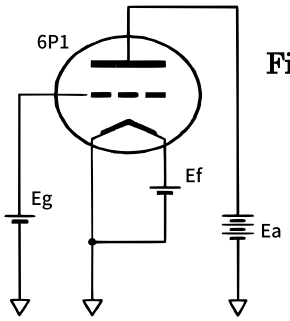


Fig. 1

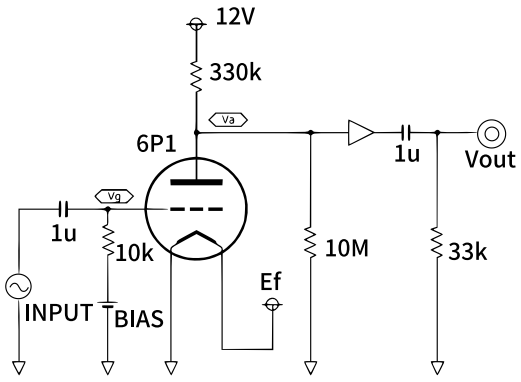


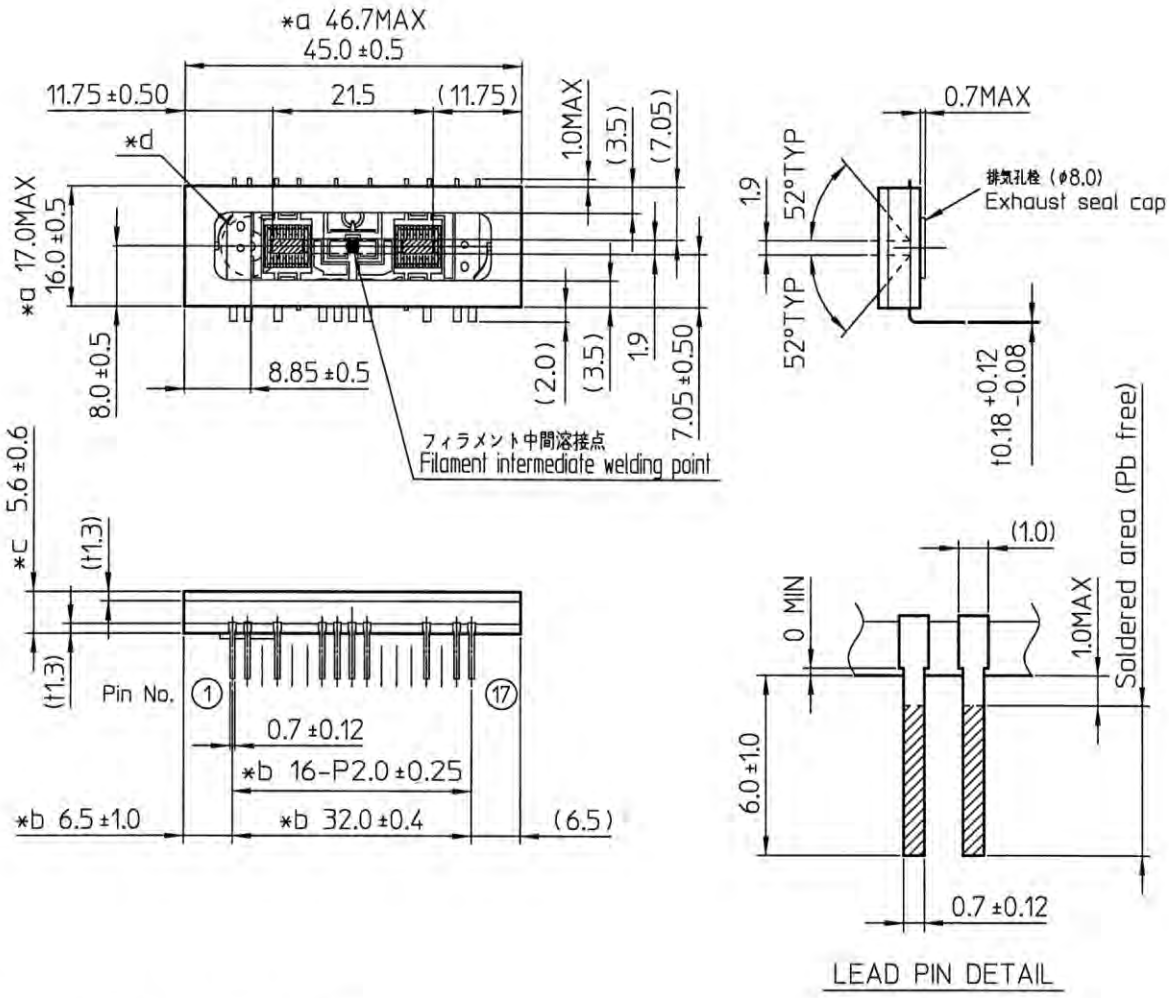
Fig. 2

Capacitances (Typical)

F1-G1 2-4	F1-A1 2-7	F1-GND 2-8	G1-A1 4-7	G1-GND 4-8	G1-A2 4-10	G1-G2 4-14	A1-GND 7-8	A1-A2 7-10
9.1pF	4.3pF	39.2pF	2.5pF	10.9pF	2.3pF	4.3pF	4.5pF	1.4pF

Nutube 6P1 External Dimensions

Unit: mm
( ): Reference only
参考寸法



*a フリットのはみ出しを含む寸法とする.
Including any protruding frit glass.

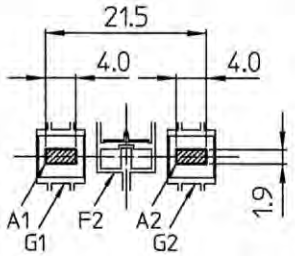
*b 基板底面より3mmの位置の寸法とする.
Within 3mm from the bottom of the glass substrate.

*c 排気孔栓の厚みを含まない.
Does not include the thickness of the exhaust seal cap.

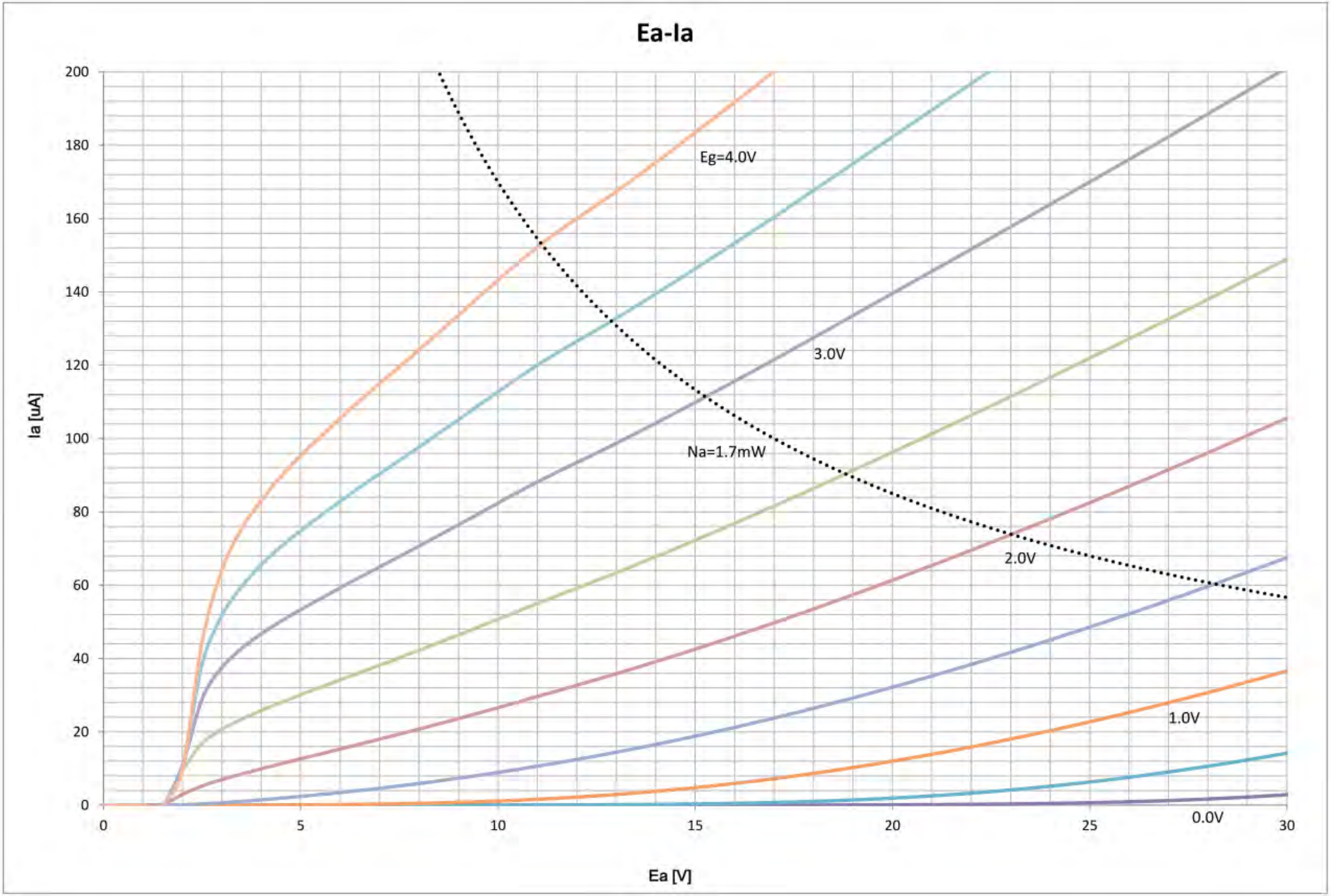
*d 排気孔栓は排気孔の中心から半径6mmの範囲に収まっていること.
Exhaust seal cap is entirely within a 6mm radius from the center point.

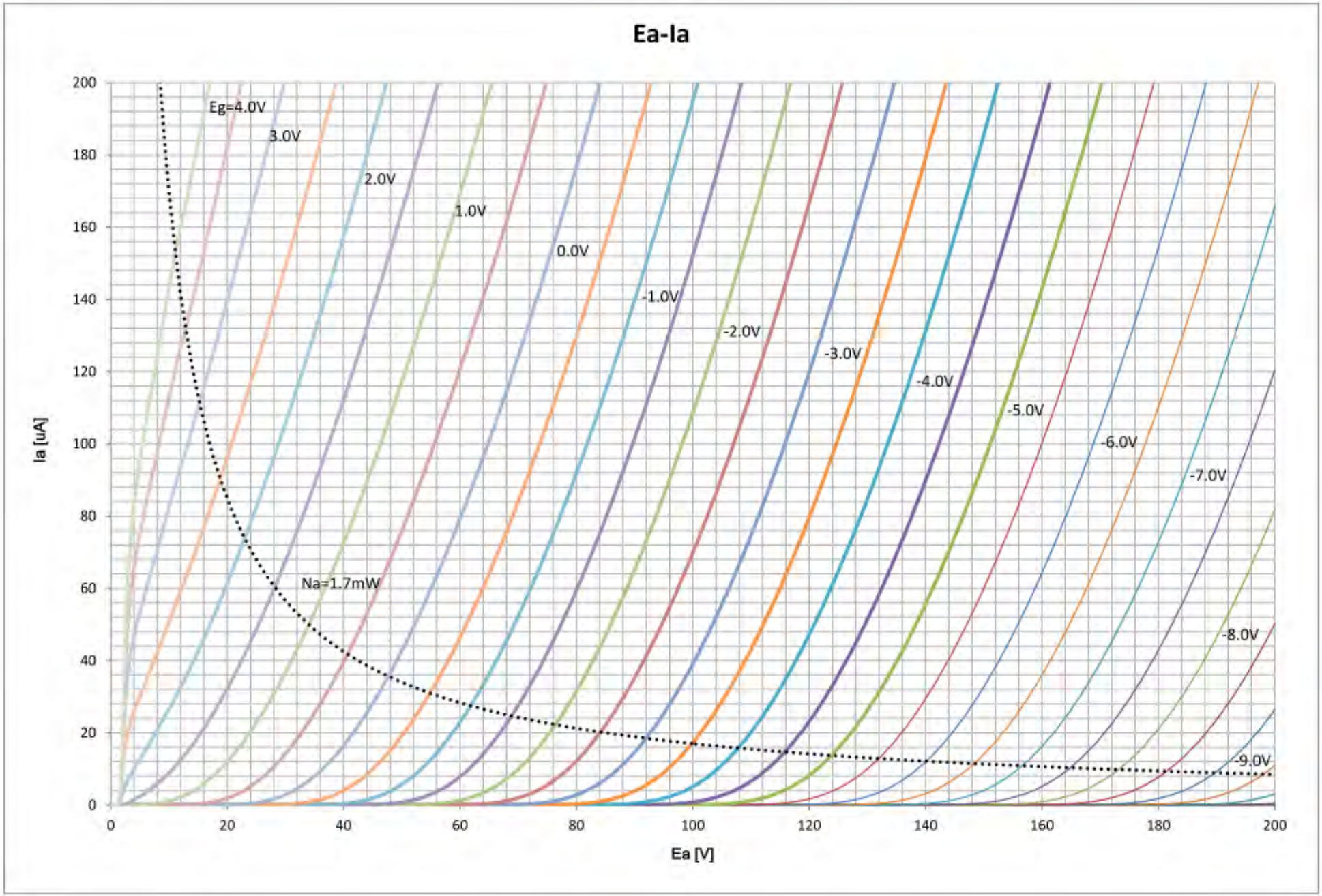
Pin assignment

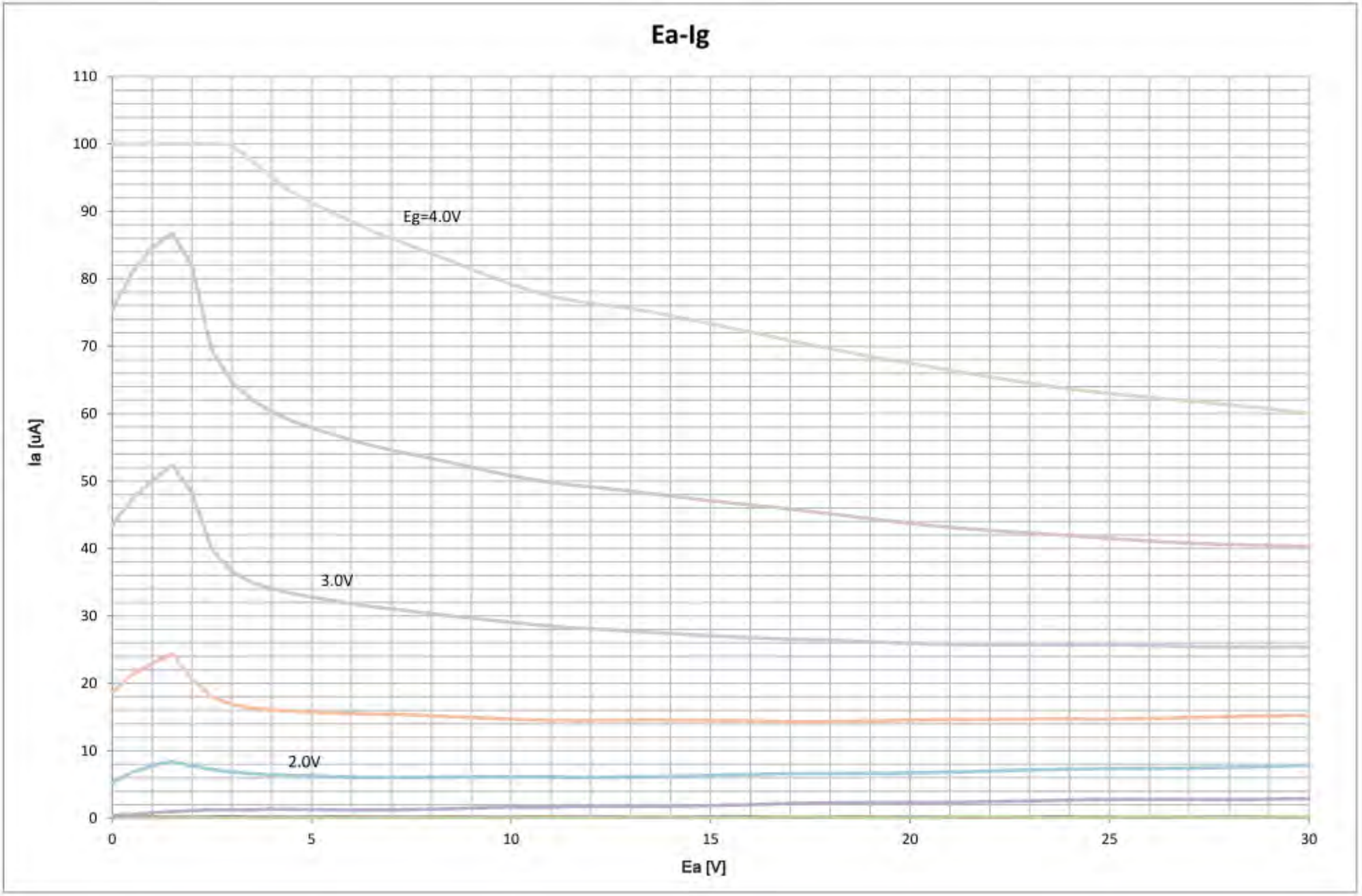
Pin NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Assignment	F1	F1	NP	G1	NP	NP	A1	GND	F2	A2	NP	NP	NP	G2	NP	F3	F3



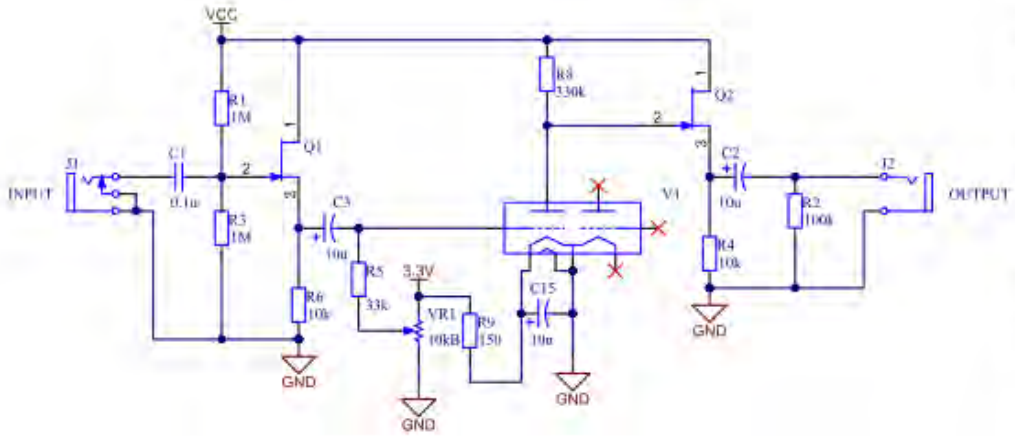
F1: フィラメント 1 (左)/Filament 1 (Left)
F2: フィラメント 2 (中間)/Filament 2 (Center)
F3: フィラメント 3 (右)/Filament 3 (Right)
NP: ノーピン/No Pin
G1: グリッド 1/Grid 1
G2: グリッド 2/Grid 2
A1: アノード 1/Anode 1
A2: アノード 2/Anode 2


Ea-Ia
Ia [uA]
Ea [V]
Eg=4.0V
3.0V
Na=1.7mW
2.0V
1.0V
0.0V
0
20
40
60
80
100
120
140
160
180
200
0
5
10
15
20
25
30


Ea-Ia
Ia [uA]
Ea [V]
Eg=4.0V
3.0V
2.0V
1.0V
0.0V
-1.0V
-2.0V
-3.0V
-4.0V
-5.0V
-6.0V
-7.0V
-8.0V
-9.0V
Na=1.7mW
0
20
40
60
80
100
120
140
160
180
200


Ea-Ig
110
100
90
80
70
60
50
40
30
20
10
0
Ia [uA]
Eg=4.0V
3.0V
2.0V
0
5
10
15
20
25
30
Ea [V]

Nutube Basic Circuit

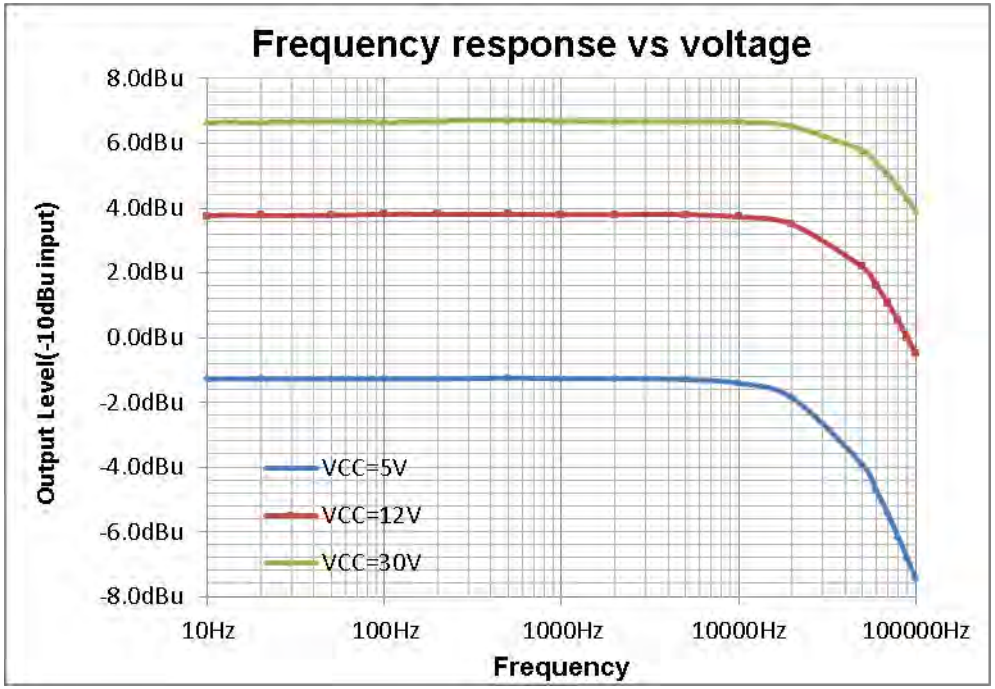


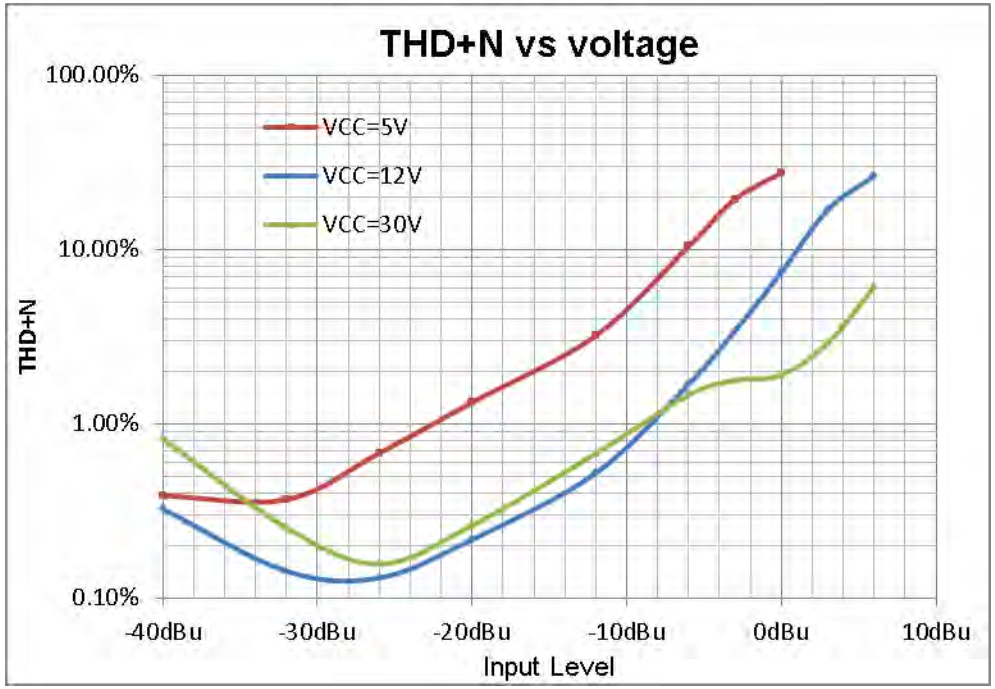
Application notes
1. C15 reduces residual noise.
When C15=10uF, residual noise is 9dB less than when without C15.

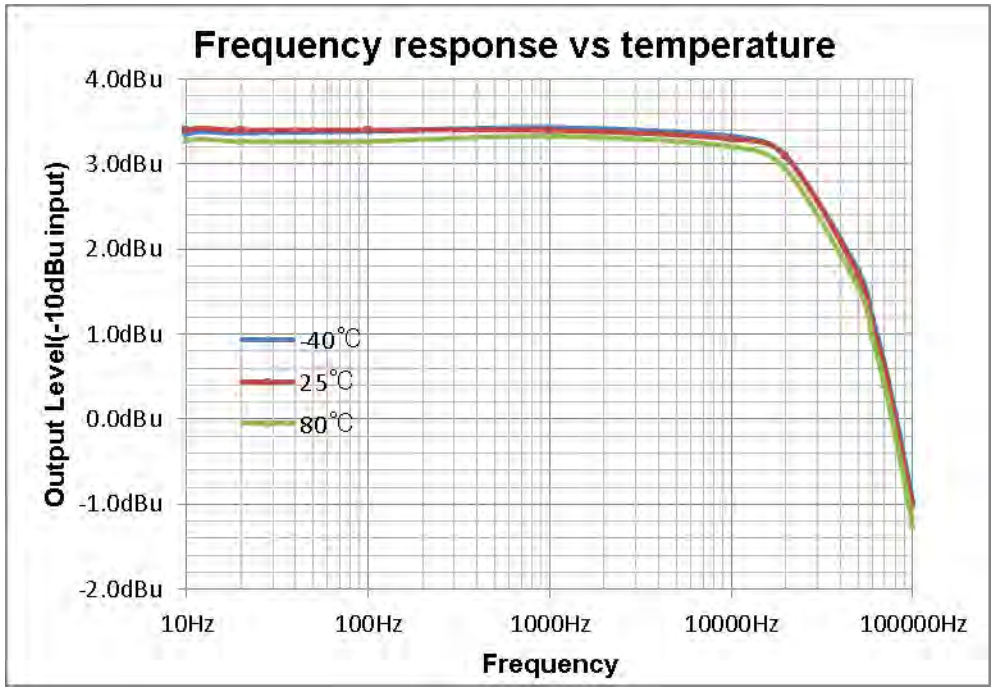
2. Nutube requires POSITIVE grid bias when the VCC voltage is under 40V approximately.
VR1 adjusts the bias voltage.

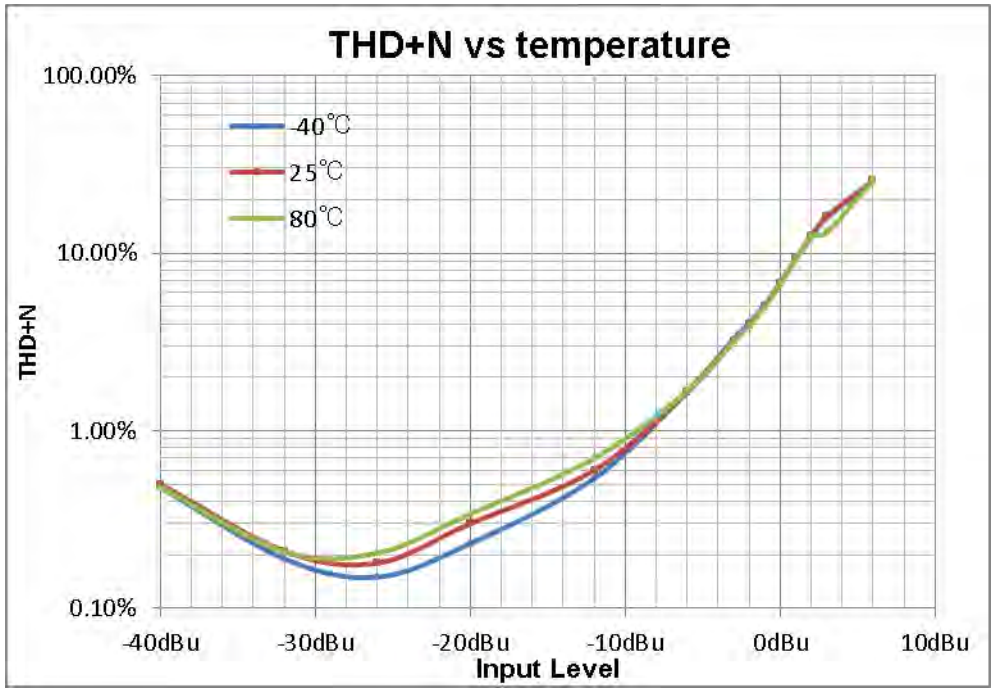
3. The approximate circuit gains are:
9dB(VCC=5V)
14dB(VCC=12V)
17dB(VCC=30V)

When R8 varies(VCC=12V):
9dB(R8=100k)
13dB(R8=220k)
14dB(R8=330k)

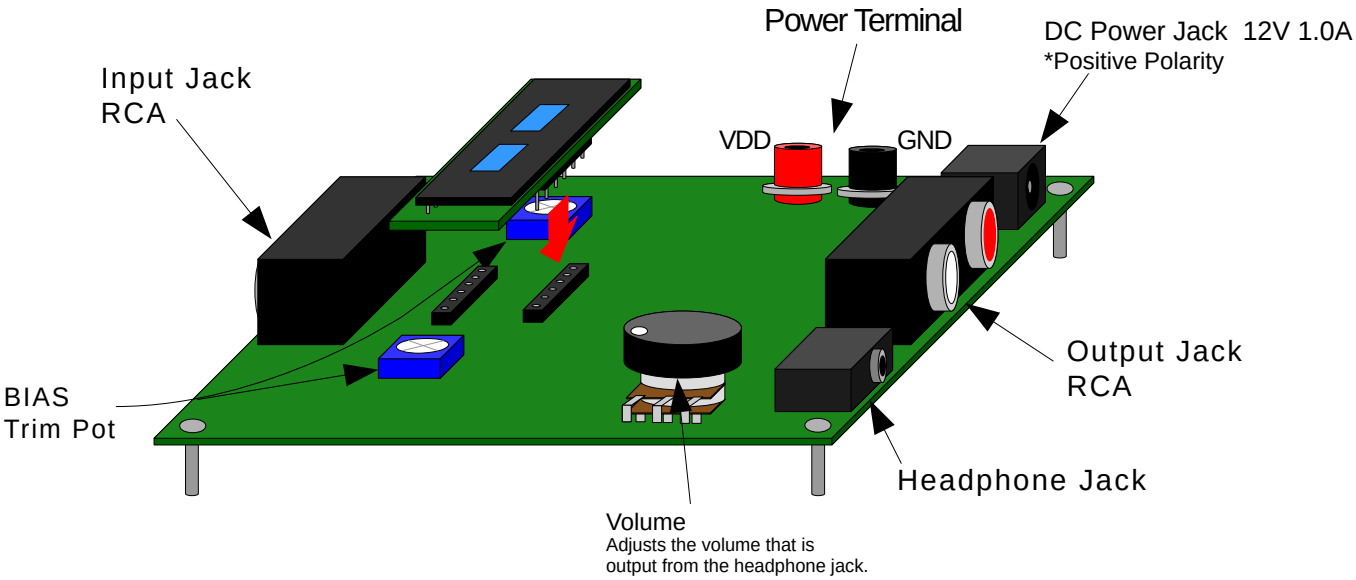

Frequency response vs voltage
8.0dBu
6.0dBu
4.0dBu
2.0dBu
0.0dBu
-2.0dBu
-4.0dBu
-6.0dBu
-8.0dBu
Output Level(-10dBu input)
VCC=5V
VCC=12V
VCC=30V
10Hz
100Hz
1000Hz
10000Hz
100000Hz
Frequency


THD+N vs voltage
100.00%
10.00%
1.00%
0.10%
THD+N
VCC=5V
VCC=12V
VCC=30V
-40dBu
-30dBu
-20dBu
-10dBu
0dBu
10dBu
Input Level


Frequency response vs temperature
4.0dBu
3.0dBu
2.0dBu
1.0dBu
0.0dBu
-1.0dBu
-2.0dBu
Output Level(-10dBu input)
-40℃
25℃
80℃
10Hz
100Hz
1000Hz
10000Hz
100000Hz
Frequency


THD+N vs temperature
100.00%
10.00%
1.00%
0.10%
THD+N
-40℃
25℃
80℃
-40dBu
-30dBu
-20dBu
-10dBu
0dBu
10dBu
Input Level

Nutube Evaluation Board Ver.1.0



Specifications		
IN/OUT		
Input x2		RCA x2
Output x2		RCA x2
Headphone Out		STEREO MINI JACK
Power		
VDD(5V~30V)	RED	
GND	BLACK	
DC Power Jack	positive polarity	12V , 1.0A

Board Size: 148 mm × 210mm *provisional