

OUTPUT COUPLING CAPACITOR-LESS LOW VOLTAGE VIDEO AMPLIFIER WITH LPF

■ GENERAL DESCRIPTION

The NJU71032 is a Low Voltage Video Amplifier with LPF circuit. By the internal charge pump circuit, output capacitor is unnecessary.

The NJU71032 features low power and small package, and is suitable for low power design on downsizing of portable video system and system with video output.

- NJU71031 (Gain=6dB)

■ PACKAGE OUTLINE



NJU71032RB1
MSOP8(TVSP8)

■ FEATURES

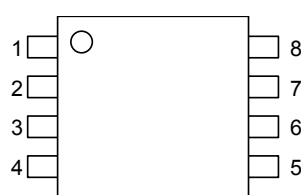
- Operating Voltage 2.5 to 3.45V
- Output coupling capacitor-less
- 6dB amplifier
- Internal 75Ω Driver Circuit (2-system drive)
- Internal LPF 0dB at 6.75MHz typ
-40dB at 54MHz typ

- Power Save Circuit
- CMOS Technology
- Package Outline

MSOP8(TVSP8)*

*MEET JEDEC MO-187-DA / THIN TYPE

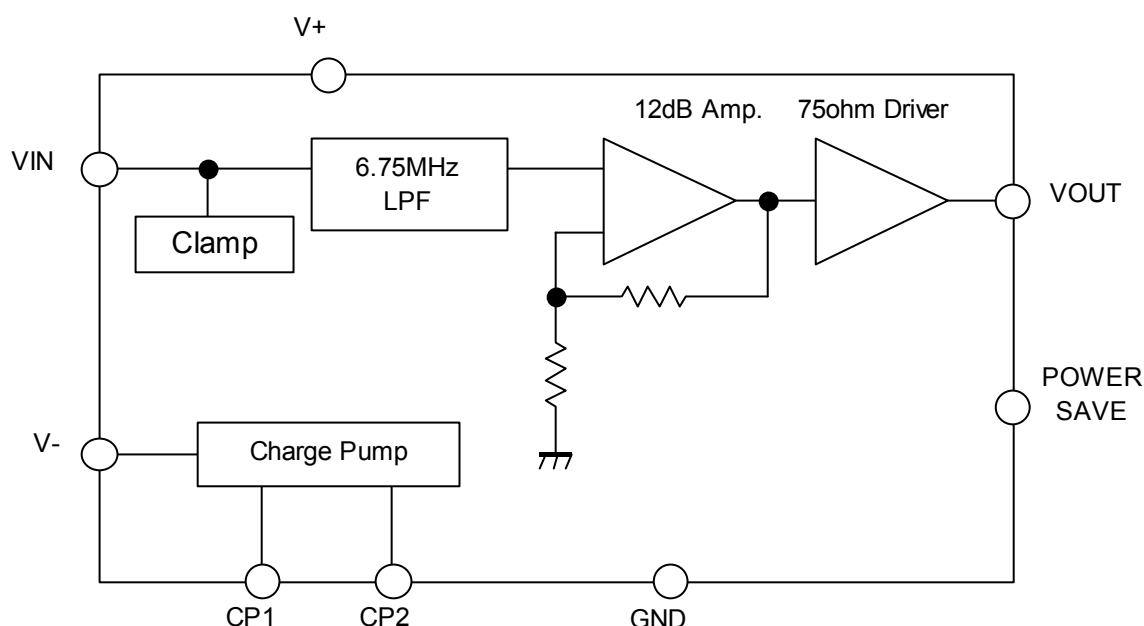
■ PIN CONFIGURATION



NJU71032RB1

- 1: CP1
- 2: V+
- 3: VIN
- 4: Power Save
- 5: VOUT
- 6: GND
- 7: V-
- 8: CP2

■ BLOCK DIAGRAM



Ver.2

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	3.55	V
Power Dissipation	P _D	MSOP8(TVSP8): 580 (Note1)	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +150	°C

(Note 1) At on a board of EIA/JEDEC specification. (114.3 x 76.2 x 1.6mm 2 layers, FR-4)

■ RECOMMENDED OPEARATING CONDITION (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	Vopr		2.5	-	3.45	V

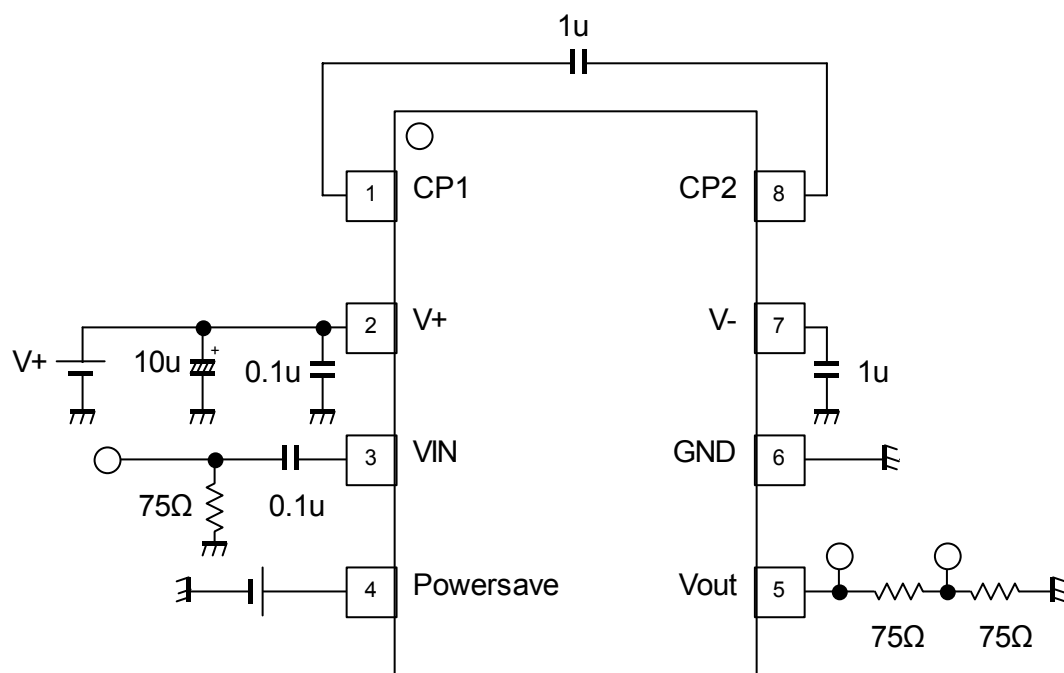
■ ELECTRICAL CHARACTERISTICS (V⁺=3.0V, R_L=150Ω, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{CC}	No Signal	-	14	22	mA
Operating Current at Power Save	I _{save}	No Signal, Power Save Mode	-	0.1	10	μA
Maximum Output Voltage Swing	V _{om}	f=100kHz, THD=1%	2.4	3.0	-	V _{p-p}
Voltage Gain	G _v	V _{in} =100kHz, 0.5V _{p-p} , Input Sine Signal	11.6	12.0	12.4	dB
Low Pass Filter Characteristic	G _{fy6.75M}	V _{in} =6.75MHz/100kHz, 0.5V _{p-p}	-1.0	0	1.0	dB
	G _{fy54M}	V _{in} =54MHz/100kHz, 0.5V _{p-p}	-	-40	-24	
Differential Gain	DG	V _{in} =0.5V _{p-p} , 10step Video Signal	-	0.5	-	%
Differential Phase	DP	V _{in} =0.5V _{p-p} , 10step Video Signal	-	0.5	-	deg
S/N Ratio	SN _v	100kHz to 6MHz, V _{in} =0.5V _{p-p} 100% White Video Signal, R _L =75Ω	-	+65	-	dB
Switching Noise Level	N _{swpl}	R _L =75Ω, 10% White Video Signal	-	4	7	mV _{pp}
SW Change Voltage High Level	V _{thPH}	Active	1.25	-	V ⁺	V
SW Change Voltage Low Level	V _{thPL}	Non-active	0	-	0.45	

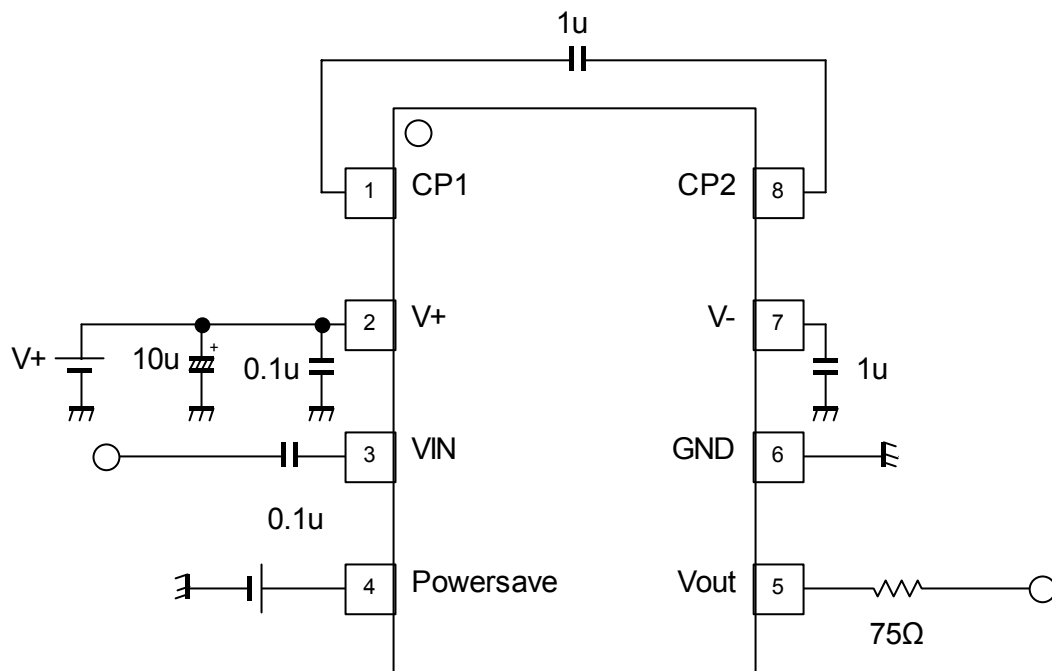
■ CONTROL TERMINAL

PARAMETER	STATUS	NOTE
Power Save	H	Power Save: OFF
	L	Power Save: ON (Mute)
	OPEN	Power Save: ON (Mute)

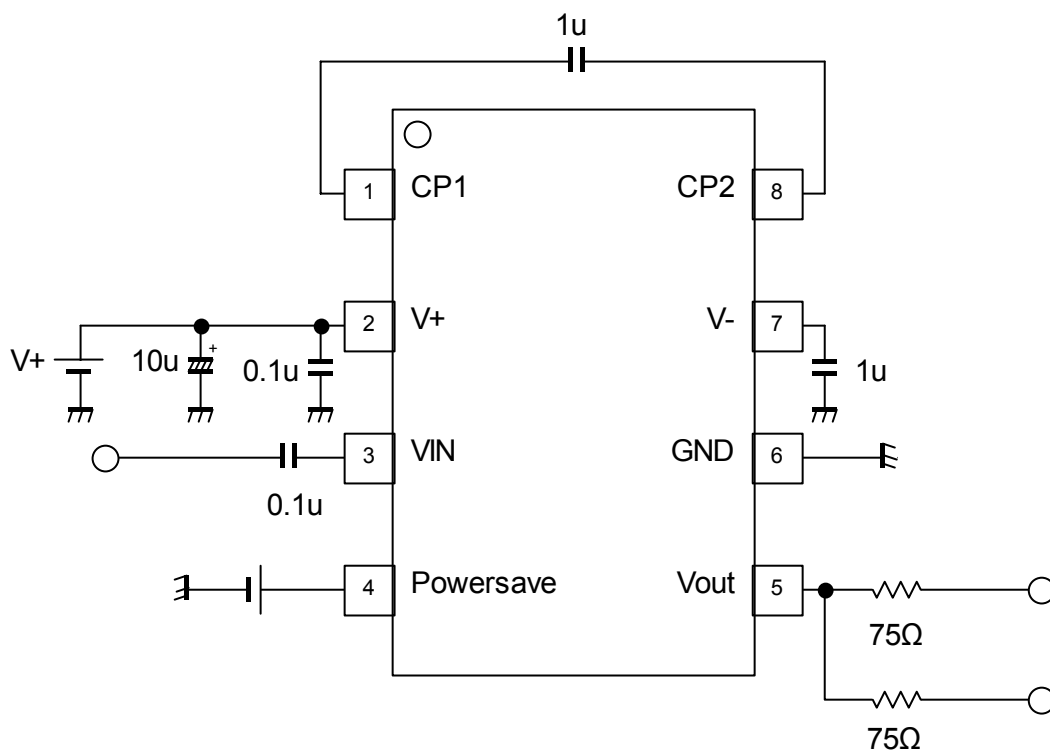
■ TEST CIRCUIT



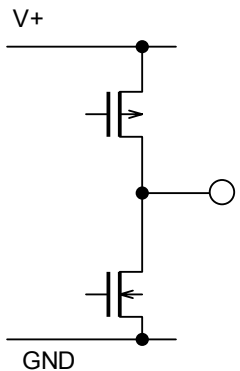
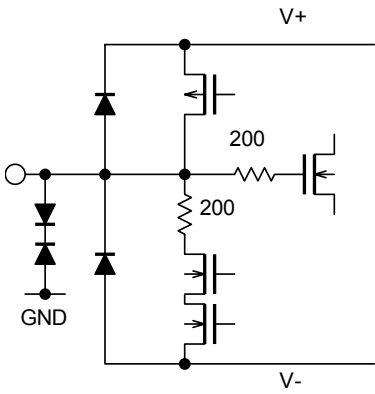
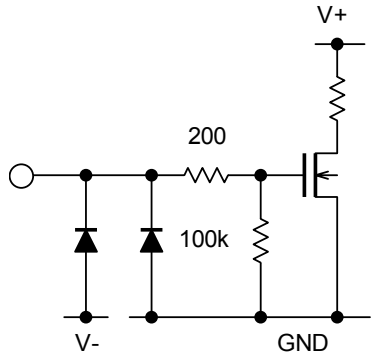
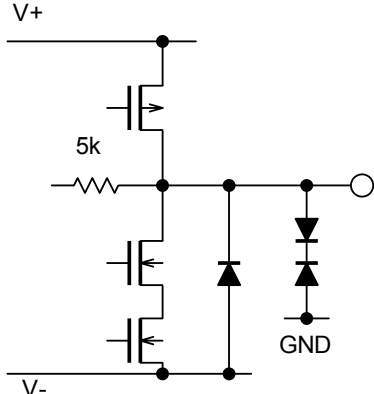
■ APPLICATION CIRCUIT 1 (Standard circuit)



■ APPLICATION CIRCUIT 2 (Two-line drive circuit)



■ TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	EQUIVALENT CIRCUIT	DC VOLTAGE
1	CP1	Flying Capacitor Terminal		-
2	V+	V+ Power Supply	-	-
3	VIN	Input		0V
4	Power Save	Power Save		-
5	VOUT	Output		0V

Ver.2

PIN No.	PIN NAME	FUNCTION	EQUIVALENT CIRCUIT	DC VOLTAGE
6	GND	Ground	-	-
7	V-	V- Power Supply	-	-
8	CP2	Flying Capacitor Terminal		-

APPLICATION

When coax multiplex transmission, we recommend that you adjust the output signal.
Please refer to figure1.

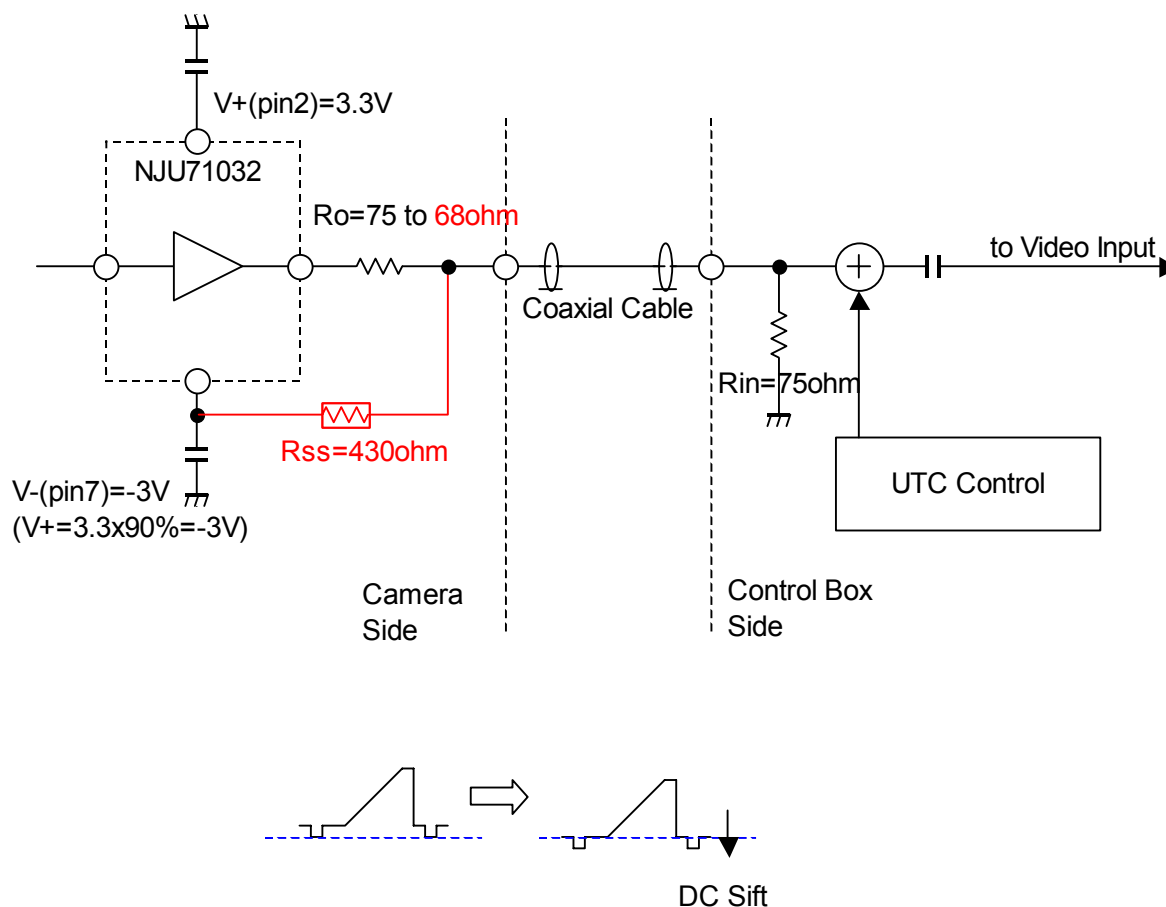


Figure1: How to shift the output DC signal

The rare case, there is to be superimposed the directly DC control signal on the video signal when superimposed a control signal to the video signal by using a coaxial cable.

In that case, the following symptoms will appear.

- The control signal appears on the screen.
- Loss of synchronization of the video signal

Shows the proposed measures on the next page.

A case of multiple coaxial transmission: UTC(Up The Coaxial)

This is one of a case at the multiplex coaxial transmission used in CCTV.

It is a system that control signals of camera multiplexing to the coaxial cable.

This system is superimposed on the control signal pulse in the vertical blanking period as shown in Figure 2.

This is because do not affect the video signal.

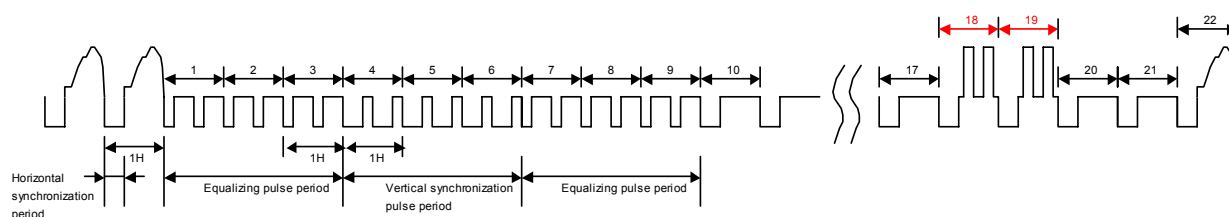


Figure2: A case of UTC

Ver.2

Proposed measures is shift the output DC signal by using the V- terminal (pin 7) of NJU71032.

The steps are as follows:

1. A resistor: R_{ss} add between the R_o (75Ω) and V- terminal (7pin).
2. Reduce R_o (75Ω).

By adding a R_{ss} , level of the video signal is attenuated.

Example: Level of the video signal will be reduced 5% at connected $R_{ss} = 430\Omega$ and $R_o = 75\Omega$.

Therefore, increase 5% of video output level by changed to 68Ω the R_o .

*Table 1 shows an external resistor value and the swing of video output signal at $V+$ (pin2) = 3.3V, 3V.

3. Please evaluation of S/N.

It is because the noise of the charge pump may change.

	Value (typ.)		UNIT
V+(pin2)	3.3	3	V
V-(pin7) ($V+ \times 90\%$)	-2.95	-2.67	V
Termination resistance	75	75	ohm
Resistance (between V_{ss} and V_{out})	430	430	ohm
Output resistance(R_o)	68	68	ohm
Sync. Voltage of V_{out}	-0.203	-0.19	V
Swing of V_{out}	0.975	0.975	Vpp

Table 1: external resistor value and the swind of video output signal at $V+$ (pin2) = 3.3V, 3V.

- Case of 2-system 75ohm drive

Shown in Figure 3, 2-system drive will be possible at system 1 (75Ω for multiplex coaxial system) and system -2(75Ω system for monitoring).

However, shown in Figure 4, 2-system drive is not recommended, case of system 1 and 2 (75Ω for multiplex coaxial system)

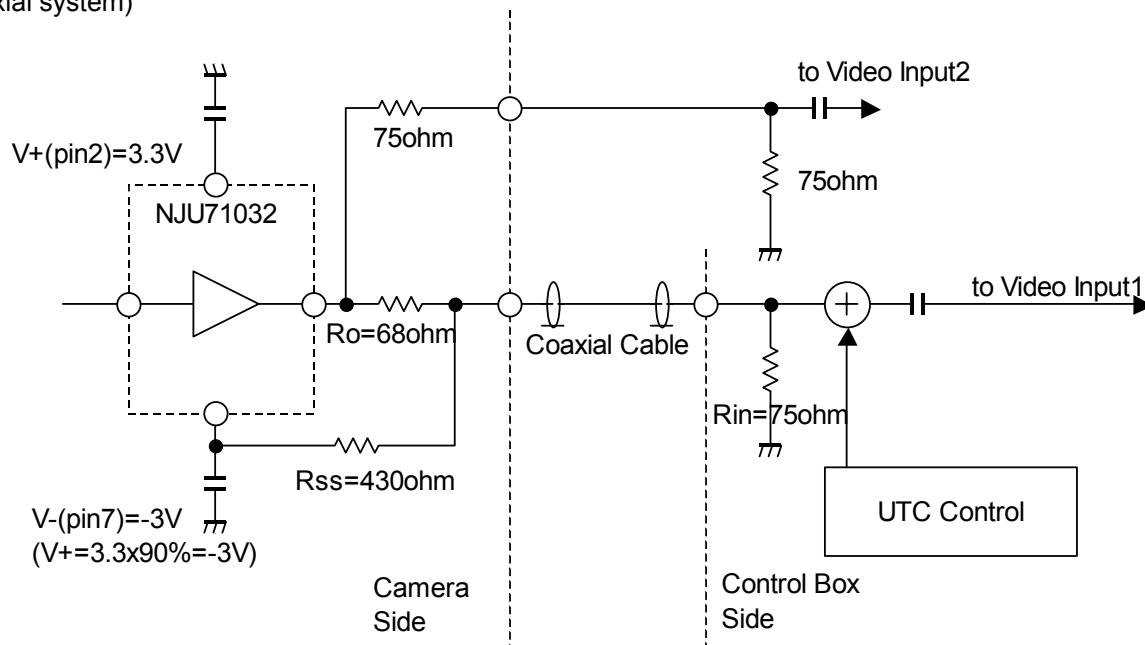


Figure 3: Recommended 2-system drive circuit

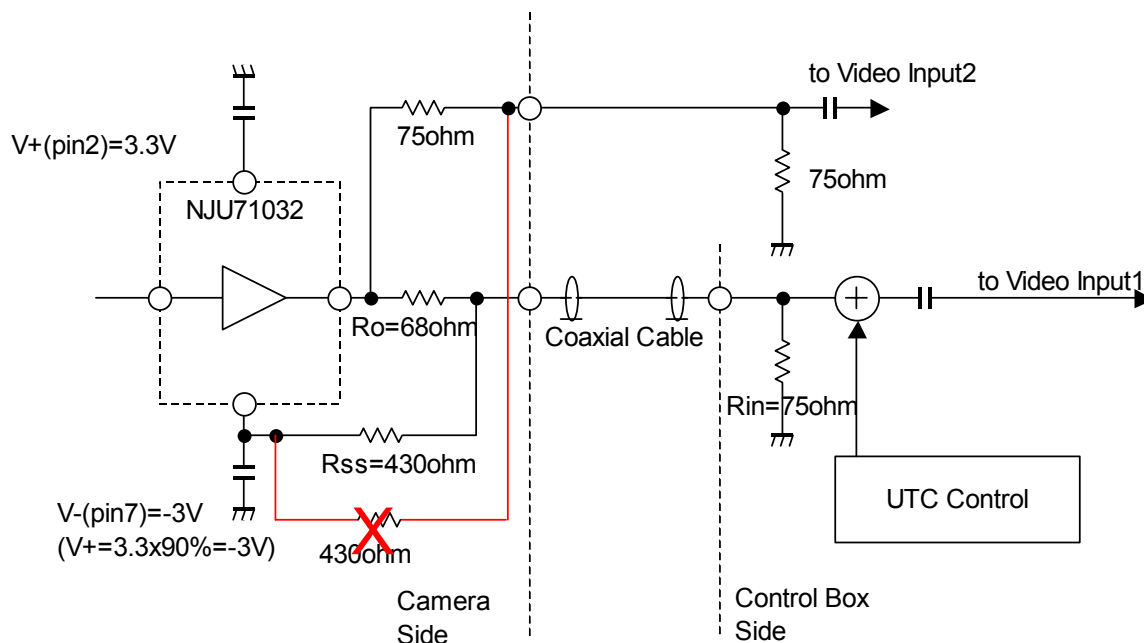
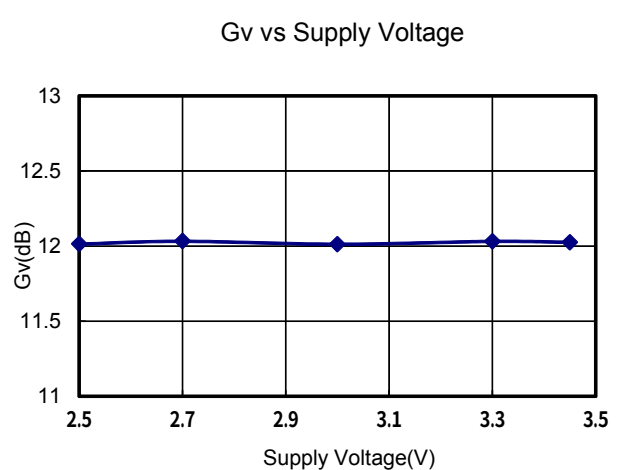
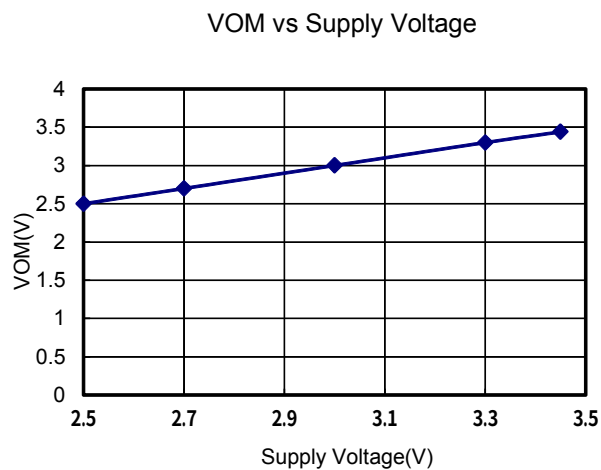
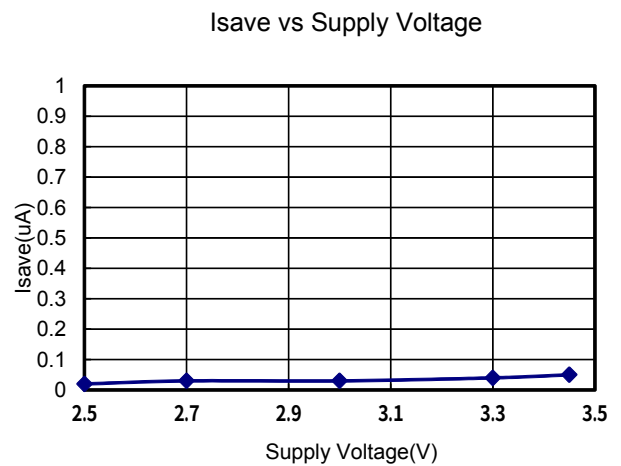
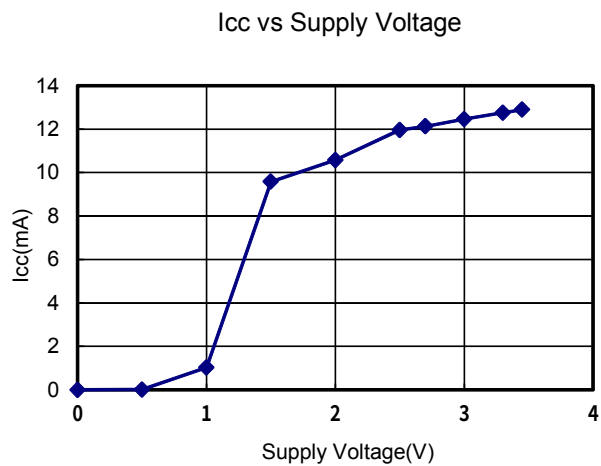
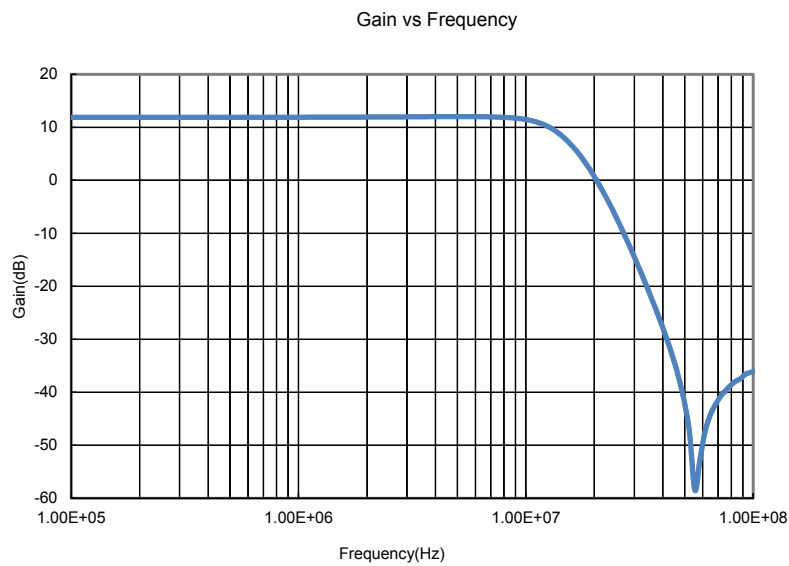


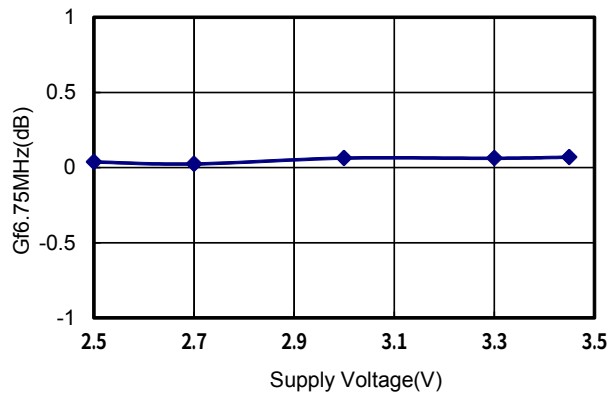
Figure 4: Not recommended 2-system drive circuit

■ TYPICAL CHARACTERISTICS

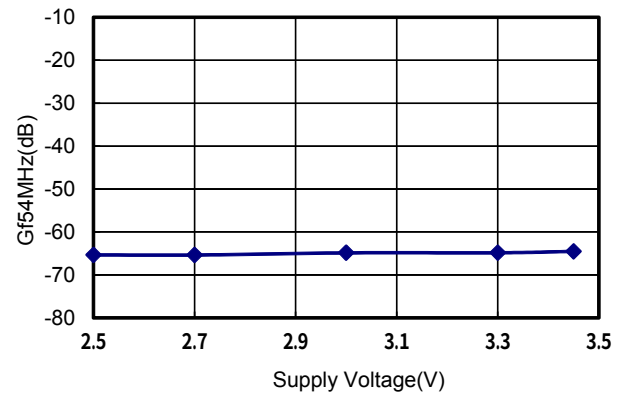


■ TYPICAL CHARACTERISTICS

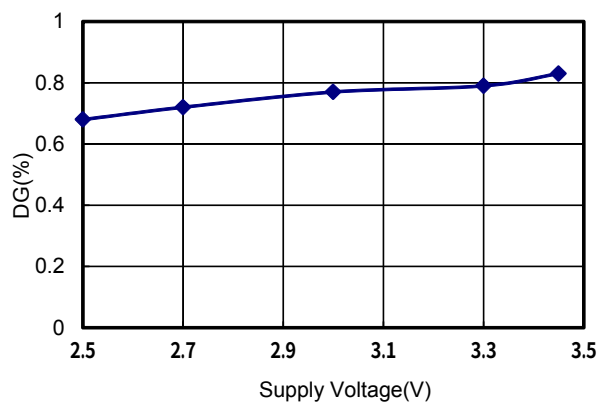
Gf6.75MHz vs Supply Voltage



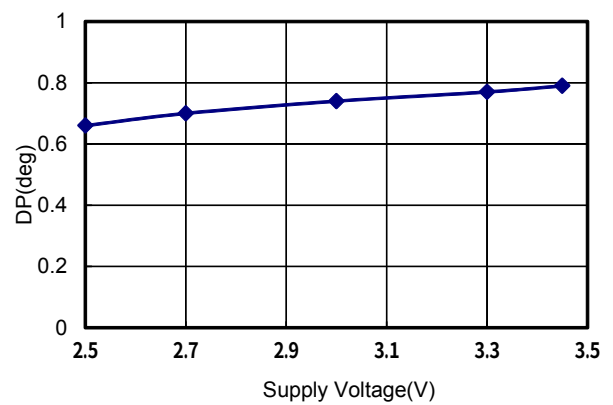
Gf54MHz vs Supply Voltage



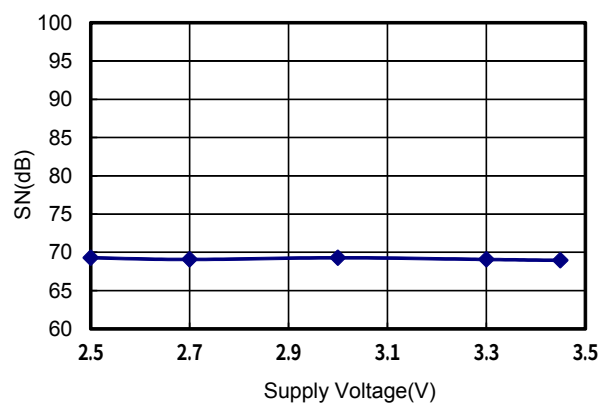
DG vs Supply Voltage



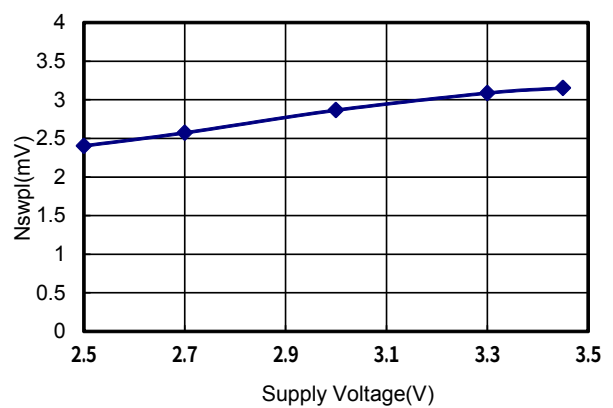
DP vs Supply Voltage



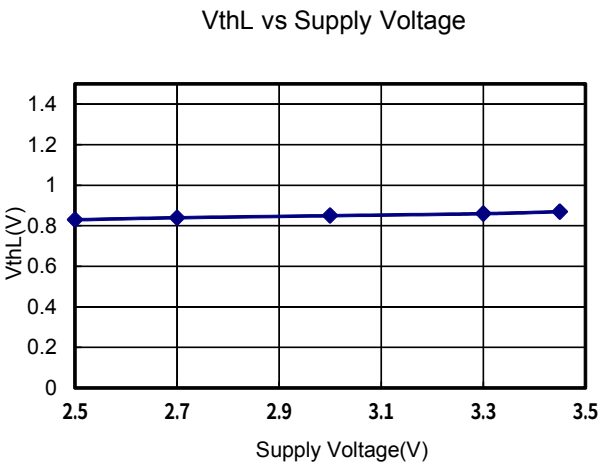
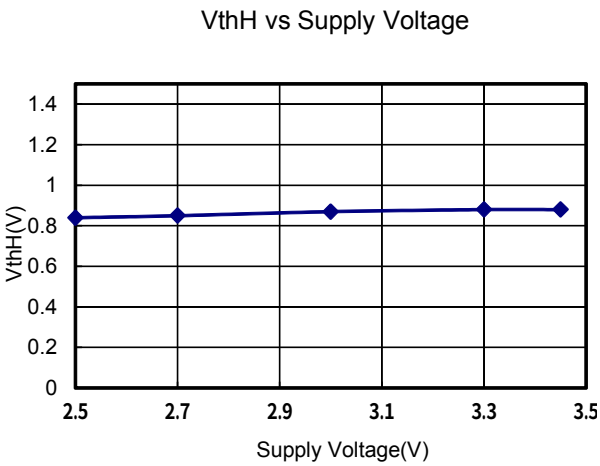
SN vs Supply Voltage



Nswpl vs Supply Voltage

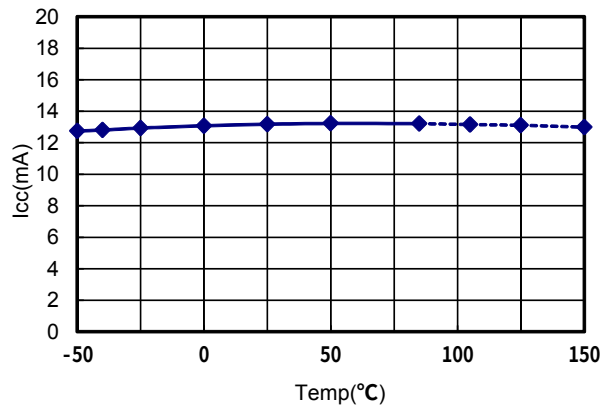


■ TYPICAL CHARACTERISTICS

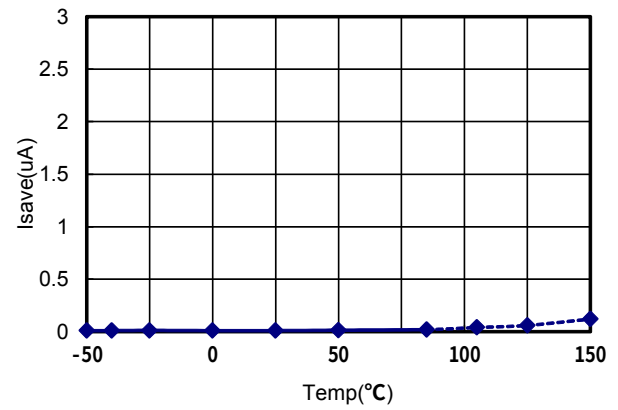


TYPICAL CHARACTERISTICS

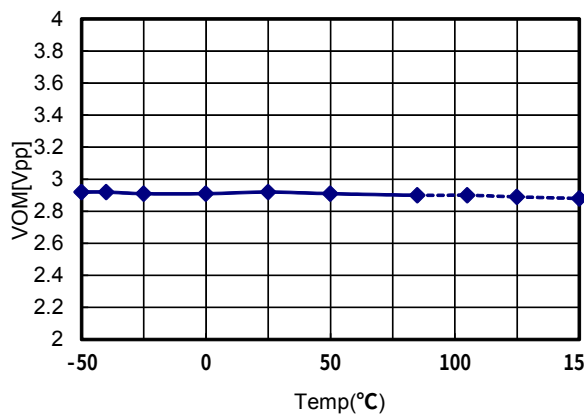
I_{cc} vs Temp



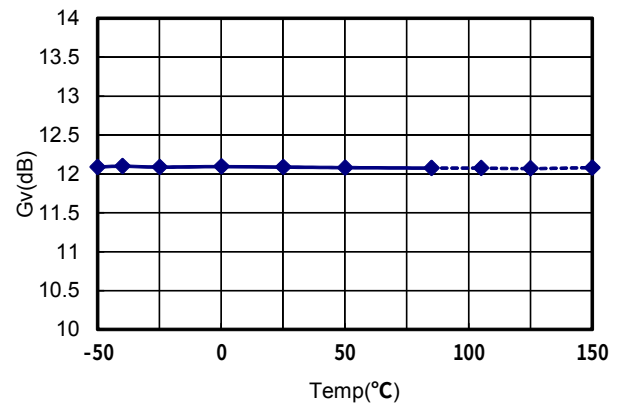
I_{save} vs Temp



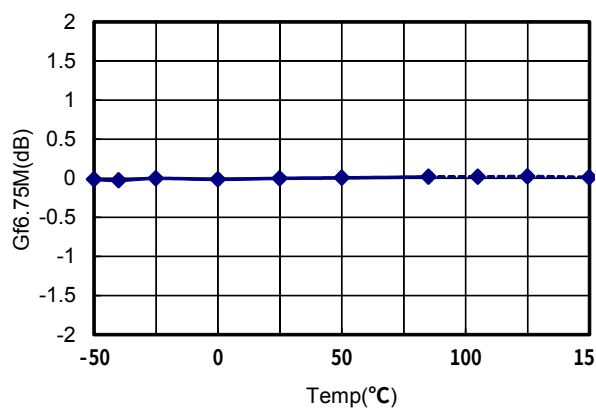
VOM vs Temp



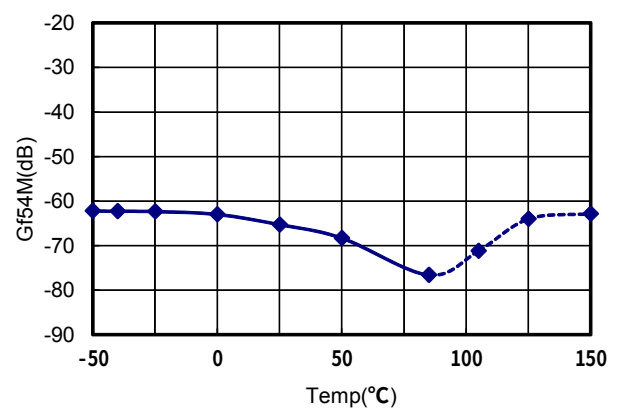
G_v vs Temp



G_{f6.75M} vs Temp

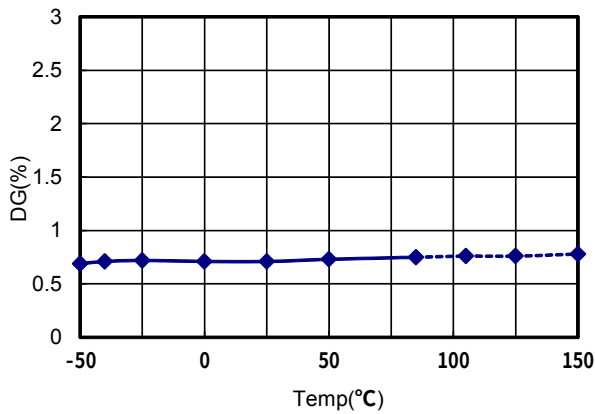


G_{f54M} vs Temp

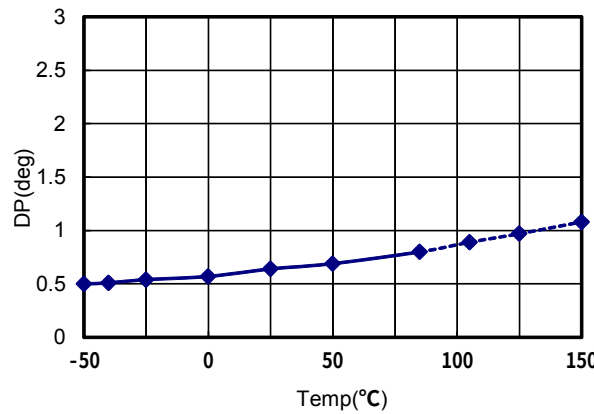


■ TYPICAL CHARACTERISTICS

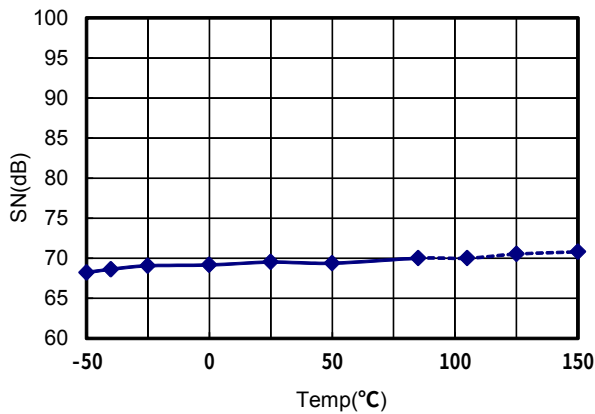
DG vs Temp



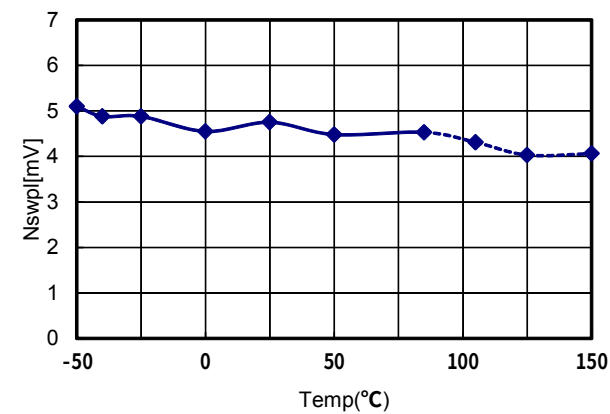
DP vs Temp



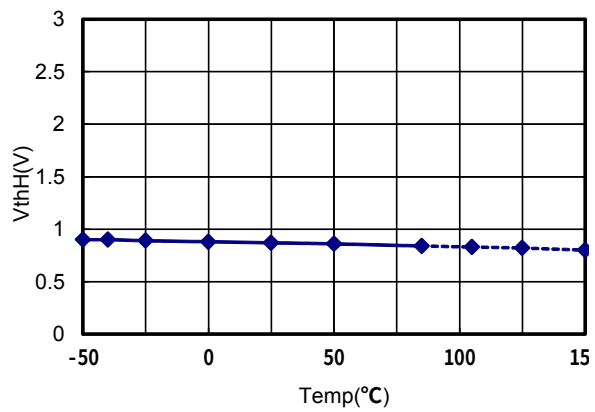
SN vs Temp



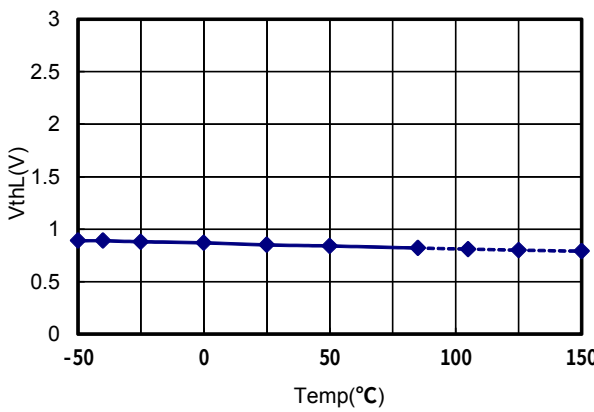
Nswpl vs Temp



VthH vs Temp



VthL vs Temp



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