

## OUTPUT COUPLING CAPACITOR-LESS LOW VOLTAGE VIDEO AMPLIFIER WITH LPF, Y/C MIX

### ■ GENERAL DESCRIPTION

The NJU71074 is a Low Voltage Video Amplifier with LPF, Y/C MIX circuit. By the internal charge pump circuit, output capacitor is unnecessary.

The NJU71074 features low power and small package, and is suitable for low power design on downsizing of portable video system and system with video output.

### ■ PACKAGE OUTLINE

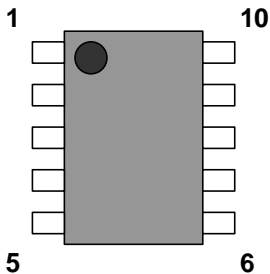


**NJU71074RB2**  
**MSOP10(TVSP10)**

### ■ FEATURES

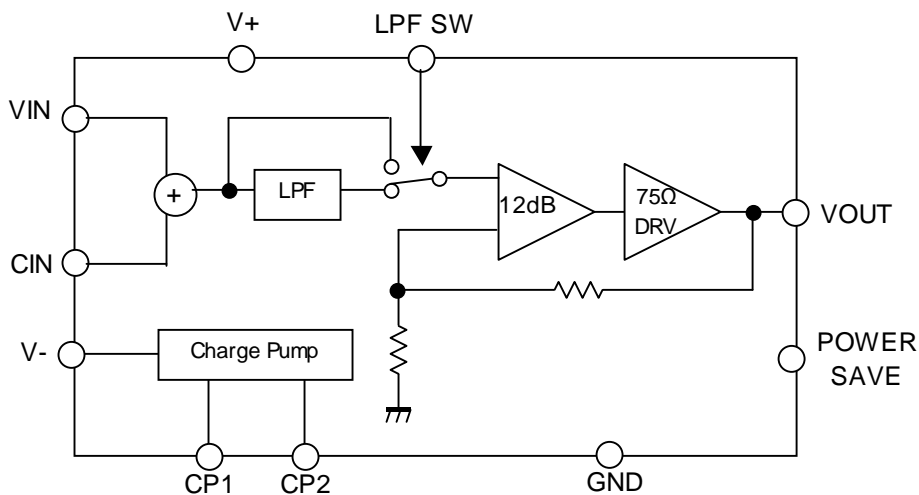
- Operating Voltage                    2.5 to 3.45V
- Output coupling capacitor-less
- 12dB amplifier
- Internal 75Ω Driver Circuit (2-system drive)
- Internal Y/C MIX Circuit
- Internal LPF                            0dB at 6.75MHz typ  
   -40dB at 108MHz typ
  
- Power Save Circuit
- CMOS Technology
- Package Outline                        MSOP10(TVSP10)\*  
   \*MEET JEDEC MO-187-DA / THIN TYPE

### ■ PIN CONFIGURATION



- 1: CP1
- 2: V+
- 3: YIN
- 4: Power save
- 5: CIN
- 6: VOUT
- 7: LPF SW
- 8: GND
- 9: V-
- 10: CP2

### ■ BLOCK DIAGRAM



# NJU71074

## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	3.55	V
Power Dissipation	P <sub>D</sub>	MSOP10(TVSP10): 480 (Note1)	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +125	°C

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

## ■ RECOMMENDED OPERATING CONDITION (Ta=25°C)

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

## ■ ELECTRICAL CHARACTERISTICS (V<sup>+</sup>=3.0V, R<sub>L</sub>=150Ω, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I <sub>CC</sub>	No Signal	-	17	23	mA
Operating Current at Power Save	I <sub>save</sub>	No Signal, Power Save Mode	-	0.1	10	μA
Maximum Output Voltage Swing	V <sub>om</sub>	Y <sub>in</sub> =100kHz, THD=1%	2.4	3.0	-	V <sub>p-p</sub>
Voltage Gain 1	G <sub>v1</sub>	Y <sub>in</sub> =100kHz, 0.5V <sub>p-p</sub> , Input Sine Signal	11.6	12.0	12.4	dB
Voltage Gain 2	G <sub>v2</sub>	C <sub>in</sub> =3.58MHz, 0.15V <sub>p-p</sub> , Input Sine Signal	11.6	12.0	12.4	dB
Frequency Characteristic at LPF through	G <sub>f</sub>	Y <sub>in</sub> =10MHz/100kHz, 0.5V <sub>p-p</sub> , Input Sine Signal	-1.0	0	1.0	dB
Low Pass Filter Characteristic	G <sub>fy</sub> 6.75M	Y <sub>in</sub> =6.75MHz/100kHz, 0.5V <sub>p-p</sub>	-1.0	0	1.0	dB
	G <sub>fy</sub> 54M	Y <sub>in</sub> =54MHz/100kHz, 0.5V <sub>p-p</sub>	-	-40	-24	
Differential Gain	DG	Y <sub>in</sub> =0.5V <sub>p-p</sub> , 10step Video Signal	-	0.9	-	%
Differential Phase	DP	Y <sub>in</sub> =0.5V <sub>p-p</sub> , 10step Video Signal	-	0.5	-	deg
S/N Ratio	SN <sub>v</sub>	Y <sub>in</sub> =100kHz to 6MHz, 0.5V <sub>p-p</sub> 100% White Video Signal, R <sub>L</sub> =75Ω	-	+65	-	dB
Input Resistance at C <sub>in</sub>	R <sub>cin</sub>	Chroma input	-	120	-	kΩ
Switching Noise Level	N <sub>swpl</sub>	R <sub>L</sub> =75Ω, V <sub>out</sub> =10% White Video Signal	-	4	-	mV <sub>pp</sub>
SW Change Voltage High Level	V <sub>thPH</sub>		1.25	-	V <sup>+</sup>	V
SW Change Voltage Low Level	V <sub>thPL</sub>		0	-	0.45	

## ■ CONTROL TERMINAL

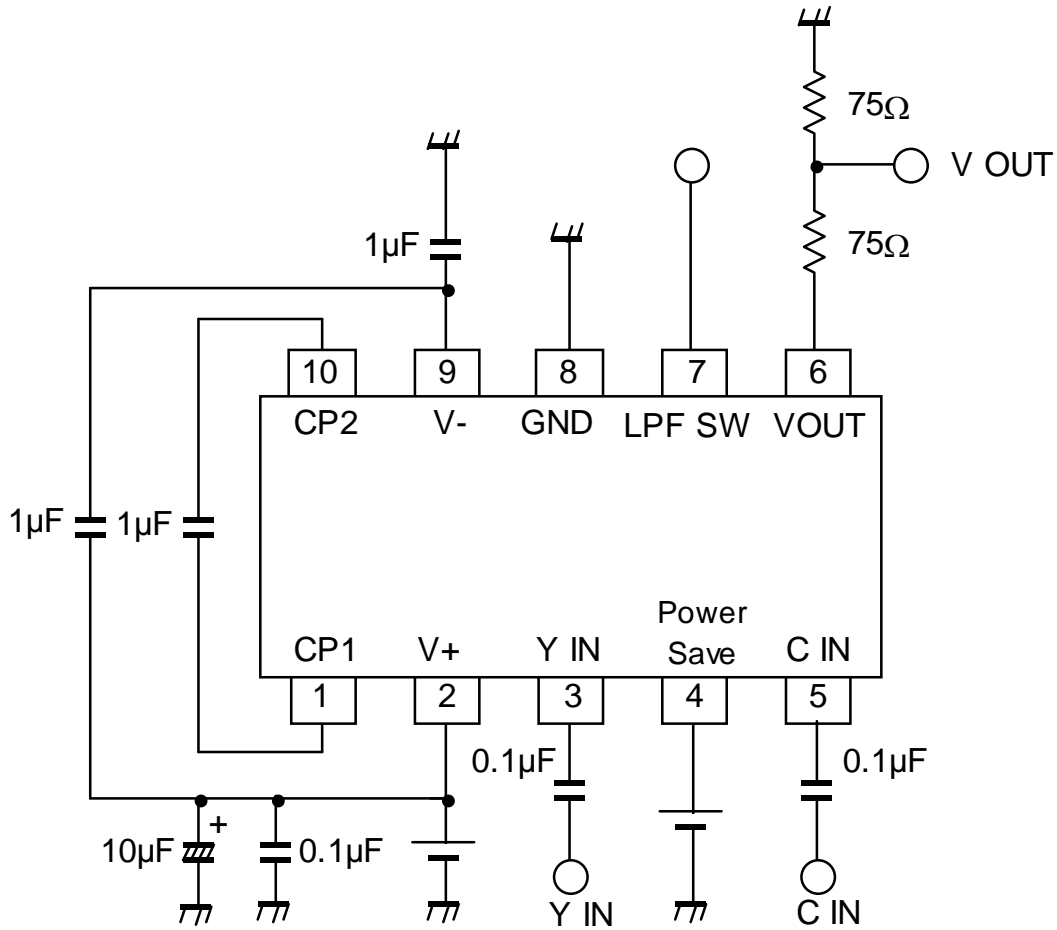
PARAMETER	STATUS	NOTE
LPF SW	H	Through mode
	L	LPF mode
	OPEN	LPF mode
Power Save	H	Power Save: OFF
	L	Power Save: ON (Mute)
	OPEN	Power Save: ON (Mute)

## ■ TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	EQUIVALENT CIRCUIT	DC VOLTAGE
1 10	CP1 CP2	Flying Capacitor Terminal	<p>The diagram shows two equivalent circuits. CP1 is connected to V+ and GND. CP2 is connected to GND and V-.</p>	-
3	YIN	Y Signal Input	<p>The diagram shows a signal input connected to a network of resistors (200 ohms), capacitors, and diodes connected to V+, V-, and GND.</p>	0V
4 7	Power Save LPF SW	Power Save LPF Switch	<p>The diagram shows a signal input connected to a network of resistors (200 ohms, 100k), capacitors, and diodes connected to V+, V-, and GND.</p>	-
5	CIN	C Signal Input	<p>The diagram shows a signal input connected to a network of resistors (200 ohms, 100k), capacitors, and diodes connected to V+, V-, and GND.</p>	0V
6	VOUT	Output	<p>The diagram shows an output terminal connected to a network of resistors (5k), capacitors, and diodes connected to V+, V-, and GND.</p>	0V

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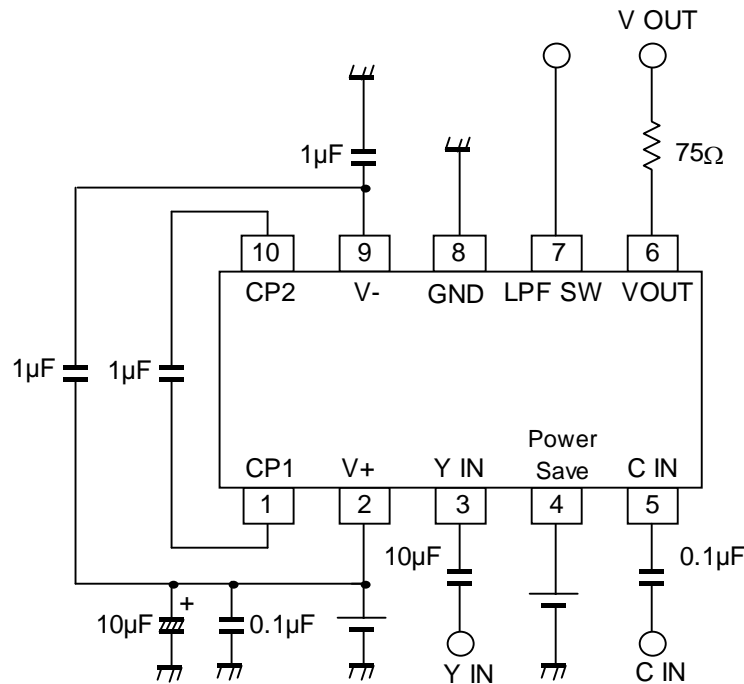
## ■ TEST CIRCUIT



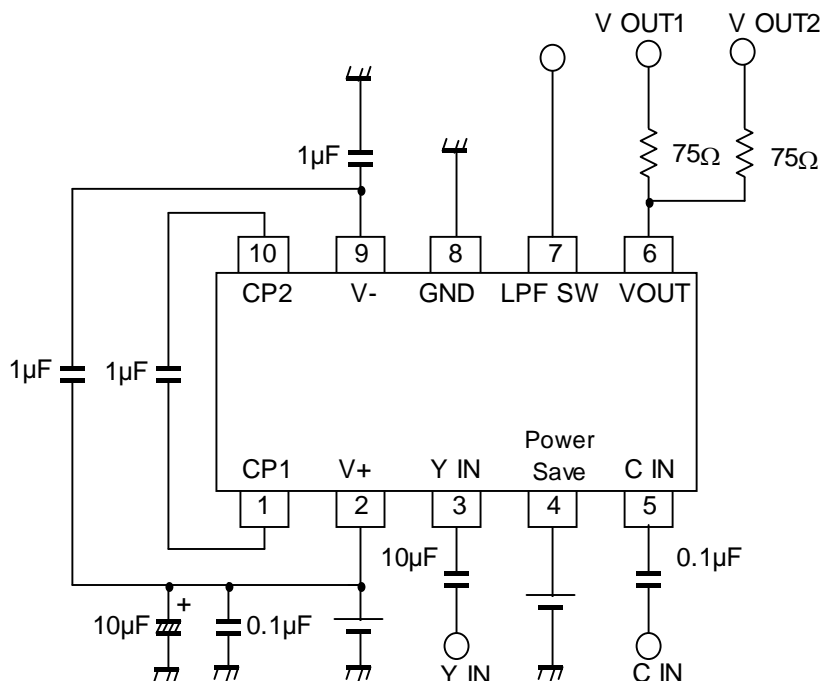
Note) Refer to " APPLICATION CIRCUIT (next page) " at real use.

## APPLICATION CIRCUIT

### 1) 1-Drive system



### 2) 2-Drive system



## APPLICATION

The purpose of the capacitor (1µF) between the 2pin(V+)-9pin(V-) is to improve the switching noise characteristics. It capacitor (1µF) can removed at if the switching noise characteristics are satisfied when capacitor (1µF) is not connected.

When sag increased, please increase capacitor of 3pin(YIN) than 10µF.

## APPLICATION

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

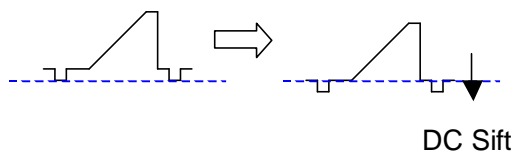
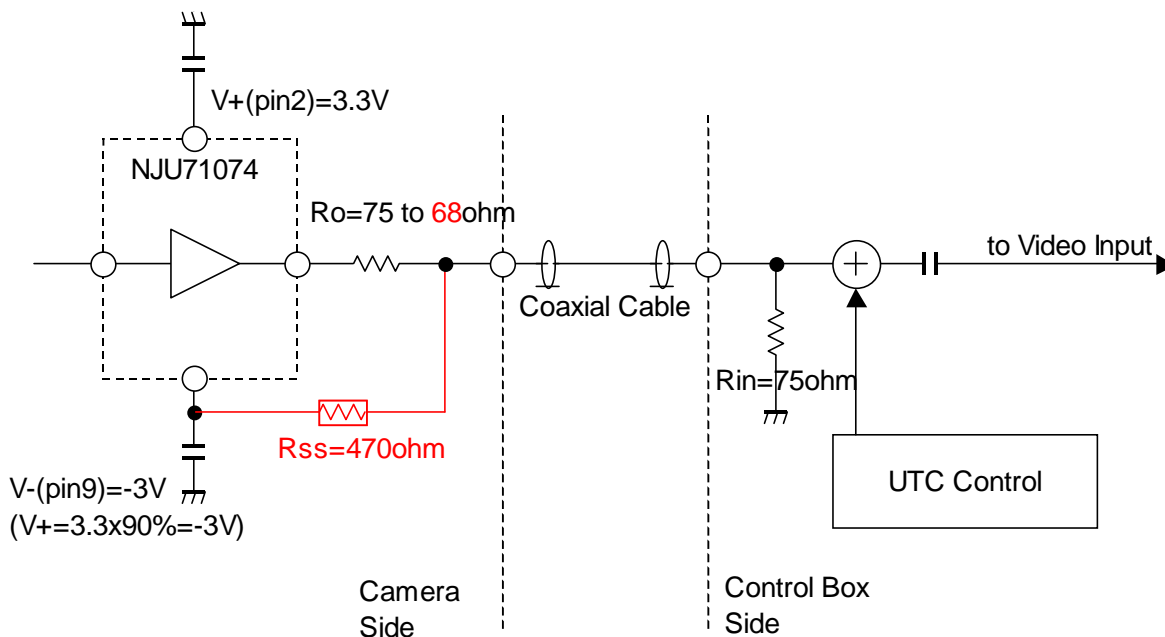


Figure1: How to shift the output DC signal

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.

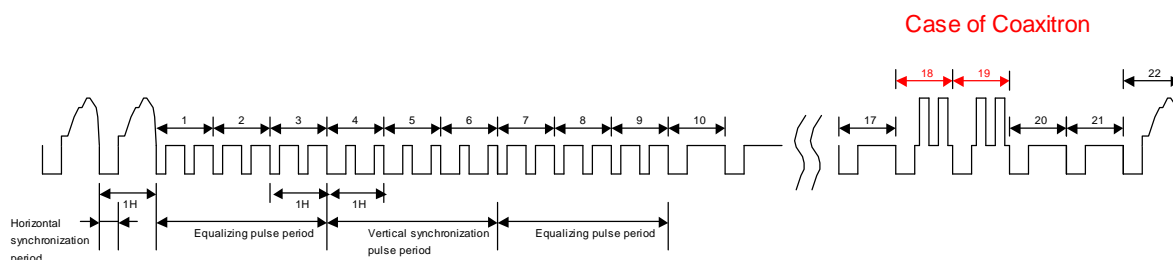


Figure2: A case of UTC

Proposed measures is shift the output DC signal by using the V- terminal (pin 9) of NJU71074.

The steps are as follows:

1. A resistor:  $R_{ss}$  add between the  $R_o$  ( $75\Omega$ ) and V- terminal (pin9).
2. Reduce  $R_o$ ( $75\Omega$ ).

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

Example: Level of the video signal will be reduced 5% at connected  $R_{ss} = 470\Omega$  and  $R_o = 75\Omega$ .

Therefore, increase 5% of video output level by changed to  $68\Omega$  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. Because it is a possibility of noise change by internal IC charge pump by this measure.

	Value(typ.)		UNIT
V+(pin2)	3.3	3	V
V-(pin9) ( $V+ \cdot 90\%$ )	-2.97	-2.7	V
Termination resistance	75	75	ohm
Resistance (between $V_{ss}$ and $V_{out}$ )	470	470	ohm
Output resistance( $R_o$ )	68	68	ohm
Sync. Voltage of $V_{out}$	-0.209	-0.19	V
Swing of $V_{out}$	0.975	0.975	V <sub>pp</sub>

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

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- 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)

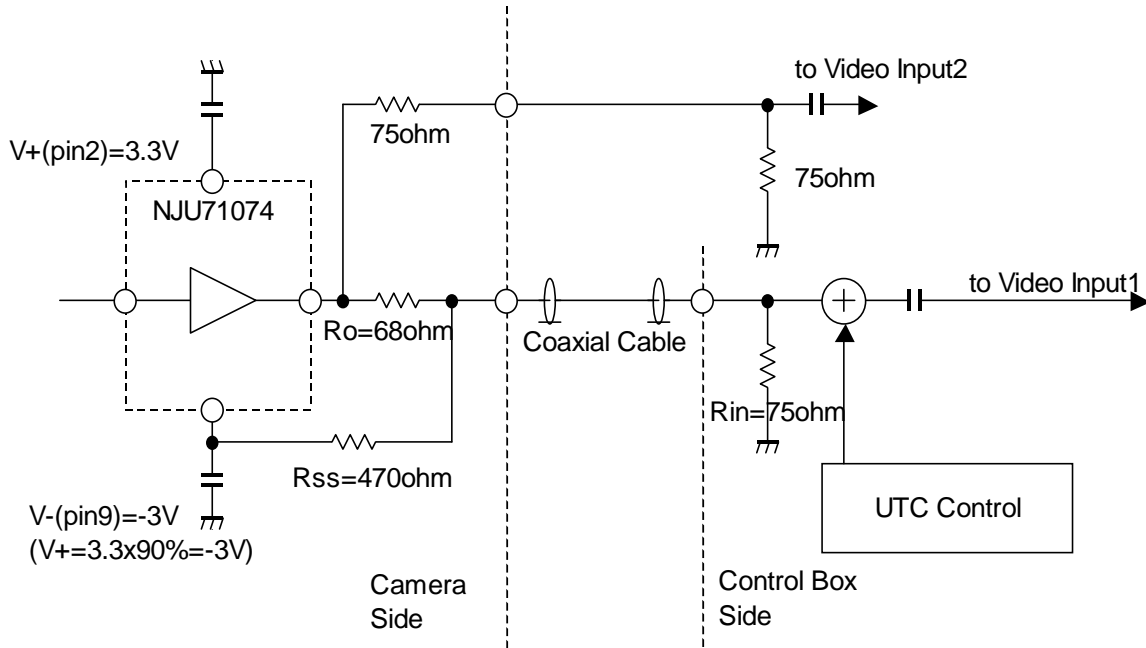


Figure 3: Recommended 2-system drive circuit

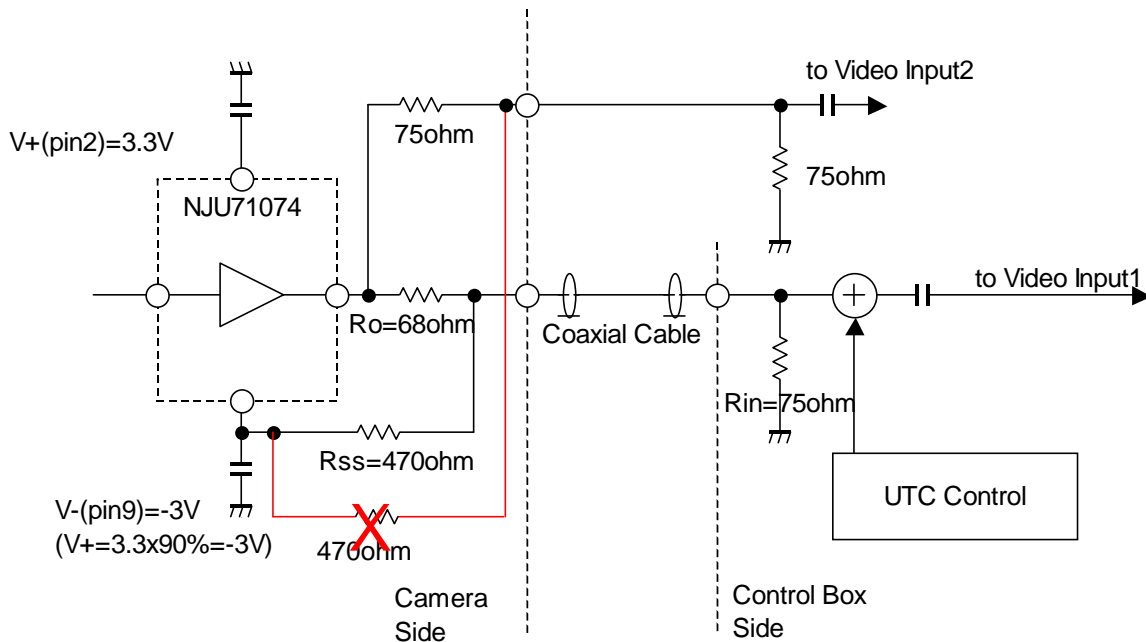
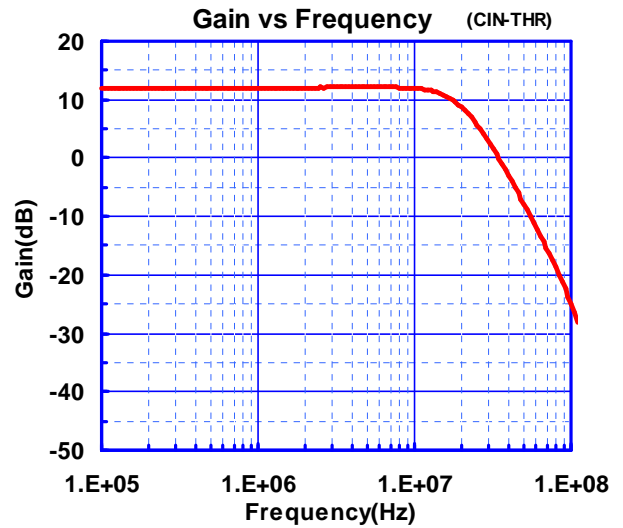
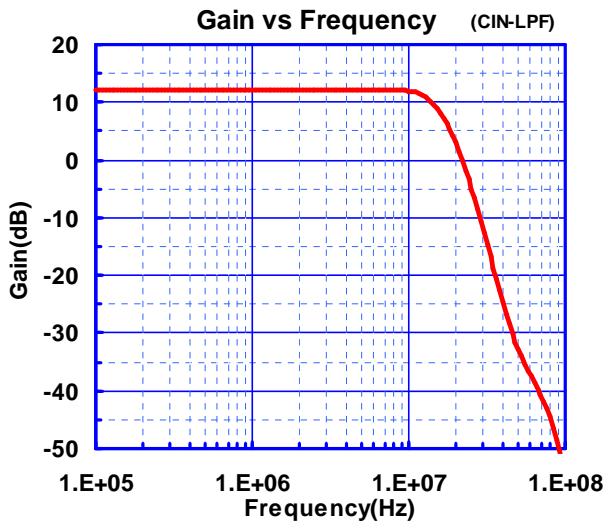
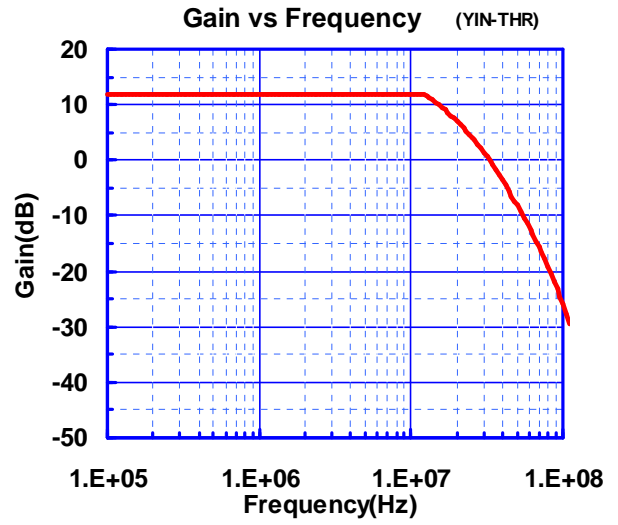
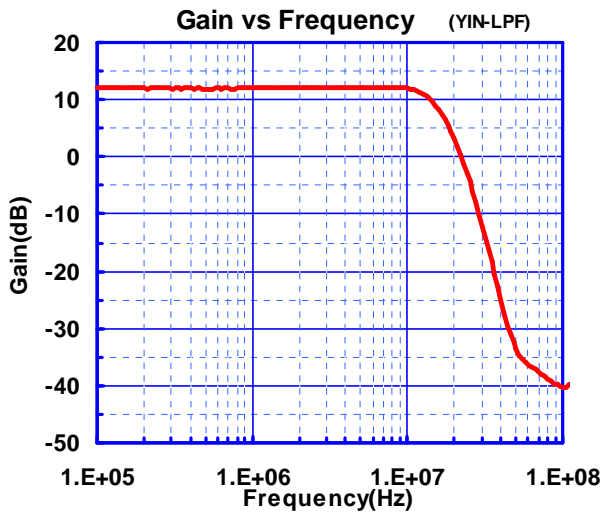


Figure 4: Not recommended 2-system drive circuit

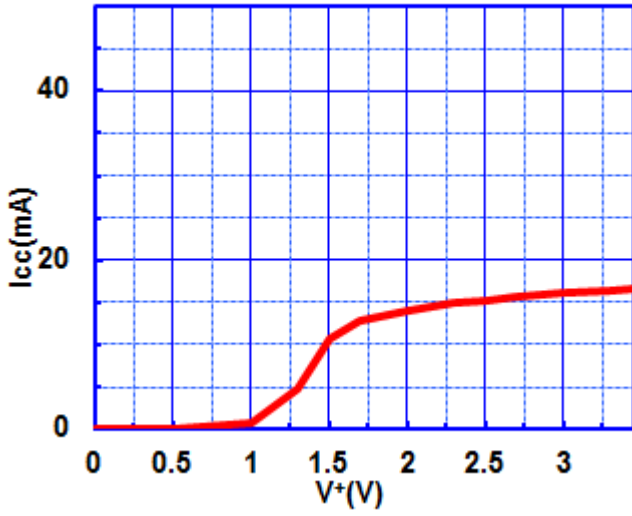


## TYPICAL CHARACTERISTICS

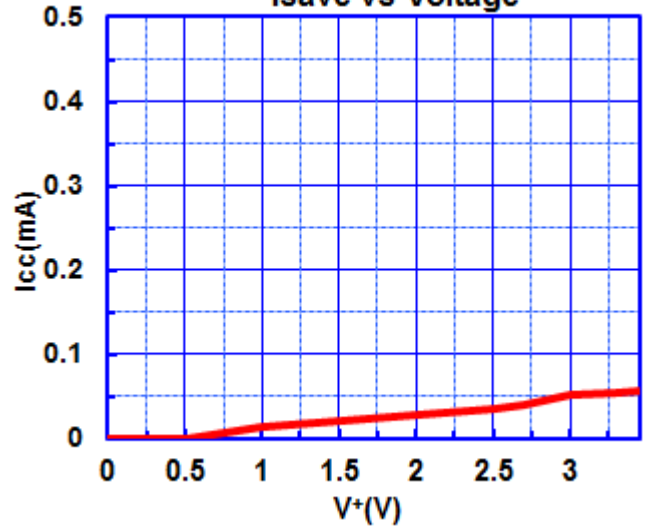


## TYPICAL CHARACTERISTICS

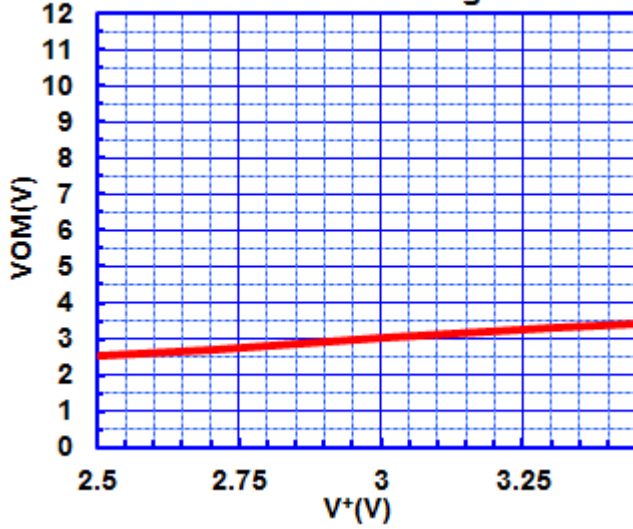
I<sub>cc</sub> vs Voltage



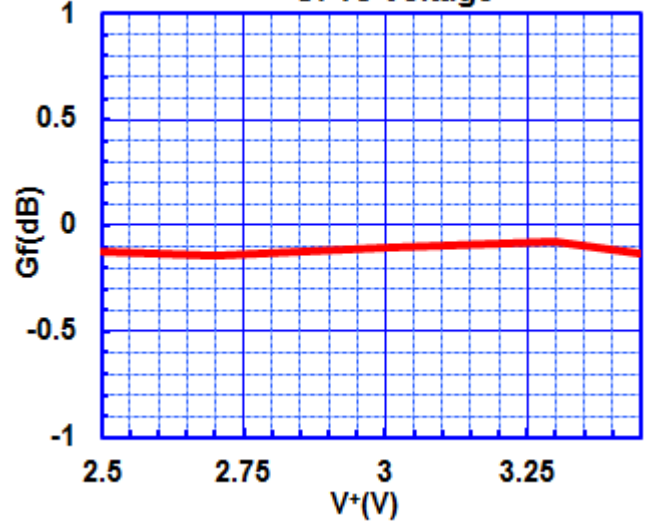
I<sub>save</sub> vs Voltage



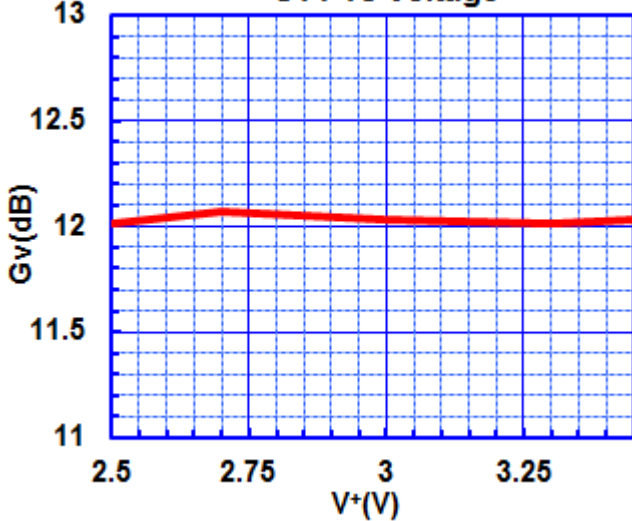
V<sub>om</sub> vs Voltage



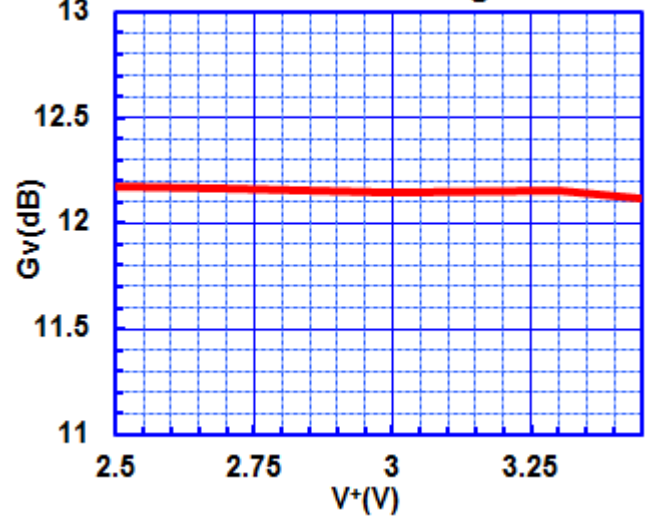
G<sub>f</sub> vs Voltage



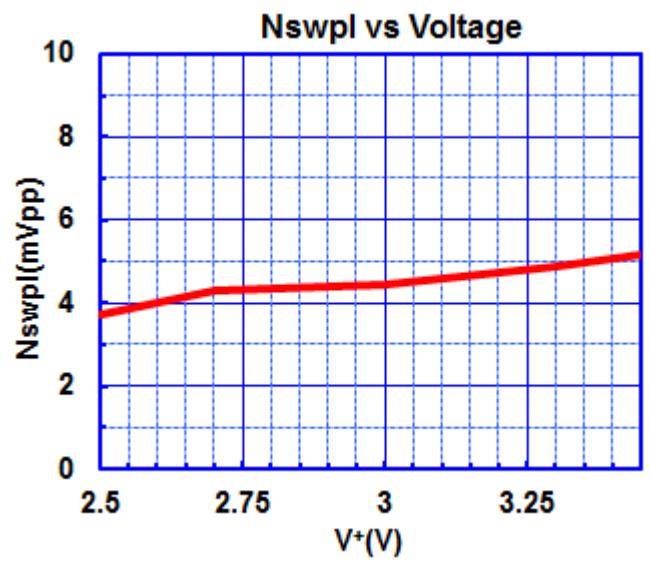
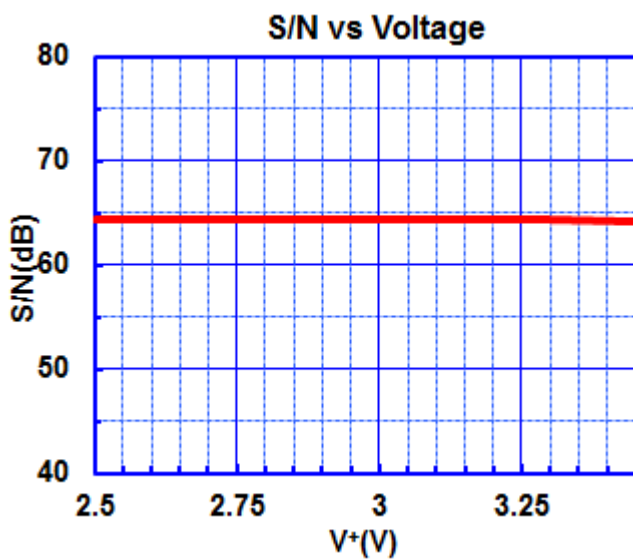
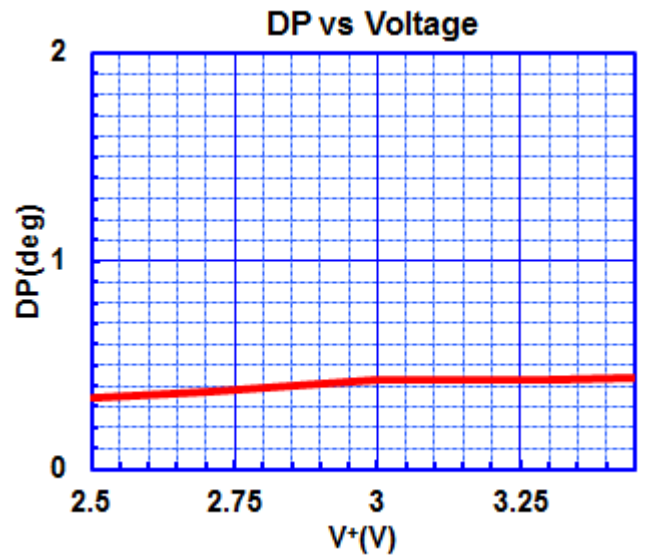
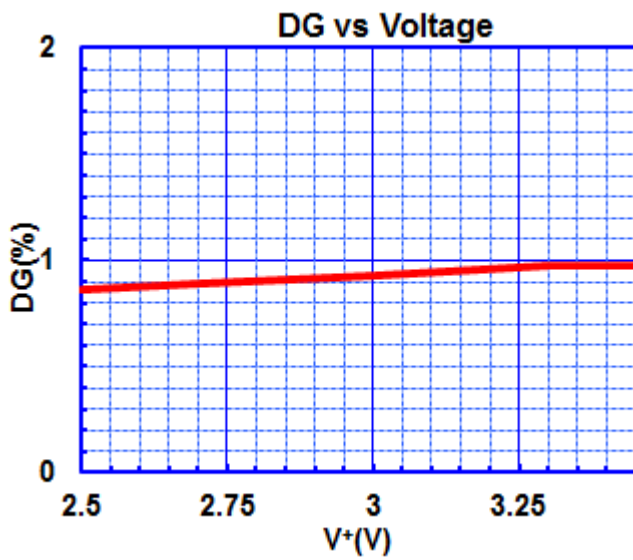
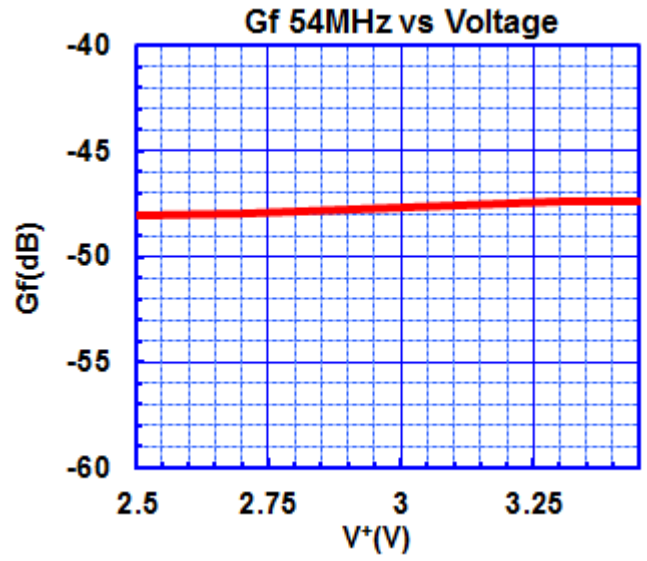
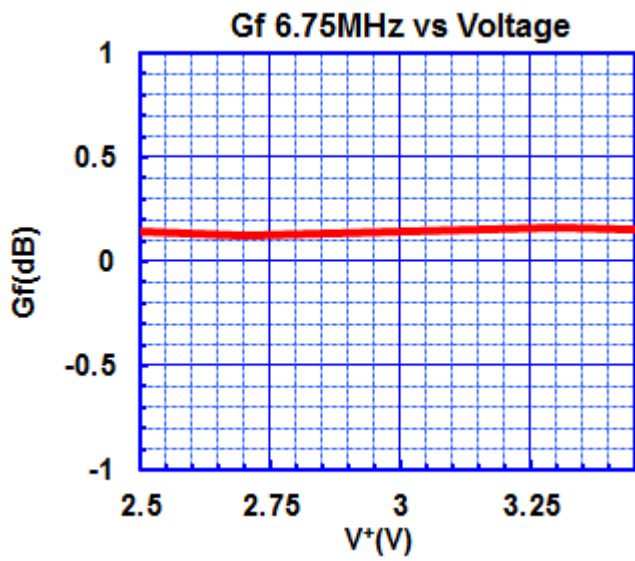
G<sub>v1</sub> vs Voltage



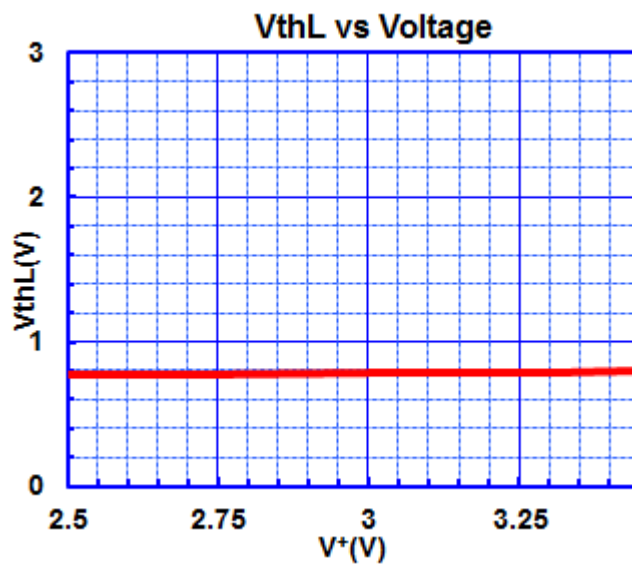
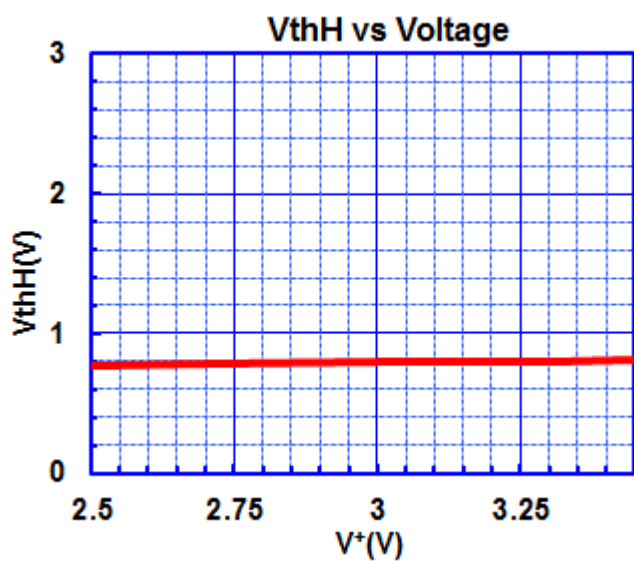
G<sub>v2</sub> vs Voltage



■ TYPICAL CHARACTERISTICS

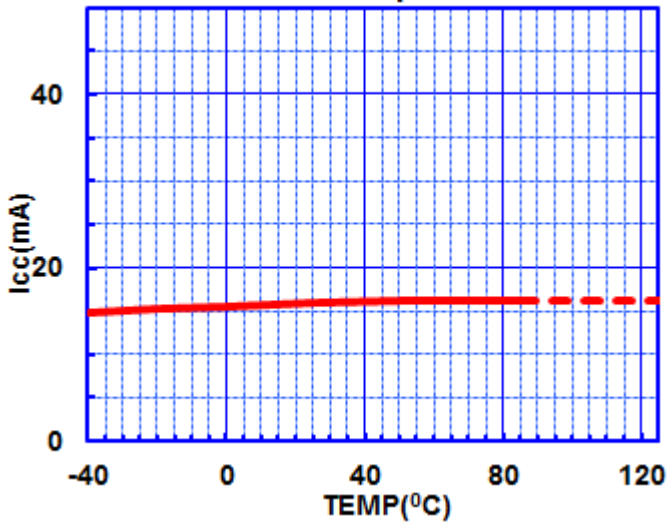


## ■ TYPICAL CHARACTERISTICS

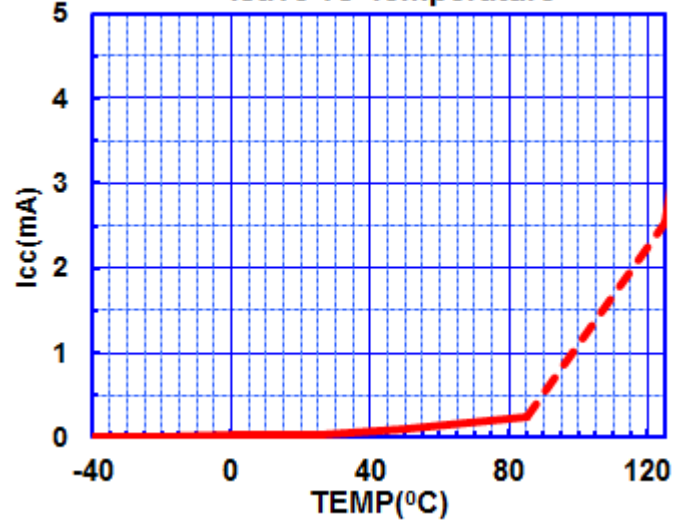


## TYPICAL CHARACTERISTICS

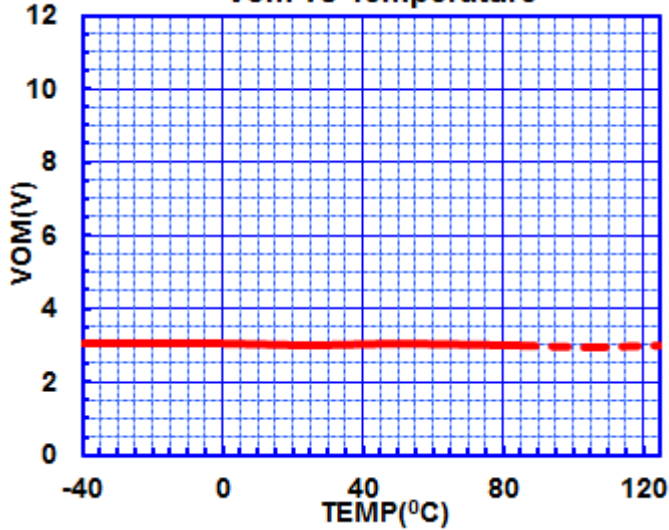
### I<sub>cc</sub> vs Temperature



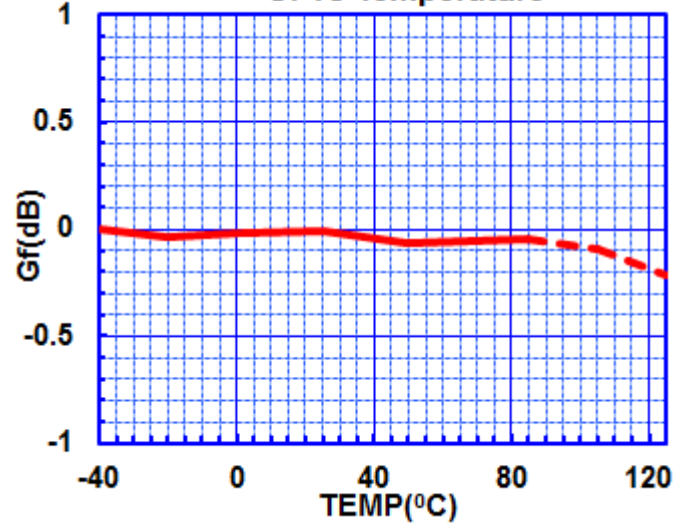
### I<sub>save</sub> vs Temperature



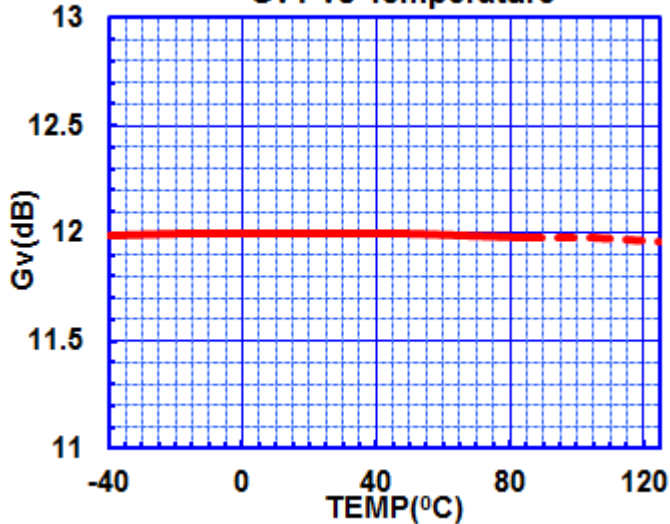
### V<sub>om</sub> vs Temperature



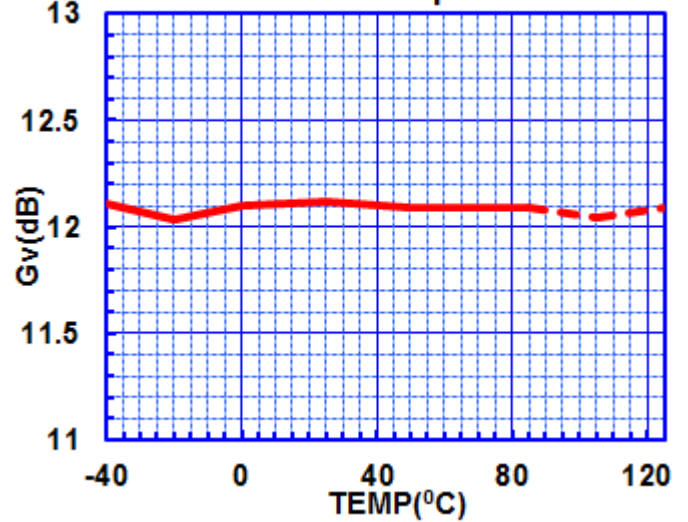
### G<sub>f</sub> vs Temperature



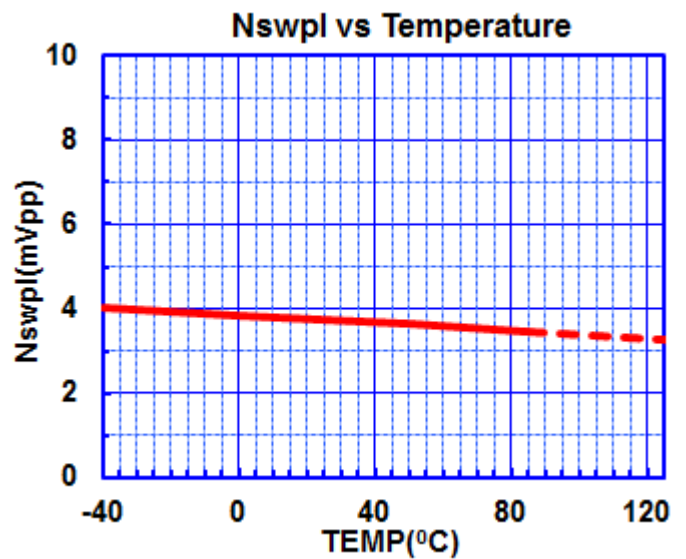
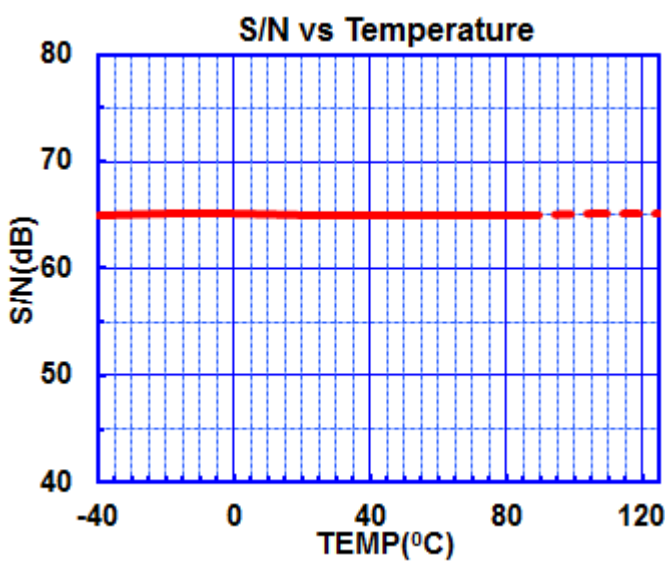
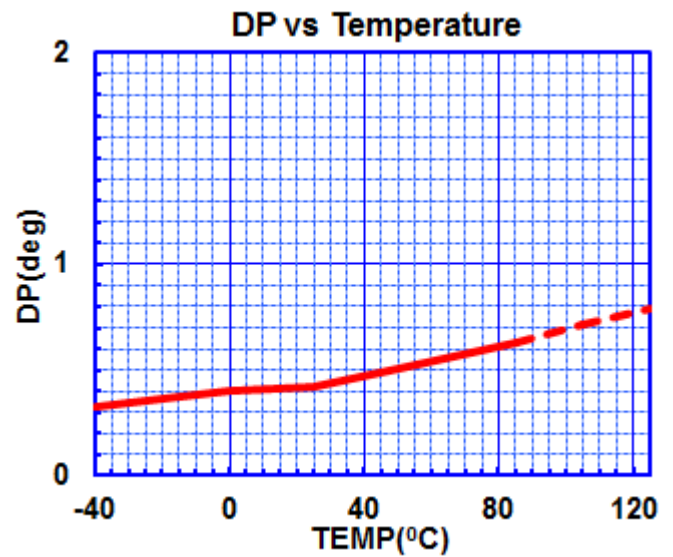
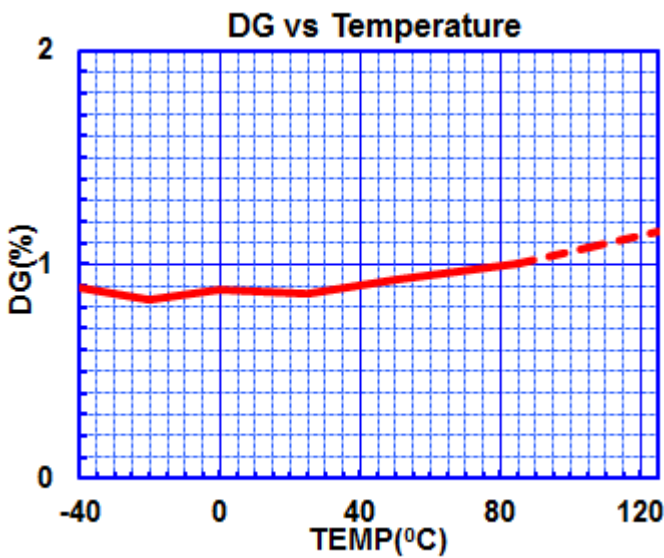
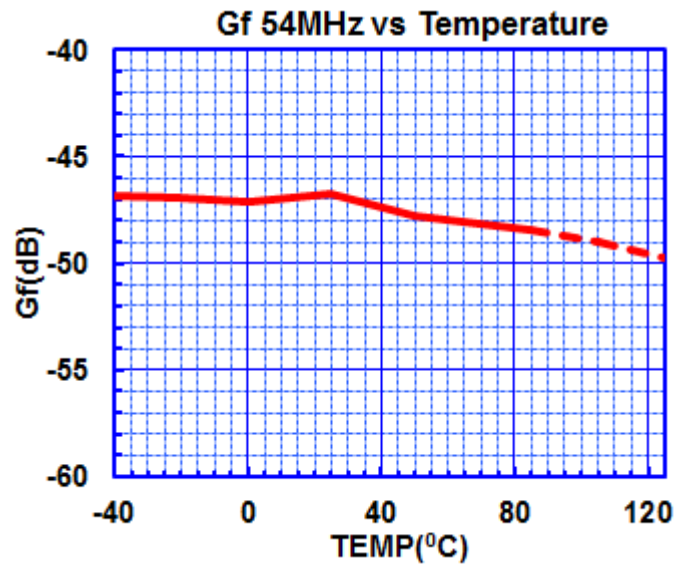
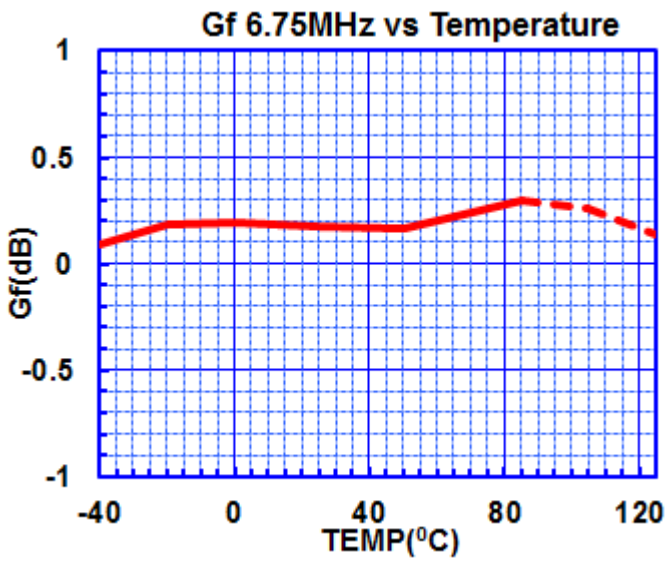
### G<sub>v1</sub> vs Temperature



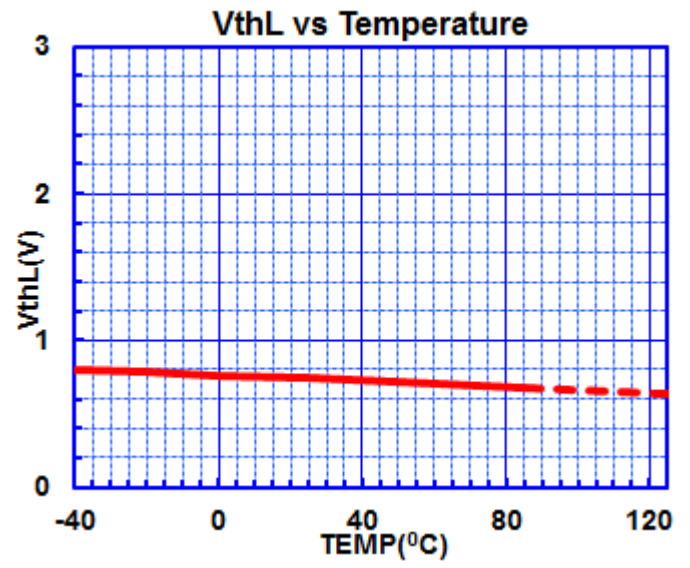
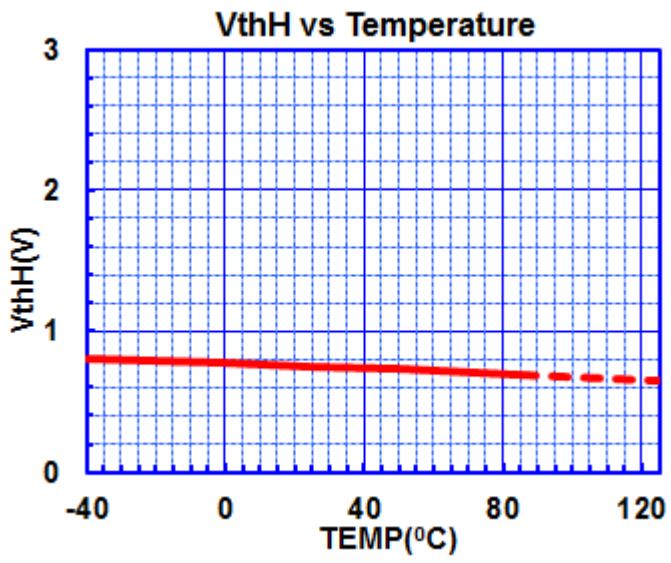
### G<sub>v2</sub> vs Temperature



## TYPICAL CHARACTERISTICS



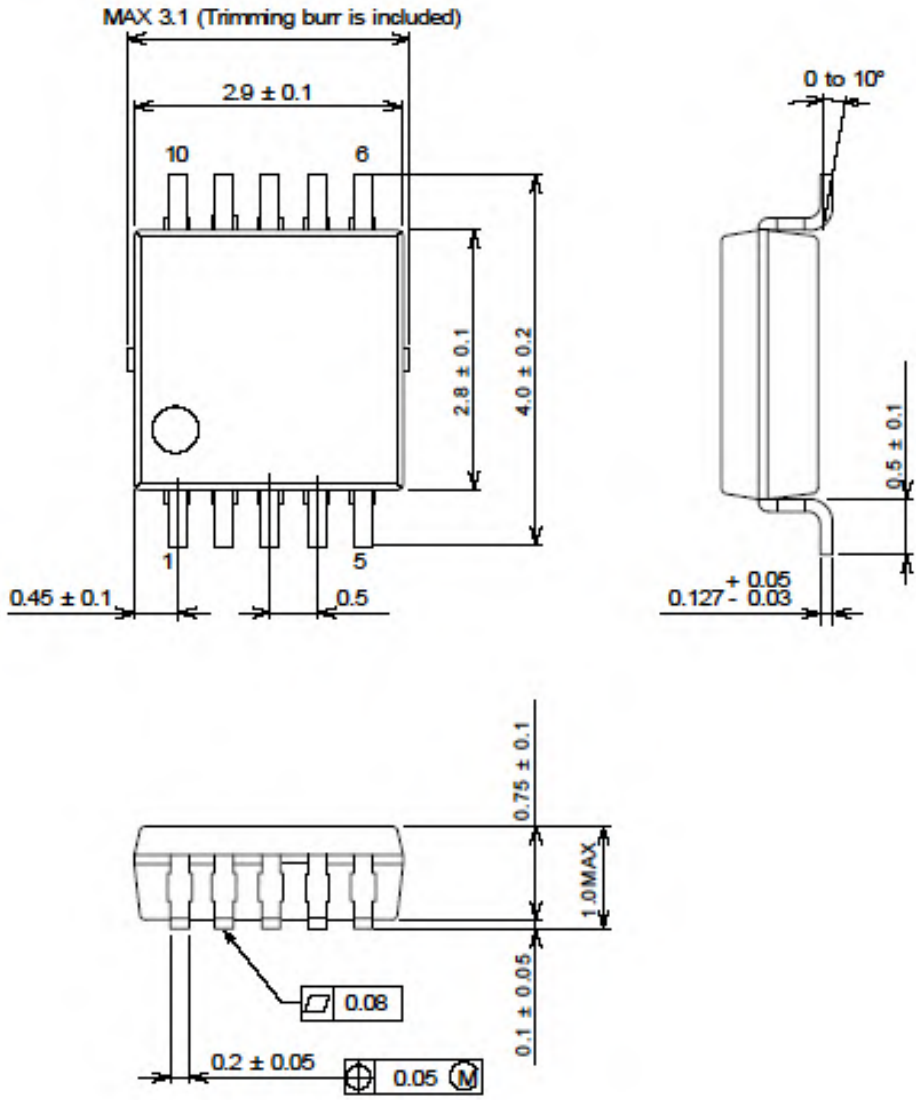
■ TYPICAL CHARACTERISTICS



# NJU71074

■ PACKAGE DIMENSIONS: MSOP10(TVSP10)\*MEET JEDEC MO-187-DA / THIN TYPE

## TVSP10



GD-R01004A-2

UNIT : mm

[CAUTION]  
 The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right