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.

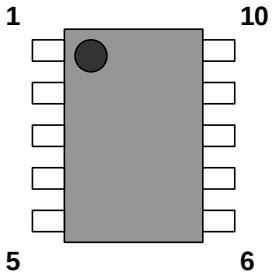
■PACKAGE OUTLINE

NJU71074RB2
MSOP10(TVSP10)

■ FEATURES

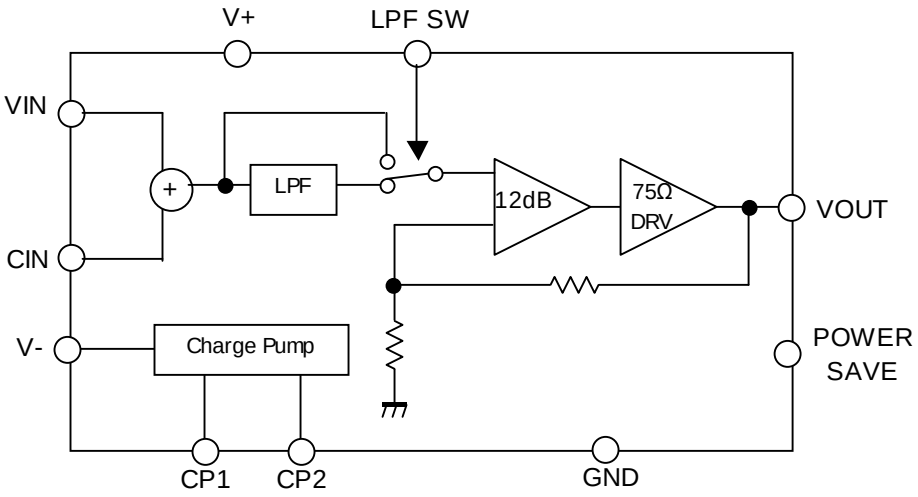
- Operating Voltage 2.5 to 3.45V
- Output coupling capacitor-less
- 12dB amplifier
- Internal 75Ω Driver Circuit (2-system drive)
- Internal Y/C MIX Circuit
- Internal LPF 0dB at 6.75MHz typ
  -40dB at 108MHz typ
- Power Save Circuit
- CMOS Technology
- Package Outline MSOP10(TVSP10)*
  *MEET JEDEC MO-187-DA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



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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	3.55	V
Power Dissipation	P_D	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 OPEARATING CONDITION** (Ta=25°C)

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

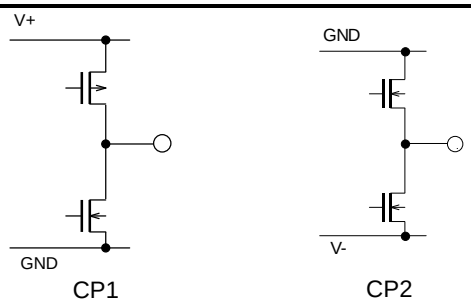
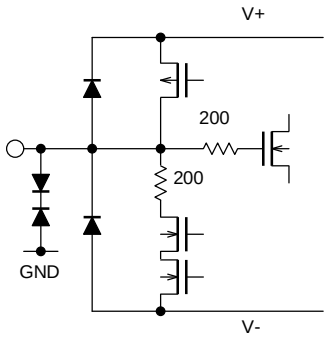
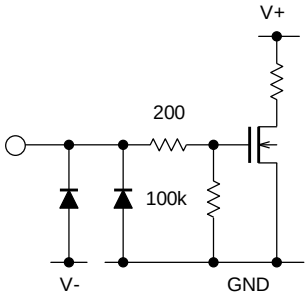
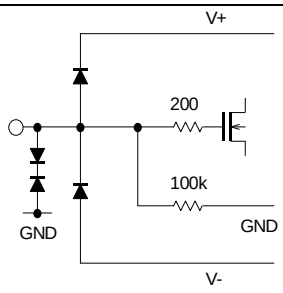
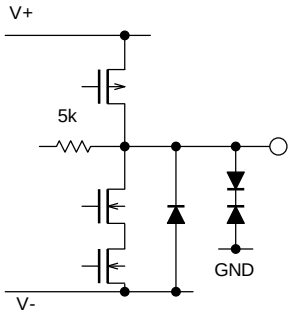
■ **ELECTRICAL CHARACTERISTICS** (V^+=3.0V,R_L=150Ω,Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	No Signal	-	17	23	mA
Operating Current at Power Save	Isave	No Signal, Power Save Mode	-	0.1	10	μA
Maximum Output Voltage Swing	Vom	Yin=100kHz,THD=1%	2.4	3.0	-	Vp-p
Voltage Gain 1	Gv1	Yin=100kHz, 0.5Vp-p,Input Sine Signal	11.6	12.0	12.4	dB
Voltage Gain 2	Gv2	Cin=3.58MHz, 0.15Vp-p, Input Sine Signal	11.6	12.0	12.4	dB
Frequency Characteristic at LPF through	Gf	Yin=10MHz/100kHz, 0.5Vp-p, Input Sine Signal	-1.0	0	1.0	dB
Low Pass Filter Characteristic	Gfy6.75M	Yin=6.75MHz/100kHz, 0.5Vp-p	-1.0	0	1.0	dB
	Gfy54M	Yin=54MHz/100kMHz, 0.5Vp-p	-	-40	-24	
Differential Gain	DG	Yin=0.5Vp-p, 10step Video Signal	-	0.9	-	%
Differential Phase	DP	Yin=0.5Vp-p, 10step Video Signal	-	0.5	-	deg
S/N Ratio	SNv	Yin=100kHz to 6MHz, 0.5Vp-p 100% White Video Signal, R_L=75Ω	-	+65	-	dB
Input Resistance at Cin	Rcin	Chroma input	-	120	-	kΩ
Switching Noise Level	Nswpl	R_L=75Ω, Vout=10% White Video Signal	-	4	-	mVpp
SW Change Voltage High Level	VthPH		1.25	-	V^+	V
SW Change Voltage Low Level	VthPL		0	-	0.45	

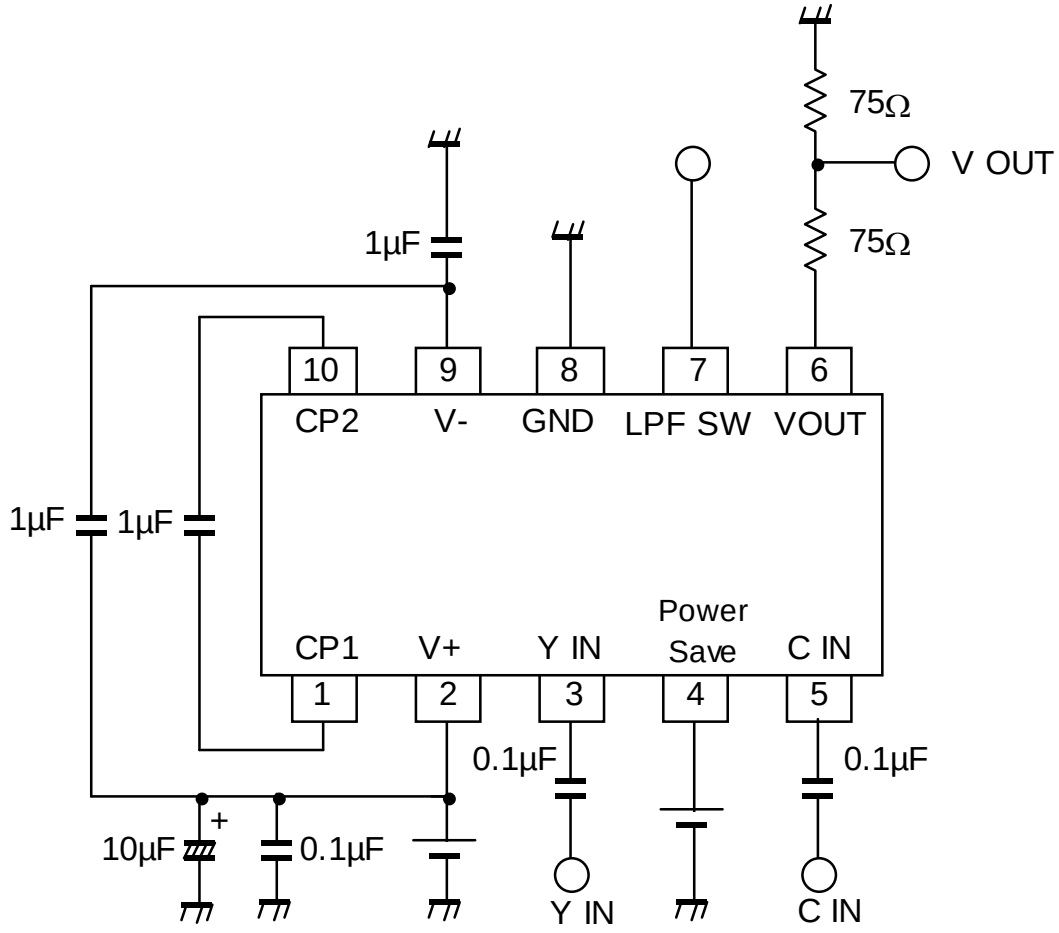
■ **CONTROL TERMINAL**

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		-
3	YIN	Y Signal Input		0V
4 7	Power Save LPF SW	Power Save LPF Switch		-
5	CIN	C Signal Input		0V
6	VOUT	Output		0V

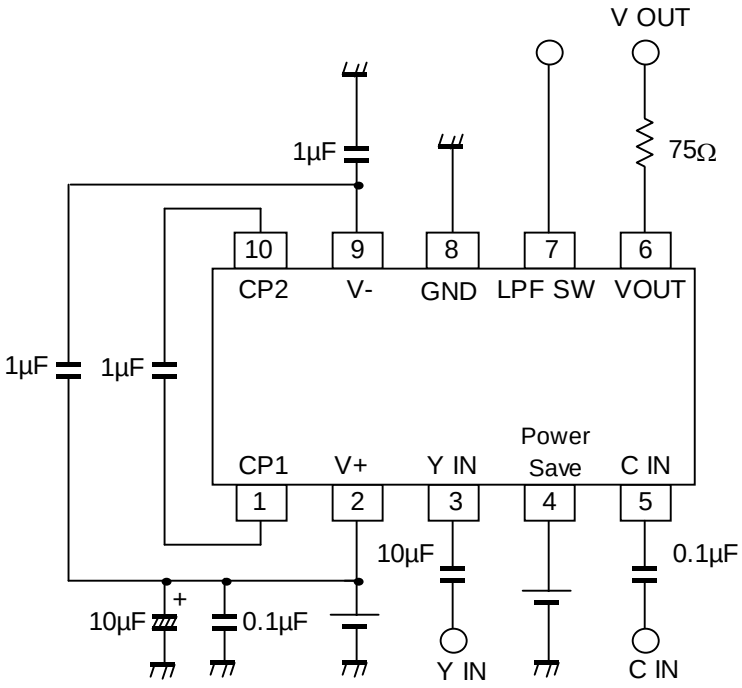
■ **TEST CIRCUIT**



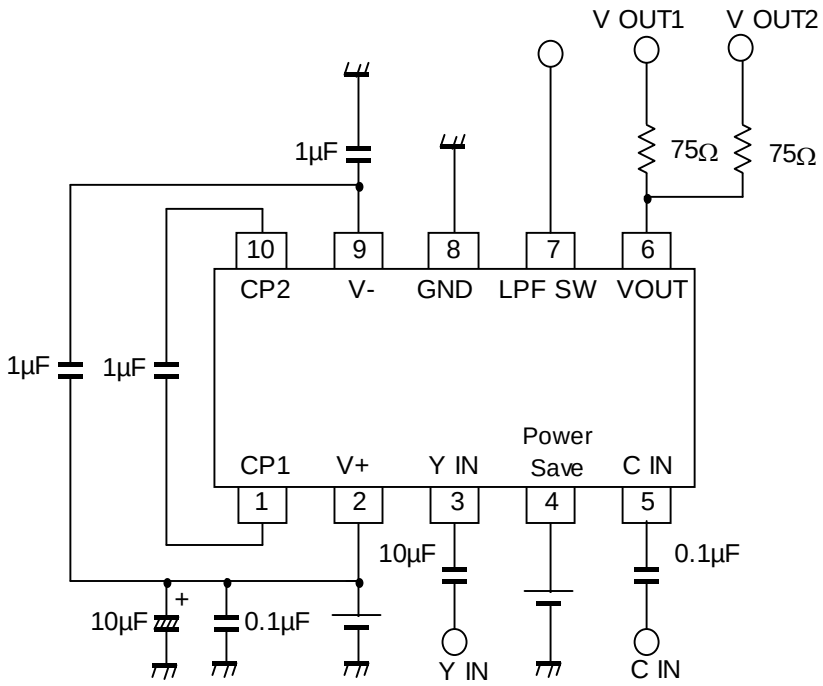
Note) Refer to " APPLICATION CIRCUIT (next page) " at real use.

■ 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.

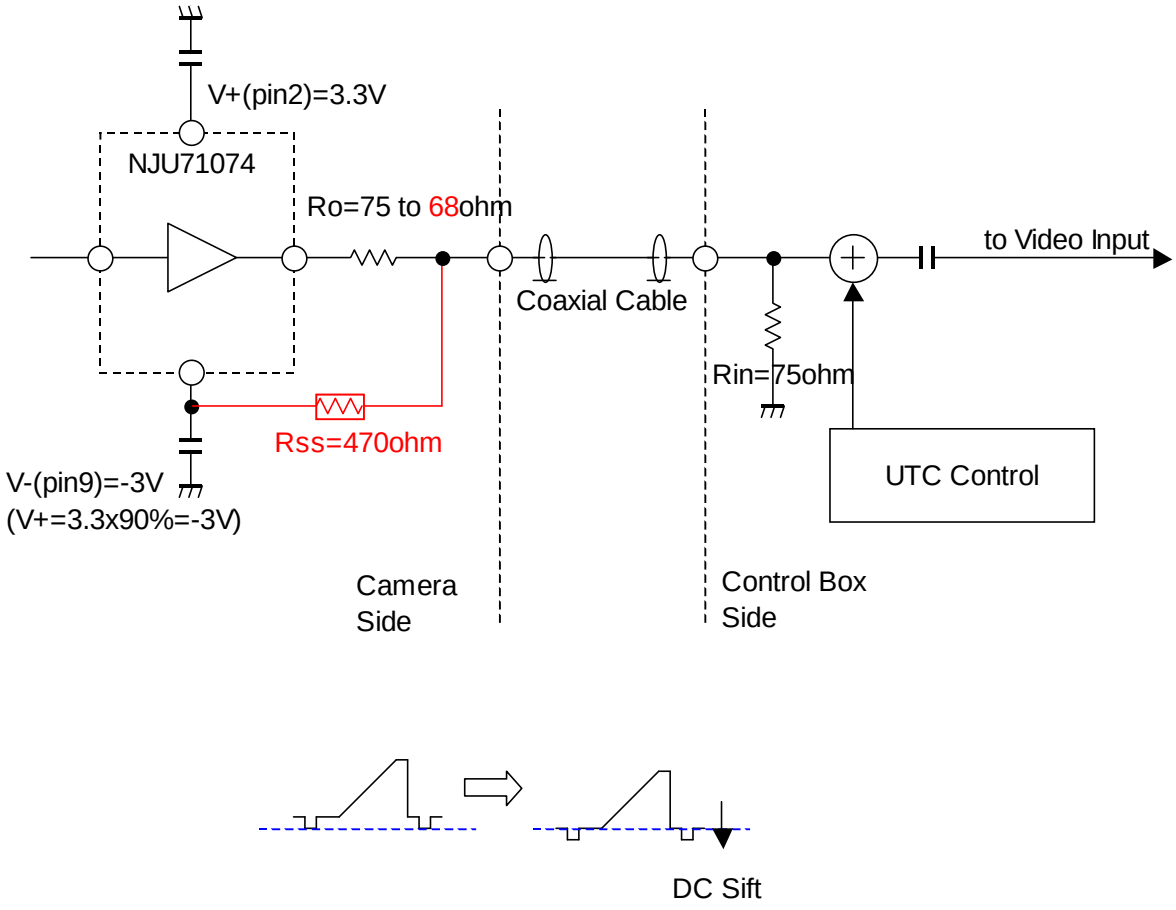


Figure1: How to shift the output DC signal

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.

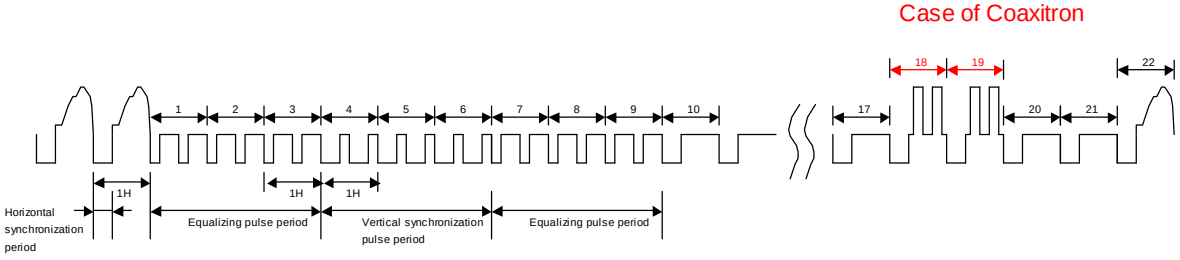


Figure2: A case of UTC

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: Rss add between the Ro (75Ω) and V- terminal (pin9).
2. Reduce Ro(75Ω).
   By adding a Rss, level of the video signal is attenuated.
   Example: Level of the video signal will be reduced 5% at connected Rss = 470Ω and Ro = 75Ω.
   Therefore, increase 5% of video output level by changed to 68Ω the Ro.
   *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+*90%)	-2.97	-2.7	V
Termination resistance	75	75	ohm
Resistance (between Vss and Vout)	470	470	ohm
Output resistance(Ro)	68	68	ohm
Sync. Voltage of Vout	-0.209	-0.19	V
Swing of Vout	0.975	0.975	Vpp

Table 1: external resistor value and the swing 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 1and 2 (75Ω for multiplex coaxial system)

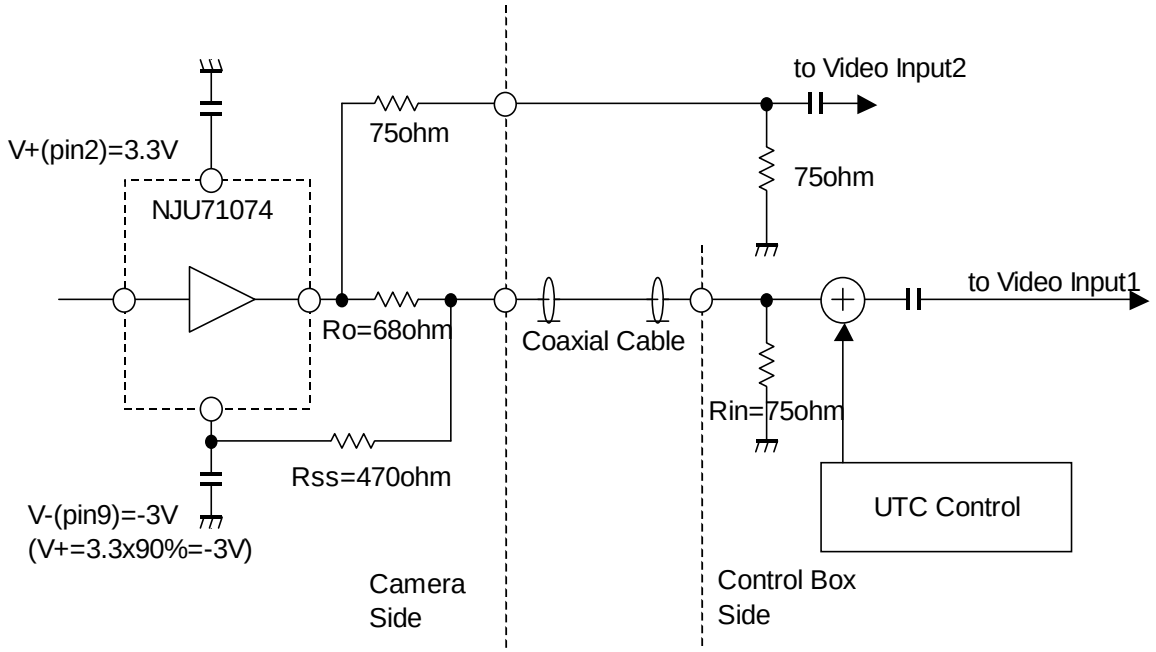


Figure 3: Recommended 2-system drive circuit

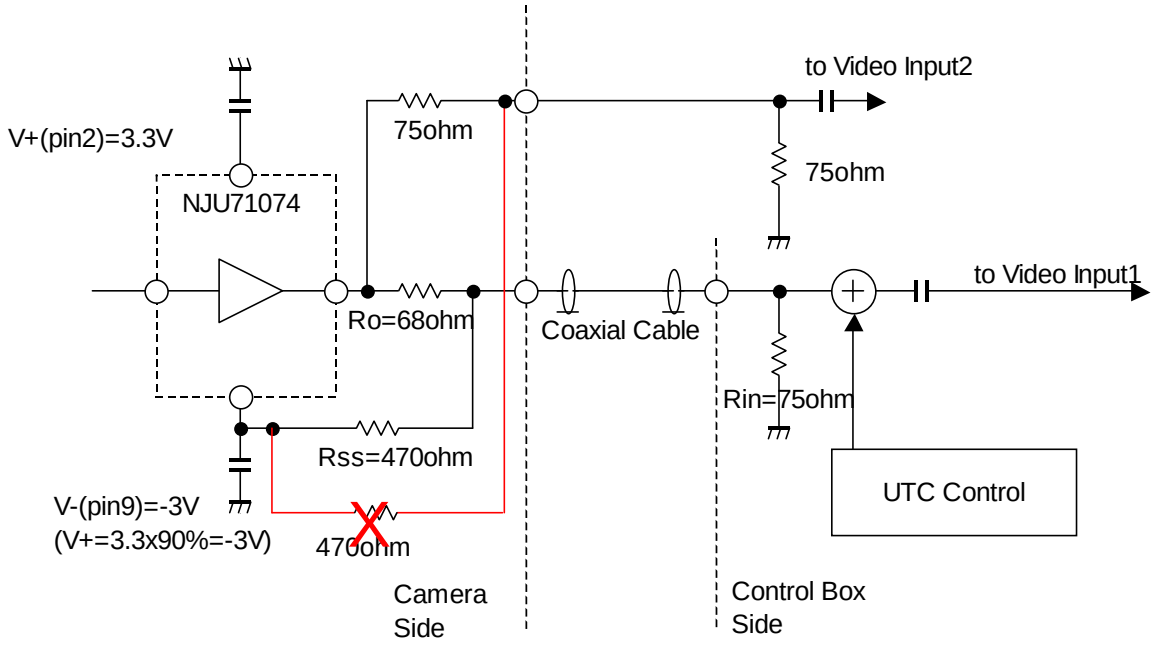
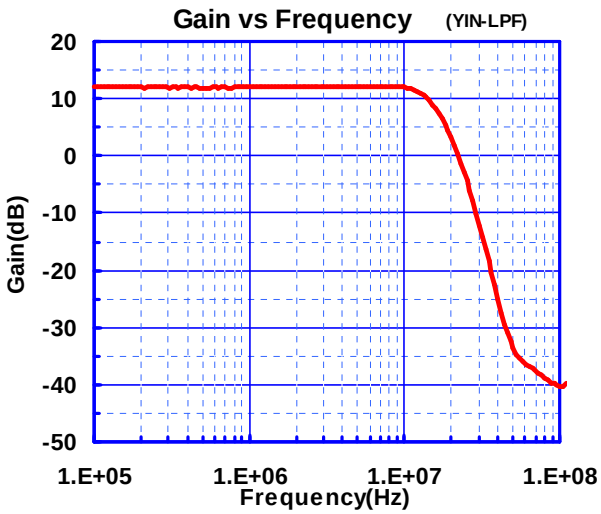
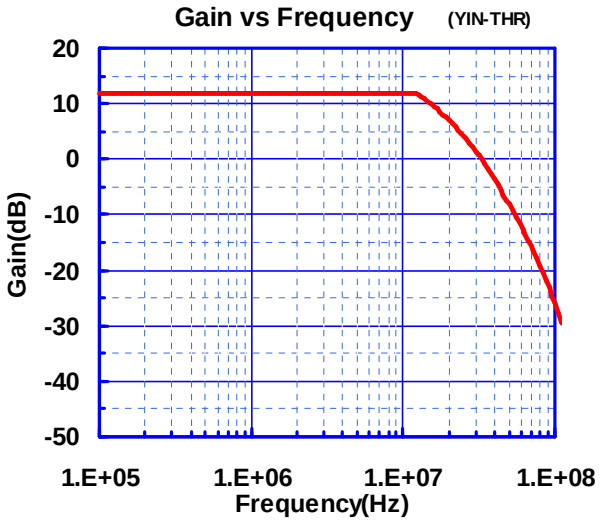
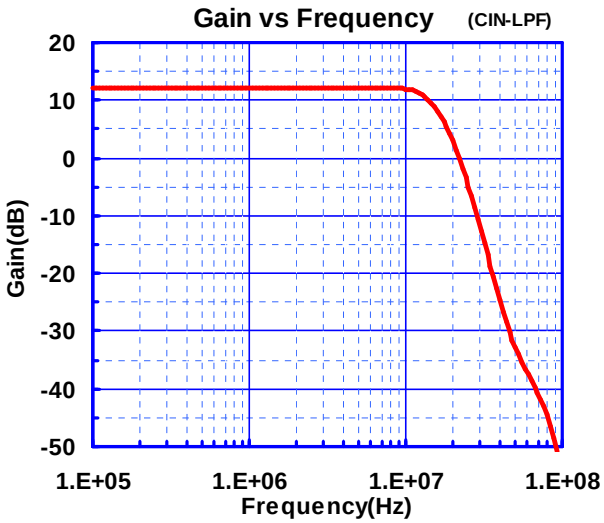


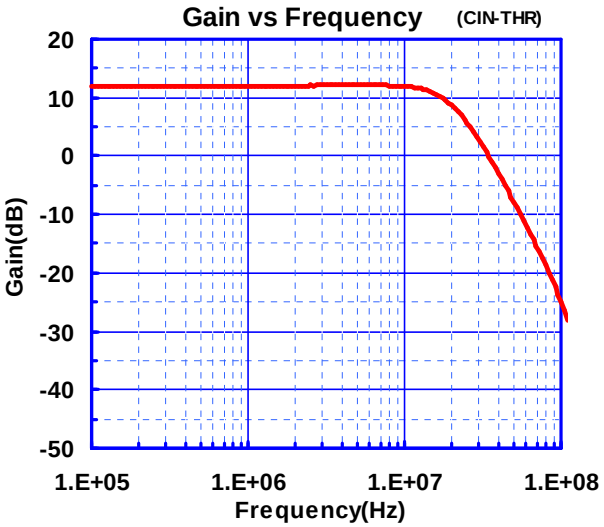
Figure 4: Not recommended 2-system drive circuit

■TYPICAL CHARACTERISTICS









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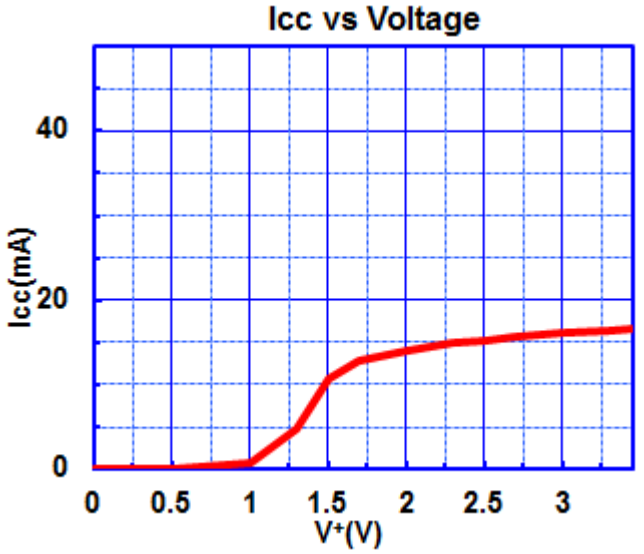

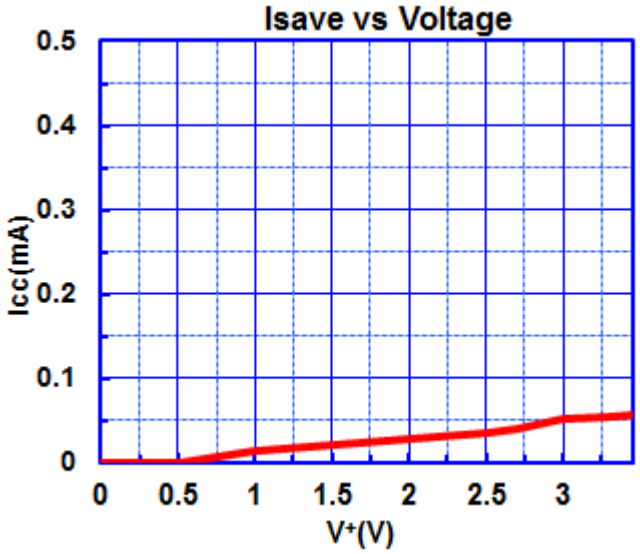

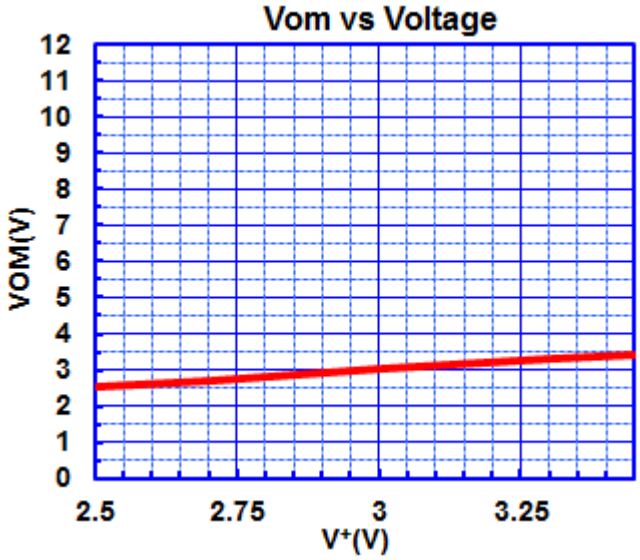

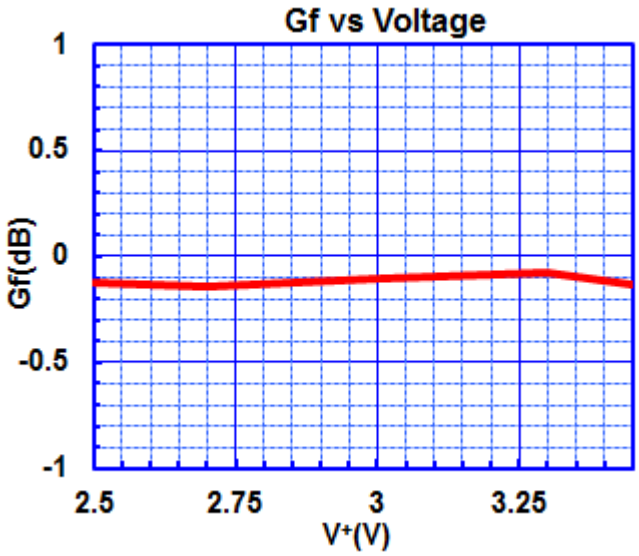

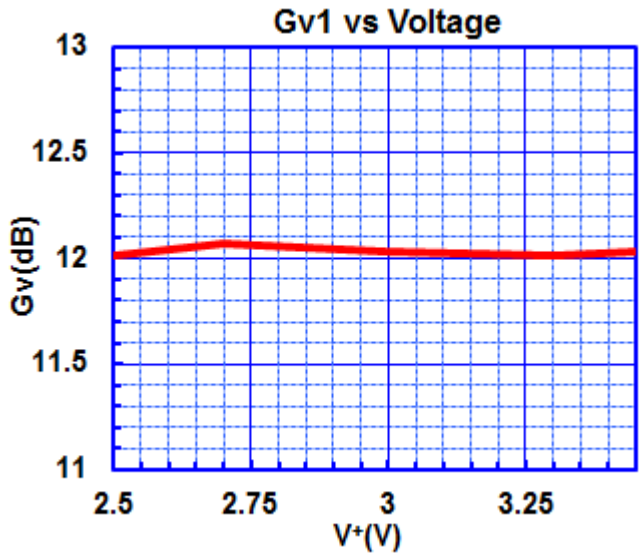

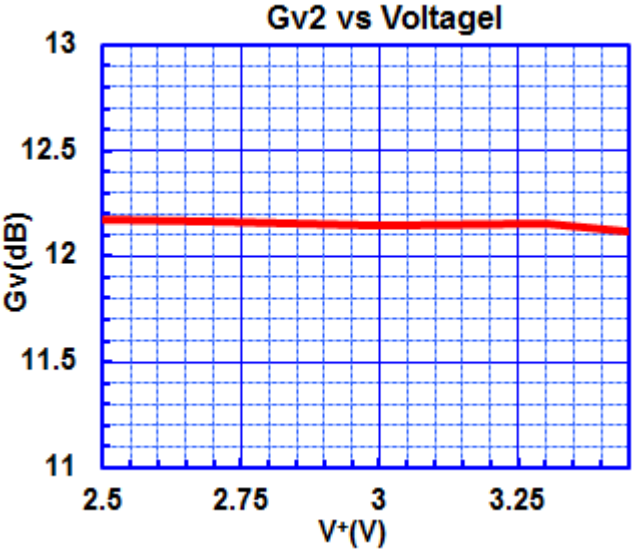

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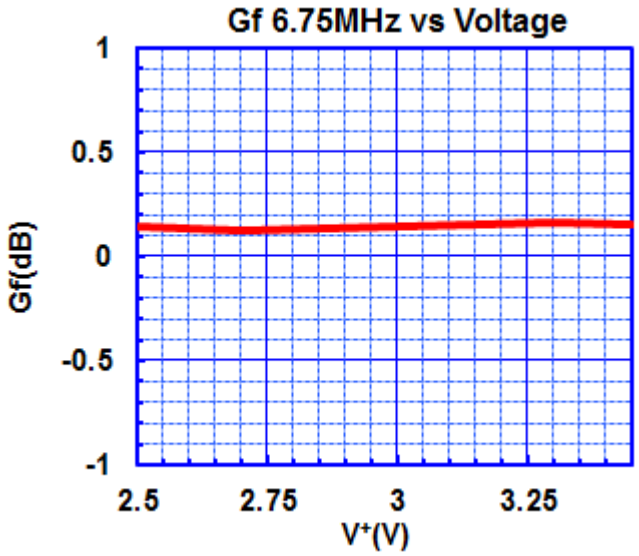

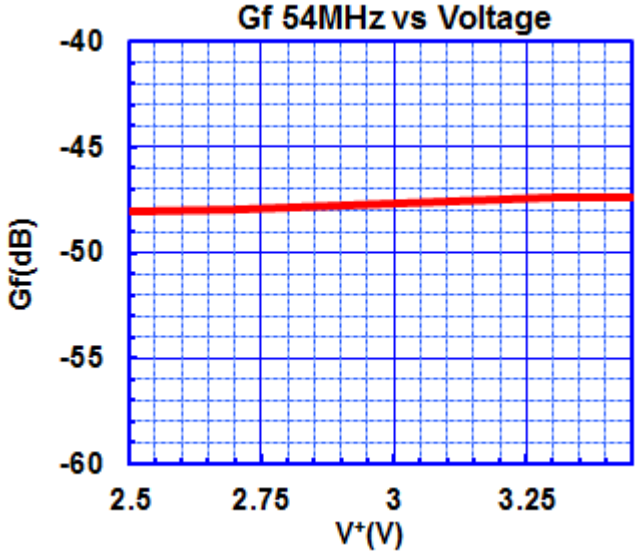

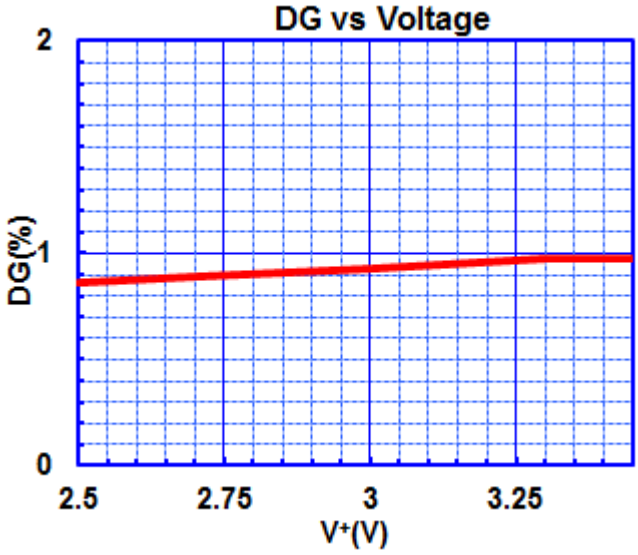

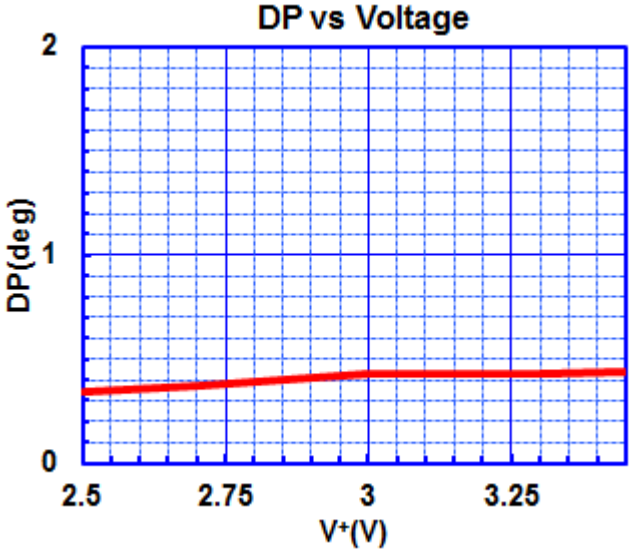

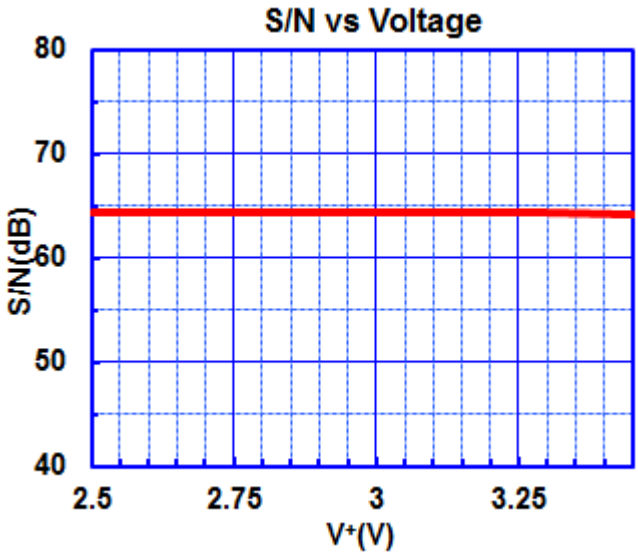

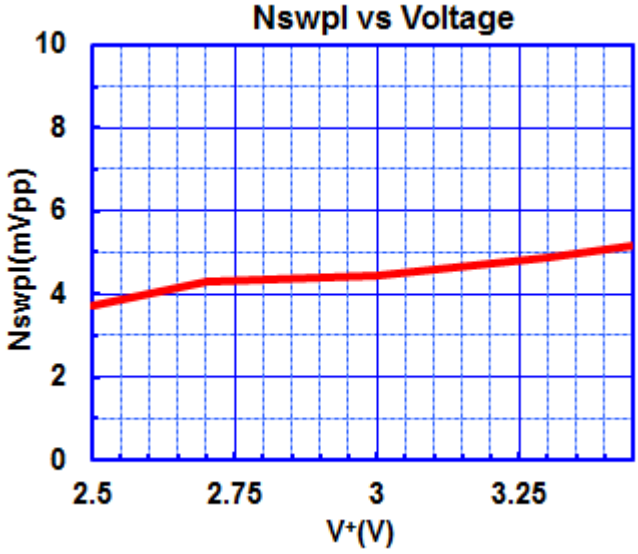

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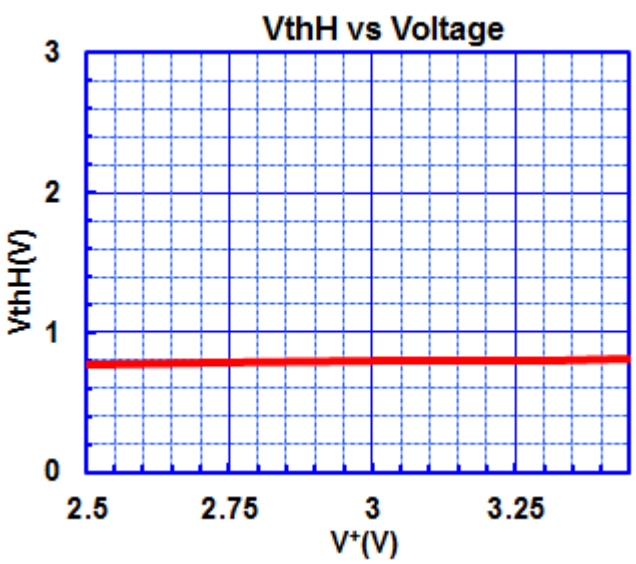

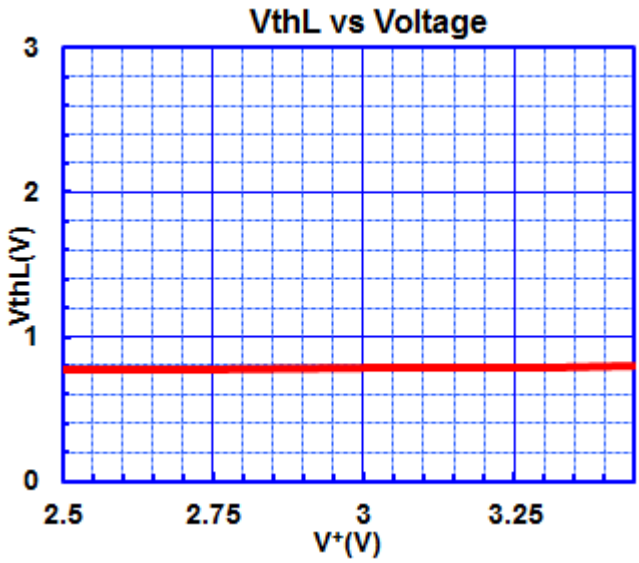

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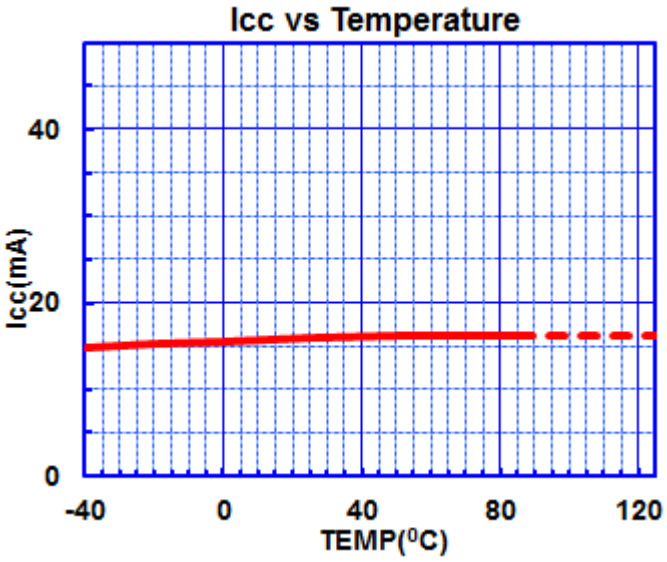

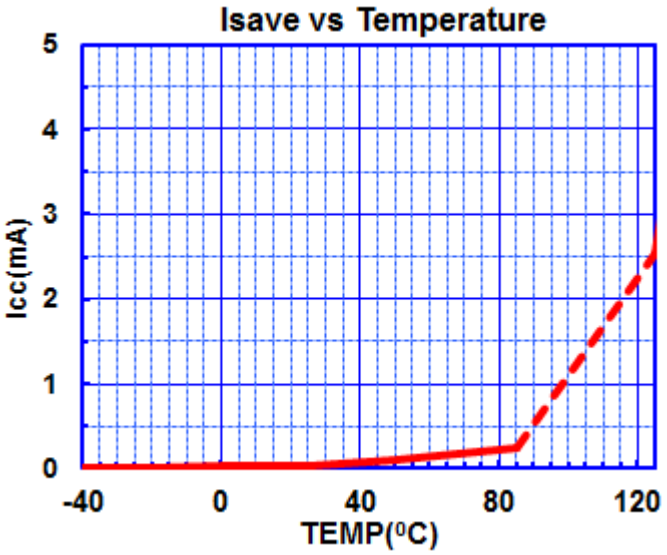

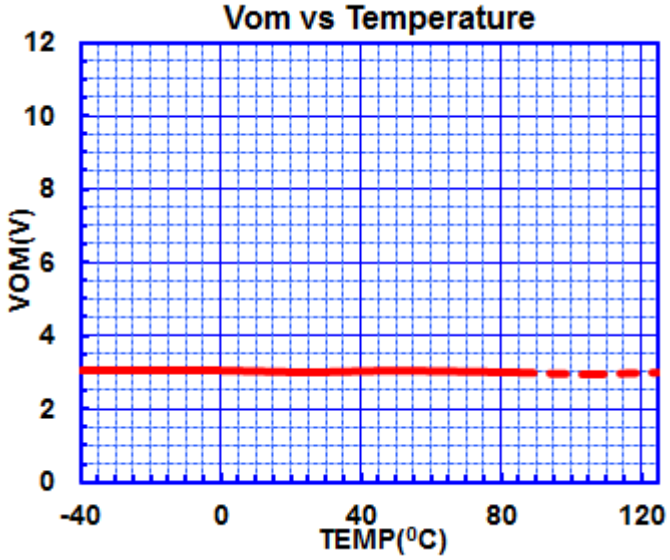

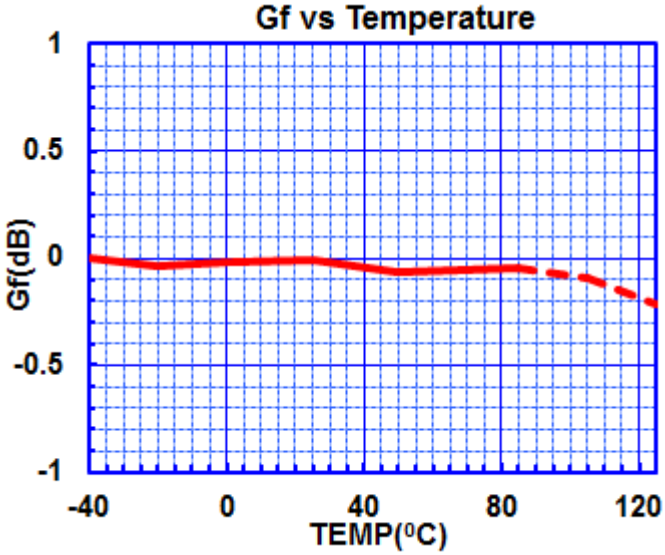

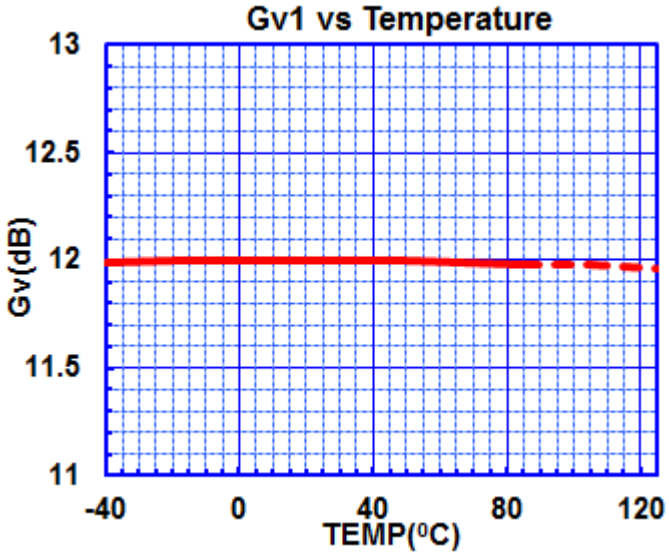

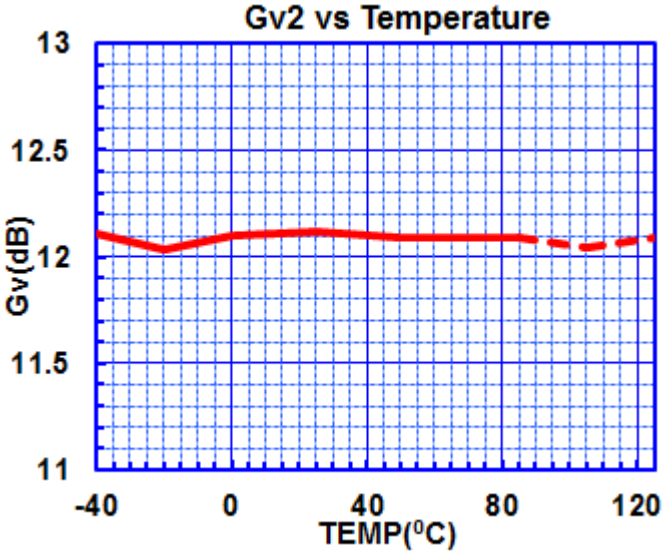

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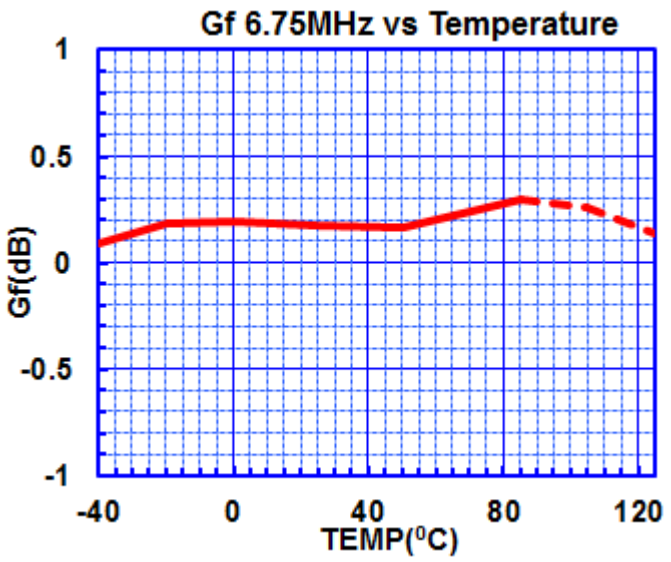

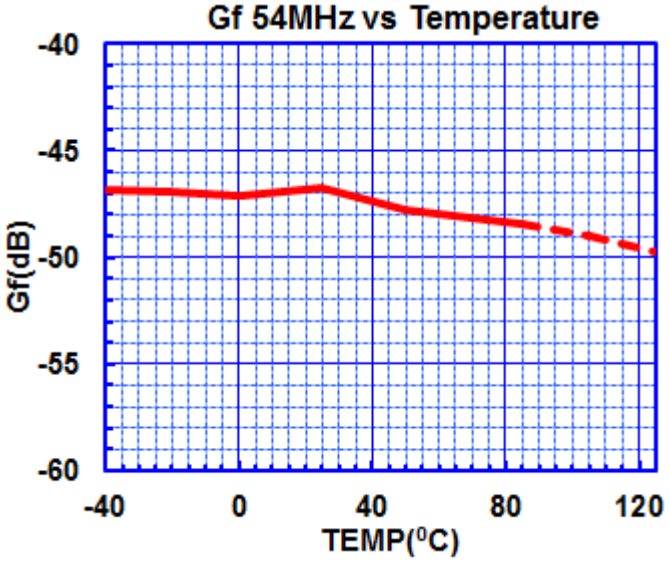

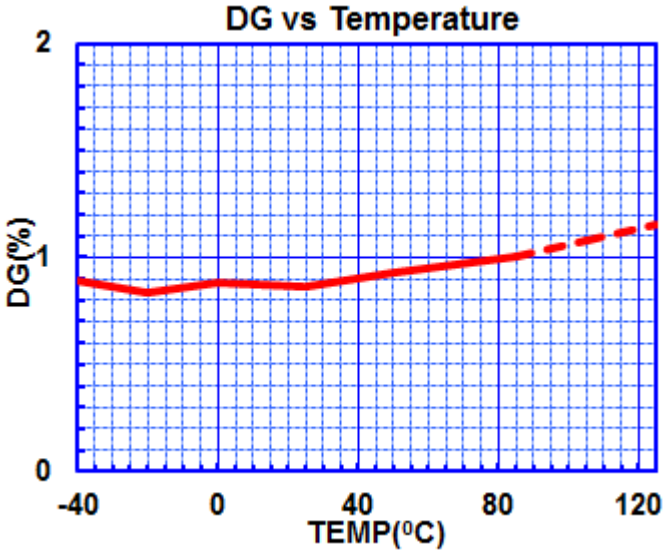

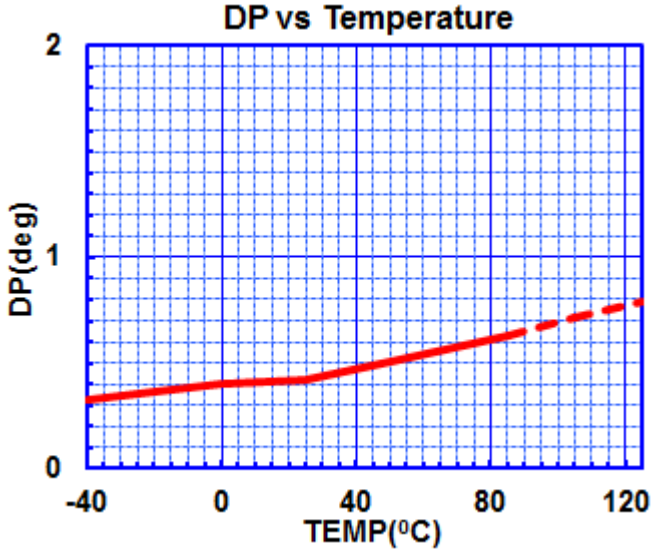

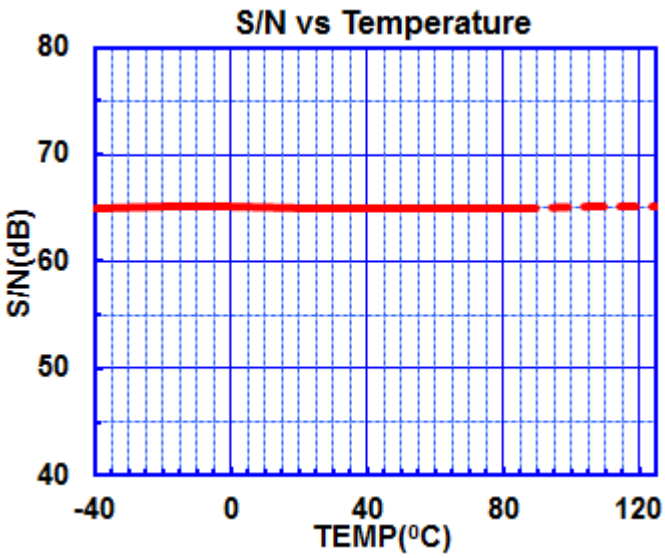

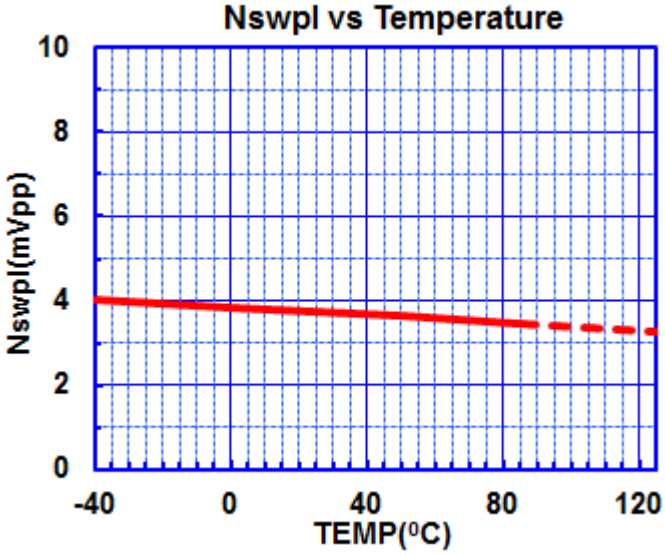

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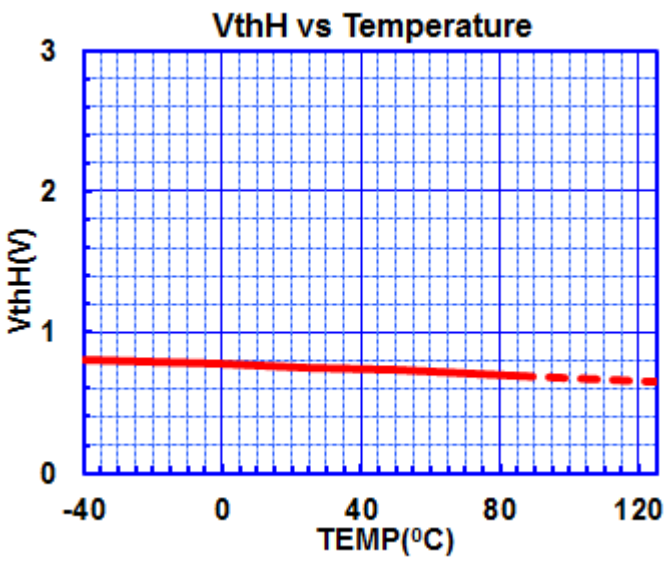

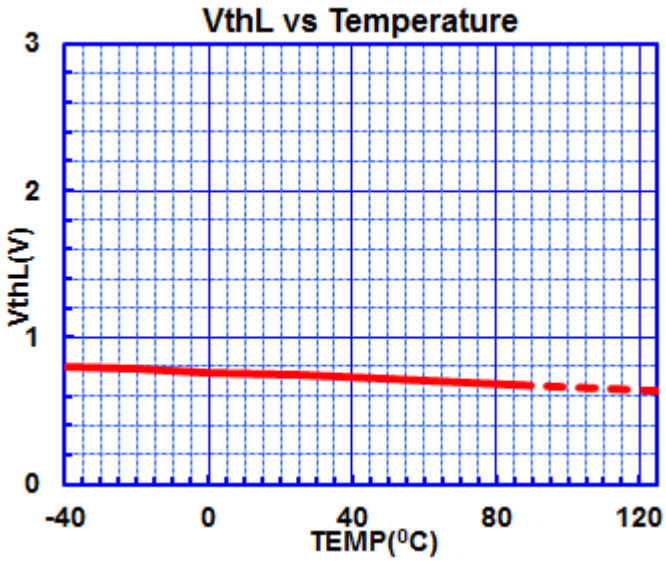

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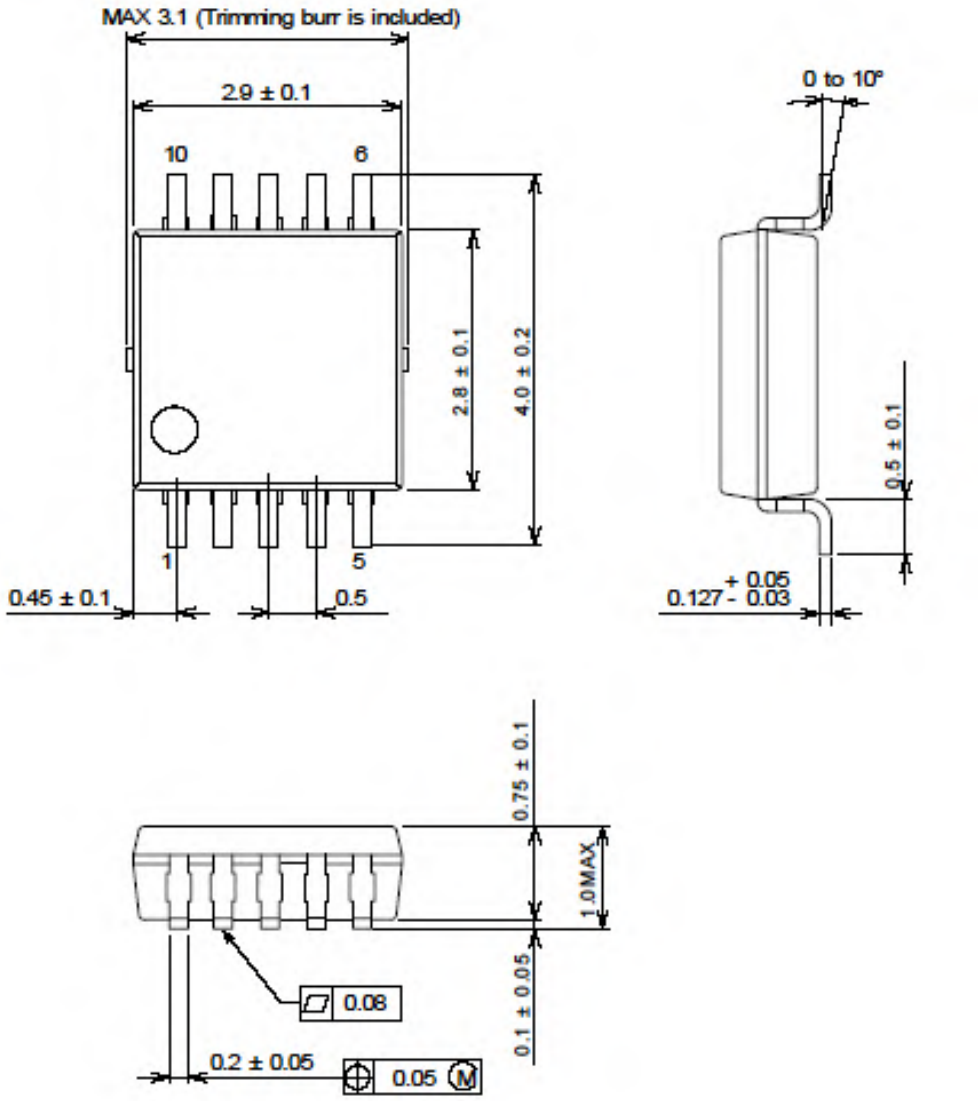
TVSP10



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UNIT : mm