

LOW VOLTAGE VIDEO AMPLIFIER WITH LPF

■GENERAL DESCRIPTION

The **NJM2575** is a Low Voltage Video Amplifier contained LPF circuit. Internal 75Ω driver is easy to connect TV monitor directly. The **NJM2575** features low power and small package, and is suitable for low power design on downsizing of DSC and DVC.

■PACKAGE OUTLINE

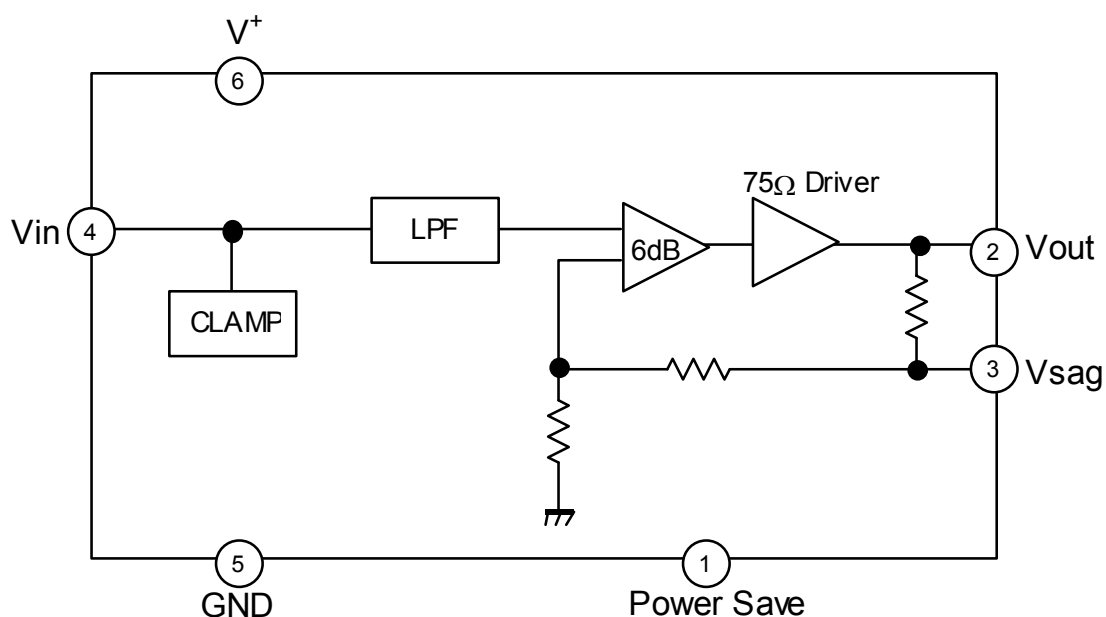


NJM2575F1

■FEATURES

- Operating Voltage 2.8 to 5.5V
- Composite Video Signal Input 1.0Vp-p
- 6dB Amplifier
- 75Ω Driver
- 2nd order Low Pass Filter
- Operating Current 7.0mA typ. at $V^+ = 3.0V$
- Operating Current 60μA typ. at $V^+ = 3.0V$
(Power Save Mode)
- Bipolar Technology
- Package Outline SOT23-6 (MTP6)

■BLOCK DIAGRAM



NJM2575

■ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	7.0	V
Power Dissipation	P _D	200	mW
Operating Temperature Range	T _{opr}	-40 to +85	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

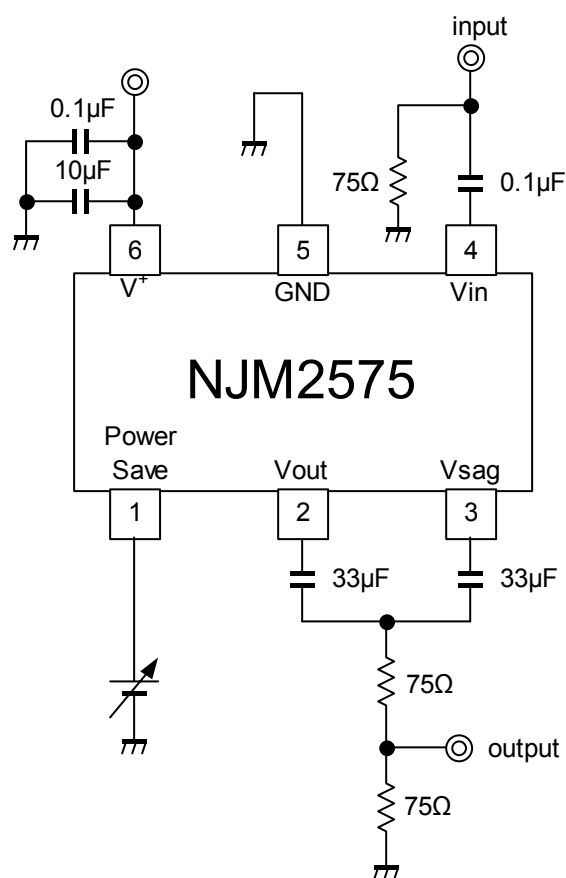
■ELECTRICAL CHARACTERISTICS (V⁺=3.0V, R_L=150Ω, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V _{opr}		2.8	3.0	5.5	V
Operating Current	I _{CC}	No Signal	-	7.0	10.0	mA
Operating Current at Power Save	I _{save}	Power Save Mode	-	60	90	μA
Maximum Output Voltage Swing	V _{om}	f=1kHz, THD=1%	2.2	2.4	-	V _{p-p}
Voltage Gain	G _v	V _{in} =100kHz, 1.0V _{p-p} , Input Sine Signal	6.1	6.5	6.9	dB
Low Pass Filter Characteristic	G _{fy} 4.5M	V _{in} =4.5MHz/100kHz, 1.0V _{p-p}	-0.5	0.0	+0.5	dB
	G _{fy} 8M	V _{in} =8MHz/100kHz, 1.0V _{p-p}	-	-2.0	-	
	G _{fy} 16M	V _{in} =16MHz/100kHz, 1.0V _{p-p}	-	-12.0	-	
Differential Gain	DG	V _{in} =1.0V _{p-p} , Input 10step Video Signal	-	0.2	-	%
Differential Phase	DP	V _{in} =1.0V _{p-p} , Input 10step Video Signal	-	0.2	-	deg
S/N Ratio	SN _v	V _{in} =1.0V _{p-p} , 100% White Video Signal, R _L =75Ω	-	+60	-	dB
2nd. Distortion	H _v	V _{in} =1.0V _{p-p} , 3.58MHz, Sine Video Signal, R _L =75Ω	-	-40	-	dB
SW Change Voltage High Level	V _{thPH}	active	1.8	-	V ⁺	V
SW Change Voltage Low Level	V _{thPL}	non-active	0	-	0.3	

■CONTROL TERMINAL

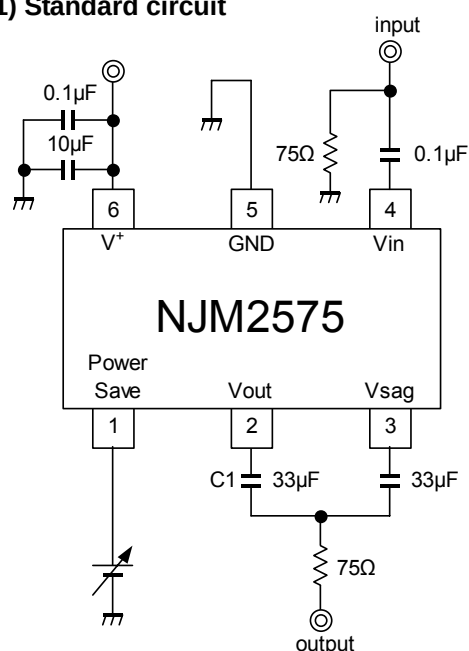
PARAMETER	STATUS	NOTE
Power Save	H	Power Save : OFF
	L	Power Save : ON (Mute)
	OPEN	Power Save : ON (Mute)

■TEST CIRCUIT

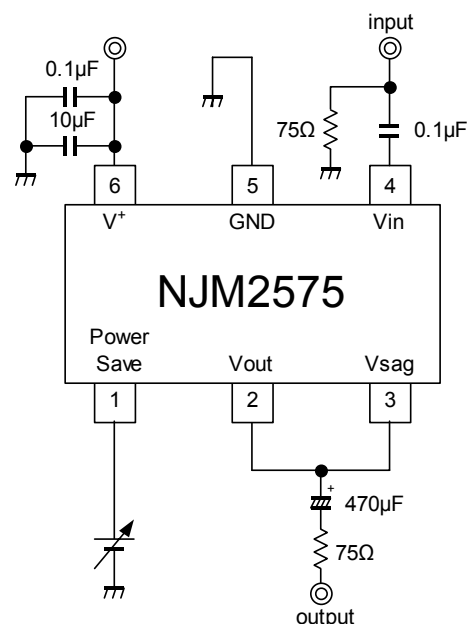


APPLICATION CIRCUIT

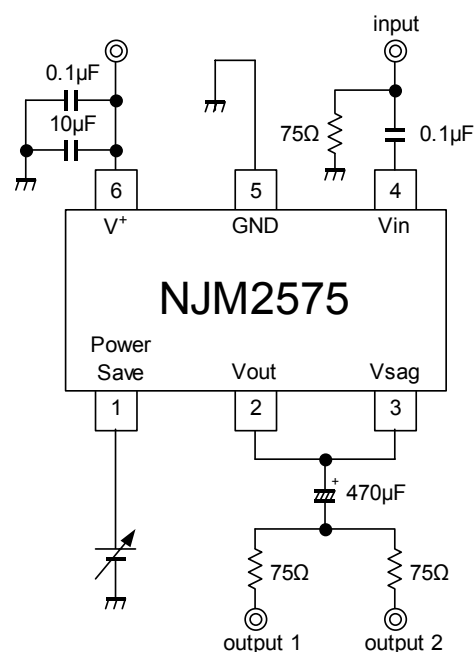
(1) Standard circuit



(2) SAG correction unused circuit



(3) Two-line driving circuit



(1) Standard circuit

This circuit is for a portable equipment of small mounting space.

The SAG correction reduces output coupling capacitor values.

However, this circuit may cause to SAG deterioration, and lose synchronization by luminance fluctuation.

Adjust the C1 value, checking the waveform containing a lot of low frequency components like a bounce waveform (Worst condition waveform of SAG). Change the capacitor of C1 into a large value to improve SAG.

(2) SAG correction unused circuit

We recommend this circuit when there is no space limitation.

Connect the coupling capacitor after connecting the Vout pin and Vsag pin. The recommended value is 470µF or more.

(3) Two-line driving circuit

This circuit drives two-line of 150Ω. However, it may cause to lose synchronization by an input signal of large APL change (100% white signals more than 1Vp-p). Confirm the large APL change waveform (100% white signals more than 1Vp-p) and evaluate sufficiently.

■ TERMINAL FUNCTION

PIN No.	PIN NAME	DC VOLTAGE	EQUIVALENT CIRCUIT
1	Power save	-	
2	Vout	0.26V	
3	Vsag	-	
4	Vin	1.10V	
5	GND	-	
6	V ⁺	3V	

■ APPLICATION

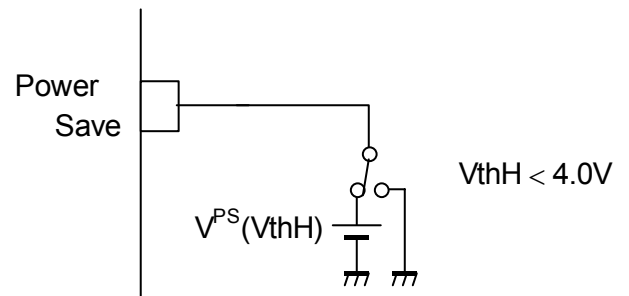
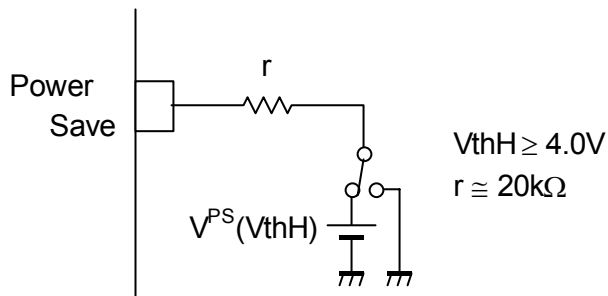
When you use a power save terminal more than by 4.0V, please put resistance of about 20k Ω into a power save terminal.

In addition, power save terminal voltage (V_{thH}) -- in the case of below 4.0V, resistance is not required

Example)

● $PS(V_{thH}) \geq 4.0V$

● $PS(V_{thH}) < 4.0V$

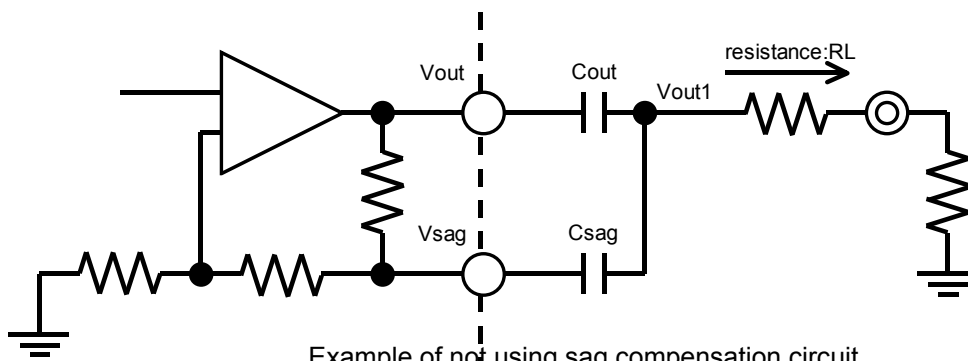


◆ SAG correction circuit

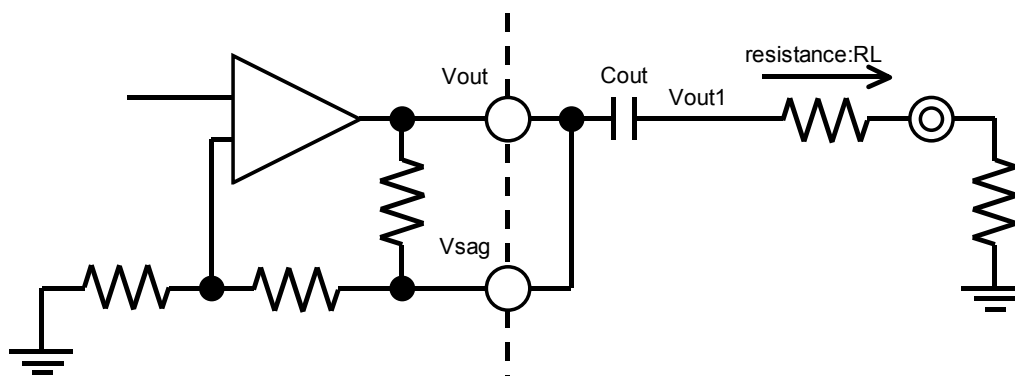
SAG correction circuit is a circuit to correct for low-frequency attenuation by high-pass filter consisting of the output coupling capacitance and load resistance. Low-frequency attenuation raises the sag in the vertical period of the video signal.

Capacitor for Vsag (Csag) is connected to the negative feedback of the amplifier. This Csag increase the low frequency gain to correct for the attenuation of low frequency gain.

Example SAG collection circuit

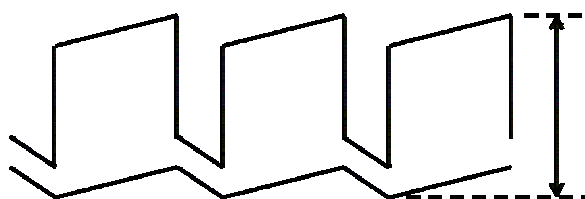


Example of not using sag compensation circuit

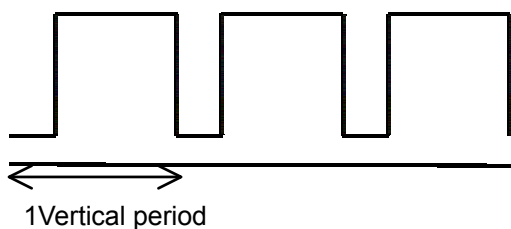


Waveform of Vout terminal and Vout1 terminal

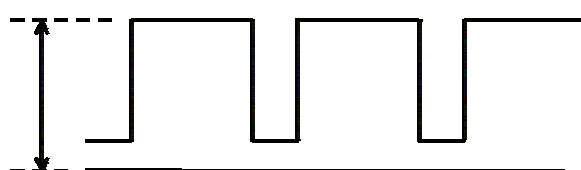
using SAG correction circuit
Waveform of Vout



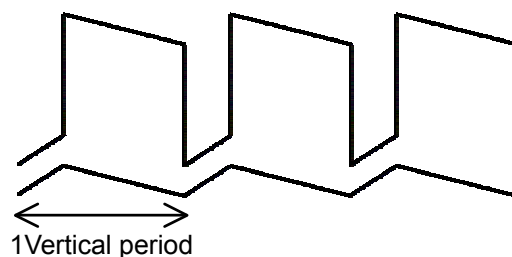
Waveform of Vout1



not using SAG correction circuit
Waveform of Vout



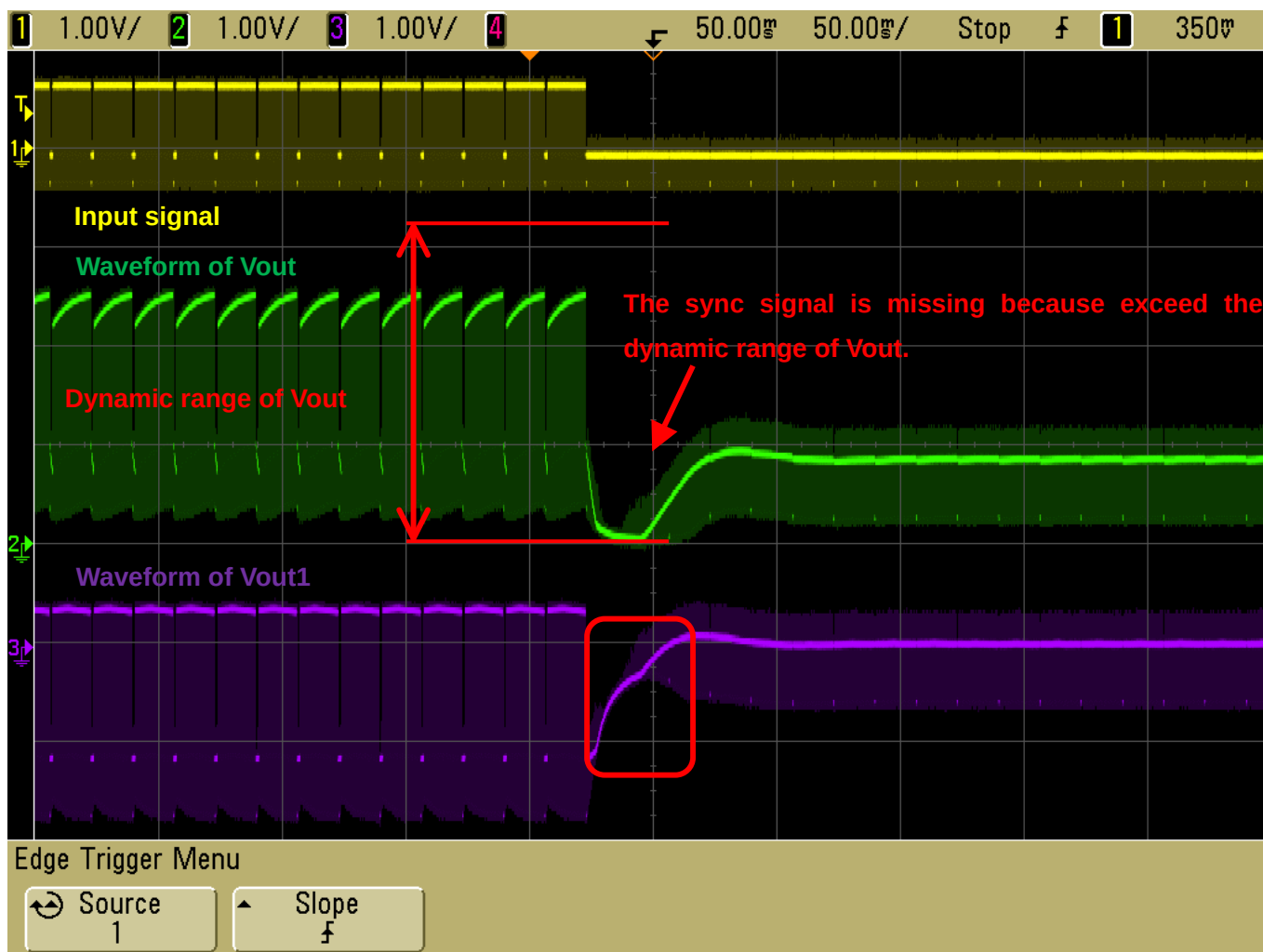
Waveform of Vout1



SAG correction circuit generates a low frequency component signal amplified to Vout terminal.

Changes of the luminance signal will be low-frequency components, if you want to output a large signal luminance changes. Therefore, generate correction signal of change of a luminance signal to Vout pin. At this time, signal is over the dynamic range of Vout pin. This may cause a lack of sync signal, and waveform distortion.

Please see diagram below (green waveform), if you want to output large changes of a signal luminance, such as 100% white video signal and black signal. Thus, output signal exceed dynamic range of Vout pin and may be the signal lack.



< Countermeasure for waveform distortion >

1. Please using small value the Sag compensation capacitor (VSAG).

It can ensure the dynamic range by using small value the capacitor (VSAG). It because of low-frequency variation of Vout pin is smaller. However, the output (VOUT) must be use large capacitor for this reason sag characteristics become exacerbated.

2. Please do not use the sag correction circuit.

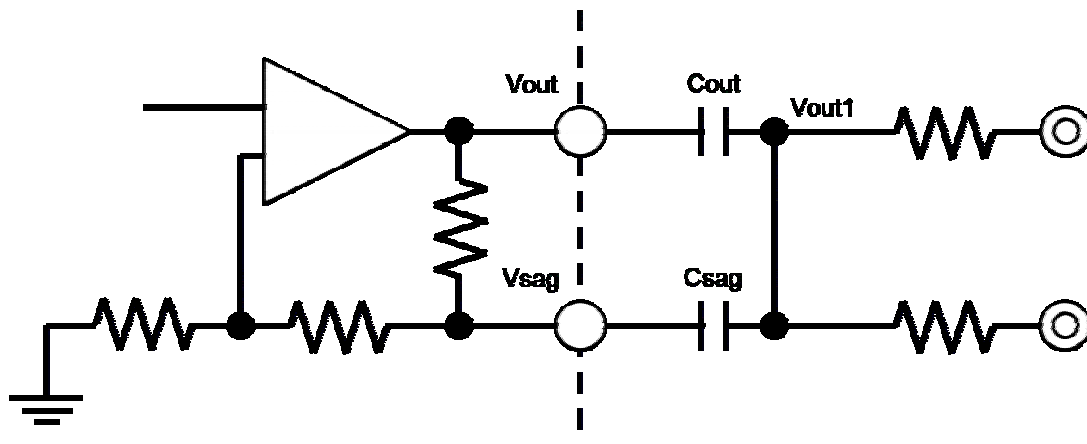
Signal can output within dynamic range for reason it does not change the DC level of the output terminal.

However, the output (VOUT) must be use large capacitor for this reason sag characteristics become exacerbated.

< Dual drive at using SAG correction circuit >

Using sag correction circuit at dual drive circuit is below. Dual drives are less load resistance. Thus, the cut-off frequency of HPF that is composed of the output capacitor and load resistance will be small. Therefore, the sag characteristics deteriorate.

Please size up to the output capacitor (Vout) for not to deteriorate the sag characteristics.



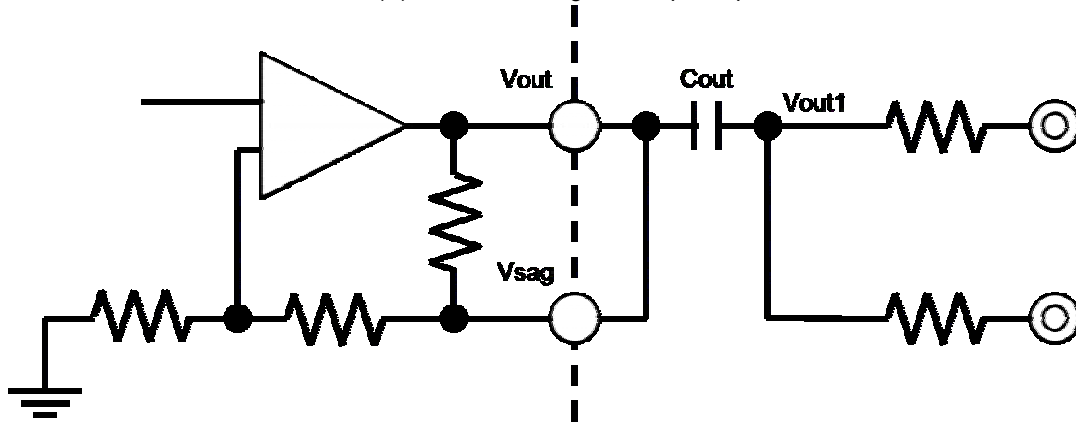
< Dual drive at not using SAG correction circuit >

We recommended two-example dual drive circuit with not use sag correction circuit. Please change the configuration to be used according to the situation. Please configure to meet the following conditions. Then you can adjust the characteristics of each configuration.

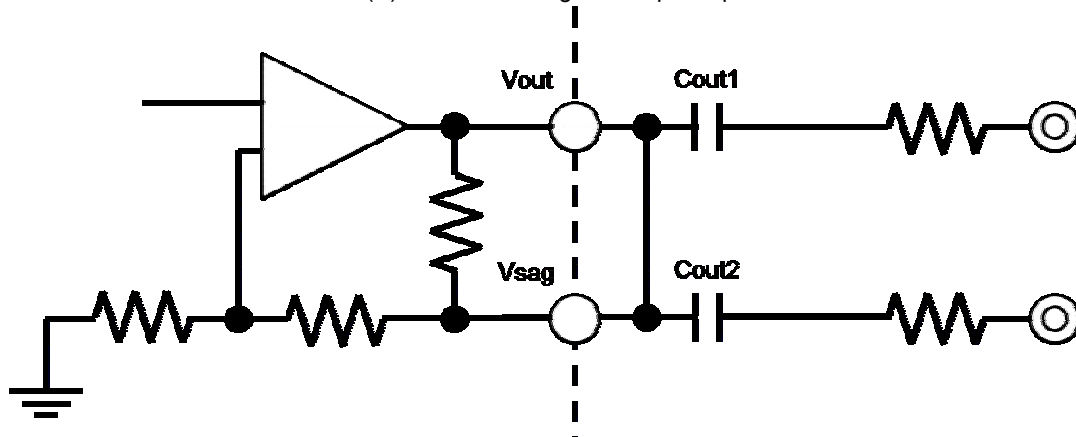
$$C_{out} = C_{out1} + C_{out2}$$

$$C_{out1} = C_{out2}$$

(A) In case of using one output capacitor



(B) In case of using two output capacitors

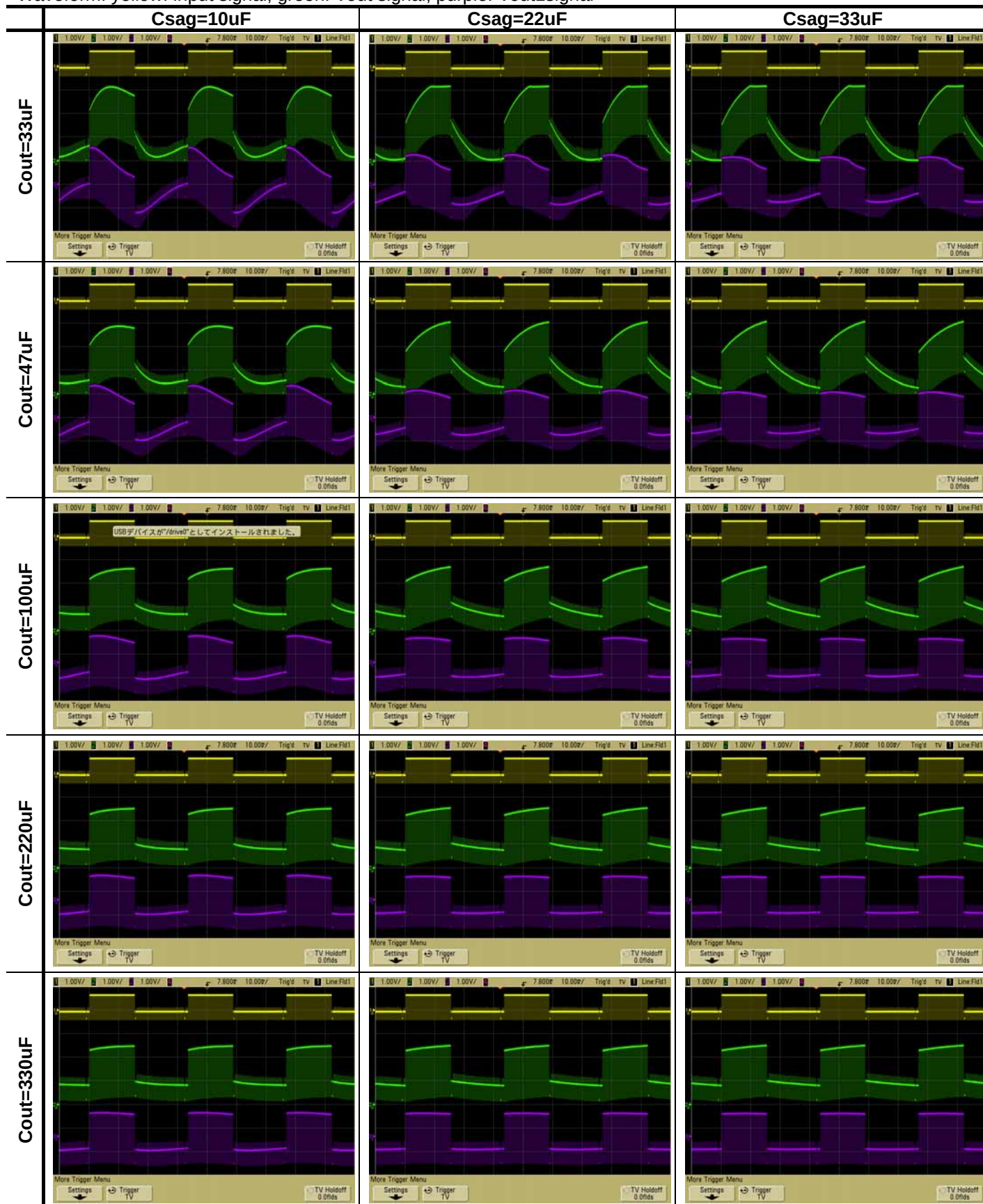


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< Using SAG correction circuit >

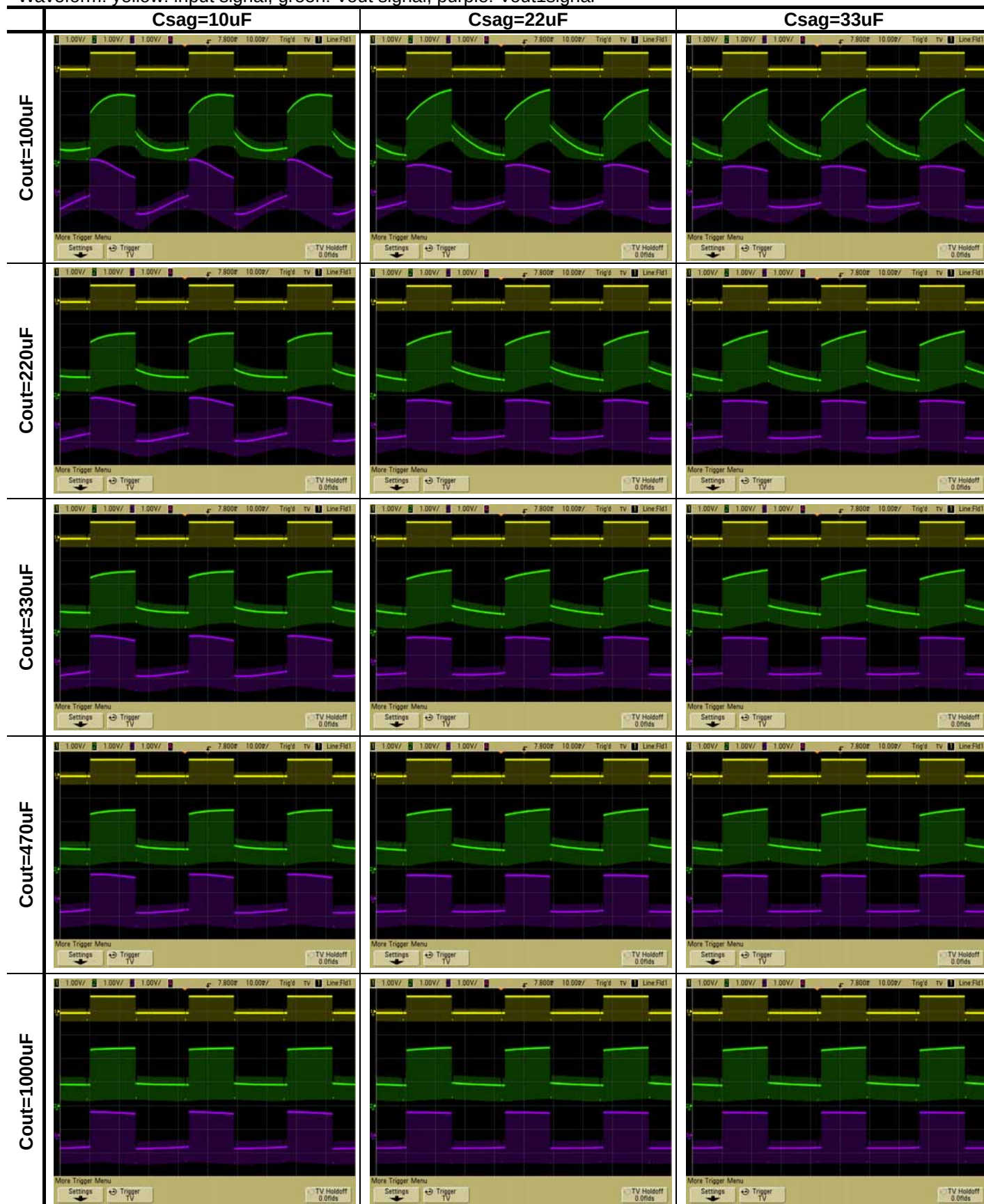
Input signal: bounce signal (IRE0%, IRE100%, 30Hz), resistance=150Ω

Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal



Input signal: bounce signal (IRE0%, IRE100%, 30Hz), resistance=75Ω

Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal

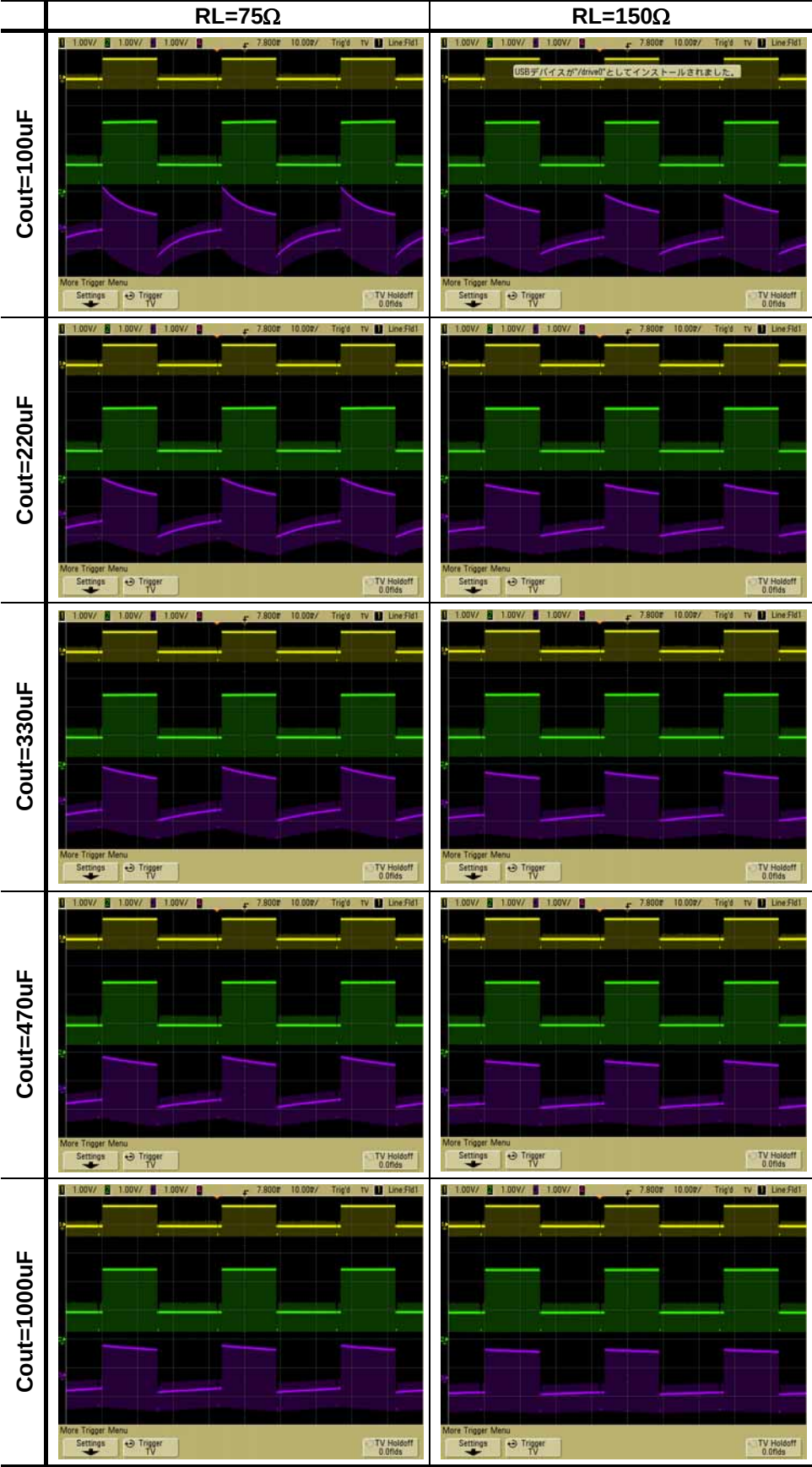


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< Not using SAG correction circuit >

Input signal: bounce signal (IRE0%, IRE100%, 30Hz), resistance=150Ω

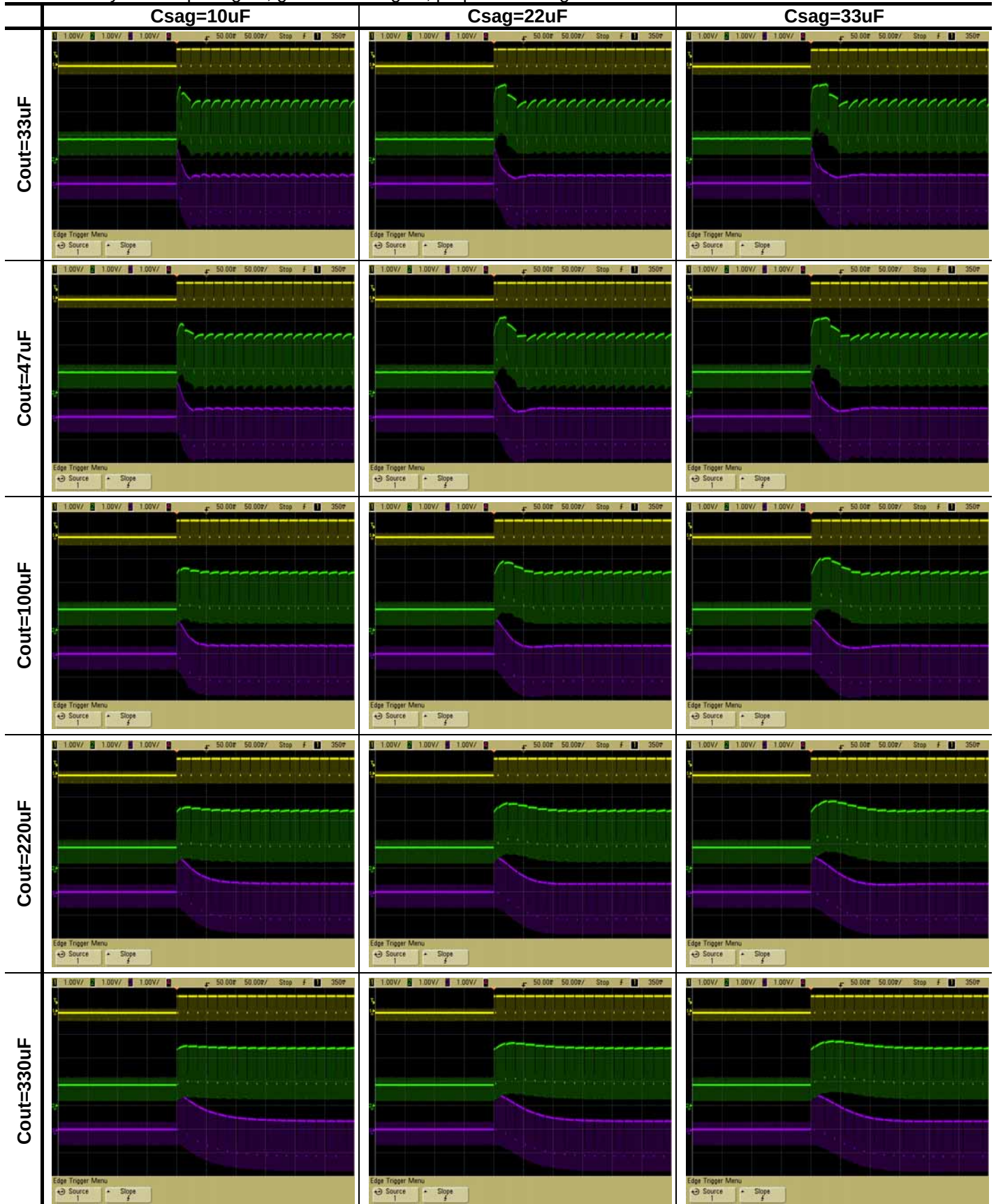
Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal



< Using SAG correction circuit >

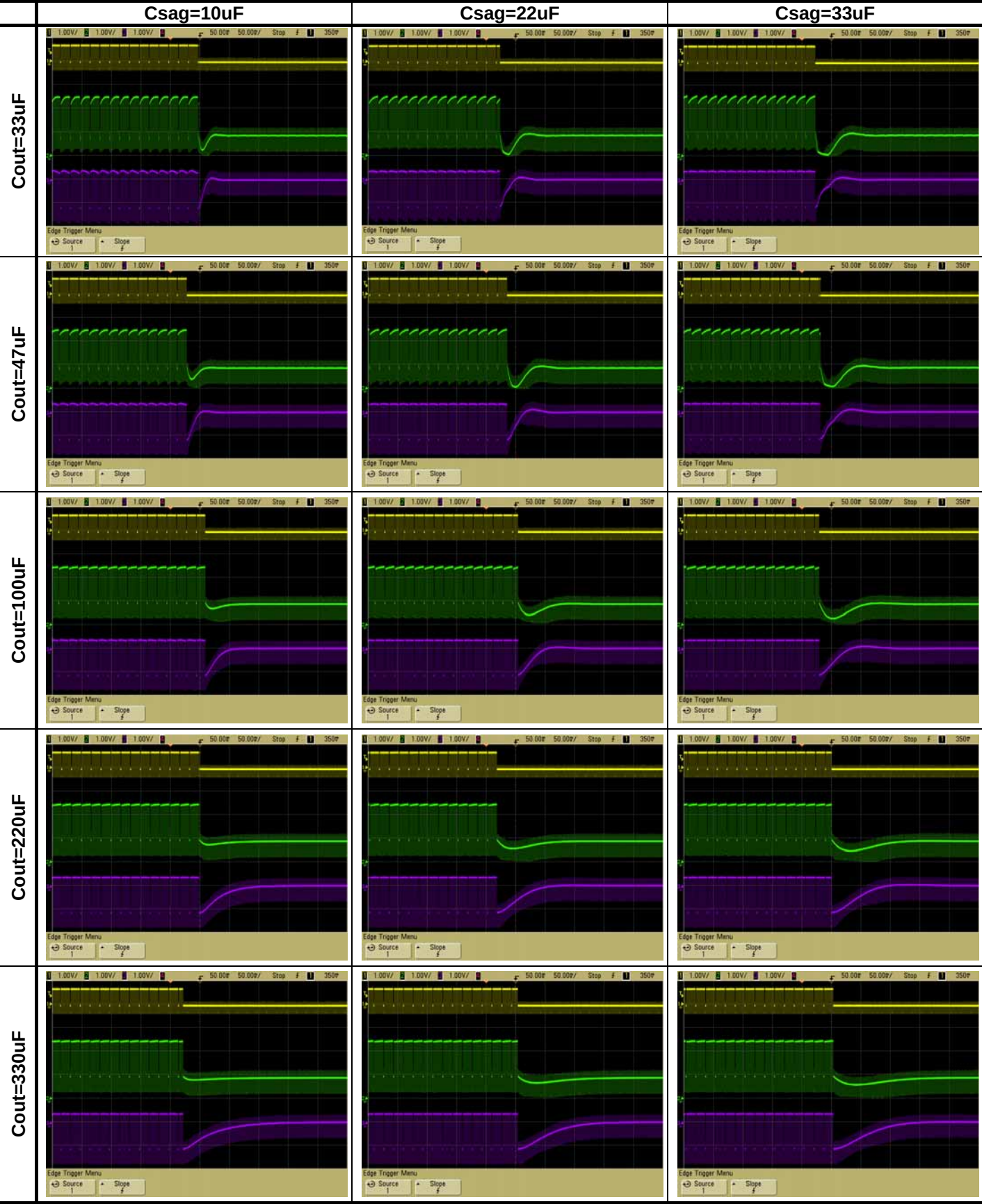
Input signal: Black to White100%, resistance150Ω

Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal



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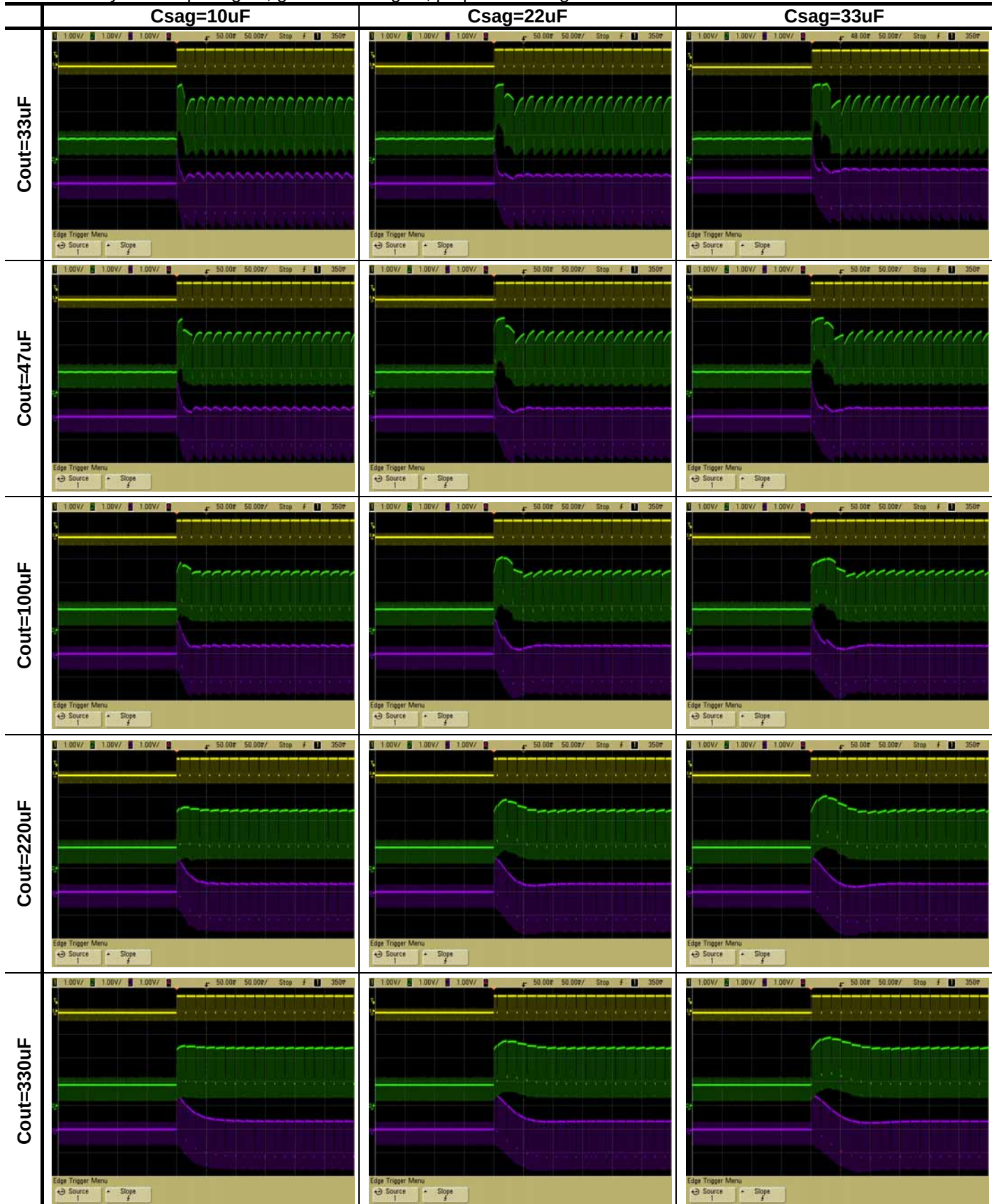
Input signal: White100% to Black, resistance150Ω
Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal



< Using SAG correction circuit >

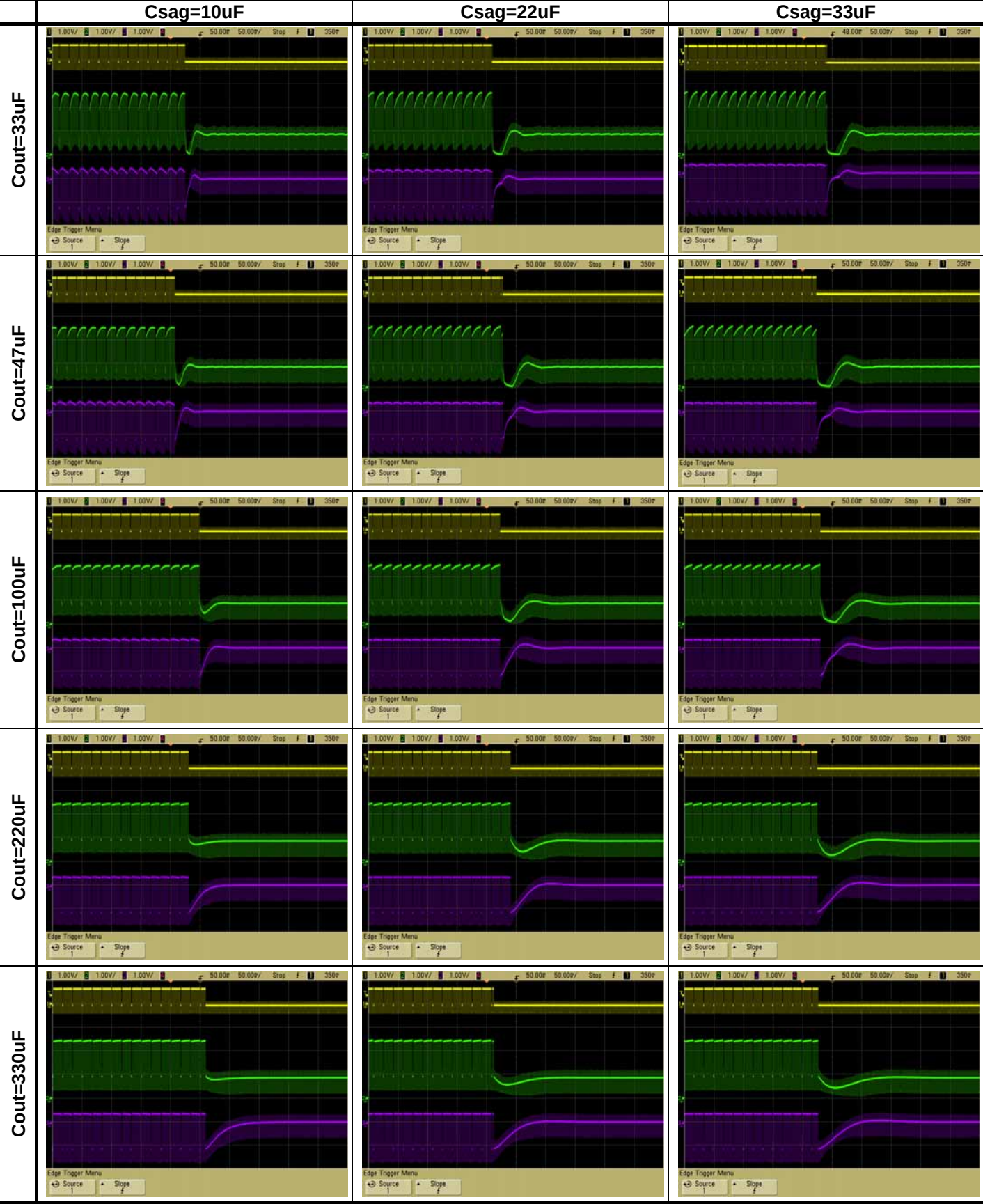
Input signal: Black to White100%, resistance=75Ω

Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal



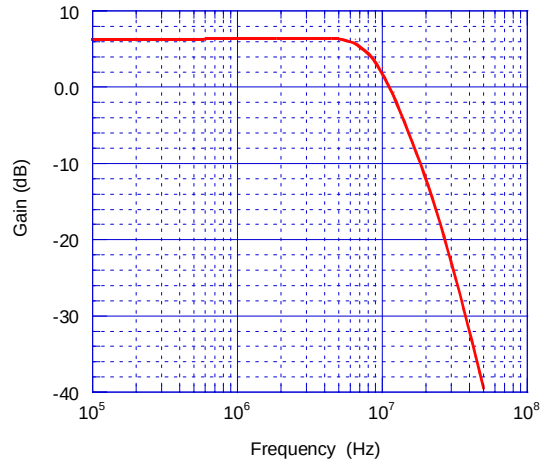
NJM2575

Input signal: White100% to Black, resistance=75Ω
Waveform: yellow: input signal, green: Vout signal, purple: Vout1signal

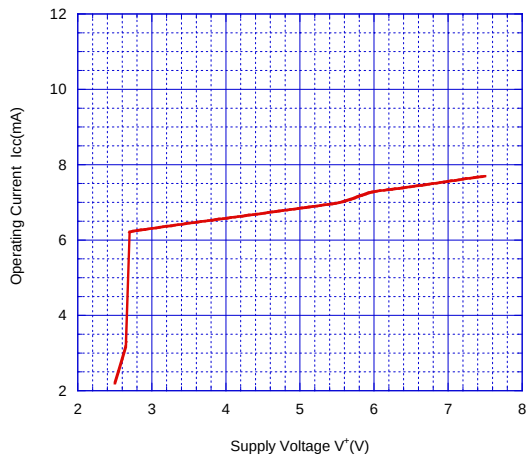


TYPICAL CHARACTERISTICS

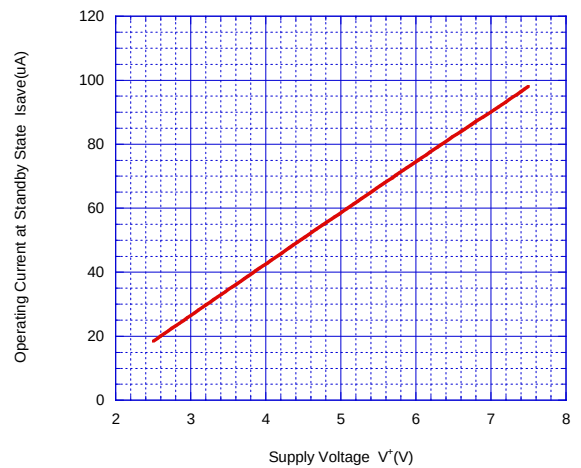
Frequency Characteristic



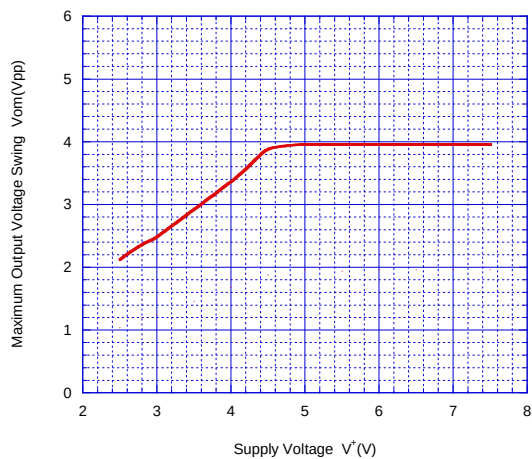
Operating Current vs. Supply Voltage



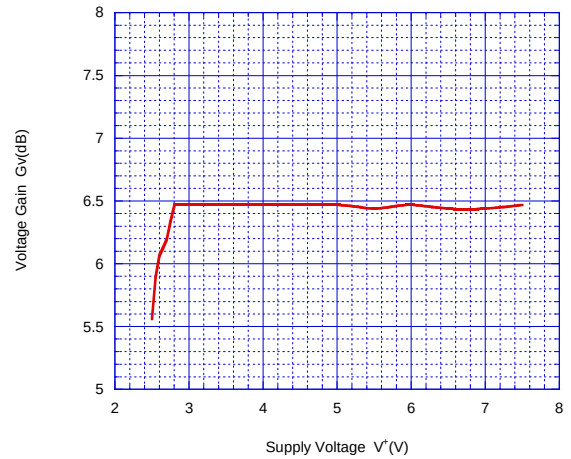
Operating Current at Standby State vs. Supply Voltage



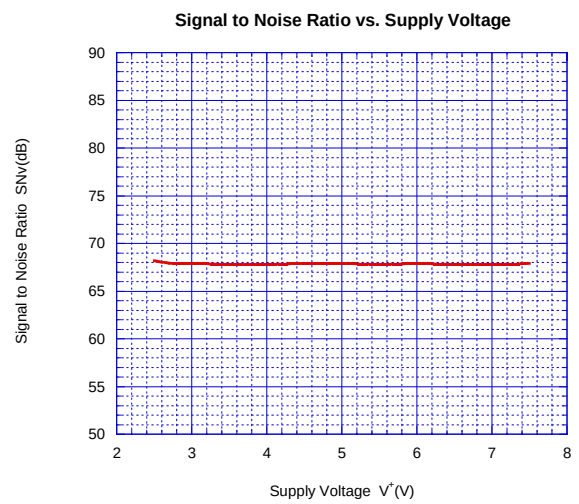
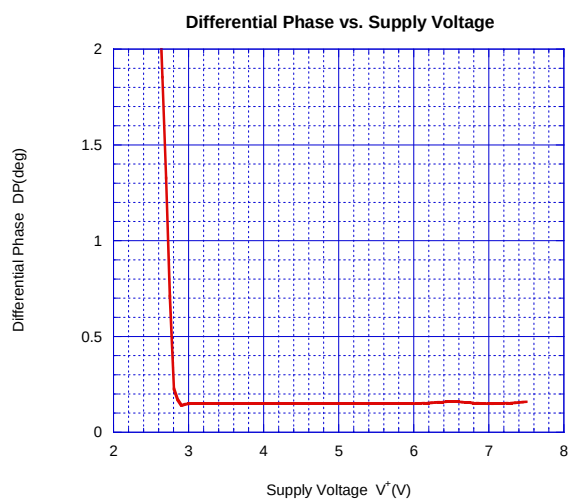
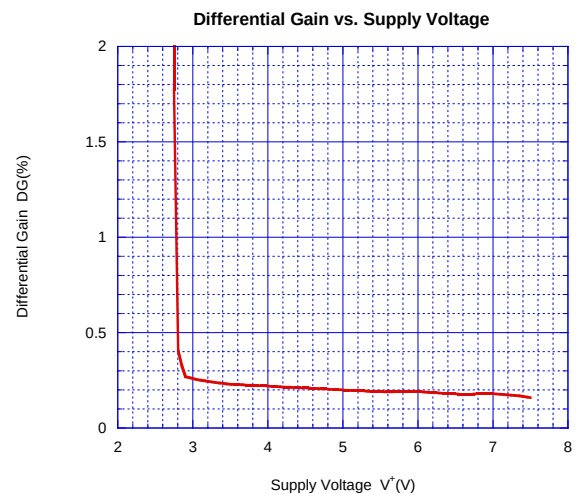
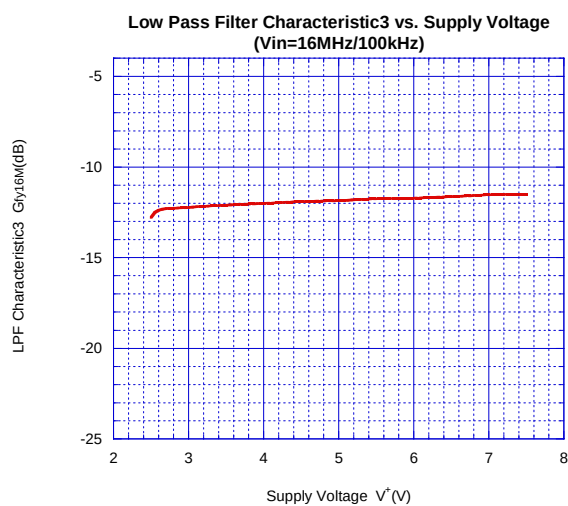
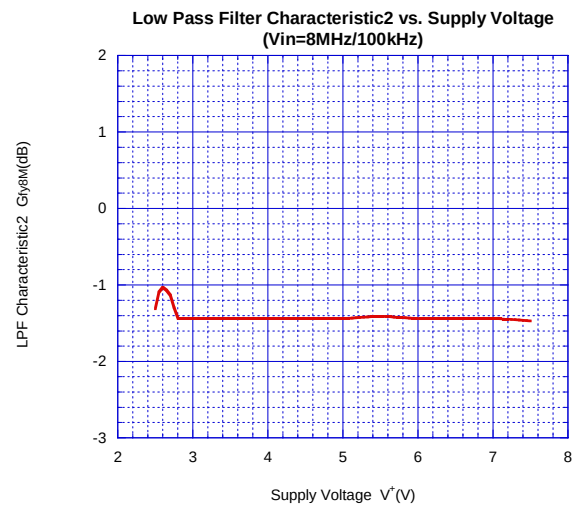
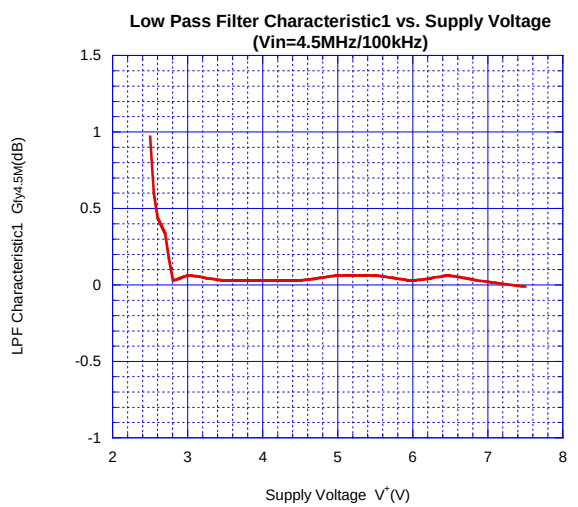
Maximum Output Voltage Swing vs. Supply Voltage



Voltage Gain vs. Supply Voltage

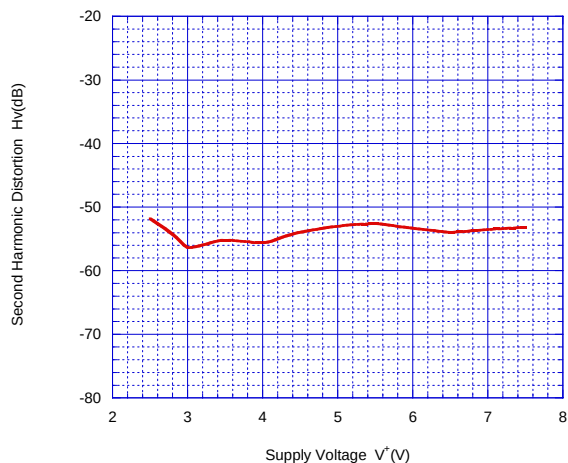


TYPICAL CHARACTERISTICS

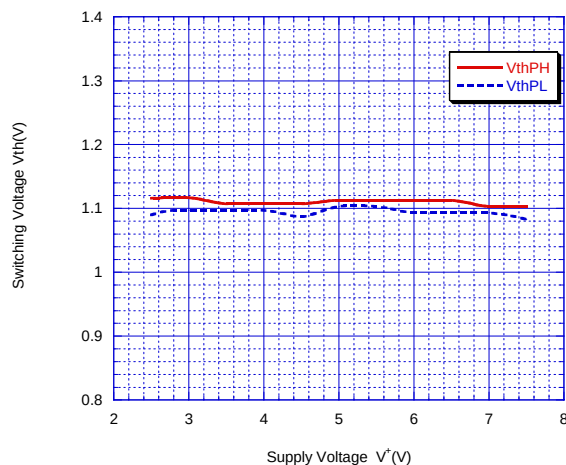


TYPICAL CHARACTERISTICS

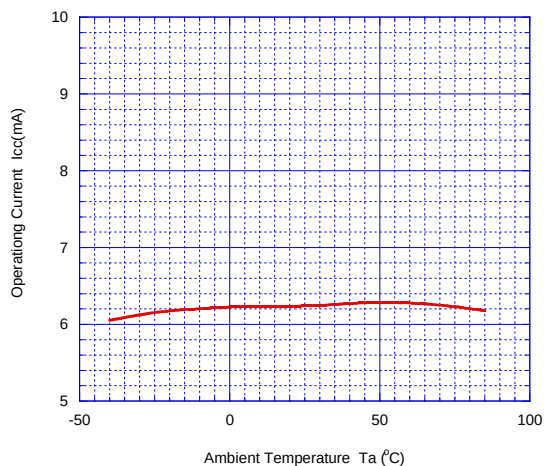
Second Harmonic Distortion vs. Supply Voltage



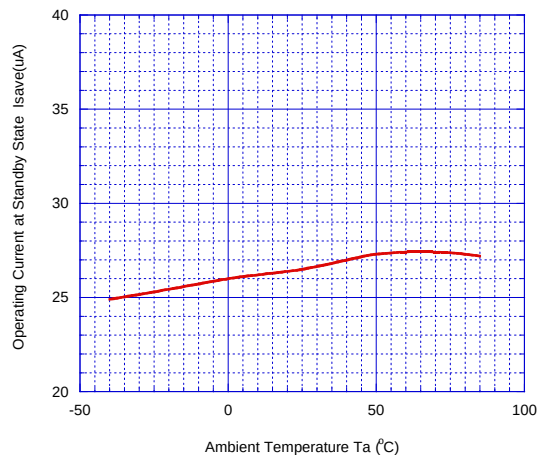
Switching Voltage vs. Supply Voltage



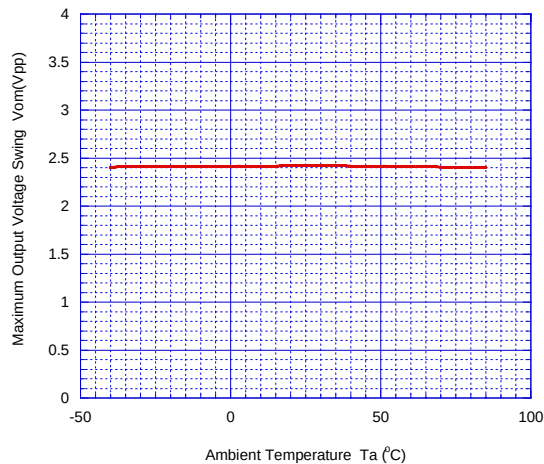
Operating Current vs. Temperature



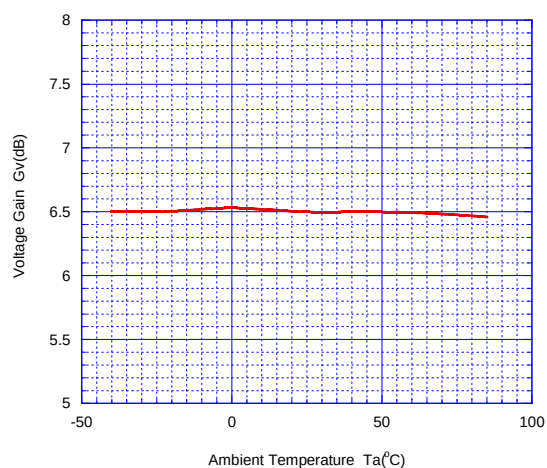
Operating Current at Standby State vs. Temperature



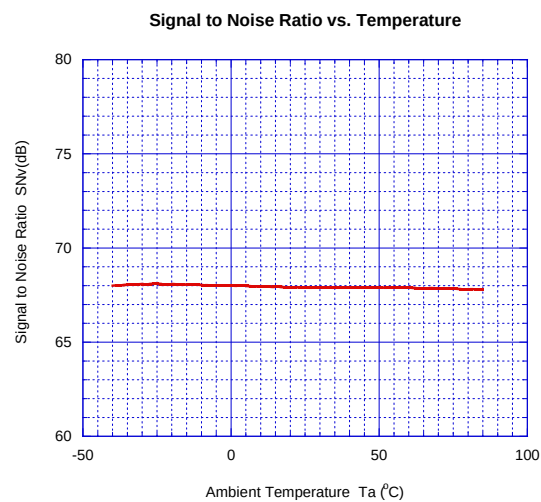
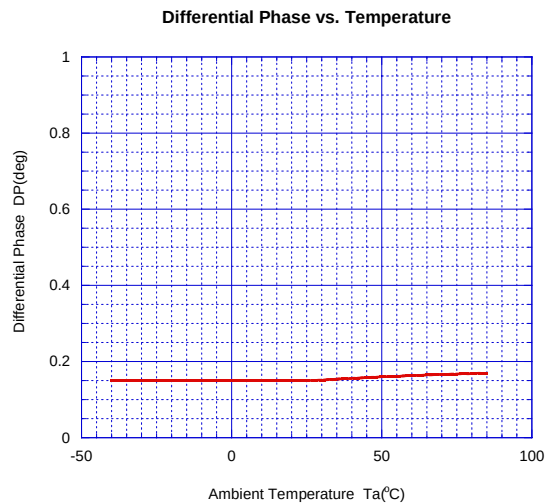
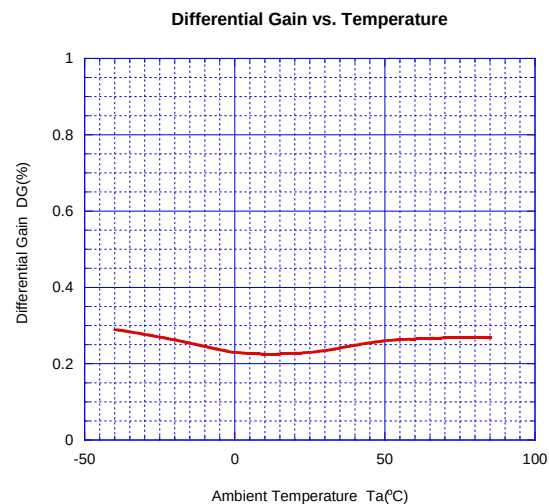
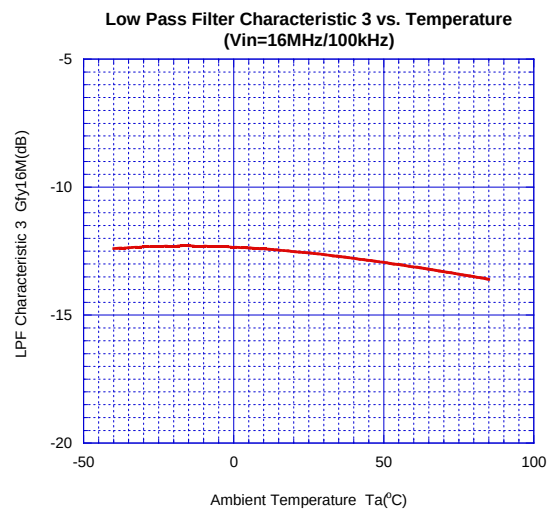
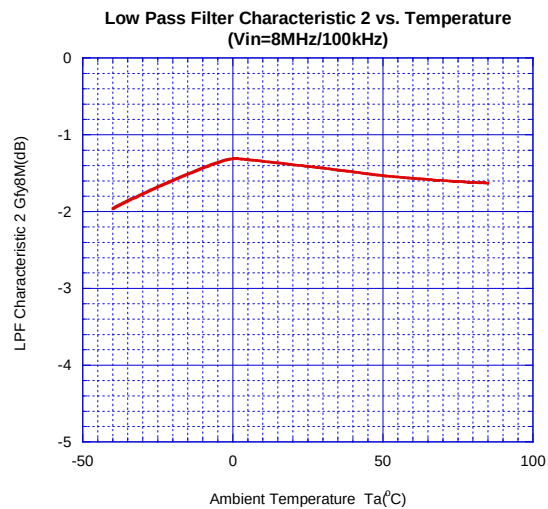
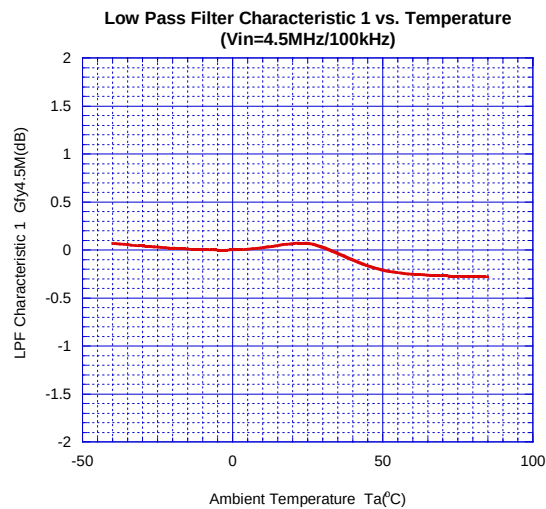
Maximum Output Voltage Swing vs. Temperature



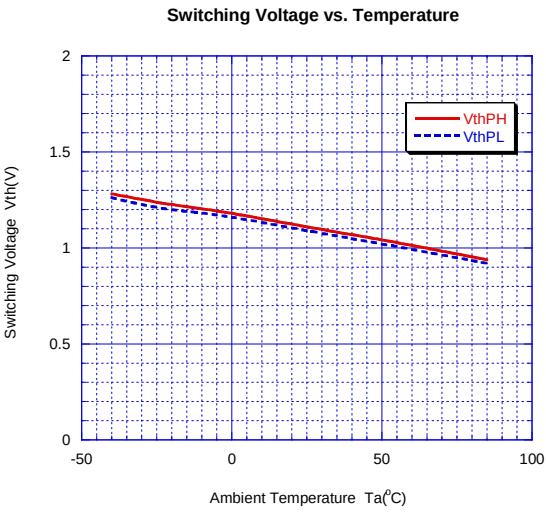
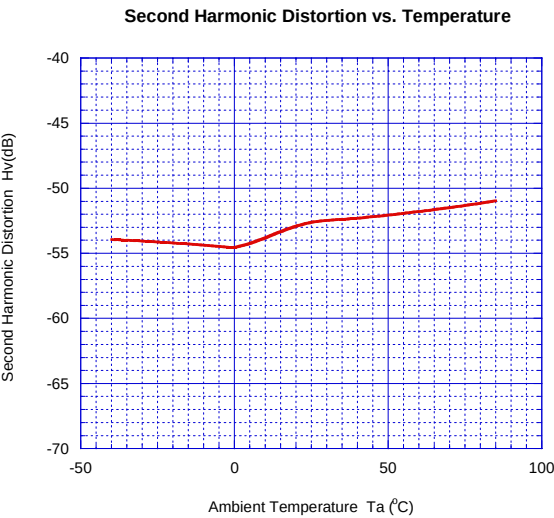
Voltage Gain vs. Temperature



TYPICAL CHARACTERISTICS



■TYPICAL CHARACTERISTICS



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