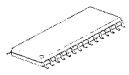
3-INPUT 1-OUTPUT 3-CIRCUIT VIDEO AMPLIFIER WITH LPF

■GENERAL DESCRIPTION

NJM2515 is the 3-input 1-output 3-circuit video amplifier. Internal LPF is progressive correspondence. Also the High Definition (30MHz) is realized by LPF through mode. It is the best for the video system corresponding to a component video signal or a RGB signal.

■PACKAGE OUTLINE

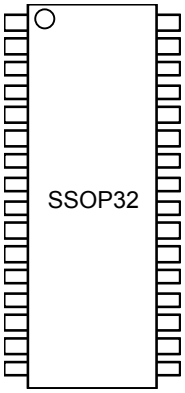


NJM2515V

■ FEATURES

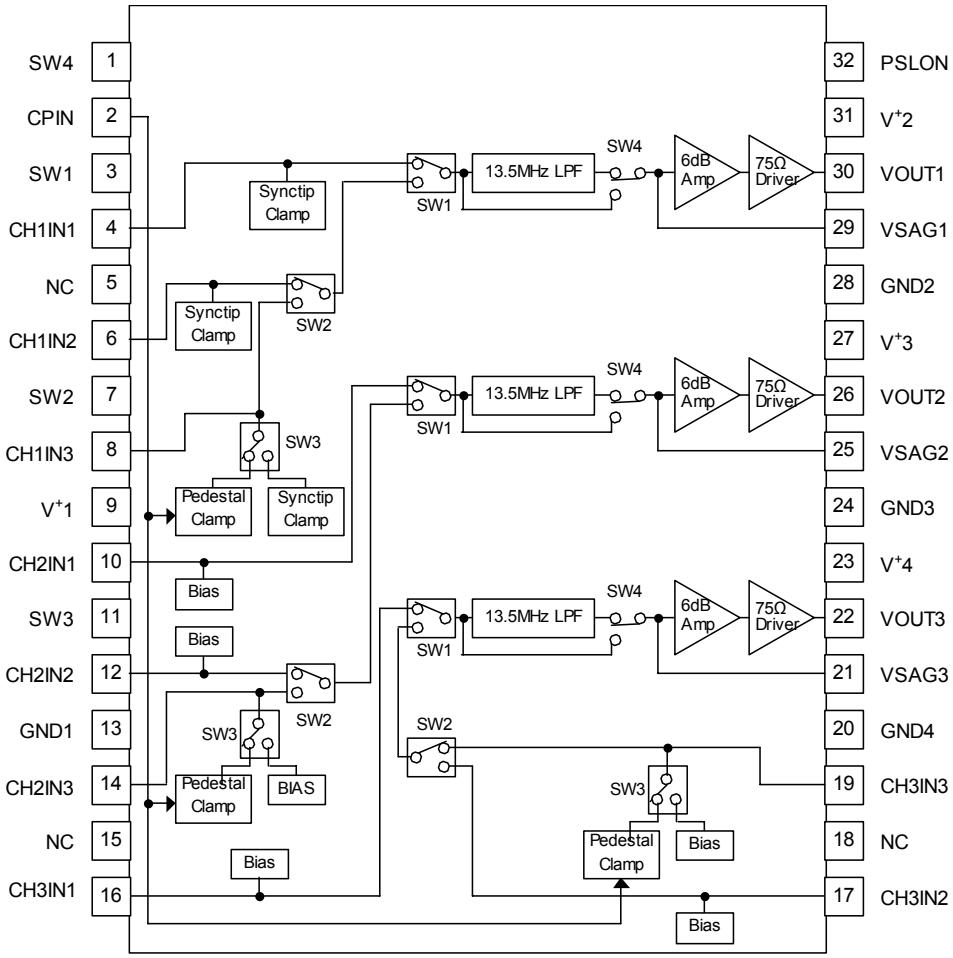
- Operating voltage 4.5 to 5.5V
- Internal 3-input 1-output 3-circuit video switch
- Internal LPF 0dBtyp.at 13.5MHz
- Internal LPF through switch 0dBtyp.at 34MHz
- Internal 6dB amplifier
- Internal 75ohm driver
- Internal Power Save circuit
- Bipolar technology
- Package outline SSOP32

■PIN CONFIGURATION



1.	SW4	17.	CH3 IN2
2.	CPIN	18.	NC
3.	SW1	19.	CH3 IN3
4.	CH1 IN1	20.	GND4
5.	NC	21.	VSAG3
6.	CH1 In2	22.	VOUT3
7.	SW2	23.	V^+4
8.	CH1 IN3	24.	GND3
9.	V^+1	25.	VSAG2
10.	CH2 IN1	26.	VOUT2
11.	SW3	27.	V^+3
12.	CH2 IN2	28.	GND2
13.	GND1	29.	VSAG1
14.	CH2 IN3	30.	VOUT1
15.	NC	31.	V^+2
16.	CH3 IN1	32.	PSLON

■ BLOCK DIAGRAM



Ver.8.1

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	10.0	V
Power Dissipation	P_D	1250*	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstr	-40 to +150	°C

*EIA/JEDEC STANDARD Test Board (76.2x114.3x1.6mm, 4layers,FR-2) mounting

■ **RECOMMENDED OPEARATING CONDITION** (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	Vopr		4.5	5.0	5.5	V

■ **ELECTRICAL CHARACTERISTICS** ($V^+1= V^+2= V^+3= V^+4$=5V, RL=150ohm, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	V^+1 to V^+4,No signal	-	27	40	mA
Supply Current with Power Save Mode	Isave	V^+1 to V^+4, Power save mode	-	0.6	1.3	mA
Maximum Output Level 1	Vomy	Vin=100kHz sin-signal, THD=1% Select to sync-chip clamp	2.4	2.5	-	Vp-p
Maximum Output Level 2	Vom PbPr	Vin=100kHz sin-signal,THD=1% Select to bias	2.4	2.5	-	Vp-p
Maximum Output Level 3	Vom RGB	Vin=100kHz sin-signal,THD=1% Select to pedestal clamp	1.8	1.9	-	Vp-p
Voltage Gain	Gv	Vin=1MHz, 1.0Vp-p sin-signal	6.0	6.4	6.8	dB
Voltage Gain Difference between Input Terminal	ΔGvI	Vin=1MHz, 1.0Vp-p sin-signal, IN1 to IN2 to IN3 for all channel	-0.2	0	0.2	dB
Voltage Gain Difference between Channel	ΔGvB	Vin=1MHz, 1.0Vp-p sin-signal, CH1 to CH2 to CH3	-0.2	0	0.2	dB
LPF Characteristics 1	Gf13.5M	13.5MHz/1MHz, 1.0Vp-p, sin-signal	-3.0	0	1.0	dB
LPF Characteristics 2	Gf54M	54MHz/1MHz, 1.0Vp-p, sin-signal	-	-40	-	dB
Frequency Characteristics	Gf	Vin=34MHz/1MHz,1.0Vp-p sin-signal, setect to LPF through mode	-	0	-	dB
Closstalk between Input Terminal 1	CT-I1	Vin=4.43MHz,1.0Vp-p sin-signal, IN1 to IN2 to IN3 for all channel	-	-70	-	dB
Closstalk between Input Terminal 2	CT-I2	Vin=30MHz,1.0Vp-p sin-signal, IN1 to IN2 to IN3 for all channel	-	-50	-	dB
Closstalk between Channel 1	CT-B1	Vin=4.43MHz,1.0Vp-p sin-signal, CH1 to CH2 to CH3	-	-70	-	dB
Closstalk between Channel 2	CT-B2	Vin=30MHz,1.0Vp-p sin-signal, CH1 to CH2 to CH3	-	-50	-	dB
Differential Gain	DG	Vin=1.0Vp-p,10step video signal	-	0.5	-	%
Differential Phase	DP	Vin=1.0Vp-p,10step video signal	-	0.3	-	deg
S/N Ratio	SN	Vin=1.0Vp-p,100% white video signal,100KHz to 6MHz	-	70	-	dB

■ **ELECTRICAL CHARACTERISTICS** ($V^+1= V^+2= V^+3= V^+4=5V$, RL=150ohm, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Switch High level for power save	VthPH	PS	2.0	-	V^+	V
Switch Low level for power save	VthPL	PS	0	-	0.6	V
Switch High level for input signal switch	VthSH	SW1, SW2	2.0	-	V^+	V
Switch High level for input signal switch	VthSL	SW1, SW2	0	-	0.6	V
High level for CP IN	Vth CPH		2.0	-	V+	V
Low level for CP IN	Vth CPL		0	-	0.6	V

■ **CONTROL SIGNAL**

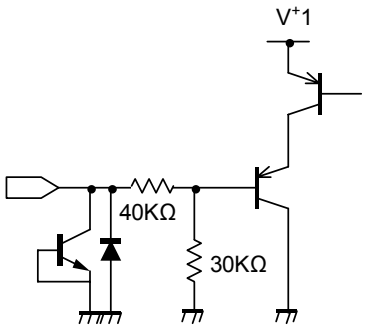
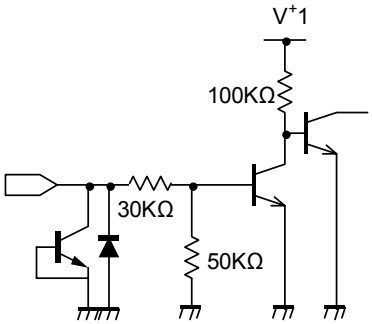
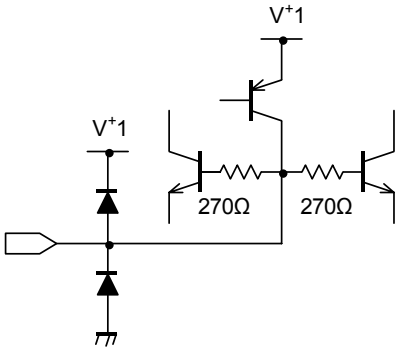
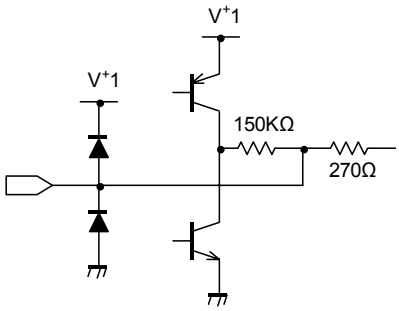
TERMINAL	CONTROL	NOTE
PS	H	Power save: OFF (Operation)
	L	Power save: ON (Mute)
	OPEN	Power save: ON (Mute)

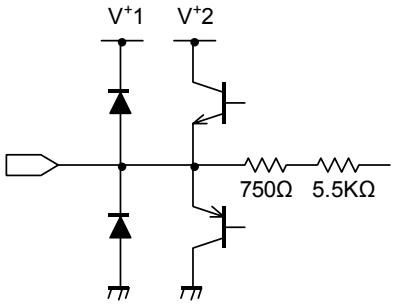
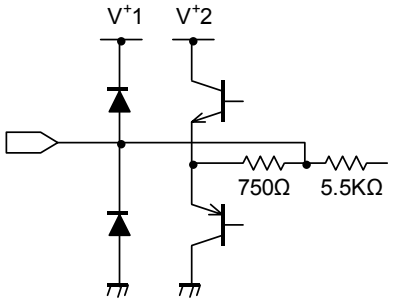
TERMINAL	CONTROL		NOTE
	SW1	SW2	
SW 1,SW2	L, OPEN	X	IN1 (X=don't care)
	H	L, OPEN	IN2
	H	H	IN3

TERMINAL	CONTROL	NOTE
SW 3	H	Y,Pb,Pr (CH1IN3: Sync Tip Clamp CH2IN3/CH3IN3: Bias)
	L	RGB (CH1IN3/CH2IN3/CH3IN3: Pedestal Clamp)
	OPEN	RGB (CH1IN3/CH2IN3/CH3IN3: Pedestal Clamp)

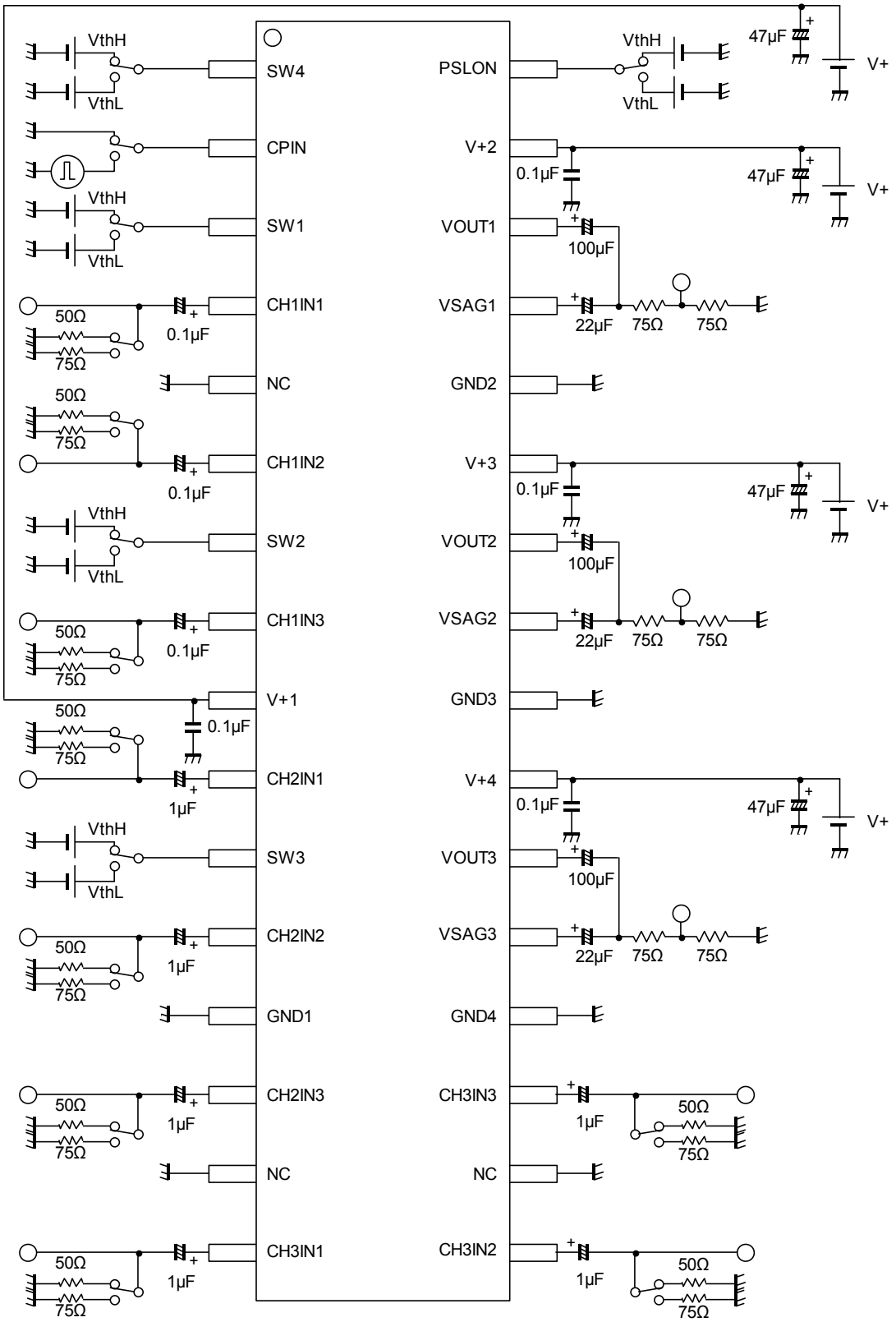
TERMINAL	CONTROL	NOTE
SW4	H	LPF
	L	Through
	OPEN	Through

■ **TERMINAL FUNCTION**

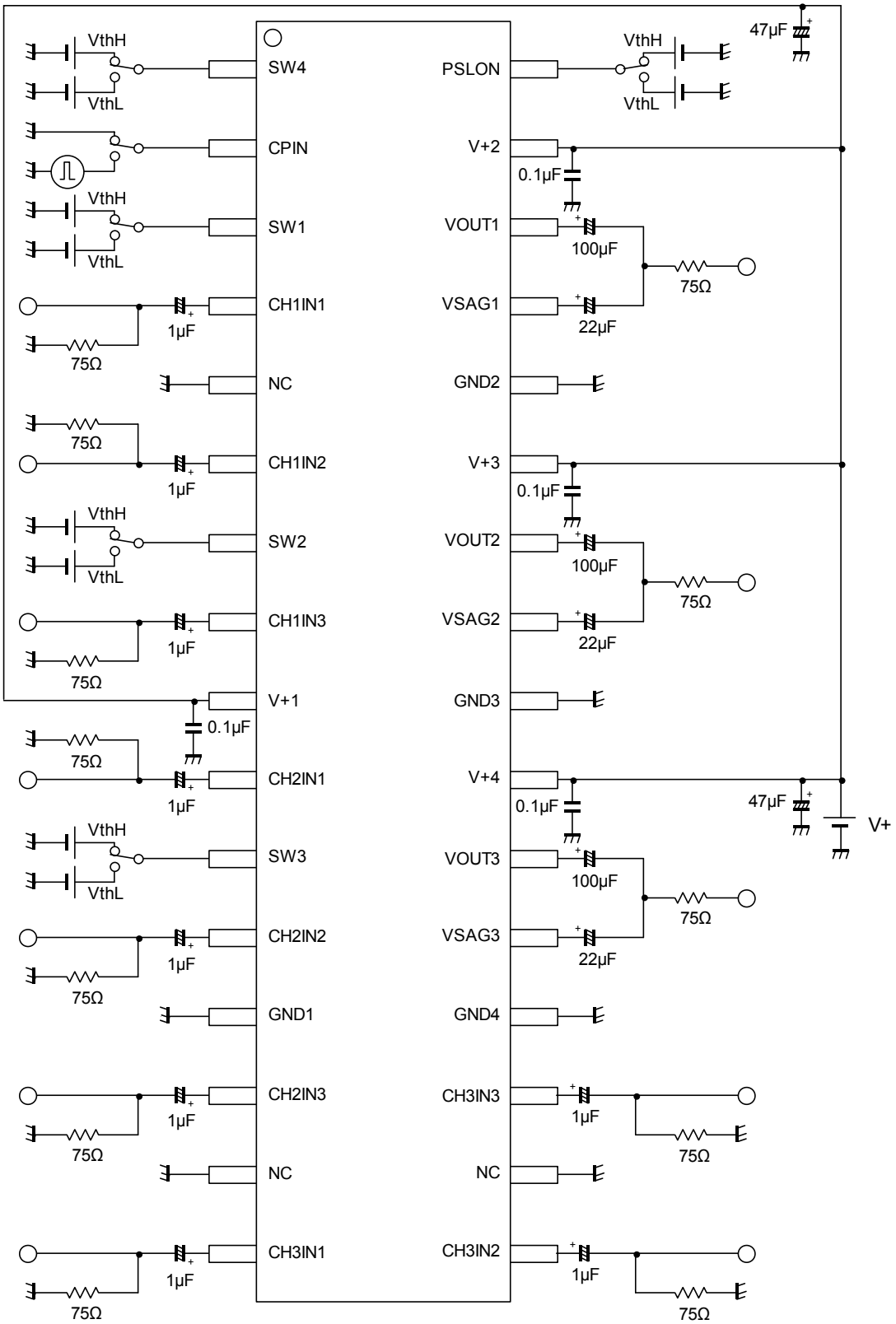
PIN No.	PIN NAME	FUNCTION	EQUIVALENT CIRCUIT	DC VOLTAGE
1 3 7 11	SW4 SW1 SW2 SW3	LPF/ THROUGH control terminal Input selector control 1 terminal Input selector control 2 terminal Y,Pb,Pr/ RGB control terminal		-
2 32	CP IN PSLON	CLAMP Pulse input terminal Power Save control terminal		-
4 6 8	CH1 IN1 CH1 IN2 CH1 IN3	Y/G input 1 terminal Y/G input 2 terminal Y/G input 3 terminal		Sync-chip clamp 2.0V Pedestal clamp 2.3V
10 12 14 16 17 19	CH2 IN1 CH2 IN2 CH2 IN3 CH3 IN1 CH3 IN2 CH3 IN3	Pb/ B input 1 terminal Pb/ B input 2 terminal Pb/ B input 3 terminal Pr/ R input 1 terminal Pr/ R input 2 terminal Pr/ R input 3 terminal		Bias 2.6V Pedestal clamp 2.3V

PIN No.	PIN NAME	FUNCTION	EQUIVALENT CIRCUIT	DC VOLTAGE
22 26 30	VOUT3 VOUT2 VOUT1	Output 3 terminal Output 2 terminal Output 1 terminal		Sync-chip clamp 1.2V Pedestal clamp 1.8V Bias 2.5V
21 25 29	VSAG3 VSAG2 VSAG1	Sag correction 3 terminal Sag correction 2 terminal Sag correction 1 terminal		1.9V
9 23 27 31	V^+1 V^+4 V^+3 V^+2	Supply voltage 1 terminal Supply voltage 4 terminal Supply voltage 3 terminal Supply voltage 2 terminal		-
13 20 24 28	GND1 GND4 GND3 GND2	GND 1 terminal GND 4 terminal GND 3 terminal GND 2 terminal		-

■ TEST CIRCUIT



■ APPLICATION CIRCUIT



■ APPLICATION

(1) Pedestal - clamp, Clamp - pulse (Terminal name: CH1IN3, CH2IN3, CH3IN3)

1. Select to pedestal - clamp (SW3: Low or OPEN) at RGB signal input.
   - Clamp - pulse input at back-porch period. (Refer Fig.A)
   - Clamp - pulse input in synchronous to input signal.
   - When used clamp-pulse, clamp-pulse keep going input in synchronous to input signal.

Clamp-pulse timing is following.

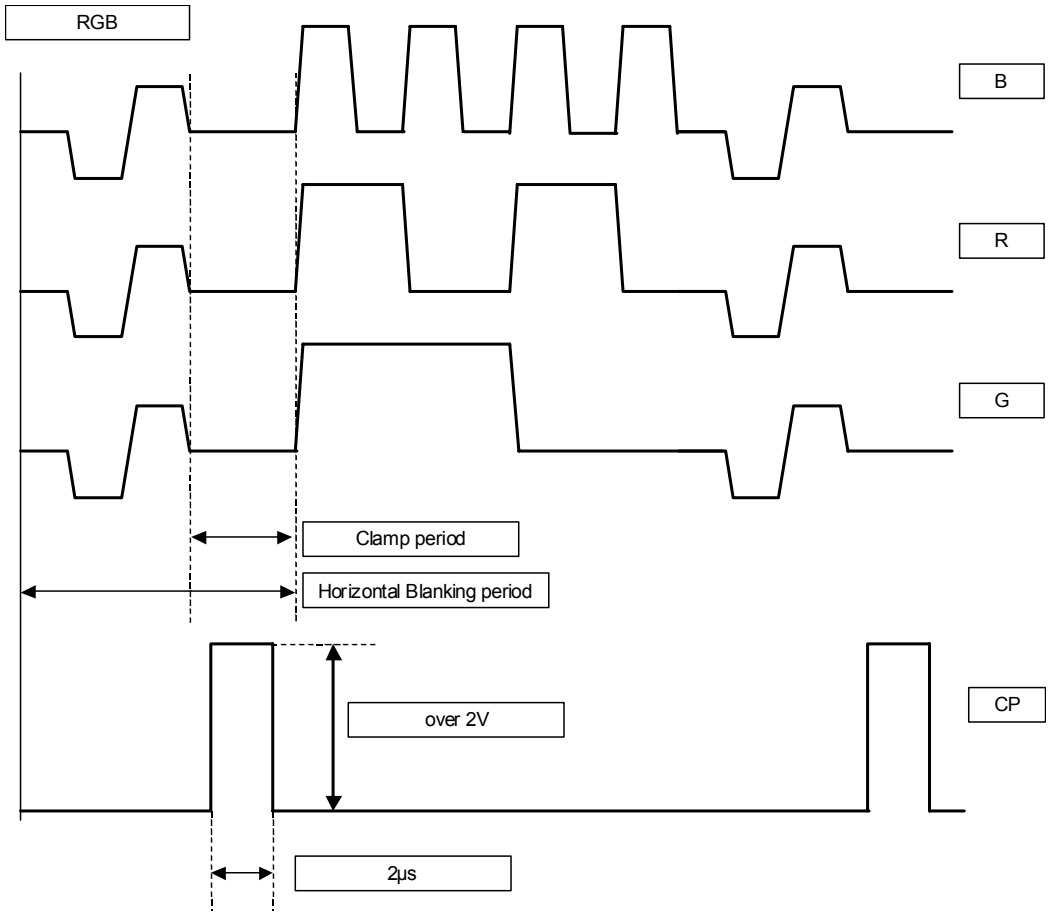


Fig.A: Clamp-pulse timing (RGB)

2. Select to sync- chip –clamp or bias (SW3: High) at component signal input.
   - When not used pedestal-clamp, clamp-pulse don't input.
     We recommend CPIN (pin2) connect to GND.

When clamp-pulse can not stopping:
   - Clamp - pulse input in synchronous to input signal. (Refer Fig.B)
   Note) When clamp-pulse isn't synchronous, come out possibility of over shoot or under shoot on video signal. (Refer Fig.C)

Clamp-pulse timing is following.

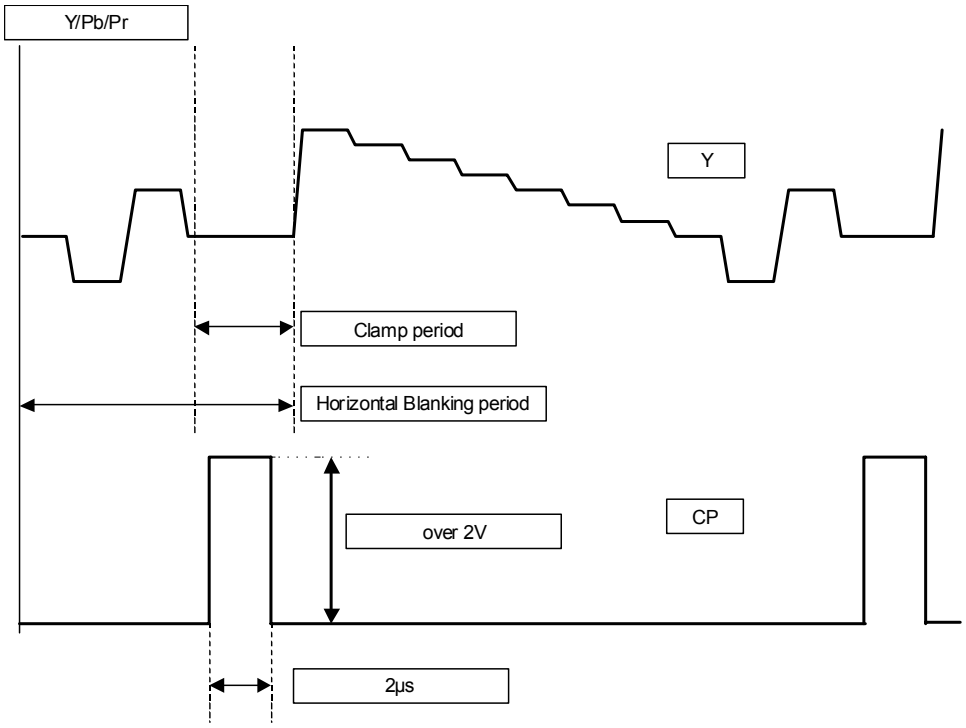


Fig.B: Clamp-pulse timing (at synchronous)

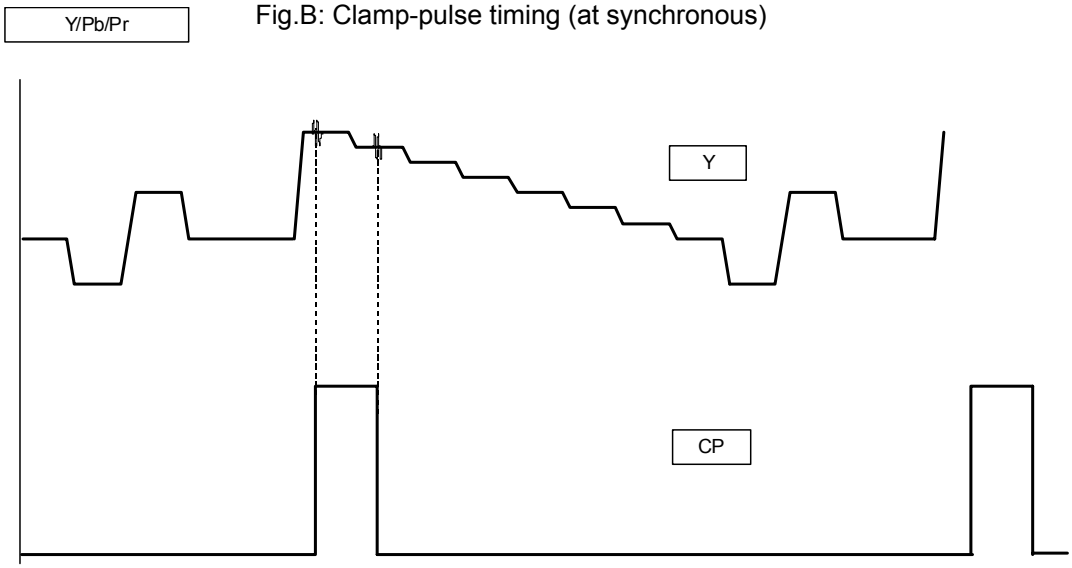


Fig.C: Clamp-pulse timing (at no-synchronous)

(2) Two-system output

We don't recommend driving the two-line load of 75Ω. (75Ω+75Ω // 75Ω+75Ω " Total load resistance = 75Ω “)
Adjust R_L of figure 2 referring to Figure 1 when two system outputs are necessary.
Cancel the SAG correction for the two-line drive. Connect the coupling capacitor after connecting the Vout pin and Vsag pin. The recommended value is 1000μF or more.

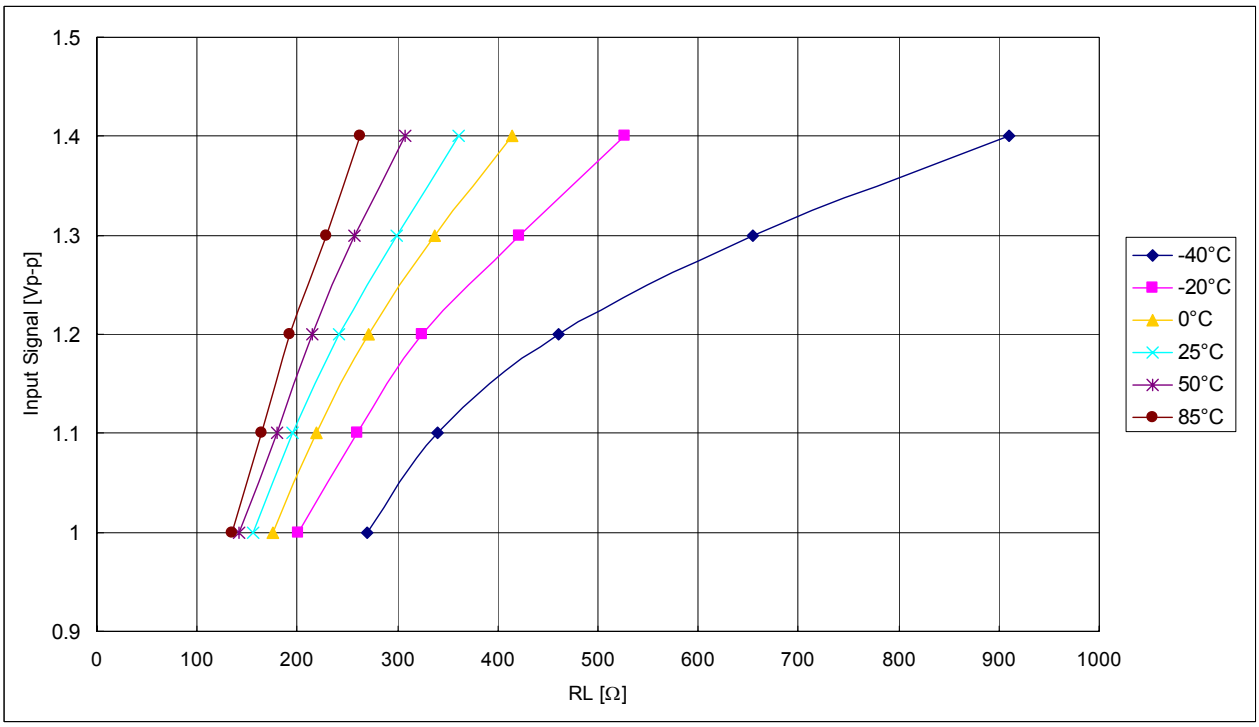


Figure 1 Input Signal vs. Load Resistance (R_L) Characteristic

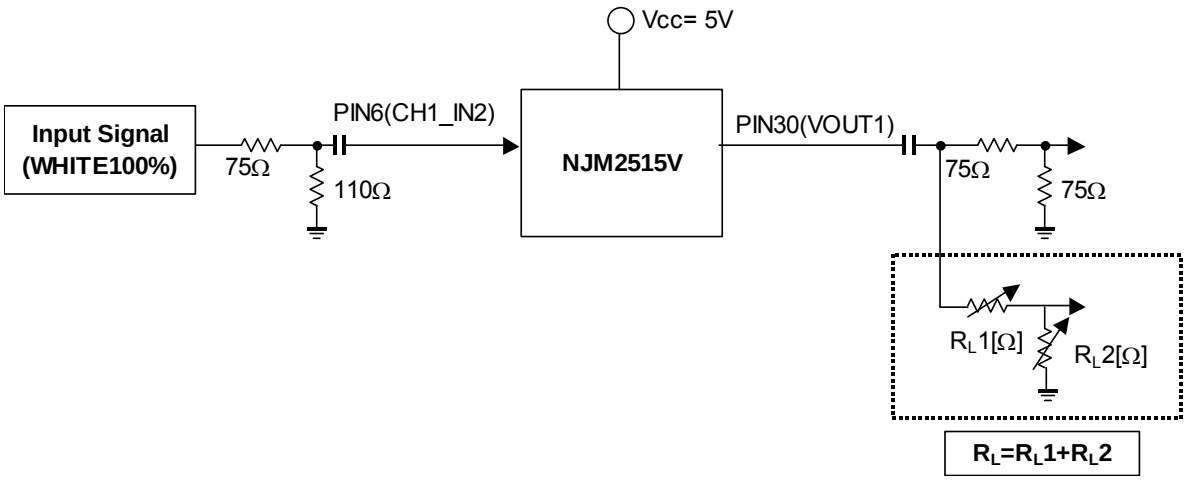
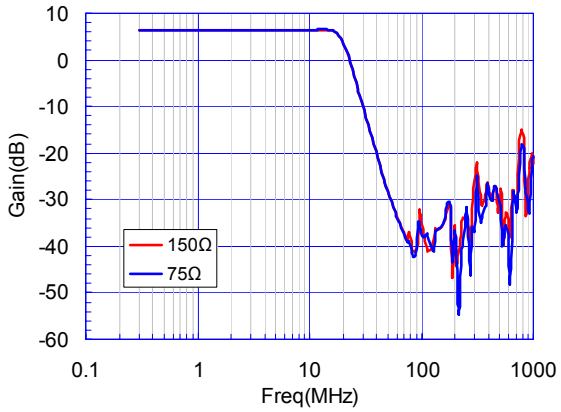


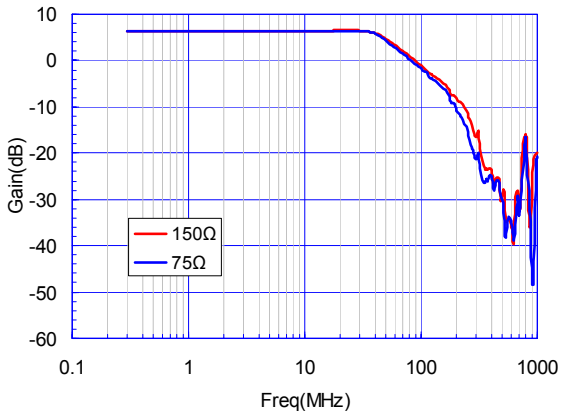
Figure 2 Test Circuit

■TYPICAL CHARACTERISTICS

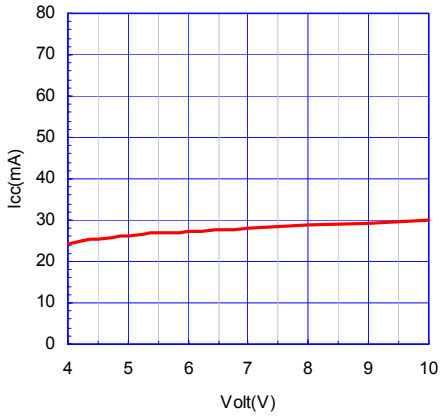
Voltage gain vs. Frequency
(Vin=1MHz,1.0Vp-p,LPF)



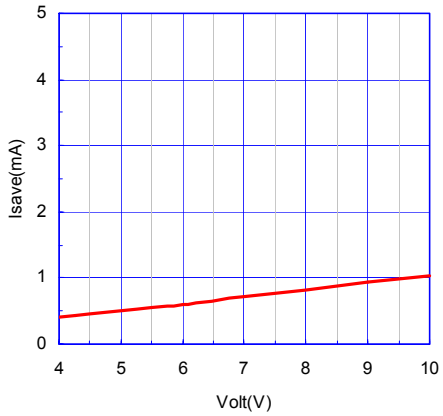
Voltage gain vs. Frequency
(Vin=1MHz,1.0Vp-p,non-LPF)



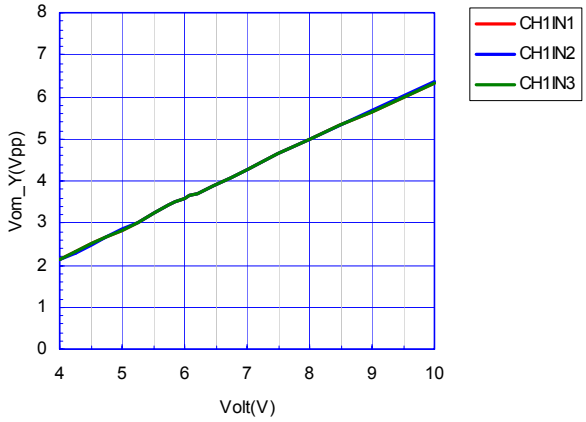
Operating current vs. Supply voltage
(Ta=25°C, No signal)



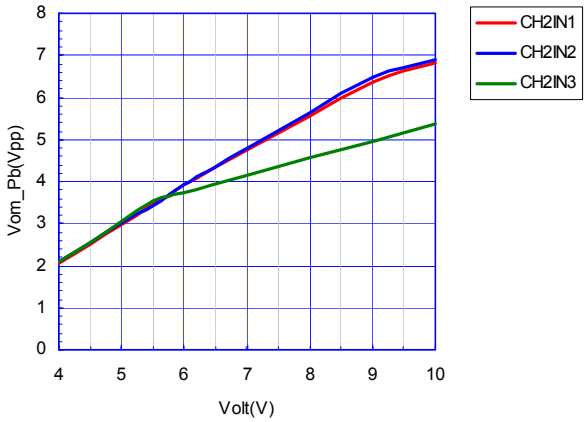
Operating current at Power save mode vs. Supply voltage
(Ta=25°C, No signal)



Maximum output level 1 vs. Supply voltage
(Ta=25°C, sync-tip clamp)

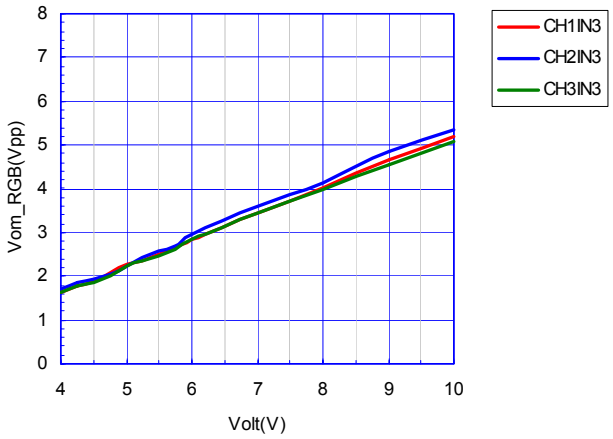


Maximum output level 2 vs. Supply voltage
(Ta=25°C, Pbin, bias)

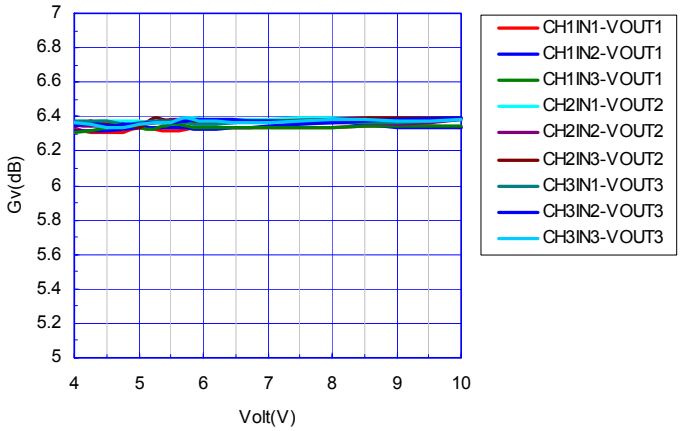


■TYPICAL CHARACTERISTICS

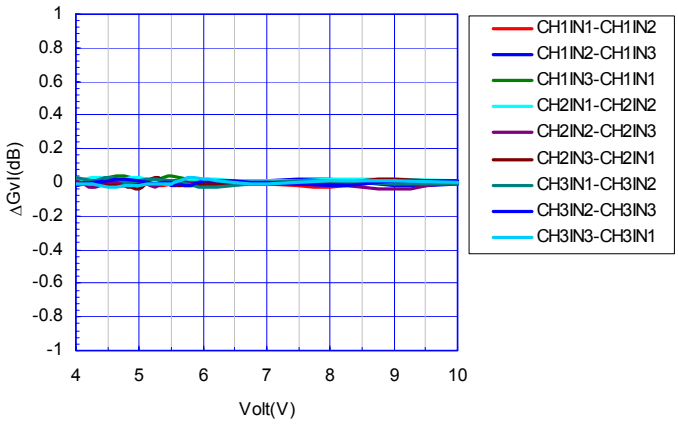
Maximum output level 3 vs. Supply voltage
(Ta=25°C, pedestal clamp)



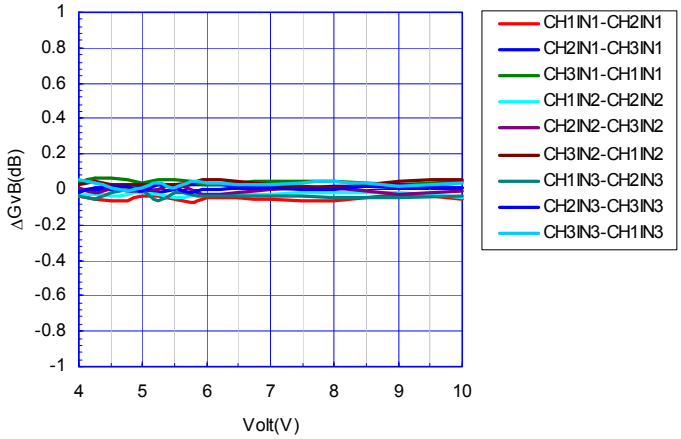
Voltage gain vs. Supply voltage
(Ta=25°C, Vin=1MHz,1.0Vp-p)



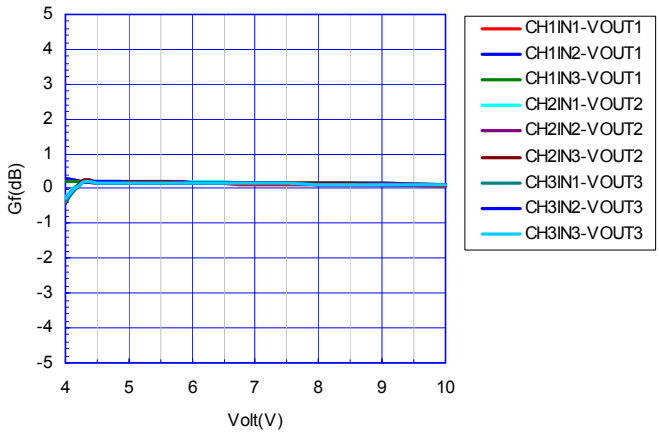
Voltage gain difference between input terminal
vs. Supply voltage
(Ta=25°C, Vin=1MHz,1.0Vp-p)



Voltage gain difference between channel
vs. Supply voltage
(Ta=25°C, Vin=1MHz,1.0Vp-p)

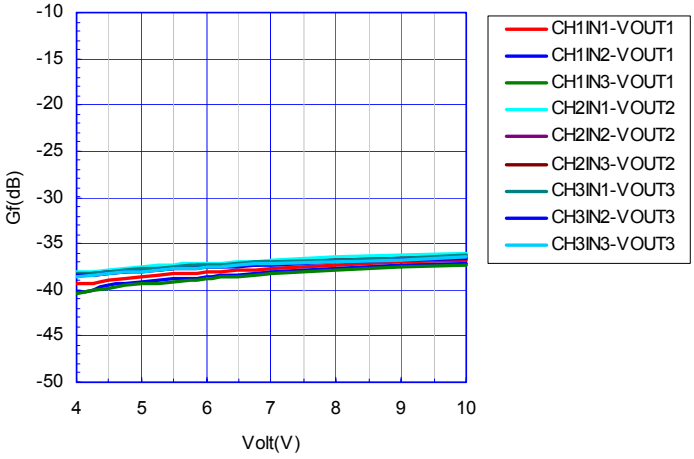


LPF vs. Supply voltage
(Ta=25°C, Vin=13.5MHz/1MHz,1.0Vp-p)

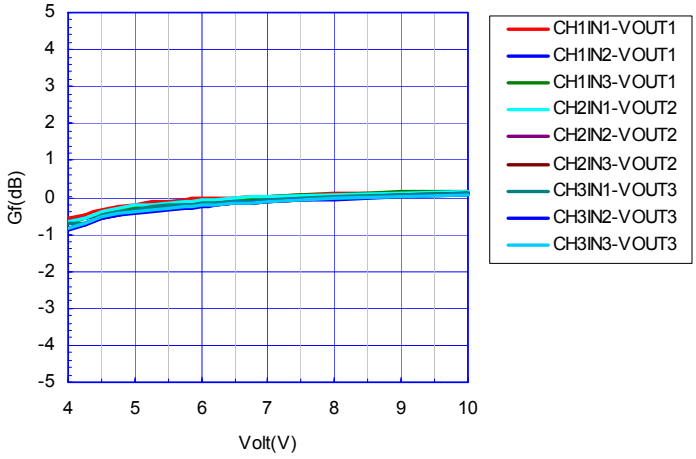


■TYPICAL CHARACTERISTICS

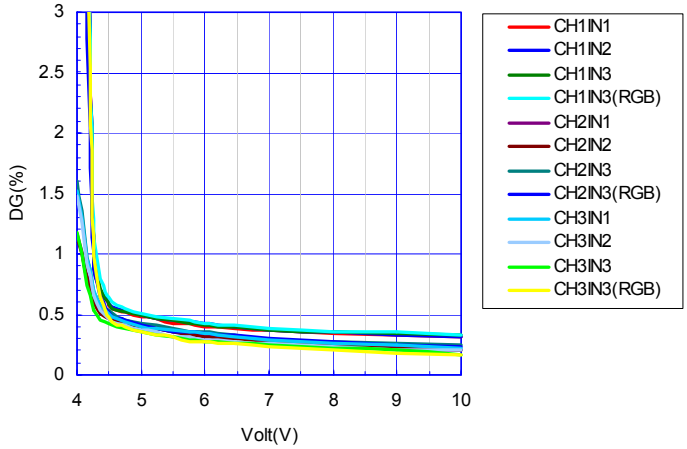
LPF vs. Supply voltage
(Ta=25°C, Vin=54MHz/1MHz,1.0Vp-p)



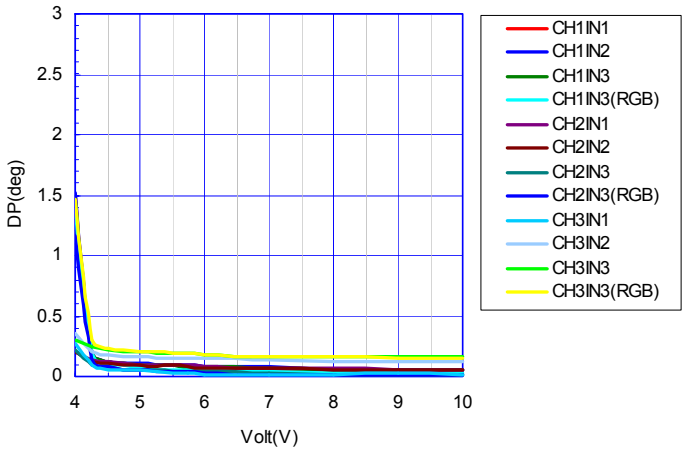
LPF vs. Supply voltage
(Ta=25°C, Vin=34MHz/1MHz,1.0Vp-p,non-LPF)



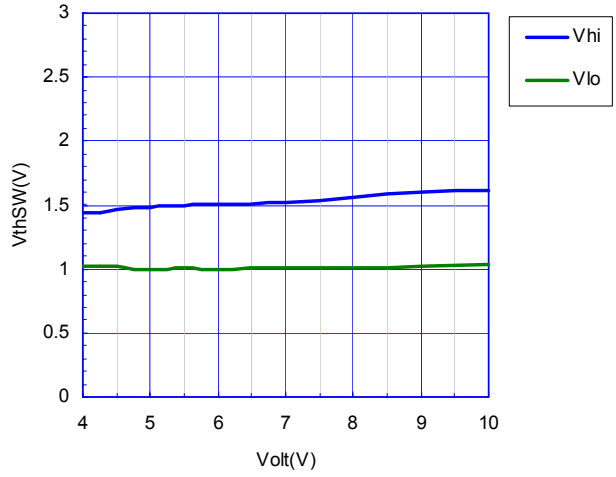
DG vs. Supply voltage
(Ta=25°C, Vin=1.0Vp-p,10STEP)



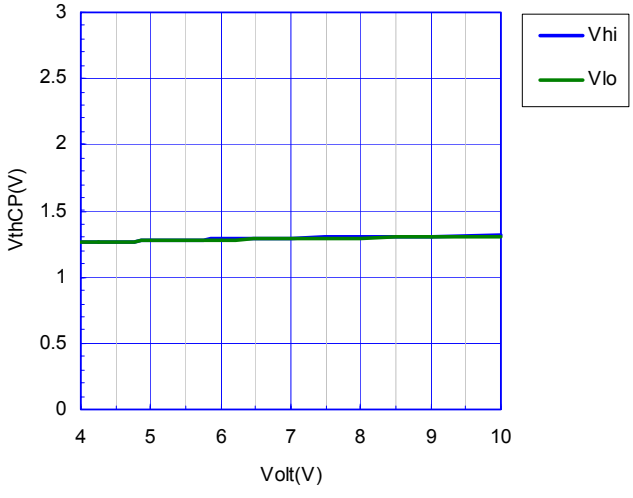
DP vs. Supply voltage
(Ta=25°C, Vin=1.0Vp-p,10STEP)



SW voltage vs. Supply voltage
(Ta=25°C)

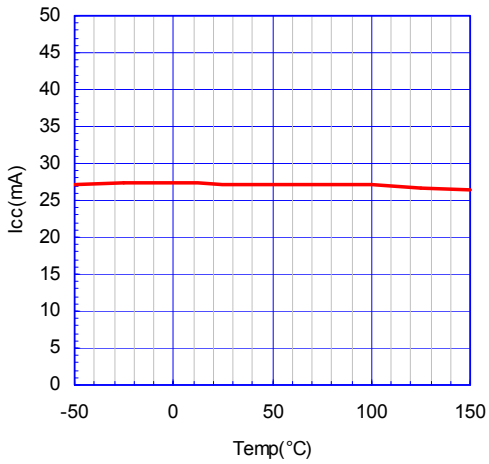


CP input level vs. Supply voltage
(Ta=25°C)

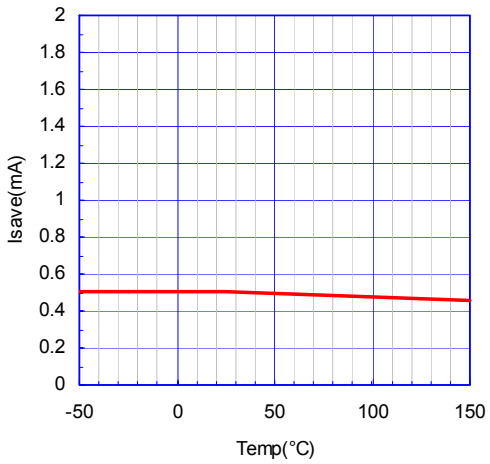


■TYPICAL CHARACTERISTICS

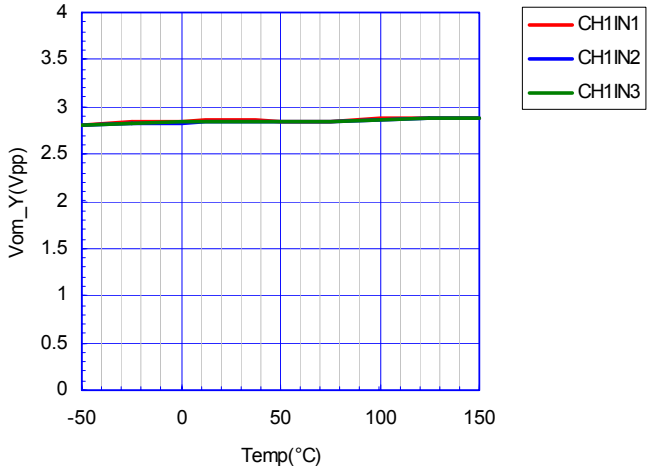
Operating current vs. Temperature
(Vcc=5V,No signal)



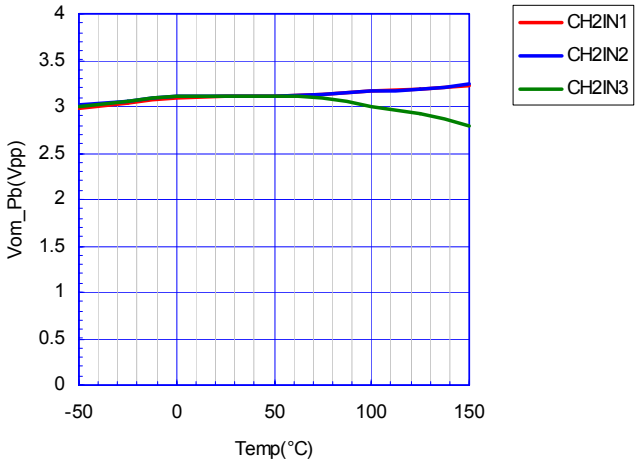
Operating current at Power save mode vs. Temperature
(Vcc=5V,No signal)



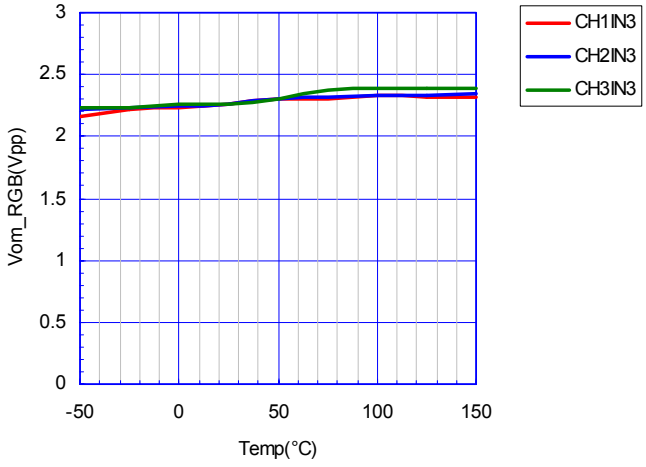
Maximum output level 1 vs. Temperature
(Vcc=5V,sync-tip clamp)



Maximum output level 2 vs. Temperature
(Vcc=5V,Pbin, Bias)

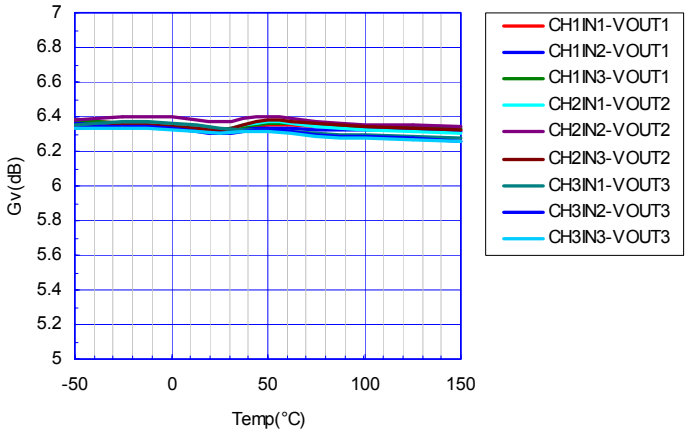


Maximum output level 3 vs. Temperature
(Vcc=5V, pedestal clamp)

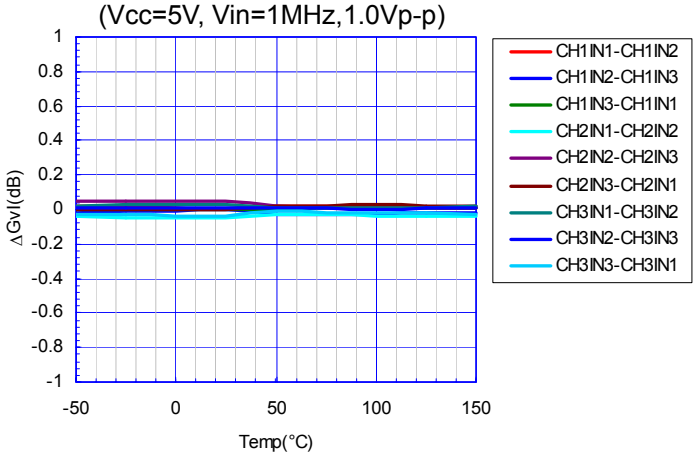


■TYPICAL CHARACTERISTICS

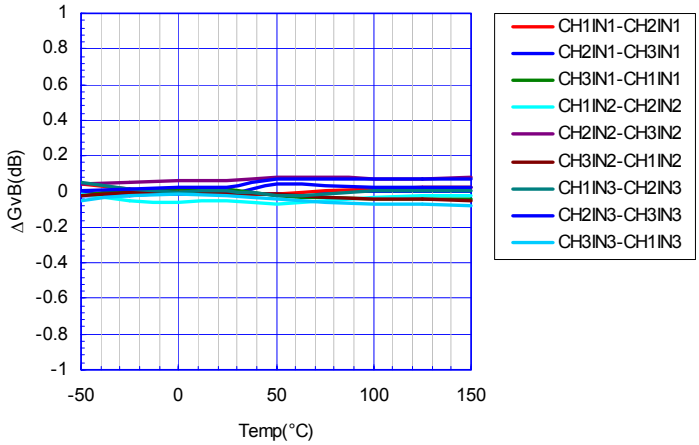
Voltage gain vs. Temperature
(Vcc=5V, Vin=1MHz,1.0Vp-p)



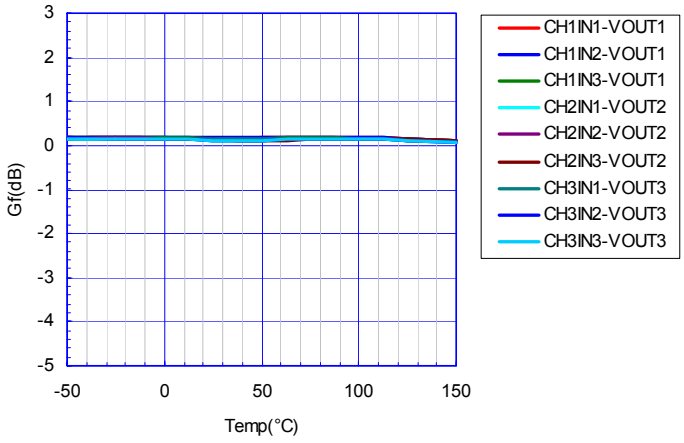
Voltage gain difference between input terminal
vs. Temperature
(Vcc=5V, Vin=1MHz,1.0Vp-p)



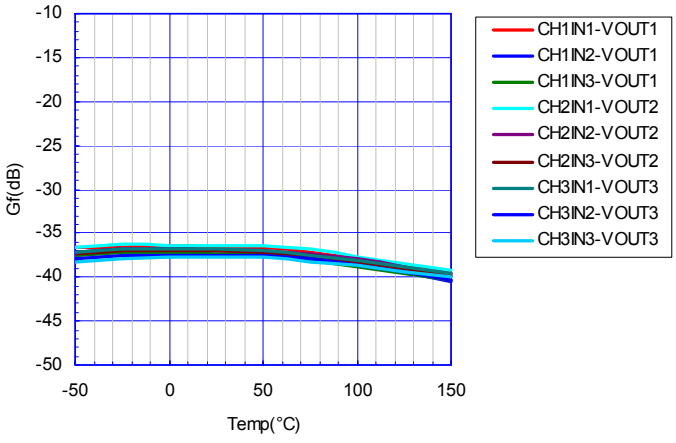
Voltage gain difference between channel
vs. Temperature
(Vcc=5V, Vin=1MHz,1.0Vp-p)



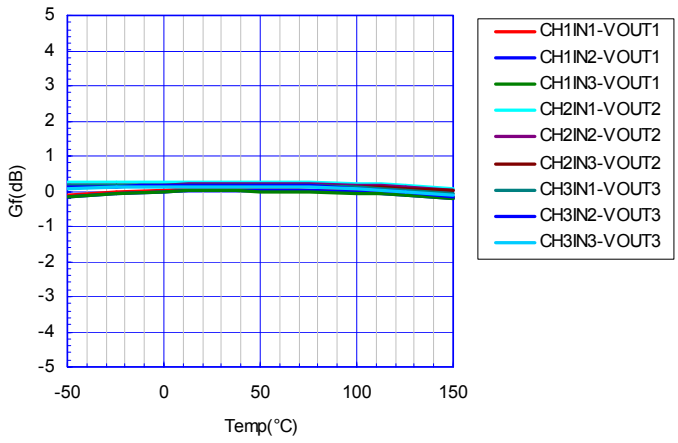
LPF vs. vs. Temperature
(Vcc=5V, Vin=13.5MHz/1MHz,1.0Vp-p)



LPF vs. Temperature
(Vcc=5V, Vin=54MHz/1MHz,1.0Vp-p)

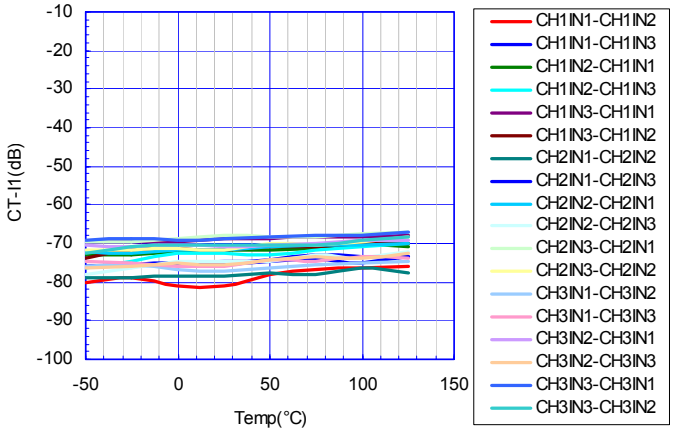


Frequency at LPF through mode vs. Temperature
(Vcc=5V, Vin= 34MHz/1MHz,1.0Vp-p)

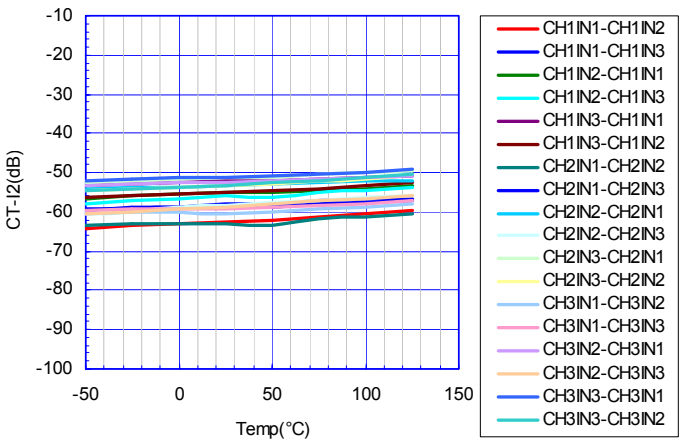


■TYPICAL CHARACTERISTICS

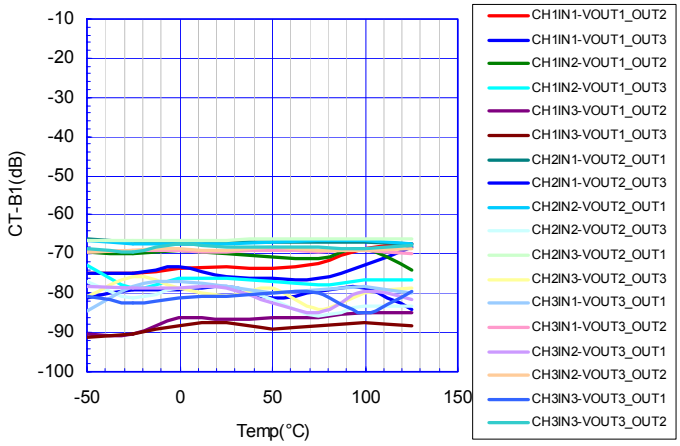
Cross talk vs. Temperature
(Vcc=5V, Vin=4.43MHz,1.0Vp-p at input terminal)



Cross talk vs. Temperature
(Vcc=5V, Vin=30MHz,1.0Vp-p at input terminal)



Cross talk vs. Temperature
(Vcc=5V, Vin=4.43MHz,1.0Vp-p at channel)



Cross talk vs. Temperature
(Vcc=5V, Vin=30MHz,1.0Vp-p at channel)