

## LOW VOLTAGE VIDEO AMPLIFIER WITH LPF

### ■ GENERAL DESCRIPTION

The NJW1351 is a Low Voltage Video Amplifier with LPF circuit. By the internal charge pump circuit, output capacitor is unnecessary.

The NJW1351 features low power and small package, and is suitable for low power design on downsizing of portable video system and system with video output.

Moreover, the following voltage gain variations are arranged.

- NJW1350 (Gain=12dB)
- NJW1352 (Gain=9dB)
- NJW1353 (Gain=16dB)

### ■ PACKAGE OUTLINE



**NJW1351RB1**  
**MSOP8(TVSP8)**



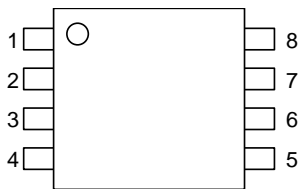
**NJW1351KK1**

### ■ FEATURES

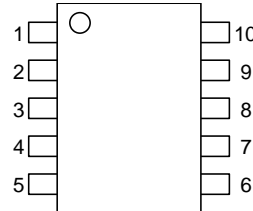
- Operating Voltage                    2.5 to 3.45V
- Output coupling capacitor-less
- 6dB amplifier
- Internal 75Ω Driver Circuit (2-system drive)
- 6<sup>th</sup> order LPF                         -38dB at 19MHz typ
- Power Save Circuit
- Bi-CMOS Technology
- Package Outline                        MSOP8(TVSP8)\*, SON10

\*MEET JEDEC MO-187-DA / THIN TYPE

### ■ PIN CONFIGURATION

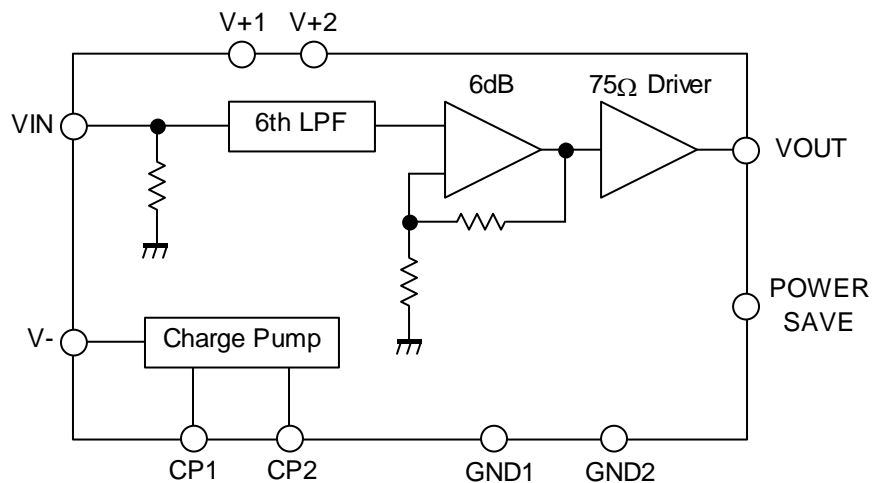


NJW1351RB1 (MSOP8)



NJW1351KK1 (SON10)

### ■ BLOCK DIAGRAM



(NOTE)

TVSP8: V+1 and V+2 are the same pins, and GND1 and GND2 are the same pins.

# NJW1351

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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	3.55	V
Power Dissipation	P <sub>D</sub>	MSOP8(TVSP8):320 SON10:250	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +125	°C

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

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

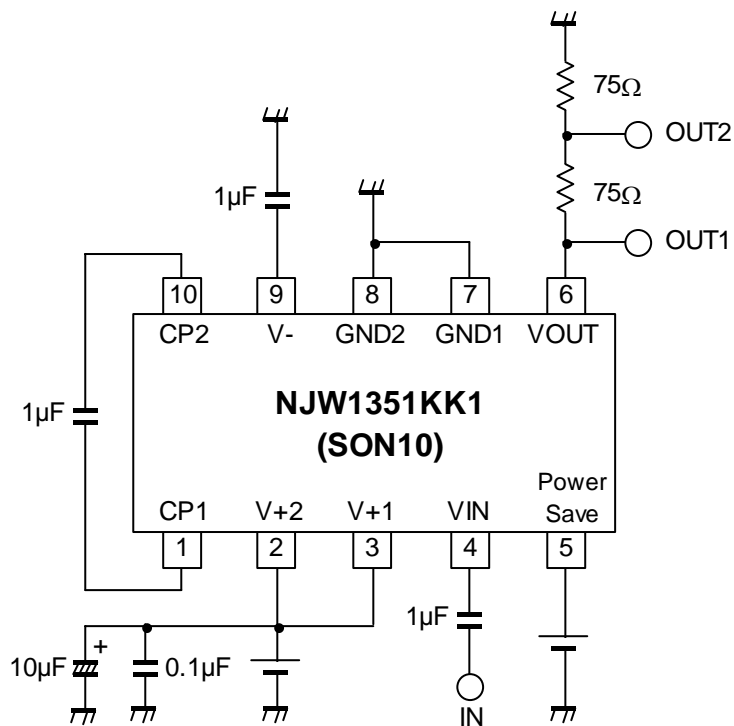
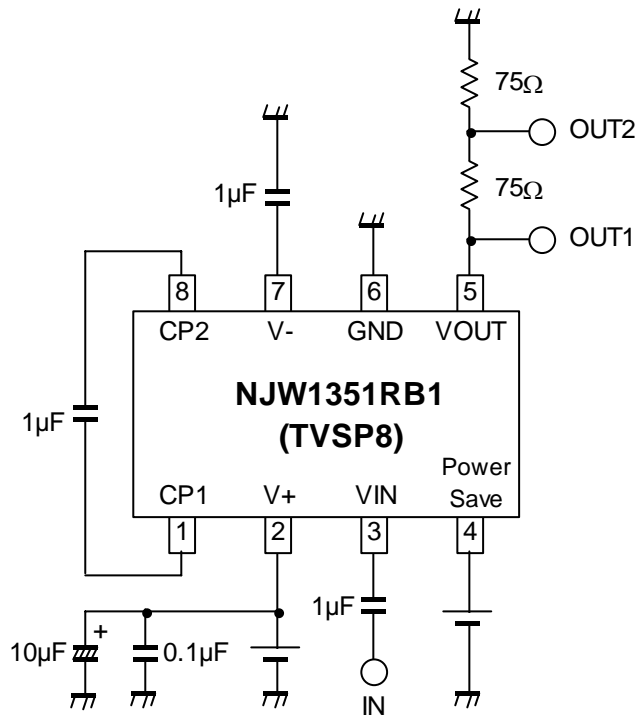
## ■ ELECTRICAL CHARACTERISTICS (V<sup>+</sup>=3.0V, R<sub>L</sub>=150Ω, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I <sub>CC</sub>	No Signal	-	14.0	20.0	mA
Operating Current at Power Save	I <sub>save</sub>	No Signal, Power Save Mode	-	0	1.0	μA
Maximum Output Voltage Swing	V <sub>om</sub>	f=100kHz, THD=1%	4.5	5.2	-	V <sub>p-p</sub>
Voltage Gain	G <sub>v</sub>	V <sub>in</sub> =100kHz, 1.0V <sub>p-p</sub> , Input Sine Signal	6.0	6.4	6.8	dB
Low Pass Filter Characteristic	G <sub>fy</sub> 4.5M	V <sub>in</sub> =4.5MHz/100kHz, 1.0V <sub>p-p</sub>	-0.75	-0.05	0.25	dB
	G <sub>fy</sub> 8M	V <sub>in</sub> =8MHz/100kHz, 1.0V <sub>p-p</sub>	-7.0	-3.0	-1.0	
	G <sub>fy</sub> 19M	V <sub>in</sub> =19MHz/100kHz, 1.0V <sub>p-p</sub>	-	-38	-23	
Differential Gain	DG	V <sub>in</sub> =1.0V <sub>p-p</sub> , 10step Video Signal	-	0.5	-	%
Differential Phase	DP	V <sub>in</sub> =1.0V <sub>p-p</sub> , 10step Video Signal	-	0.5	-	deg
S/N Ratio	SN <sub>v</sub>	100kHz to 6MHz, V <sub>in</sub> =1.0V <sub>p-p</sub> 100% White Video Signal, R <sub>L</sub> =75Ω	-	+70	-	dB
Switching Noise Level	N <sub>swpl</sub>	R <sub>L</sub> =75Ω, 10% White Video Signal input	-	4.0	7.0	mV <sub>pp</sub>
2nd. Distortion	H <sub>v</sub>	V <sub>in</sub> =1.0V <sub>p-p</sub> , Sine Signal , 3.58MHz, R <sub>L</sub> =75Ω	-	-60	-	dB
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
Power Save	H	Power Save: OFF
	L	Power Save: ON (Mute)
	OPEN	Power Save: ON (Mute)

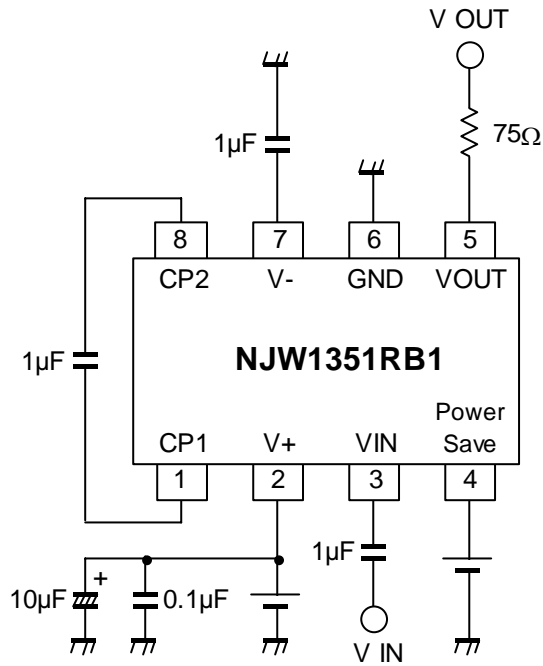
## ■ TEST CIRCUIT



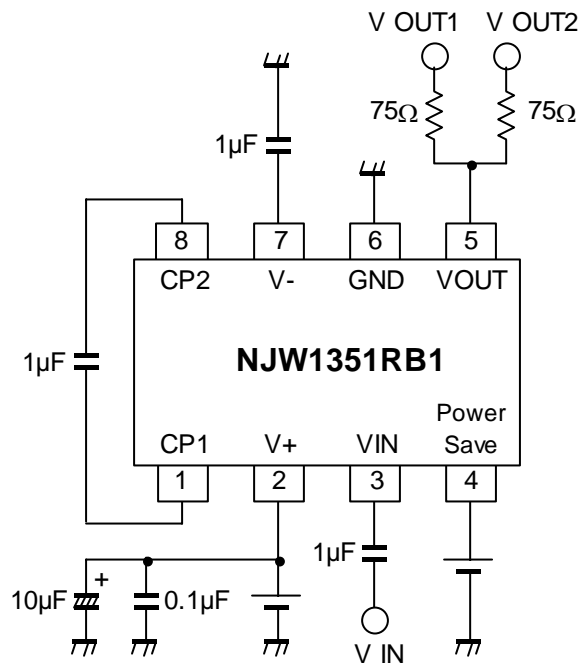
# NJW1351

## APPLICATION CIRCUIT (TVSP8)

### (1) Standard circuit



### (2) Two-line driving circuit



## ■ PIN FUNCTION (TVSP8)

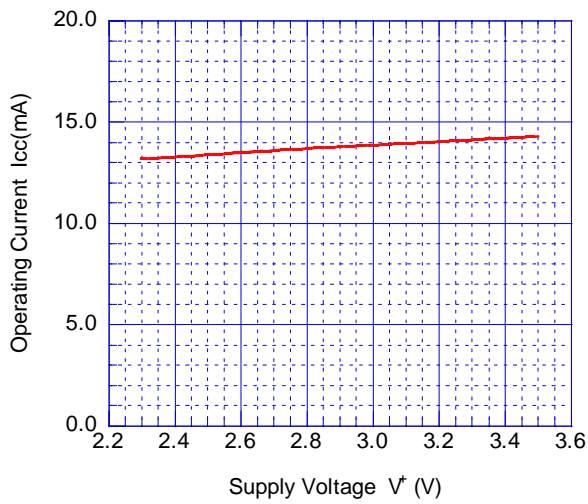
PIN NO.	PIN NAME	INSIDE EQUIVALENT CIRCUIT
1	CP1	
2	V <sup>+</sup>	-
3	V <sub>in</sub>	
4	Power Save	
5	V <sub>out</sub>	
6	GND	-
7	V <sup>-</sup>	-
8	CP2	

## ■ PIN FUNCTION(SON10)

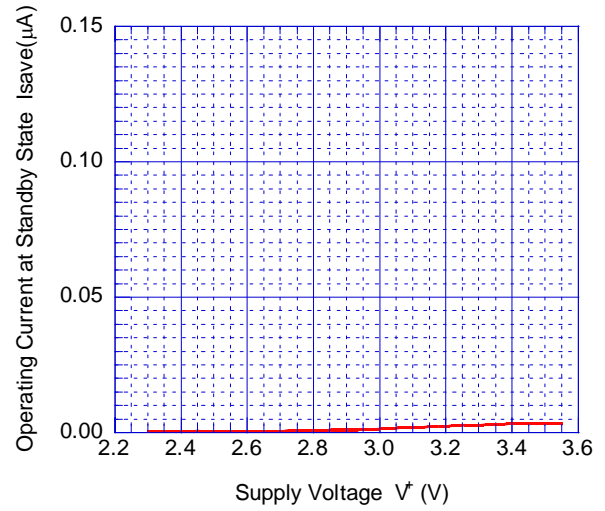
PIN NO.	PIN NAME	INSIDE EQUIVALENT CIRCUIT
1	CP1	
2,3	V+2,V+1	-
4	Vin	
5	Power Save	
6	Vout	
7,8	GND1,GND2	-
9	V-	-
10	CP2	

## ■ TYPICAL CHARACTERISTICS

Operating Current vs. Supply Voltage

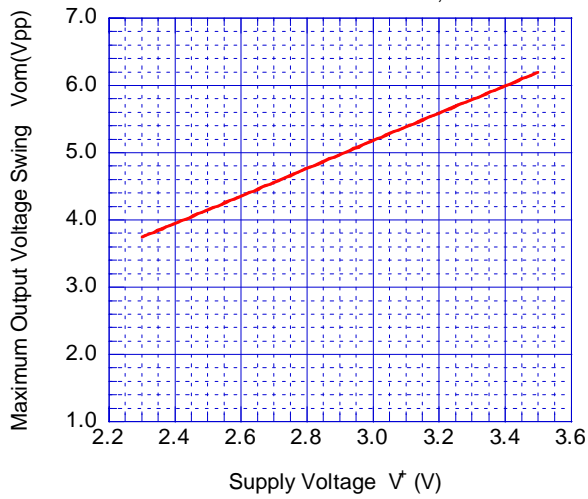


Operating Current at Standby State vs. Supply Voltage



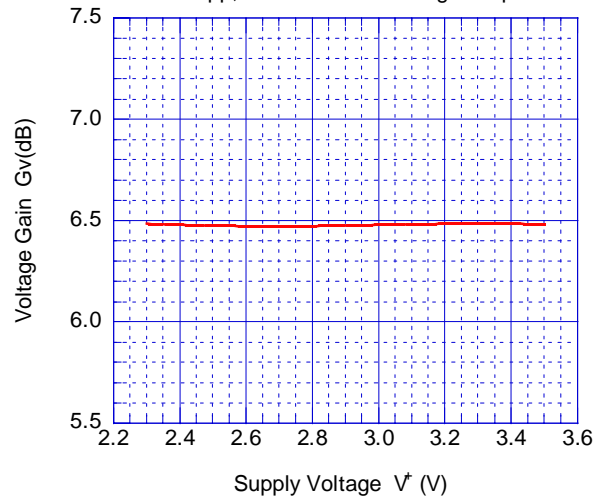
Maximum Output Voltage Swing vs. Supply Voltage

Total Harmonic Distortion=1%, 100kHz



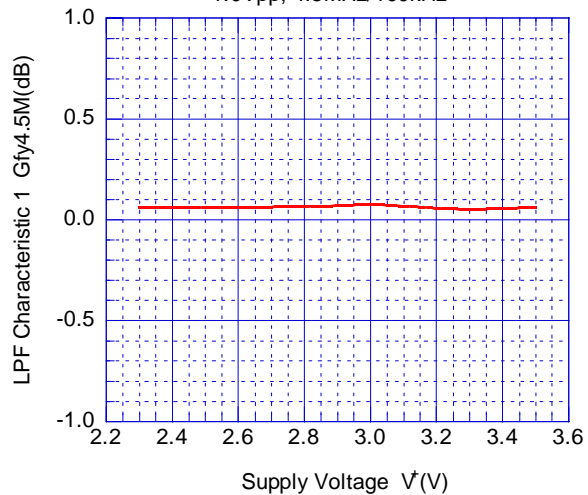
Voltage Gain vs. Supply Voltage

1.0Vpp, 100kHz sinewave signal input



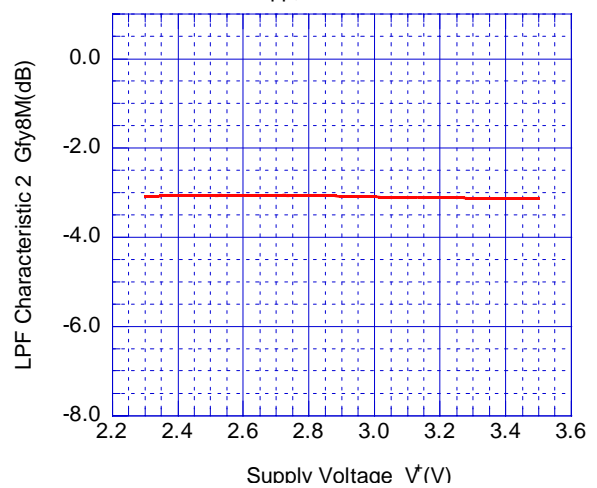
Low Pass Filter Characteristic 1 vs. Supply Voltage

1.0Vpp, 4.5MHz/100kHz



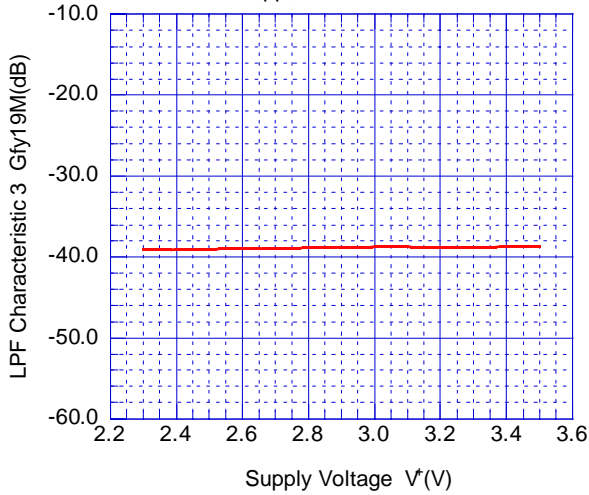
Low Pass Filter Characteristic 2 vs. Supply Voltage

1.0Vpp, 8MHz/100kHz

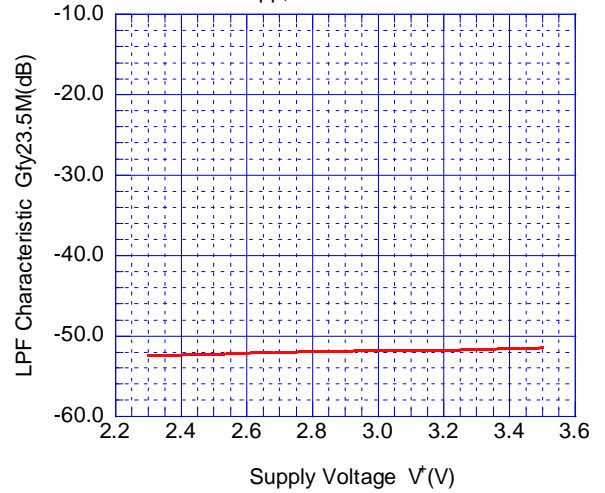


## TYPICAL CHARACTERISTICS

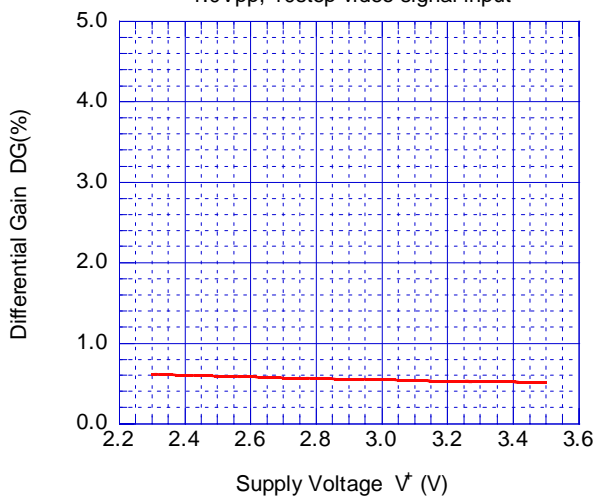
Low Pass Filter Characteristic 3 vs. Supply Voltage  
1.0Vpp, 19MHz/100kHz



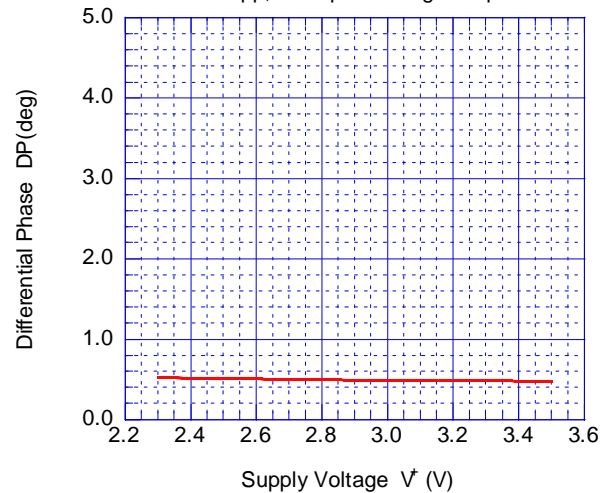
Low Pass Filter Characteristic vs. Supply Voltage  
1.0Vpp, 23.5MHz/100kHz



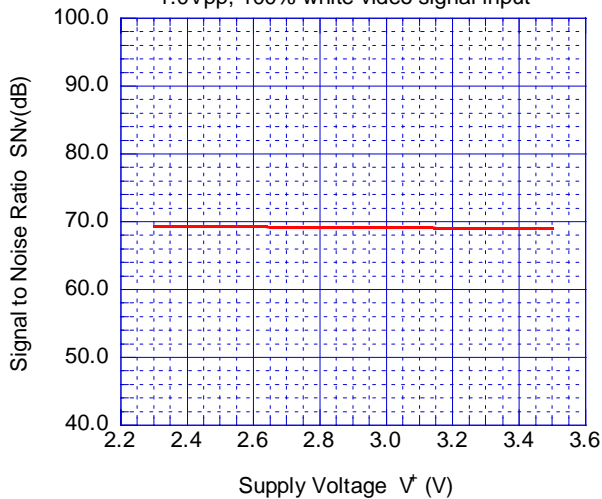
Differential Gain vs. Supply Voltage  
1.0Vpp, 10step video signal input



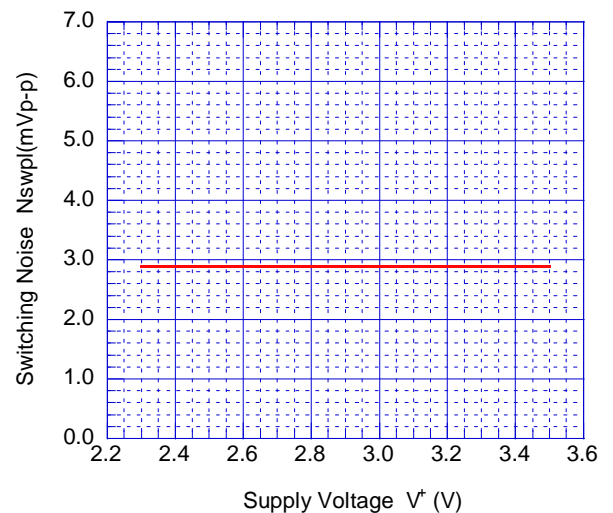
Differential Phase vs. Supply Voltage  
1.0Vpp, 10step video signal input



Signal to Noise Ratio vs. Supply Voltage  
1.0Vpp, 100% white video signal input

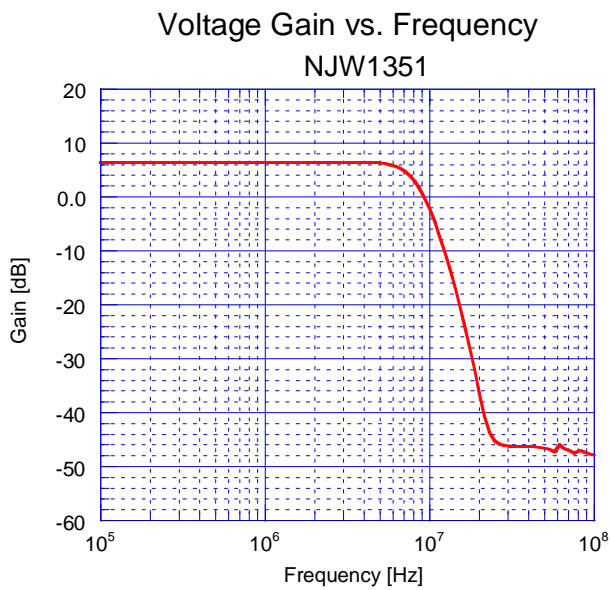
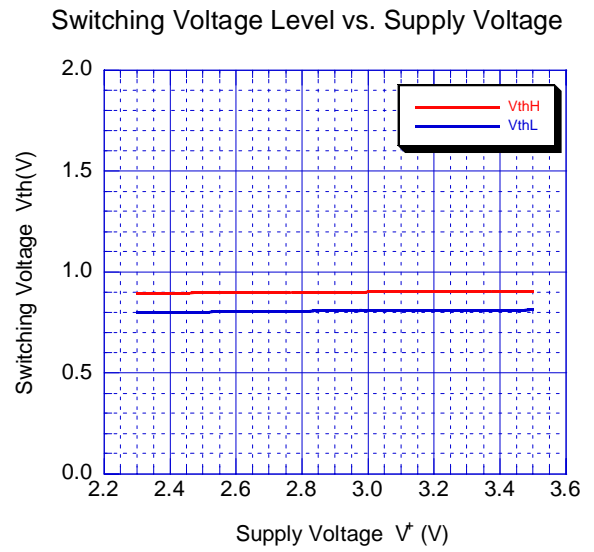
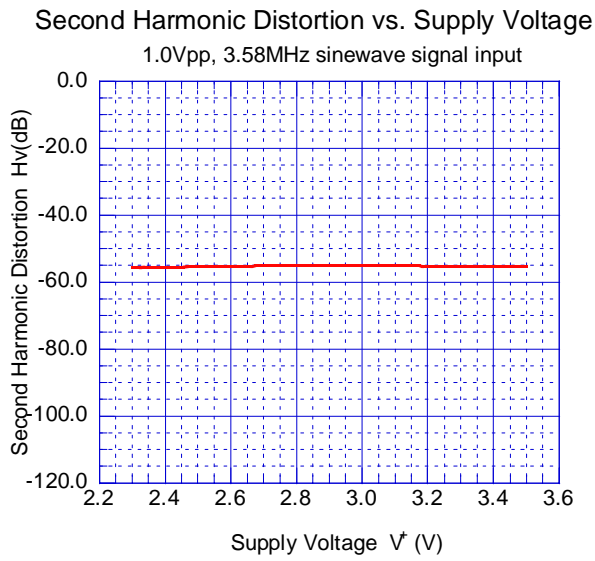


Switching Noise Level vs. Supply Voltage



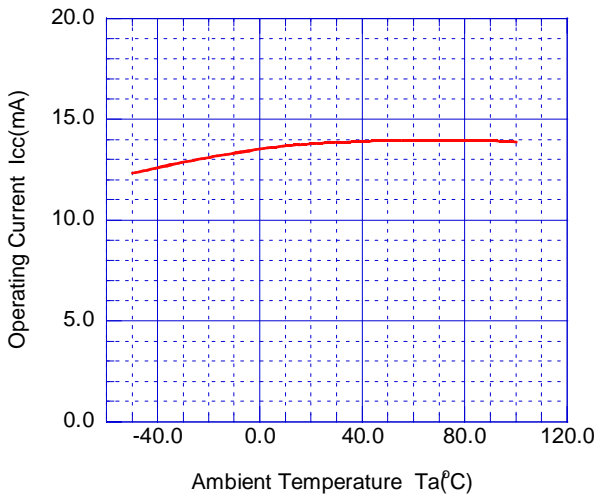


## TYPICAL CHARACTERISTICS

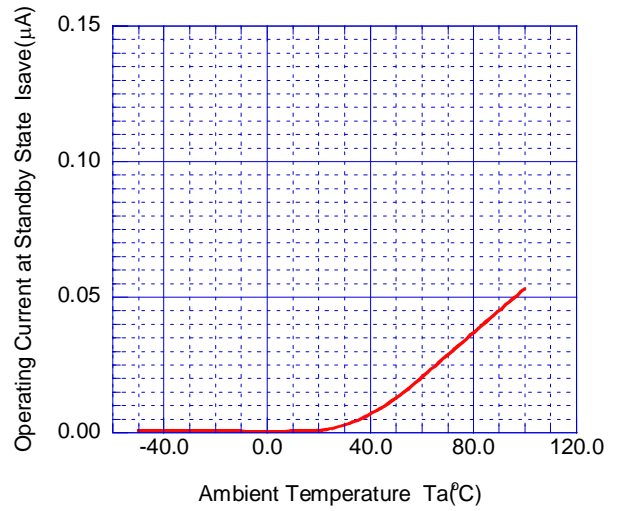


## TYPICAL CHARACTERISTICS

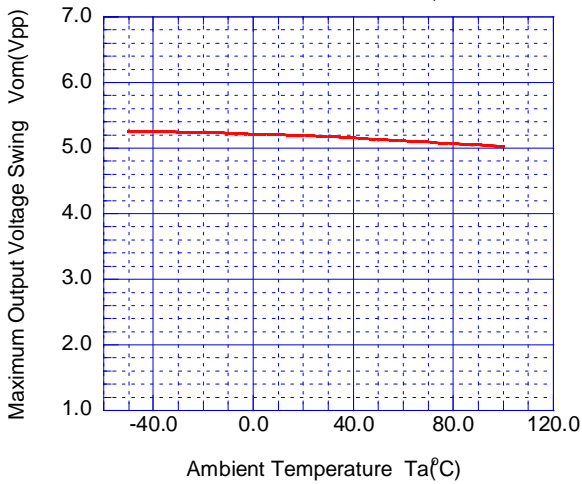
Operating Current vs. Temperature



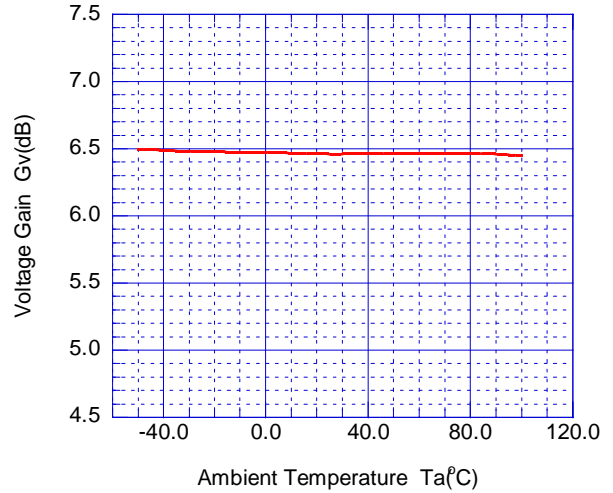
Operating Current at Standby State vs. Temperature



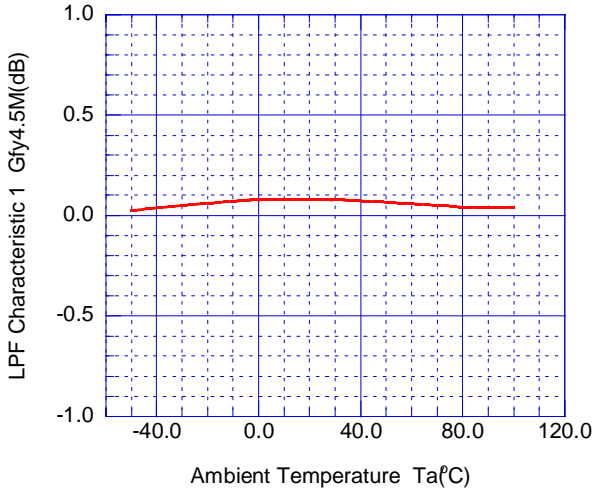
Maximum Output Voltage Swing vs. Temperature  
Total Harmonic Distortion=1%, 100kHz



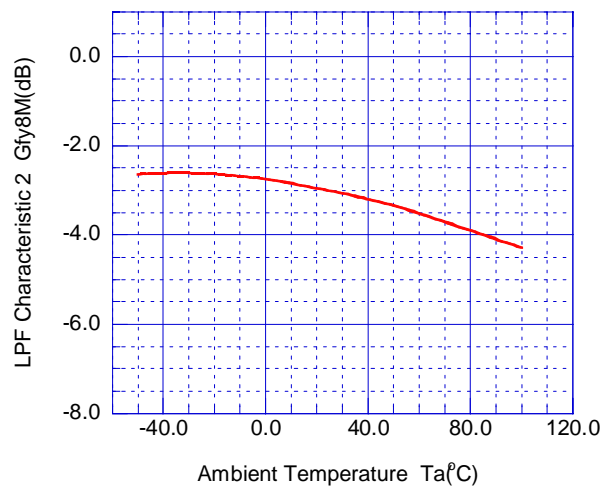
Voltage Gain vs. Temperature  
1.0Vpp, 100kHz sinewave signal input



Low Pass Filter Characteristic 1 vs. Temperature  
1.0Vpp, 4.5MHz/100kHz

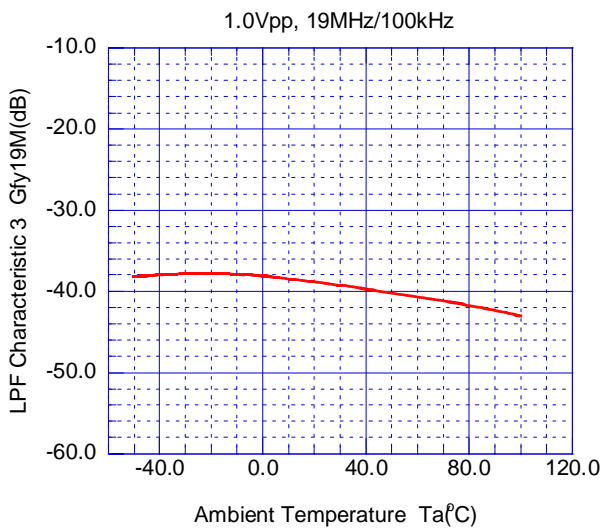


Low Pass Filter Characteristic 2 vs. Temperature  
1.0Vpp, 8MHz/100kHz

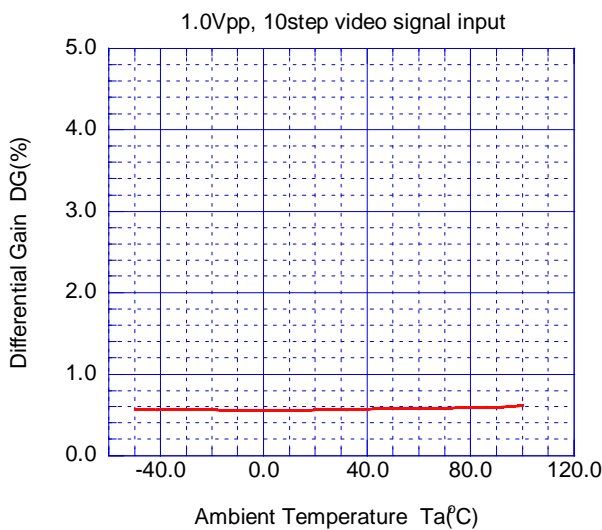


## TYPICAL CHARACTERISTICS

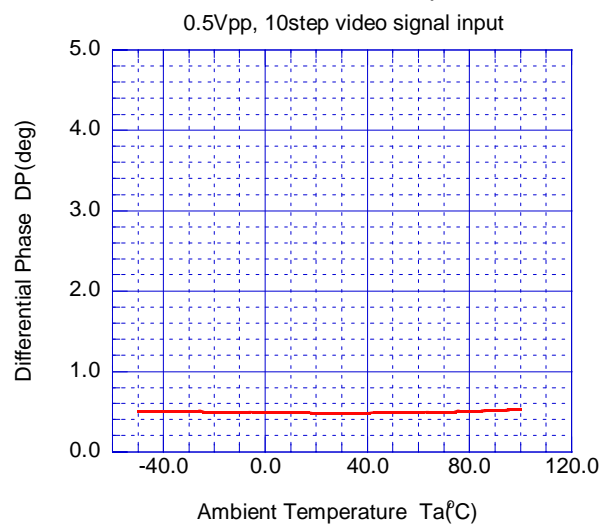
Low Pass Filter Characteristic 3 vs. Temperature



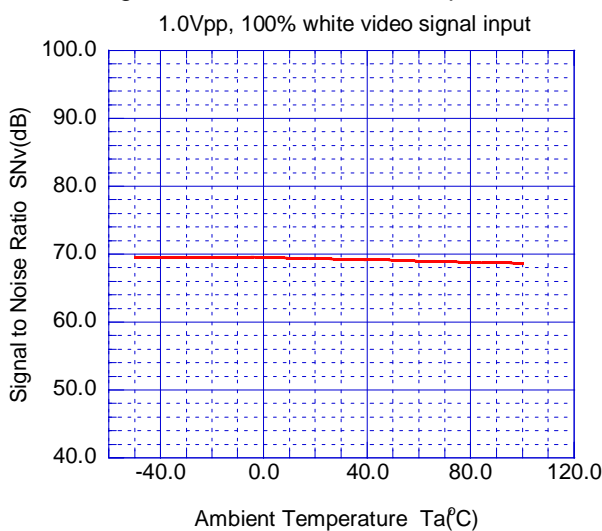
Differential Gain vs. Temperature



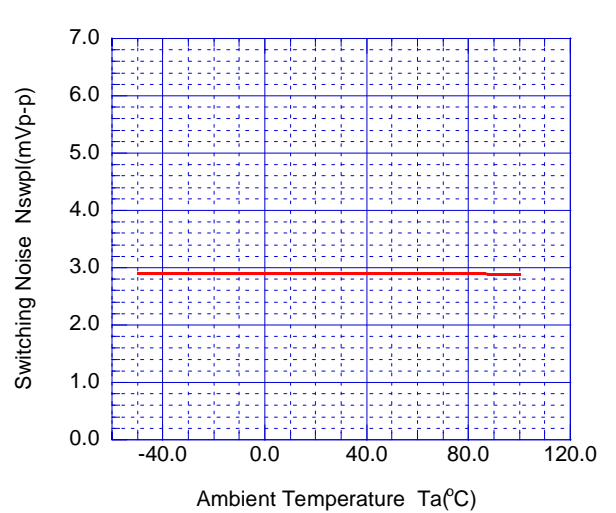
Differential Phase vs. Temperature



Signal to Noise Ratio vs. Temperature

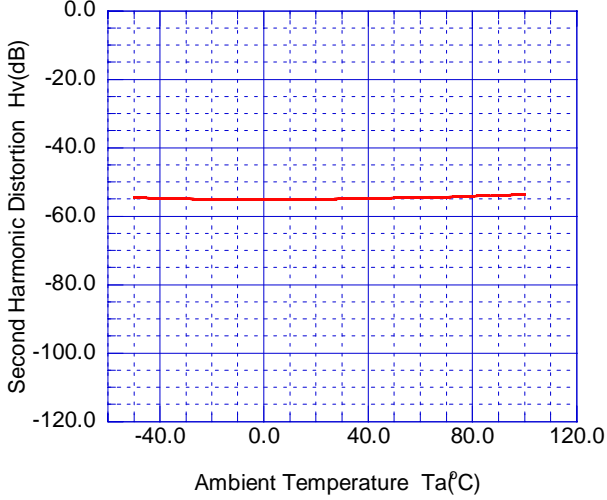


Switching Noise Level vs. Temperature

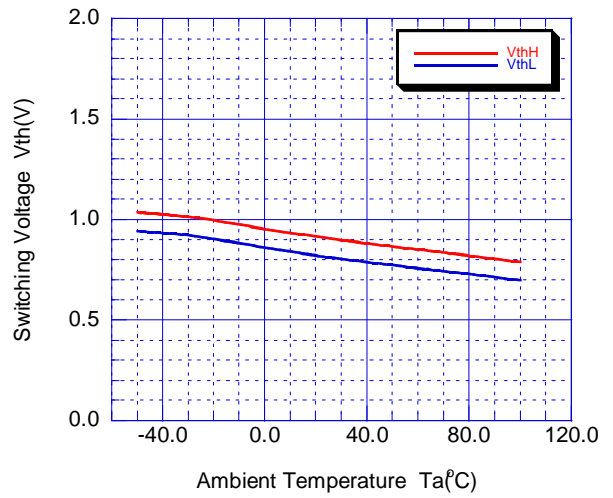


## TYPICAL CHARACTERISTICS

Second Harmonic Distortion vs. Temperature  
1.0Vpp, 3.58MHz sinewave signal input



Switching Voltage Level vs. Temperature



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