VIDEO AMPLIFIER WITH LPF

■FEATURES

- ●Operating Voltage 4.5 to 5.5V
- ●Internal LPF -40dB at 108MHz
- ●6dB Amp. , 75Ω Driver
- ●Output AC-Coupling, DC-Coupling
- ●Power Save Circuit
- ●Bipolar Technology
- ●Package Outline SOT-23-6-1

■GENERAL DESCRIPTION

The NJM41031 is a Video Amplifier contained LPF circuit. Internal 75Ω driver is easy to connect TV monitor directly. It corresponds to both AC-coupling and DC-coupling.*

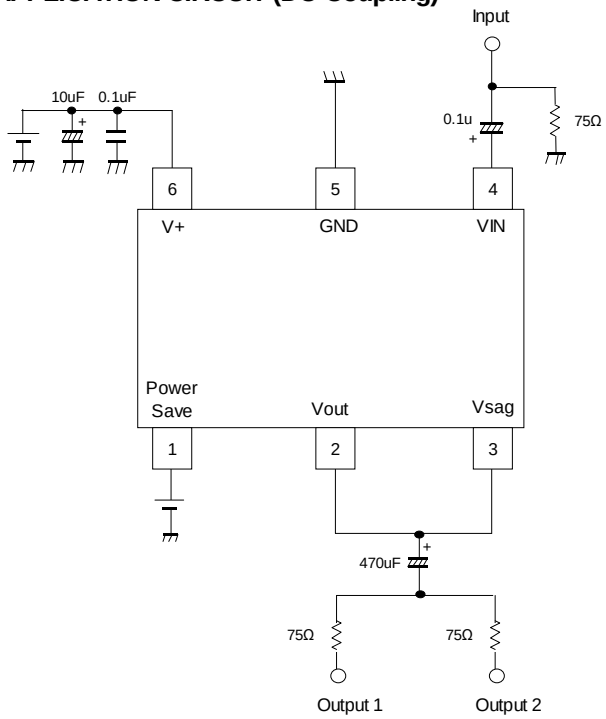
The NJM41031 features low power and small package, and is suitable for low power design on downsizing.

*0.4V is always output from Vout.

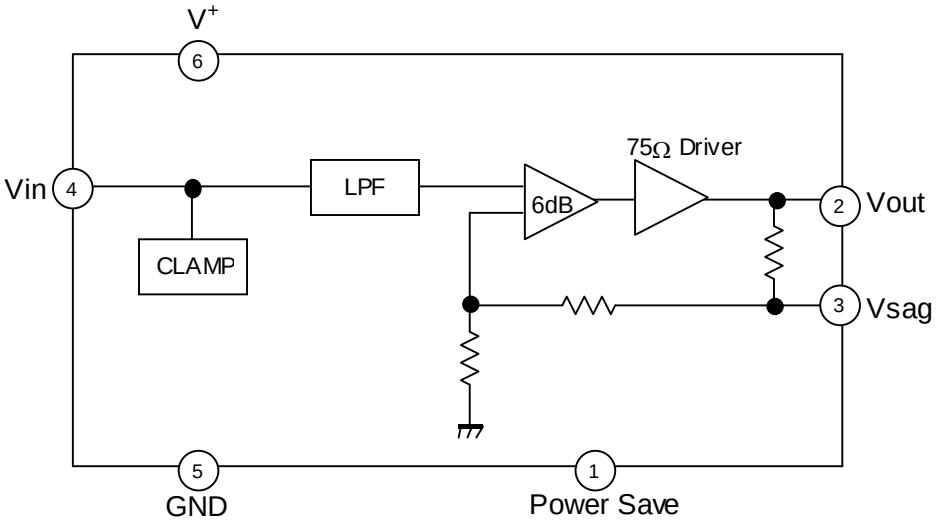
■APPLICATION

- ●Car Navigation
- ●General video equipment

■APPLICATION CIRCUIT (DC-Coupling)



■EQUIVALENT CIRCUIT・BLOCK DIAGRAM



■**Voltage Gain Valuation**

Voltage Gain	Part No.
6.4dB	NJM2561
6.0dB	NJM2561B
12.4dB	NJM2562
16.5dB	NJM2563
9.0dB	NJM2571A

■**Supply Voltage Valuation**

Supply Voltage	Part No.
2.6 to 5.5V	NJM2561A
2.8 to 5.5V	NJM2561
2.8 to 5.5V	NJM2561B

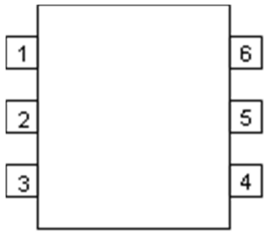
■**Output DC - coupling Valuation**

Supply Voltage	Part No.
2.8 to 5.5V	NJM2561F1A (Screening product)

■**Operating Temperature Range Valuation**

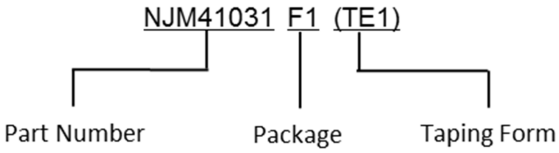
Operating Temperature Range	Part No.
-40 to 105°C	NJM2561F1-T

■**PIN CONFIGURATION**



PIN NO.	SYMBOL	DESCRIPTION
1	Power Save	Power Save Terminal
2	Vout	Video Signal Output Terminal
3	Vsag	SAG correction Terminal
4	Vin	Video Signal Input Terminal
7	GND	GND Terminal
8	V+	Power Supply Terminal

■**MARK INFORMATION**



■**ORDERING INFORMATION**

PART NUMBER	PACKAGE OUTLINE	RoHS	HALOGEN-FREE	TERMINAL FINISH	MARKING	WEIGHT (mg)	MOQ(pcs)
NJM41031F1	SOT-23-6-1	YES	YES	Sn-2.5Ag	DU	15.0	3,000

■ABSOLUTE MAXIMUM RATINGS

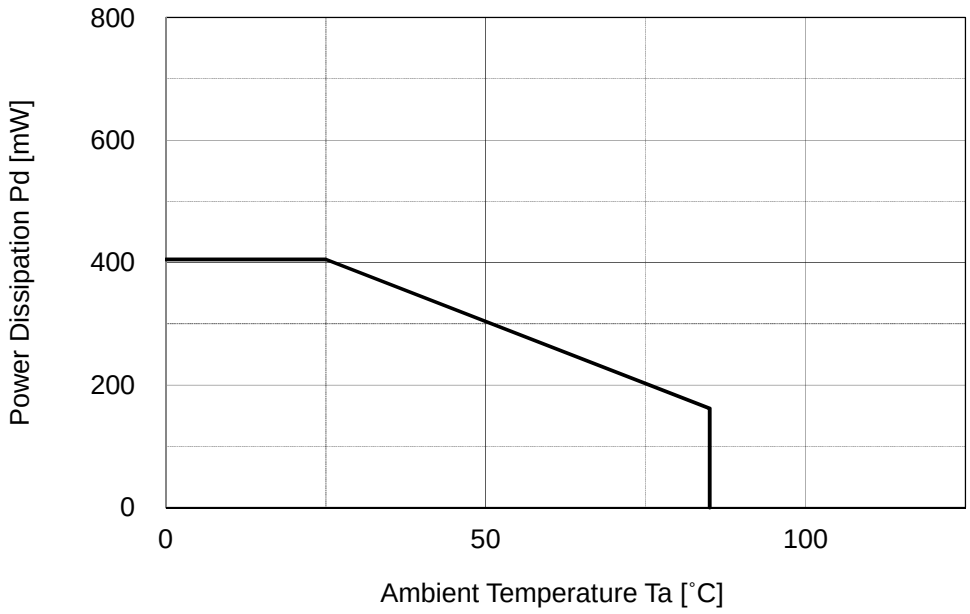
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V+	7.0	V
Power Dissipation (Ta=25°C)(4)	P_D	405 (1)	mW
Operating Temperature Range	T_{opr}	-40 to 85	°C
Storage Temperature Range	T_{stg}	-40 to 125	°C

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

■RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V+	4.5 to 5.5	V

■POWER DISSIPATION vs. AMBIENT TEMPERATURE



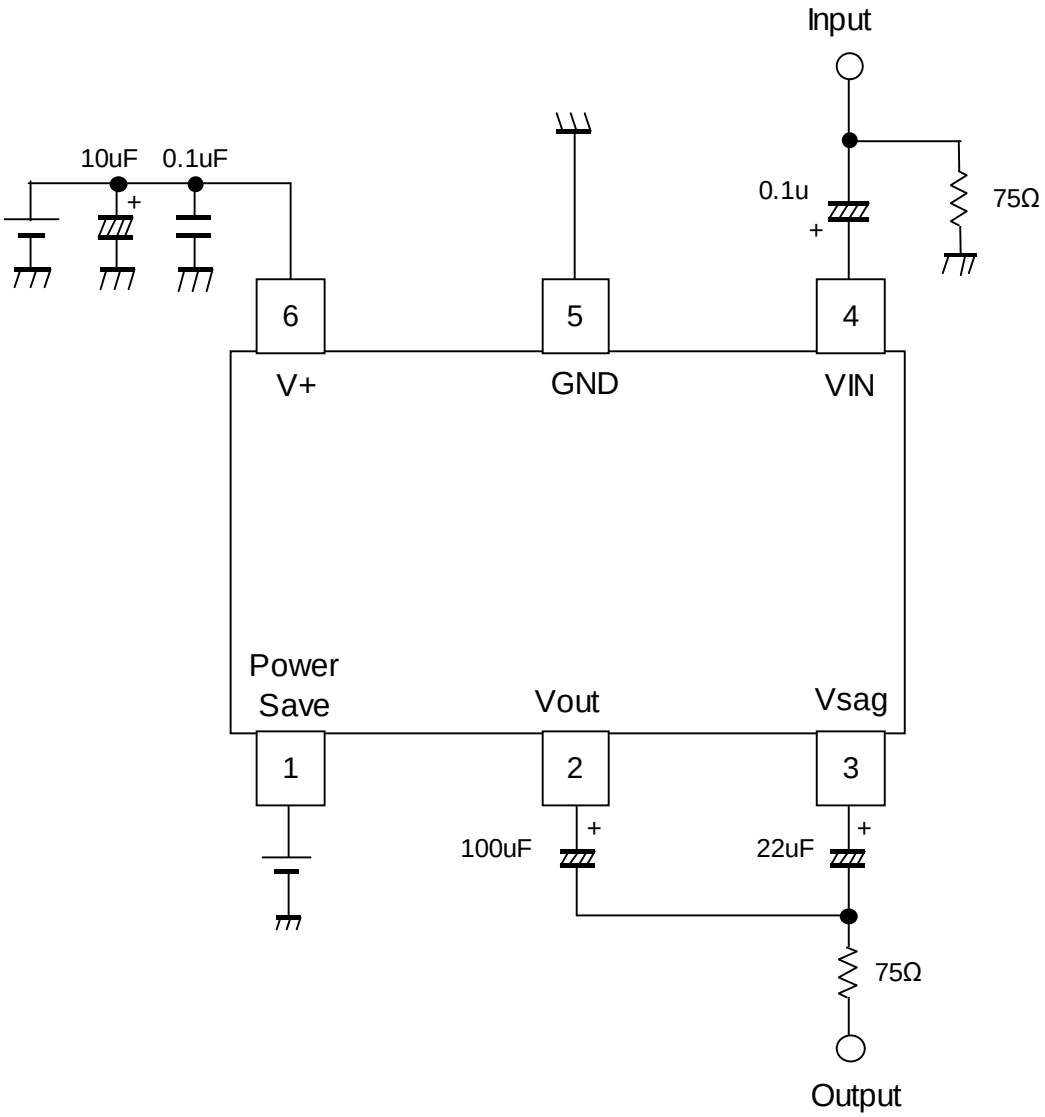
■**ELECTRICAL CHARACTERISTICS** (V^+=3.0V,R_L=150Ω,Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	No Signal	-	20	25	mA
Operating Current at Power Save	Isave	No Signal, Power Save Mode	-	45	70	μA
Maximum Output Voltage Swing	Vom	f=100kHz,THD=1%	2.2	2.5	-	Vp-p
Voltage Gain	Gv	Vin=100kHz, 1.0Vp-p, Input Sine Signal	5.6	6.0	6.4	dB
Low Pass Filter Characteristic	Gfy6.75M	Vin=6.75MHz/100kHz, 1.0Vpp	-1.0	0	1.0	dB
	Gfy108M	Vin=108MHz/100kHz, 1.0Vpp	-	-40	-23	
Differential Gain	DG	Vin=1.0Vp-p, 10step Video Signal	-	0.5	-	%
Differential Phase	DP	Vin=1.0Vp-p, 10step Video Signal	-	0.5	-	deg
S/N Ratio	SNv	Vin=1.0Vp-p, R_L=75Ω 100% White Video Signal, 100kHz to 6MHz	-	75	-	dB
SW Change Voltage High Level	VthPH	Active	1.8	-	V^+	V
SW Change Voltage Low Level	VthPL	Non-active	0	-	0.3	

■**CONTROL TERMINAL**

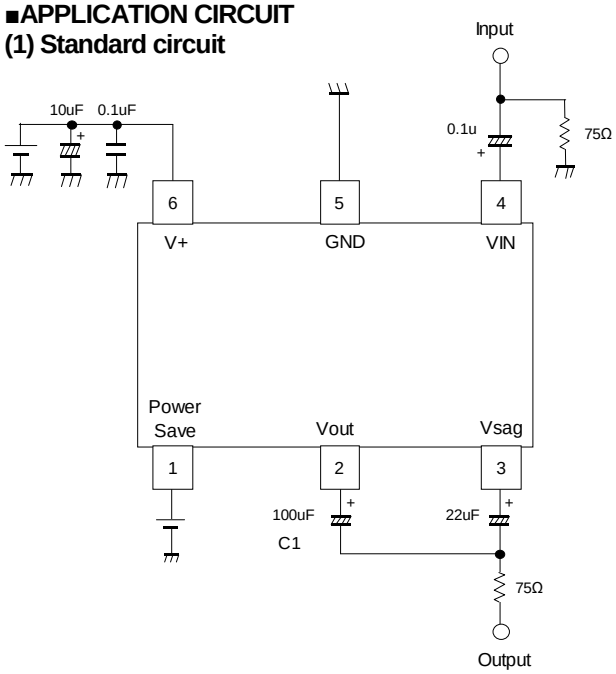
PARAMETER	STATUS	NOTE
Power Save	H	Power Save: OFF (Active)
	L	Power Save: ON (Mute)
	OPEN	Power Save: ON (Mute)

■TEST CIRCUIT

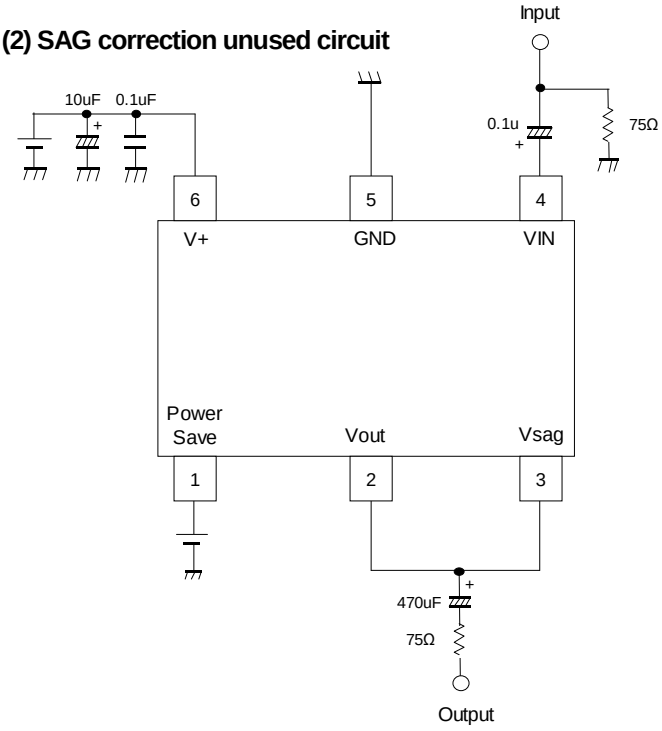


■APPLICATION CIRCUIT

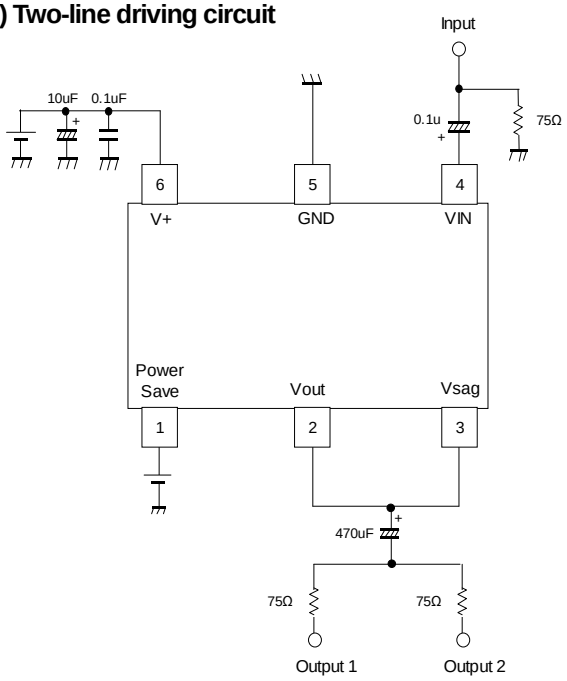
(1) Standard circuit



(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.

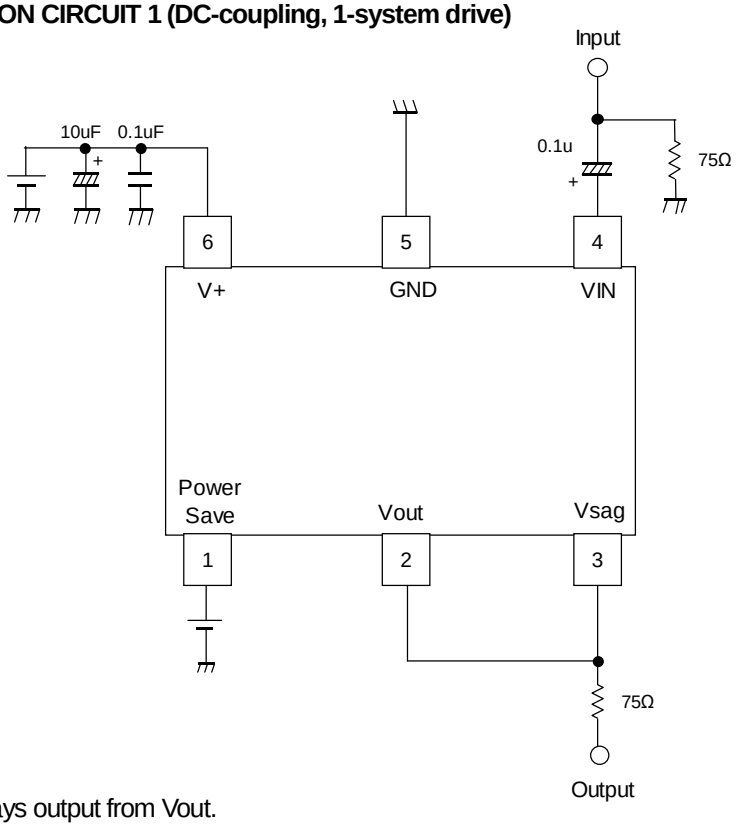
(2) SAG correction unused circuit

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

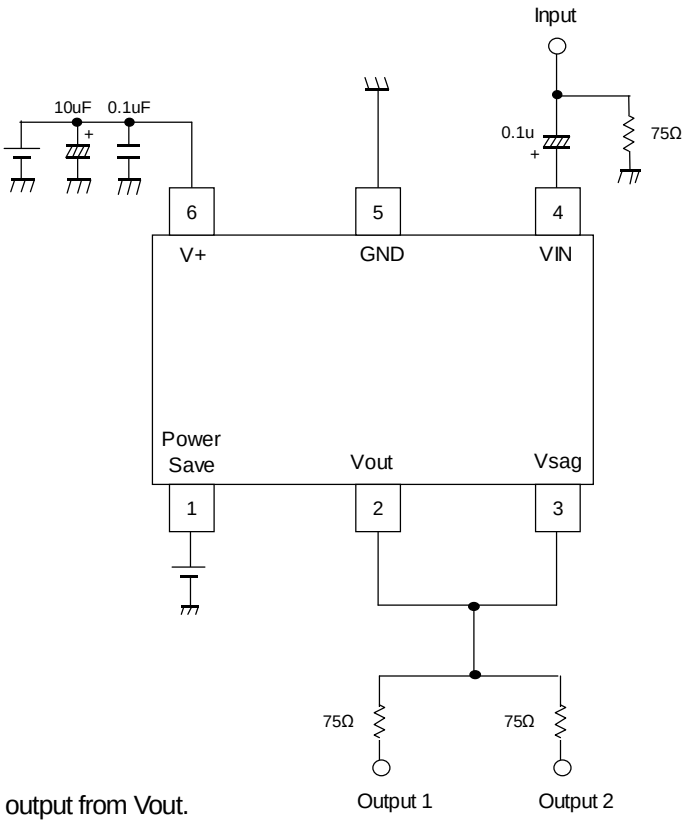
This circuit drives two-line of 150Ω. However, it may cause to lose synchronization by an input signal of large APL change (100% white signals more than 1Vp-p). Confirm the large APL change waveform (100% white signals more than 1Vp-p) and evaluate sufficiently.

■APPLICATION CIRCUIT 1 (DC-coupling, 1-system drive)



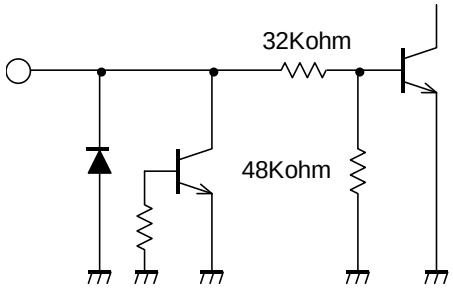
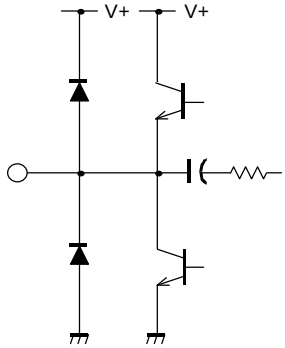
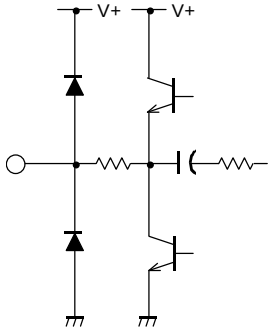
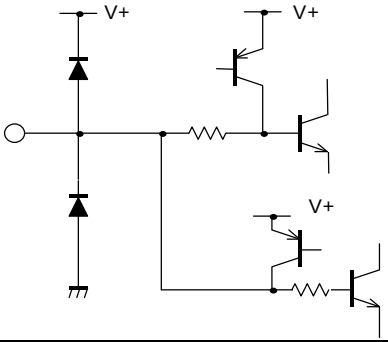
Note)
0.4V is always output from Vout.

■APPLICATION CIRCUIT 1 (DC-coupling, 1-system drive)



Note)
0.4V is always output from Vout.

■TERMINAL DESCRIPTION

PIN.No.	SYMBOL	EQUIVALENT CIRCUIT	DC VOLTAGE
1	Power Save		-
2	Vout		0.4V
3	Vsag		0.4V
4 .	Vin		1.7V
5	GND	-	-
6	V+	-	-

■APPLICATION

♦Clamp circuit

1. Operation of Sync-tip-clamp

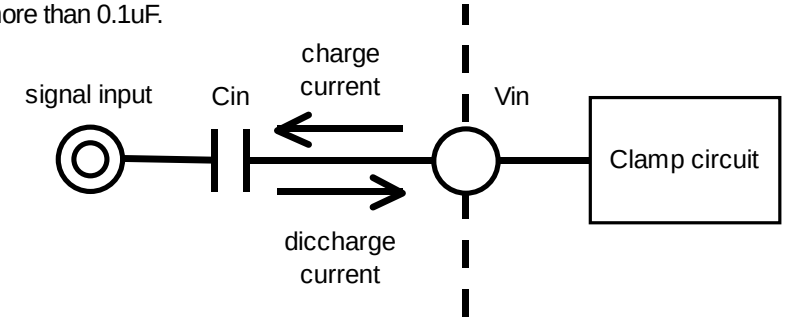
Input circuit will be explained. Sync-tip clamp circuit (below the clamp circuit) operates to keep a sync tip of the minimum potential of the video signal. Clamp circuit is a circuit of the capacitor charging and discharging of the external input Cin. It is charged to the capacitor to the external input Cin at sync tip of the video signal. Therefore, the potential of the sync tip is fixed.

And it is discharged charge by capacitor Cin at period other than the video signal sync tip. This is due to a small discharge current to the IC.

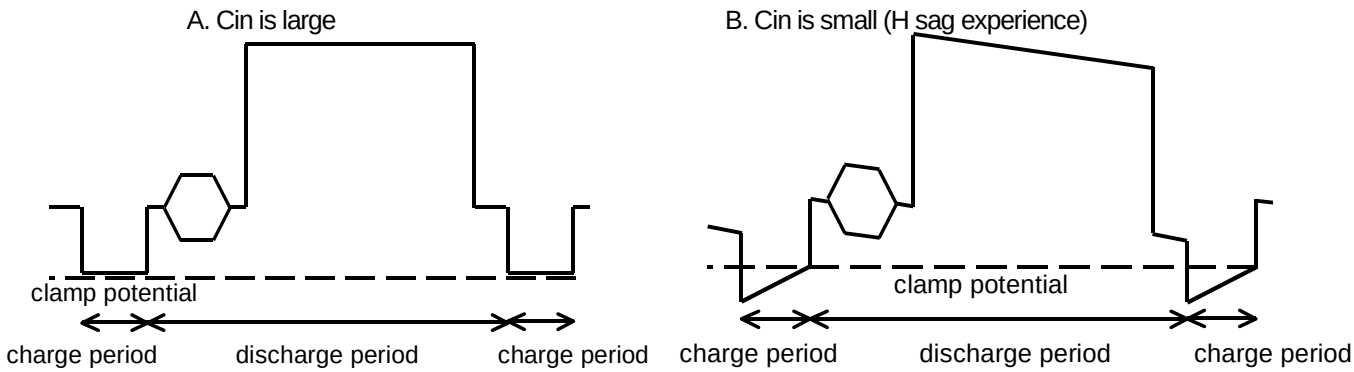
In this way, this clamp circuit is fixed sync tip of video signal to a constant potential from charging of Cin and discharging of Cin at every one horizontal period of the video signal.

The minute current be discharged an electrical charge from the input capacitor at the period other than the sync tip of video signals. Decrease of voltage on discharge is dependent on the size of the input capacitor Cin.

If you decrease the value of the input capacitor, will cause distortion, called the H sag. Therefore, the input capacitor recommend on more than 0.1uF.



< Clamp circuit >



< Waveform of input terminal >

2. Input impedance

The input impedance of the clamp circuit is different at the capacitor discharge period and the charge period.

The input impedance of the charging period is a few kΩ. On the other hand, the input impedance of the discharge period is several MΩ. Because is a small discharge-current through to the IC.

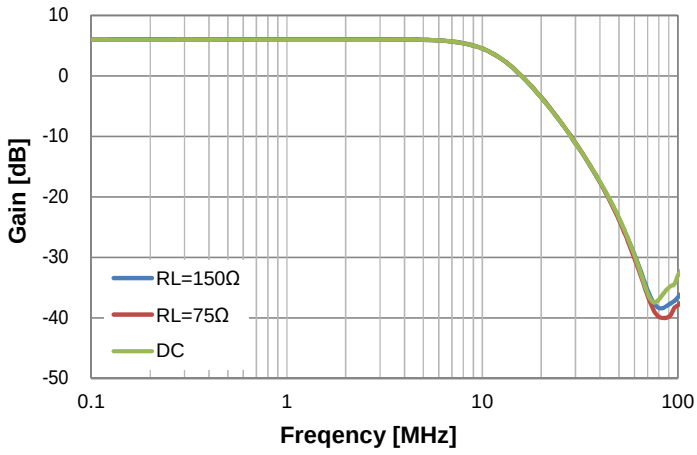
Thus the input impedance will vary depending on the operating state of the clamp circuit.

3. Impedance of signal source

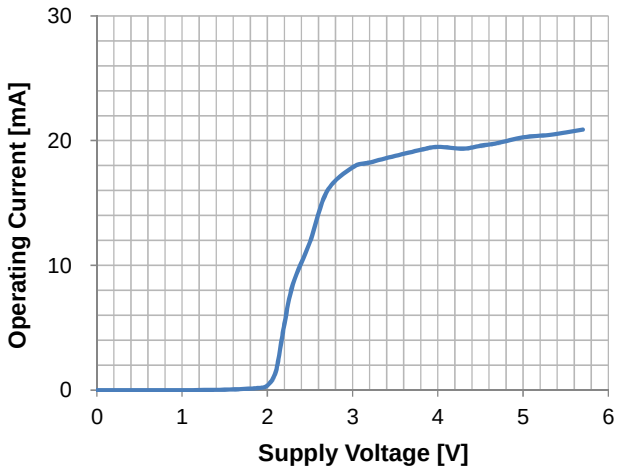
Source impedance to the input terminal, please lower than 200Ω. A high source impedance, the signal may be distorted. If so, please to connect a buffer for impedance conversion.

■TYPICAL CHARACTERISTICS

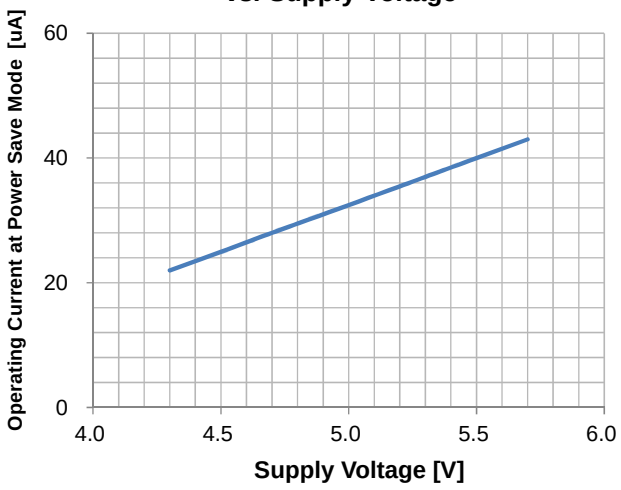
Gain vs. Freqency
V+=5V Ta=25℃ Vin=1.0Vpp Sine Signal Input



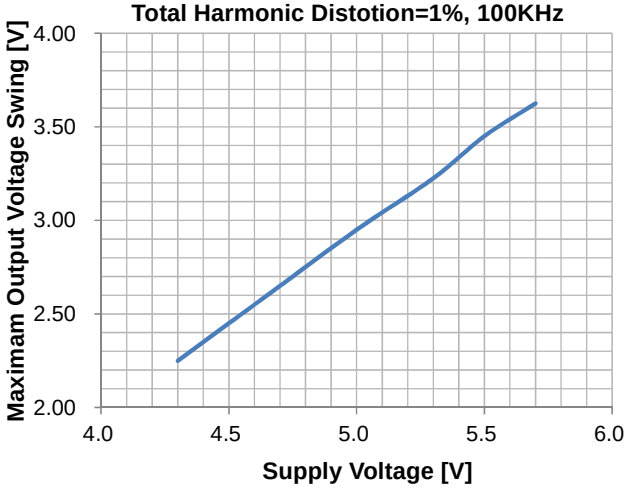
Operating Current vs. Supply Voltage



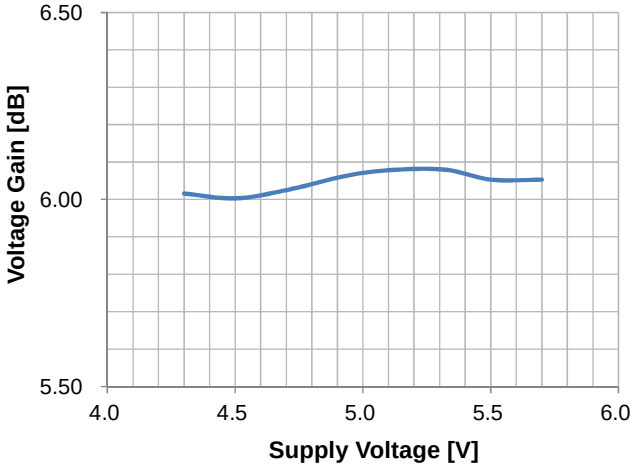
Operating Current at Power Save Mode vs. Supply Voltage



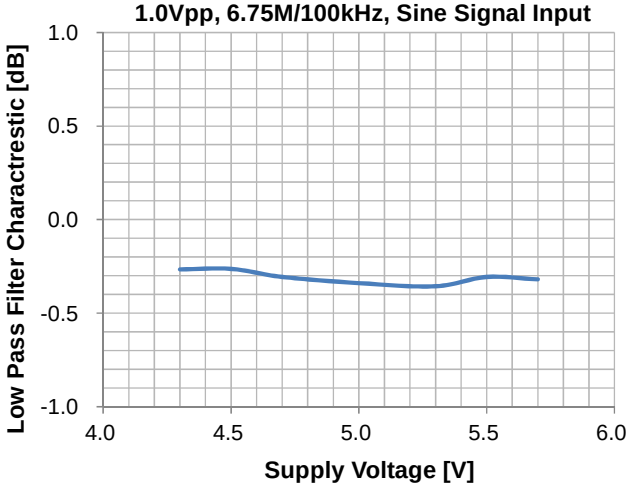
Maximam Output Voltage Swing vs. Supply Voltage
Total Harmonic Distotion=1%, 100KHz



Voltage Gain vs. Supply Voltage
1.0Vpp, 100kHz, Sine Signal Input

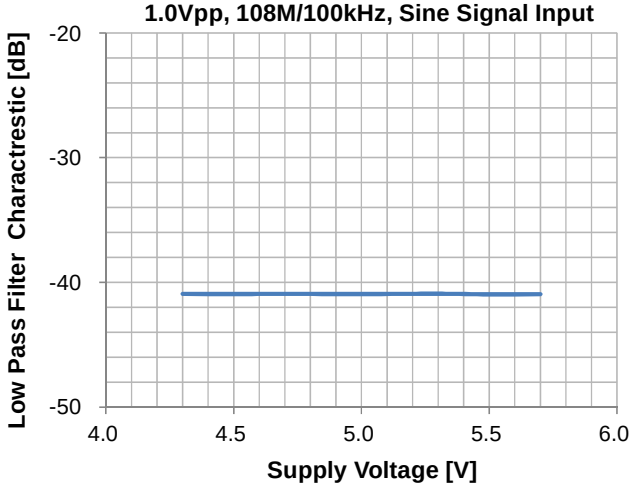


Low Pass Filter Charactrestic vs. Supply Voltage
1.0Vpp, 6.75M/100kHz, Sine Signal Input

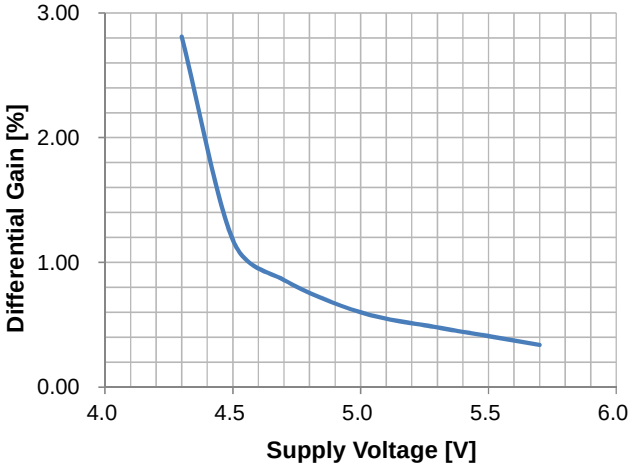


■TYPICAL CHARACTERISTICS

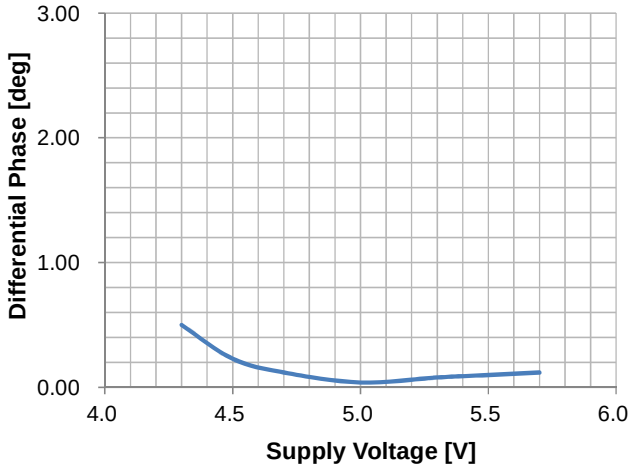
Low Pass Filter Charactrestic vs. Supply Voltage
1.0Vpp, 108M/100kHz, Sine Signal Input



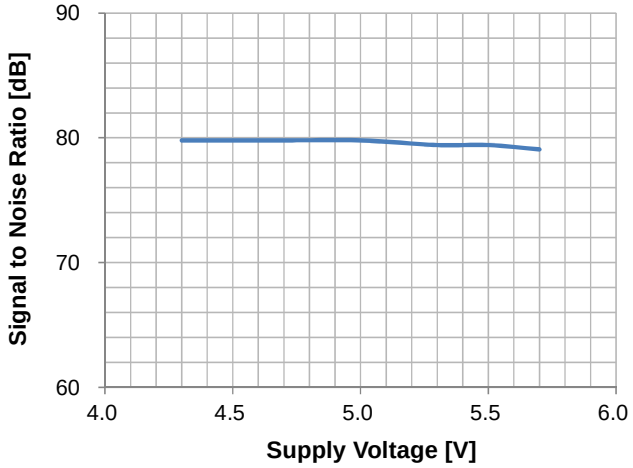
Differential Gain vs. Supply Voltage
1.0Vpp, 10step Video Signal Input



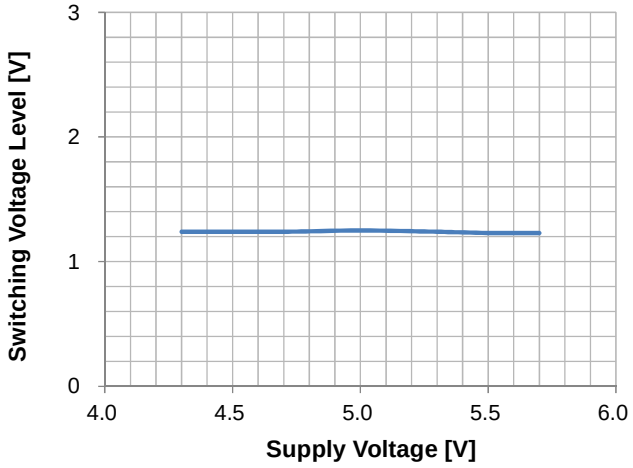
Differential Phase vs. Supply Voltage
1.0Vpp, 10step Video Signal Input



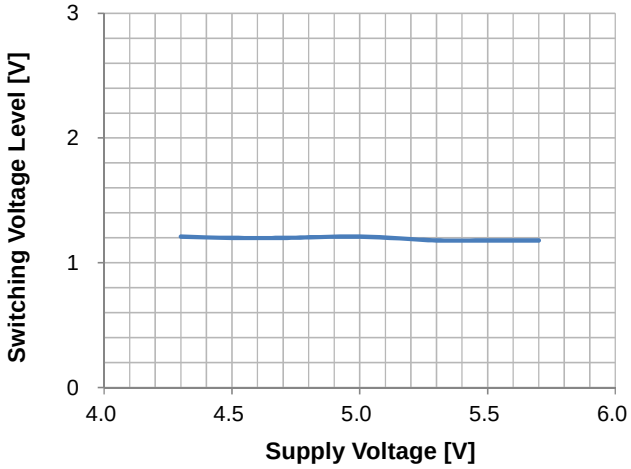
Signal to Noise Ratio vs. Supply Voltage
1.0Vpp, White 100%Video Signal Input



Switching Voltage Level (High Level) vs. Supply Voltage

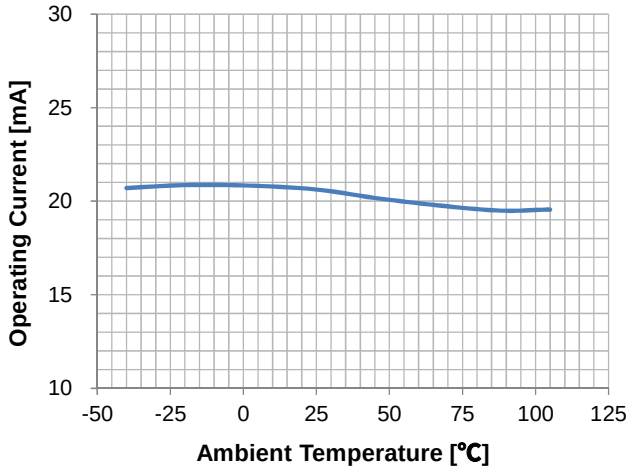


Switching Voltage Level (Low Level) vs. Supply Voltage

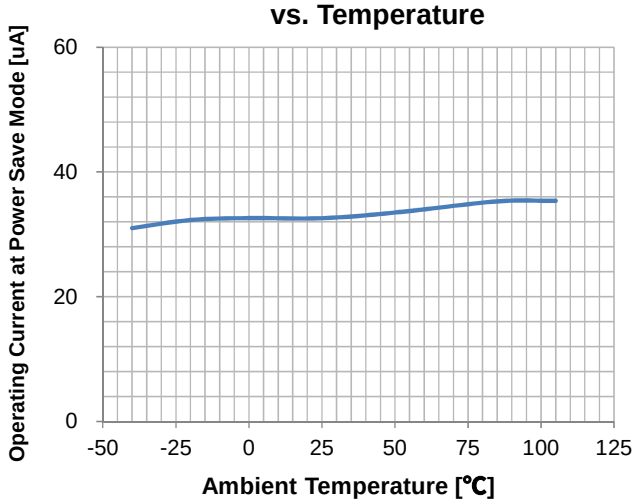


■TYPICAL CHARACTERISTICS

Operating Current vs. Temperature

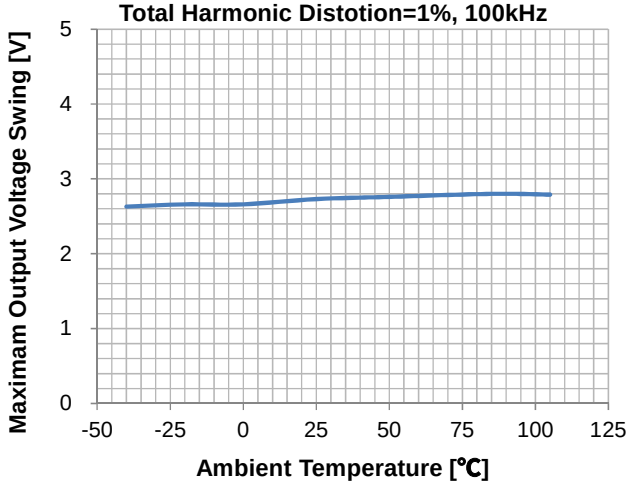


Operating Current at Power Save Mode vs. Temperature



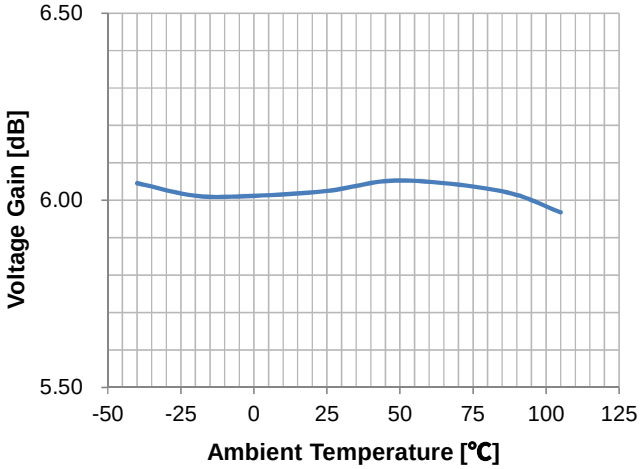
Maximam Output Voltage Swing vs. Temperature

Total Harmonic Distotion=1%, 100kHz



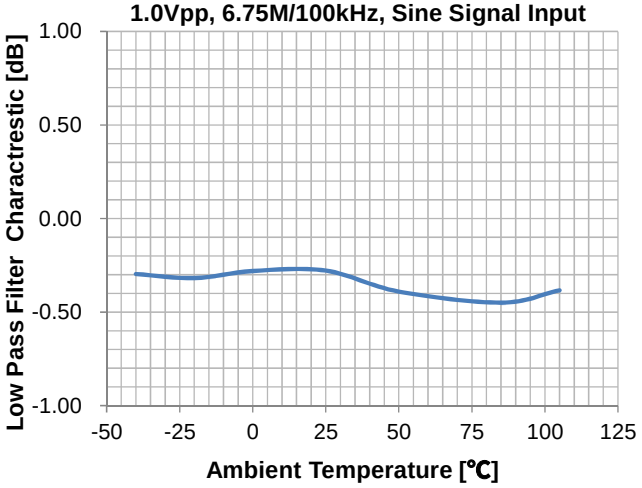
Voltage Gain vs. Temperature

1.0Vpp, 100kHz, Sine Signal Input



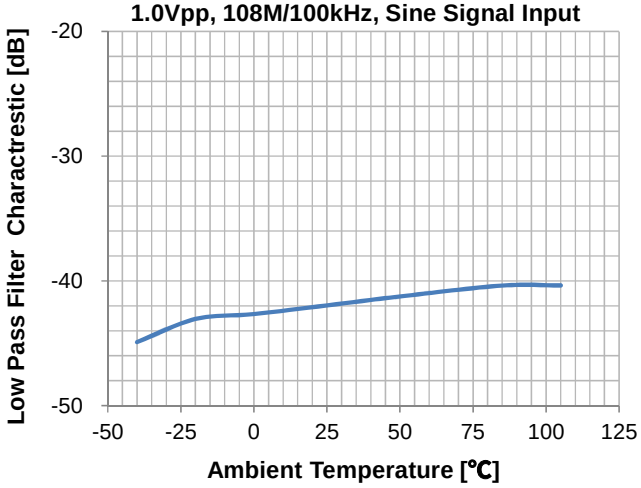
Low Pass Filter Charactrestic vs. Temperature

1.0Vpp, 6.75M/100kHz, Sine Signal Input



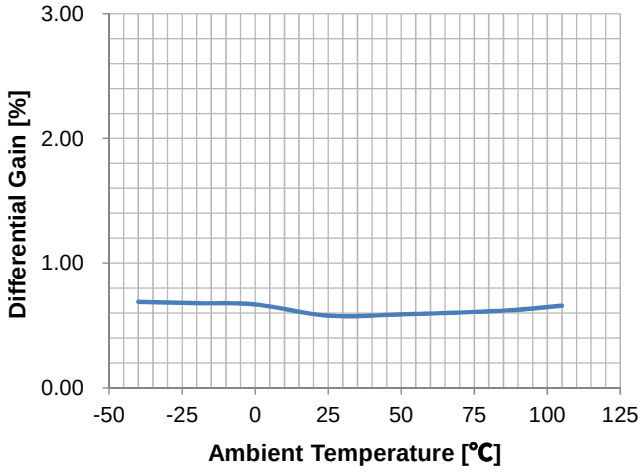
Low Pass Filter Charactrestic vs. Temperature

1.0Vpp, 108M/100kHz, Sine Signal Input

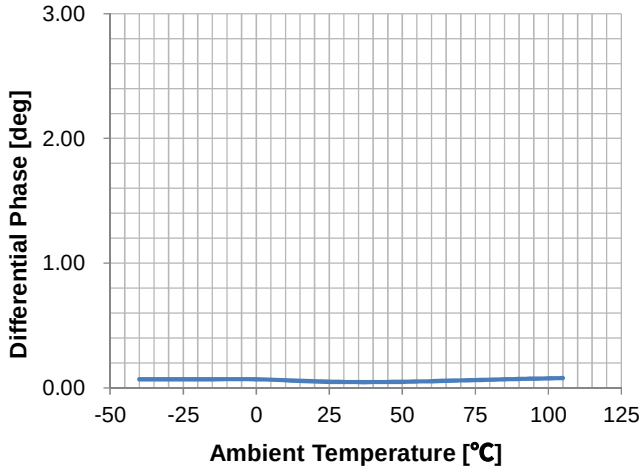


■TYPICAL CHARACTERISTICS

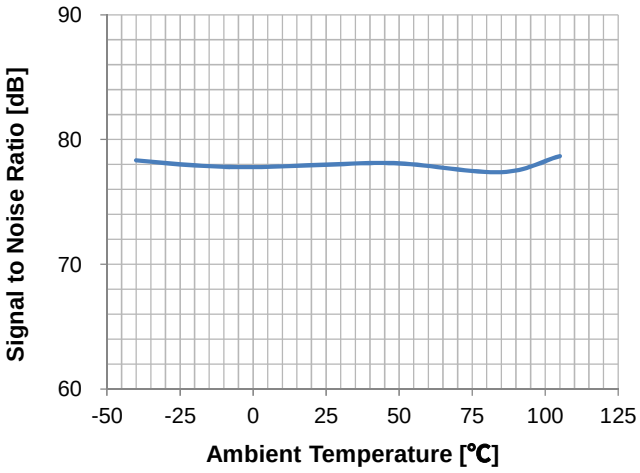
Differential Gain vs. Temperature
1.0Vpp, 10step Video Signal Input



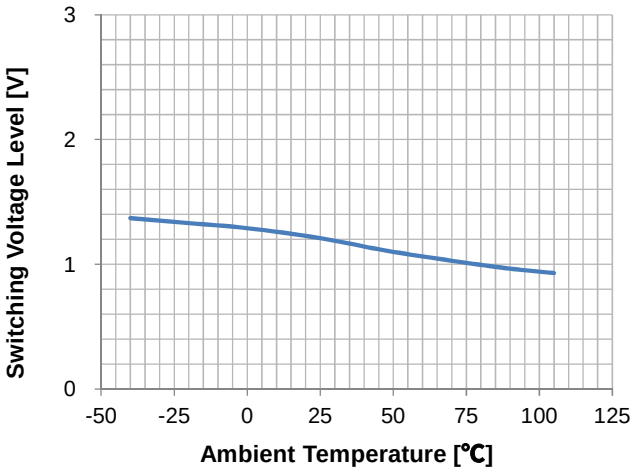
Differential Phase vs. Temperature
1.0Vpp, 10step Video Signal Input



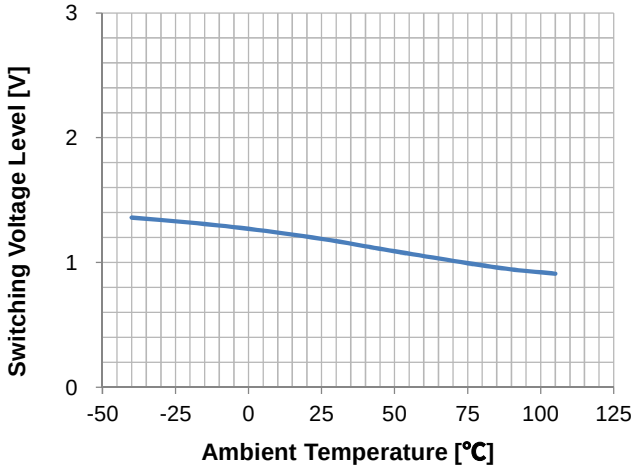
Signal to Noise Ratio vs. Temperature
1.0Vpp, White 100% Video Signal Input



Switching Voltage Level (High Level) vs. Temperature

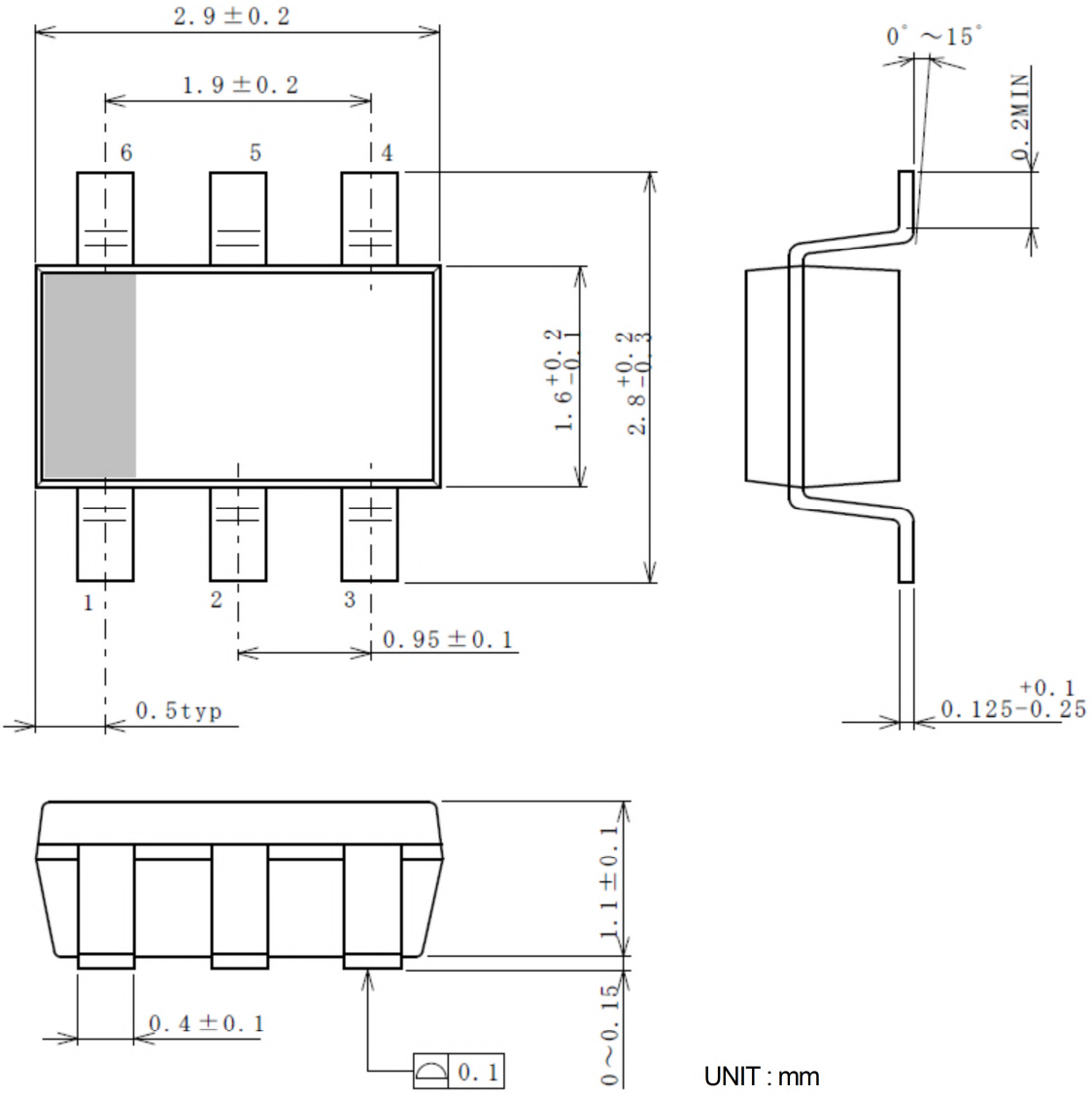


Switching Voltage Level (Low Level) vs. Temperature



■PACKAGE OUTLINE

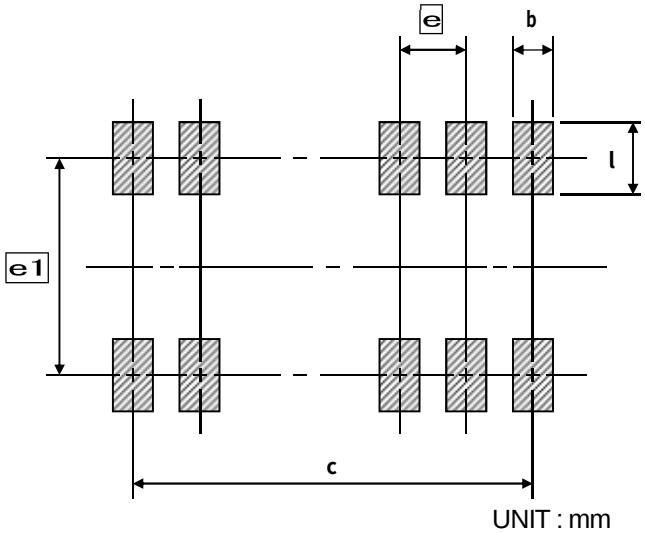
SOT-23-6-1(MTP6-1)



UNIT : mm

■SOLDER FOOT PRINT

PKG	b	l	c	e1	e
SOT-23-6-1	0.70	1.00	1.90	2.40	0.95



UNIT : mm

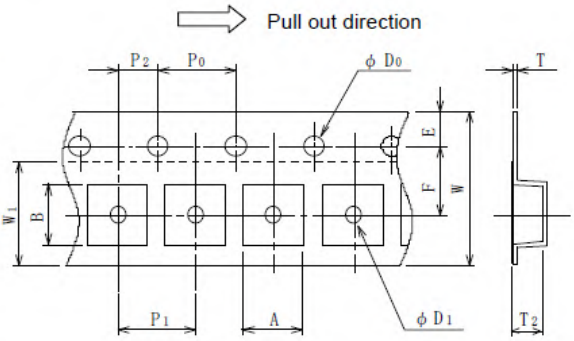
■PACKING SPECIFICATION

General Description

NJRC delivers ICs in 4 methods, plastic tube container, two kinds of Taping, tray and vinyl bag packing. Except adhesive tape treated anti electrostatic and contain carbon are using as the ESD (Electrostatic Discharge Damage) protection.

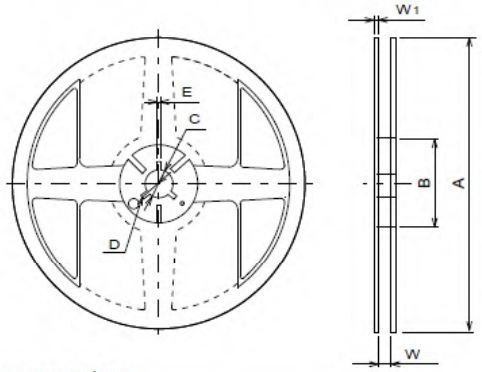
SOT-23(MTP) Emboss Taping (TE1)

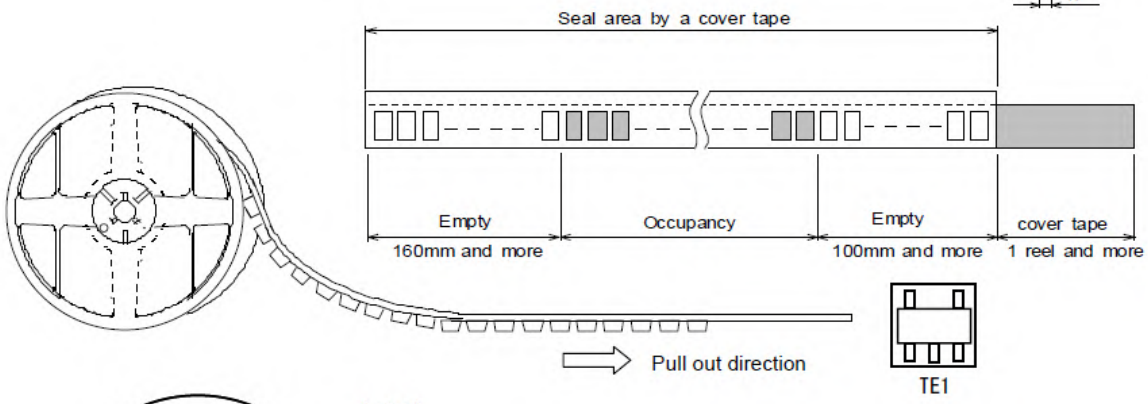
Symbol	SOT-23-6-1	Remark
A	3.3±0.1	Bottom size
B	3.2±0.1	Bottom size
D_0	1.55	
D_1	1.05	
E	1.75±0.1	
F	3.5±0.05	
P_0	4.0±0.1	
P_1	4.0±0.1	
P_2	2.0±0.05	
T	0.25±0.05	
T_2	1.57	
W	8.0±0.3	
W_1	5.5	Thickness 0.1MAX

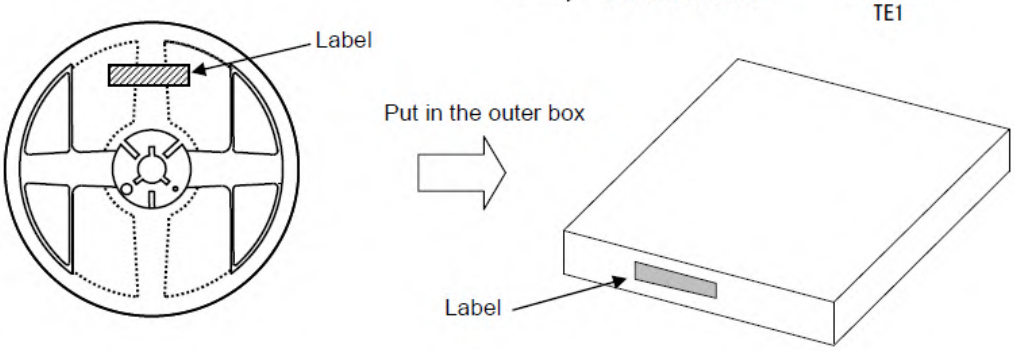


Symbol	SOT-23-6-1
A	Ø180±1
B	Ø 60±1
C	Ø 13±0.2
D	Ø 21±0.8
E	2±0.5
W	9±0.5
W_1	1.2±0.2
Contents	3,000pcs

Unit : mm

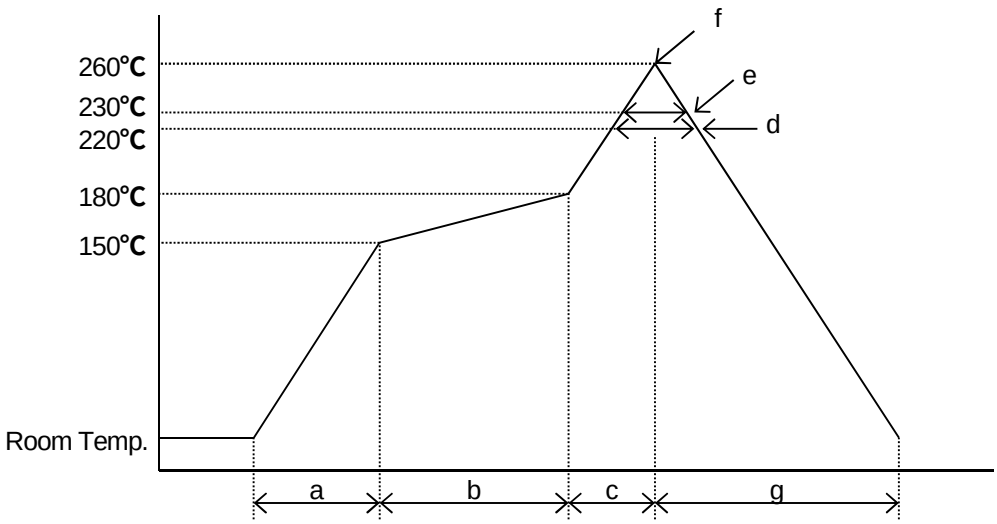






■RECOMMENDED MOUNTING METHOD

＊Recommended reflow soldering procedure



a：Temperature ramping rate	: 1 to 4℃/s
b：Pre-heating temperature	: 150 to 180℃
time	: 60 to 120s
c：Temperature ramp rate	: 1 to 4℃/s
d：220℃ or higher time	: Shorter than 60s
e：230℃ or higher time	: Shorter than 40s
f：Peak temperature	: Lower than 260℃
g：Temperature ramping rate	: 1 to 6℃/s

The temperature indicates at the surface of mold package.

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