2-Input 1-Output Video Driver

■FEATURES

- ●Operating Voltage 4.5 to 5.5V
- ●2-Input 1-Output Video Switch
- ●6dB Amp. , 75Ω Driver (2-system drive)
- ●Frequency Characteristics 0dB at 10MHz
- ●Sync-tip Clamp
- ●Bipolar Technology
- ●Package Outline SOT-23-6-1

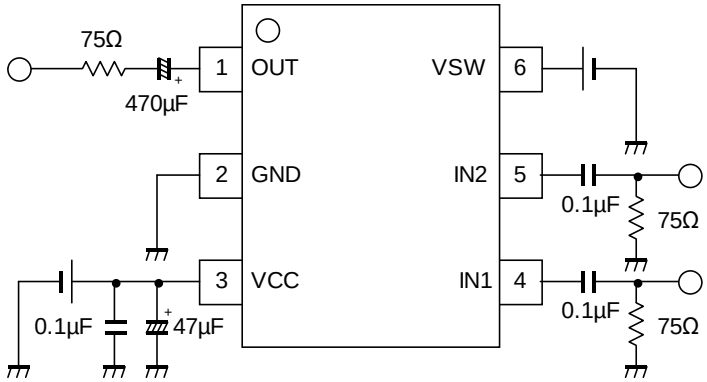
■GENERAL DESCRIPTION

The **NJM41010** is a 2-Input 1-Output general-purpose video switch. It includes 6dB amplifier and 75ohm driver circuit. The NJM41010 is suitable for a variety of AV equipment because of a small package.

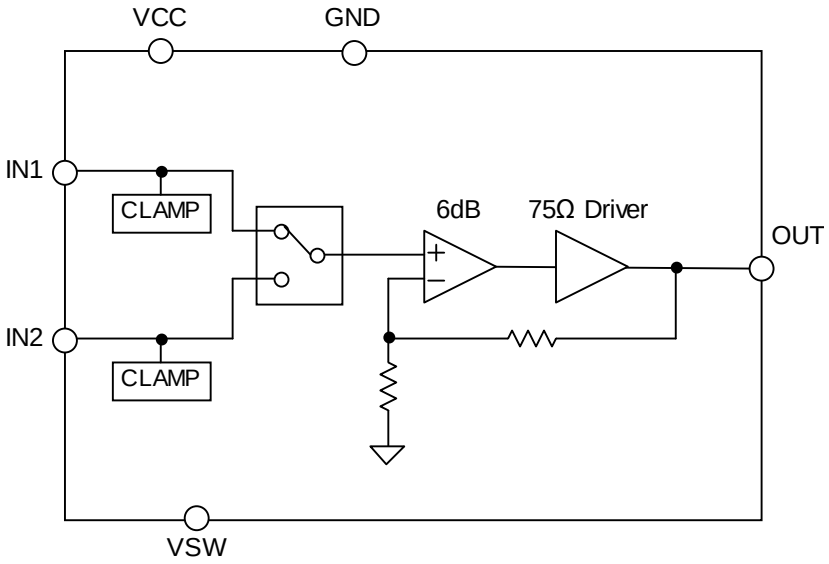
■APPLICATION

- ●Car Navigation
- ●General video equipment

■APPLICATION CIRCUIT



■EQUIVALENT CIRCUIT・BLOCK DIAGRAM



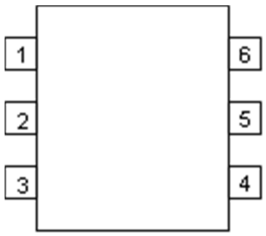
■**Video Switch Valuation**

Input-Output	Part No.
3in-1out	NJM41050
4in-2out	NJW1342
8in-2out	NJW1341

■**Operating Temperature Range Valuation**

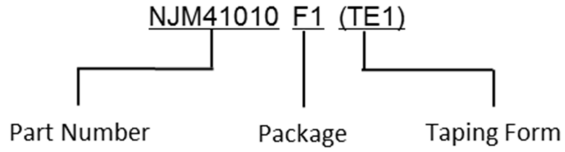
Operating Temperature Range	Part No.
-40 to 105°C	NJM41010F1-T

■**PIN CONFIGURATION**



PIN NO.	SYMBOL	DESCRIPTION
1	OUT	Video Signal Output Terminal
2	GND	GND Terminal
3	VCC	Power Supply Terminal
4	IN1	Video Signal Input Terminal
7	IN2	Video Signal Input Terminal
8	VSW	Video Signal Switch Terminal

■**MARK INFORMATION**



■**ORDERING INFORMATION**

PART NUMBER	PACKAGE OUTLINE	RoHS	HALOGEN-FREE	TERMINAL FINISH	MARKING	WEIGHT (mg)	MOQ(pcs)
NJM41010F1	SOT-23-6-1	YES	YES	Sn-2Bi	DP	15.0	3,000

■ABSOLUTE MAXIMUM RATINGS

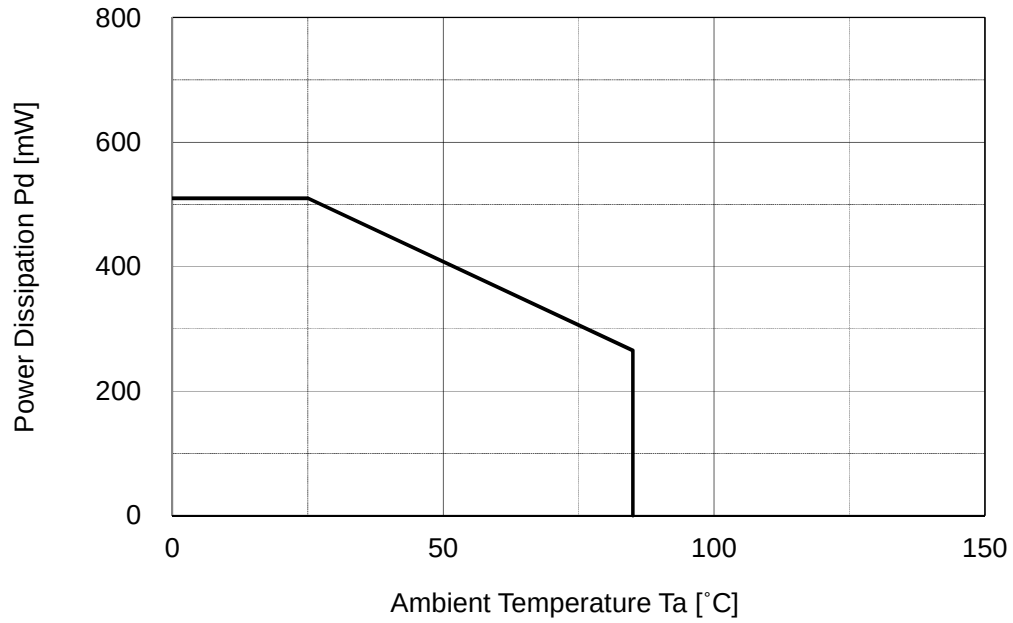
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	VCC	11.0	V
Power Dissipation (Ta=25°C)(4)	P_D	510 (1)	mW
Operating Temperature Range	T_{opr}	-40 to 85	°C
Storage Temperature Range	T_{stg}	-40 to 150	°C

(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	VCC	4.5 to 5.5	V

■POWER DISSIPATION vs. AMBIENT TEMPERATURE



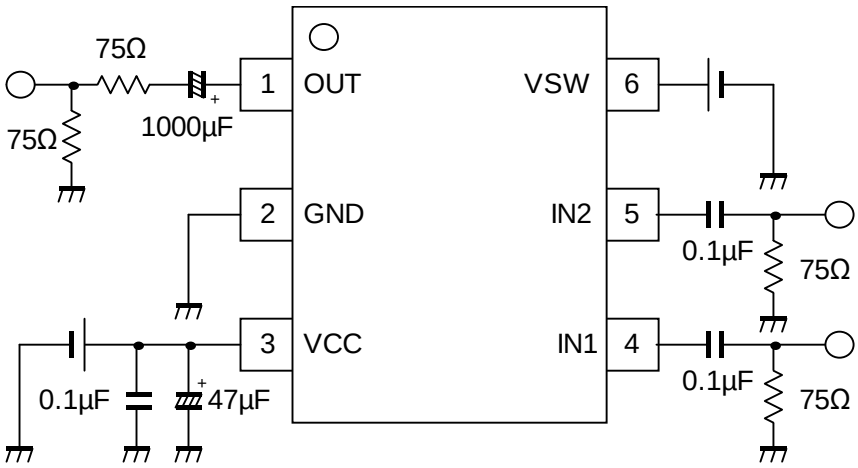
■**ELECTRICAL CHARACTERISTICS** (VCC=5.0V,R_L=150Ω,Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	No Signal	-	8.0	15.0	mA
Voltage Gain	Gv	VIN=1MHz, 1.0Vp-p, Input Sine Signal	5.5	6.0	6.5	dB
Maximum Output Voltage Swing	Vom	f=100kHz,THD=1%	2.2	-	-	Vp-p
Frequency Characteristics	Gf	VIN=10MHz/1MHz,1.0Vp-p Sine-wave	-1.0	0	1.0	dB
Channel Cross talk	CT	VIN=4.43MHz, 1.0Vp-p, Sine-wave	-	-60	-50	dB
Differential Gain	DG	VIN=1.0Vp-p, 10step Video Signal	-	0.5	-	%
Differential Phase	DP	VIN=1.0Vp-p, 10step Video Signal	-	0.2	-	deg
Switch inflow current High Level	I_{SWH}	V=5V	-	-	300	μA
Switch inflow current Low Level	I_{SWL}	V=0.3V	-	-	30	μA
SW Change Voltage High Level	V_{thH}	VSW	2.0	-	VCC	V
SW Change Voltage Low Level	V_{thL}	VSW	0	-	1.0	

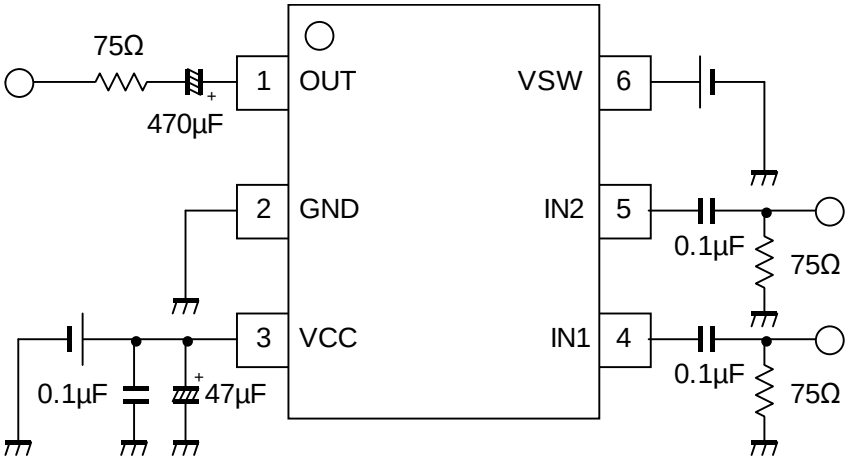
■**CONTROL TERMINAL**

PARAMETER	STATUS	NOTE
VSW(Output signal select)	H	IN2 output
	L	IN1 output
	OPEN	IN1 output

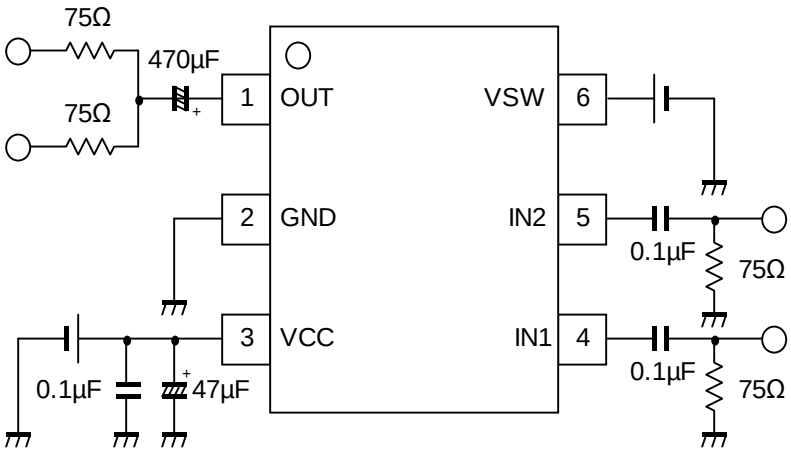
■TEST CIRCUIT



■APPLICATION CIRCUIT 1



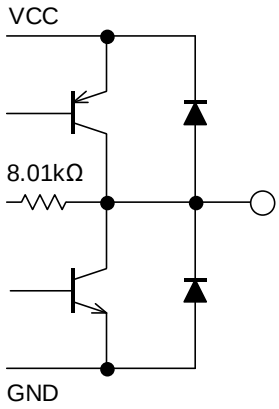
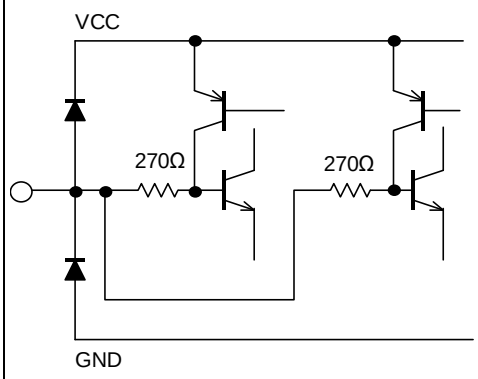
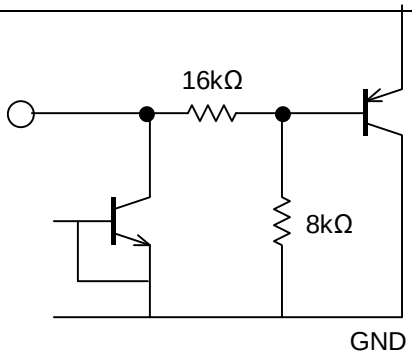
■APPLICATION CIRCUIT 2 (2-system drive)



Note

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	FUNCTION	EQIVALENT CIRCUIT	DC VOLTAGE
1	OUT	Video Signal Output Terminal		1.3V
2	GND	GND Terminal	-	-
3	VCC	Power Supply Terminal	-	-
4 5	IN1 IN2	Video Signal Input Terminal		1.56V
6	VSW	Video Signal Switch Terminal		-

♦**Clamp circuit**

1. Operation of Sync-tip-clamp

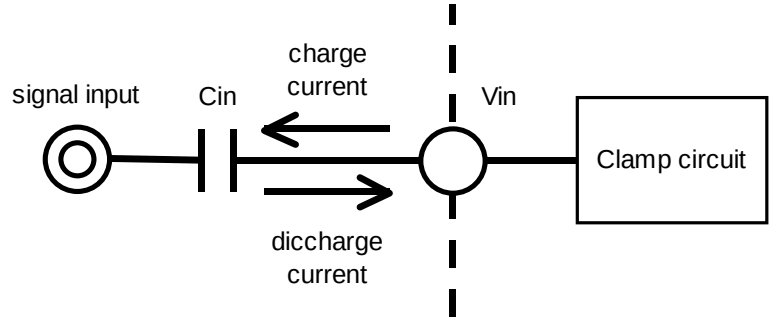
Input circuit will be explained. Sync-tip clamp circuit (below the clamp circuit) operates to keep a sync tip of the minimum potential of the video signal. Clamp circuit is a circuit of the capacitor charging and discharging of the external input Cin. It is charged to the capacitor to the external input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

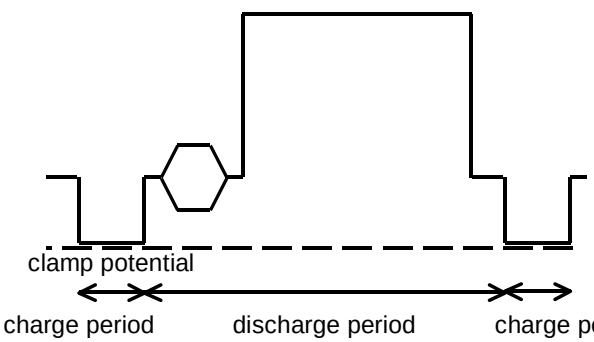
The minute current be discharged an electrical charge from the input capacitor at the period other than the sync tip of video signals. Decrease of voltage on discharge is dependent on the size of the input capacitor Cin.

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.

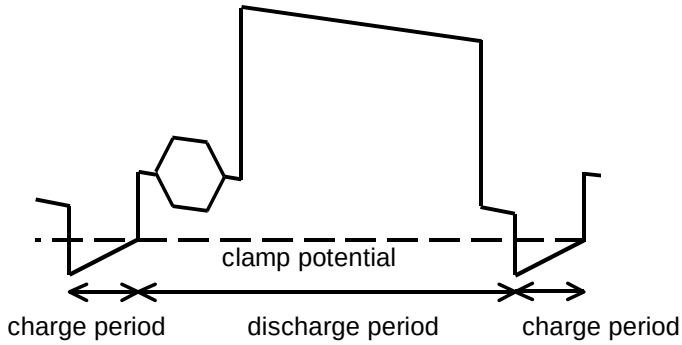


< Clamp circuit >

A. Cin is large



B. Cin is small (H sag experience)



< 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.

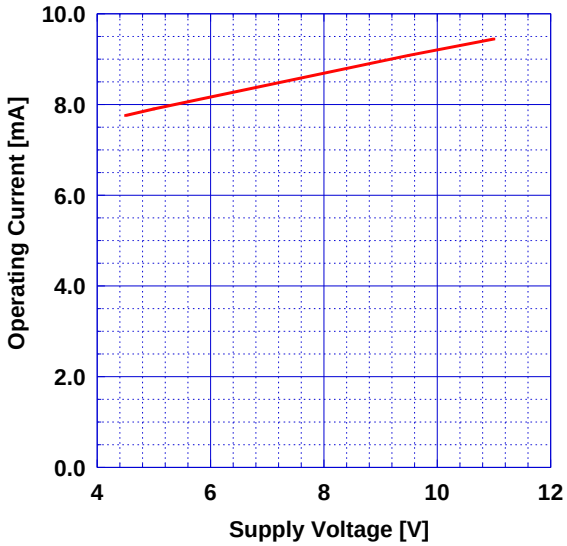
Thus the input impedance will vary depending on the operating state of the clamp circuit.

3. Impedance of signal source

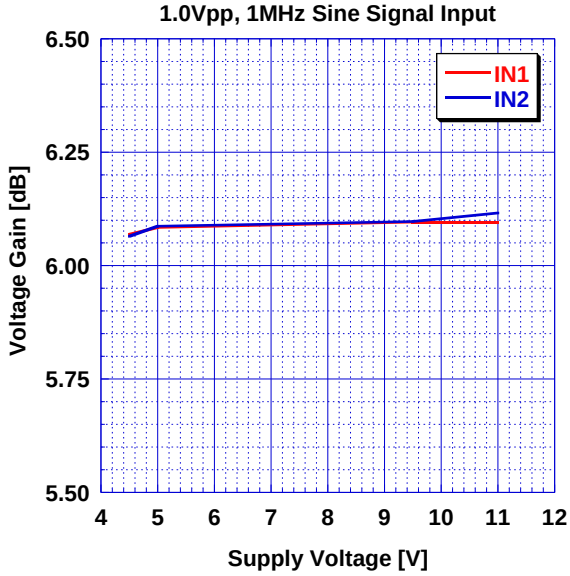
Source impedance to the input terminal, please lower than 200Ω. A high source impedance, the signal may be distorted. If so, please to connect a buffer for impedance conversion.

■TYPICAL CHARACTERISTICS

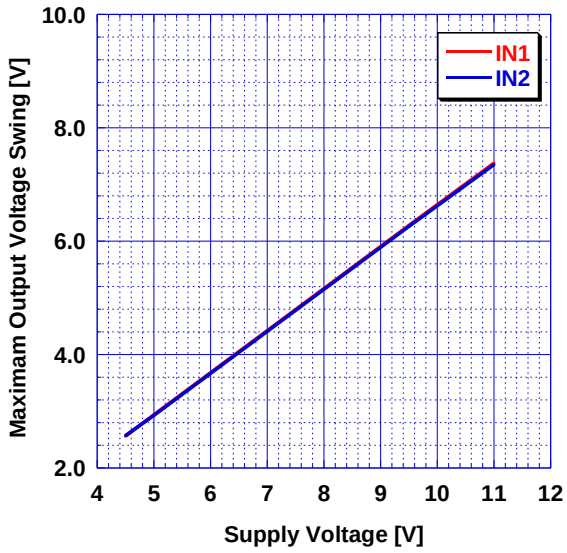
Operating Current vs. Supply Voltage



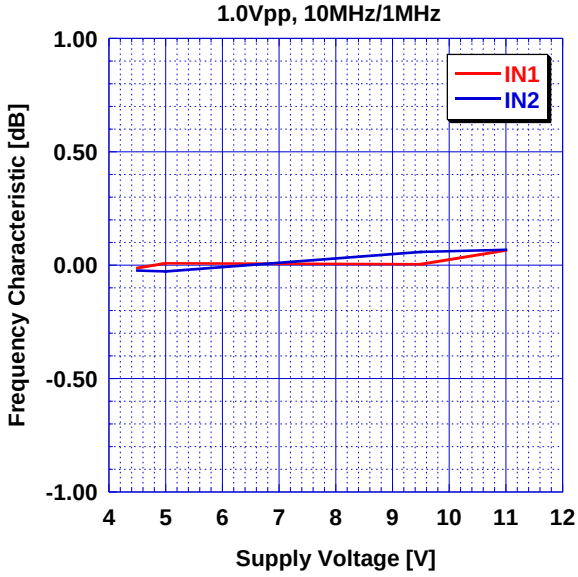
Voltage Gain vs. Supply Voltage
1.0Vpp, 1MHz Sine Signal Input



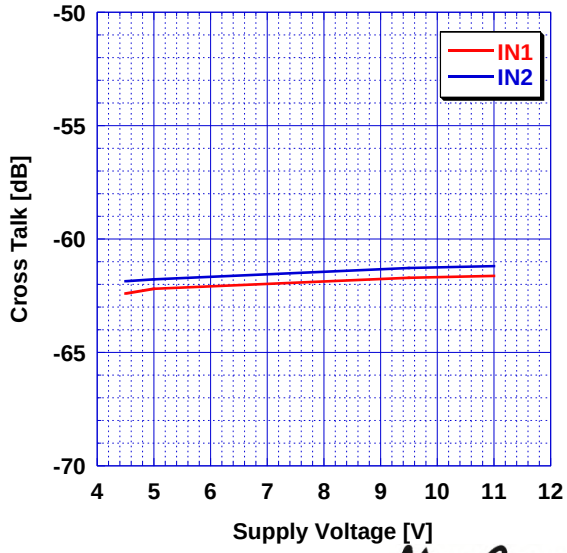
Maximam Output Voltage Swing vs. Supply Voltage
Total Harmonic Distortion=1%, 100kHz



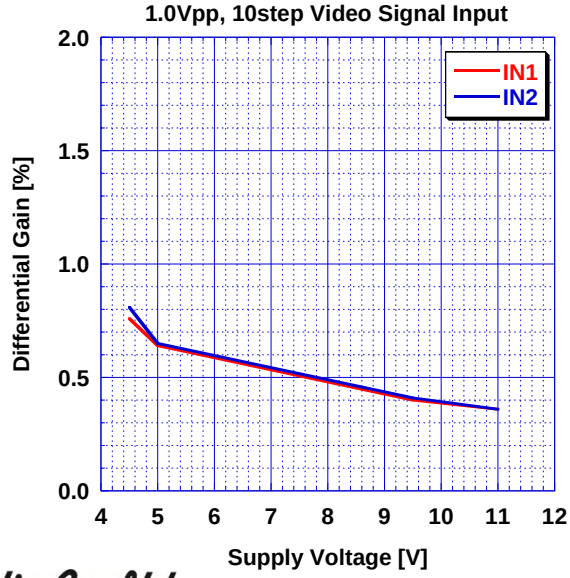
Frequency Characteristic vs. Supply Voltage
1.0Vpp, 10MHz/1MHz



Cross Talk vs. Supply Voltage
1.0Vpp 4.43MHz, Sine Signal Input

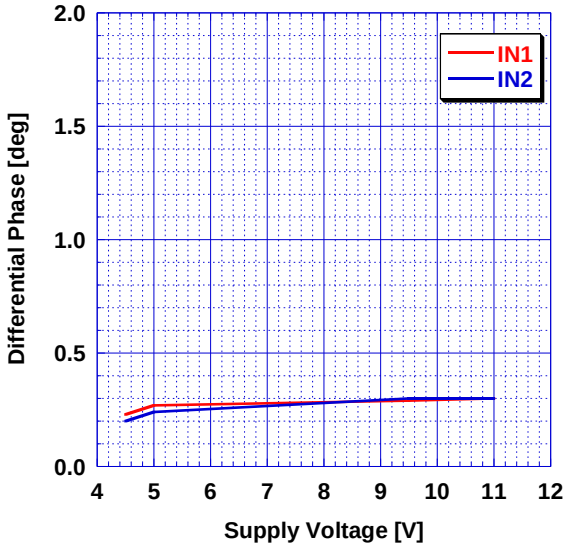


Differential Gain vs. Supply Voltage
1.0Vpp, 10step Video Signal Input

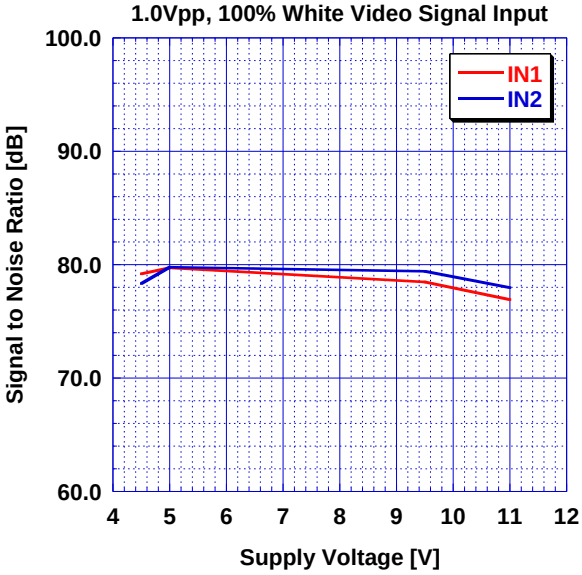


■TYPICAL CHARACTERISTICS

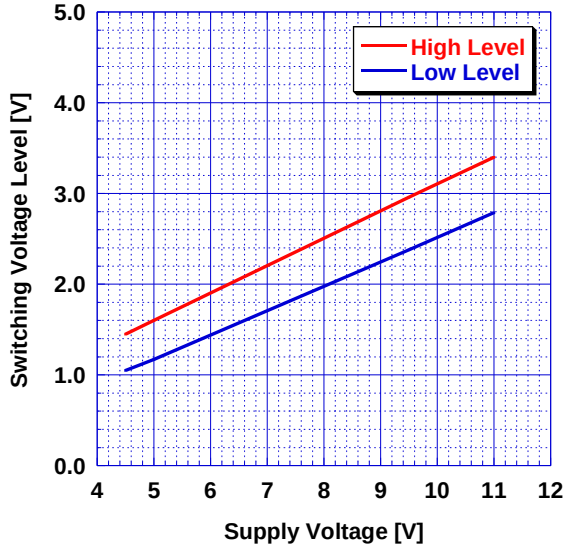
Differential Phase vs. Supply Voltage
1.0Vpp, 10step Video Signal Input



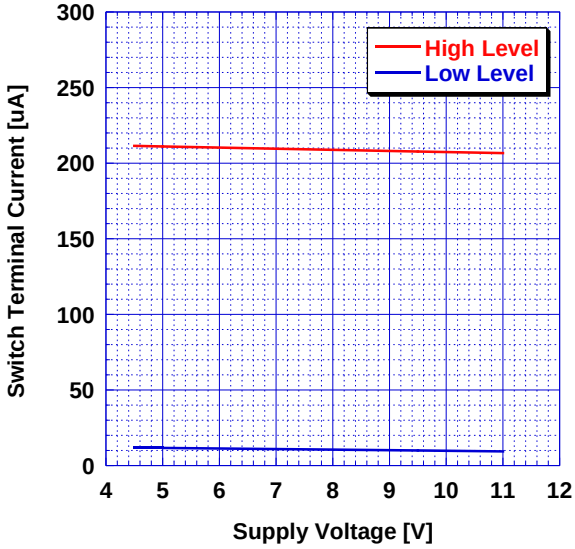
Signal to Noise Ratio vs. Suppply Voltage
1.0Vpp, 100% White Video Signal Input



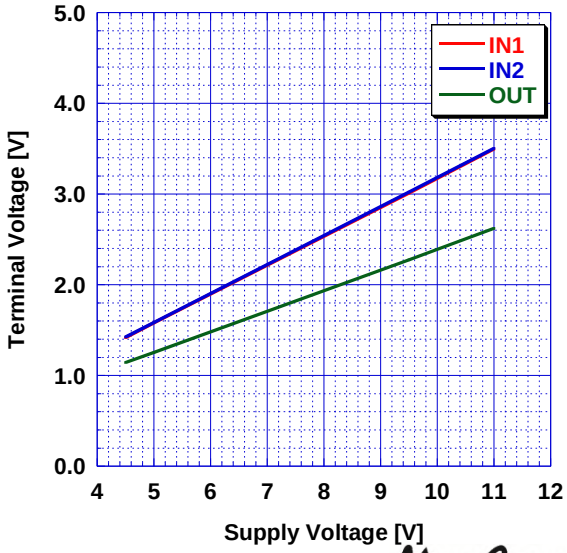
Switching Voltage Level vs. Supply Voltage



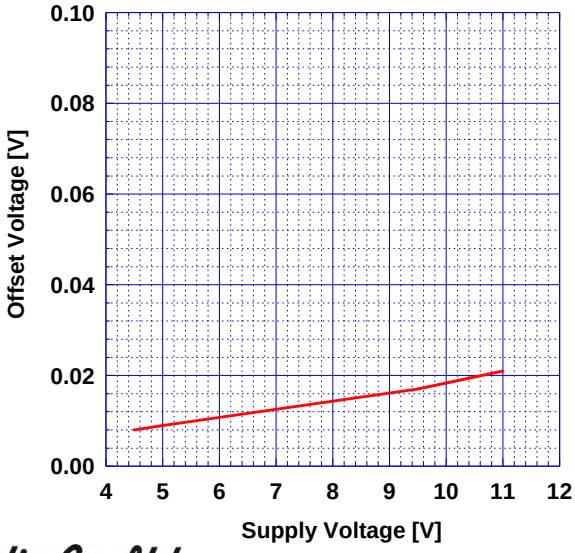
Switch Terminal Current vs. Supply Voltage



Terminal Voltage vs. Supply Voltage

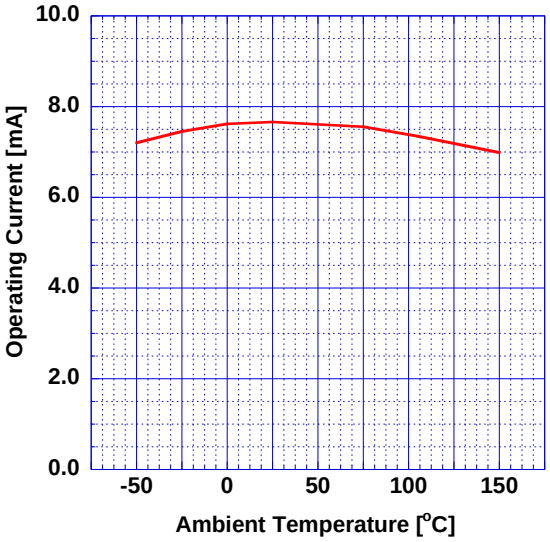


Offset Voltage vs. Supply Voltage

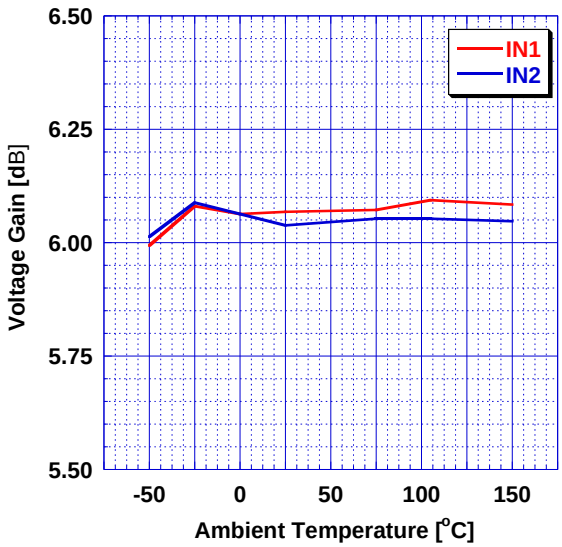


■TYPICAL CHARACTERISTICS

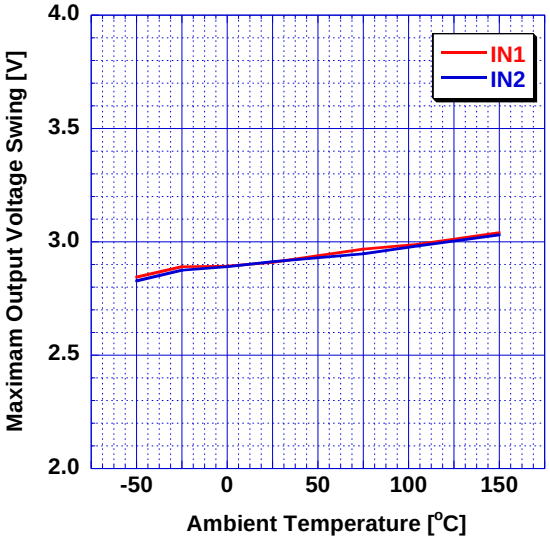
Operating Current vs. Temperature



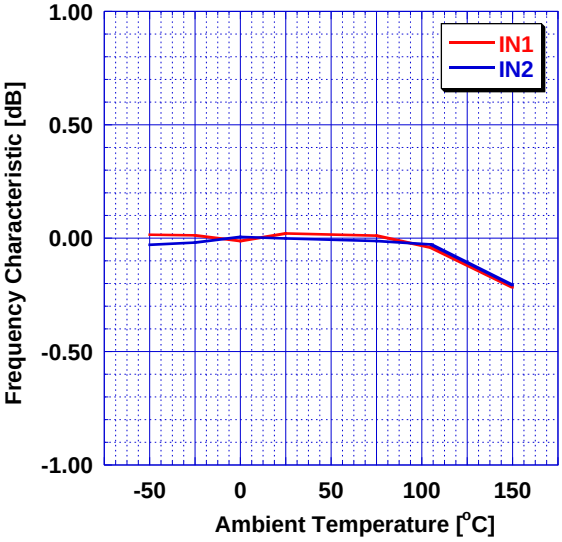
Voltage Gain vs. Temperature
1.0Vpp, 1MHz Sine Signal Input



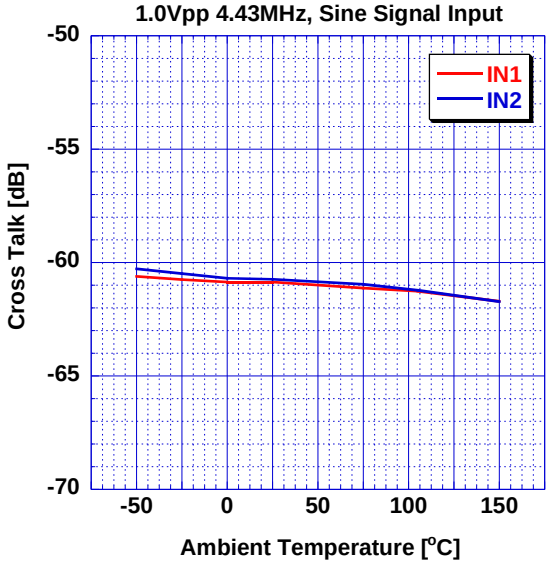
Maximam Output Voltage Swing vs. Temperature
Total Harmonic Distortion=1%, 100kHz



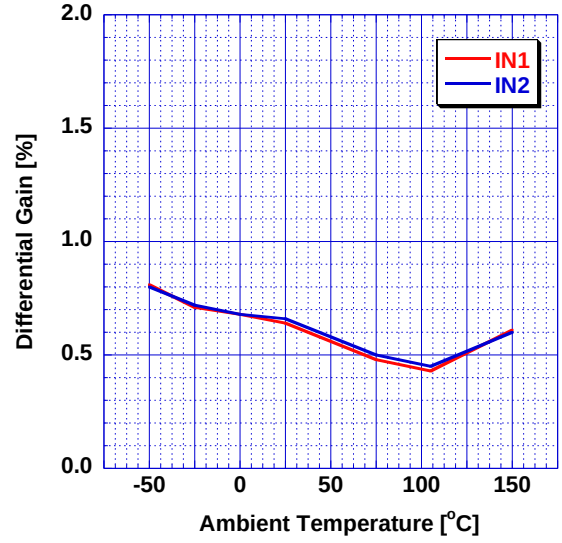
Frequency Characteristic vs. Temperature
1.0Vpp, 10MHz/1MHz



Cross Talk vs. Temperature
1.0Vpp 4.43MHz, Sine Signal Input

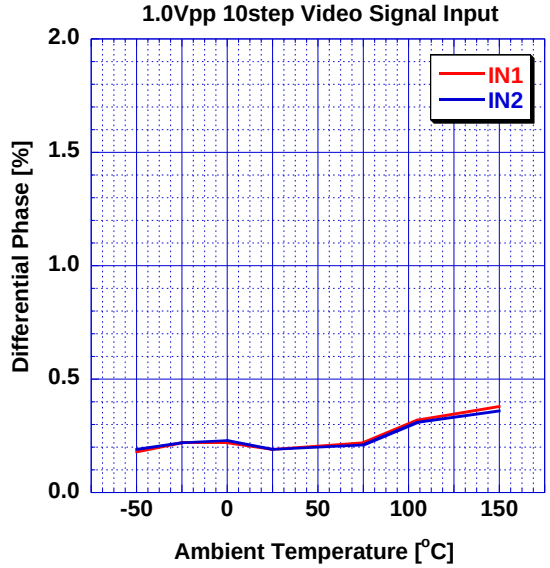


Differential Gain vs. Temperature
1.0Vpp 10step Video Signal Input

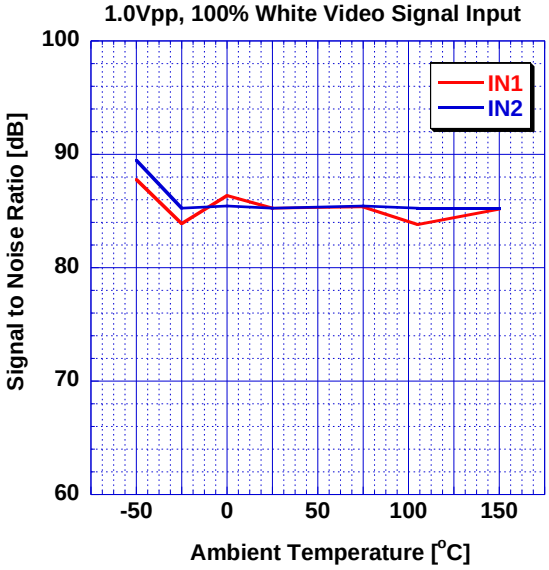


■TYPICAL CHARACTERISTICS

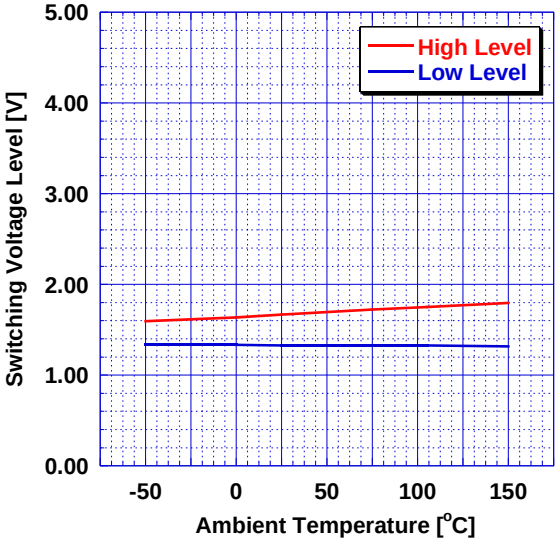
Differential Phase vs. Temperature
1.0Vpp 10step Video Signal Input



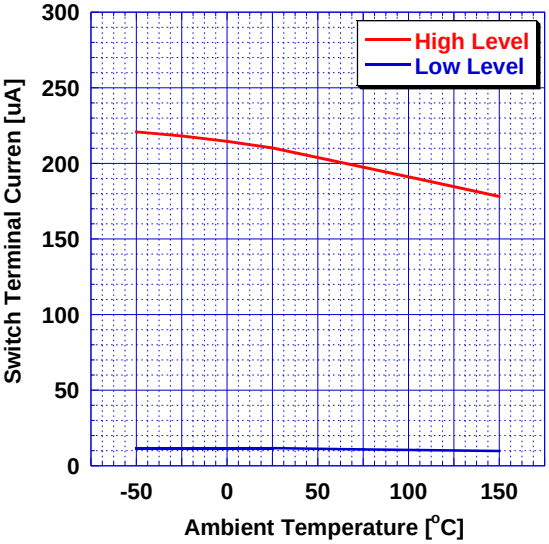
Signal to Noise Ratio vs. Temperature
1.0Vpp, 100% White Video Signal Input



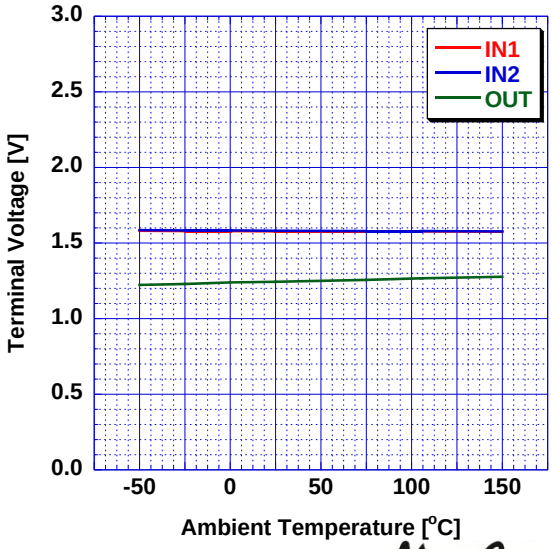
Switching Voltage Level vs. Temperature



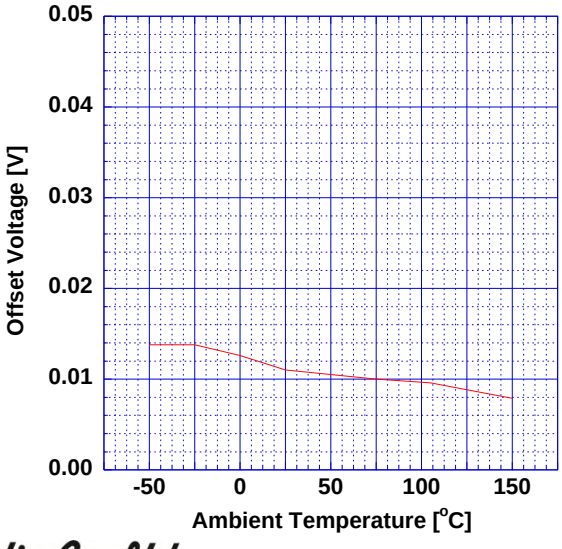
Switch Terminal Current vs. Temperature



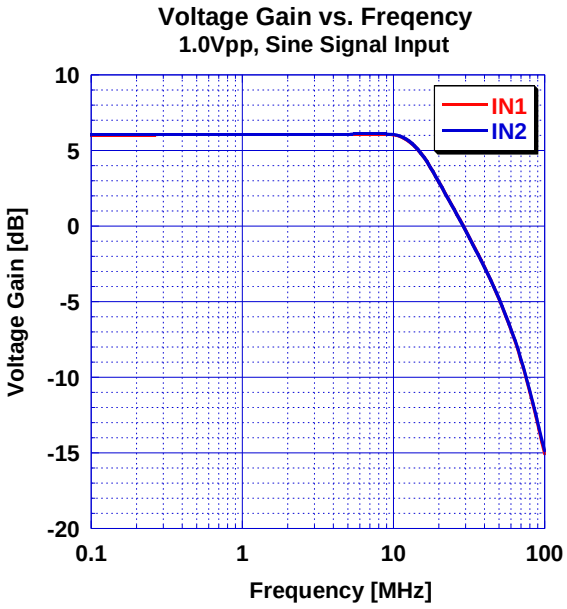
Terminal Voltage vs. Temperature



Offset Voltage vs. Temperature

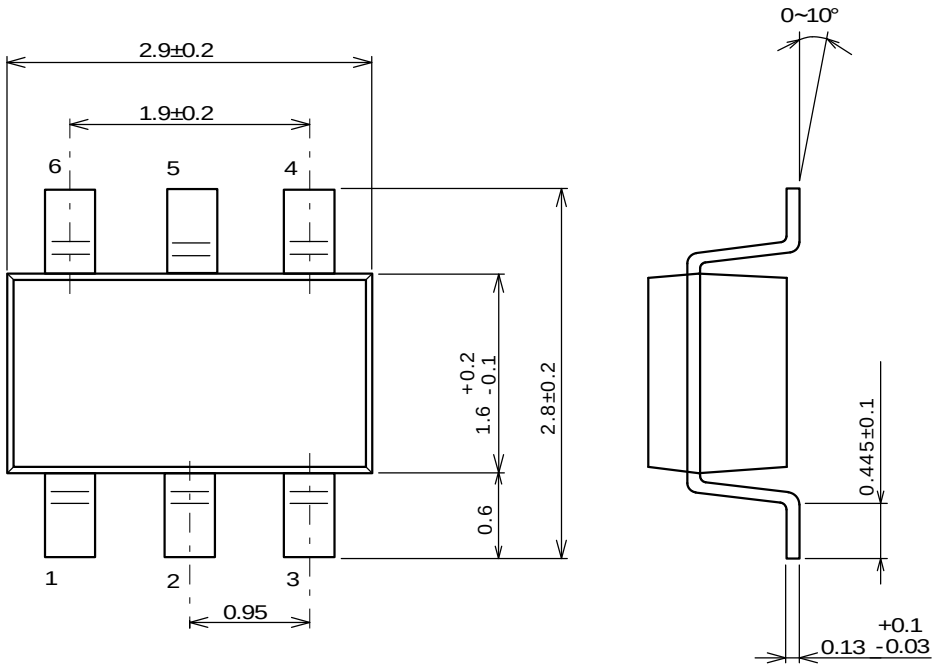


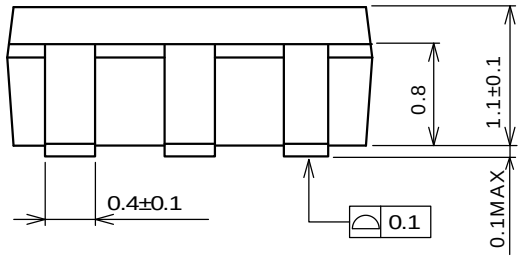
■TYPICAL CHARACTERISTICS



■PACKAGE OUTLINE

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



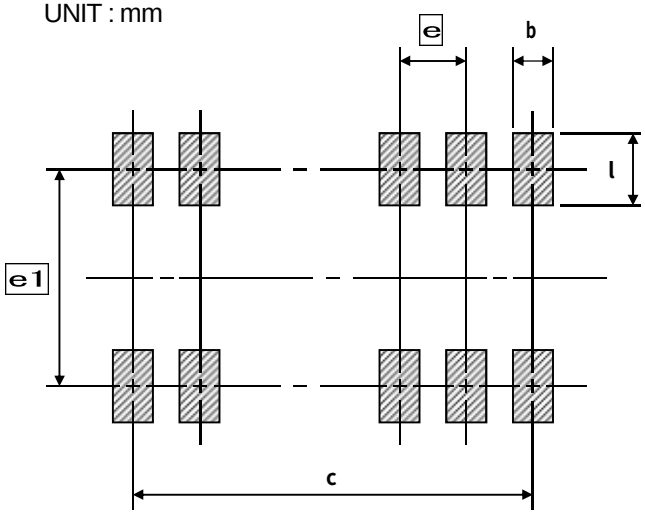


UNIT : mm

■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



Note : These solder foot print dimensions are just examples.
When designing PCB, please estimate the pattern carefully.

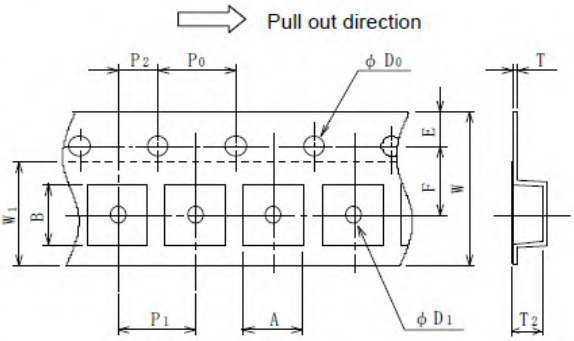
■PACKING SPECIFICATION

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.

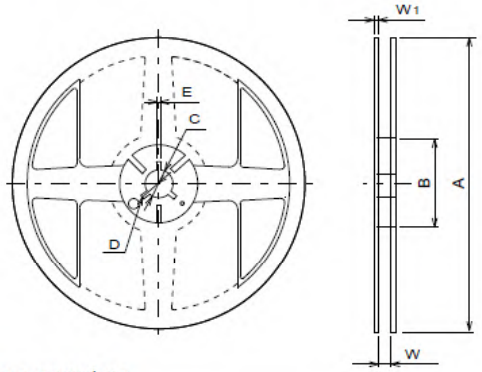
SOT-23(MTP) Emboss Taping (TE1)

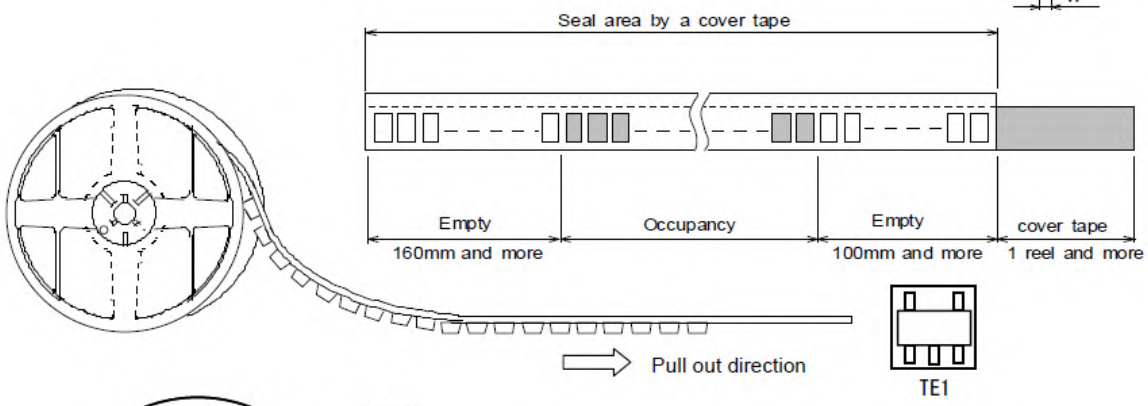
Symbol	SOT-23-6-1	Remark
A	3.3±0.1	Bottom size
B	3.2±0.1	Bottom size
D_0	1.55	
D_1	1.05	
E	1.75±0.1	
F	3.5±0.05	
P_0	4.0±0.1	
P_1	4.0±0.1	
P_2	2.0±0.05	
T	0.25±0.05	
T_2	1.57	
W	8.0±0.3	
W_1	5.5	Thickness 0.1MAX

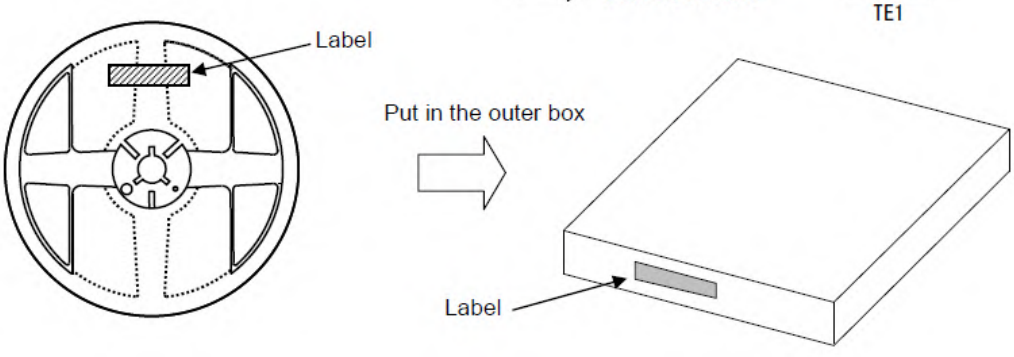


Symbol	SOT-23-6-1
A	Ø180±1
B	Ø 60±1
C	Ø 13±0.2
D	Ø 21±0.8
E	2±0.5
W	9±0.5
W_1	1.2±0.2
Contents	3,000pcs

Unit : mm

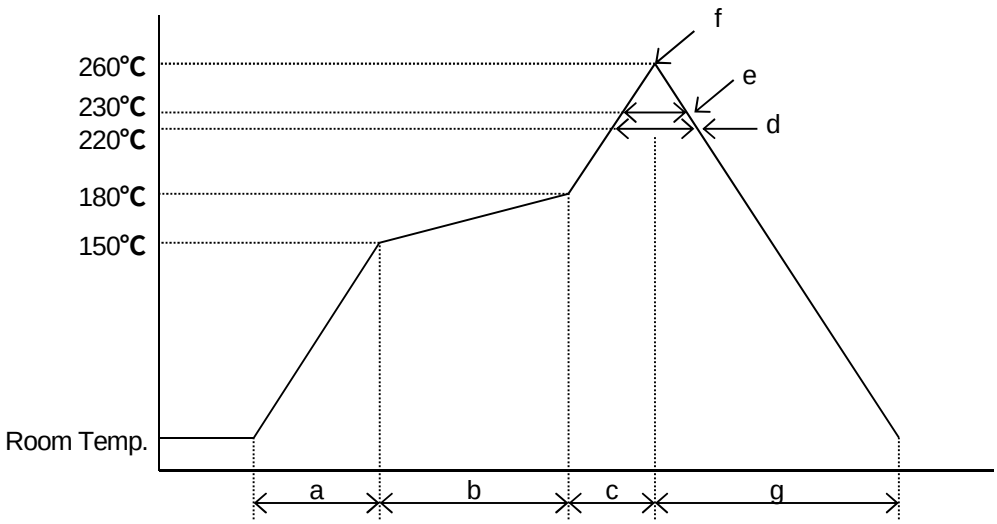






■RECOMMENDED MOUNTING METHOD

＊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.

[CAUTION]

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9. The product specifications and descriptions listed in this catalog are subject to change at any time, without notice.

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