



## FEATURES

- Slew rate: 6.1V/ $\mu$ s
- Bandwidth: 6.6MHz
- Input/Output full swing
- Low supply current: 650 $\mu$ A (Typical)
- Offset Voltage: 5.1 $\mu$ V (Typical)
- Supply Voltage: 2.2V to 5.5V
- Operation Temperature Range: -40°C to 125°C
- Micro Size Packages: SOT23, SC70 and SOIC

## APPLICATIONS

- ADC buffer
- Audio equipment
- Instrument circuit
- Stress test circuit
- Current measuring circuit
- Consumer electronics

## GENERAL DESCRIPTION

The MT076X series are single, dual, and quad rail-to-rail CMOS operational amplifiers with low noise and low quiescent current. These amplifiers have the characteristics of input/output full swing, low offset, low power and stable high frequency response. These amplifiers achieve very good AC performance with 6.6MHz bandwidth, 6.1V/ $\mu$ s slew rate and low distortion while drawing only 650 $\mu$ A of quiescent current per amplifier. These amplifiers have the characteristics of low input bias current and high open-loop gain. This product adopts rail to rail input and output design, with 5.1 $\mu$ V offset voltage and extremely low noise.

MT076X has wide temperature range from -40°C to +125°C.

Single or dual supplies as low as 2.2V ( $\pm$ 1.1V) and up to 5.5V ( $\pm$ 2.75V) can be used. And these amplifiers have good PSRR characteristics, as a result of that, they can be powered by battery without voltage regulator.

The MT0761 is available in the 5-Pin SOT23, SC70 and 8-Pin SOIC packages.

## SIMPLIFIED SCHEMATIC

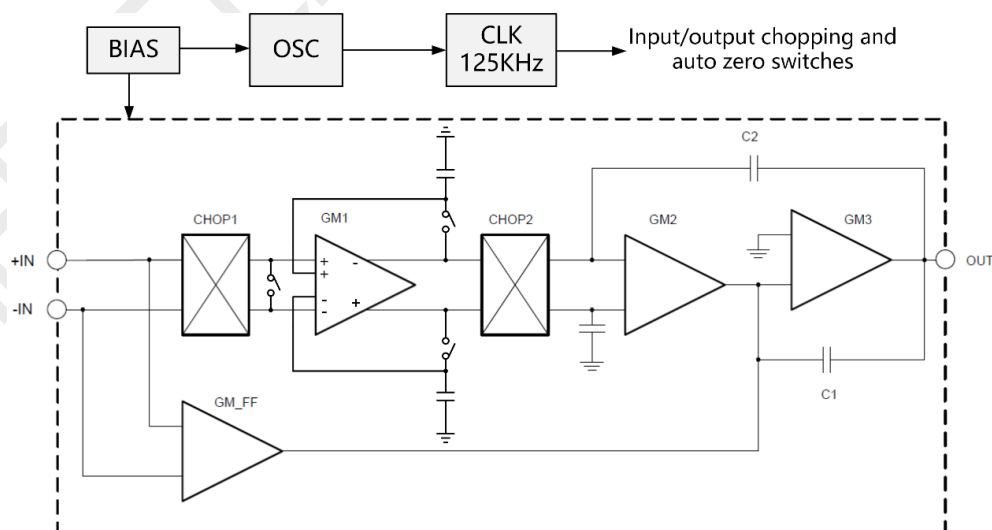
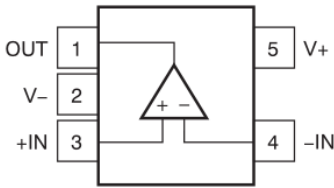
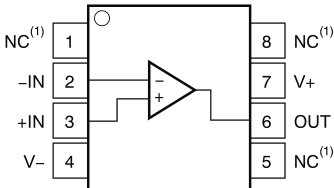


Figure 1. Simplified schematic

## ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage.....	+2.2V to +5.5V
Input Offset Voltage.....	5.1 $\mu$ V(typical)
Input Offset Current.....	91pA(typical)
Maximum Operating Junction Temperature.....	150°C
Operating Temperature Range.....	-40°C to 125°C
Storage Temperature .....	-65°C to 150°C

## PACKAGE/ORDER INFORMATION

TOP VIEW	Order Part Number	Package	Top Marking
	MT0761	5-Pin SOT23 5-Pin SC70	MT0761 <u>AC</u> MT0761 <u>CD</u>
		8-Pin SOIC	MT0761 <u>AJ</u>

## DEVICE INFORMATION

Order Part Number	Top Marking	Package
MT0761	MT0761 <u>AC</u>	SOT23-5
	MT0761 <u>CD</u>	SC70-5 (SOT353)
	MT0761 <u>AJ</u>	SOIC-8

## PIN DESCRIPTION

Pin Name	Pin Number	Description
OUT	-	Output
-IN	-	Inverting input

+IN	-	Noninverting input
-V	-	Positive (highest) power supply
+V	-	Negative (lowest) power supply

## ELECTRICAL CHARACTERISTICS (Note 3)

(At  $T_A = 25^\circ\text{C}$ ,  $+V_S = +2.5\text{V}$ ,  $-V_S = -2.5\text{V}$ ,  $R_L = 10\text{K}\Omega$ ,  $C_L = 0$ , unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_S = 5.0\text{V}$		5.1	25	mV
Input Offset Voltage Drift	$T_A = -40^\circ\text{C}$ to $125^\circ\text{C}$		0.3		$\mu\text{V}/^\circ\text{C}$
Input Bias Current	$T_A = 25^\circ\text{C}$		283		pA
Input Offset Current			91		pA
Power Supply Rejection Ratio			124		dB
Common-mode Rejection Ratio			132		dB
Open Loop Voltage Gain	$R_L = 10\text{K}\Omega$ , $C_L = 0\text{pF}$		123		dB
Gain-bandwidth product	$R_L = 0\Omega$ , $C_L = 100\text{pF}$ , $V_{DD} = 5.5\text{V}$		6.6		MHz
Slew Rate	$G = +1$ , $R_L = 0\Omega$ , $C_L = 100\text{pF}$ , $V_{DD} = 5.5\text{V}$		6.1		$\text{V}/\mu\text{s}$
Input Voltage Noise	$f = 0.1\text{Hz}$ to $10\text{Hz}$		0.8		$\mu\text{V}_{PP}$
Input Voltage Noise Density	$f = 1\text{kHz}$		7.5		$\text{nV}/\sqrt{\text{Hz}}$
Supply Current (per amplifier)			650		$\mu\text{A}$
Operating Temperature Range		-40		125	$^\circ\text{C}$
Storage Temperature Range		-65		150	$^\circ\text{C}$

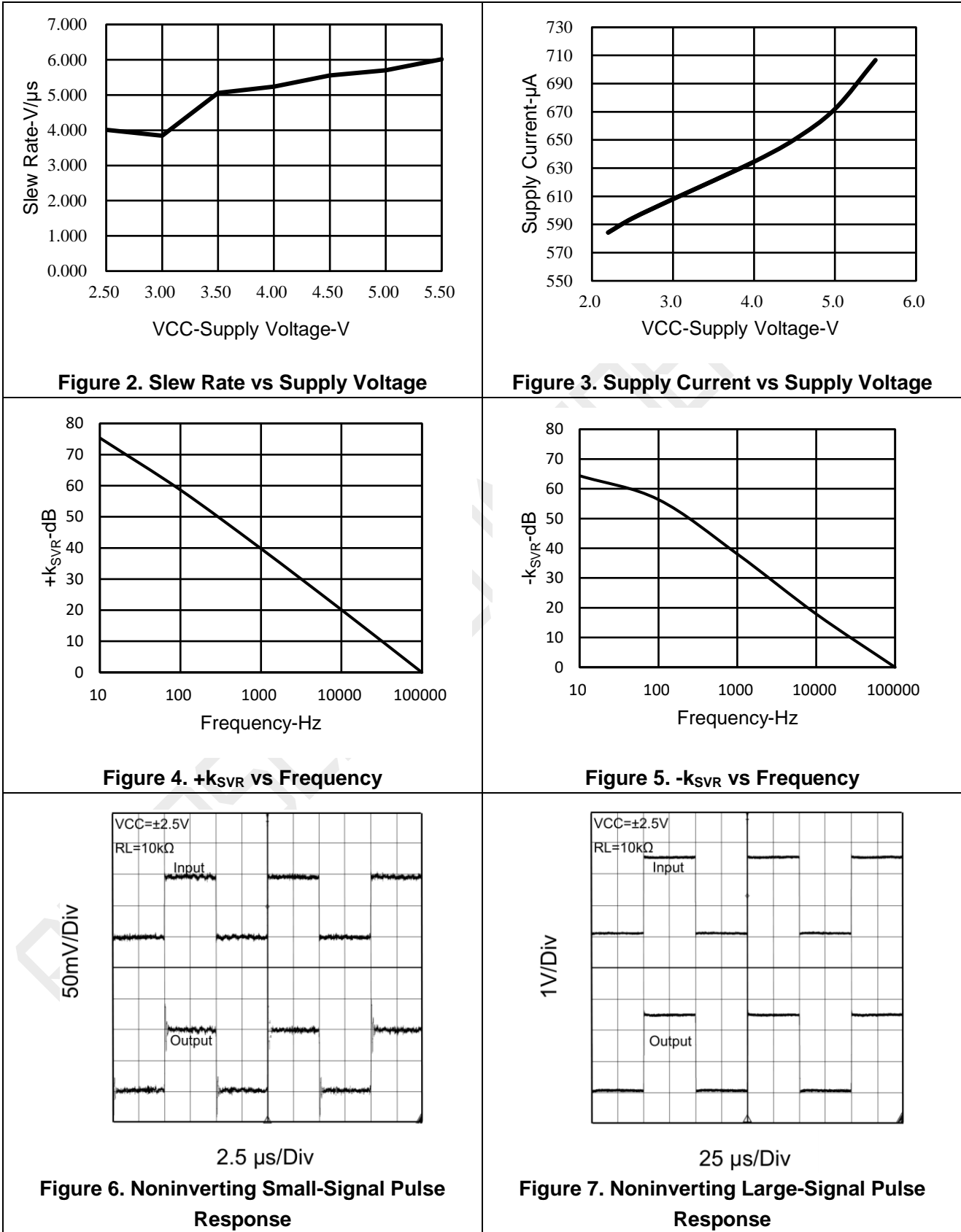
**Note 1:** Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

**Note 2:**  $T_J$  is calculated from the ambient temperature  $T_A$  and power dissipation  $P_D$  according to the following formula:  $T_J = T_A + (P_D) \times (170^\circ\text{C}/\text{W})$ .

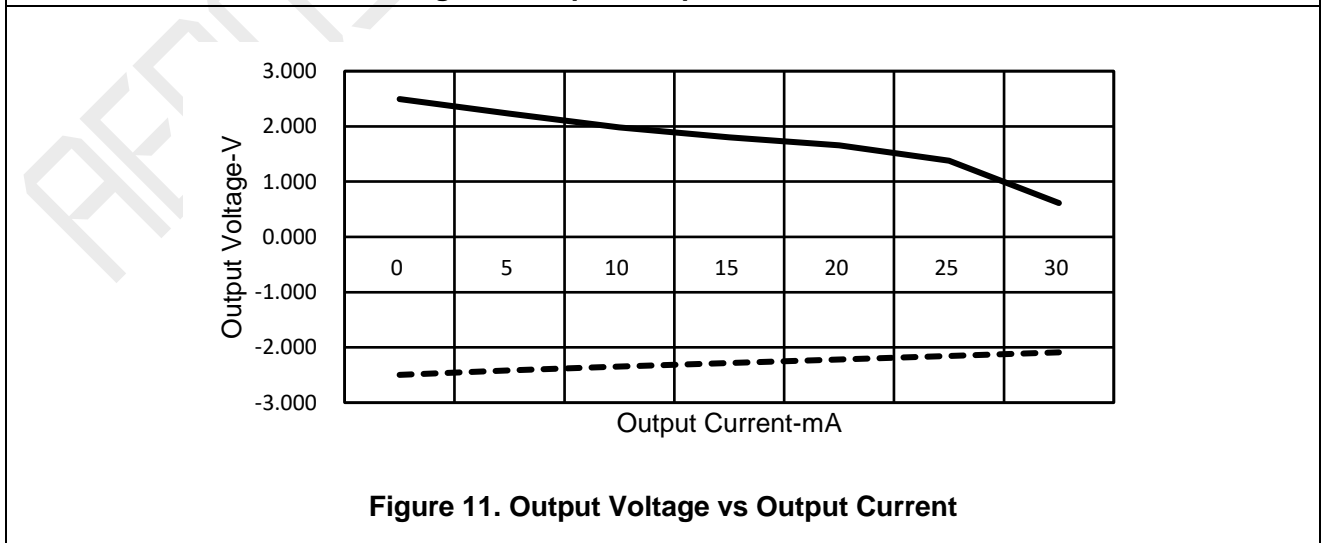
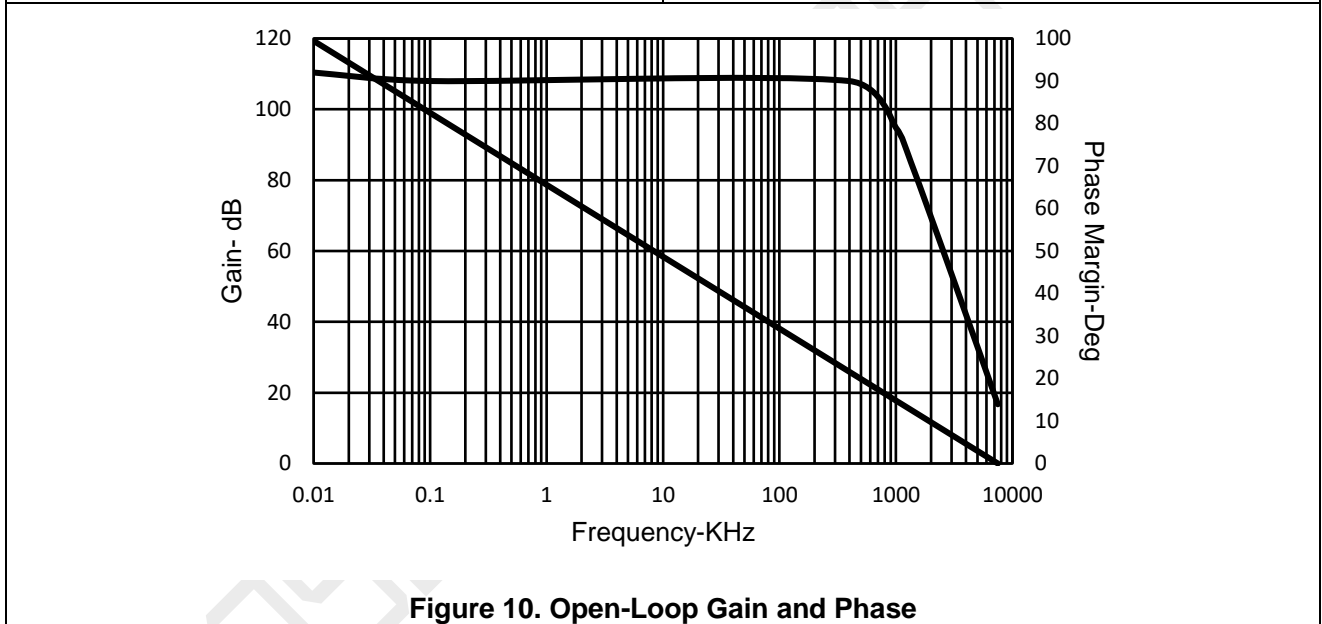
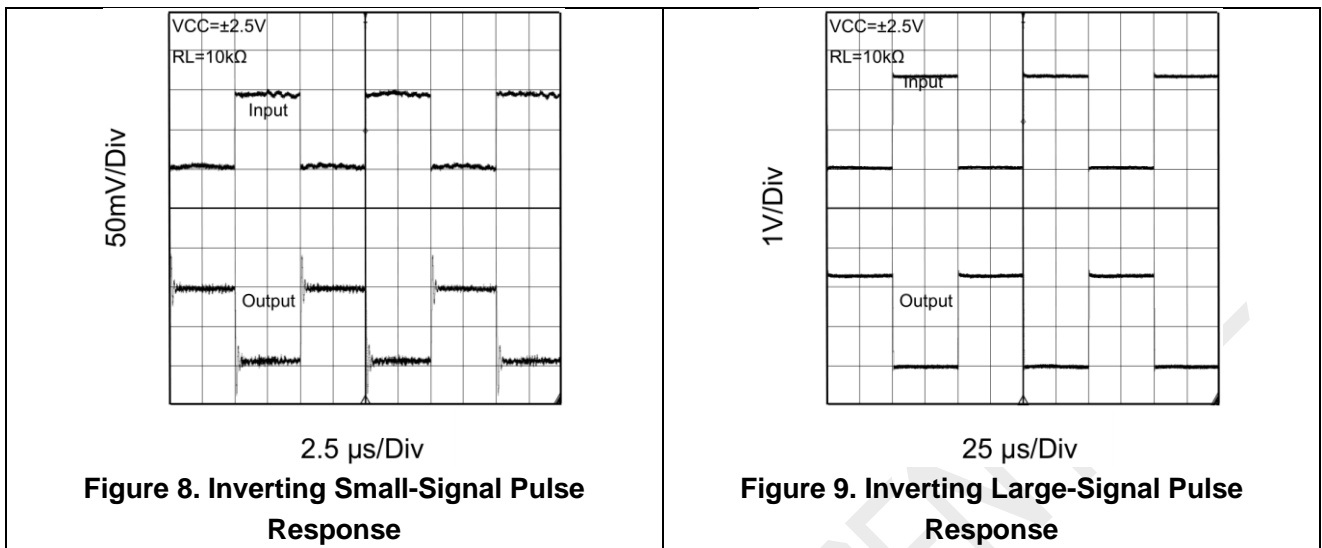
**Note 3:** 100% production test at  $+25^\circ\text{C}$ . Specifications over the temperature range are guaranteed by design and characterization.

## TYPICAL PERFORMANCE CHARACTERISTICS

(At  $T_A = 25^\circ\text{C}$ ,  $+V_S = +2.5\text{V}$ ,  $-V_S = -2.5\text{V}$ ,  $R_L = 2\text{K}\Omega$ ,  $C_L = 100\text{pF}$ , unless otherwise noted.)



## TYPICAL PERFORMANCE CHARACTERISTICS



## APPLICATIONS INFORMATION

MT076X are low supply voltage CMOS operational Amplifiers. This amplifier has the characteristics of Input/Output full swing, high slew rate, low supply current and high speed operation. MT076X has wide temperature range from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ . Single or dual supplies as low as  $2.2\text{V}(\pm 1.1\text{V})$  and up to  $5.5\text{V}(\pm 2.75\text{V})$  can be used.

### Voltage follower

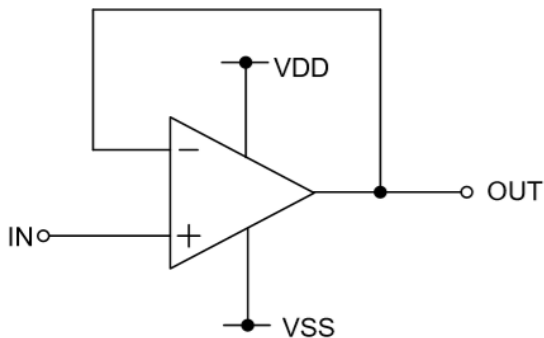


Figure 12. Voltage follower

Voltage gain is 0dB. Using this circuit, the output voltage (OUT) is configured to be equal to the input voltage (IN). This circuit also stabilizes the output voltage (OUT) due to high input impedance and low output impedance. Computation for output voltage (OUT) is shown below.  $\text{OUT} = \text{IN}$ .

### Inverting amplifier

For inverting amplifier, input voltage (IN) is amplified by a voltage gain and depends on the ratio of R1 and R2. The out-of-phase output voltage is shown in the next expression

$$\text{OUT} = -(\text{R2}/\text{R1}) \cdot \text{IN}$$

This circuit has input impedance equal to R1.

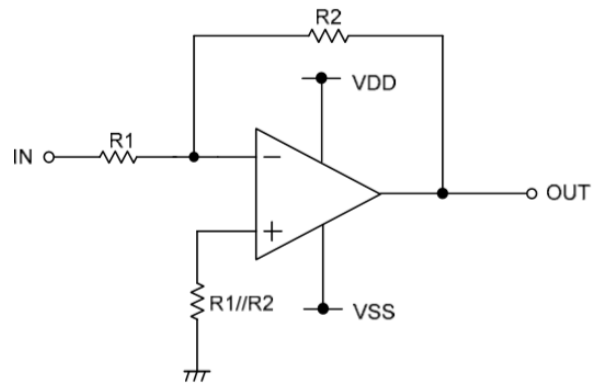


Figure 13. Inverting amplifier circuit

### Non-inverting amplifier

For non-inverting amplifier, input voltage (IN) is amplified by a voltage gain, which depends on the ratio of R1 and R2. The output voltage (OUT) is in-phase with the input voltage (IN) and is shown in the next expression.

$$\text{OUT} = (1 + \text{R2}/\text{R1}) \cdot \text{IN}$$

Effectively, this circuit has high input impedance since its input side is the same as that of the operational amplifier.

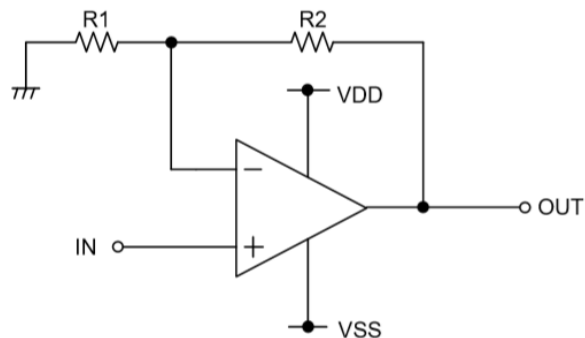
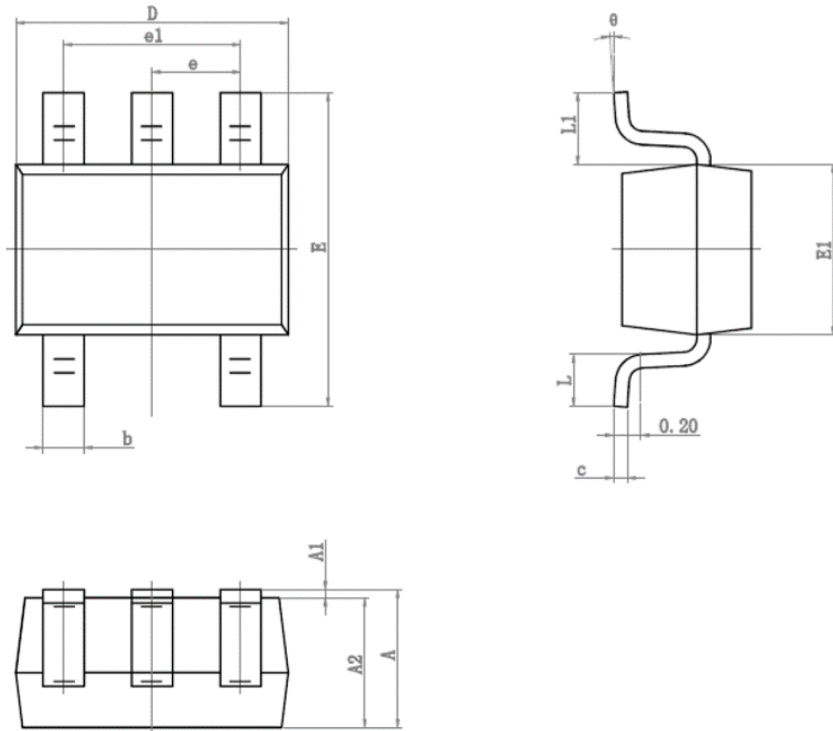


Figure 14. Non-inverting amplifier circuit

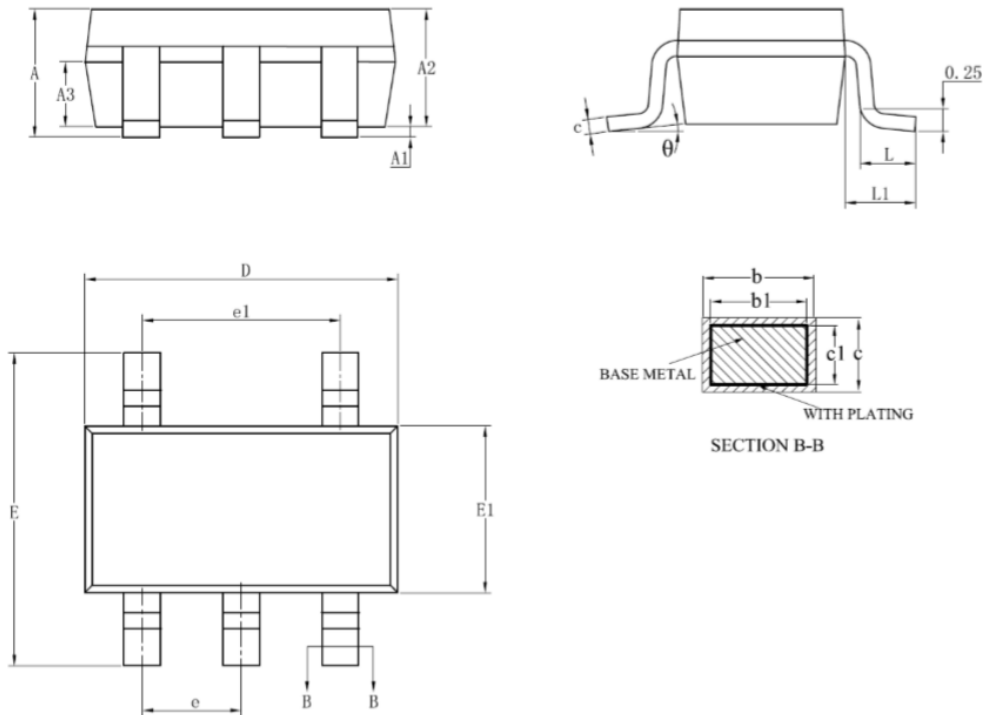
## PACKAGE DESCRIPTION

SC70-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.175	0.004	0.007
D	2.000	2.200	0.079	0.087
E	2.150	2.450	0.085	0.096
E1	1.150	1.350	0.045	0.053
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.260	0.460	0.010	0.018
L1	0.525 REF.		0.021 REF.	
θ	0°	8°	0°	8°

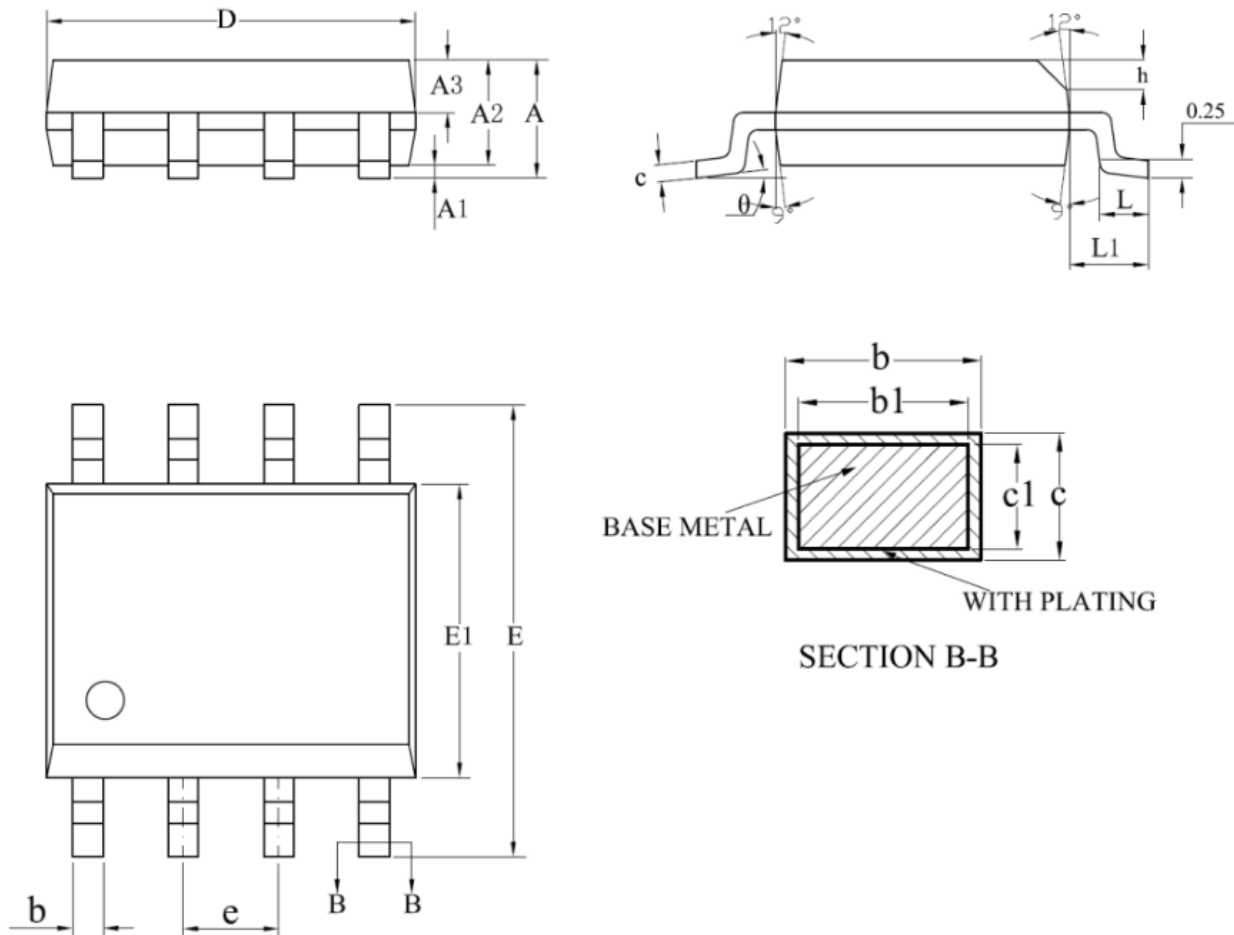
## SOT23-5



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	-	-	1.25
A1	0.04	-	0.10
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	-	0.41
b1	0.32	0.35	0.38
c	0.15	-	0.19
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95BSC		
e1	1.90BSC		
L	0.30	-	0.60
L1	0.6REF		
$\theta$	0	-	8°



## SOIC-8



SYMBOL	millimeter		
	min	nom	max
A	-	-	1.75
A1	0.10	-	0.23
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	-	0.47
b1	0.38	0.41	0.44
c	0.20	-	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	-	0.50
L	0.50	-	0.80
L1	1.05REF		
$\theta$	0	-	8°

NOTE:

- 1.All linear dimensions are in inches (millimeters).
- 2.This drawing is subject to change without notice.
- 3.Body length does not include mold flash,protrusions,or gate burrs.mold flash,protrusions,or gate burrs shall not exceed 0.006 (0.15) each side.
- 4.Body width does not include interlead flash.interlead flash shall not exceed 0.017 (0.43)each side.

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