AEROSEMI

MT0630

Ultra-Small Low Voltage CMOS Operational Amplifier

FEATURES

- High slew rate: 8.2V/μs
- Bandwidth:6.5MHz
- Low input offset voltage:1.4mV(Typical)
- Low input bias current:2pA(Typical)
- Quiescent Current:700μA
- Supply Voltage:1.8V to 5.5V
- Micro Size Packages: TSSOP8

APPLICATIONS

- Transducers
- Temperature Measurement
- Electronic Scales
- Medical instrumentation
- Handheld Test Equipment
- Battery equipment
- Consumer electronics

GENERAL DESCRIPTION

The MT0630 are high slew rate dual CMOS Operational Amplifiers. These amplifiers have the characteristics of low voltage operation, low input offset voltage and low supply current. In addition to a low operating voltage from 1.8V, these device output can achieve full swing output voltage capability extending to either supply.

MT0630 has wide temperature range from -40°C to +85°C.

Single or dual supplies as low as 1.8V(±0.9V) and up to 5.5V(±2.75V) can be used.

The MT0630 is available in the 8-pin TSSOP8 packages.

SIMPLIFIED SCHEMATIC

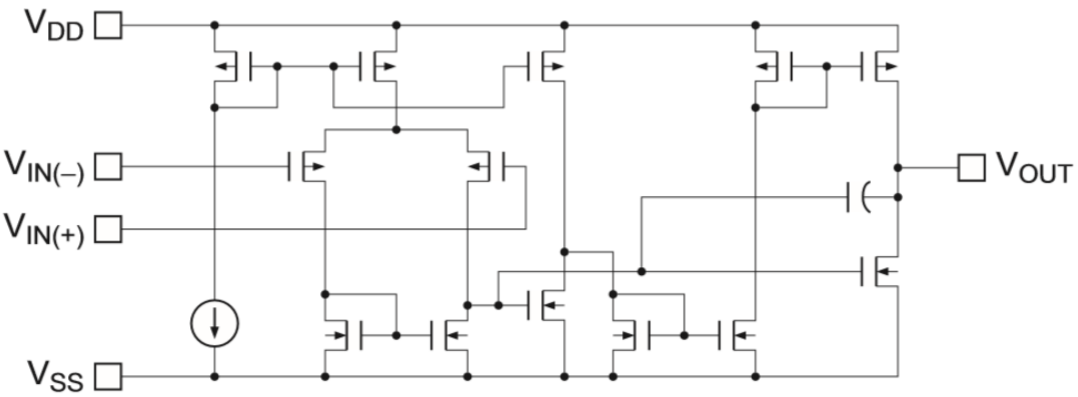

Figure 1. Simplified schematic

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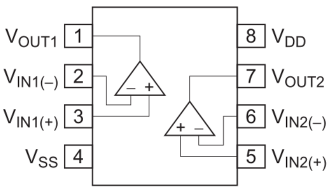
ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage...+1.8V to +5.5V
Input Offset Voltage..............................1.4mV(Typical)
Input Offset Current..............................0.75pA(Typical)
Maximum Operating Junction Temperature...................85°C
Operating Temperature Range............-40°C to 85°C
Storage Temperature ....-55°C to 125°C

PACKAGE/ORDER INFORMATION

	Order Part Number	Package	Top Marking
	MT0630	8-Pin TSSOP	MT0630CH

DEVICE INFORMATION

Order Part Number	Top Marking	Package
MT0630	MT0630CH	TSSOP-8

PIN DESCRIPTION

Pin Name	Pin Number	Description
VOUT1	1	Output of channel 1
VIN1(-)	2	Inverting input of channel 1
VIN1(+)	3	Noninverting input of channel 1
VSS	4	Negative(lowest) power supply
VIN2(+)	5	Noninverting input of channel 2
VIN2(-)	6	Inverting input of channel 2
VOUT2	7	Output of channel 2
VDD	8	Positive (highest) power supply

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ELECTRICAL CHARACTERISTICS (Note 3)

(At T_A = 25°C, VDD=+3V, VSS=0V, C_L=22pF, R_L=100kΩ, unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IN}=1.5V		1.4	4	mV
Input Bias Current	T_A = 25°C		2		pA
Input Offset Current			0.75		pA
Power Supply Rejection Ratio			95		dB
Common-mode Rejection Ratio			79		dB
Open Loop Voltage Gain			111		dB
Gain-bandwidth product	C_L=22pF		8.2		MHz
Slew Rate	G=+1, C_L=22pF		8.2		V/μs
Maximum Voltage Output	R_L=100kΩ	2.9			mV
Minimum Voltage Output	R_L=100kΩ			0.1	mV
Input Common-mode Voltage Range	VSS to VDD	0		1.9	V
Supply Current	R_L=∞		700		μA
Operating Temperature Range		-40		85	°C
Storage Temperature Range		-55		125	°C

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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: $T_J = T_A + (P_D)$ x (170°C/W).
Note 3: 100% production test at +25°C. Specifications over the temperature range are guaranteed by design and characterization.

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TYPICAL PERFORMANCE CHARACTERISTICS

(At T_A = 25°C, +VS=+1.5V, -VS=-1.5V, R_L =10KΩ, CL=25pF unless otherwise noted.)

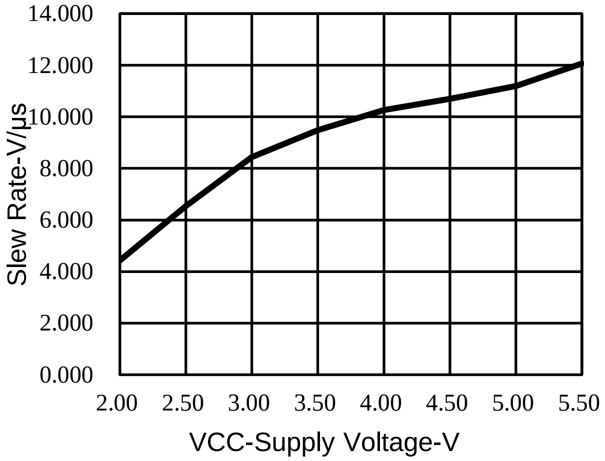

Figure 2. Slew Rate vs Supply Voltage

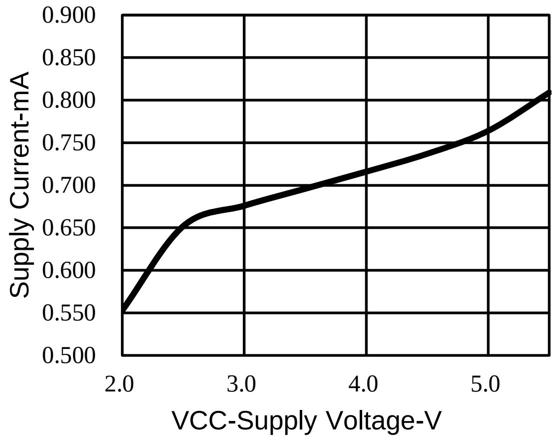

Figure 3. Supply Current vs Supply Voltage

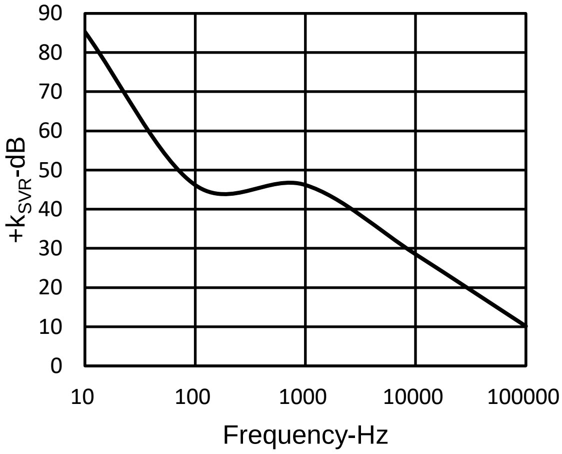

Figure 4. +k_{SVR} vs Frequency

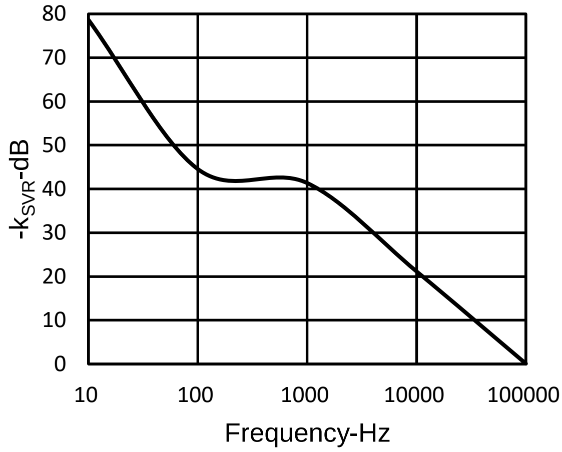

Figure 5. -k_{SVR} vs Frequency

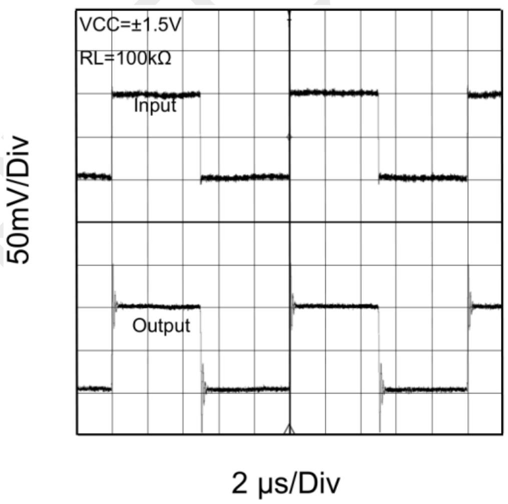

Figure 6. Noninverting Small-Signal Pulse Response

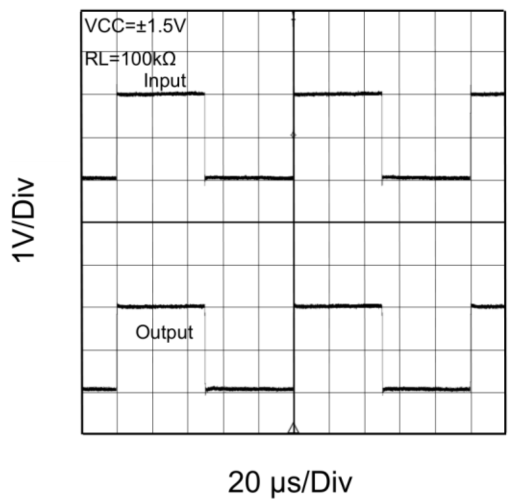

Figure 7. Noninverting Large-Signal Pulse Response

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TYPICAL PERFORMANCE CHARACTERISTICS

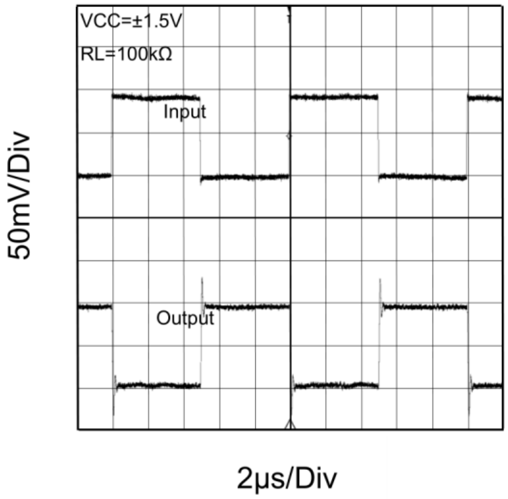

Figure 8. Inverting Small-Signal Pulse Response

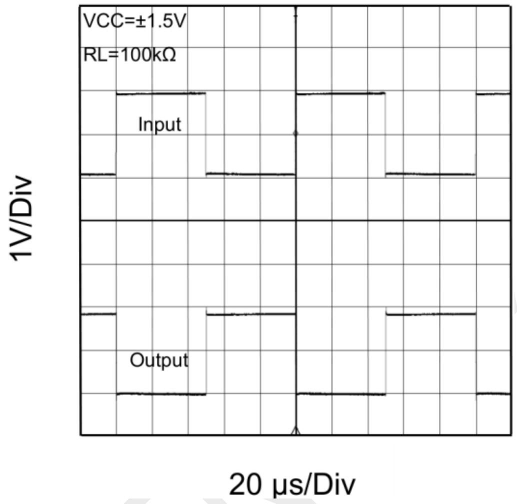

Figure 9. Inverting Large-Signal Pulse Response

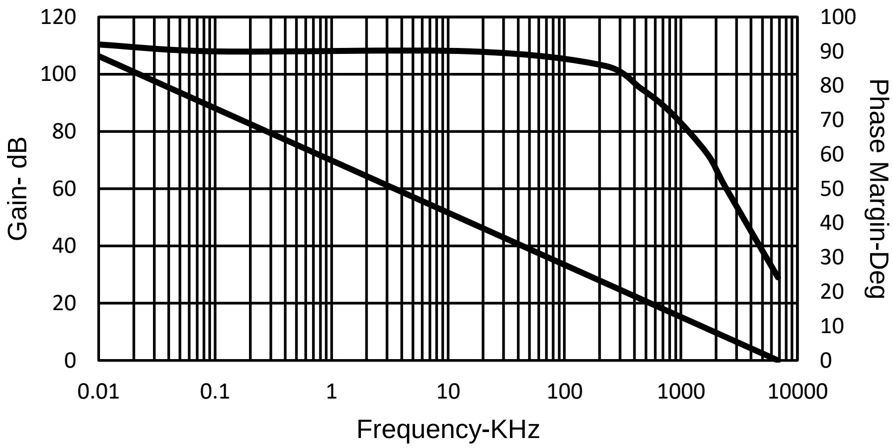

Figure 10. Open-Loop Gain and Phase

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APPLICATIONS INFORMATION

MT0630 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. Input bias current is very low at 2pA (Typ). MT0630 has wide temperature range from -40°C to +85°C.Single or dual supplies as low as 1.8V(±0.9V) and up to 5.5V(±2.75V) can be used.

Voltage follower

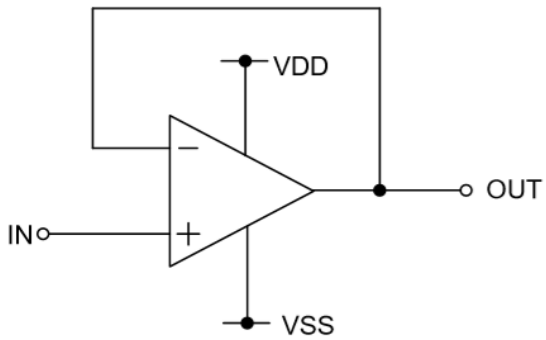

Figure 11. Voltage follower

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. OUT=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

OUT=-(R2/R1) · IN

This circuit has input impedance equal to R1.

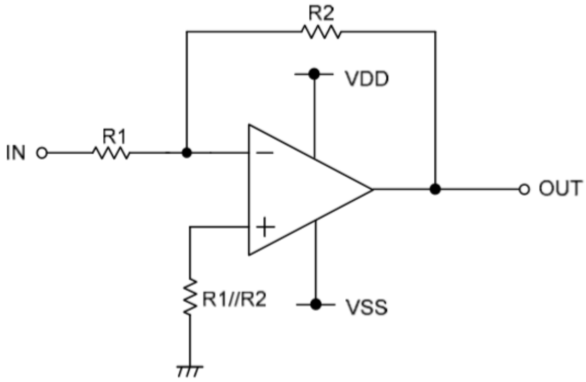

Figure 12. Inverting amplifier circuit

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.

OUT=(1 + R2/R1) · IN

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

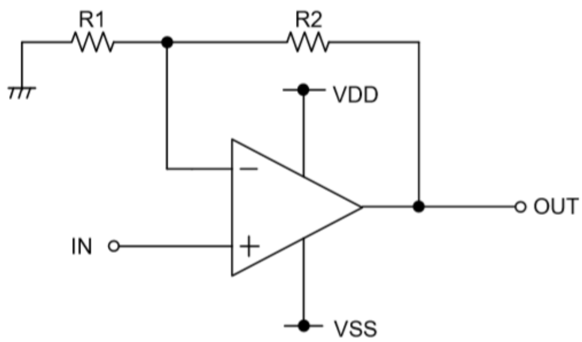

Figure 13. Non-inverting amplifier circuit

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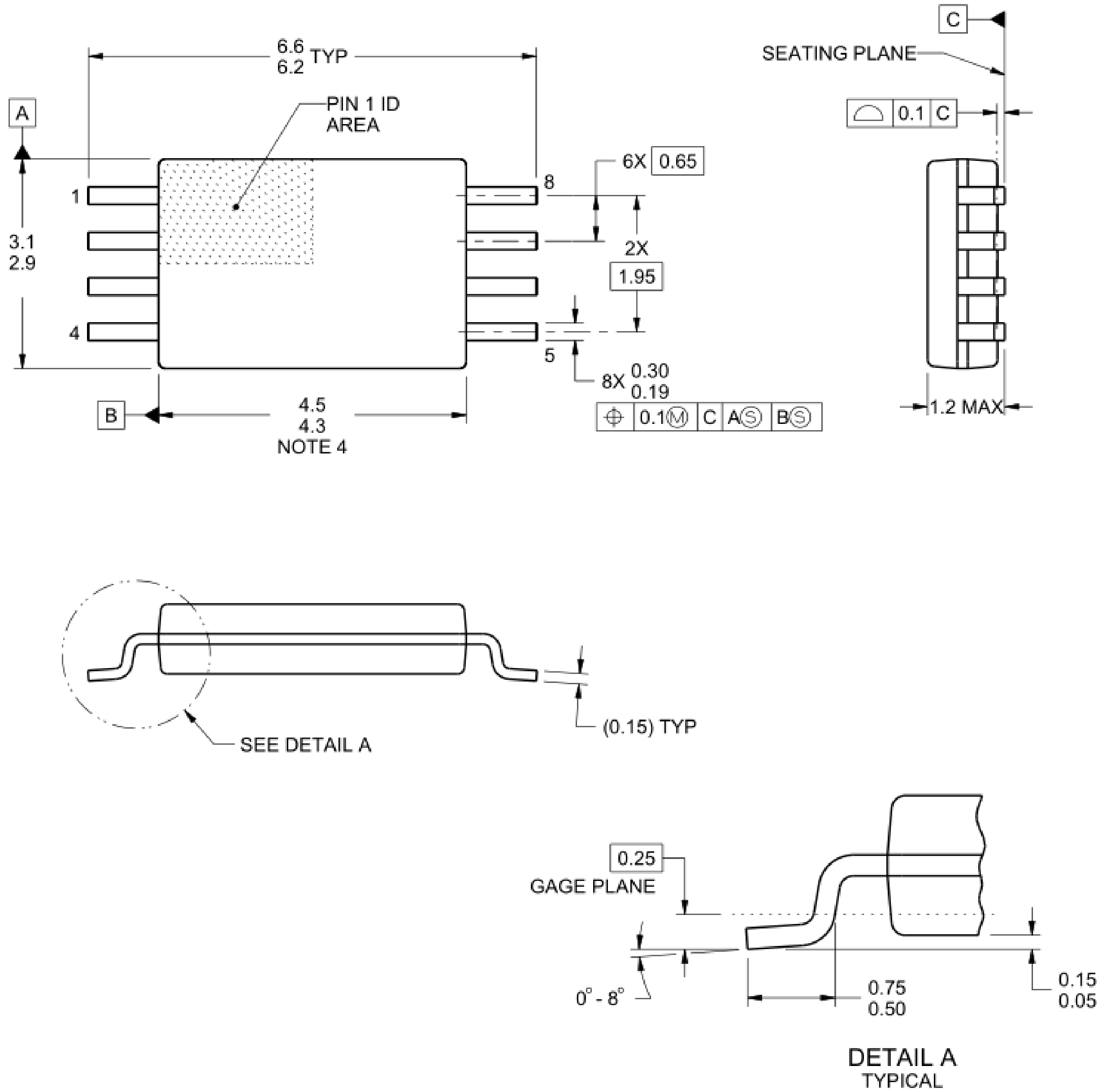
PACKAGE DESCRIPTION

TSSOP-8



NOTES:

1. All linear dimensions are in millimeters.
2. This drawing is subject to change without notice.
3. Falls within JEDEC MO-203 variation AA.
4. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.

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