



The Infinite Bandwidth Company™

MIC6251/6252

IttyBitty™ GainBlock™ Amplifiers

Final Information

General Description

The MIC6251 and MIC6252 are IttyBitty™ GainBlock™ amplifiers for use as follows:

- MIC6251 +2, +1, -1 gain amplifier
- MIC6252 +0.5, +1 gain amplifier;
average value amplifier

The MIC6251 and MIC6252 amplifiers operate from 4V to 32V. Both can use single or split supplies. These amplifiers feature internal, well-matched, gain-setting resistors and an input common-mode range that includes the negative supply (ground).

The MIC6251/2 is available in the tiny SOT-23-5 surface mount package.

Features

- 4V to 32V operation
- Small footprint package
- Internally compensated
- 2MHz bandwidth
- 6V/μs typical slew rate
- Short circuit protected

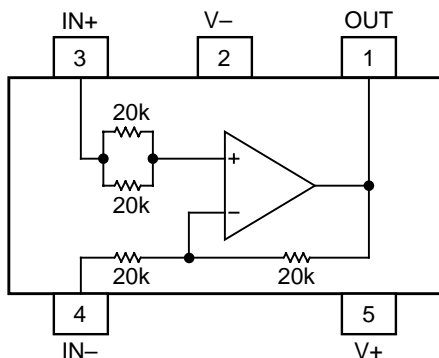
Applications

- Analog building blocks
- Summing amplifier
- Gain block

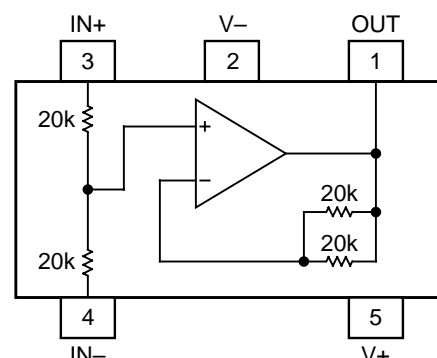
Ordering Information

| Part Number | Marking | Temperature | Range Package |
|-------------|---------|----------------|---------------|
| MIC6251BM5 | A51 | -40°C to +85°C | SOT-23-5 |
| MIC6252BM5 | A52 | -40°C to +85°C | SOT-23-5 |

Functional Configuration



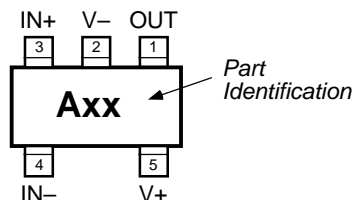
MIC6251



MIC6252

Pin Configuration

| Part Number | Identification |
|-------------|----------------|
| MIC6251BM5 | A51 |
| MIC6252BM5 | A52 |



SOT-23-5 (M5)

Pin Description

| Pin Number | Pin Name | Pin Function |
|------------|----------|--|
| 1 | OUT | Amplifier Output |
| 2 | V- | Negative Supply: Negative supply for split supply application or ground for single supply application. |
| 3 | IN+ | Noninverting Input: See "Electrical Characteristics: Note 1. " |
| 4 | IN- | Inverting Input: See "Electrical Characteristics: Note 1. " |
| 5 | V+ | Positive Supply |

Absolute Maximum Ratings

| | |
|--|-----------------------------|
| Supply Voltage ($V_{V+} - V_{V-}$) | 36V or $\pm 18V$ |
| Differential Input Voltage ($V_{IN+} - V_{IN-}$) | $\pm 36V$ |
| Input Voltage (V_{IN+}, V_{IN-}) | $V_{V-} - 0.3V$ to V_{V+} |
| Output Short Circuit Current Duration | ∞ |
| Junction Temperature (T_J) | 150°C |
| Storage Temperature (T_S) | -65°C to +150°C |
| Lead Temperature (soldering, 10 sec.) | 260°C |
| ESD, Note 4 | [TBD] |

Operating Ratings

| | |
|---|----------------|
| Supply Voltage | 4V to 32V |
| Ambient Temperature Range | -40°C to +85°C |
| SOT-23-5 Thermal Resistance (θ_{JA}) | 325°C/W |

Electrical Characteristics (Differential Supply)

$V_{V+} = +15V$, $V_{V-} = -15V$; $V_{CM} = 0V$, **Note 1**; $T_A = 25^\circ C$, **bold** values indicate $-40^\circ C \leq T_A \leq +85^\circ C$, $T_A = T_J$; unless noted.

| Symbol | Parameter | Condition | Min | Typ | Max | Units |
|------------|-----------------------------------|--|------------|------------|-----|------------------|
| G_E | Gain Error | MIC6251: $A_V = 2$, $V_O = \pm 10V$ | | 0.3 | 0.5 | % |
| | | MIC6252: $A_V = 0.5$, $V_O = \pm 10V$ | | 0.3 | 0.5 | % |
| G_{NL} | Gain Non-linearity | MIC6251: $A_V = 2$, $V_O = \pm 10V$ | | 0.01 | | % |
| | | MIC6252: $A_V = 0.5$, $V_O = \pm 10V$ | | 0.01 | | % |
| V_{OS} | Offset Voltage | MIC6251: Referred to output | | 4 | 14 | mV |
| | | MIC6252: Referred to output | | 2 | 7 | mV |
| TCV_{OS} | Average Offset Drift | | | 7 | | $\mu V/^\circ C$ |
| I_B | Input Bias Current | | | 50 | 250 | nA |
| V_{CM} | Input Voltage Range, Differential | Note 3 | | ± 25 | | V |
| | Input Volt. Range, Common Mode | | ± 13.5 | ± 13.8 | | V |
| CMRR | Common Mode Rejection Ratio | $\Delta V_{CM} = 27V$, -13.5V to +13.5V | 65 | 100 | | dB |
| PSRR | Power Supply Rejection Ratio | $\Delta V_S = 25V$, $\pm 15V$ to $\pm 2.5V$ | 65 | 110 | | dB |
| V_{OUT} | Maximum Output Voltage Swing | $R_L = 2k$ | ± 12.5 | ± 14 | | V |
| B_W | Bandwidth | | | 2 | | MHz |
| S_R | Slew Rate | | | 6 | | V/ μs |
| I_S | Supply Current | | | 1.3 | 2.0 | mA |

General Note : Devices are ESD protected; however, handling precautions are recommended.

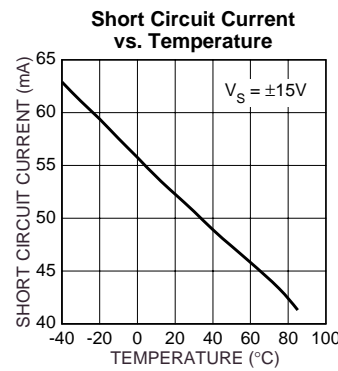
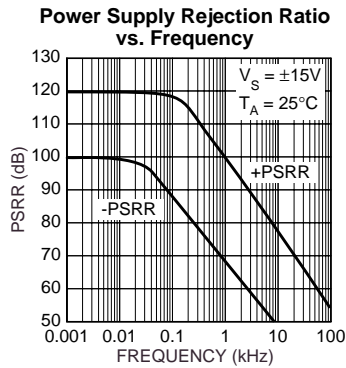
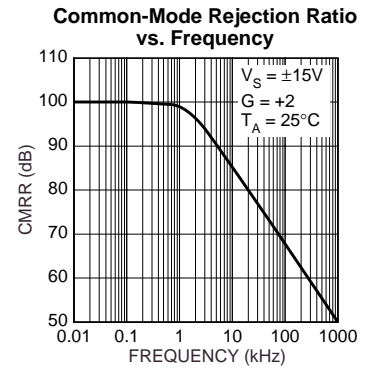
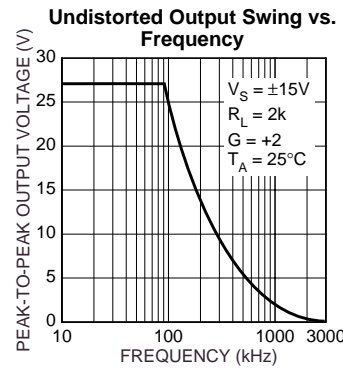
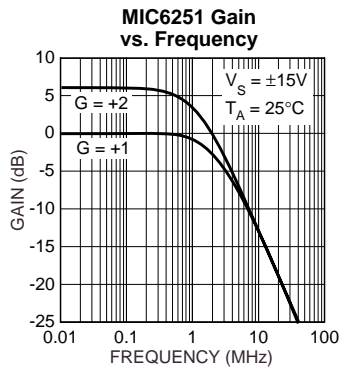
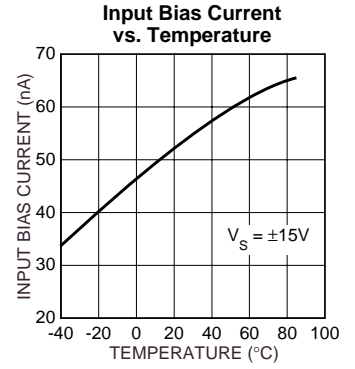
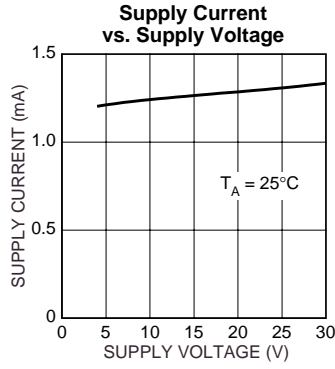
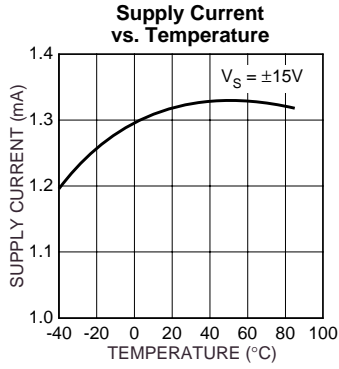
Note 1 : IN+ and IN- pins on the MIC6252 are interchangeable.

Note 2 : Gain setting resistors are ratio-matched but have a $\pm 20\%$ absolute tolerance

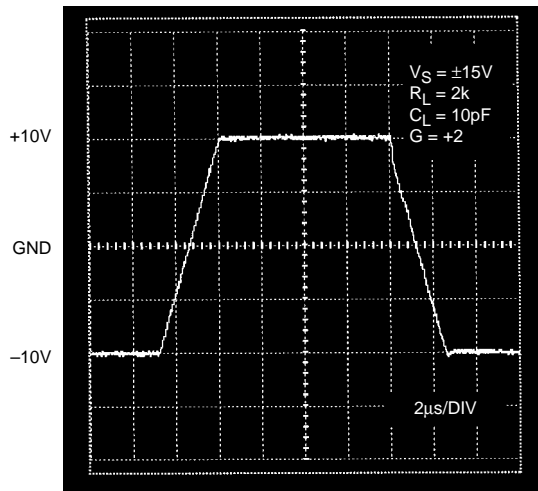
Note 3 : Limit input current to 1mA.

Note 4 : Human body model, 1.5k in series with 100pF.

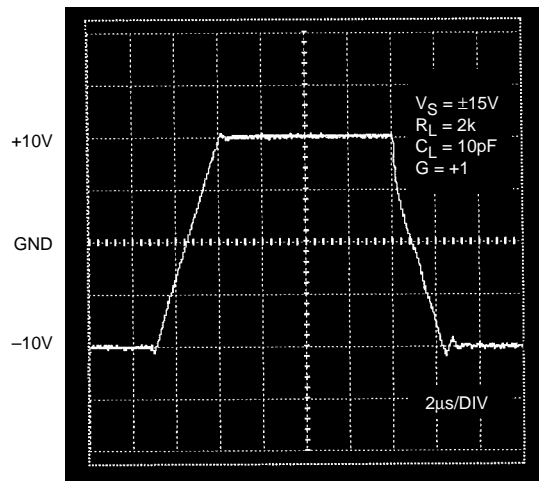
Typical Characteristics



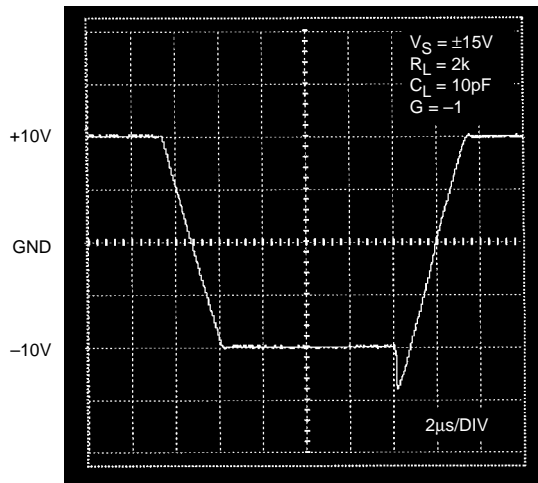
MIC6251 Large-Signal Transient Response



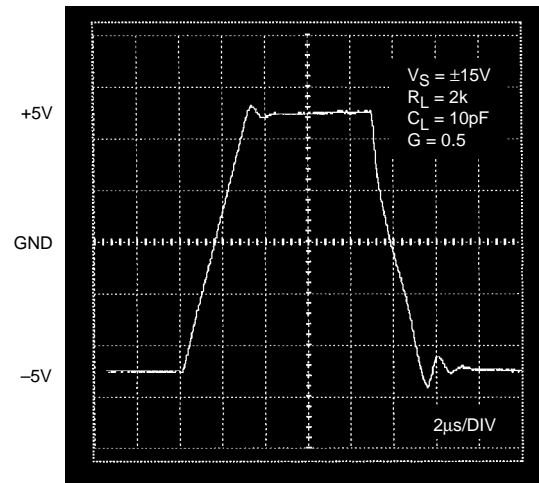
MIC6251 Large-Signal Transient Response



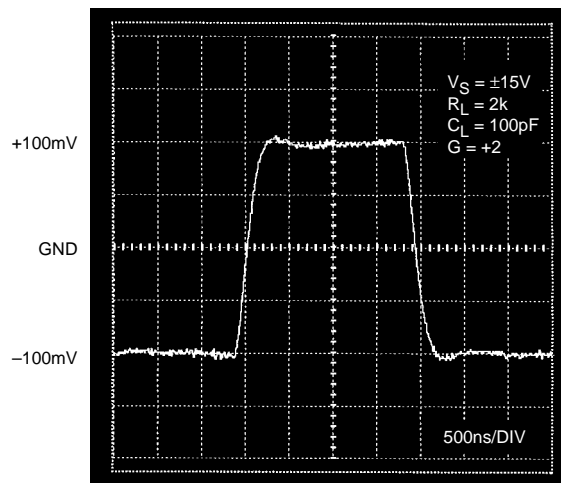
MIC6251 Large-Signal Transient Response



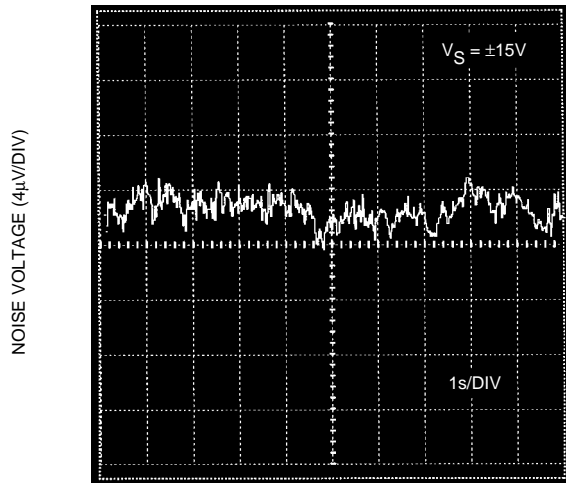
MIC6252 Large-Signal Transient Response



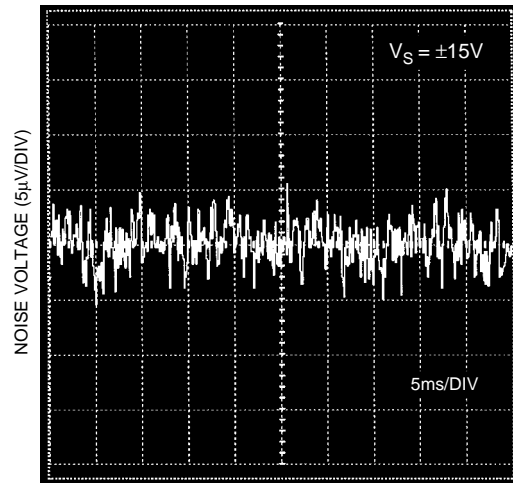
MIC6251 Small-Signal Transient Response



MIC6251/2 0.1Hz to 10Hz Noise
Gain = +1



MIC6251/2 Wideband Noise
Gain +1



Functional Configurations

Figures 1 through 6 illustrate basic MIC6251 and MIC6252 GainBlock™ configurations.

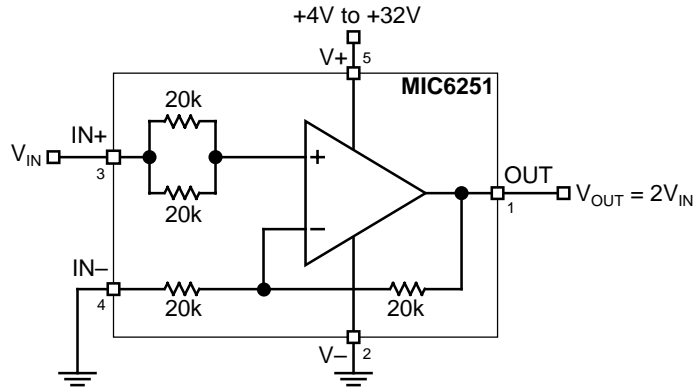


Figure 1. MIC6251 $A_V = 2$ Amplifier

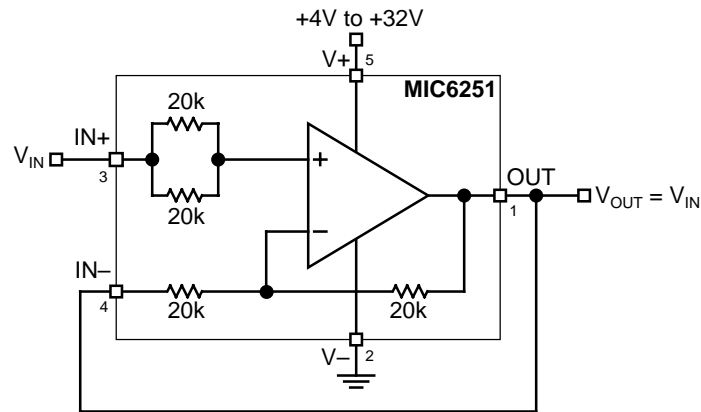


Figure 2. MIC6251 Voltage Follower

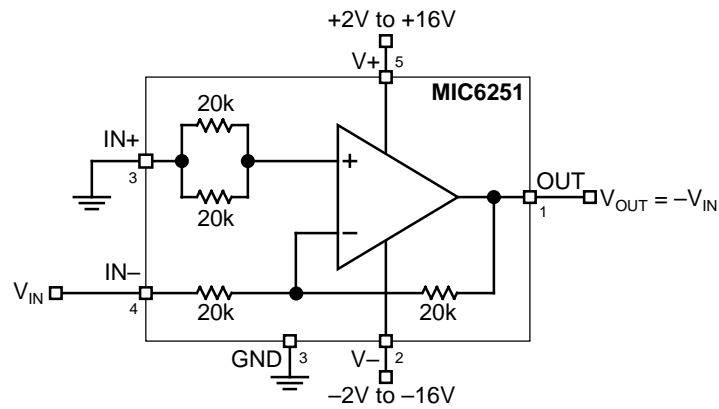


Figure 3. MIC6251 Inverting Unity-Gain Circuit

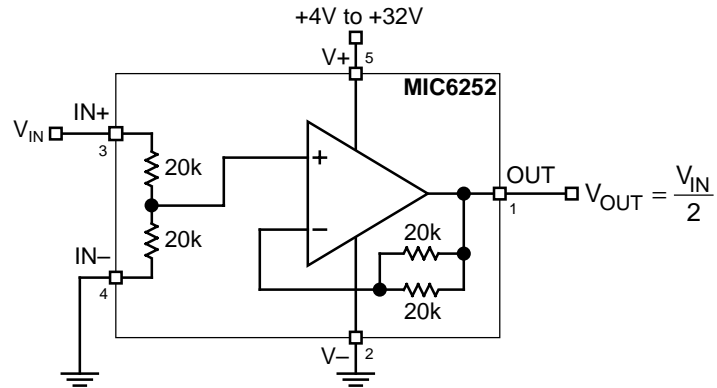


Figure 4. MIC6252 $A_V = 0.5$ Amplifier

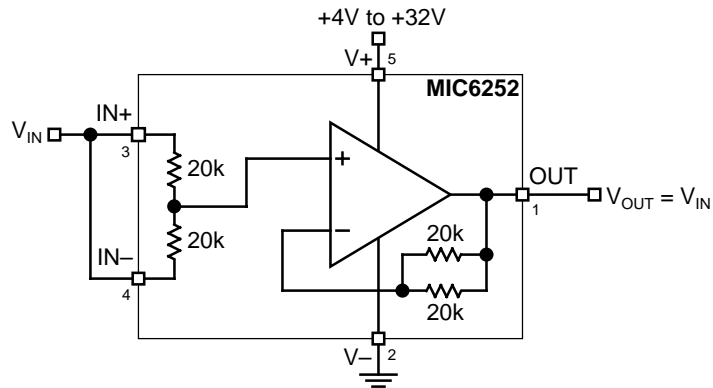


Figure 5. MIC6252 Voltage Follower

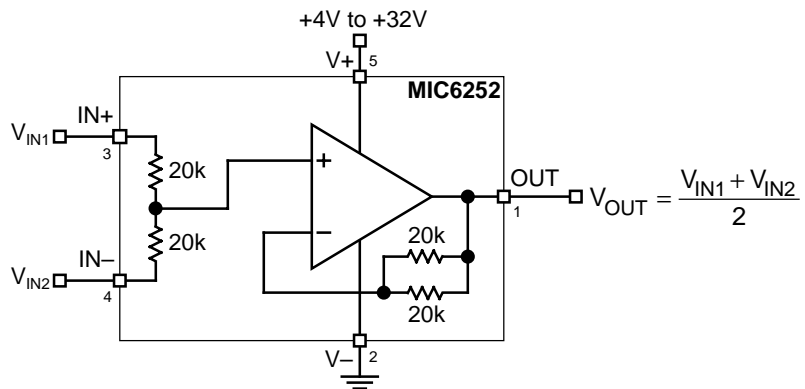
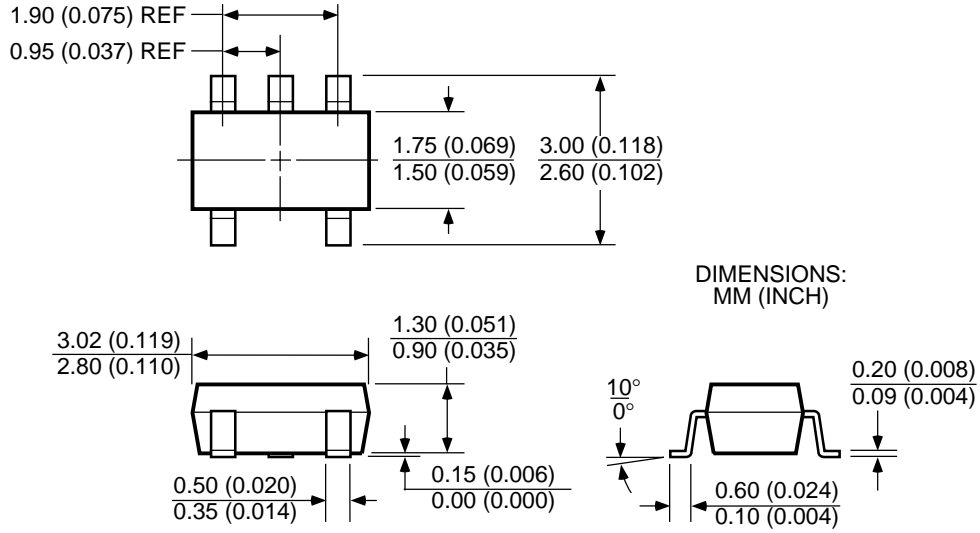


Figure 6. MIC6252 Voltage Averager

Package Information



SOT-23-5 (M5)

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