MIC6251/6252

IttyBitty™ GainBlock™ Amplifiers

Preliminary 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

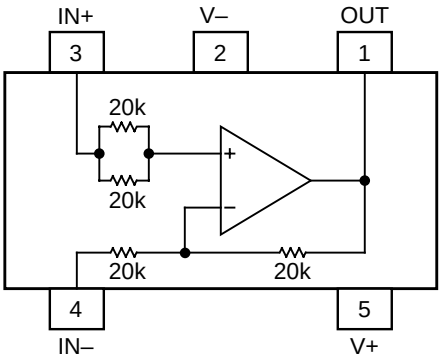
Applications

- Analog building blocks
- Summing amplifier
- Gain block

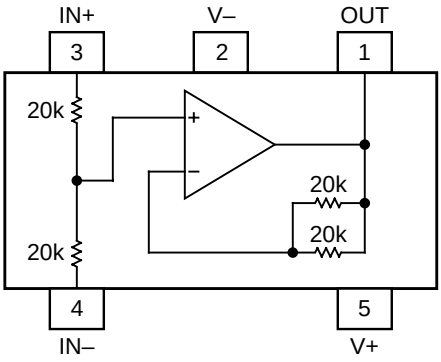
Ordering Information

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



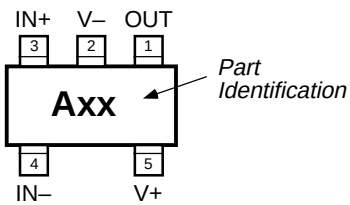
MIC6251



MIC6252

Pin Configuration

Part Number	Identification
MIC6251BM5	A51
MIC6252BM5	A52



SOT-23-5 (M5)

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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 ±18V
Differential Input Voltage ($V_{IN+} – V_{IN–}$) ..... ±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°C, **bold** values indicate –40°C ≤ T_A ≤ +85°C, T_A = T_J; unless noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
G_E	Gain Error	MIC6251: A_V = 2, V_O = ±10V MIC6252: A_V = 0.5, V_O = ±10V		0.3 0.3	0.5 0.5	% %
G_{NL}	Gain Non-linearity	MIC6251: A_V = 2, V_O = ±10V MIC6252: A_V = 0.5, V_O = ±10V		0.01 0.01		% %
V_{OS}	Offset Voltage	MIC6251: Referred to output MIC6252: Referred to output		4 2	14 7	mV mV
TCV_{OS}	Average Offset Drift			7		µV/°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	ΔV_{CM} = 27V, –13.5V to +13.5V	65	100		dB
PSRR	Power Supply Rejection Ratio	ΔV_S = 25V, ±15V to ±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.

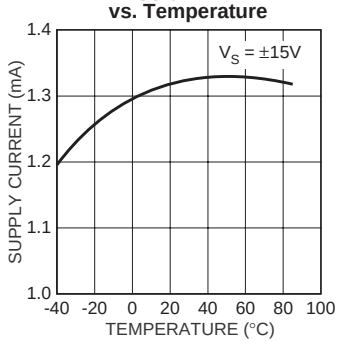
Note 2: Gain setting resistors are ratio-matched but have a ±20% absolute tolerance

Note 3: Limit input current to 1mA.

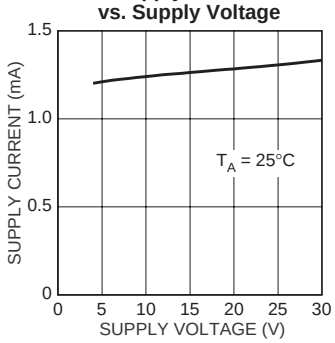
Note 4: Human body model, 1.5k in series with 100pF.

Typical Characteristics

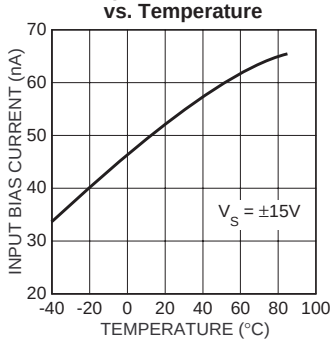
Supply Current vs. Temperature



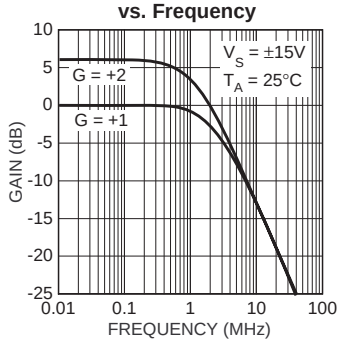
Supply Current vs. Supply Voltage



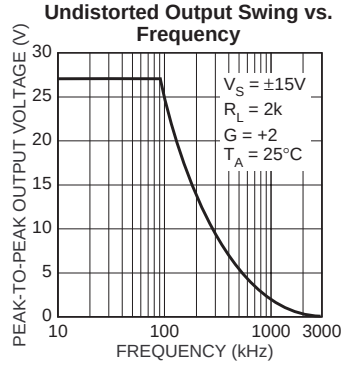
Input Bias Current vs. Temperature



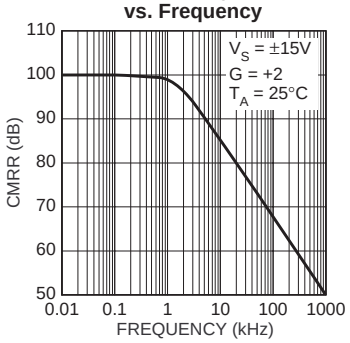
MIC6251 Gain vs. Frequency



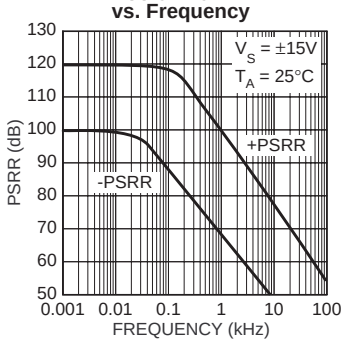
Undistorted Output Swing vs. Frequency



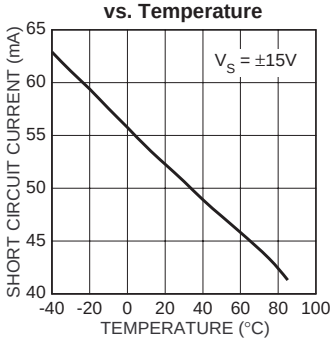
Common-Mode Rejection Ratio vs. Frequency



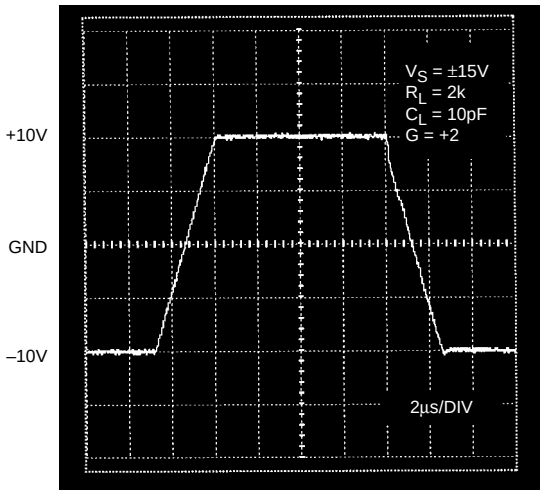
Power Supply Rejection Ratio vs. Frequency



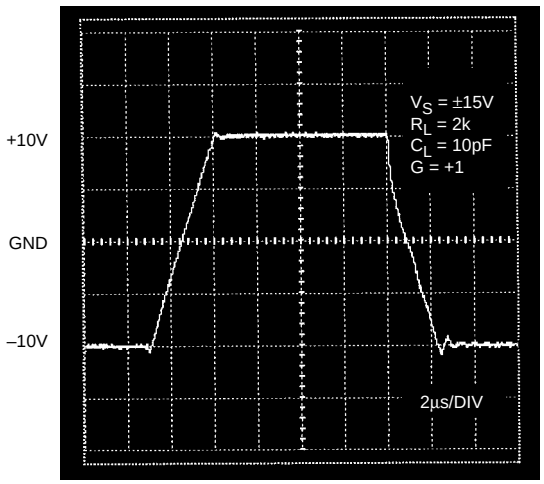
Short Circuit Current vs. Temperature



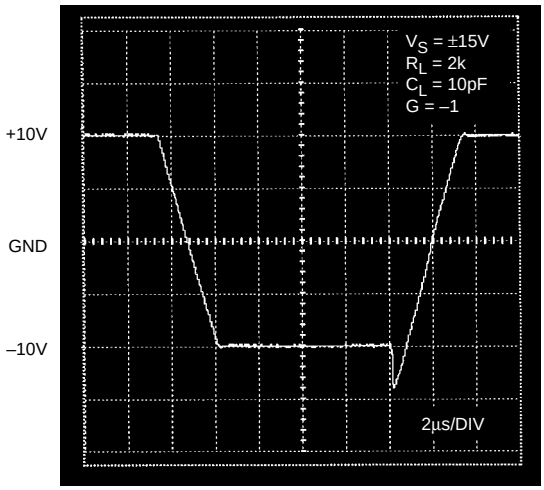
MIC6251 Large-Signal Transient Response



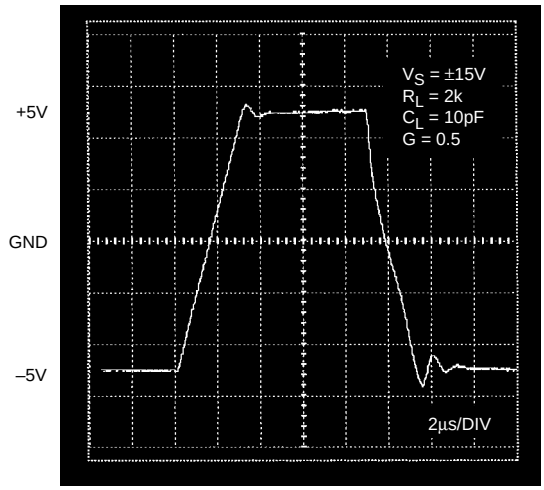
MIC6251 Large-Signal Transient Response



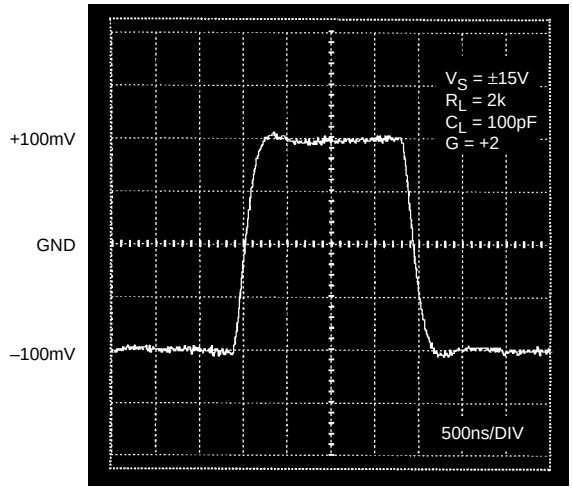
MIC6251 Large-Signal Transient Response



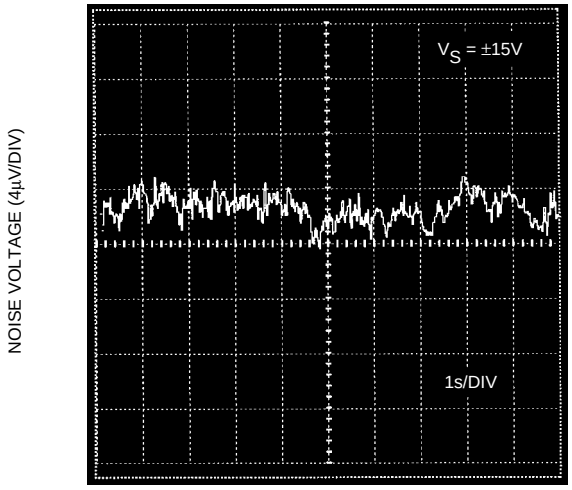
MIC6252 Large-Signal Transient Response



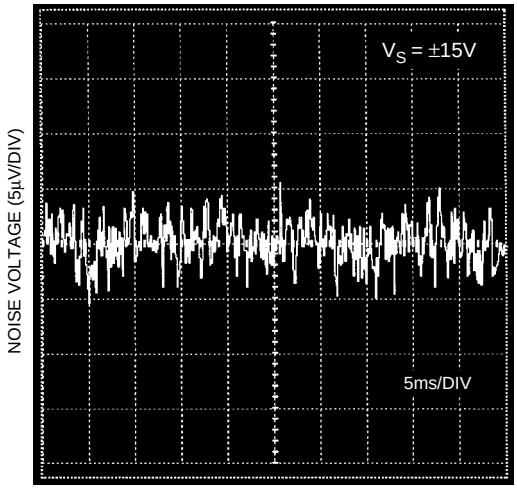
MIC6251 Small-Signal Transient Response



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.

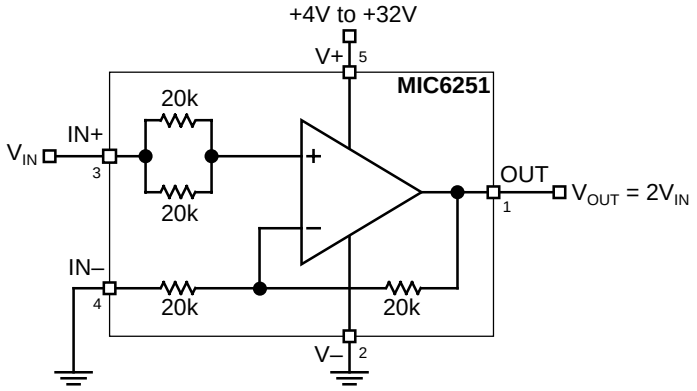


Figure 1. MIC6251 A_V = 2 Amplifier

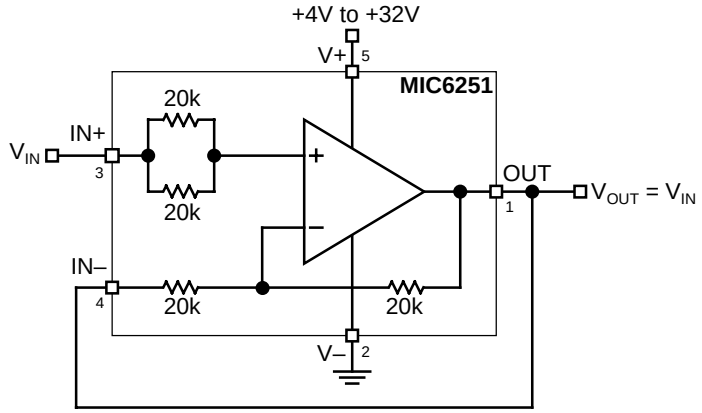


Figure 2. MIC6251 Voltage Follower

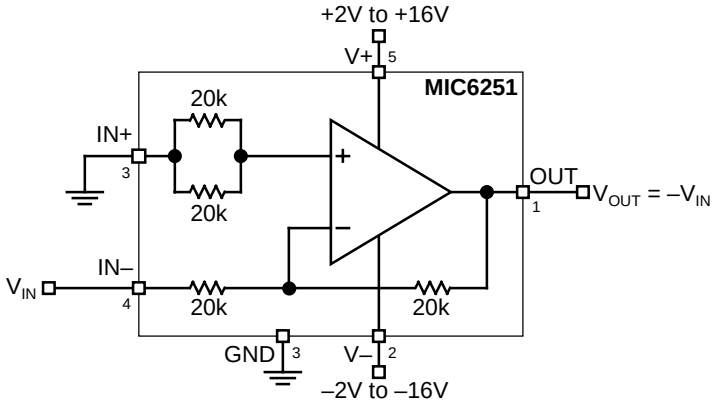


Figure 3. MIC6251 Inverting Unity-Gain Circuit

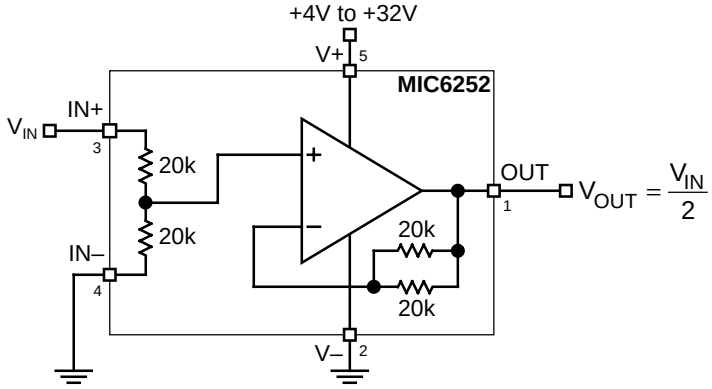


Figure 4. MIC6252 A_V = 0.5 Amplifier

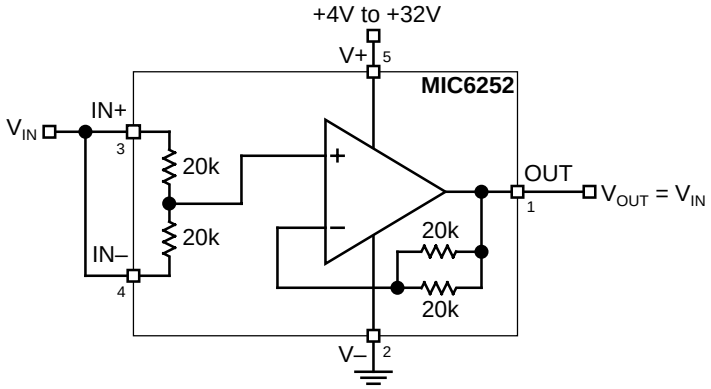


Figure 5. MIC6252 Voltage Follower

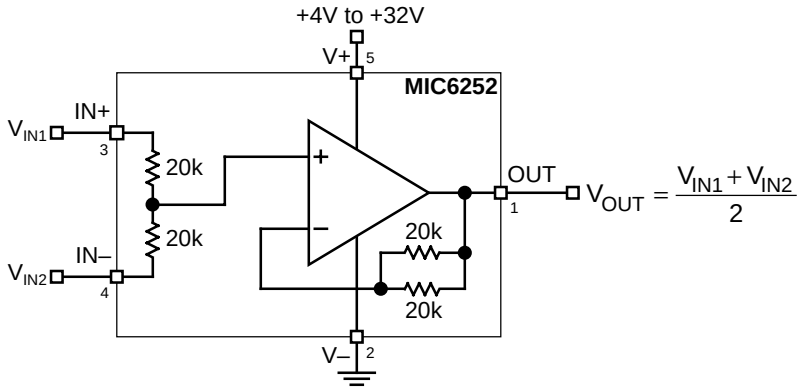
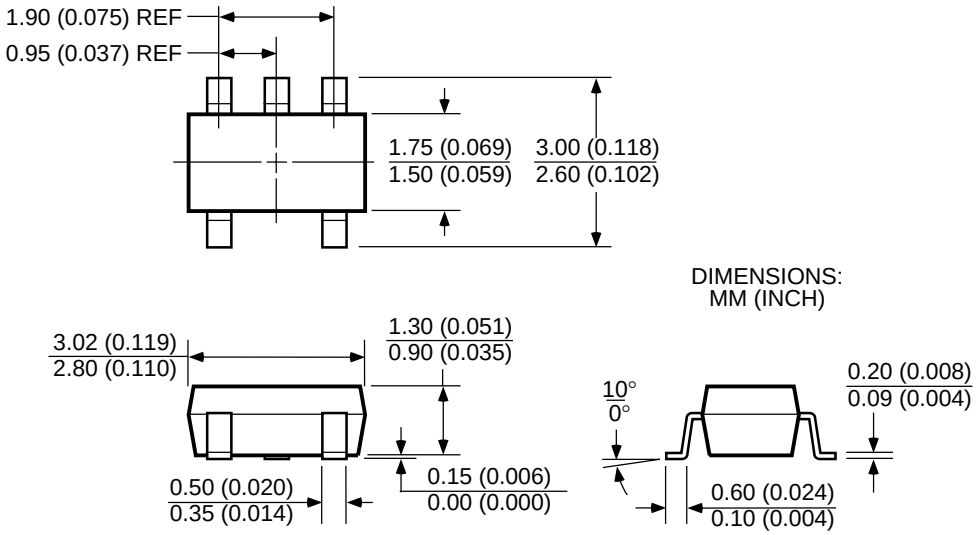


Figure 6. MIC6252 Voltage Averager

Package Information



SOT-23-5 (M5)

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