



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

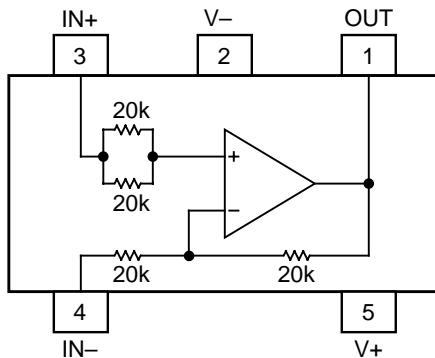
Applications

- Analog building blocks
- Summing amplifier
- Gain block

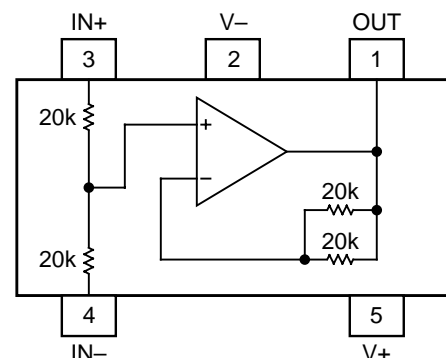
Ordering Information

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



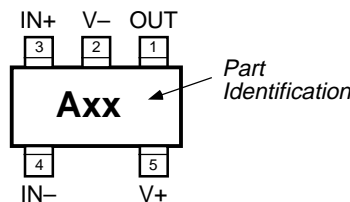
MIC6251



MIC6252

Pin Configuration

Part Number	Identification
MIC6251BM5	A51
MIC6252BM5	A52



SOT-23-5 (M5)

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.

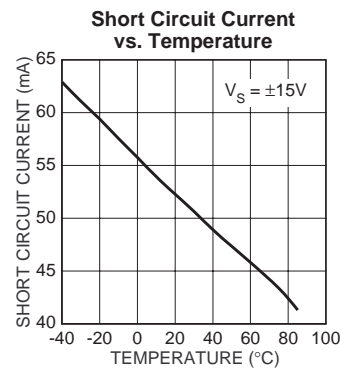
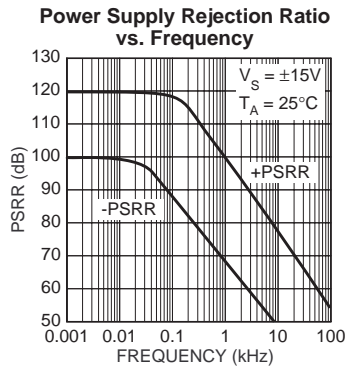
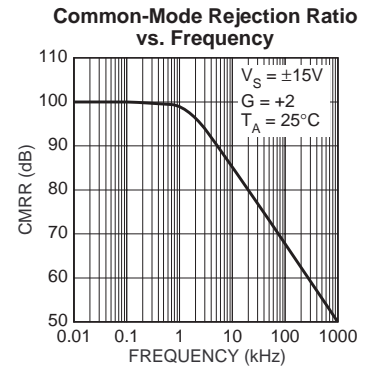
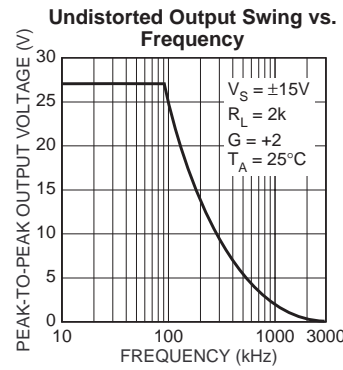
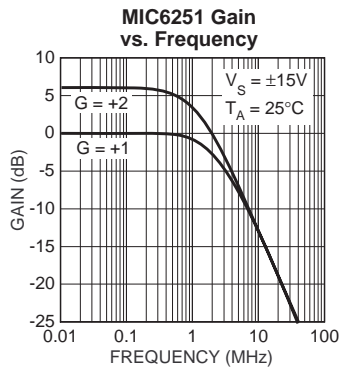
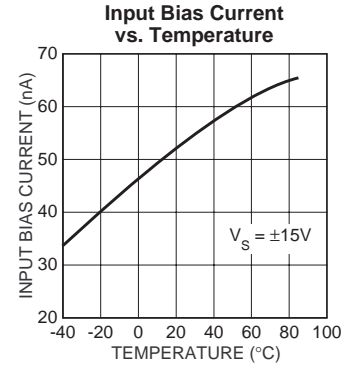
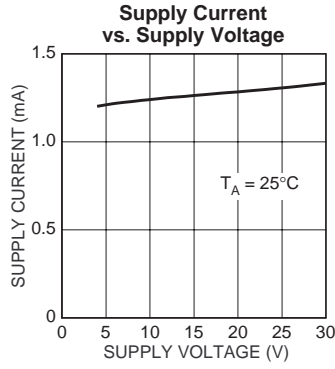
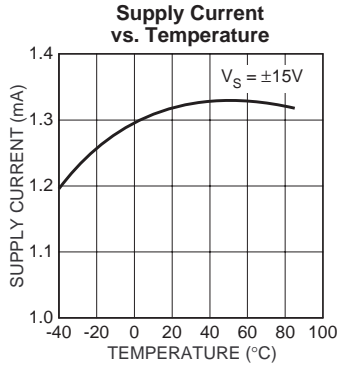
Note 1 : IN+ and IN- pins on the MIC6252 are interchangeable.

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

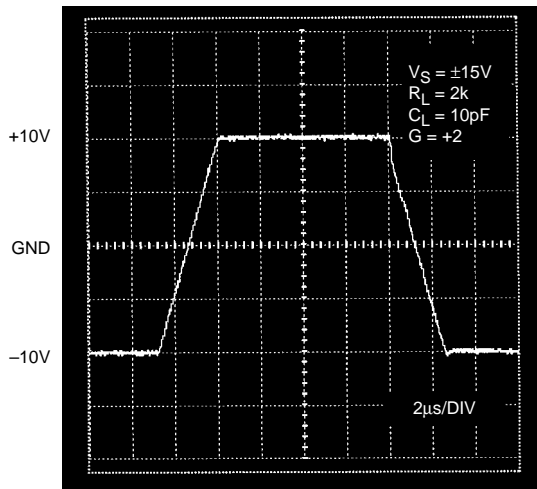
Note 3 : Limit input current to 1mA.

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

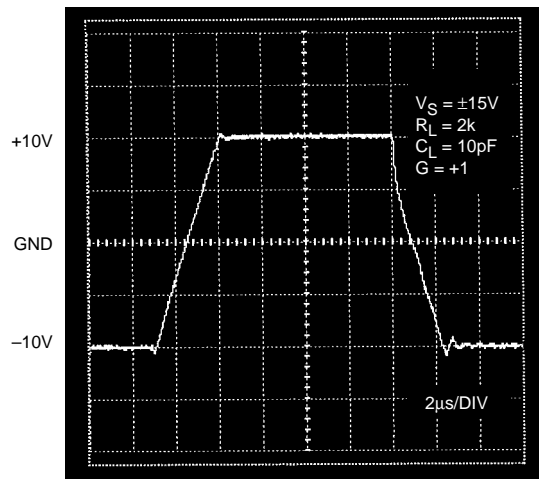
Typical Characteristics



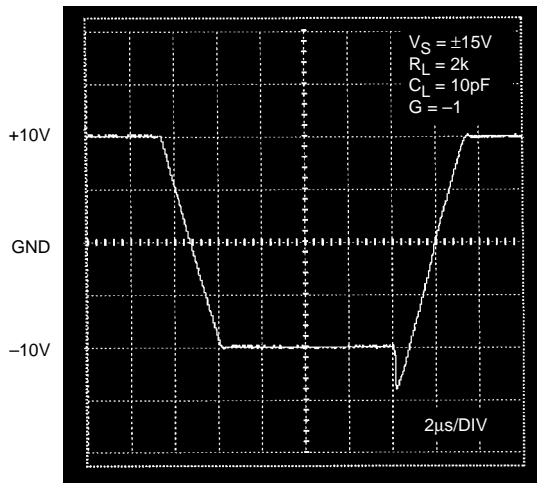
MIC6251 Large-Signal Transient Response



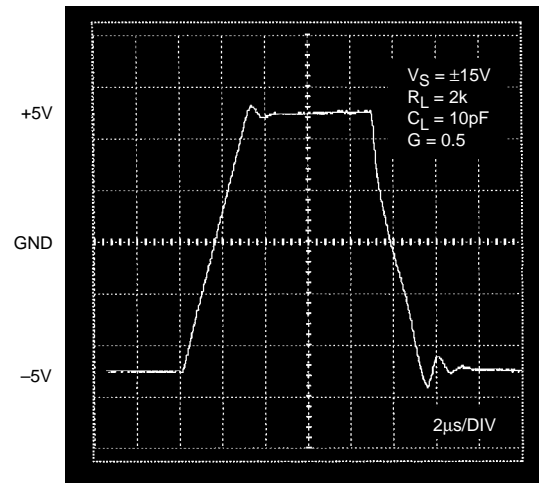
MIC6251 Large-Signal Transient Response



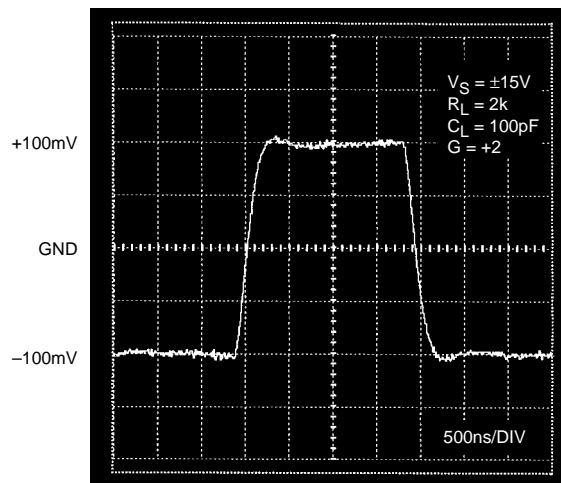
MIC6251 Large-Signal Transient Response



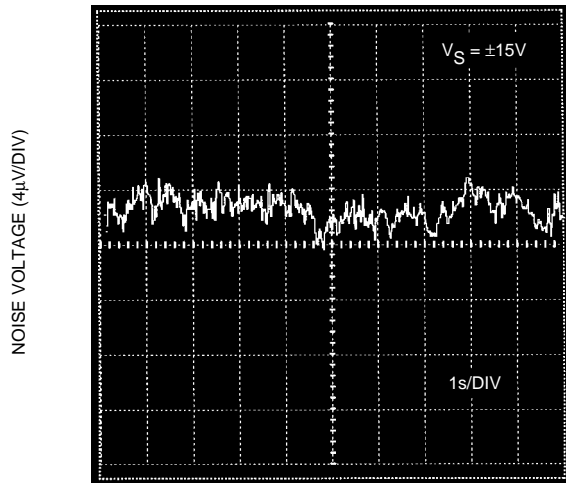
MIC6252 Large-Signal Transient Response



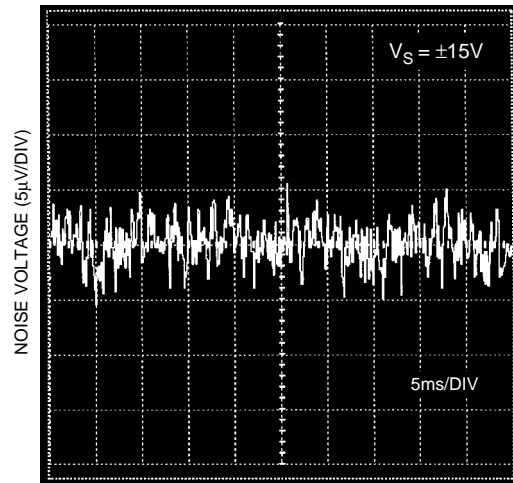
MIC6251 Small-Signal Transient Response



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.

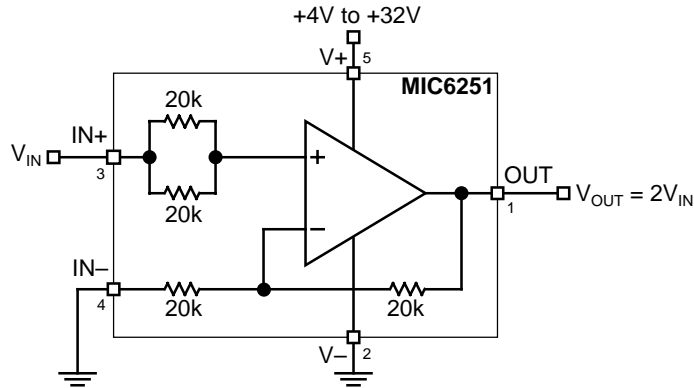


Figure 1. MIC6251 $A_V = 2$ Amplifier

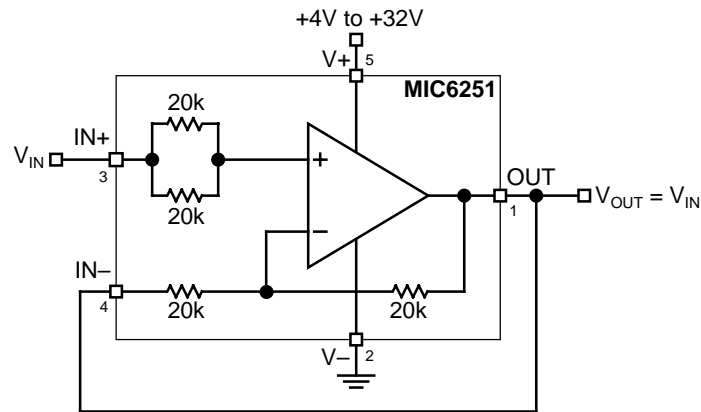


Figure 2. MIC6251 Voltage Follower

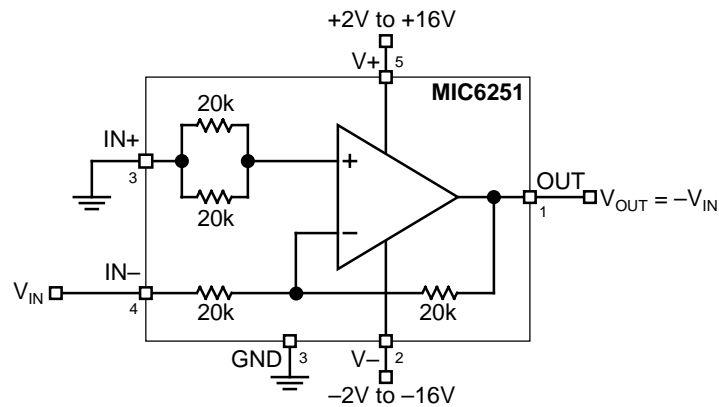


Figure 3. MIC6251 Inverting Unity-Gain Circuit

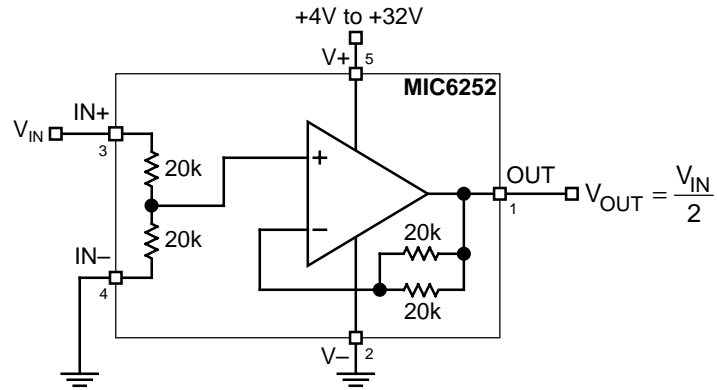


Figure 4. MIC6252 $A_V = 0.5$ Amplifier

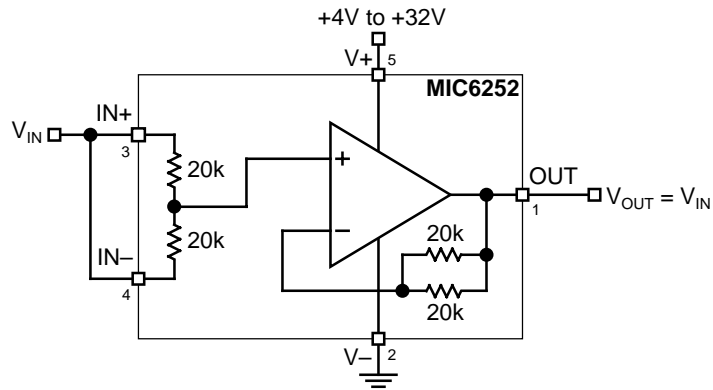


Figure 5. MIC6252 Voltage Follower

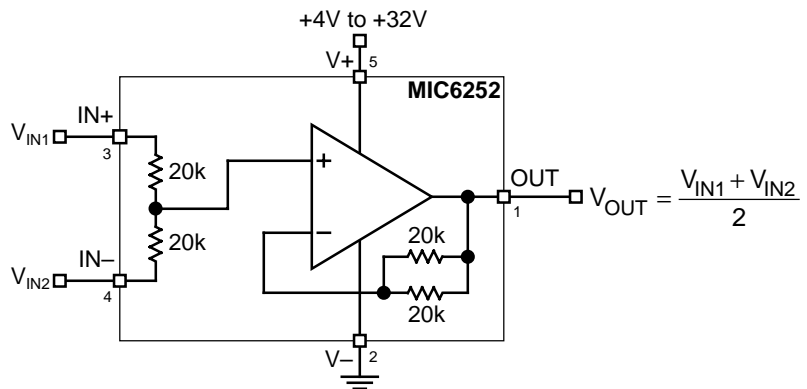
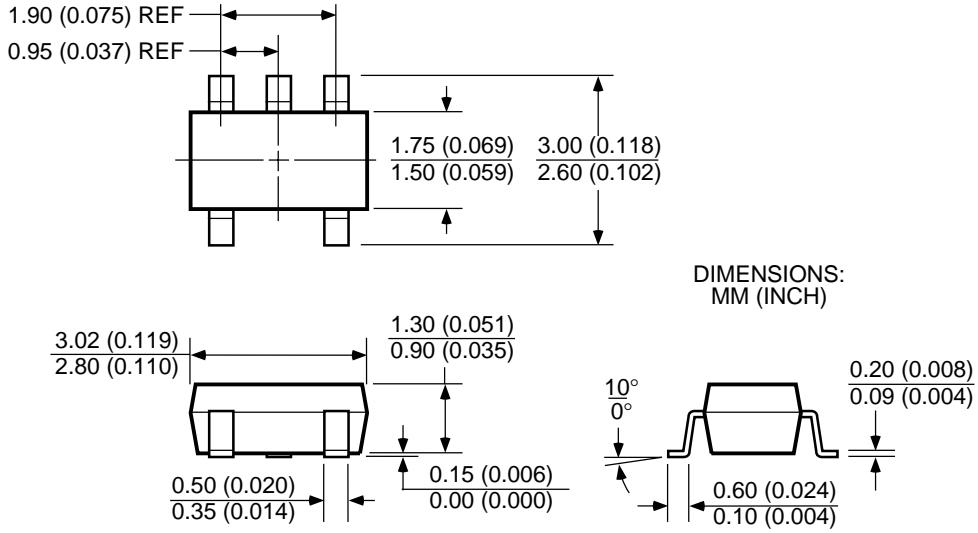


Figure 6. MIC6252 Voltage Averager

Package Information



SOT-23-5 (M5)

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