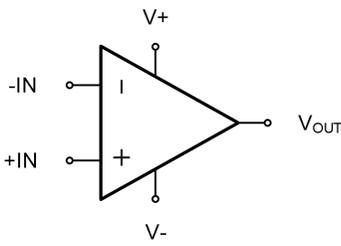


GT8342S

Low-Voltage, Low-Power, Rail-to-Rail I/O CMOS Op Amps

1 Features	2 Application
<ul style="list-style-type: none"> - High gain bandwidth: 1.6 MHz - Rail-to-rail input and output - Low supply current: 65 μA/amplifier at 5 V - Input voltage range: -0.1 V to +5.6 V with $V_S=5.5$ V - Supply range: +2.2 V to +5.5 V - Operation temperature range: -40°C to +125°C 	<ul style="list-style-type: none"> - Smoke detector - Photodiode amplification - Active filters - Test equipment - Driving A/D converters

3 Description	Circuit Diagram
<p>The GT8342S offers low voltage operation and rail-to-rail input and output, as well as excellent speed/power consumption ratio, providing an excellent bandwidth (1.6MHz) and slew rate of 0.6V/μs. The op-amps are unity gain stable and feature an ultra-low input bias current.</p> <p>The devices are ideal for sensor interfaces, active filters and portable applications. The GT8342S amplifiers are specified at the temperature range of -40°C to +125°C under single or dual power supplies of 2.2V to 5.5V.</p>	

4 Device Summary, Pin and Packages

Table. 4-1. Device Summary⁽¹⁾

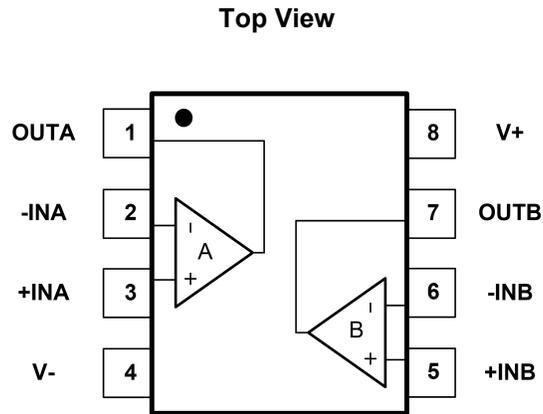
Serial Name	Part Name	Package	Body Size (Nom)	Marking ⁽²⁾	MSL ⁽³⁾	Package Qty
GT8342S	GT8342SP8	SOP8	4.90mm×3.90mm×1.75mm	GT8342S XXXXXXX	3	Tape and Reel,4000

(1) For all available packages, please contact product sales.

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

(4) "XXXXX" in Marking will be appeared as the batch code.

4 Device Summary, Pin and Packages(Continued)

Fig.4-1.GT8342S: P8(SOP8) Package
Table. 4-2. Pin Definition

Pin		I/O	Description
Name	P8		
-INA	2	I	Inverting input, channel A
+INA	3	I	Noninverting input, channel A
-INB	6	I	Inverting input, channel B
+INB	5	I	Noninverting input, channel B
OUTA	1	O	Output, channel A
OUTB	7	O	Output, channel B
V-	4	-	Negative (lowest) supply or ground (for single-supply operation)
V+	8	-	Positive (highest) supply

* It is suggested to leave the unconnected pins floating.

5 Voltage, Temperature, ESD and Thermal Ratings

5.1 Absolute Maximum Ratings⁽¹⁾

Parameters	Min.	Max.	Unit
Supply Voltage $V_s=(V^+)-(V^-)$		6.5	V
Select Input Voltage ⁽²⁾	(V ⁻)-0.5	(V ⁺)+0.5	V
Maximum Junction Temperature	-55	150	°C
Storage Temperature Range	-55	150	°C

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

(2) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.

5.2 ESD Ratings

ESD			Value	Unit
V(ESD)	Electrostatic discharge	Human-Body Model (HBM) ⁽¹⁾	7.5 K	V
		Charged-Device Model (CDM) ⁽²⁾	2 K	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

5.3 Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameters	Min.	Max.	Unit
Supply Voltage $V_s=(V^+)-(V^-)$	Single-supply	2.2	5.5	V
	Dual-supply	±1.1	±2.75	
TA	Operating temperature	-40	125	°C

5.4 Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
SOP8	158	43	°C/W

6 Electrical Specifications

$V_{CC}=5.0V$, $V_{cm}=V_{CC}/2$, $V_o=V_{CC}/2$, and $R_L=10k\Omega$, FULL= $-40^{\circ}C$ to $+125^{\circ}C$, Typical values are at $T_A=+25^{\circ}C$. (unless otherwise noted)

Parameters	Symbol	Conditions	V_{CC}	T_A	Min.	Typ.	Max.	Unit
Power Supply								
Quiescent Current/amplifier	I_Q		5V	$+25^{\circ}C$		65	100	μA
Operating Voltage Range	V_s			$+25^{\circ}C$	2.2		5.5	V
Power-supply Rejection Ratio	PSRR		5V	$+25^{\circ}C$	75	95		dB
Offset Voltage								
Input Offset Voltage	V_{osA}		5V	$+25^{\circ}C$	0		0.5	mV
	V_{osB}		5V	$+25^{\circ}C$	0		2	mV
Input Offset Voltage Average Drift	$V_{os TC}$	$-40^{\circ}C$ to $+125^{\circ}C$	5V			± 3		$\mu V/^{\circ}C$
Input								
Common-mode Voltage Range	V_{cm}		5.5V	$+25^{\circ}C$	-0.1		5.6	V
Common-mode Rejection Ratio	CMRR	$V_{cm} = -0.1V$ to $4V$	5.5V	$+25^{\circ}C$	65	85		dB
		$V_{cm} = -0.1V$ to $5.6V$			60	80		
Input Bias Current	I_B			$+25^{\circ}C$		10		pA
Input Offset Current	I_{os}			$+25^{\circ}C$		10		pA
Noise								
Input Voltage Noise(rms)	E_N	$f=0.1Hz$ to $10Hz$	5V	$+25^{\circ}C$		1.4		μV_{rms}
Input Voltage Noise Density	e_N	$f=1kHz$	5V	$+25^{\circ}C$		35		nV/ \sqrt{Hz}
		$f=10kHz$				12		
Output								
Open-loop Voltage Gain	AOL	$R_L=2K\Omega$, $V_o=0.15V$ to $4.85V$	5V	$+25^{\circ}C$	90	110		dB
		$R_L=10K\Omega$, $V_o=0.05V$ to $4.95V$	5V	$+25^{\circ}C$	85	100		
Output Swing From Rail	V_o	$R_L=10k\Omega$	5V	$+25^{\circ}C$		4.5		mV
		$R_L=2k\Omega$				15		
Output Current	I_{out}		5V	$+25^{\circ}C$		75		mA
Frequency Response								
Gain Bandwidth Product	GBP		5V	$+25^{\circ}C$		1.6		MHz
Phase Margin	PM		5V	$+25^{\circ}C$		60		$^{\circ}$
Slew Rate	SR		5V	$+25^{\circ}C$		0.6		V/ μs

7 Typical Characteristics

$V_{cc}=5.0V$, $V_{cm}=V_{cc}/2$, $V_o=V_{cc}/2$, and $R_L=10k\Omega$, FULL= $-40^{\circ}C$ to $+125^{\circ}C$, Typical values are at $T_A=+25^{\circ}C$. (unless otherwise noted)

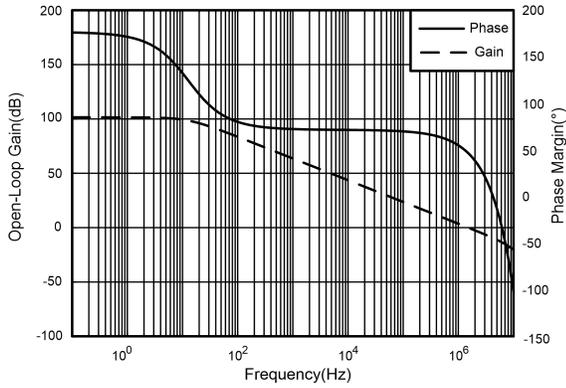


Fig.7-1. Open-Loop Gain and Phase vs Frequency

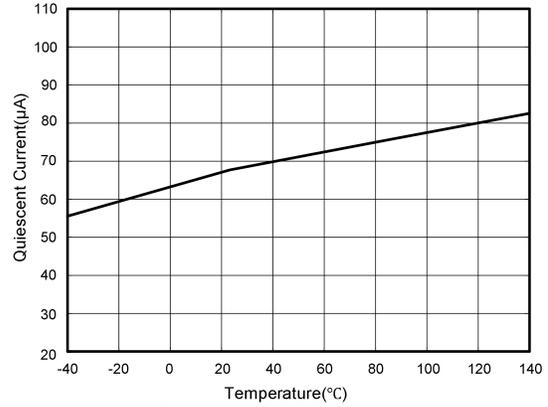


Fig.7-2. Quiescent Current vs Temperature

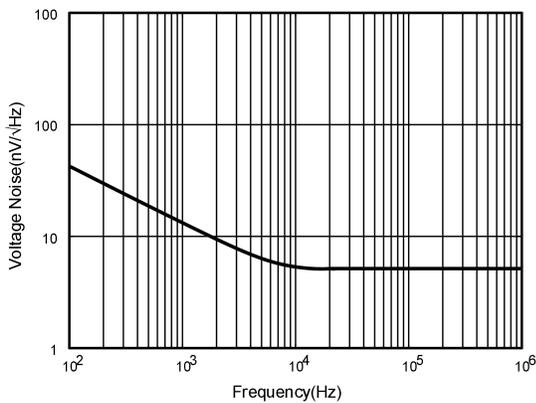


Fig.7-3. Voltage Noise vs Frequency

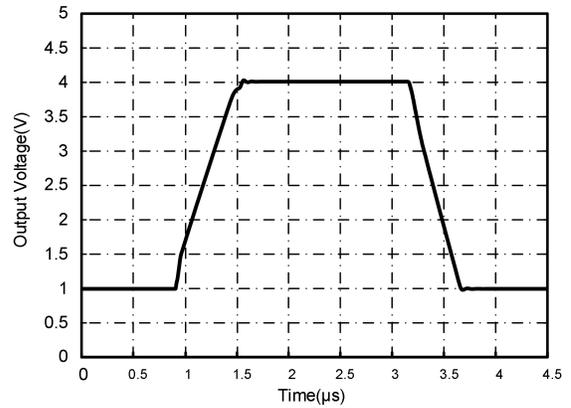


Fig.7-4. Large-Signal Step Response

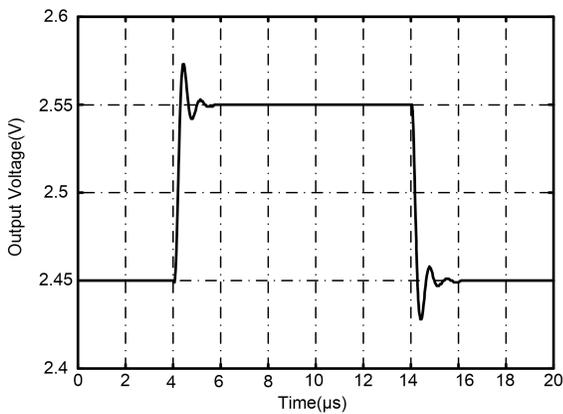


Fig.7-5. Small-Signal Step Response

8 Detailed Description

The GT8342S products are rail-to-rail operational amplifiers that can be run from a single-supply voltage 2.2V to 5.5V ($\pm 1.1V$ to $\pm 2.75V$). Supply voltages higher than 6.5V (absolute maximum) can permanently damage the amplifier. Rail-to-rail input and output swing significantly increases dynamic range, especially in low-supply applications.

Attention to good layout practices is always recommended. Keep traces short. When possible, use a PCB ground plane with surface-mount components placed as close to the device pins as possible. Place a 0.1 μ F capacitor closely across the supply pins. These guidelines should be applied throughout the analog circuit to improve performance and provide benefits such as reducing the EMI susceptibility.

9 Application Note

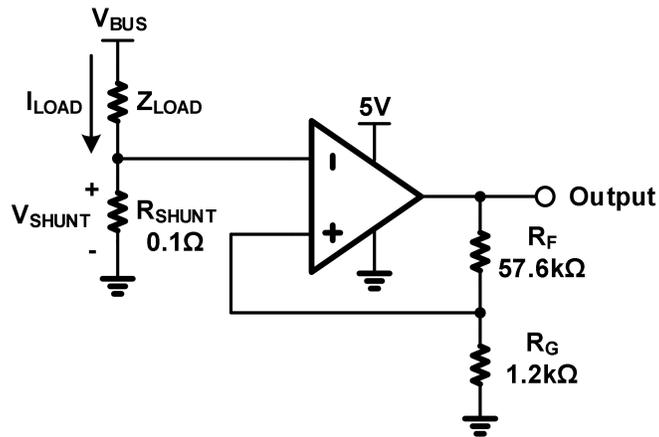
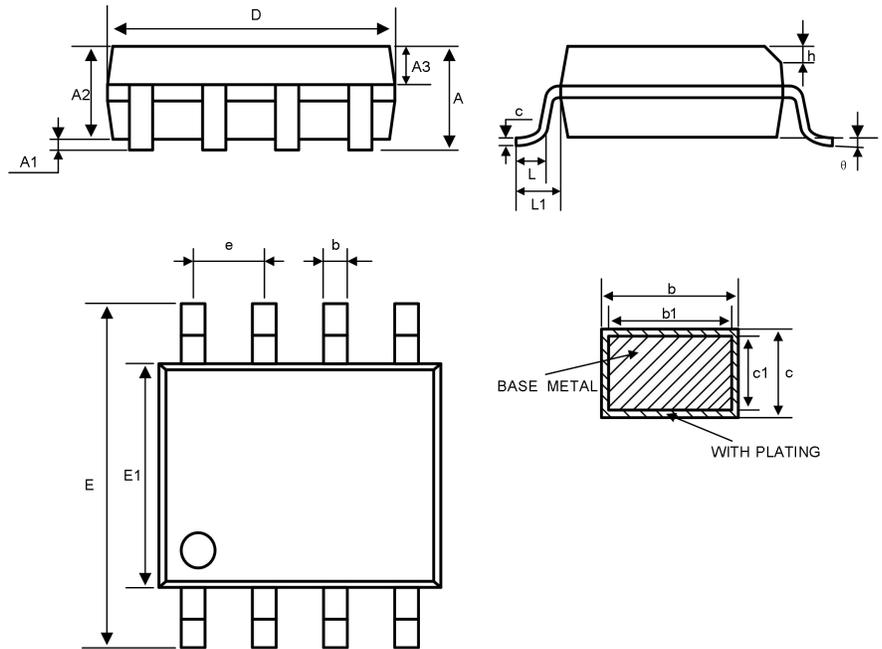


Fig.9-1. A Low-Side, Current-Sensing Application

Fig.9-1 shows the GT8342S configured in a low-side current sensing application..

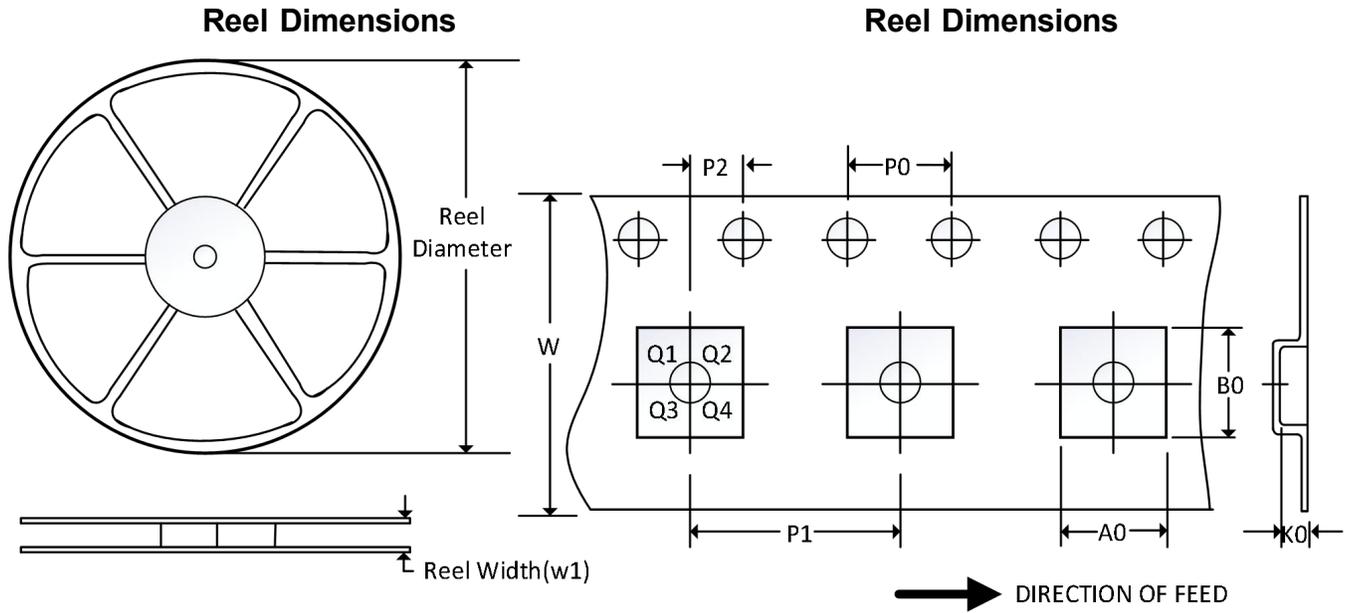
Use the following parameters for this design example:

- Load current: 0 A to 1 A
- Output voltage: 4.9 V
- Maximum shunt voltage: 100 mV

10 Package Outline Dimension
SOP8


Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	—	—	1.75	—	—	0.069
A1	0.10	—	0.225	0.004	—	0.009
A2	1.30	1.40	1.50	0.051	0.055	0.059
A3	0.60	0.65	0.70	0.024	0.026	0.028
b	0.39	—	0.47	0.015	—	0.019
b1	0.38	0.41	0.44	0.015	0.016	0.017
c	0.20	—	0.24	0.008	—	0.009
c1	0.19	0.20	0.21	0.007	0.008	0.008
D	4.80	4.90	5.00	0.189	0.193	0.197
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27BSC			0.05BSC		
h	0.25	—	0.50	0.010	—	0.020
L	0.50	—	0.80	0.020	—	0.031
L1	1.05REF			0.041REF		
theta	0	—	8°	0	—	8°

11 Tape and Reel Information



NOTE: The picture is only for reference. Please make the object as the standard.

Key Parameter List of Tape and Reel

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOP8	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1

- NOTE:
1. All dimensions are nominal.
 2. Plastic or metal protrusions of 0.15mm maximum per side are not included.