

GS324SF

Low Power Quad Operational Amplifiers

Product Description

The GS324 consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages.

Operation from split power supplies is also possible and the low power supply current drains in independent of the magnitude of the power supply voltage.

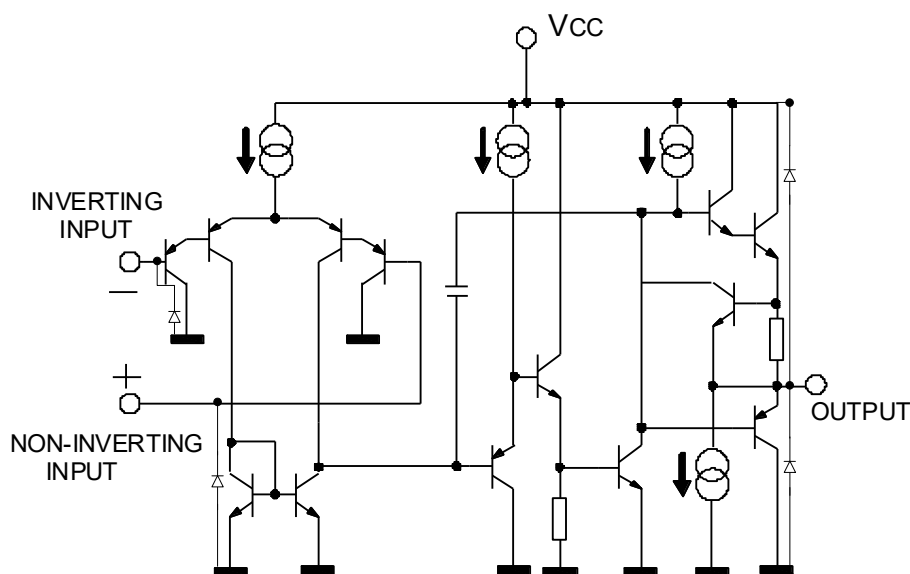
Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits, which now can be more easily implemented in single power supply systems.

For example, the GS324 can be directly operated off of the standard +5V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional $\pm 15V$ power supplies.

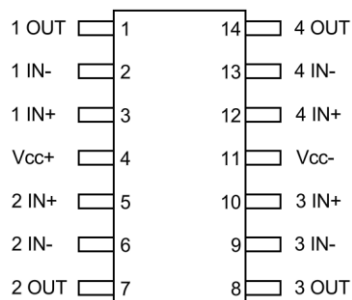
Features

- Wide range of supply voltages 3V to 32V
- Low supply current drain independent of supply voltage 1.5mA TYP.
- Low input biasing current
- Low input offset voltage and offset current
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- DC voltage gain: 100V/mV TYP.
- Internally frequency compensation
- RoHS Compliant and Halogen Free

Block Diagram



Packages & Pin Assignments



Pin	Pin Name	I/O	Description
1	1 OUT	Output	Output 1
2	1 IN-	Input	Negative input 1
3	1IN+	Input	Positive input 1
4	Vcc+	—	Positive (highest) supply
5	2 IN+	Input	Positive input 2
6	2 IN-	Input	Negative input 2
7	2 OUT	Output	Output 2
8	3 OUT	Output	Output 3
9	3 IN-	Input	Negative input 3
10	3 IN+	Input	Positive input 3
11	Vcc-	—	Negative (lowest) supply or ground (for single-supply operation)
12	4 IN+	Input	Positive input 4
13	4 IN-	Input	Negative input 4
14	4 OUT	Output	Output 4

Ordering and Marking Information

Ordering Information			
Part Number	Package	Marking Code	Quantity/Reel
GS324SF	SOP-14L	GS324SF □□□□	4,000 PCS
Marking Information			
GS324 1 2 □□□□ Product Code: GS324 Package Code: 1 is S – S is SOP-8 Green Level: 2 is F stands for RoHS Compliant and Halogen Free GS Code: □ is GS Code. □□□□			

Absolute Maximum Ratings

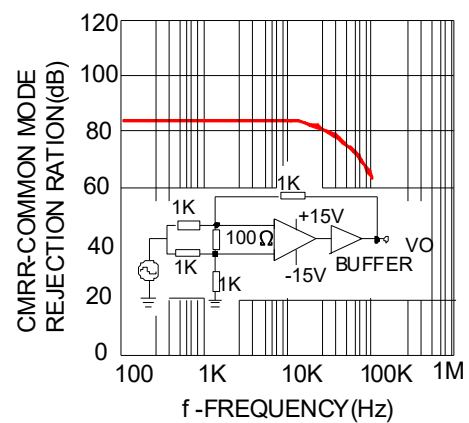
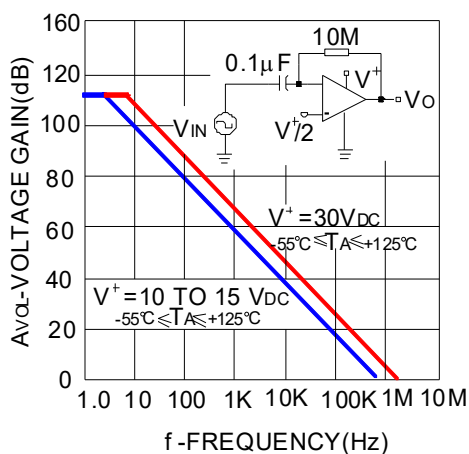
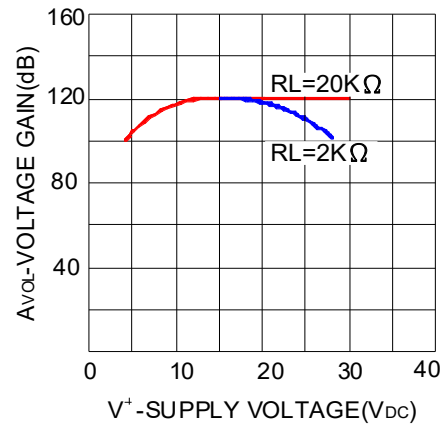
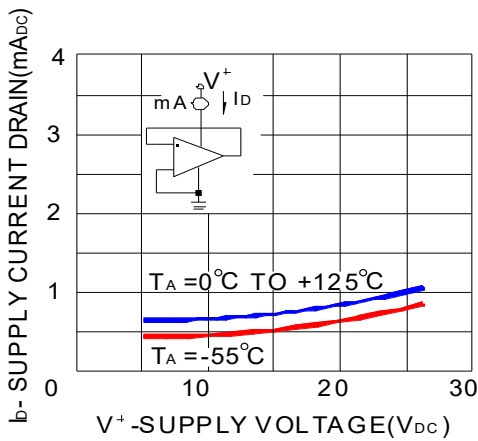
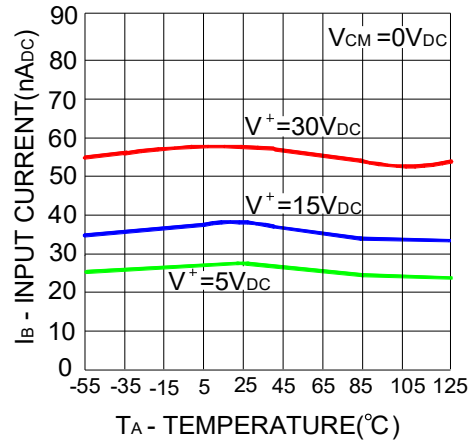
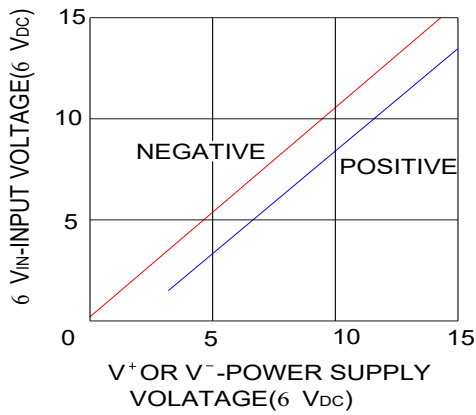
Symbol	Parameter	Value	Unit
V _{CC}	Single Supply	32	V
V _{CC} , V _{EE}	Split Supply	±16	V
V _{IDR}	Input Differential Voltage Range	32	V
I _{OS}	Output Short-circuit to GND	Continuous	
T _J	Junction Temperature	150	°C
T _{STG}	Storage Temperature Range	-65 to +150	°C
T _A	Operating Ambient Temperature Range	-40 to 85	°C
θ _{JA}	Junction to Ambient Thermal Resistance	150	°C/W
θ _{JC}	Junction to Case Thermal Resistance	23	°C/W

Electrical Characteristics (at specified free-air temperature, $V_{CC}=5V$ (Unless Otherwise Noted))

Symbol	Parameter	Test Conditions*		Min	Typ	Max	Unit
V_{IO}	Input offset voltage	$V_{CC}=5V$ to Max. $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	25°C		2	7	mV
			Full range			9	
αV_{IO}	Average temperature coefficient of input offset voltage		Full range		7		$\mu V/^{\circ}C$
I_{IO}	Input offset current	$V_O=1.4V$	25°C		2	50	nA
			Full range			150	
αI_{IO}	Average temperature coefficient of input offset current		Full range		10		$pA/^{\circ}C$
I_{IB}	Input bias current	$V_O=1.4V$	25°C		20	250	nA
			Full range			500	
V_{ICR}	Common-mode input voltage range	$V_{CC}=5V$ to MAX	25°C	0 to $V_{CC}-1.5$			V
			Full range	0 to $V_{CC}-2$			
V_{OH}	High-level output voltage	$R_L \geq 2k\Omega$	25°C	$V_{CC}-1.5$			V
		$V_{CC}=MAX$, $R_L=2k\Omega$	Full range	26			
		$V_{CC}=MAX$, $R_L \geq 10k\Omega$	Full range	27	28		
V_{OL}	Low-level output voltage	$R_L \geq 10k\Omega$	Full range		5	20	mV
A_{VD}	Large-signal differential voltage amplification	$V_{CC}=15V$ $V_O=1V$ to $11V$ $R_L \geq 2k\Omega$	25°C	25	100		V/mV
			Full range	15			
CMRR	Common-mode rejection ratio	$V_{CC}=5V$ to MAX $V_{IC}=V_{ICR}$ min	25°C	65	80		dB
K_{SVR}	Supply voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$)	$V_{CC}=5V$ to MAX	25°C	65	100		dB
V_{O1}/V_{O2}	Crosstalk attenuation	$f=1kHz$ to $20kHz$	25°C		120		dB
I_O	Output current	$V_{CC}=15V$, $V_{ID}=1V$, $V_O=0V$	25°C	-20	-30		mA
			Full range	-10			
		$V_{CC}=15V$ $V_{ID}=-1V$, $V_O=15V$	25°C	10	20		mA
			Full range	5			
		$V_{ID}=-1V$, $V_O=200mV$	25°C	12	30		μA
I_{OS}	Short-circuit output current	V_{CC} at $5V$, GND at $-5V$, $V_O=0V$	25°C		± 40	± 60	mA
I_{CC}	Supply current (two amplifiers)	$V_O=2.5V$, No load	Full range		1.5	2.4	mA
		$V_{CC}=MAX$, $V_O=0.5V_{CC}$, No load	Full range		1.1	3	mA

*All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing Purposes is 30V. Full range is $-40^{\circ}C$ to $85^{\circ}C$.

Typical Performance Characteristics



Typical Performance Characteristics (Continue)

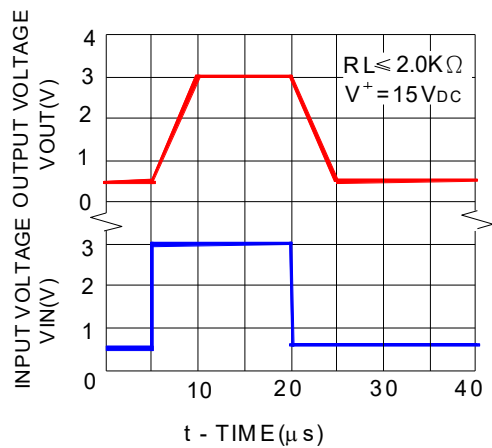


Fig.7 Voltage Follower Pulse Response

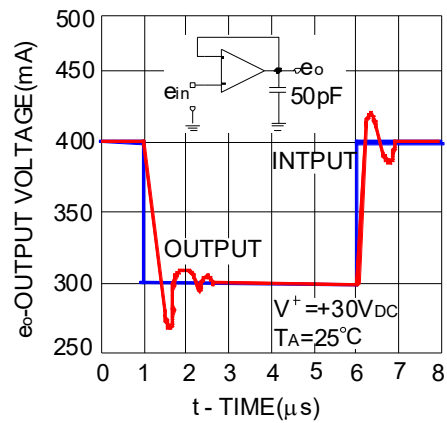


Fig.8 Voltage Follower Pulse Response (Small Signal)

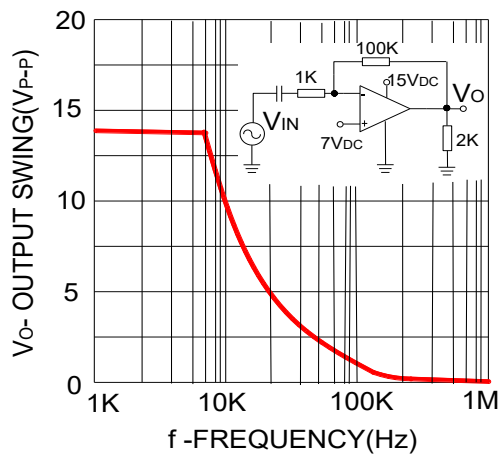


Fig.9 Large Signal Frequency Response

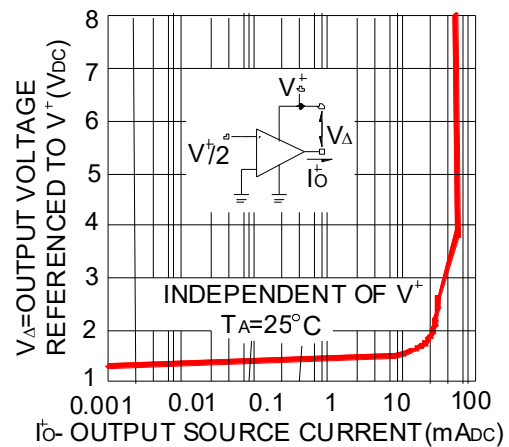


Fig.10 Output Characteristics Current Sourcing

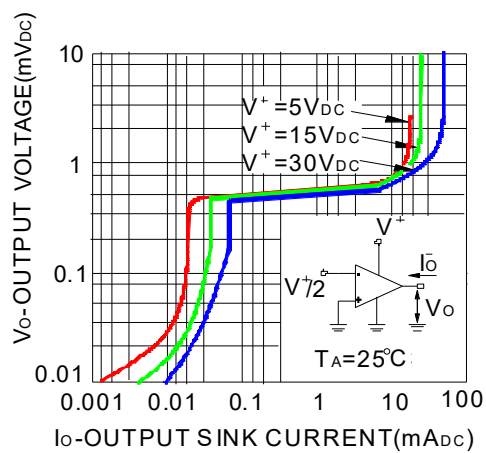


Fig.11 Output Characteristics Current Sinking

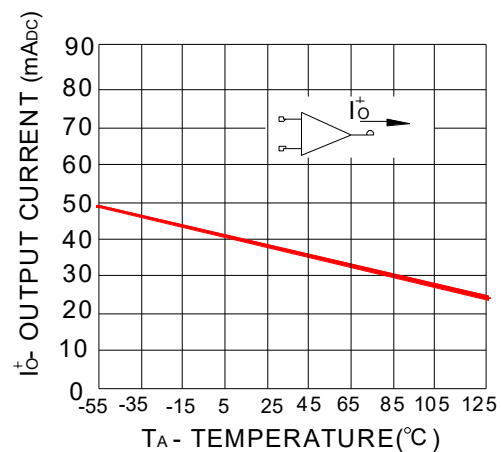
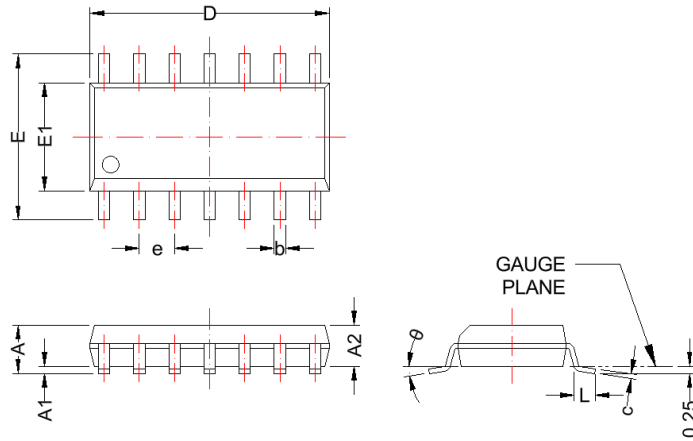


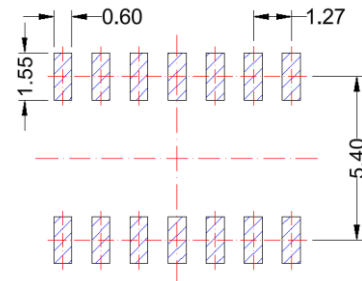
Fig.12 Current Limiting

SOP-14L

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	---	1.75	---	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	---	0.049	---
b	0.31	0.51	0.012	0.020
c	0.10	0.25	0.004	0.010
D	8.50	8.80	0.335	0.346
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

Note:

Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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