Rail-to-Rail I/O OP Amp

Features

- **Single-Supply Operation: 2.0V to 5.5V**
- **Low Supply Current: 700μA**
- **Wide Bandwidth: 3MHz**
- **Slew Rate: 1 V/μs**
- **No Phase Reversal**
- **Unity Gain Stable**
- **Small, SOT-23-5 Package available**

Applications

- **Battery-Powered Instruments**
- **Portable Equipment**
- **Audio Signal Conditioning**
- **Multimedia Audio**
- **ASIC Input or Output Amplifier**

General Description

The G1212 is a rail-to-rail input and output single-supply amplifiers. This high output current makes these amplifiers excellent for driving either resistive or capacitive loads. AC performance is very good with 3.0MHz bandwidth.

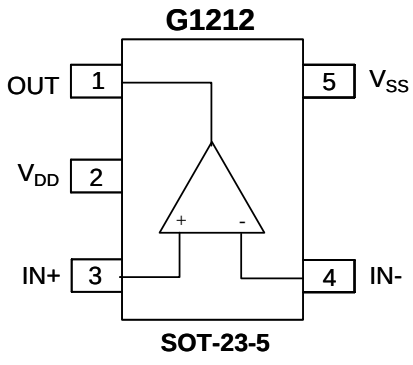
The very low input bias currents enable the G1212 to be used for integrators and diode amplification and other applications requiring low input bias current. The supply current is only 700μA per amplifier at 3.0V, allowing low current applications to control high current loads.

Applications include audio amplification for computers, sound ports, sound cards and set-top boxes. The G1212 is very stable and capable of driving capacitive loads. The ability to swing rail-to-rail at the inputs and outputs enables designers to buffer CMOS ADC/DACs, ASICs or other wide output swing devices in single-supply systems.

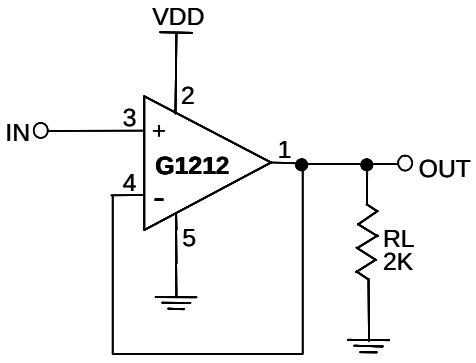
Ordering Information

ORDER NUMBER (Pb free/Green)	MARKING	TEMP. RANGE	PACKAGE
G1212f	12xx	0°C~70°C	SOT23-5

Pin Configuration



Typical Application Circuit



Absolute Maximum Ratings (Note1)

Supply Voltage (V_{DD}) . . . . . .0V to 7.0V
Thermal Resistance Junction to Ambient, (θ_{JA})*
SOT-23-5 . . . . . 240°C/W
Continuous Power Dissipation (T_A=25°C)*
SOT-23-5 . . . . . 520mW
Thermal Resistance Junction to Case, (θ_{JC})
SOT-23-5 . . . . . 60°C/W
Storage temperature (T_{stg}) . . . .-65°C to 150°C
Operating ambient temperature (T_{amb}). . . .0°C to 70°C
Reflow Temperature (soldering, 10sec) . . . . . .260°C

* Please refer to "Minimum Footprint PCB Layout Section".

Notes1: Absolute Maximum Ratings are limits beyond which damage to the device may occur.

Electrical Characteristics

V_{DD} = 2V; V_{SS} = 0V; T_{amb} = 25°C; R_L >1MΩ; unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
Supply current	I_{DD}	no load	---	0.13	0.45	mA
Total power dissipation	P_{tot}	no load	---	0.26	0.8	mW
DC Characteristics						
Input offset voltage	$V_{I(OS)}$		---	±1mV	±15	mV
Common mode voltage	V_{CM}		0	---	2.0	V
Input Bias Current	I_B		---	±0.05	---	nA
Input Bias Current Offset	I_{OS}		---	±0.05	---	nA
Input Resistance	R_{IN}		---	1000	---	MΩ
Open Loop Gain	A_V		---	95	---	dB
Maximum output current	I_O	V_{OUT} = ±V_{IN} x 90%	---	±12	---	mA
Output Voltage Swing	V_O	R_L = 2kΩ	0.04	---	1.93	V
Power supply rejection ratio	PSRR		---	50	---	dB
Common-Mode Rejection Ratio	CMRR		---	55	---	dB
AC Characteristics						
Gain-Bandwidth Product	GBWP	Open-loop; No Load	---	1.0	---	MHz
Slew-Rate	SR	Measured from 20% to 80% of $2V_{P-P}$ step	---	0.3	---	V/µs
Phase Margin	PM		---	60	---	deg

Electrical Characteristics

V_{DD} = 3V; V_{SS} = 0V; T_{amb} = 25°C; R_L =1MΩ; unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
Supply current	I_{DD}	no load	---	0.7	2.1	mA
Total power dissipation	P_{tot}	no load	---	2.1	6.3	mW
DC Characteristics						
Input offset voltage	$V_{I(OS)}$		---	±1.5	±15	mV
Common mode voltage	V_{CM}		0	---	3.0	V
Input Bias Current	I_B		---	±0.05	---	nA
Input Bias Current Offset	I_{OS}		---	±0.05	---	nA
Input Resistance	R_{IN}		---	1000	---	MΩ
Open Loop Gain	A_V		---	90	---	dB
Maximum output current	I_O	V_{OUT} = ±V_{IN} x 90%	---	±27	---	mA
Output Voltage Swing	V_O	R_L = 2kΩ	0.04	---	2.96	V
Power supply rejection ratio	PSRR		---	65	---	dB
Common-Mode Rejection Ratio	CMRR		---	55	---	dB
AC Characteristics						
Gain-Bandwidth Product	GBWP	Open-loop; No Load	---	3.0	---	MHz
Slew-Rate	SR	Measured from 20% to 80% of $5V_{P-P}$ step	---	1	---	V/µs
Phase Margin	PM		---	60	---	deg

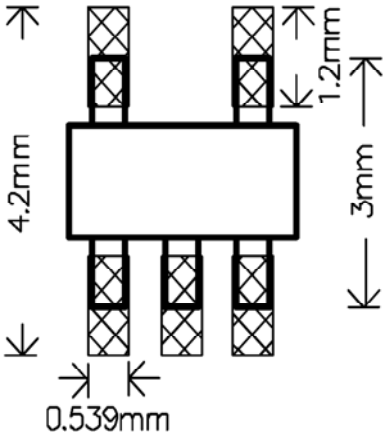
Electrical Characteristics

V_{DD} = 5V; V_{SS} = 0V; T_{amb} = 25°C; R_L = 1MΩ; unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
Supply current	I_{DD}	no load	---	0.9	2.4	mA
Total power dissipation	P_{tot}	no load	---	4.5	12	mW
DC Characteristics						
Input offset voltage	$V_{I\ (OS)}$		---	±3	±15	mV
Common mode voltage	V_{CM}		0	---	5.0	V
Input Bias Current	I_B		---	±0.05	---	nA
Input Bias Current Offset	I_{OS}		---	±0.05	---	nA
Input Resistance	R_{IN}		---	1000	---	MΩ
Open Loop Gain	A_V		---	65	---	dB
Maximum output current	I_O	V_{OUT} = ±V_{IN} x 90%	---	±60	---	mA
Output Voltage Swing	V_O	R_L = 2kΩ	0.05	---	4.95	V
Power supply rejection ratio	PSRR		---	65	---	dB
Common-Mode Rejection Ratio	CMRR		---	45	---	dB
AC Characteristics						
Gain-Bandwidth Product	GBWP	Open-loop; No Load	---	13	---	MHz
Slew-Rate	SR	Measured from 10% to 90% of $5V_{P-P}$ step	---	6	---	V/µs
Phase Margin	PM		---	60	---	deg

Minimum Footprint PCB Layout Section

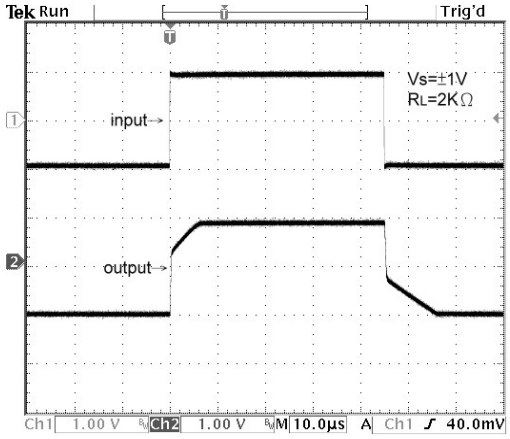
SOT-23-5



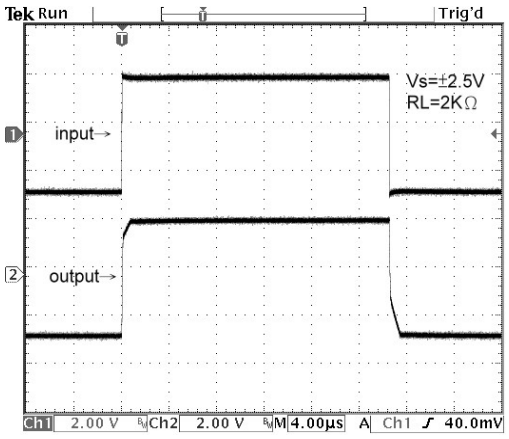
Large Signal Transient Response Figure

Test Condition：T_A = 25°C, A_V = 1, R_L = 2KΩ

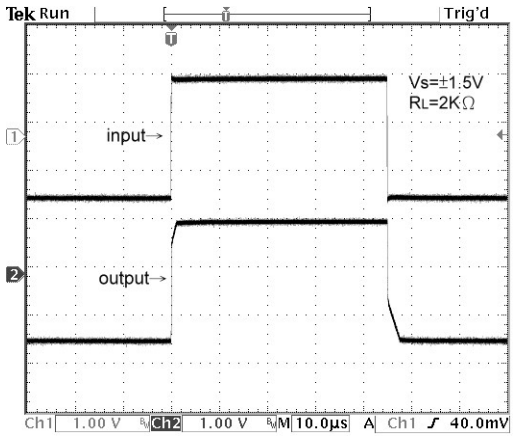
Vs = ±1V

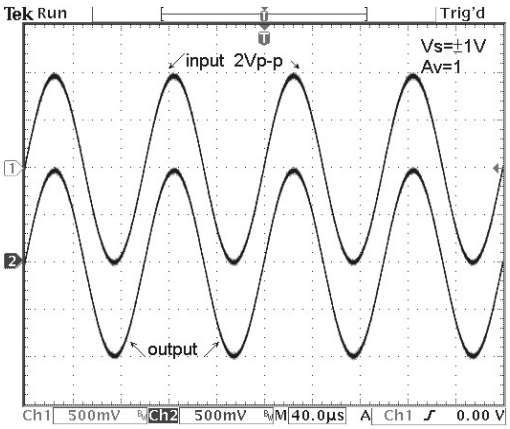


Vs = ±2.5V

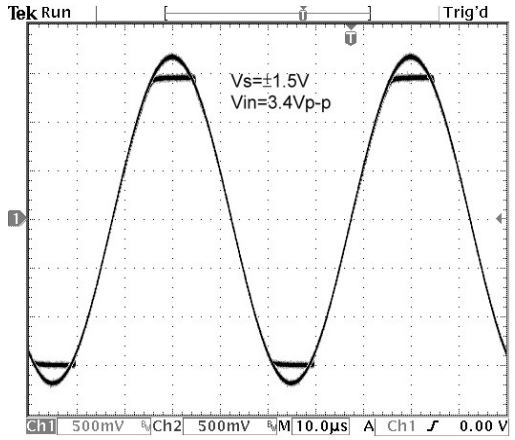


Vs = ±1.5V





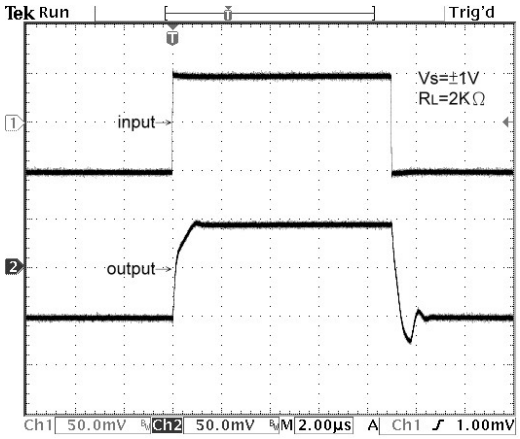
Operation with Beyond-the Rail Input



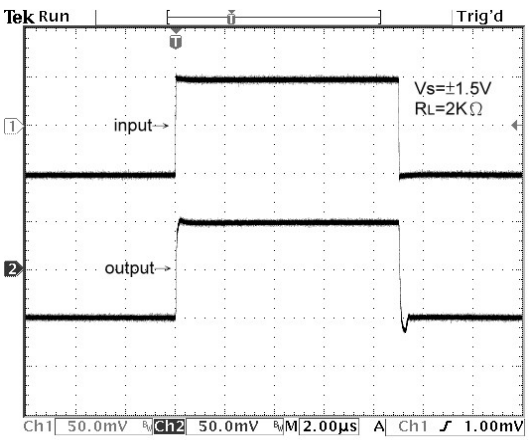
Small Signal Transient Response Figure

Test Condition：T_A = 25°C, A_V = 1, R_L = 2kΩ

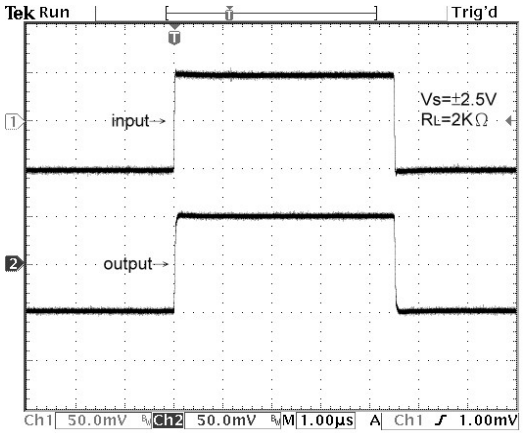
Vs = ±1V



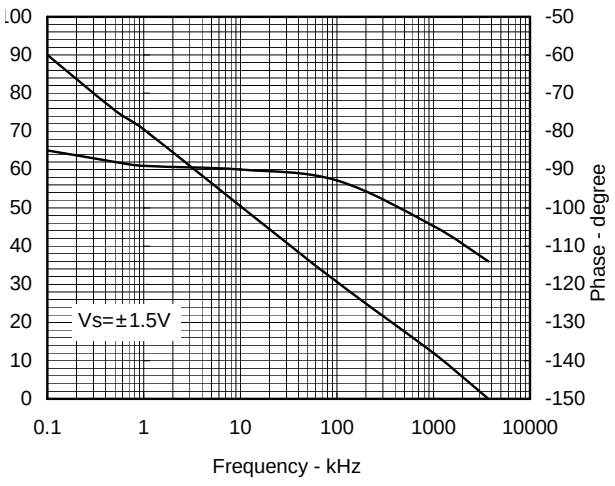
Vs = ±1.5V



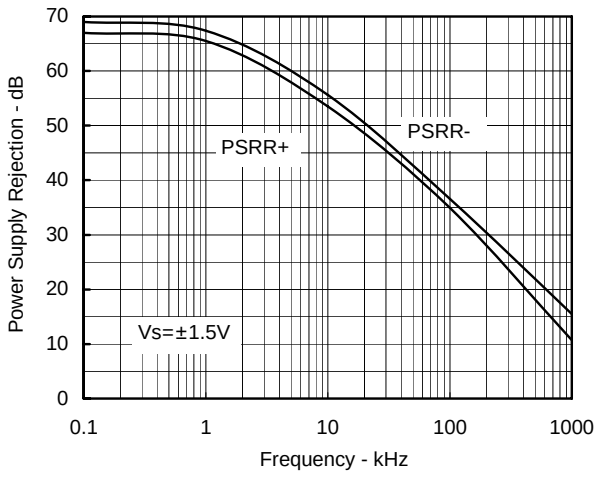
Vs = ±2.5V



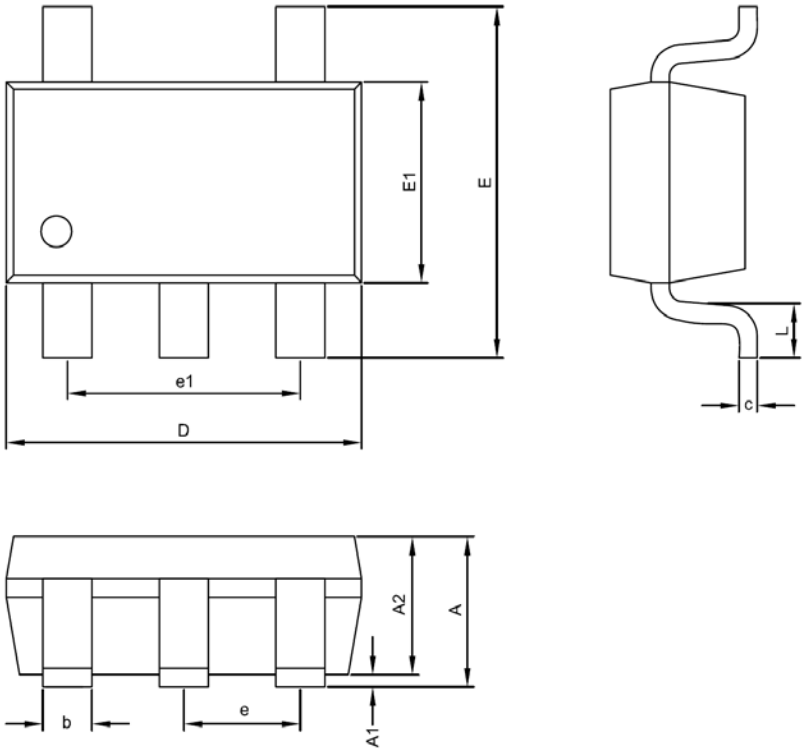
Open-Loop Gain & Phase vs. Frequency



PSRR



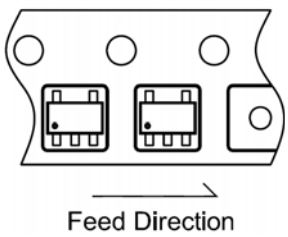
Package Information



SOT-23-5 (T1) Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.10	1.45	0.039	0.043	0.057
A1	0.00	---	0.15	0.000	---	0.006
A2	1.00	1.10	1.30	0.039	0.043	0.051
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
c	0.08	0.15	0.25	0.003	0.006	0.010
b	0.30	0.40	0.50	0.012	0.016	0.020
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	0.45	0.60	0.012	0.018	0.024

Taping Specification



PACKAGE	Q'TY/REEL
SOT-23-5	3,000 ea