

**Rail-to-Rail I/O, High-Slew-Rate OP Amp****Features**

- +3V to +5.5V Single-Supply Operation
- Input / Output Rail-to-Rail
- Low input current
- High output driving capacity
- Low Quiescent Current: 500 μ A @ 5V
- High Slew rate 6.5V/ μ s
- High Gain-Bandwidth Product 6.5MHz
- High Open Loop Gain 95dB
- High PSRR 70dB

Applications

- Headphone Driver
- Portable Equipment
- Battery-Powered Equipment
- Multimedia Audio
- ASIC Input or Output Amplifier
- Sensor Amplifier
- Low Power/Low Voltage Applications

General Description

G1214 is a input/output rail-to-rail Operational Amplifier. It can be operated from +3V to +5.5V single supply or from ± 1.5 V to ± 2.75 V dual supply. G1214 can drive 66mA into resistor loads to within 10% power rail. AC performance is very excellent with 6.5MHz bandwidth, 6.5V/ μ s Slew Rate, 95dB open loop gain, 60 degree phase margin and low distortion.

Supply current of G1214 is only 500 μ A per Amplifier. It is very suitable for low current consumption applications to control high current loads. Applications include audio amplification for computers, sound ports, sound cards and set-top boxes.

G1214 is housed in a 5-pin small SOT-23-5 and SC-70-5 package.

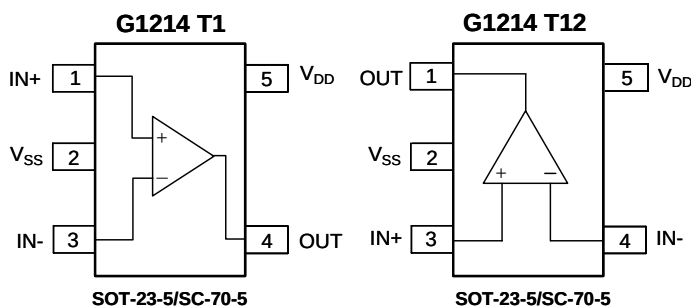
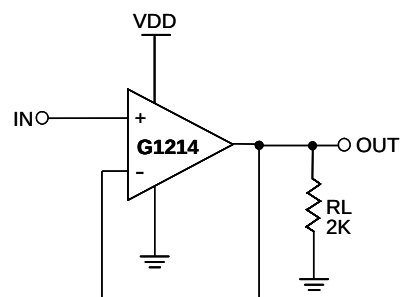
Ordering Information

ORDER NUMBER	ORDER NUMBER (Pb free)	MARKING	TEMP. RANGE	PACKAGE
G1214T1U	G1214T1Uf	1214x	-40°C to 85°C	SOT-23-5
G1214TAU	G1214TAUf	1214x	-40°C to 85°C	SC-70-5
G1214T12U	G1214T12Uf	214Ax	-40°C to 85°C	SOT-23-5
G1214TA2U	G1214TA2Uf	14xx	-40°C to 85°C	SC-70-5

Note: T1: SOT-23-5 TA: SC-70-5

2: Bonding Code

U: Tape & Reel

Pin Configuration**Typical Application Circuit**

Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd.

**Absolute Maximum Ratings**

Supply Voltage (V_{DD} to V_{SS}) 6.5V
 All Other Pins ($V_{SS}-0.3V$) to ($V_{DD}+0.3V$)
 Continuous Power Dissipation ($T_A=25^\circ C$)
 SOT-23-5 520mW
 SC-70-5 313mW
 Thermal Resistance Junction to Ambient, (θ_{JA})
 SOT-23-5 $240^\circ C/Watt$
 SC-70-5 $400^\circ C/Watt$

Junction Temperature $150^\circ C$
 Operating Temperature Range $-40^\circ C$ to $85^\circ C$
 Storage Temperature Range $-65^\circ C$ to $160^\circ C$
 Reflow Temperature (soldering, 10sec) $260^\circ C$

Electrical Characteristics

$V_{DD} = 5V$; $V_{SS} = 0V$; $T_{amb} = 25^\circ C$; $C_L = 10pF$, $R_L = 1k\Omega$ to $V_{DD}/2$; unless otherwise specified.

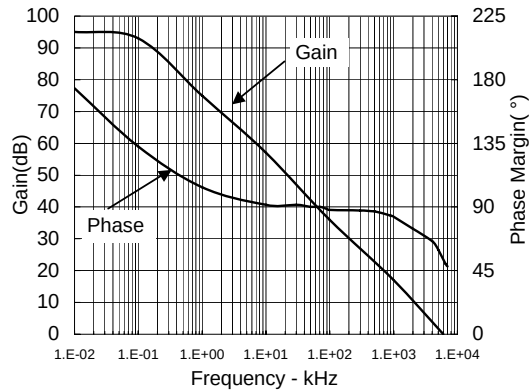
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	V_{DD}	Note1	3	---	5.5	V
Supply Current	I_{DD}	No load	---	0.5	0.7	mA
Total Power Dissipation	P_{tot}	No load	---	0.25	0.35	mW
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		---	± 5	± 15	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	0	---	5	V
Input Bias Current	I_B		---	± 1.5	± 20	nA
Input Bias Current Offset	I_{OS}		---	± 1.5	± 20	nA
Input Resistance	R_{IN}		---	1000	---	$M\Omega$
Open Loop Gain	A_V		85	95	---	dB
Maximum Output Current	I_O	$V_{OUT} = \pm V_{IN} \times 90\%$	55	± 66	---	mA
Output Voltage Swing High	V_{OH}	$R_L = 2k\Omega$	4.96	4.99	---	V
Output Voltage Swing Low	V_{OL}	$R_L = 2k\Omega$	-	0.012	0.04	V
Power Supply Rejection Ratio	PSRR	$3V \leq V_{DD} \leq 5.5V$	45	70	---	dB
Common-Mode Rejection Ratio	CMRR	$V_{SS} \leq V_{CM} \leq V_{DD}$	45	65	---	dB
AC Characteristics						
Gain-Bandwidth Product	GBWP	Open-loop; No Load	---	6.5	---	MHz
Slew-Rate	SR	Measured from 10% to 90% of $4V_{P-P}$ step, $R_L = 1k\Omega$, $C_L = 10pF$	---	6.5	---	V/ μs
Phase Margin	PM		---	60	---	deg
Maximum Output Current with THD	I_O	THD $<0.1\%$, $R_L = 16\Omega$	---	100	---	mA

Note1: Guaranteed by the Power-Supply Rejection Ratio (PSRR) test

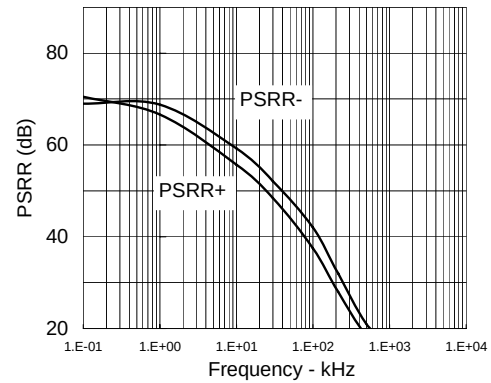


Typical Performance Characteristics

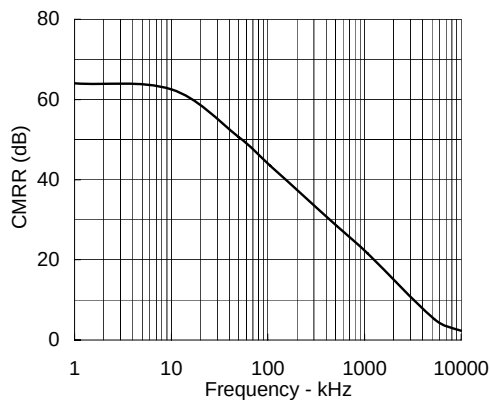
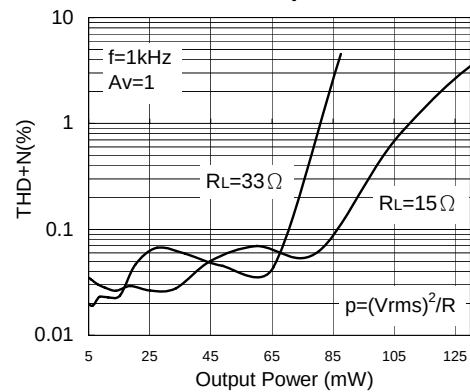
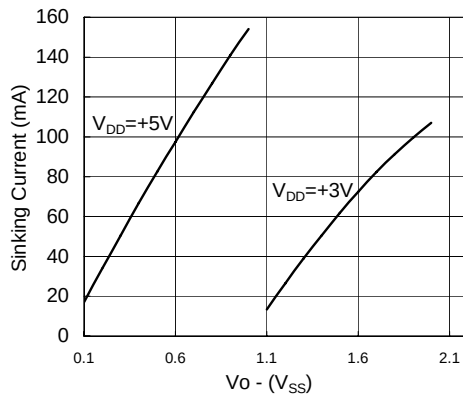
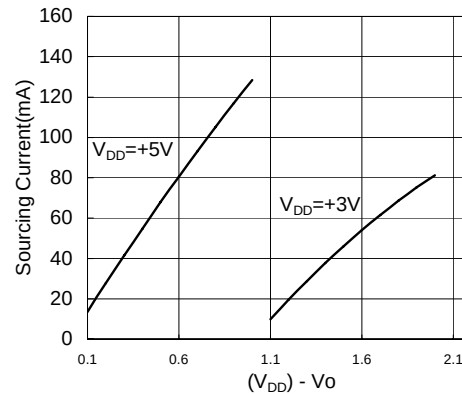
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Open Loop Gain & Phase Margin
vs. Frequency

PSRR vs. Frequency

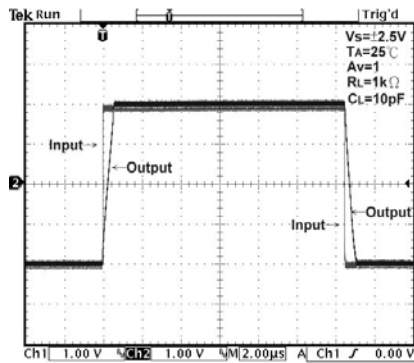


CMRR vs. Frequency

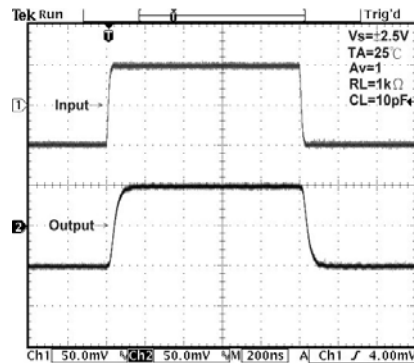
Total Harmonic Distortion Plus
Noise vs. Output PowerSinking Current vs. $V_O - (V_{SS})$ Sourcing Current vs. $(V_{DD}) - V_O$ 

Typical Performance Characteristics (Continued)

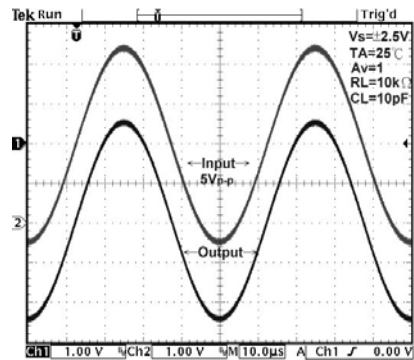
Large Signal Transient Response



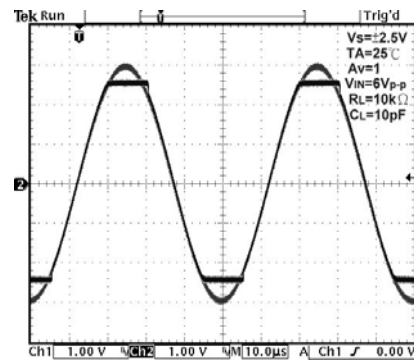
Small Signal Transient Response



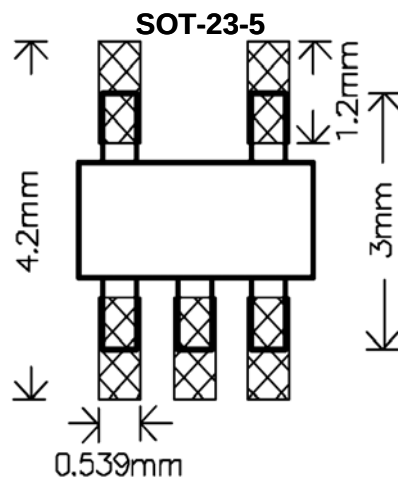
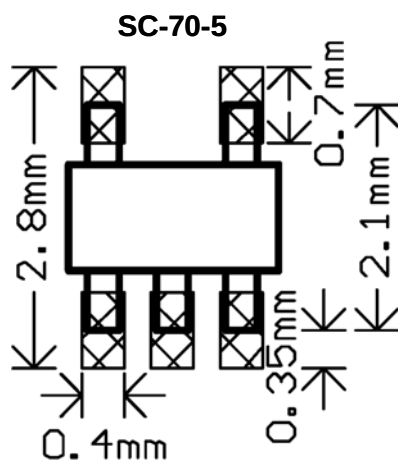
Operation with Rail-to-Rail Input and Output



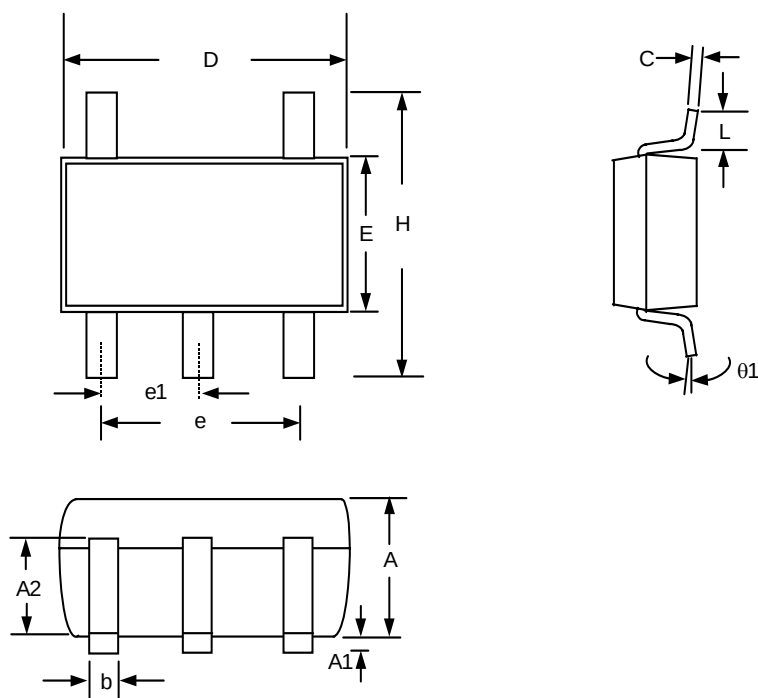
Operation with Beyond-the Rail Input



Recommended Minimum Footprint



Package Information

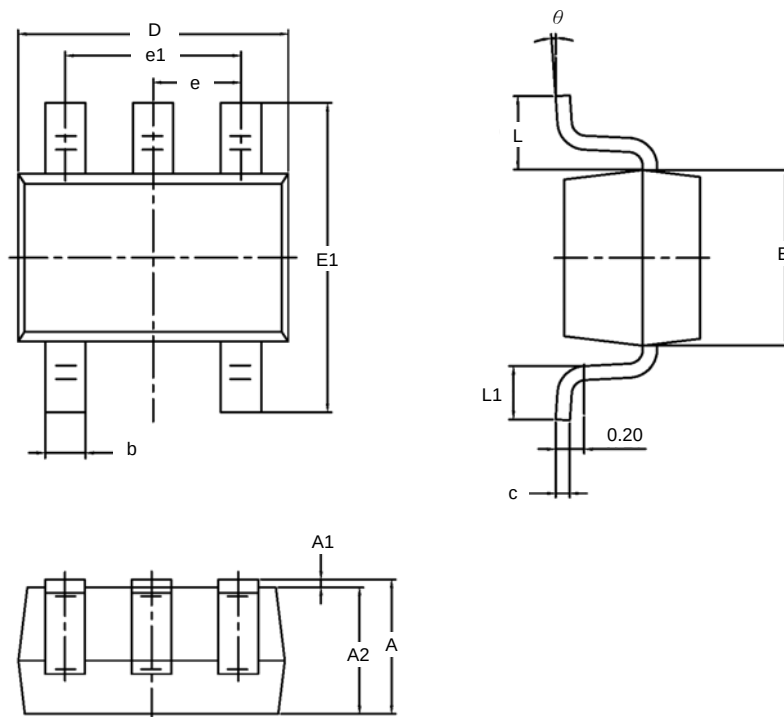


SOT-23-5 (T1) Package

Note:

1. Package body sizes exclude mold flash protrusions or gate burrs
2. Tolerance ± 0.1000 mm (4mil) unless otherwise specified
3. Coplanarity: 0.1000mm
4. Dimension L is measured in gage plane

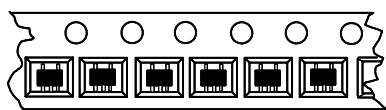
SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.10	1.30	0.039	0.043	0.051
A1	0.00	-----	0.10	0.000	-----	0.004
A2	0.70	0.80	0.90	0.028	0.031	0.035
b	0.35	0.40	0.50	0.014	0.016	0.020
C	0.10	0.15	0.25	0.004	0.006	0.010
D	2.70	2.90	3.10	0.106	0.114	0.122
E	1.40	1.60	1.80	0.055	0.063	0.071
e	-----	1.90(TYP)	-----	-----	0.075(TYP)	-----
e1	-----	0.95	-----	-----	0.037	-----
H	2.60	2.80	3.00	0.102	0.110	0.118
L	0.37	-----	-----	0.015	-----	-----
$\theta 1$	1°	5°	9°	1°	5°	9°



SC-70-5 (TA) Package

SYMBOL	DIMENSION IN MM		DIMENSION IN INCH	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.10	0.035	0.043
A1	0.00	0.10	0.00	0.004
A2	0.90	1.00	0.035	0.039
b	0.15	0.35	0.006	0.014
c	0.08	0.15	0.003	0.006
D	2.00	2.20	0.079	0.087
E	1.15	1.35	0.045	0.053
E1	2.15	2.45	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.20	1.40	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.26	0.46	0.010	0.018
θ	0°	8°	0°	8°

Taping Specification



SOT-23-5、SC-70-5L Package Orientation

PACKAGE	Q'TY/REEL
SOT-23-5	3,000 ea
SC-70-5	3,000 ea

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