

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

Features

- +2.2V to +7V 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
- Set-up Box Audio HP or Pre-driver Applications

General Description

G1214 is a input/output rail-to-rail Operational Amplifier. It can be operated from +2.2V to +7V single supply or from ± 1.1 V to ± 3.5 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 (SOT-353) package.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1214T1Uf	1214x	-40°C to 85°C	SOT-23-5
G1214TAUf	1214x	-40°C to 85°C	SC-70-5 (SOT-353)
G1214TADf	1214x	-40°C to 85°C	SC-70-5 (SOT-353)
G1214T12Uf	214Ax	-40°C to 85°C	SOT-23-5
G1214TA2Uf	14xx	-40°C to 85°C	SC-70-5 (SOT-353)

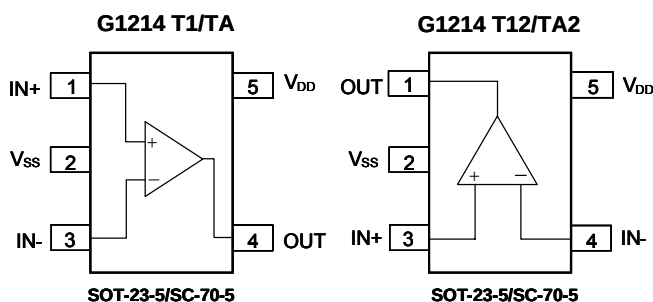
Note: T1: SOT-23-5 TA: SC-70-5 (SOT-353)

2: Bonding Code

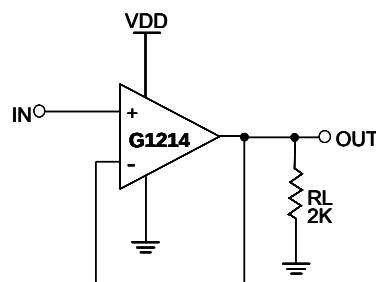
U & D: Tape & Reel

Green : Lead Free / Halogen Free

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}) 8.5V
 All Other Pins (V_{SS} -0.3V) to (V_{DD} +0.3V)
 Thermal Resistance Junction to Ambient, (θ_{JA})*
 SOT-23-5 240°C/W
 SC-70-5 (SOT-353) 400°C/W
 Continuous Power Dissipation ($T_A=25^\circ\text{C}$)*
 SOT-23-5 520mW
 SC-70-5 (SOT-353) 313mW

Thermal Resistance Junction to Case, (θ_{JC})
 SOT-23-5 60°C/W
 SC-70-5 (SOT-353) 120°C/W
 Junction Temperature 150°C
 Operating Temperature Range -40°C to 85°C
 Storage Temperature Range -65°C to 150°C
 Reflow Temperature (soldering, 10sec) 260°C

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

Electrical Characteristics

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

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at $+25^\circ\text{C}$, unless otherwise specified.

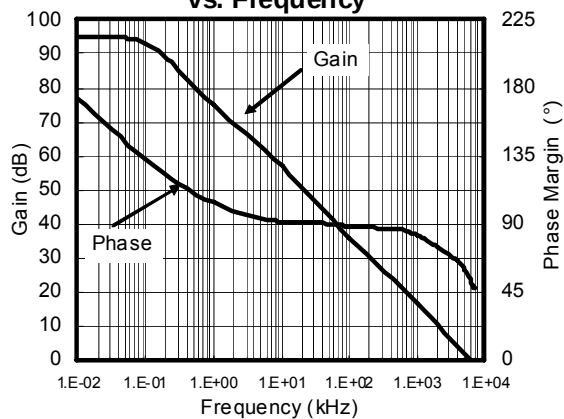
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	V_{DD}	Note1	2.2	---	7	V
Supply Current	I_{DD}	No load	---	0.5	0.7	mA
Total Power Dissipation	P_{tot}	No load	---	0.25	0.35	mW
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		---	± 5	± 15	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	0	---	V_{DD}	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 Ω
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

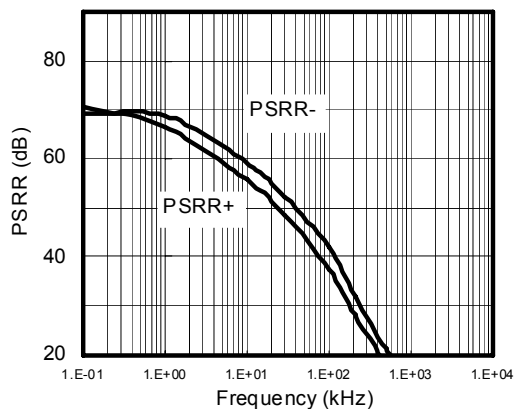
Typical Performance Characteristics

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

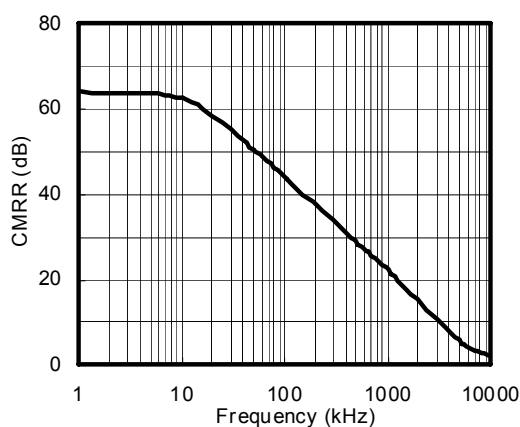
Open Loop Gain & Phase Margin vs. Frequency



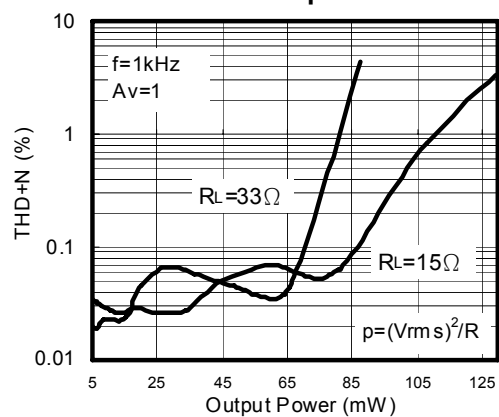
PSRR vs. Frequency



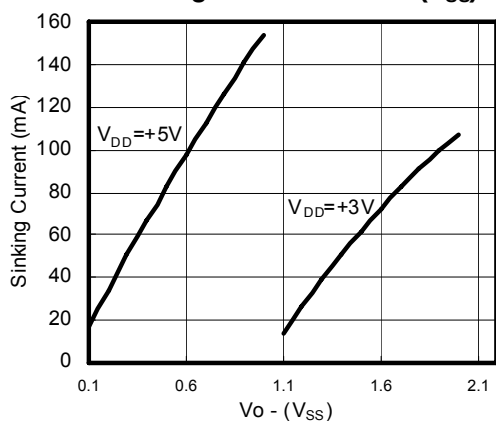
CMRR vs. Frequency



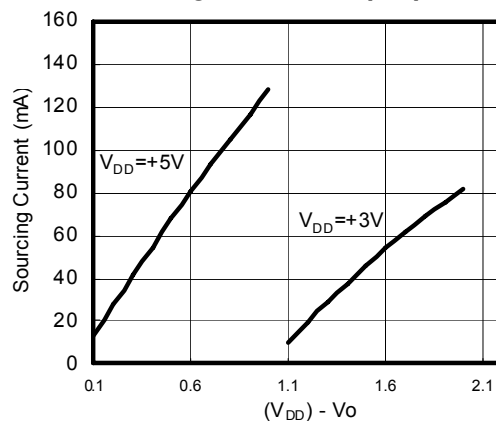
Total Harmonic Distortion Plus Noise vs. Output Power



Sinking Current vs. $V_o - (V_{SS})$

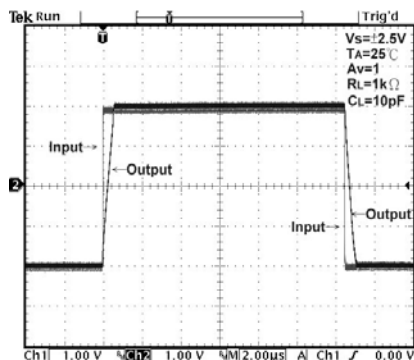


Sourcing Current vs. $(V_{DD}) - V_o$

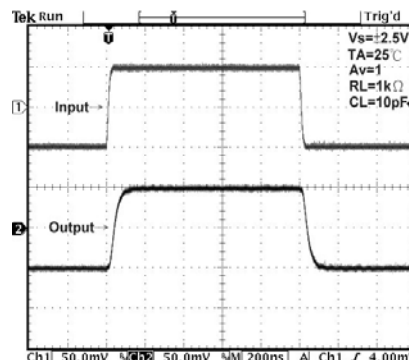


Typical Performance Characteristics (continued)

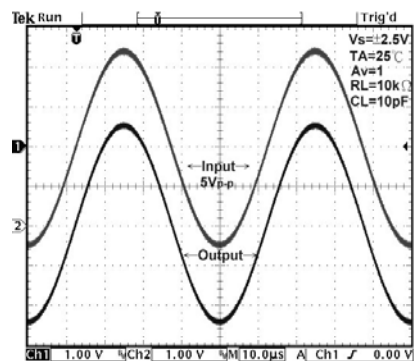
Large Signal Transient Response



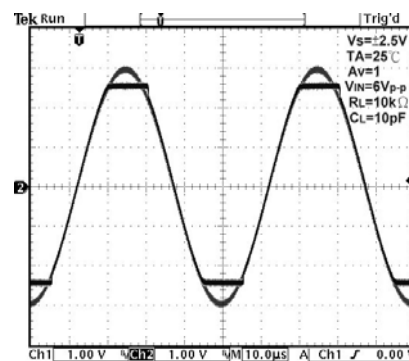
Small Signal Transient Response



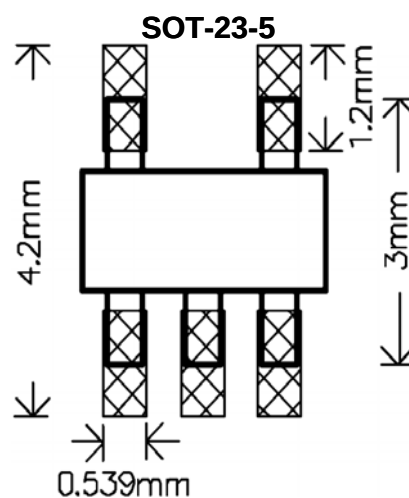
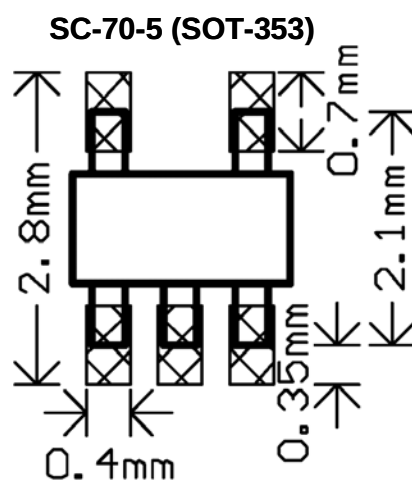
Operation with Rail-to-Rail Input and Output



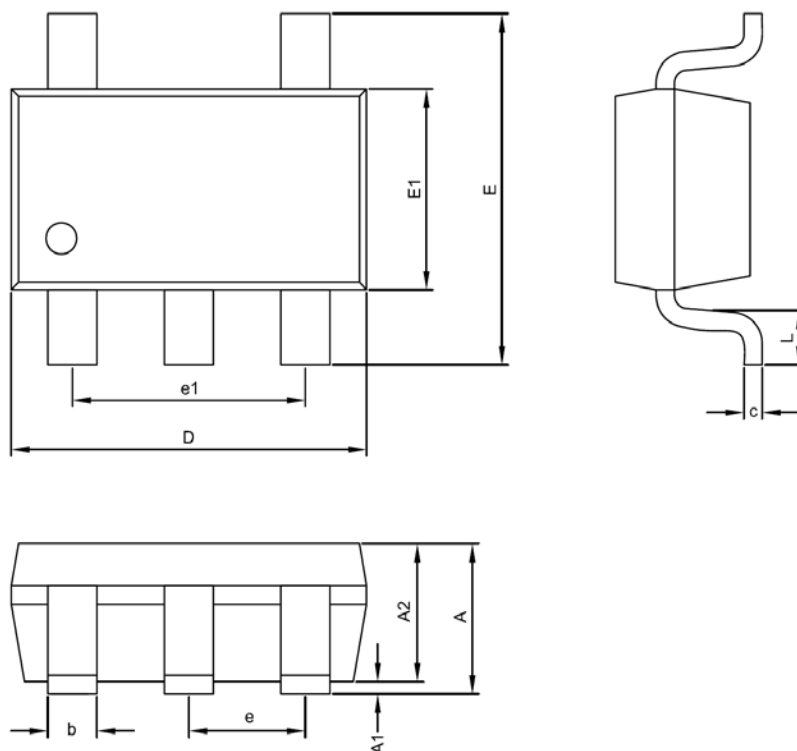
Operation with Beyond-the Rail Input



Minimum Footprint PCB Layout Section



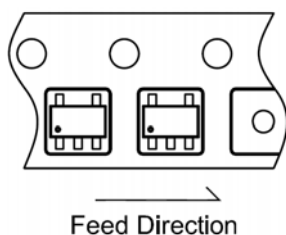
Package Information



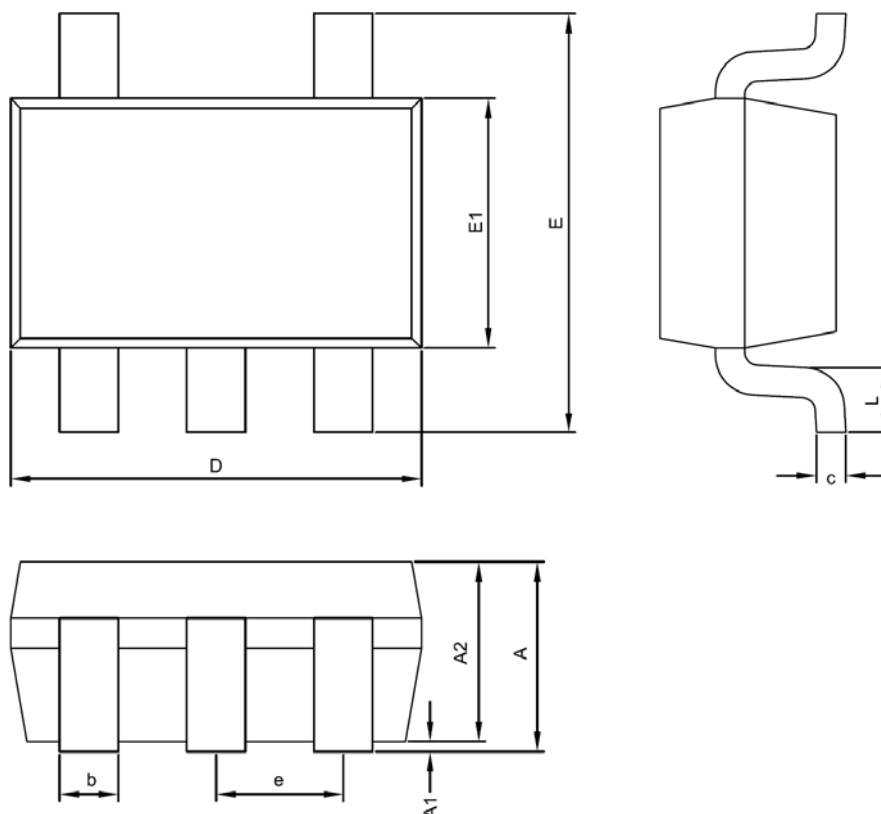
SOT-23-5 Package

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



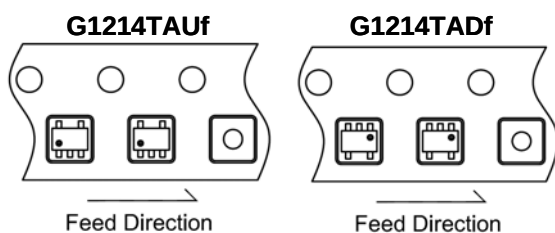
PACKAGE	Q'TY/REEL
SOT-23-5	3,000 ea



SC-70-5 (SOT-353) Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.90	1.00	0.028	0.035	0.039
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.80	2.10	2.40	0.071	0.083	0.094
E1	1.15	1.25	1.35	0.045	0.049	0.053
c	0.08	0.15	0.25	0.003	0.006	0.010
b	0.15	0.25	0.30	0.006	0.010	0.012
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018

Taping Specification



PACKAGE	Q'TY/REEL
SC-70-5 (SOT-353)	3,000 ea

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