Low power, Single, SOT23-5, Rail-to-rail OP Amp

Features

- **Single-Supply Operation: 4V to 6V**
- **High Output Current: ±100mA**
- **Low Supply Current: 500 µA**
- **Wide Bandwidth: 3 MHz**
- **Slew Rate: 4 V/µs**
- **No Phase Reversal**
- **Unity Gain Stable**
- **Small, 5-Pin SOT23 Package available**

Applications

- **Battery-Powered Instruments**
- **Portable Equipment**
- **Data-Acquisition Systems**
- **High-Side/Low-Side Current Sensors**
- **ASIC Input or Output Amplifier**
- **Signal Conditioning**
- **Low-Power, Low voltage Applications**

General Description

The G1213 is a rail-to-rail input and output single-supply amplifiers featuring 100mA output drive current. This high output current makes these amplifiers excellent for driving either resistive or capacitive loads. AC performance is very good with 3.0MHz bandwidth; 4.0V/µs slew rate and low distortion. All are guaranteed to operate from a +4 to +6 volt single supply.

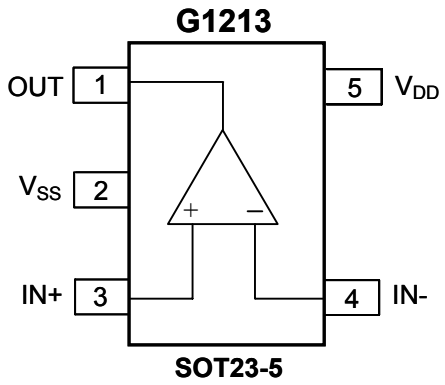
The very low input bias currents enable the G1213 to be used for integrators and diode amplification and other applications requiring low input bias current. The 100mA high output current and supply current is only 850µA per amplifier at 5 volts, allowing low current applications to control high current loads.

Applications include audio amplification for computers, sound ports, sound cards and set-top boxes. The G1213 is very stable and capable of driving heavy 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.

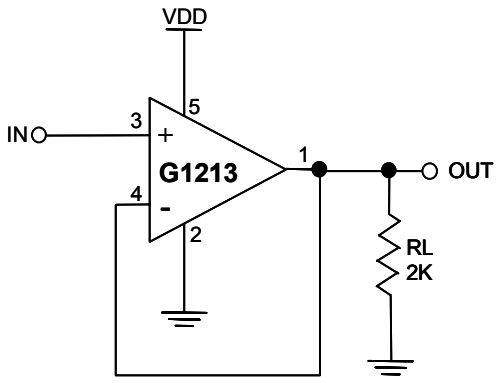
Ordering Information

PART	MARKING	TEMP. RANGE	PIN-PACKAGE
G1213	13xx	-20°C to +85°C	SOT23-5

Pin Configuration



Tpypical Application Circuit



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

Absolute Maximum Ratings (Note1)

Supply Voltage (V_{DD} to V_{SS})……..…+7.0V
All Other Pins……(Vss-0.3V) to (V_{DD}+0.3V)
Operating Ambient Temperature ……...-20°C to +85°C
Storage Temperature Range……..……-65°C to +150°C

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

Thermal Characteristics

SYMBOL	PARAMETER	VALUE	UNIT
R_{thj-a}	Thermal resistance from junction to ambient in free air SOT23-5	240	°C/W

Electrical Characteristics

V_{DD} = 5V; V_{SS} = 0V; T_{amb} = 25°C; f_i = 1kHz; V_{CM}=V_{DD}/2, R_L = 2KΩ connected to V_{DD}/2; unless otherwise specified.

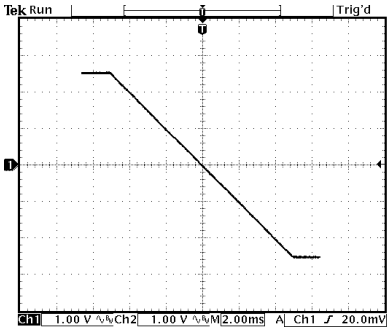
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supplies						
V_{DD}	Supply voltage		4.0	5.0	6.0	V
	Single		4.0	5.0	6.0	V
	Dual		2	2.5	3.0	V
V_{SS}	Negative supply voltage (dual)		-2.0	-2.5	-3.0	V
I_{DD}	Supply current	no load		0.85	1.2	mA
P_{tot}	Total power dissipation	no load		4.25	6.0	mW
DC Characteristics						
$V_{I(OS)}$	Input offset voltage			±1.5	±6	mV
V_{CM}	Common mode voltage		0		5.0	V
I_B	Input Bias Current			±0.05		nA
I_{OS}	Input Bias Current Offset			±0.05		nA
R_{IN}	Input Resistance			1000		MΩ
A_V	Large-Signal Voltage Gain			80		dB
I_O	Maximum output current	THD<0.1%, R_L= 16Ω		100		mA
R_O	Output resistance	Open-loop, R_L= 20Ω		5.5		Ω
V_O	Output voltage swing	R_L = 32Ω	1.0		4.0	V
		R_L = 2kΩ	0.1		4.9	V
PSRR	Power supply rejection ratio	fi = 1kHz; $V_{ripple(peak)}$ = 1V		60		dB
CMRR	Common-Mode Rejection Ratio			56		dB
AC Characteristics						
THD	Total harmonic distortion	Note 2		< 0.1		%
		R_L = 2kΩ, Note 2				
GBWP	Gain-Bandwidth Product	Open-loop; No Load		3.0		MHz
SR	Slew-Rate	Measured from 30% to 70% of 5Vp-p step		4		V/μs
PM	Phase Margin			60		deg
P_O	Maximum output power	Note 1; R_L = 32Ω		135		mW
B	Power bandwidth	Unity gain; R_L = 32Ω		25		KHz

Notes:
1. Values are proportional to V_{DD}; THD < 0.1%
2. V_{DD} = 5.0V; $V_{O(P-P)}$ = 4.0V (at 0 dB)

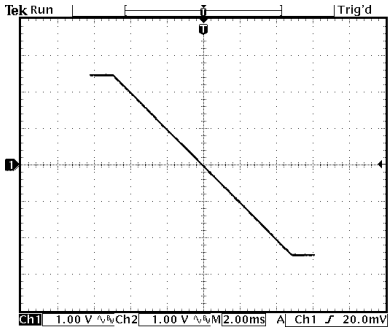
Output Swing Range Voltage Figure

Test Condition：T_A = 25°C, A_V = -1

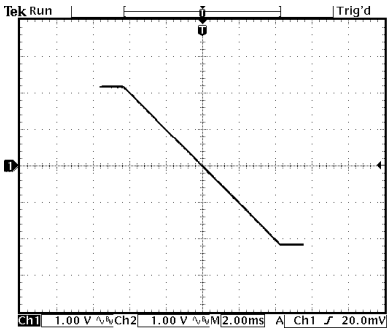
V+ = 2.5V , V- = - 2.5V , R_L=2kΩ



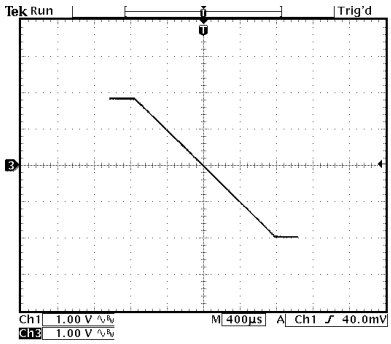
V+ = 2.5V , V- = - 2.5V , R_L=250Ω



V+ = 2.5V , V- = - 2.5V , RL=32Ω



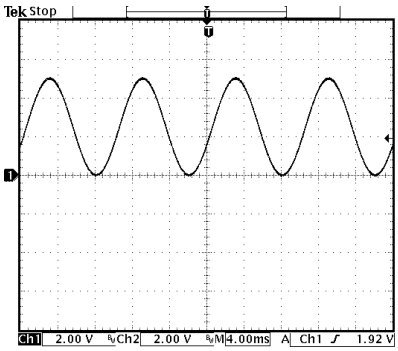
V+ = 2.5V , V- = - 2.5V , R_L=16Ω

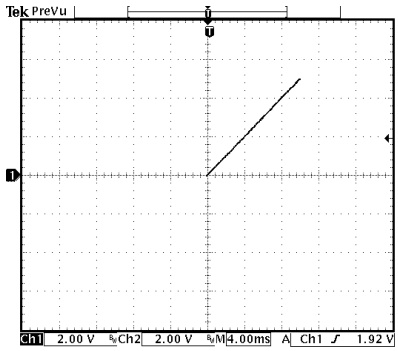


Input Common Mode Voltage Range Figure

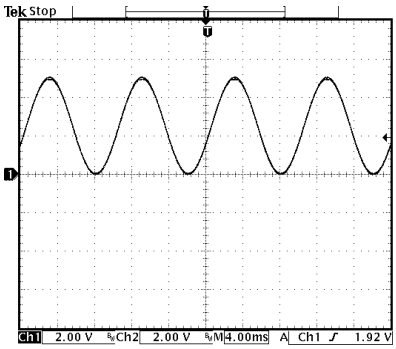
Test Condition：T_A = 25°C, A_V = 1

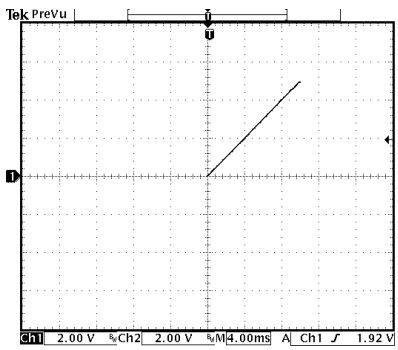
V+ = 5V, V- = 0V, RL = 2KΩ





V+ = 5V, V- = 0V, RL = 250Ω

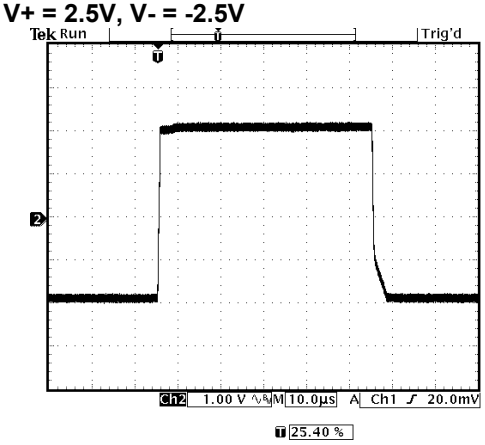




Large Signal Transient Response Figure

Test Condition：TA=25°C, AV=1 , RL = 2kΩ

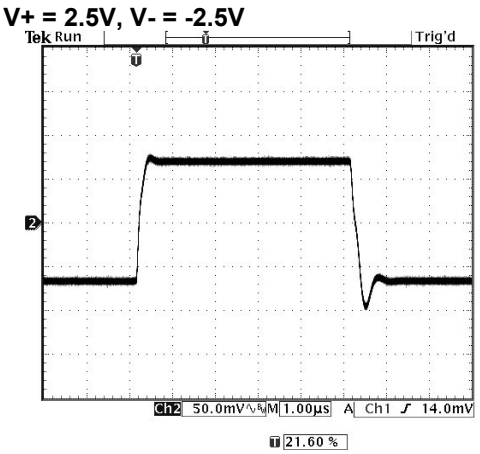
V+ = 2.5V, V- = -2.5V



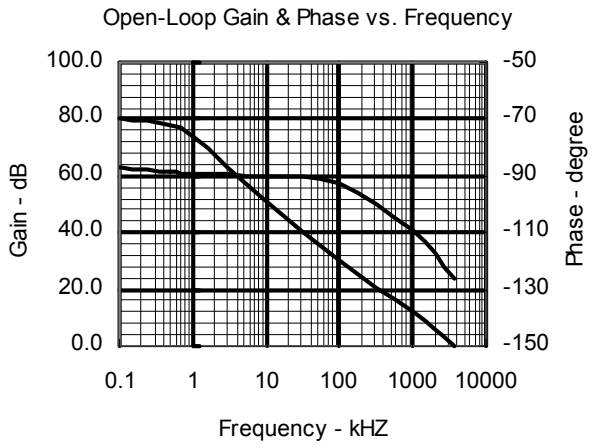
Small Signal Transient Response Figure

Test Condition：TA=25°C, AV=1 , RL = 32Ω

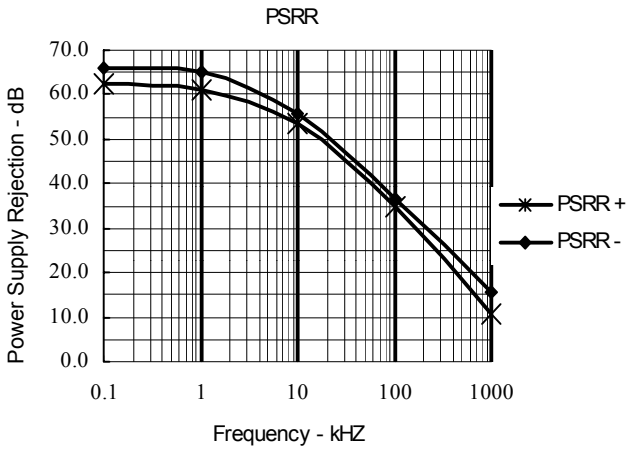
V+ = 2.5V, V- = -2.5V



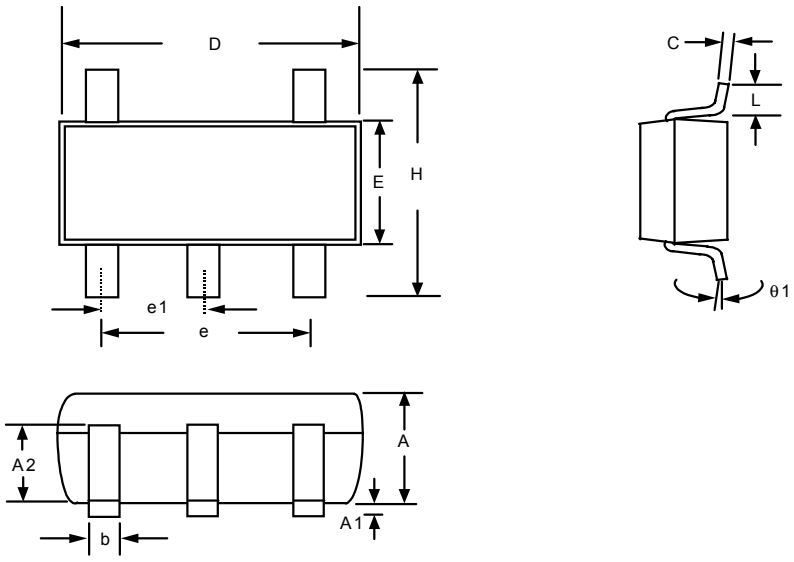
Test Condition: Vs = ±2.5V, TA = 25°C



Test Condition: Vs = ±2.5V, TA = 25°C



Package Information

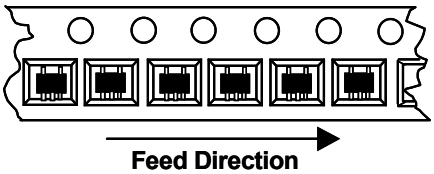


Note:

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

SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	-----	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.40	1.60	1.80
e	-----	1.90(TYP)	-----
e1	-----	0.95	-----
H	2.60	2.80	3.00
L	0.37	------	-----
θ 1	1º	5º	9º

Package Orientation



Feed Direction

SOT23-5 Package Orientation