

Quadruple Rail-to-Rail Operational Amplifiers

Features

- Wide Supply Operation Range +4.5V to +20V
- Beyond the Rails Input Capability
- Rail-to-Rail Output Swing
- Low Supply Current, 3mA Per Amplifier (Typical)
- Low Input Offset Voltage 2mV (Typical)
- Internal Frequency Compensated for Unit Gain Stable
- Wide Bandwidth (unit gain) 30MHz
- High Slew Rate = 150V/μs
- Large DC Voltage Gain 80dB (Typical)
- ±180mA Output Short Current
- Embedded Over-Temperature Protection
- TSSOP-14 & TSSOP-14 (FD) package available

Applications

- Portable Equipment
- TFT Vcom/Gamma buffers
- Battery-Powered Equipment
- ASIC Input or Output Amplifier
- Low Power/Low Voltage Applications

General Description

The G1564 is the quadruple rail-to-rail input/output operation amplifiers with the low power, high voltage swing. Operating on supplies ranging from 4.5V to 20V, while current consuming only 3mA / per amplifier, the G1564 is with high unit-gain bandwidth of 30MHz. The G1564 also provides common mode input ability beyond the supply rails, as well as rail-to-rail output capability. This enables this amplifier to offer maximum dynamic range at any supply voltage.

The G1564 also features fast slewing and settling times, as well as a high output drive capability of 65mA (sink and source). These features make these amplifiers ideal for high speed filtering and signal conditioning application. Other applications include battery power, TFT Vcom /Gamma buffers, portable devices, and anywhere low power consumption is important.

There is with over temperature protection embedded to avoid the unexpected damages. The G1564 is available in TSSOP-14 & TSSOP-14 (FD) package.

Ordering Information

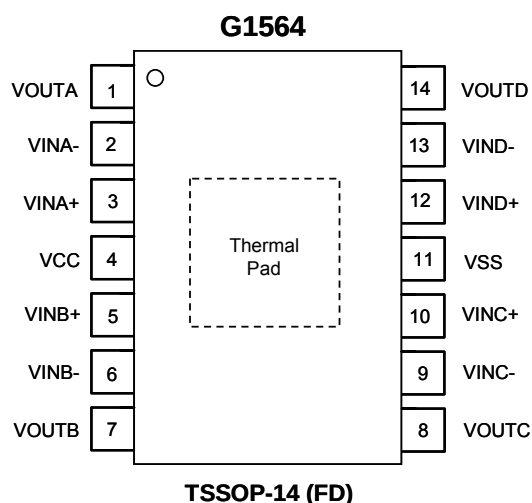
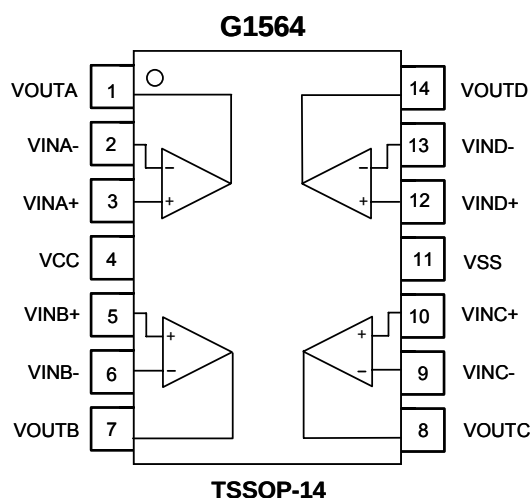
ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1564D21U	G1564	-40°C~ +85°C	TSSOP-14
G1564FA1U	G1564	-40°C~ +85°C	TSSOP-14 (FD)

Note: D2:TSSOP-14 FA :TSSOP-14 (FD)

1: Bonding Code

U: Tape & Reel

Pin Configuration



Note: Recommend connecting the Thermal Pad to the Pin#11 VSS for excellent power dissipation.

**Absolute Maximum Ratings**

Supply Voltage (V_{CC} to V_{SS}) +24V
 Input Voltage $V_{SS}-0.3V$ to $V_{CC}+0.3V$
 Storage Temperature Range. -65°C to 135°C
 Junction Temperature. 135°C
 Reflow Temperature (soldering, 10sec) 260°C
 Thermal Resistance Junction to Ambient, (θ_{JA})*
 TSSOP-14 135°C/W
 TSSOP-14 (FD) 130°C/W
 Continuous Power Dissipation ($T_A=25^\circ\text{C}$)*
 TSSOP-14 0.8W
 TSSOP-14 (FD) 0.85W

Thermal Resistance Junction to Case, (θ_{JC})

TSSOP-14 30°C/W

TSSOP-14 (FD) 20°C/W

Recommend Operating RangeOperating Supply Voltage Range. . 6.5V $\leq V_{DD} \leq$ 19.5V

Operating Temperature Range -40°C to 85°C

ESD Susceptibility 2000V

* Please refer to Minimum Footprint PCB Layout Section.

Electrical Characteristics $V_{CC} = 10V$; $V_{SS} = 0V$; $T_{AMB} = 25^\circ\text{C}$; $R_L = 1k\Omega$ to $V_{CC}/2$.

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

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	V_{CC}	Note1	4.5	---	20	V
Supply Current	I_{CC}	$V_O=5V$ no load / per amplifier	---	3	5	mA
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		---	2	12	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	-0.5	---	$V_{CC}+0.5$	V
Input Bias Current	I_B	$V_O=5V$	---	20	100	nA
Input Bias Current Offset	I_{OS}	$V_O=5V$	---	2	50	nA
Open Loop Gain	A_V	$0.5V \leq V_{OUT} \leq 9.5V$ (no load)	70	80	---	dB
Output Voltage Swing High	V_{OH}	$I_L=5mA$	9.86	9.92	---	V
Output Voltage Swing Low	V_{OL}	$I_L=-5mA$	---	0.08	0.14	V
Power Supply Rejection Ratio	PSRR	$7V \leq V_{CC} \leq 18V$	65	80	---	dB
Common-Mode Rejection Ratio	CMRR	$V_{SS} \leq V_{CM} \leq V_{CC}$	50	65	---	dB
Channel Separation	α	$f=1kHz$	---	90	---	dB
Output Current	$I_{O(Source)}$		---	65	---	mA
	$I_{O(Sink)}$		---	65	---	mA
Short Circuit Current	I_{SC}		---	± 180	---	mA
Slew-Rate	SR	$1V \leq V_{CC} \leq 9V$; 20% to 80%	---	150	---	V/ μS
Unit-Gain Bandwidth	BW	No load	---	30	---	MHz
Phase Margin	PH	No load	---	50	---	degree
Settling Time	t_s	$AV=+1$, $V_O=2V$ step (Settling to 0.1%)	---	130	---	nS

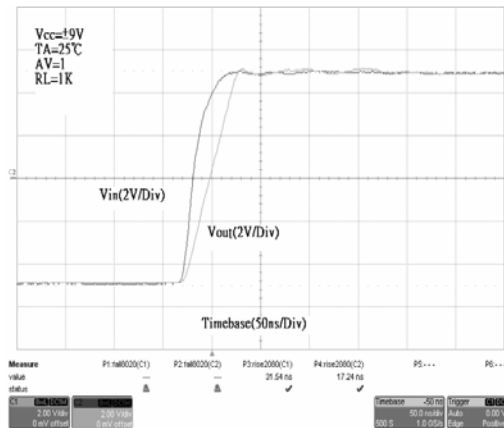
Note1: Guaranteed by the Power-Supply Rejection Ratio (PSRR) test



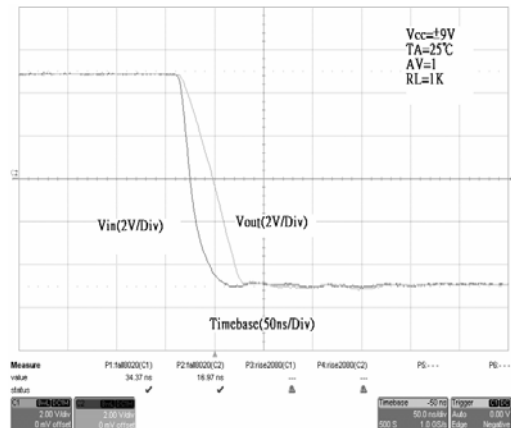
Typical Performance Characteristics

 $(V_{IN} = \pm 9V, V_{OUT} = 0V, T_A = 25^\circ C)$

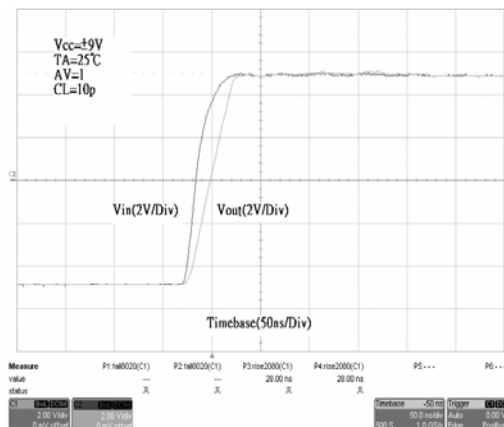
Large Signal Transient Response



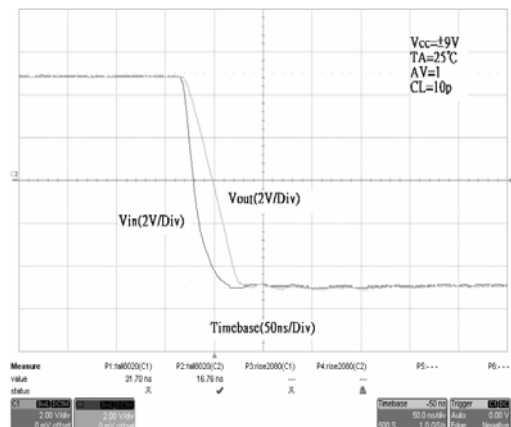
Large Signal Transient Response



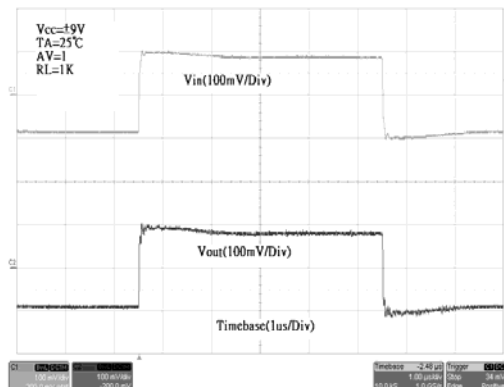
Large Signal Transient Response



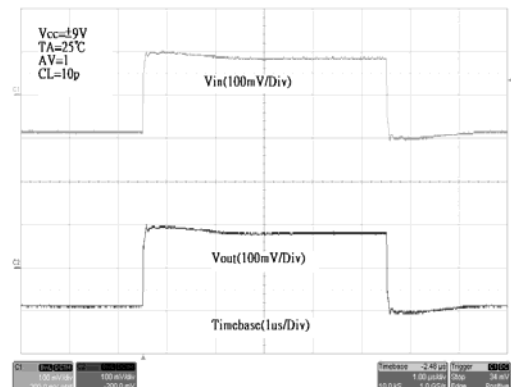
Large Signal Transient Response



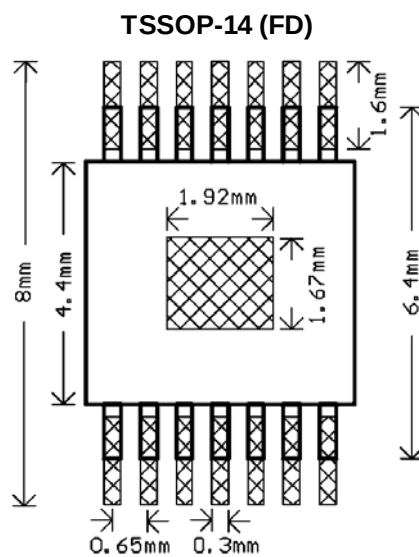
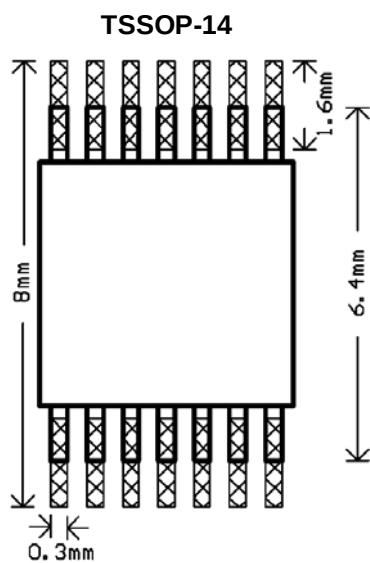
Small Signal Transient Response



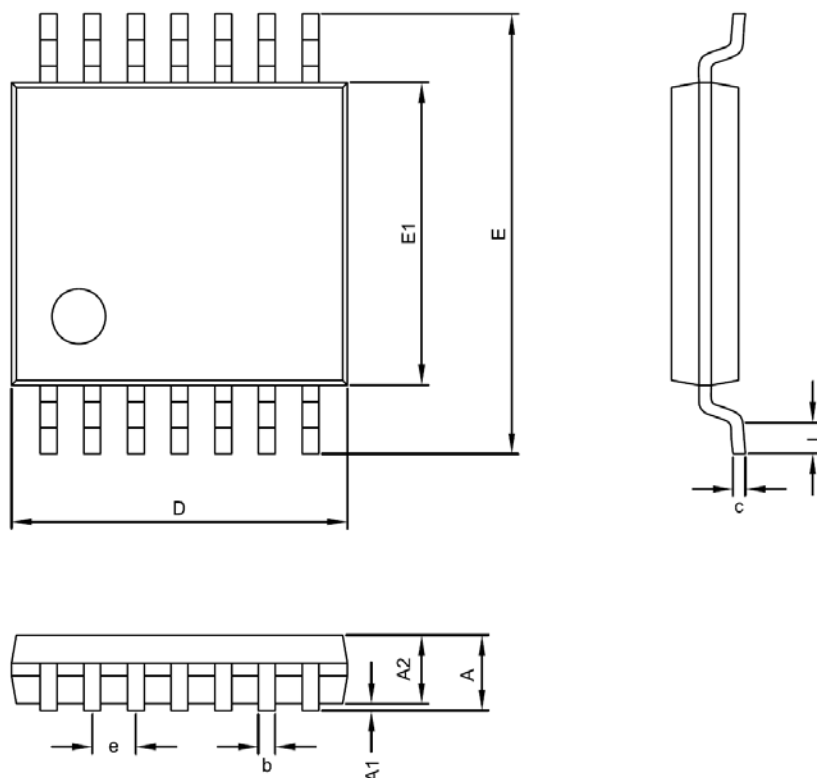
Small Signal Transient Response



Minimum Footprint PCB Layout Section



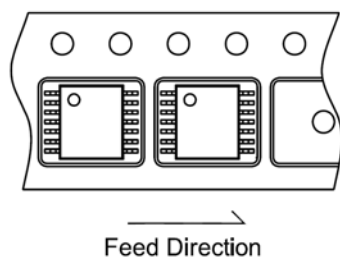
Package Information



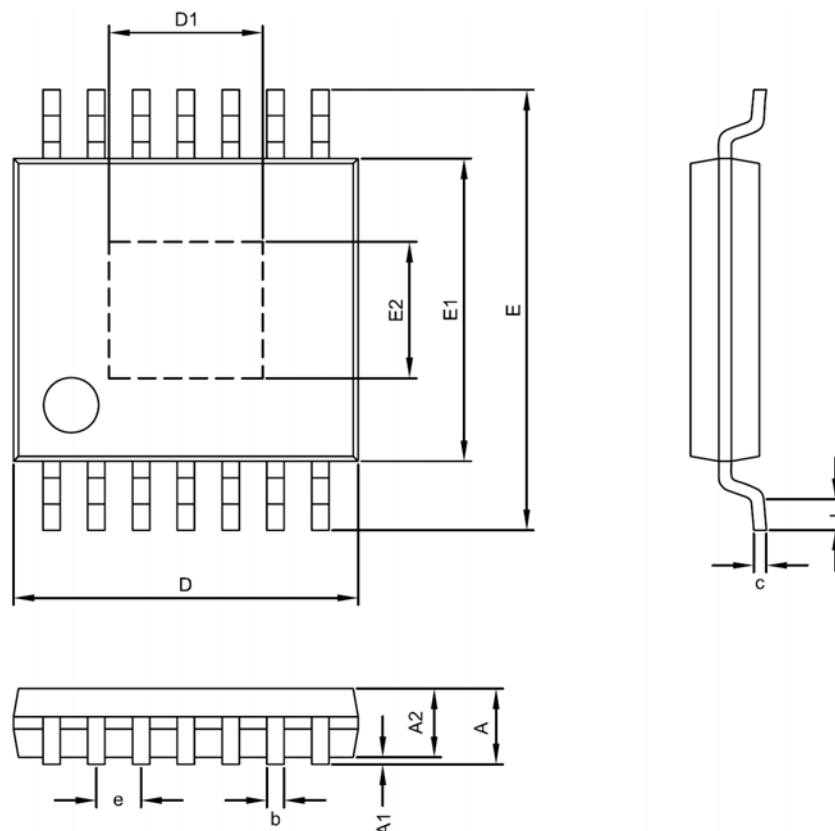
TSSOP-14 Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	---	---	1.20	---	---	0.048
A1	0.00	---	0.15	0.000	---	0.006
A2	0.85	1.00	1.05	0.033	0.039	0.041
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
c	0.09	---	0.20	0.004	---	0.008
b	0.19	0.22	0.30	0.008	0.009	0.012
e	0.65 BSC			0.026 BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030

Taping Specification



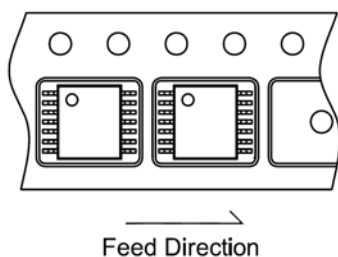
PACKAGE	Q'TY/REEL
TSSOP-14	3,000 ea



TSSOP-14 (FD) Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	---	---	1.20	---	---	0.047
A1	0.05	---	0.15	0.002	---	0.006
A2	0.80	0.90	1.05	0.031	0.035	0.041
D	4.90	5.00	5.10	0.193	0.197	0.201
D1	1.92	---	2.54	0.076	---	0.100
E	6.40 BSC			0.252 BSC		
E1	4.30	4.40	4.50	0.169	0.173	0.177
E2	1.67	---	2.29	0.066	---	0.090
c	0.09	---	0.20	0.004	---	0.008
b	0.19	0.22	0.30	0.007	0.009	0.012
e	0.65 BSC			0.026 BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030

Taping Specification



PACKAGE	Q'TY/REEL
TSSOP-14 (FD)	3,000 ea

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