

FEATURES

- Low Cost
- Current Feedback Amplifier
- Differential Gain: 0.01%, $R_L = 150\Omega$, $V_S = \pm 5V$
- Differential Phase: 0.09°, $R_L = 150\Omega$, $V_S = \pm 5V$
- Flat to 30MHz, 0.1dB
- 100MHz Bandwidth on $\pm 5V$
- Wide Supply Range: $\pm 2V(4V)$ to $\pm 14V(28V)$
- Low Power: 85mW at $\pm 5V$

APPLICATIONS

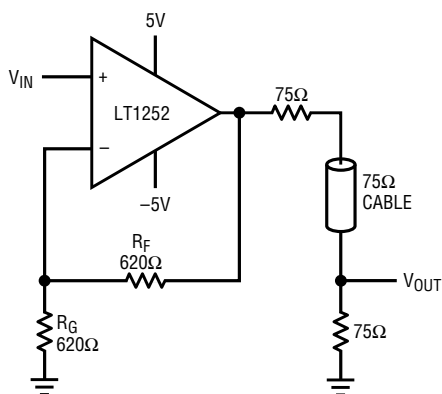
- RGB Cable Drivers
- Composite Video Cable Drivers
- Gain Blocks in IF Stages

DESCRIPTION

The LT1252 is a low cost current feedback amplifier for video applications. The LT1252 is ideal for driving low impedance loads such as cables and filters. The wide bandwidth and high slew rate of this amplifier make driving RGB signals between PCs and workstations easy. The linearity of the LT1252 is outstanding; it is unsurpassed for driving composite video.

The LT1252 is available in the 8-pin DIP and the S8 surface mount package. For higher performance and shutdown operation, see the LT1227. For dual and quad amplifiers with similar performance see the LT1253/LT1254.

TYPICAL APPLICATION

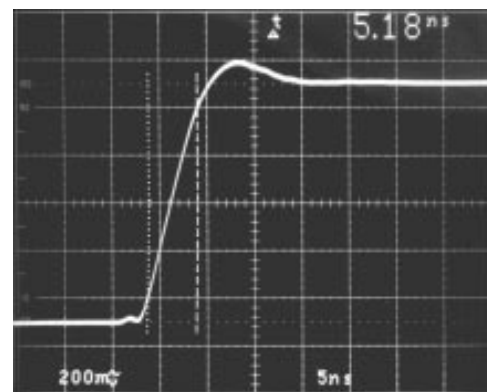


$$A_V = 1 + \frac{R_F}{R_G} \quad BW = 100\text{MHz}$$

AT AMPLIFIER OUTPUT.
 6dB LESS AT V_{OUT} .

LT1252 • TA01

Transient Response



$$V_S = \pm 5V$$

$$A_V = 2$$

$$R_L = 150\Omega$$

$$V_O = 1V$$

LT1252 • TA02

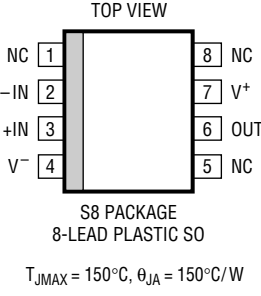
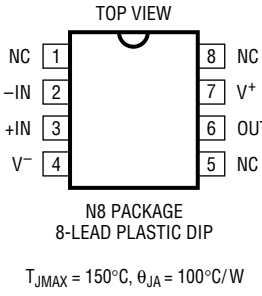
LT1252

ABSOLUTE MAXIMUM RATINGS

Total Supply Voltage (V^+ to V^-) 28V
 Input Current $\pm 15\text{mA}$
 Output Short-Circuit Duration (Note 1) Continuous
 Operating Temperature Range 0°C to 70°C

Storage Temperature Range -65°C to 150°C
 Junction Temperature (Note 2) 150°C
 Lead Temperature (Soldering, 10 sec) 300°C

PACKAGE/ORDER INFORMATION

| | | | |
|---|-------------------|---|-------------------|
|  <p>S8 PACKAGE 8-LEAD PLASTIC SO $T_{JMAX} = 150^\circ\text{C}$, $\theta_{JA} = 150^\circ\text{C/W}$</p> | ORDER PART NUMBER |  <p>N8 PACKAGE 8-LEAD PLASTIC DIP $T_{JMAX} = 150^\circ\text{C}$, $\theta_{JA} = 100^\circ\text{C/W}$</p> | ORDER PART NUMBER |
| | LT1252GS8 | | LT1252CN8 |
| | S8 PART MARKING | | |
| | 1252 | | |

ELECTRICAL CHARACTERISTICS $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$, $V_S = \pm 5\text{V}$ to $\pm 12\text{V}$, unless otherwise noted.

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|------------------------------|---|------------------------|-------------------------|----------------|------------------|
| V_{OS} | Input Offset Voltage | | | 5 | 15 | mV |
| $+I_B$ | Noninverting Bias Current | | | 1 | 15 | μA |
| $-I_B$ | Inverting Bias Current | | | 20 | 100 | μA |
| A_{VOL} | Large-Signal Voltage Gain | $V_S = \pm 5\text{V}$, $V_O = \pm 2\text{V}$, $R_L = 150\Omega$ | 560 | 1500 | | V/V |
| PSRR | Power Supply Rejection Ratio | $V_S = \pm 3\text{V}$ to $\pm 12\text{V}$ | 60 | 70 | | dB |
| CMRR | Common-Mode Rejection Ratio | $V_S = \pm 5\text{V}$, $V_{CM} = \pm 2\text{V}$ | 55 | 65 | | dB |
| V_{OUT} | Maximum Output Voltage Swing | $V_S = \pm 12\text{V}$, $R_L = 500\Omega$ $V_S = \pm 5\text{V}$, $R_L = 150\Omega$ | ± 7.0 ± 2.5 | ± 10.5 ± 3.7 | | V V |
| I_{OUT} | Maximum Output Current | | 30 | 55 | | mA |
| I_S | Supply Current | | | 8.5 | 18 | mA |
| R_{IN} | Input Resistance | | 1 | 10 | | $\text{M}\Omega$ |
| C_{IN} | Input Capacitance | | | 3 | | pF |
| | Power Supply Range | Dual Single | ± 2 4 | | ± 12 24 | V V |
| SR | Input Slew Rate | $A_V = 1$ | | 125 | | V/ μs |
| | Output Slew Rate | $A_V = 2$ | | 250 | | V/ μs |

ELECTRICAL CHARACTERISTICS $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$, $V_S = \pm 5\text{V}$ to $\pm 12\text{V}$, unless otherwise noted.

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|--------|------------------------|--|-----|-----|-----|-------|
| t_r | Small-Signal Rise Time | $V_S = \pm 12\text{V}$, $A_V = 2$ | | 3.5 | | ns |
| | Rise and Fall Time | $V_S = \pm 5\text{V}$, $A_V = 2$, $V_{OUT} = 1V_{P-P}$ | | 5.2 | | ns |
| t_p | Propagation Delay | $V_S = \pm 5\text{V}$, $A_V = 2$ | | 3.5 | | ns |

Note 1: A heat sink may be required to keep the junction temperature below absolute maximum when the output is shorted indefinitely.

LT1252CN8: $T_J = T_A + (P_D \times 100^{\circ}\text{C}/\text{W})$

LT1252CS8: $T_J = T_A + (P_D \times 150^{\circ}\text{C}/\text{W})$

Note 2: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formulas:

TYPICAL AC PERFORMANCE

BANDWIDTH

| V_S | A_V | R_L | R_F | R_G | SMALL SIGNAL -3dB BW (MHz) | SMALL SIGNAL -0.1dB BW (MHz) | SMALL SIGNAL PEAKING (dB) |
|-------|-------|-------|-------|-------|-------------------------------|---------------------------------|------------------------------|
| ±12 | 1 | 150 | 2370 | None | 282 | 45 | 1.9 |
| ±12 | -1 | 1000 | 1100 | 1100 | 58 | 17 | 0.1 |
| ±12 | -1 | 150 | 909 | 909 | 73 | 34 | 0.1 |
| ±12 | 2 | 1000 | 1210 | 1210 | 253 | 20 | 0.1 |
| ±12 | 2 | 150 | 909 | 909 | 142 | 38 | 0.1 |
| ±12 | 5 | 1000 | 1000 | 249 | 73 | 25 | 0.1 |
| ±12 | 5 | 150 | 866 | 215 | 75 | 31 | 0.1 |
| ±12 | 10 | 1000 | 909 | 100 | 67 | 26 | 0.1 |
| ±12 | 10 | 150 | 768 | 84.5 | 69 | 32 | 0.1 |
| ±5 | 1 | 1000 | 2210 | None | 260 | 10 | 2.4 |
| ±5 | 1 | 150 | 1300 | None | 232 | 50 | 0.8 |
| ±5 | -1 | 1000 | 1000 | 1000 | 50 | 11 | 0.1 |
| ±5 | -1 | 150 | 732 | 732 | 69 | 34 | 0.1 |
| ±5 | 2 | 1000 | 909 | 909 | 133 | 24 | 0.1 |
| ±5 | 2 | 150 | 787 | 787 | 100 | 30 | 0.1 |
| ±5 | 5 | 1000 | 825 | 205 | 62 | 21 | 0.1 |
| ±5 | 5 | 150 | 698 | 174 | 66 | 30 | 0.1 |
| ±5 | 10 | 1000 | 750 | 82.5 | 58 | 22 | 0.1 |
| ±5 | 10 | 150 | 619 | 68.1 | 60 | 30 | 0.1 |

NTSC VIDEO (Note 1)

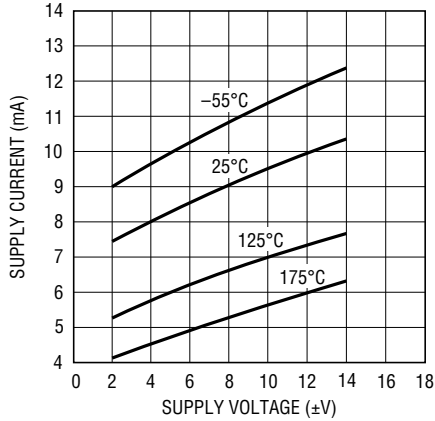
| V_S | A_V | R_L | R_F | R_G | DIFFERENTIAL GAIN | DIFFERENTIAL PHASE |
|-------|-------|-------|-------|-------|----------------------|-----------------------|
| ±12 | 2 | 1000 | 1000 | 1000 | 0.02% | 0.02° |
| ±12 | 2 | 150 | 1000 | 1000 | 0.03% | 0.04° |
| ±5 | 2 | 1000 | 1000 | 1000 | 0.02% | 0.08° |
| ±5 | 2 | 150 | 1000 | 1000 | 0.01% | 0.09° |

Note 1: Differential Gain and Phase are measured using a Tektronix TSG 120 YC/NTSC signal generator and a Tektronix 1780R Video Measurement Set. The resolution of this equipment is 0.1% and 0.1°. Ten identical

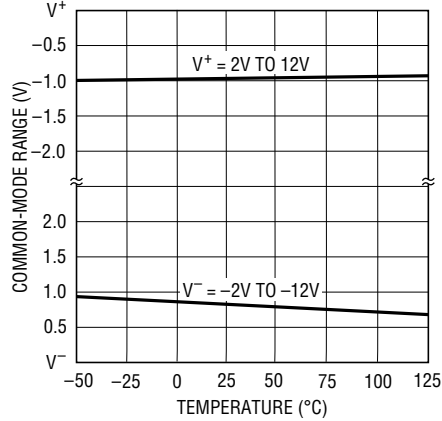
amplifier stages were cascaded giving an effective resolution of 0.01% and 0.01°.

TYPICAL PERFORMANCE CHARACTERISTICS

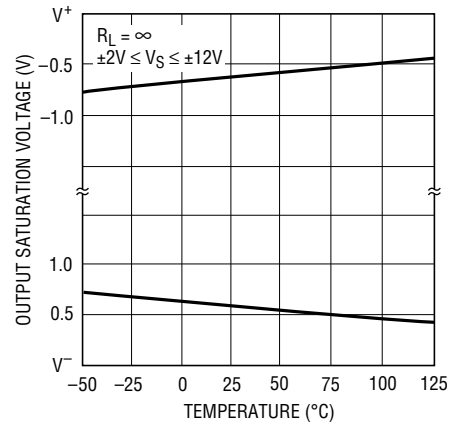
Supply Current vs Supply Voltage



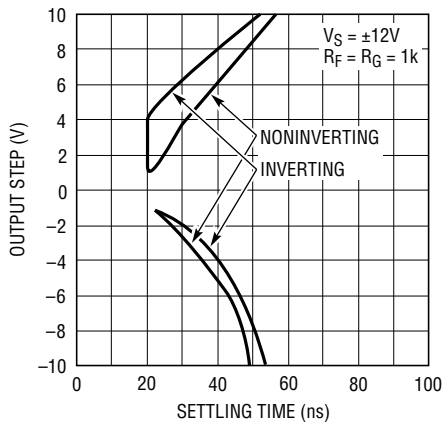
Input Common-Mode Limit vs Temperature



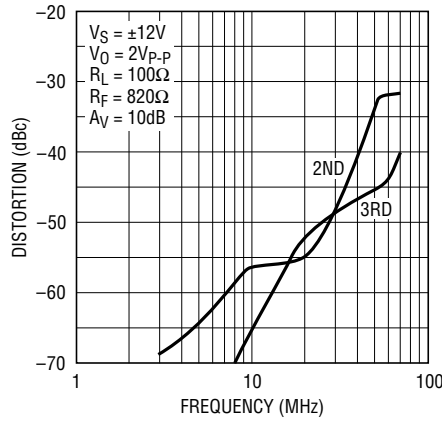
Output Saturation Voltage vs Temperature



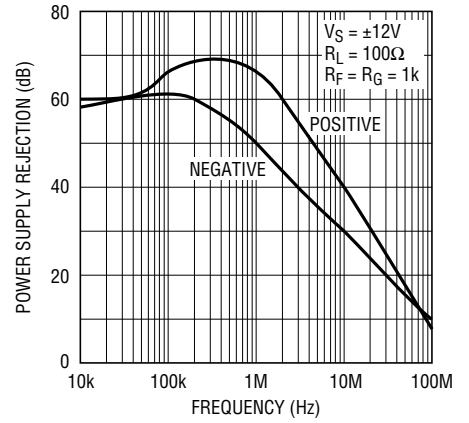
Settling Time to 10mV vs Output Step



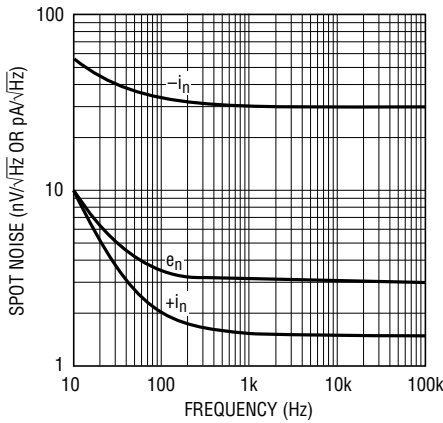
2nd and 3rd Harmonic Distortion vs Frequency



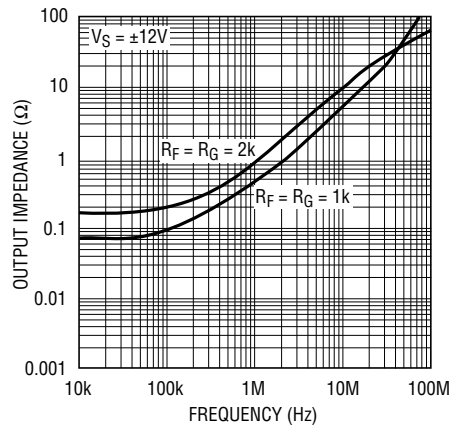
Power Supply Rejection vs Frequency



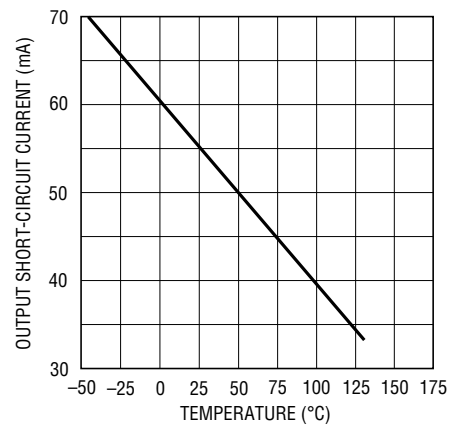
Spot Noise Voltage and Current vs Frequency



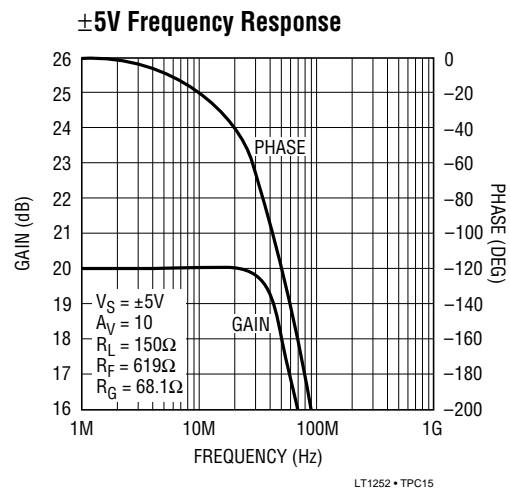
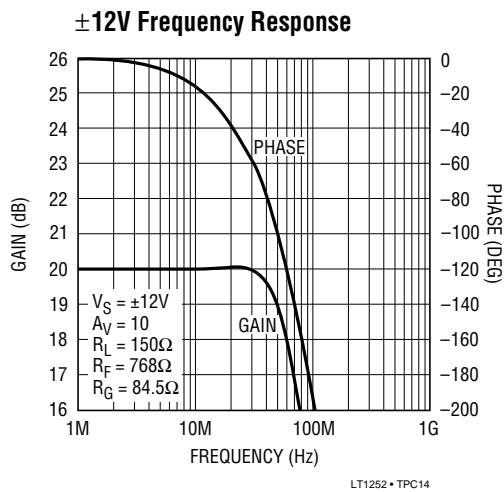
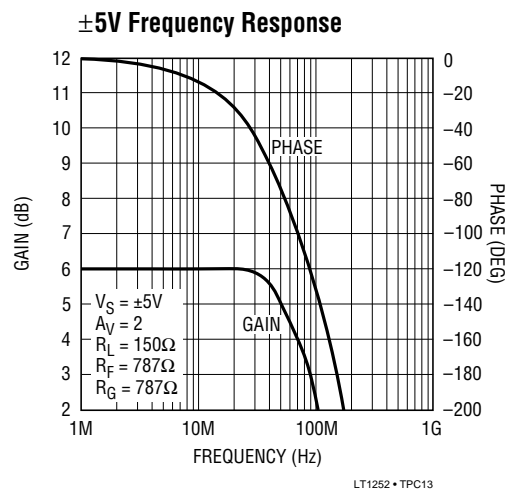
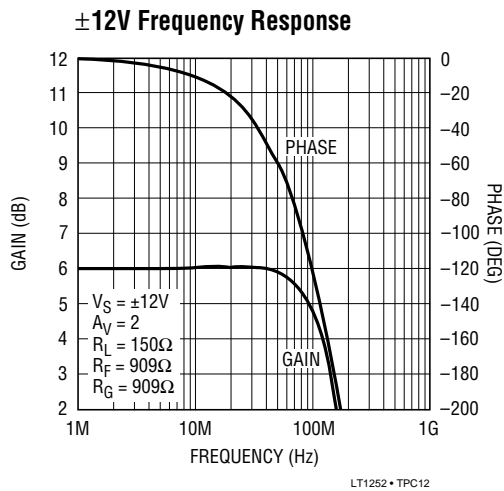
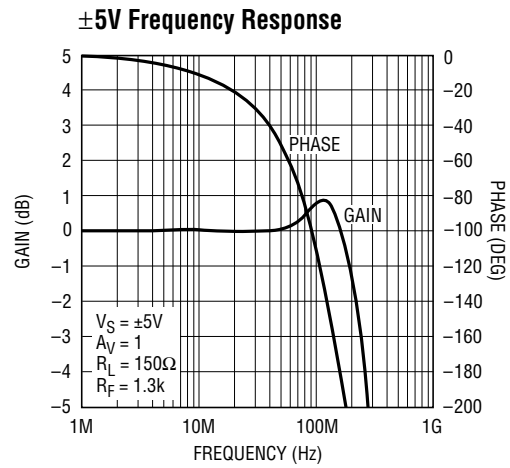
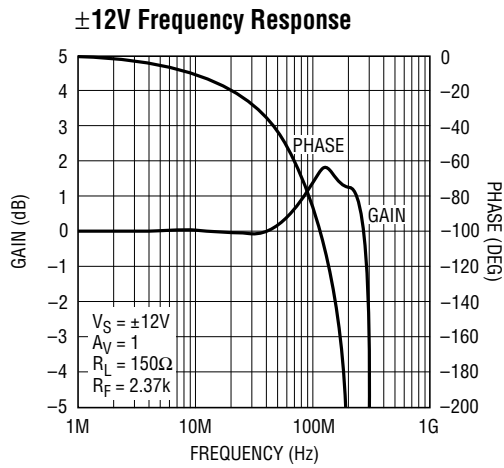
Output Impedance vs Frequency



Output Short-Circuit Current vs Junction Temperature

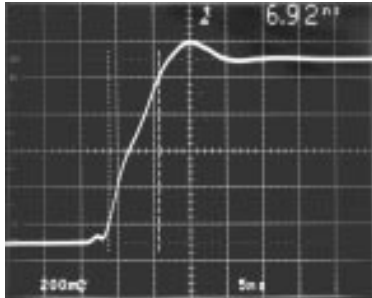


TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS

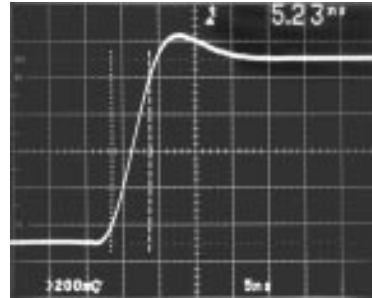
Transient Response



$V_S = \pm 5V$
 $A_V = 1$
 $R_L = 150\Omega$
 $R_F = 619\Omega$
 $V_O = 1V$

LT1252 • TPC16

Transient Response

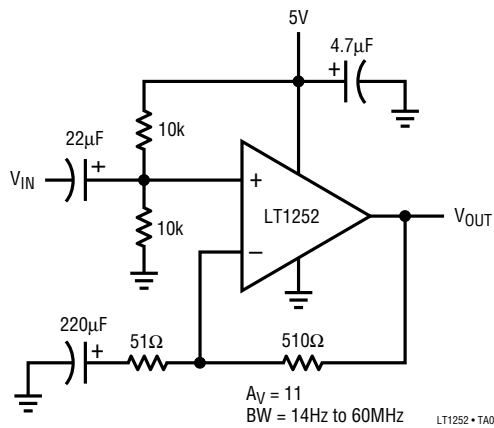


$V_S = \pm 5V$ $R_F = 619\Omega$
 $A_V = 10$ $R_G = 68.1\Omega$
 $R_L = 150\Omega$ $V_O = 1.5V$

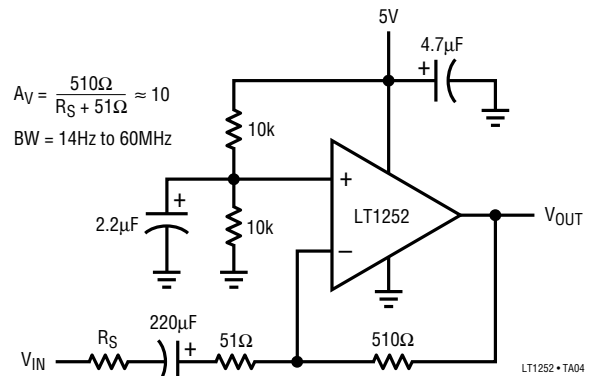
LT1252 • TPC17

TYPICAL APPLICATIONS

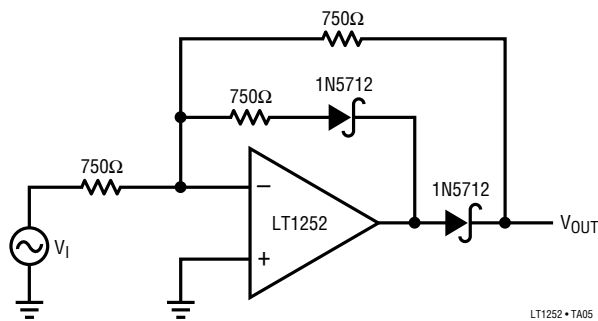
Single Supply AC-Coupled Amplifier
Noninverting



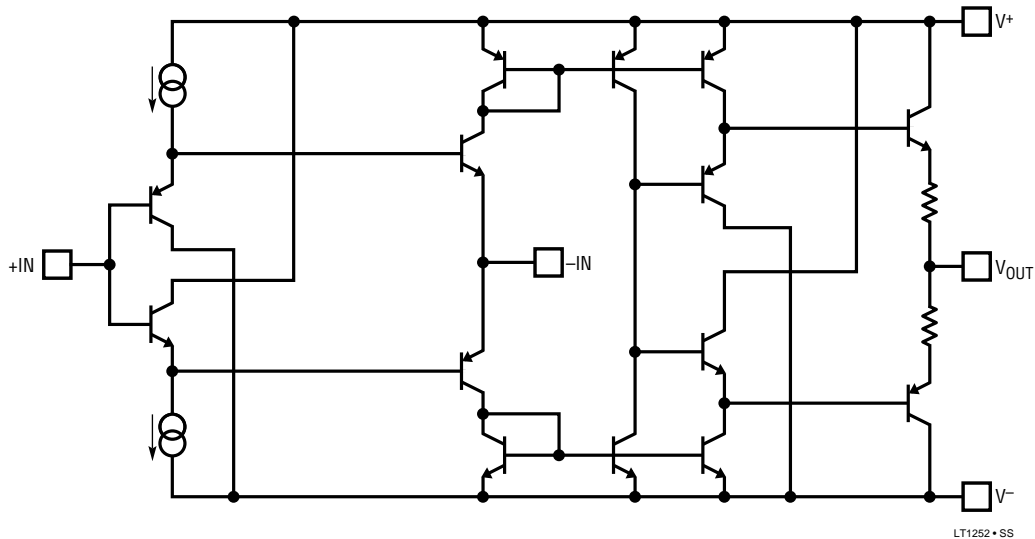
Single Supply AC-Coupled Amplifier
Inverting



Half Wave Rectifier



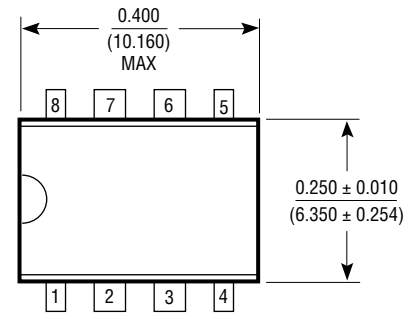
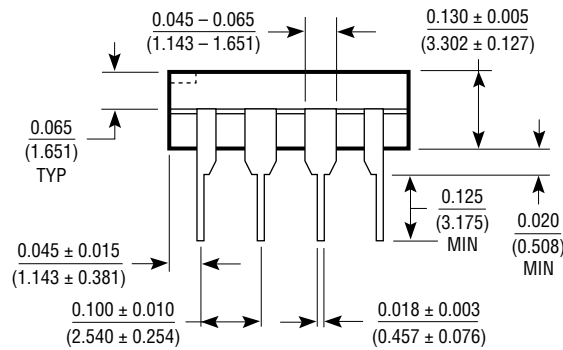
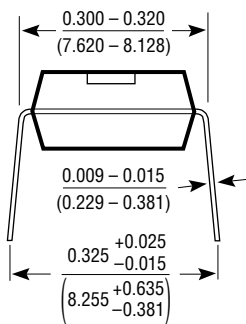
SIMPLIFIED SCHEMATIC



LT1252 • SS

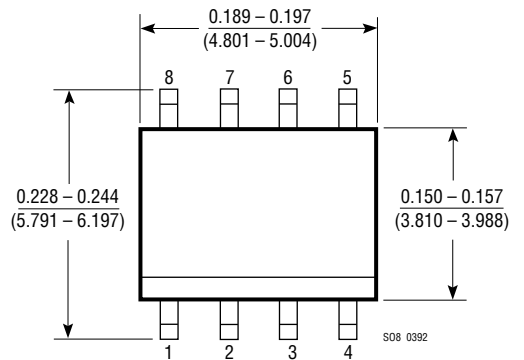
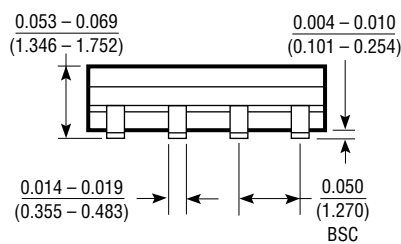
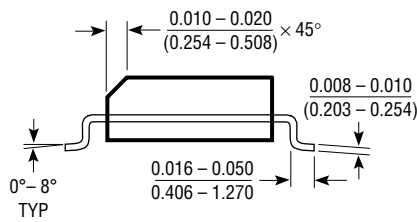
PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise noted.

N8 Package 8-Lead Plastic DIP



N8 0392

S8 Package 8-Lead Plastic SOIC



S08 0392

U.S. Area Sales Offices

NORTHEAST REGION

Linear Technology Corporation
 One Oxford Valley
 2300 E. Lincoln Hwy., Suite 306
 Langhorne, PA 19047
 Phone: (215) 757-8578
 FAX: (215) 757-5631

Linear Technology Corporation
 266 Lowell St., Suite B-8
 Wilmington, MA 01887
 Phone: (508) 658-3881
 FAX: (508) 658-2701

SOUTHEAST REGION

Linear Technology Corporation
 17060 Dallas Parkway
 Suite 208
 Dallas, TX 75248
 Phone: (214) 733-3071
 FAX: (214) 380-5138

CENTRAL REGION

Linear Technology Corporation
 Chesapeake Square
 229 Mitchell Court, Suite A-25
 Addison, IL 60101
 Phone: (708) 620-6910
 FAX: (708) 620-6977

SOUTHWEST REGION

Linear Technology Corporation
 22141 Ventura Blvd.
 Suite 206
 Woodland Hills, CA 91364
 Phone: (818) 703-0835
 FAX: (818) 703-0517

NORTHWEST REGION

Linear Technology Corporation
 782 Sycamore Dr.
 Milpitas, CA 95035
 Phone: (408) 428-2050
 FAX: (408) 432-6331

International Sales Offices

FRANCE

Linear Technology S.A.R.L.
 Immeuble "Le Quartz"
 58 Chemin de la Justice
 92290 Chatenay Malabry
 France
 Phone: 33-1-41079555
 FAX: 33-1-46314613

GERMANY

Linear Technonlogy GmbH
 Untere Hauptstr. 9
 D-85386 Eching
 Germany
 Phone: 49-89-3197410
 FAX: 49-89-3194821

JAPAN

Linear Technology KK
 5F YZ Bldg.
 4-4-12 Iidabashi, Chiyoda-Ku
 Tokyo, 102 Japan
 Phone: 81-3-3237-7891
 FAX: 81-3-3237-8010

KOREA

Linear Technology Korea Branch
 Namsong Building, #505
 Itaewon-Dong 260-199
 Yongsan-Ku, Seoul
 Korea
 Phone: 82-2-792-1617
 FAX: 82-2-792-1619

SINGAPORE

Linear Technology Pte. Ltd.
 101 Boon Keng Road
 #02-15 Kallang Ind. Estates
 Singapore 1233
 Phone: 65-293-5322
 FAX: 65-292-0398

TAIWAN

Linear Technology Corporation
 Rm. 801, No. 46, Sec. 2
 Chung Shan N. Rd.
 Taipei, Taiwan, R.O.C.
 Phone: 886-2-521-7575
 FAX: 886-2-562-2285

UNITED KINGDOM

Linear Technology (UK) Ltd.
 The Coliseum, Riverside Way
 Camberley, Surrey GU15 3YL
 United Kingdom
 Phone: 44-276-677676
 FAX: 44-276-64851

World Headquarters

Linear Technology Corporation
 1630 McCarthy Blvd.
 Milpitas, CA 95035-7487
 Phone: (408) 432-1900
 FAX: (408) 434-0507