

## 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

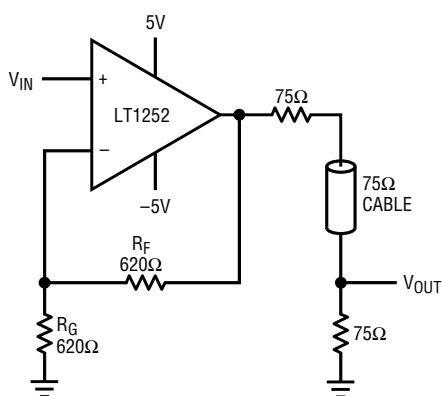
- RGB Cable Drivers
- Composite Video Cable Drivers
- Gain Blocks in IF Stages

## 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

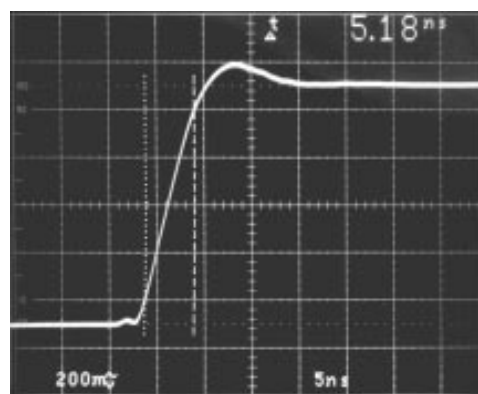


$$A_V = 1 + \frac{R_F}{R_G} \quad BW = 100\text{MHz}$$

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

LT1252 • TA01

Transient Response



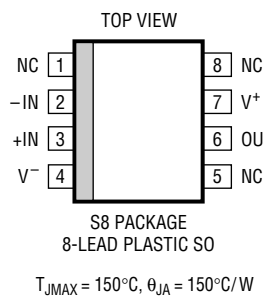
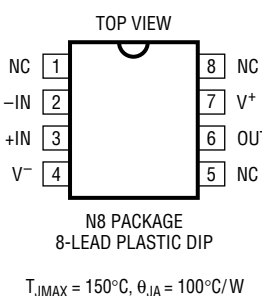
$V_S = \pm 5V$   
 $A_V = 2$   
 $R_L = 150\Omega$   
 $V_O = 1V$

LT1252 • TA02

## ABSOLUTE MAXIMUM RATINGS

Total Supply Voltage ( $V^+$ to $V^-$ ) .....	28V	Storage Temperature Range .....	-65°C to 150°C
Input Current .....	±15mA	Junction Temperature (Note 2) .....	150°C
Output Short-Circuit Duration (Note 1) .....	Continuous	Lead Temperature (Soldering, 10 sec) .....	300°C
Operating Temperature Range .....	0°C to 70°C		

## PACKAGE/ORDER INFORMATION

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

## ELECTRICAL CHARACTERISTICS $0^{\circ}C \leq T_A \leq 70^{\circ}C, V_S = \pm 5V$ to $\pm 12V$ , 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	$V_S = \pm 5V, V_O = \pm 2V, R_L = 150\Omega$	560	1500		V/V
PSRR	Power Supply Rejection Ratio	$V_S = \pm 3V$ to $\pm 12V$	60	70		dB
CMRR	Common-Mode Rejection Ratio	$V_S = \pm 5V, V_{CM} = \pm 2V$	55	65		dB
$V_{OUT}$	Maximum Output Voltage Swing	$V_S = \pm 12V, R_L = 500\Omega$ $V_S = \pm 5V, R_L = 150\Omega$	±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		MΩ
$C_{IN}$	Input Capacitance			3		pF
	Power Supply Range	Dual	±2		±12	V
		Single	4		24	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)**

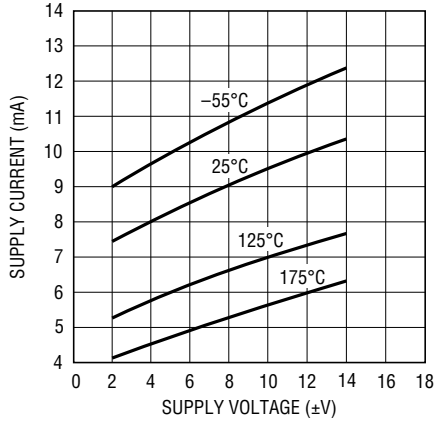
$V_S$	$A_V$	$R_L$	$R_F$	$R_G$	DIFFERENTIAL GAIN	DIFFERENTIAL PHASE
±12	2	1000	1000	1000	0.02%	0.02°
±12	2	150	1000	1000	0.03%	0.04°
±5	2	1000	1000	1000	0.02%	0.08°
±5	2	150	1000	1000	0.01%	0.09°

**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°.

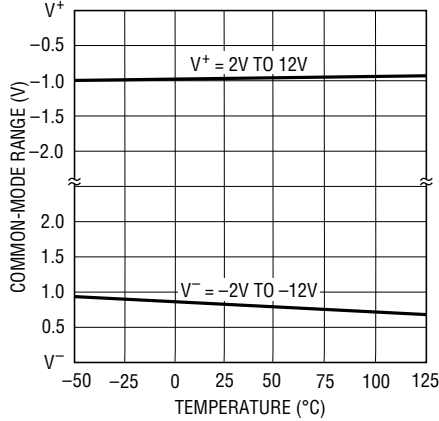
# TYPICAL PERFORMANCE CHARACTERISTICS

**Supply Current vs Supply Voltage**



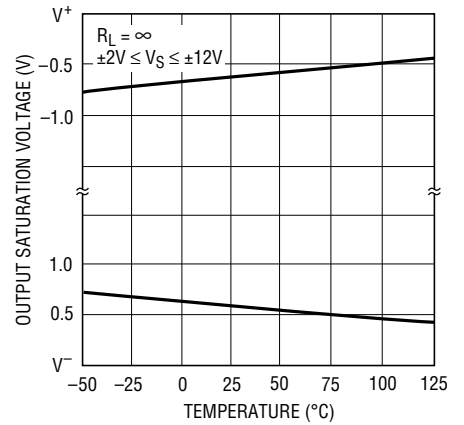
LT1252 • TPC01

**Input Common-Mode Limit vs Temperature**



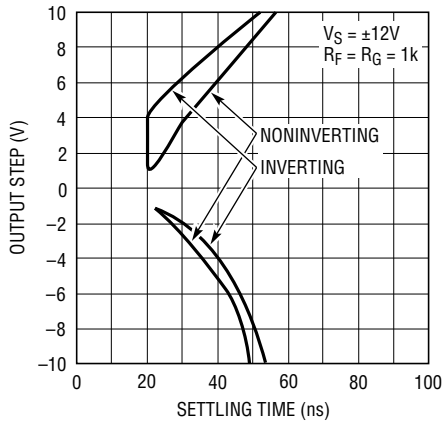
LT1252 • TPC02

**Output Saturation Voltage vs Temperature**



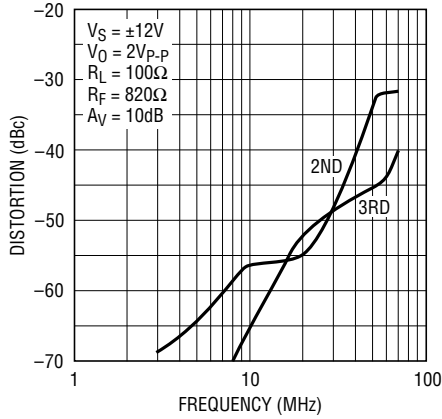
LT1252 • TPC03

**Settling Time to 10mV vs Output Step**



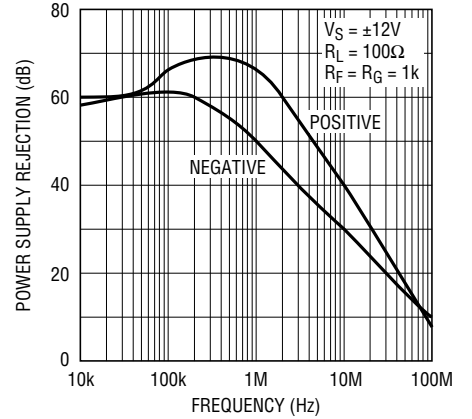
LT1252 • TPC04

**2nd and 3rd Harmonic Distortion vs Frequency**



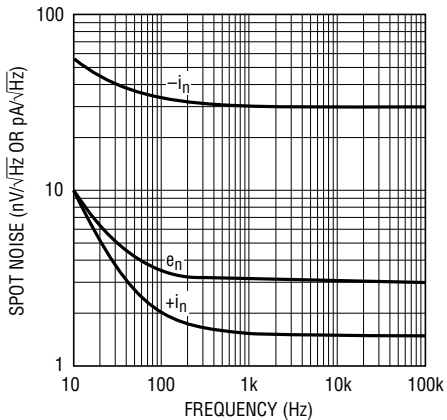
LT1252 • TPC05

**Power Supply Rejection vs Frequency**



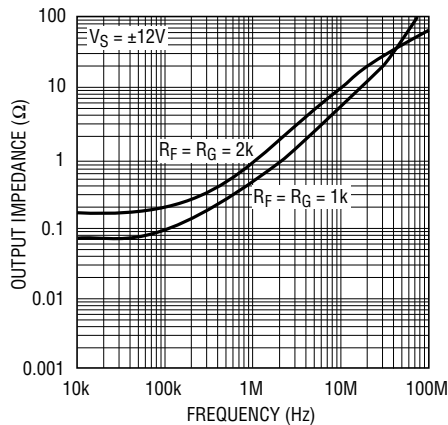
LT1252 • TPC06

**Spot Noise Voltage and Current vs Frequency**



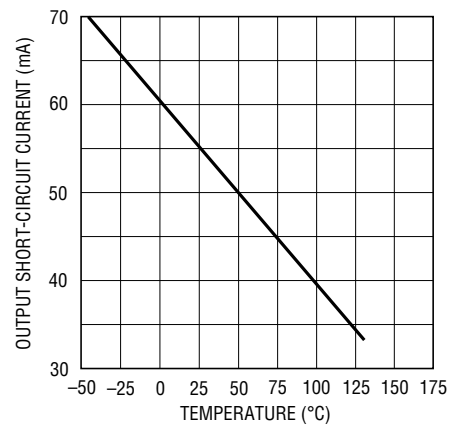
LT1252 • TPC07

**Output Impedance vs Frequency**



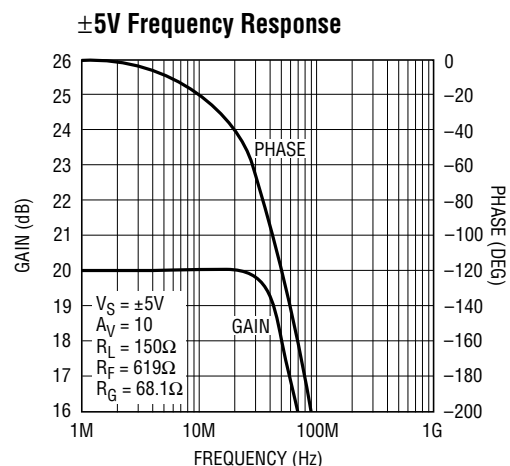
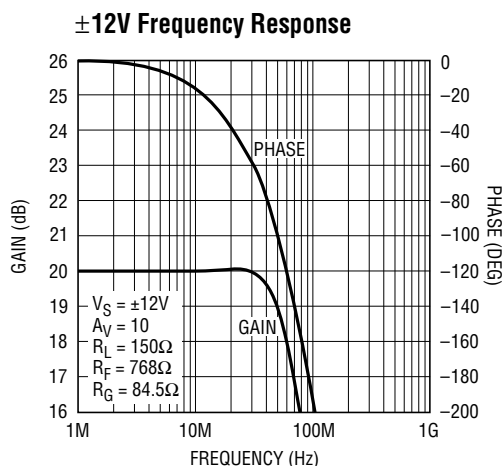
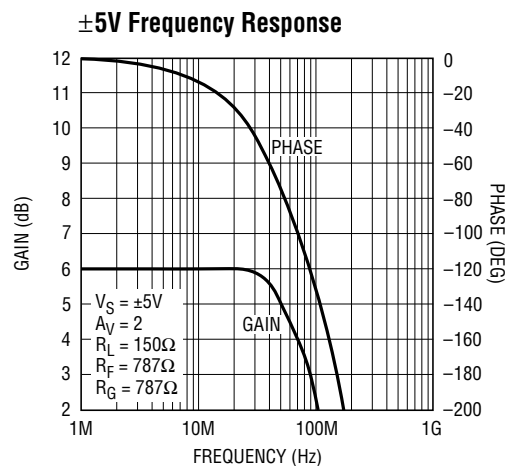
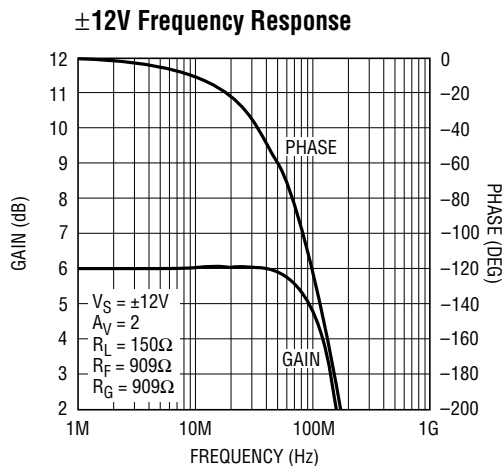
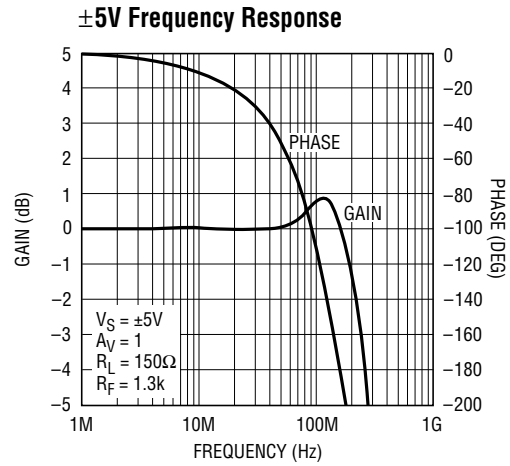
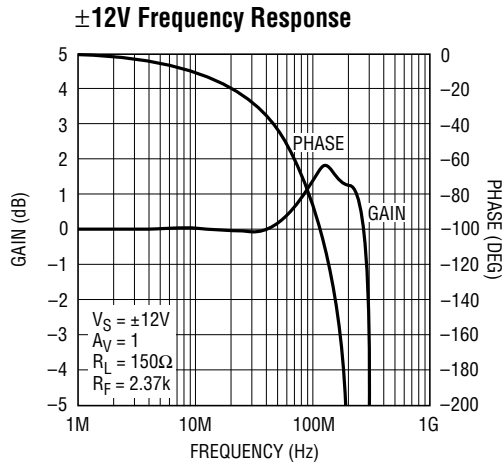
LT1252 • TPC08

**Output Short-Circuit Current vs Junction Temperature**



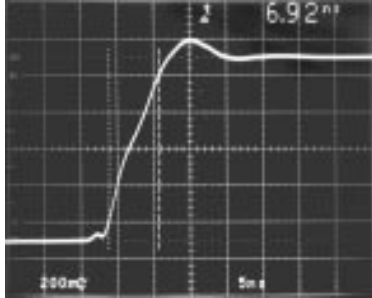
LT1252 • TPC09

# TYPICAL PERFORMANCE CHARACTERISTICS



# TYPICAL PERFORMANCE CHARACTERISTICS

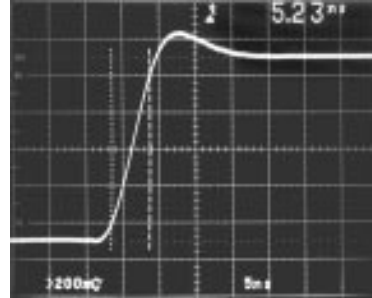
Transient Response



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

LT1252 • TPC16

Transient Response

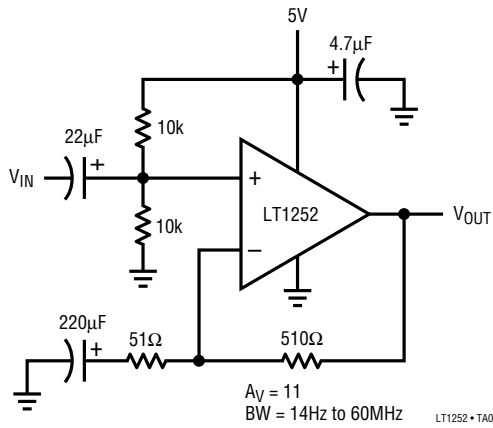


$V_S = \pm 5V$     $R_F = 619\Omega$   
 $A_V = 10$     $R_G = 68.1\Omega$   
 $R_L = 150\Omega$     $V_O = 1.5V$

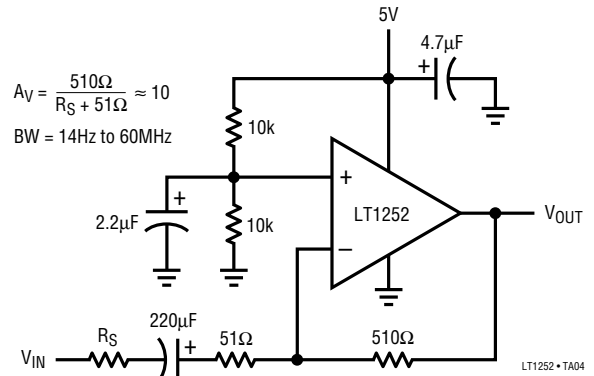
LT1252 • TPC17

# TYPICAL APPLICATIONS

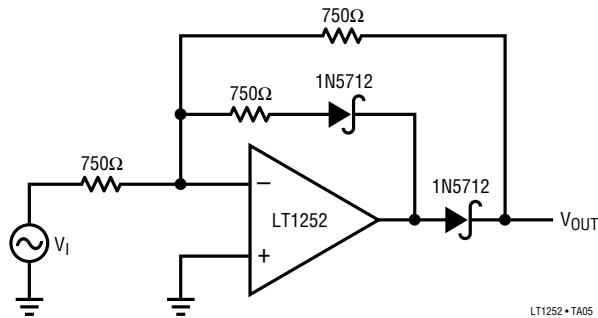
Single Supply AC-Coupled Amplifier  
Noninverting



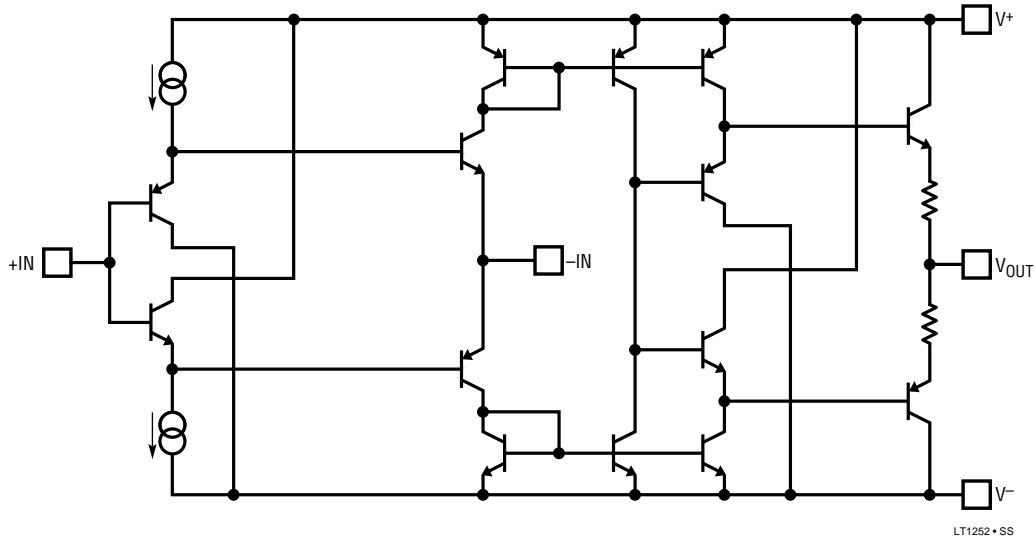
Single Supply AC-Coupled Amplifier  
Inverting



Half Wave Rectifier



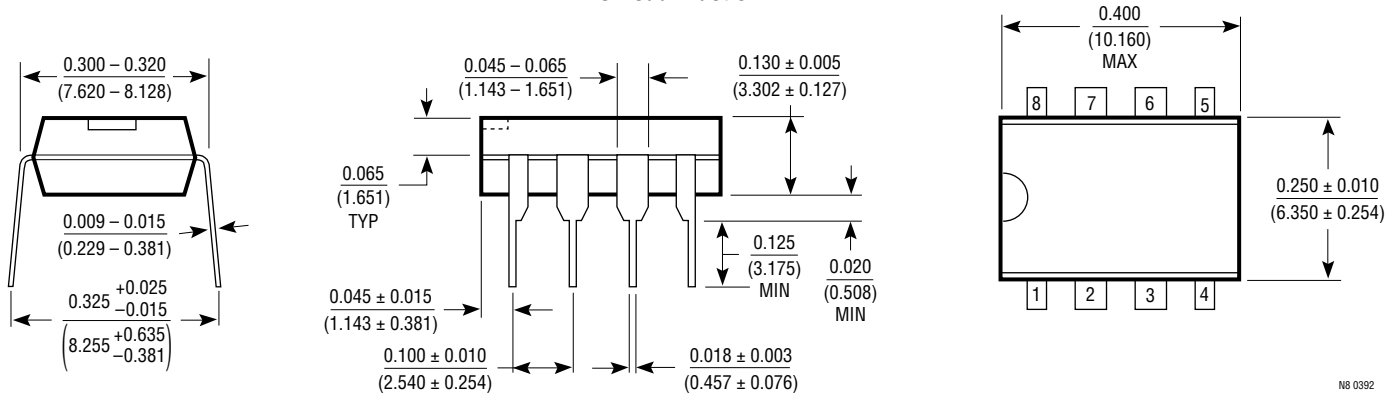
# SIMPLIFIED SCHEMATIC



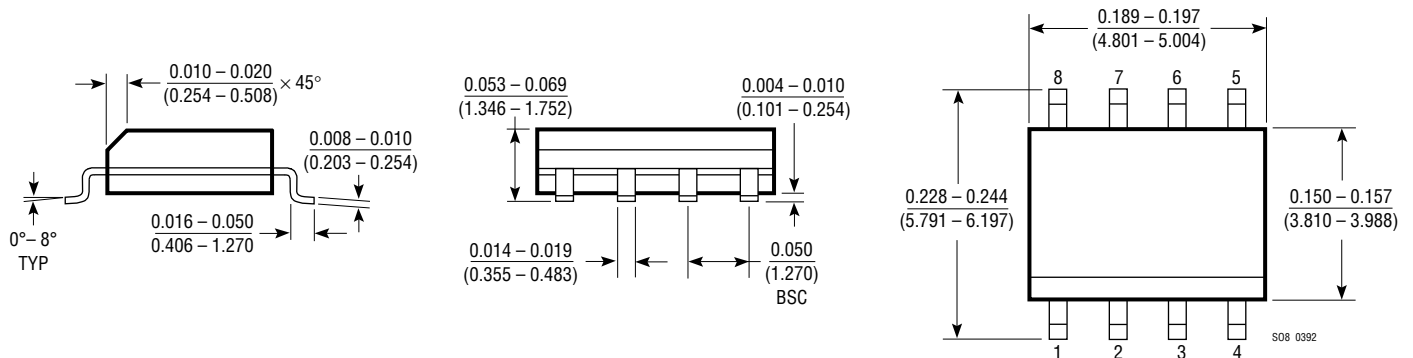
LT1252 • SS

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

## N8 Package 8-Lead Plastic DIP



## S8 Package 8-Lead Plastic SOIC



**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