

### HIGH SPEED

#### Instrumentation and Data Acquisition

- Fast DAC Amplifiers
- Signal Processing
- RF Amplification
- RADAR
- Fiber-Optic Systems
- Copiers/Laser Printers

#### Color, B/W Video and Multimedia

- Frame Grabbers
- Video Cable Drivers
- Video MUXs
- Cable Tappers
- Video Gain Blocks
- Building Security
- Image Recognition
- Video Keyer/Fader

Lowest Offsets,  
Lowest Bias Current

Fastest Slew Rate,  
Fastest Settling

Dual Supplies,  
Largest Bandwidth

±5V, or Single 5V  
Supplies, Lowest Cost

#### Single Supply, DC Precision

- Low  $V_{OS}$  with High Bandwidth/Slew Rate (150 $\mu$ V Max, A-Grades)
- Single Supply 3.3V, 5V or Dual  $\pm$ 15V Operation
- Low Power (1.3mA/Amplifier): LT<sup>®</sup>1211/12
- Fast Settling to 0.01%, 250ns, 2V Step: LT1215/16
- SO-8 (Duals) and 0.150" SO-16 (Quads)

	GBW (Typ) MHz	SR (Typ) V/ $\mu$ s	$V_{OS}$ (Max) $\mu$ V
LT1211 (D)	14	7	150/275
LT1212 (Q)	14	7	275
LT1213 (D)	28	12	150/275
LT1214 (Q)	28	12	275
LT1215 (D)	23	50	300/450
LT1216 (Q)	23	50	450

#### NEW AMPLIFIER ARCHITECTURE!

##### Voltage Feedback Op Amps with Current Feedback Speed

- Low Supply Current/Amplifier (250 $\mu$ A): LT1352/3
- Very High Slew Rate (1000V/ $\mu$ s): LT1363
- Low  $V_{OS}$  (0.6mV Maximum): LT1352/3/7/8/9
- Low Power (6mA/Amplifier for 1000V/ $\mu$ s Slew Rate): LT1363/4/5
- Fast Settling (80ns to 0.01%, 50ns to 0.1%, 10V Step)
- C-Load<sup>™</sup>: Drives Unlimited Capacitive Loads

Single	Dual	Quad	GBW MHz	SR V/ $\mu$ s	$I_S$ /Amp (mA)
LT1351	LT1352	LT1353	3	200	0.25
LT1354	LT1355	LT1356	12	400	1
LT1357	LT1358	LT1359	25	600	2
LT1360	LT1361	LT1362	50	800	4
LT1363	LT1364	LT1365	70	1000	6

#### Voltage Feedback Op Amps

- 12-Bit Accurate: LT1220/21/22
- 10-Bit Accurate: LT1224/25/26
- C-Load: Drives Unlimited Capacitive Loads

	$A_V$ (Min) V/V	GBW (Typ) MHz	0.1% Settling Time ns	SR (Typ) V/ $\mu$ s	$V_{OS}$ (Max) mV
LT1220	1	45	75	250	1.0
LT1221	4	150	65	250	0.6
LT1222	10	500	75	200	0.3
LT1224	1	45	90	400	2.0
LT1225	5	150	90	400	1.0
LT1226	25	1000	100	400	1.0

#### Current Feedback Amps

- Bandwidth Independent of Gain
- "Shutdown" Feature: LT1217, LT1223, LT1227
- 12-Bit Accurate: LT1223
- Low Power ( $I_S = 1$ mA): LT1217
- Lowest Cost: LT1252/3/4
- Operates on  $\pm$ 2V to  $\pm$ 15V Supplies\*

\* LT1223 & LT1217 Min Supply Voltage =  $\pm$ 5V

	BW (Typ) MHz	SR (Typ) V/ $\mu$ s	$V_{OS}$ (Max) mV
LT1227	140	1100	10
LT1259 (D)	130	1600	10
LT1260 (T)	130	1600	10
LT1223	100	1300	3
LT1229 (D)	100	1000	10
LT1230 (Q)	100	1000	10
LT1252	100	250	15
LT1253 (D)	90	250	15
LT1254 (Q)	90	250	15
LT1217	10	500	3

#### Low Cost Video Op Amps

- Specified Operation with  $\pm$ 5V and Single 5V Supplies
- Color Video Performance
- "Shutdown" Feature: LT1190/1/2/5
- Directly Drives Cables: 50mA  $I_{OUT}$
- 450V/ $\mu$ s Slew Rate
- Low Power: LT1195

	GBW (Typ) MHz	SR (Typ) V/ $\mu$ s	$A_V$ (Min) V/V
LT1190	50	450	1
LT1191	90	450	1
LT1192	350	450	5
LT1195	50	165	1

LT and LT are registered trademarks of Linear Technology Corporation.  
C-Load is a trademark of Linear Technology Corporation.

(D) = Dual, (T) Triple, (Q) = Quad

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### Video Products

In addition to high speed amplifiers, LTC® offers the following products tailored to video, multimedia and computer graphics applications.

#### Low Cost Dual/Triple 130MHz CFAs with Shutdown

- LT1260: Triple CFA for RGB Video
- LT1259: Dual CFA with Shutdown
- 90MHz Bandwidth on  $\pm 5V$
- 0.1dB Gain Flatness, 30MHz: Good for HDTV
- 1600V/ $\mu s$  Slew Rate
- $\pm 2V$  to  $\pm 15V$  Supply Range
- 100ns/40ns Turn On/Off Times
- Makes 2 or 3 Input MUX Amp
- Low Supply Current (5mA/Amp)
- Narrow SO Packages

#### $\pm 5V$ Video Difference Amps

- 50dB CMRR @ 10MHz
- Input Voltage Range: (-2.5V to 3.5V)
- $\pm 4V$  Output Voltage Swing
- Color Video Performance
- "Shutdown" Feature
- Can Directly Drive Cables
- 500V/ $\mu s$  Slew Rate: LT1193/LT1194
- Low Power: LT1187/LT1189

		$A_V$ (Min) V/V	BW (Typ) MHz	\$ (100's)
Gain				
LT1187	Adj.	2	50	2.95
LT1189	Adj.	10	35	2.95
LT1193	Adj.	2	80	2.95
LT1194	Fixed	10	35	2.95

#### Video Distribution Amplifier

- LT1206, Single; LT1207, Dual: 250mA Minimum Output Current
- 60MHz, 900V/ $\mu s$  Current Feedback Amplifier
- Drives Ten 150 $\Omega$  Video Cables
- Drives Low Impedances & High Capacitances
- Color Video Performance
- Low Current "Shutdown" Mode Available

#### 2:1 and 4:1 Video Multiplexers Very Fast for Pixel Switching

- LT1203 (2:1), LT1205 (2  $\times$  2:1 or 4:1)
- 150MHz, -3dB Bandwidth
- 90dB Channel Separation
- 30MHz, 0.1dB Gain Flatness (HDTV)
- 25ns Channel Switching Time
- 50mV Switching Transient
- 10M $\Omega$  Disabled Output Impedance
- Expandable
- 8- and 16-Pin Narrow SO Packages

#### 4:1 Video Multiplexer

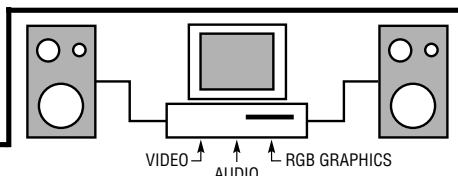
- LT1204: 4:1 MUX w/ Current Feedback Amp
- 0.1dB Gain Flatness to >30MHz: for HDTV
- 1000V/ $\mu s$  Slew Rate
- 75MHz, -3dB Bandwidth ( $A_V = 2$ )
- 90dB Channel Separation
- Expandable
- 16-Pin PDIP and SW Packages

#### Current Feedback Amp with DC Gain Control

- LT1228: 75MHz Transconductance Amp with 100MHz Current Feedback Amplifier
- Color Video Performance
- Differential Input
- Operates on  $\pm 2V$  to  $\pm 15V$  Supplies
- For Auto-Gain, Tunable Filters and Specialized Video Circuits

#### Video Fader/Gain-Controlled Amplifier

- LT1251: 40MHz Video Fader
- LT1256: 40MHz Gain-Controlled Amplifier
- Accurate 1% Linear Gain Control
- Low Differential Gain/Phase, 0.1%/0.1°
- 14-Pin PDIP and Narrow SO Packages



### Multimedia

Multimedia systems combine **audio**, **composite video** (broadcast quality TV) and **high resolution computer graphics**.

Typical requirements are:

**Video:** NTSC or PAL need minimum 50MHz, -3dB bandwidth  
HDTV needs 0.1dB flatness to 30MHz

Suggested Products (Refer to above and reverse side):

**General Purpose Gain Blocks/Video A/D Buffers** LT1360/61/62/63/64/65: Single/Dual/Quad Voltage Feedback Op Amps with Current Feedback Speed  
LT1227/29/60/30: Single/Dual/Triple/Quad Current Feedback Amplifiers  
LT1252/3/4: Low Cost Current Feedback Amplifiers

**Multiplexer** LT1204: 4:1 Video MUX with CFA

**Video Distribution** LT1206: 250mA Output Current CFA

**DC Restoration** LT1228: CFA with Gain Control

**Gain Control** LT1228: CFA with Gain Control, LT1256: 40MHz Amplifier with DC Gain Control

**COAX Loophrough/ Twisted-Pair Receiver** LT1187/89/93/94: Video Difference Amplifiers

**Video Fader** LT1251: 40MHz Fader

**Graphics:** VGA needs >50MHz, 19" monitors need >100MHz

**RGB, YUV, YC, Amps** LT1259/60: Dual/Triple, 130MHz, 1800V/ $\mu s$  Current Feedback Amplifiers with Shutdown

**Pixel Switching** LT1203/05: 2:1 and 4:1 Video Multiplexers

**Audio:** For 8 $\times$  Oversampling, 200kHz Bandwidth is Required

**Gain Blocks** LT1115: Low Noise Preamplifier

LT1124/26: Dual Low Noise Preamplifier

LT1211/12: High Slew Rate, Single Supply Dual/Quad Op Amps

LT1122: Ultralow Distortion FET-Input Op Amp with Symmetric Slew Rates

LT1354/55/56: Ultrahigh Slew Rate, Low Supply Current Op Amps