

Comlinear™ CLC1007, CLC2007, CLC3007

Single, Dual, and Triple 500MHz RRIO Amplifiers



FEATURES

- 0.1dB gain flatness to 130MHz
- 0.01%/0.01° differential gain/phase error
- 350MHz -3dB bandwidth at G = 2
- 500MHz -3dB bandwidth at G = 1
- 1,800V/μs slew rate
- 100mA output current (easily drives three video loads)
- 4mA supply current
- Fully specified at ±5V supplies
- CLC1007: Lead-free SOT23-6
- Future option CLC2007: Lead-free SOIC-8
- Future option CLC3007: Lead-free TSSOP-14

APPLICATIONS

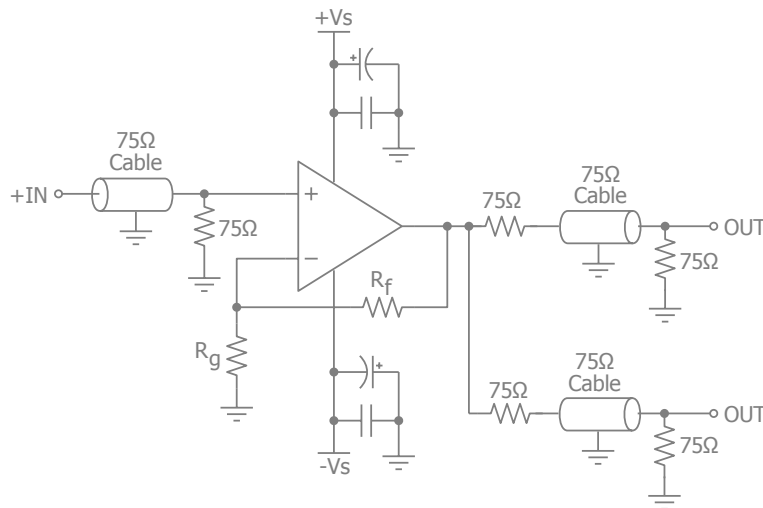
- RGB video line drivers
- High definition video driver
- Video switchers and routers
- ADC buffer
- Active filters
- Cable drivers
- Imaging applicaitons

General Description

The *Comlinear* CLC1007 (single), CLC2007 (dual), and CLC3007 (triple) are high-performance, voltage feedback amplifiers with rail-to-rail inputs and outputs. These amplifiers provide 500MHz unity gain bandwidth, ±0.1dB gain flatness to 130MHz, and provide 1,800V/μs slew rate exceeding the requirements of high-definition television (HDTV) and other multimedia applications. These *Comlinear* high-performance amplifiers also provide ample output current to drive multiple video loads.

The *Comlinear* CLC1007, CLC2007, and CLC3007 are designed to operate from ±5V or +5V supplies. They consume only 4mA of supply current per channel. The combination of high-speed, low-power, and excellent video performance make these amplifiers well suited for use in many general purpose, high-speed applications including standard definition and high definition video. The rail-to-rail input and output capability along with the input range going below the negative rail, make these amplifiers very easy to use in single supply applications.

Typical Application - Driving Dual Video Loads



Ordering Information

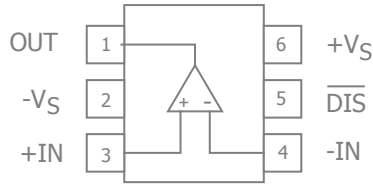
Part Number	Package	Pb-Free	Operating Temperature Range	Packaging Method
CLC1007IST6X*	SOT23-6	Yes	-40°C to +85°C	Reel
CLC1007IST6*	SOT23-6	Yes	-40°C to +85°C	Rail
CLC2007ISO8X†	SOIC-8	Yes	-40°C to +85°C	Reel
CLC2007ISO8†	SOIC-8	Yes	-40°C to +85°C	Rail
CLC3007ITP14X†	TSSOP-14	Yes	-40°C to +85°C	Reel
CLC3007ITP14†	TSSOP-14	Yes	-40°C to +85°C	Rail

*Preliminary Product Information, †Future Product Offering

Moisture sensitivity level for all parts is MSL-1.



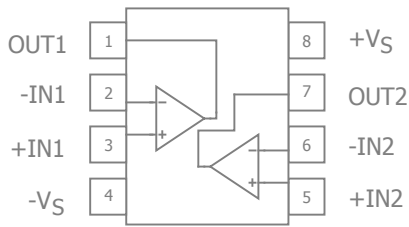
CLC1007 Pin Configuration



CLC1007 Pin Assignments

Pin No.	Pin Name	Description
1	OUT	Output
2	-VS	Negative supply
3	+IN	Positive input
4	-IN	Negative input
5	$\overline{\text{DIS}}$	Disable. Enabled if pin is left floating or pulled above V_{ON} , disabled if pin is grounded or pulled below V_{OFF} .
6	+VS	Positive supply

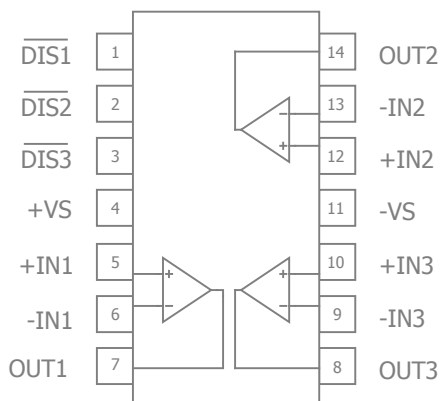
CLC2007 Pin Configuration



CLC2007 Pin Configuration

Pin No.	Pin Name	Description
1	OUT1	Output, channel 1
2	-IN1	Negative input, channel 1
3	+IN1	Positive input, channel 1
4	-VS	Negative supply
5	+IN2	Positive input, channel 2
6	-IN2	Negative input, channel 2
7	OUT2	Output, channel 2
8	+VS	Positive supply

CLC3007 Pin Configuration



CLC3007 Pin Configuration

Pin No.	Pin Name	Description
1	$\overline{\text{DIS1}}$	Disable pin channel 1. Enabled if pin is left floating or pulled above V_{ON} , disabled if pin is grounded or pulled below V_{OFF} .
2	$\overline{\text{DIS2}}$	Disable pin channel 2. Enabled if pin is left floating or pulled above V_{ON} , disabled if pin is grounded or pulled below V_{OFF} .
3	$\overline{\text{DIS3}}$	Disable pin channel 3. Enabled if pin is left floating or pulled above V_{ON} , disabled if pin is grounded or pulled below V_{OFF} .
4	+VS	Positive supply
5	+IN1	Positive input, channel 1
6	-IN1	Negative input, channel 1
7	OUT1	Output, channel 1
8	OUT3	Output, channel 3
9	-IN3	Negative input, channel 3
10	+IN3	Positive input, channel 3
11	-VS	Negative supply
12	+IN2	Positive input, channel 2
13	-IN2	Negative input, channel 2
14	OUT2	Output, channel 2



Absolute Maximum Ratings

The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table defines the conditions for actual device operation.

Parameter	Min	Max	Unit
Supply Voltage	0	14	V
Input Voltage Range	$-V_S - 0.5V$	$+V_S + 0.5V$	V

Reliability Information

Parameter	Min	Typ	Max	Unit
Junction Temperature			150	°C
Storage Temperature Range	-65		150	°C
Lead Temperature (Soldering, 10s)			300	°C
Package Thermal Resistance				
6-Lead SOT23		TBD		°C/W
8-Lead SOIC		100		°C/W
14-Lead TSSOP		TBD		°C/W

Notes:

Package thermal resistance (θ_{JA}), JEDEC standard, multi-layer test boards, still air.

ESD Protection

Product	SOT23-6	SOIC-8	TSSOP-14
Human Body Model (HBM)	TBD	TBD	TBD
Charged Device Model (CDM)	TBD	TBD	TBD

Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature Range	-40		+85	°C
Supply Voltage Range	± 4		± 6	V



Electrical Characteristics at +5V

$T_A = 25^\circ\text{C}$, $V_S = +5\text{V}$, $R_f = R_g = ?\Omega$, $R_L = 150\Omega$ to $V_S/2$, $G = 2$; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response						
UGBW	-3dB Bandwidth	$G = +1$, $V_{OUT} = 0.2V_{pp}$		500		MHz
BW _{SS}	-3dB Bandwidth	$G = +2$, $V_{OUT} = 0.2V_{pp}$		350		MHz
BW _{LS}	Large Signal Bandwidth	$G = +2$, $V_{OUT} = 4V_{pp}$		300		MHz
BW _{0.1dBSS}	0.1dB Gain Flatness	$G = +2$, $V_{OUT} = 0.2V_{pp}$		130		MHz
BW _{0.1dBLS}	0.1dB Gain Flatness	$G = +2$, $V_{OUT} = 2V_{pp}$		TBD		MHz
Time Domain Response						
t_R , t_F	Rise and Fall Time	$V_{OUT} = 2\text{V}$ step; (10% to 90%)		2		ns
t_S	Settling Time to 0.1%	$V_{OUT} = 2\text{V}$ step		20		ns
OS	Overshoot	$V_{OUT} = 0.2\text{V}$ step		<1		%
SR	Slew Rate	2V step		1500		V/ μs
Distortion/Noise Response						
HD2	2nd Harmonic Distortion	$2V_{pp}$, 5MHz		-80		dBc
HD3	3rd Harmonic Distortion	$2V_{pp}$, 5MHz		-80		dBc
THD	Total Harmonic Distortion	$2V_{pp}$, 5MHz		TBD		dB
D _G	Differential Gain	NTSC (3.58MHz), DC-coupled, $R_L = 150\Omega$		0.01		%
D _P	Differential Phase	NTSC (3.58MHz), DC-coupled, $R_L = 150\Omega$		0.01		°
e_n	Input Voltage Noise	> 1MHz		5		nV/ $\sqrt{\text{Hz}}$
e_n	Input Voltage Noise	at 10Hz		TBD		nV/ $\sqrt{\text{Hz}}$
X _{TALK}	Crosstalk	Channel-to-channel 5MHz		TBD		dB
DC Performance						
V _{IO}	Input Offset Voltage			1		mV
dV _{IO}	Average Drift			TBD		$\mu\text{V}/^\circ\text{C}$
I _b	Input Bias Current			5		μA
dI _b	Average Drift			TBD		nA/ $^\circ\text{C}$
PSRR	Power Supply Rejection Ratio	DC		60		dB
A _{OL}	Open-Loop Gain	$V_{OUT} = V_S / 2$		60		dB
I _S	Supply Current	per channel		4		mA
Input Characteristics						
R _{IN}	Input Resistance	Non-inverting		TBD		M Ω
C _{IN}	Input Capacitance			TBD		pF
CMIR	Common Mode Input Range			-0.3 to 4.95		V
CMRR	Common Mode Rejection Ratio	DC		60		dB
Output Characteristics						
R _O	Output Resistance	Closed Loop, DC		TBD		m Ω
V _{OUT}	Output Voltage Swing	$R_L = 150\Omega$		0.05 to 4.95		V
		$R_L = 1\text{k}\Omega$		0.01 to 4.99		V
I _{OUT}	Output Current			± 100		mA
I _{SC}	Short-Circuit Output Current	$V_{OUT} = V_S / 2$		± 250		mA

Notes:

- 100% tested at 25°C



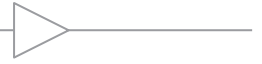
Electrical Characteristics at $\pm 5V$

$T_A = 25^\circ C$, $V_S = \pm 5V$, $R_f = R_g = ?\Omega$, $R_L = 150\Omega$ to $V_S/2$, $G = 2$; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Frequency Domain Response						
UGBW	-3dB Bandwidth	$G = +1$, $V_{OUT} = 0.2V_{pp}$		500		MHz
BW _{SS}	-3dB Bandwidth	$G = +2$, $V_{OUT} = 0.2V_{pp}$		350		MHz
BW _{LS}	Large Signal Bandwidth	$G = +2$, $V_{OUT} = 4V_{pp}$		300		MHz
BW _{0.1dBSS}	0.1dB Gain Flatness	$G = +2$, $V_{OUT} = 0.2V_{pp}$		130		MHz
BW _{0.1dBLS}	0.1dB Gain Flatness	$G = +2$, $V_{OUT} = 2V_{pp}$		TBD		MHz
Time Domain Response						
t_R, t_F	Rise and Fall Time	$V_{OUT} = 2V$ step; (10% to 90%)		2		ns
t_S	Settling Time to 0.1%	$V_{OUT} = 2V$ step		20		ns
OS	Overshoot	$V_{OUT} = 0.2V$ step		<1		%
SR	Slew Rate	4V step		1800		V/ μ s
Distortion/Noise Response						
HD2	2nd Harmonic Distortion	$2V_{pp}$, 5MHz		-80		dBc
HD3	3rd Harmonic Distortion	$2V_{pp}$, 5MHz		-80		dBc
THD	Total Harmonic Distortion	$2V_{pp}$, 5MHz		TBD		dB
D _G	Differential Gain	NTSC (3.58MHz), DC-coupled, $R_L = 150\Omega$		0.01		%
D _P	Differential Phase	NTSC (3.58MHz), DC-coupled, $R_L = 150\Omega$		0.01		°
e_n	Input Voltage Noise	> 1MHz		5		nV/ \sqrt{Hz}
e_n	Input Voltage Noise	at 10Hz		TBD		nV/ \sqrt{Hz}
X _{TALK}	Crosstalk	Channel-to-channel 5MHz		TBD		dB
DC Performance						
V _{IO}	Input Offset Voltage ⁽¹⁾		-4	1	+4	mV
dV _{IO}	Average Drift			TBD		μ V/ $^\circ C$
I _b	Input Bias Current ⁽¹⁾		-12	5	12	μ A
dI _b	Average Drift			TBD		nA/ $^\circ C$
PSRR	Power Supply Rejection Ratio ⁽¹⁾	DC	50	60		dB
A _{OL}	Open-Loop Gain ⁽¹⁾	$V_{OUT} = V_S / 2$	50	60		dB
I _S	Supply Current ⁽¹⁾	per channel		4	6.5	mA
Input Characteristics						
R _{IN}	Input Resistance	Non-inverting		TBD		M Ω
C _{IN}	Input Capacitance			TBD		pF
CMIR	Common Mode Input Range			-5.3 to 4.95		V
CMRR	Common Mode Rejection Ratio ⁽¹⁾	DC	50	60		dB
Output Characteristics						
R _O	Output Resistance	Closed Loop, DC		TBD		m Ω
V _{OUT}	Output Voltage Swing	$R_L = 150\Omega$ ⁽¹⁾	-4.65	± 4.7	4.65	V
		$R_L = 1k\Omega$		± 4.95		V
I _{OUT}	Output Current			± 100		mA
I _{SC}	Short-Circuit Output Current	$V_{OUT} = V_S / 2$		± 250		mA

Notes:

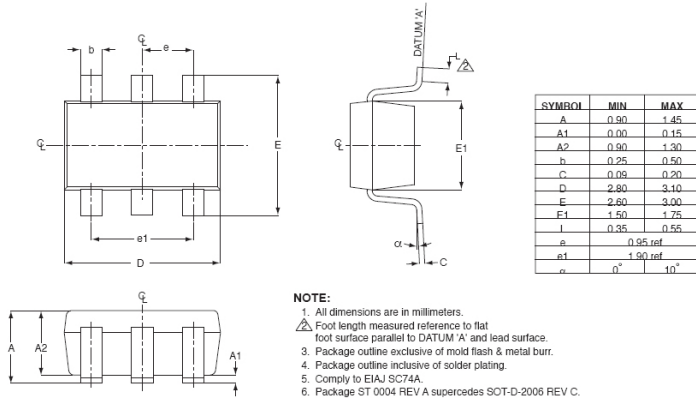
1. 100% tested at 25°C



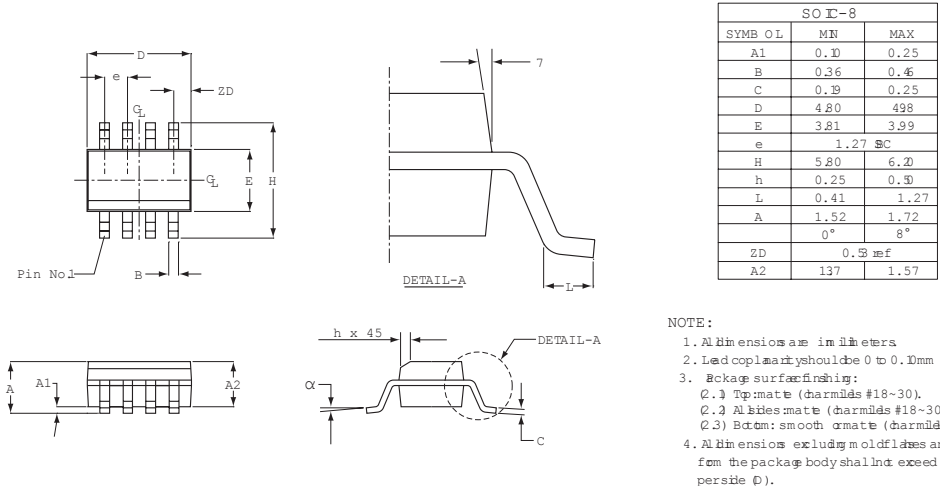
Mechanical Dimensions

SOT23-6 Package

SOT23-6



SOIC-8 Package



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