



# High Speed Buffer

## CLM4121 / CLM4321

### FEATURES

- High Slew Rate..... 2000V/μs
- Wide Bandwidth..... 180MHz
- Peak Output Current..... 300mA
- Low Supply Current..... 7mA
- No Oscillations with Capacitive Loads
- 5V to ±15V Operation Guaranteed
- Fully Specified to Drive 50Ω Lines

### APPLICATIONS

- Coaxial Cable Driver
- Flash A/D Converter Driver
- Video DAC Buffer
- OP Amp Booster
- Video Amplifier
- High Frequency Filter
- Wide Bandwidth Signal Conditioning
- Radar
- Sonar

### GENERAL DESCRIPTION

The CLM4121 family are high speed unity gain buffers that slew at 2000V/μs, having a small signal bandwidth of 180MHz, delivers 150mA, yet draws only 7mA supply current.

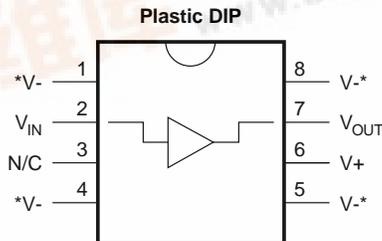
The fast slew rate, wide bandwidth, and high output drive make the CLM4121 family the ideal choice for closed loop buffer applications with wide band op amps.

These same characteristics are the excellent choices for open loop applications such as driving coaxial and switched pair cables.

### ORDERING INFORMATION

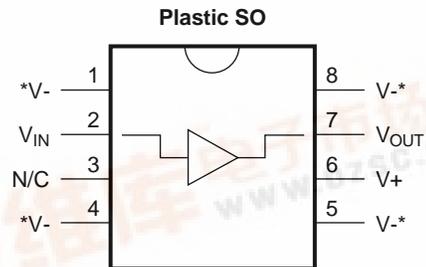
Part	Package	Temperature Range
CLM4121 N	NO8A (Plastic P Dip 8 Lead)	-40°C to 85°C
CLM4121 M	MO8B (SOIC 8 Lead)	-40°C to 85°C
CLM4321 N	NO8A (Plastic P Dip 8 Lead)	-25°C to 70°C
CLM4321 M	MO8B (SOIC 8 Lead)	-25°C to 70°C

### CONNECTION DIAGRAMS



\*Heat-sinking pins. Pin 1 and Pin 8 must be connected to the negative supply.

Package NO8A



\*Heat-sinking pins. Pin 1 and Pin 8 must be connected to the negative supply.

Package MO8B



## ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage . . . . .	±20	ESD Tolerance (Note 3) . . . . .	±2000V
Input Voltage . . . . .	±V <sub>supply</sub>	Thermal Resistance (θ <sub>JA</sub> ) (Note 6)	
Storage Temperature Range . . . . .	-65°C to +150°C	N Package . . . . .	50°C/W
Lead Temperature		M Package . . . . .	60°C/W
(Soldering 10 seconds) . . . . .	260°C	Maximum Junction Temperature . . . . .	150°C
Power Dissipation . . . . .	(Note 4)		

## DC ELECTRICAL CHARACTERISTICS

The following specifications apply for Supply Voltage = ±15V, V<sub>CM</sub> = 0, R<sub>L</sub> ≥ 100KΩ and R<sub>S</sub> = 50Ω unless otherwise noted. **Boldface** limits apply for T<sub>A</sub> = T<sub>J</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>; all other limits T<sub>A</sub> = T<sub>J</sub> = 25°C.

SYMBOL	CHARACTERISTICS	TYP	CLM4121	CLM4321	UNITS	CONDITIONS
			Limit (Note 5)	Limit (Note 5)		
Av1	Voltage Gain 1	0.970	0.950 <b>0.950</b>	0.950 <b>0.950</b>	V/V Min	R <sub>L</sub> = 1KΩ, V <sub>IN</sub> = ±10V
Av2	Voltage Gain 2	0.900	0.800 <b>0.800</b>	0.800 <b>0.800</b>		R <sub>L</sub> = 50Ω, V <sub>IN</sub> = ±6V
Av3	Voltage Gain 3	0.840	0.780 <b>0.750</b>	0.750 <b>0.700</b>		R <sub>L</sub> = 50Ω, V <sup>+</sup> = 5V V <sub>IN</sub> = 2V <sub>PP</sub>
V <sub>OS</sub>	Offset Voltage	15	20 <b>30</b>	30 <b>30</b>	mV Max	R <sub>L</sub> = 1KΩ
I <sub>B</sub>	Input Bias Current	1	5 <b>7</b>	10 <b>10</b>	µA Max	R <sub>L</sub> = 1KΩ, R <sub>S</sub> = 10kΩ,
R <sub>IN</sub>	Input Resistance	0.5	.2	.2	MΩ	R <sub>L</sub> = 50Ω
C <sub>IN</sub>	Input Capacitance	3.5			pF	
R <sub>O</sub>	Output Resistance	3	5 <b>10</b>	5 <b>6</b>	Ω Max	I <sub>OUT</sub> = ±10mA
I <sub>S1</sub>	Supply Current 1	7.5	10 <b>10</b>	10 <b>10</b>	mA Max	R <sub>L</sub> = ∞
I <sub>S2</sub>	Supply Current 2	2.5	5 <b>5</b>	5 <b>5</b>		R <sub>L</sub> = ∞, V <sup>+</sup> = 5V
V <sub>O1</sub>	Output Swing 1	13.5	13.3 <b>13</b>	13.2 <b>13</b>	±V Min	R <sub>L</sub> = 1K
V <sub>O2</sub>	Output Swing 2	12.7	10 <b>9</b>	10 <b>9</b>		R <sub>L</sub> = 100Ω
V <sub>O3</sub>	Output Swing 3	1.8	1.6 <b>1.3</b>	1.6 <b>1.5</b>	V <sub>PP</sub> Min	R <sub>L</sub> = 50Ω, V <sup>+</sup> = 5V (Note 5)
I <sub>OUT</sub>	Output Current	200	140	140	mA	V <sub>IN</sub> = ±13V
PSSR	Power Supply Rejection Ratio	70	60 <b>60</b>	60 <b>60</b>	dB Min	V <sup>±</sup> = ±5V to ±15V

**AC ELECTRICAL CHARACTERISTICS**

The following specifications apply for Supply Voltage =  $\pm 15V$ ,  $V_{CM} = 0$ ,  $R_L \geq 100K\Omega$  and  $R_S = 50\Omega$  unless otherwise noted. **Boldface** limits apply for  $T_A = T_J = T_{MIN}$  to  $T_{MAX}$ ; all other limits  $T_A = T_J = 25^\circ C$ .

SYMBOL	CHARACTERISTICS	TYP	CLM4121	CLM4321	UNITS	CONDITIONS
			Limit (Note 5)	Limit (Note 5)		
SR <sub>1</sub>	Slew Rate 1	4000	3500	2500	V/ $\mu$ s	$V_{IN} = \pm 11V$ , $R_L = 1K\Omega$ (Note 2)
SR <sub>2</sub>	Slew Rate 2	2000	1500	1000		$V_{IN} = \pm 5V$ , $R_L = 50\Omega$ (Note 2)
SS <sub>BW</sub>	Small Signal Bandwidth	180	140	100	MHz	$V_{IN} = \pm 100mV_{PP}$ , $R_L = 50\Omega$ $C_L \leq 10pF$
LS <sub>BW</sub>	Large Signal Bandwidth	65	55	40		$V_{IN} = \pm 11V$ , $R_L = 1K$ $C_L \leq 10pF$
P <sub>BW</sub>	Power Bandwidth	40	30	20		$V_{IN} = \pm 8V$ , $R_L = 50\Omega$ $C_L \leq 10pF$
t <sub>r</sub> , t <sub>f</sub>	Rise Time Fall Time	2.0	2.5	3.5	ns	$R_L = 50\Omega$ , $C_L \leq 10pF$ $V_O = 100mV_{PP}$
t <sub>pd</sub>	Propagation Delay Time	3.0			ns	$R_L = 50\Omega$ , $C_L \leq 10pF$ $V_O = 100mV_{PP}$
O <sub>s</sub>	Overshoot	10			%	$R_L = 50\Omega$ , $C_L \leq 10pF$ $V_O = 100mV_{PP}$

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. DC and AC electrical specifications do not apply when operating the device beyond its rated operating conditions.

**Note 2:** Slew rate is measured with  $50\Omega$  source impedance at  $25^\circ C$ . For accurate measurements, the input slew rate should be at least  $5000V/\mu s$ .

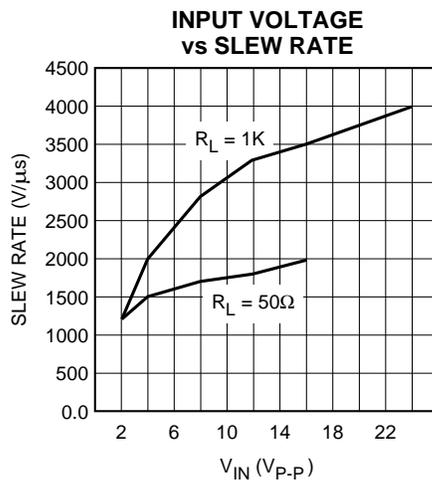
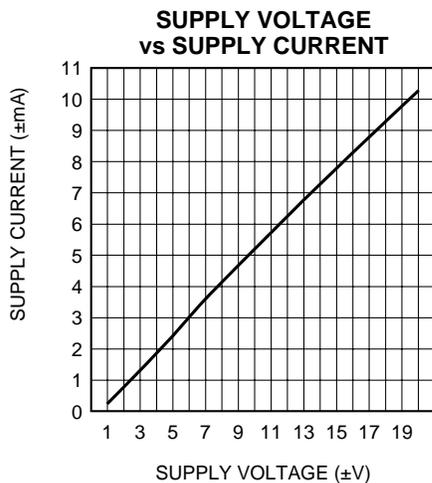
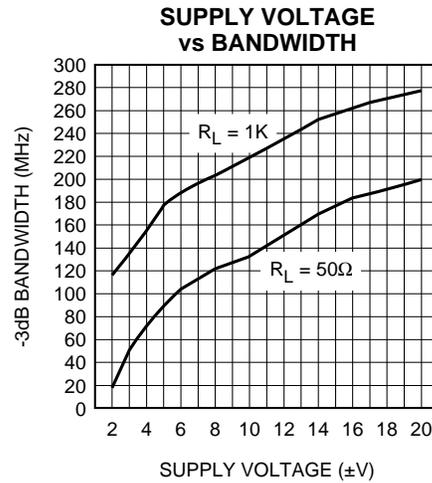
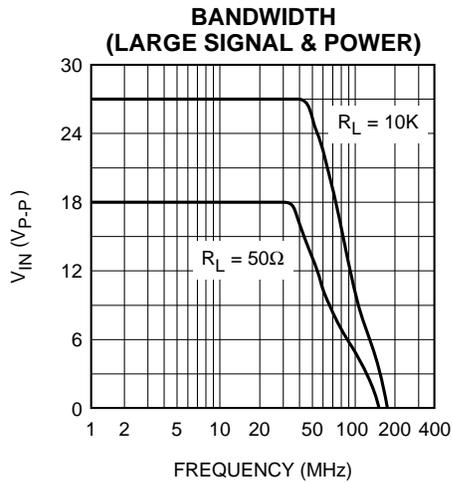
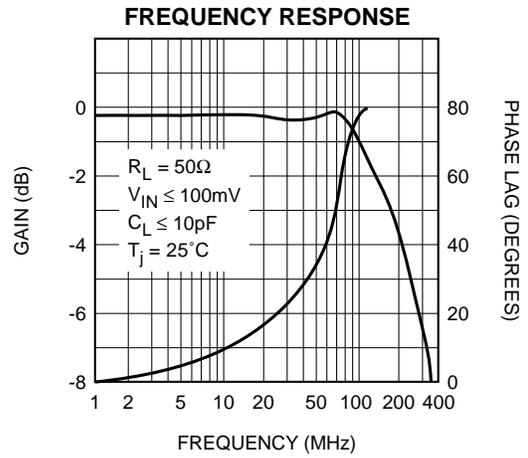
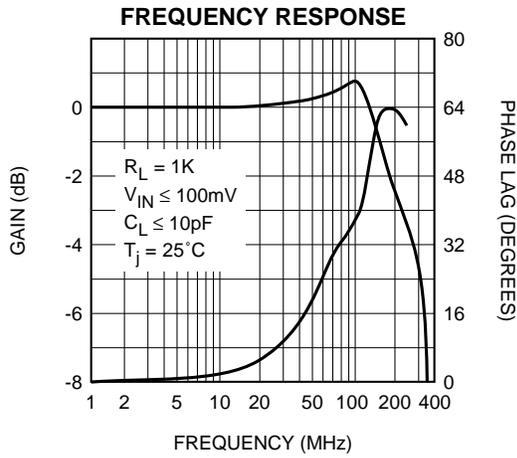
**Note 3:** The test circuit consists of the human body model of  $120pF$  in series with  $1500\Omega$ .

**Note 4:** The maximum power dissipation is a function of  $T_{J(max)}$ ,  $\theta_{JA}$  and  $T_A$ . The maximum allowable power dissipation at any ambient temperature is  $P_D = (T_{J(max)} - T_A)/\theta_{JA}$ .

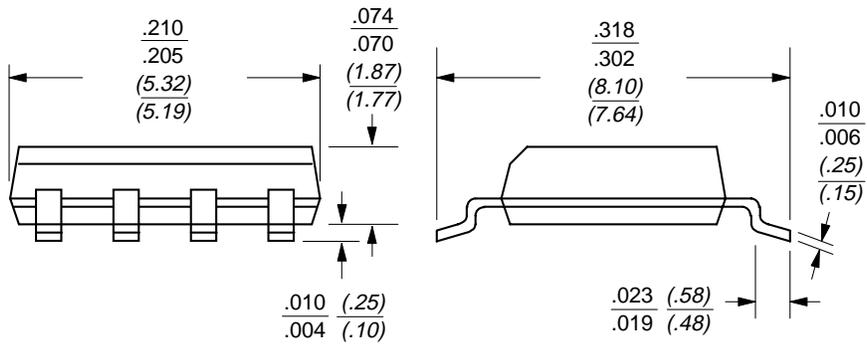
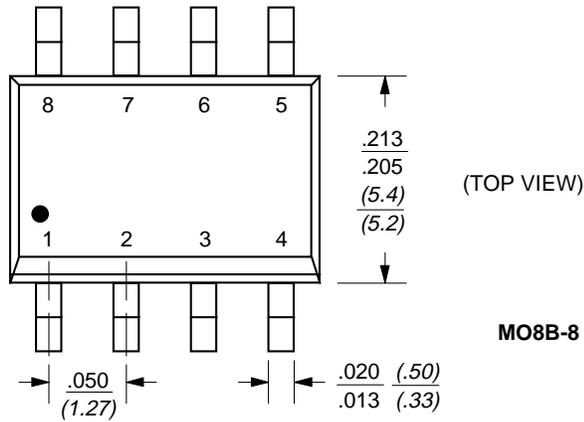
**Note 5:** Limits are guaranteed by testing, correlation or periodic characterization.

**Note 6:** For M & N package,  $\theta_{JA}$  is measured by soldering the unit directly on a printed circuit board and V pins are connected to 2 square inches of 2 oz copper.

TYPICAL PERFORMANCE CHARACTERISTICS



**MO8B DIMENSIONS**



**NO8A DIMENSIONS**

