

CLM6121 / CLM6321

FEATURES

- Slew Rate 1200V/ μ s
- Wide Bandwidth..... 100MHz
- Output current 230mA
- High Input Impedance..... 2M Ω
- No Oscillations with Capacitive Loads
- 5V to $\pm$ 15V Operation Guaranteed
- Current and Thermal Limiting
- Fully Specified to Drive 50 Ω Lines

APPLICATIONS

- Line Driving
- Radar
- Sonar

GENERAL DESCRIPTION

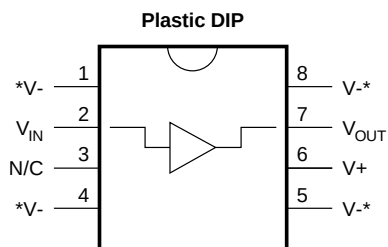
The CLM6121 family are high speed unity gain buffers that slew at 1200V/ μ s, having a small signal bandwidth of 100MHz, and capable of providing a continuous output current of $\pm$ 200mA. They are monolithic ICs which are pin to pin compatible with the LH0002H/CH with the additional feature of current limiting.

The internal output short circuit current limiting feature has been designed in the device such that when the junction temperature reaches 170 $^{\circ}$ C, the current is limited to 100mA.

ORDERING INFORMATION

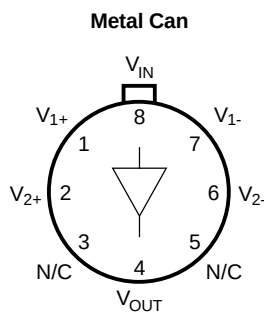
Part	Package	Temperature Range
CLM6121 H	Hermetic TO5 8 Lead	-55 $^{\circ}$ C to 125 $^{\circ}$ C
CLM6321 H	Hermetic TO5 8 Lead	-40 $^{\circ}$ C to 85 $^{\circ}$ C
CLM6121 N	Plastic P Dip 8 Lead	-40 $^{\circ}$ C to 85 $^{\circ}$ C
CLM6321 N	Plastic P Dip 8 Lead	-40 $^{\circ}$ C to 85 $^{\circ}$ C
CLM6121 M	SOIC 8 Lead	-25 $^{\circ}$ C to 70 $^{\circ}$ C
CLM6321 M	SOIC 8 Lead	-25 $^{\circ}$ C to 70 $^{\circ}$ C
CLM6321 S	SOIC 14 Lead	-25 $^{\circ}$ C to 70 $^{\circ}$ C

CONNECTION DIAGRAMS



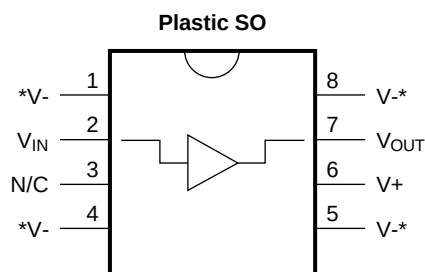
*Heat-sinking pins. Pin 1 and Pin 8 must be connected to the negative supply.

Package NO8A



Top View

Package HO8A

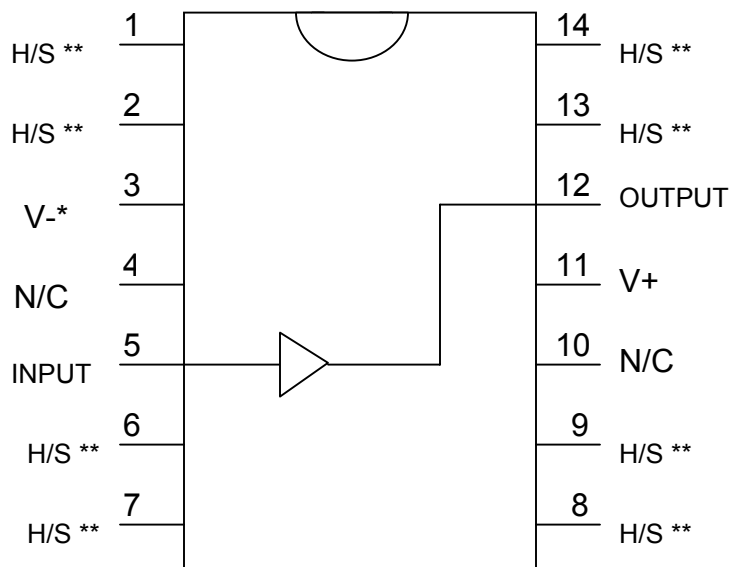


*Heat-sinking pins. Pin 1 and Pin 8 must be connected to the negative supply.

Package MO8A

New Package Release April 2004

Plastic SO-14



*Pin 3 must be connected to the negative supply.

**Heat-sinking pins. See application section on heat sinking requirements.
These pins are at V^- Potential.

ABSOLUTE MAXIMUM RATINGS (Note 1)

If Military/Aerospace specified devices are required, please contact the Calogic Sales Office for availability and specifications.

Supply Voltage ± 18
 Input Voltage $\pm V_{\text{supply}}$
 Short Circuit to GND (Note 2) Continuous
 Storage Temperature Range -65°C to $+150^{\circ}\text{C}$
 Lead Temperature
 (Soldering 10 seconds) 260°C

ESD Tolerance (Note 4) $\pm 2000\text{V}$
 Thermal Resistance (θ_{JA}) (Note 7)
 H Package 125°C/W
 N Package 50°C/W
 M Package 60°C/W
 Thermal Resistance (θ_{JC})
 H Package 15°C/W

DC ELECTRICAL CHARACTERISTICS

The following specifications apply for Supply Voltage = $\pm 15\text{V}$, $V_{\text{CM}} = 0$, $R_{\text{L}} \geq 100\text{k}\Omega$ and $R_{\text{S}} = 50\Omega$ unless otherwise noted.

Boldface limits apply for $T_{\text{A}} = T_{\text{J}} = T_{\text{MIN}}$ to T_{MAX} ; all other limits $T_{\text{A}} = T_{\text{J}} = 25^{\circ}\text{C}$.

SYMBOL	CHARACTERISTICS	TYP	CLM6121	CLM6321	UNITS	CONDITIONS
			Limit (Note 6)	Limit (Note 6)		
A_{V1}	Voltage Gain 1	0.990	0.980 0.970	0.970 0.950	V/V Min	$R_{\text{L}} = 1\text{k}\Omega$, $V_{\text{IN}} = \pm 10\text{V}$
A_{V2}	Voltage Gain 2	0.900	0.860 0.800	0.850 0.820		$R_{\text{L}} = 50\Omega$, $V_{\text{IN}} = \pm 10\text{V}$
A_{V3}	Voltage Gain 3	0.840	0.780 0.750	0.750 0.700		$R_{\text{L}} = 50\Omega$, $V^{+} = 5\text{V}$ $V_{\text{IN}} = 2V_{\text{PP}}$
V_{OS}	Offset Voltage	15	30 50	50 100	mV Max	$R_{\text{L}} = 1\text{k}\Omega$
I_{B}	Input Bias Current	1	4 7	5 7	μA Max	$R_{\text{L}} = 1\text{k}\Omega$, $R_{\text{S}} = 10\text{k}\Omega$,
R_{IN}	Input Resistance	5			M Ω	$R_{\text{L}} = 50\Omega$
C_{IN}	Input Capacitance	3.5			pF	
R_{O}	Output Resistance	3	5 10	5 6	Ω Max	$I_{\text{OUT}} = \pm 10\text{mA}$
I_{S1}	Supply Current 1	15	18 20	20 22	mA Max	$R_{\text{L}} = \infty$
I_{S2}	Supply Current 2	14	16 18	18 20		$R_{\text{L}} = \infty$, $V^{+} = 5\text{V}$
V_{O1}	Output Swing 1	13.5	13.3 13	13.2 13	$\pm\text{V}$ Min	$R_{\text{L}} = 1\text{k}$
V_{O2}	Output Swing 2	12.7	11.5 10	11 10		$R_{\text{L}} = 100\Omega$
V_{O3}	Output Swing 3	12	11 9	10 9		$R_{\text{L}} = 50\Omega$
V_{O4}	Output Swing 4	1.8	1.6 1.3	1.6 1.5	V_{PP} Min	$R_{\text{L}} = 50\Omega$, $V^{+} = 5\text{V}$ (Note 6)
PSSR	Power Supply Rejection Ratio	70	60 55	60 50	dB Min	$V^{\pm} = \pm 5\text{V}$ to $\pm 15\text{V}$

AC ELECTRICAL CHARACTERISTICS

The following specifications apply for Supply Voltage = $\pm 15\text{V}$, $V_{\text{CM}} = 0$, $R_{\text{L}} \geq 100\text{k}\Omega$ and $R_{\text{S}} = 50\Omega$ unless otherwise noted.

Boldface limits apply for $T_{\text{A}} = T_{\text{J}} = T_{\text{MIN}}$ to T_{MAX} ; all other limits $T_{\text{A}} = T_{\text{J}} = 25^{\circ}\text{C}$.

SYMBOL	CHARACTERISTICS	TYP	CLM6121	CLM6321	UNITS	CONDITIONS
			Limit (Note 6)	Limit (Note 6)		
SR ₁	Slew Rate 1	1200	550	550	V/ μs	$V_{\text{IN}} = \pm 11\text{V}$, $R_{\text{L}} = 1\text{k}\Omega$
SR ₂	Slew Rate 2	800	550	550	V/ μs	$V_{\text{IN}} = \pm 5\text{V}$, $R_{\text{L}} = 50\Omega$ (Note 3)
SR ₃	Slew Rate 3	650	550	550	V/ μs	$V_{\text{IN}} = 2 V_{\text{PP}}$, $R_{\text{L}} = 50\Omega$ $V^+ = 5\text{V}$
BW	-3 dB Bandwidth	50	30	30	MHz	$V_{\text{IN}} = \pm 100 \text{ mV}_{\text{PP}}$, $R_{\text{L}} = 50\Omega$ $C_{\text{L}} \leq 10\text{pF}$
t _r , t _f	Rise Time Fall Time	7.0			ns	$R_{\text{L}} = 50\Omega$, $C_{\text{L}} \leq 10\text{pF}$ $V_{\text{O}} = 100\text{mV}_{\text{PP}}$
t _{pd}	Propagation Delay Time	4.0			ns	$R_{\text{L}} = 50\Omega$, $C_{\text{L}} \leq 10\text{pF}$ $V_{\text{O}} = 100\text{mV}_{\text{PP}}$
O _S	Overshoot	10			%	$R_{\text{L}} = 50\Omega$, $C_{\text{L}} \leq 10\text{pF}$ $V_{\text{O}} = 100\text{mV}_{\text{PP}}$

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: The CLM6121 series buffers contain current limit and thermal shutdown to protect against fault conditions.

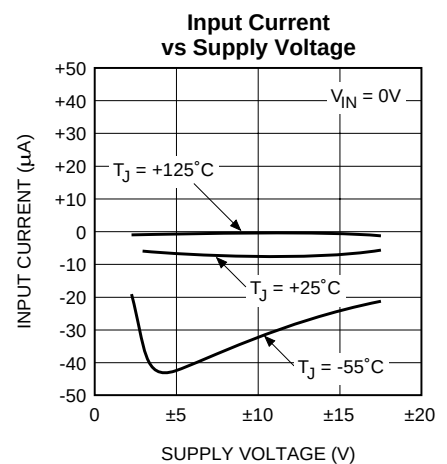
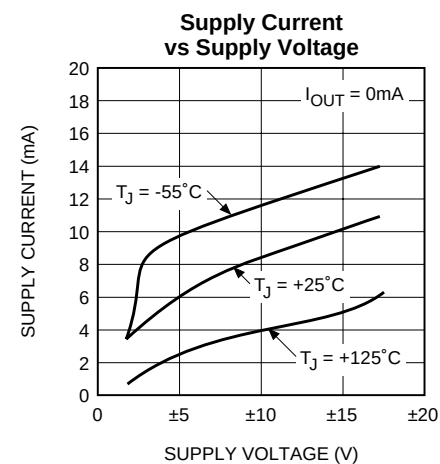
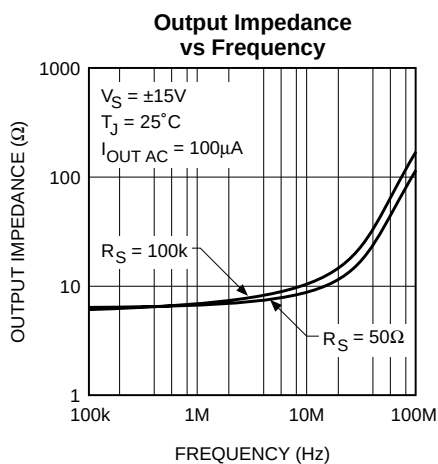
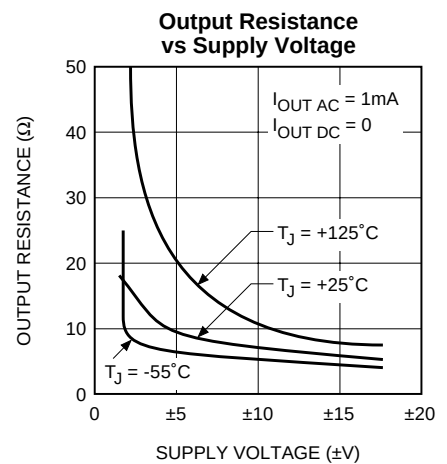
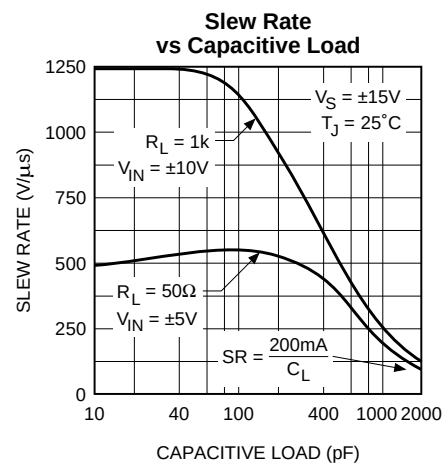
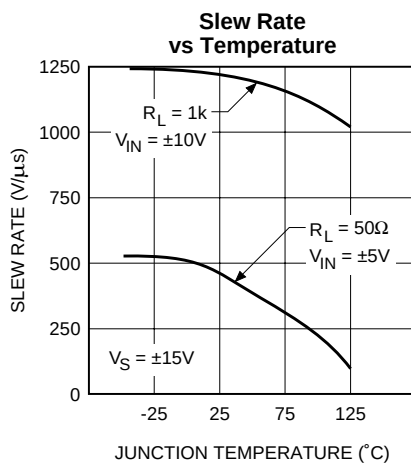
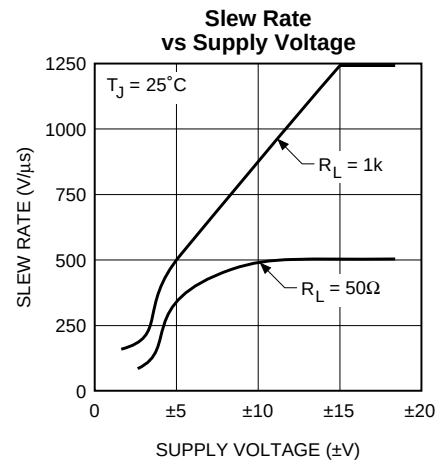
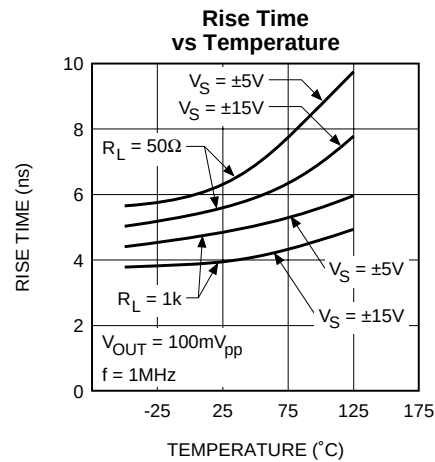
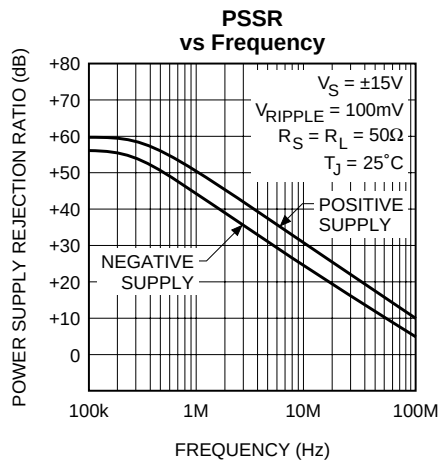
Note 3: Slew rate is measured with a $\pm 11\text{V}$ input pulse and 50Ω source impedance at 25°C . For accurate measurements, the input slew rate should be at least $1700\text{V}/\mu\text{s}$.

Note 4: The test circuit consists of the human body model of 120pF in series with 1500Ω .

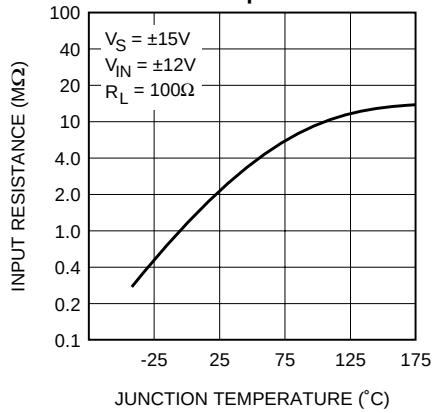
Note 5: The maximum power dissipation is a function of $T_{\text{J(max)}}$, θ_{JA} and T_{A} . The maximum allowable power dissipation at any ambient temperature is $P_{\text{D}} = (T_{\text{J(max)}} - T_{\text{A}})/\theta_{\text{JA}}$.

Note 6: Limits are guaranteed by testing, correlation or periodic characterization.

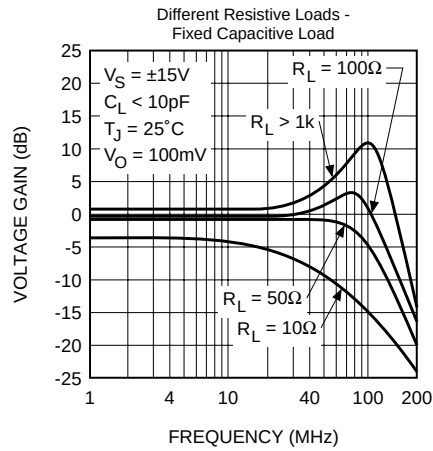
Note 7: For M & N package, θ_{JA} is measured by soldering the unit directly on a printed circuit board and V pins are connected to 2 square inches of 2 oz copper.



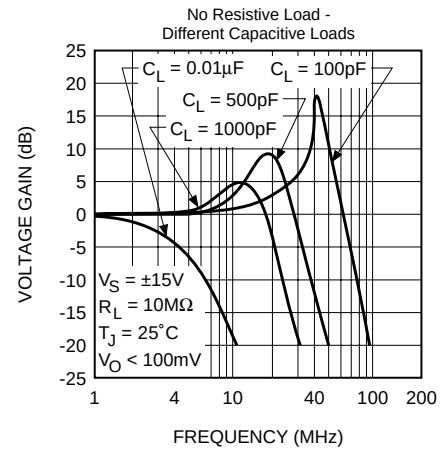
Input Resistance vs Temperature



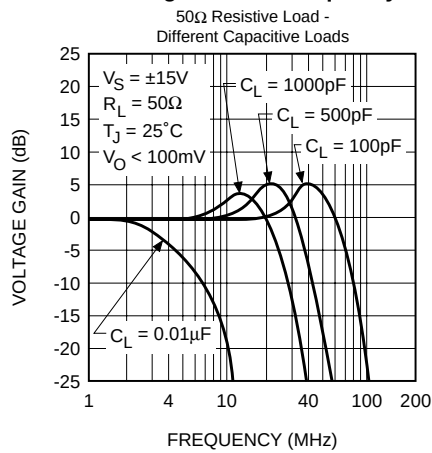
Voltage Gain vs Frequency



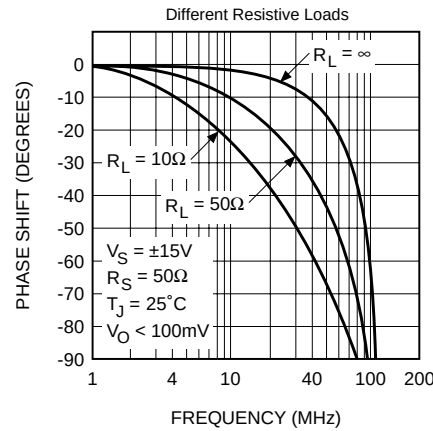
Voltage Gain vs Frequency



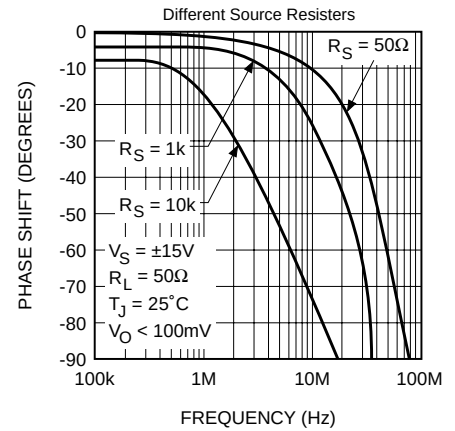
Voltage Gain vs Frequency



Phase Shift vs Frequency



Phase Shift vs Frequency



Small Signal Bandwidth vs Supply Voltage

