

Differential Linear Amplifier

LI370

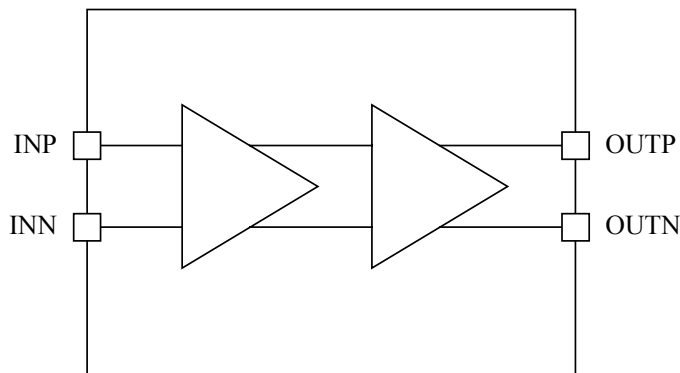
PRODUCT DESCRIPTION

LI370 is a differential amplifier with 0.2% (-55dBc) THD at 1GHz and better than 0.5% (-46dBc) THD at up to 3GHz with 1.2Vp-p (0.6Vp-p single-ended) output. The amplifier can be used as single-ended to differential, single-ended to single-ended, differential to single-ended, or differential to differential amplifier. Both the inputs and outputs are biased at 0V for ideal interfacing with most devices. The small-signal 3dB bandwidth is 4GHz while a ± 0.2 dB gain flatness is maintained from DC to 2GHz.

KEY FEATURES

- 4 GHz small-signal bandwidth
- ± 0.2 dB gain flatness DC to 2GHz
- 12dB differential, 6dB single-ended small signal gain
- 0.2% THD at 1GHz with 1.2Vp-p differential (0.6Vp-p S.E.) output
- 0.5% THD at 3GHz with 1.2Vp-p differential (0.6Vp-p S.E.) output
- AC or DC input coupling
- AC or DC output coupling
- Low group delay variation
- Low jitter
- Low $2\text{nV}/\sqrt{\text{Hz}}$ input referred noise
- Dual +5V and -5V power supplies
- 1.7W power consumption

BLOCK DIAGRAM



ELECTRICAL SPECIFICATIONS

| Parameter | Conditions/Note | Min | Typical | Max | Unit |
|---------------------------|---|------|---------|------|--------|
| Operating Temperature | | -40 | | 85 | °C |
| Bandwidth | -3dB | | 4 | | GHz |
| Gain Variation | DC to 1GHz | -0.1 | | +0.1 | dB |
| | DC to 2GHz | -0.2 | | +0.2 | dB |
| | DC to 3GHz | -0.4 | | +0.4 | dB |
| Small Signal Gain | Differential | | 12 | | dB |
| | Single-ended | | 6 | | dB |
| Total Harmonic Distortion | Up to 3GHz, 1.2Vp-p differential (600mVp-p single-ended) output | | | 0.5 | % |
| Input Common-mode | | | 0 | | V |
| Output Common-mode | | -0.2 | 0 | +0.2 | V |
| Input Impedance | Differential | | 100 | | Ω |
| | Single-ended | | 50 | | Ω |
| Output Impedance | Differential | | 100 | | Ω |
| | Single-ended | | 50 | | Ω |
| Input Return Loss | Up to 3GHz | | 15 | | dB |
| Output Return Loss | Up to 3GHz | | 13 | | dB |
| Input Referred Noise | Up to 4GHz | | 2 | | nV/√Hz |
| Common Mode Rejection | | | 20 | | dB |

ELECTRICAL SPECIFICATIONS (CONTINUED)

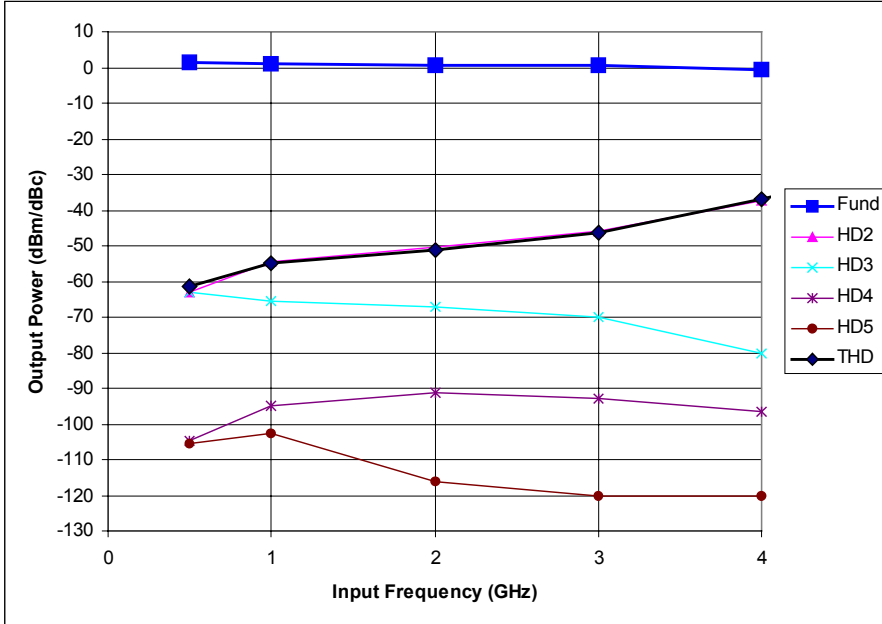
| Parameter | Conditions/Note | Min | Typical | Max | Unit |
|-------------------------|------------------------|------------|----------------|------------|-------------|
| POWER SUPPLY | | | | | |
| Positive Supply Voltage | Vcc | 4.75 | 5 | 5.25 | V |
| Vcc Current | Icc | | 150 | | mA |
| Negative Supply Voltage | Vee | -5.25 | -5 | -4.75 | V |
| Vee Current | Iee | | 180 | | mA |
| Power Dissipation | | | 1.7 | | W |
| Warm Up Time | | | 10 | | s |

PERFORMANCE

Distortion vs Frequency

Input: Single-ended -6dBm to INP

Output: Single-ended from OUTP

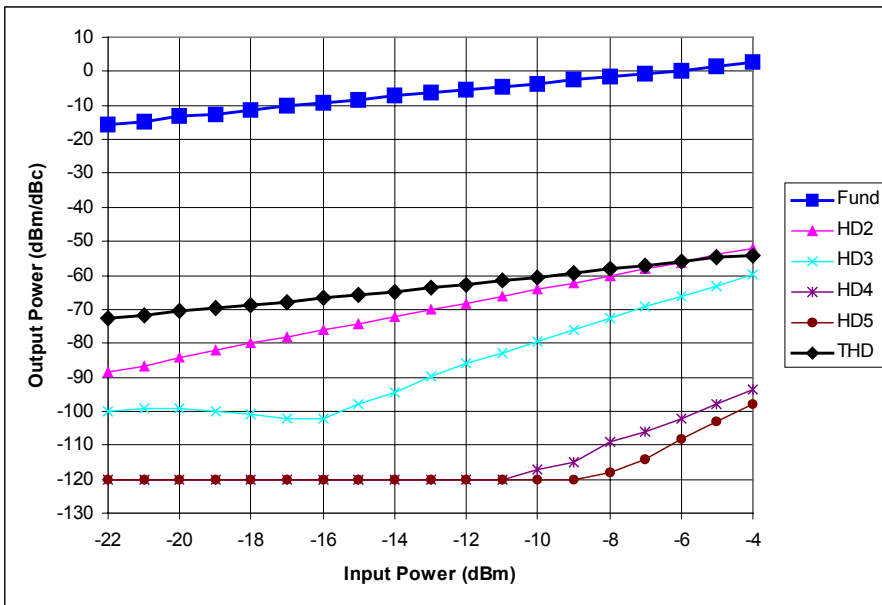


Note: Spectrum analyzer noise floor is -120dBm.

Distortion vs Input Power

Input: Single-ended 1GHz to INP

Output: Single-ended from OUTP

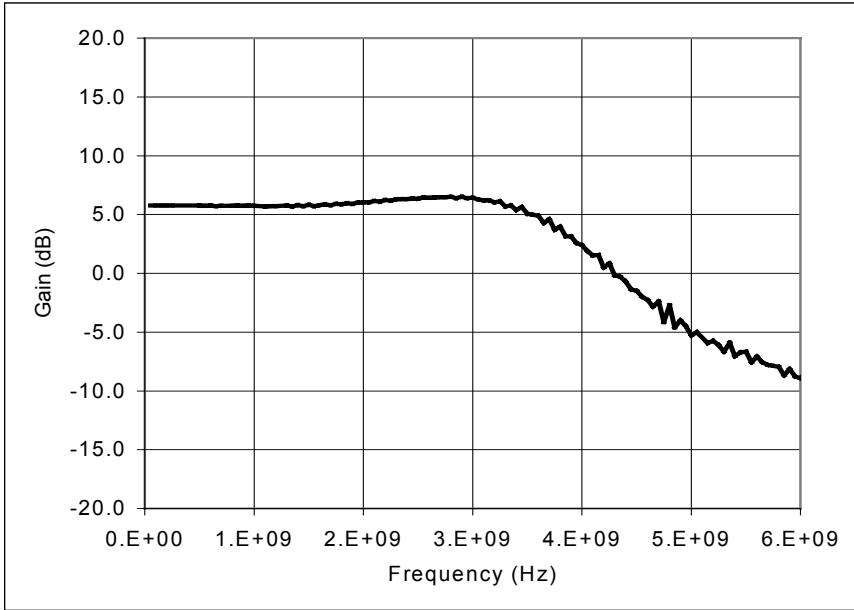


Note: Spectrum analyzer noise floor is -120dBm.

Small-Signal Frequency Response

Input: Single-ended to INP

Output: Single-ended from OUTP

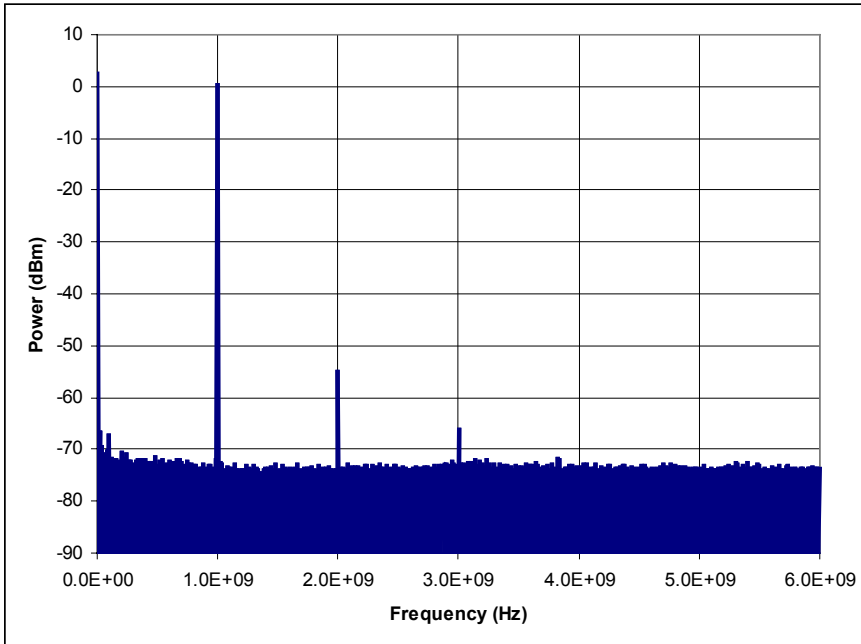


Output Spectrum

Input: Single-ended -6dBm at 1GHz to INP

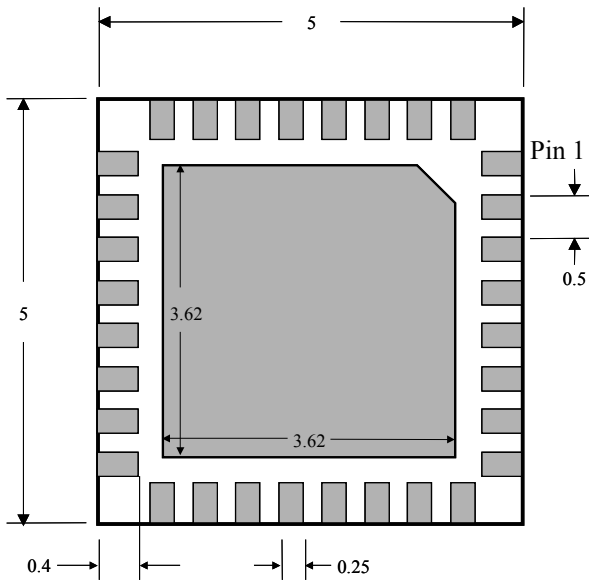
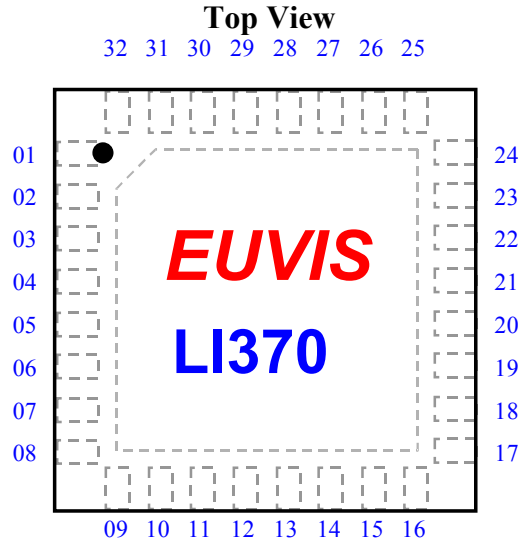
Output: Single-ended from OUTP

THD: -55dB (0.2%)

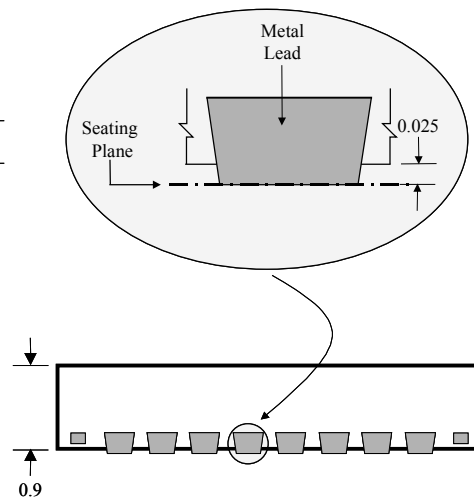


PACKAGE DIMENSIONS

- Unit: mm
- Package Format: 32-pin QFN
- Package Size: 5 mm x 5 mm



Bottom View



Side View

PIN DESCRIPTION

| Pin No. | Name | Function |
|---------|------|-----------------------|
| 1 | GND | Ground |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | VCC | Positive Power Supply |
| 5 | VEE | Negative Power Supply |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | GND | Ground |
| 10 | NC | No Connect |
| 11 | GND | Ground |
| 12 | OUTP | Positive Output |
| 13 | OUTN | Negative Output |
| 14 | GND | Ground |
| 15 | NC | No Connect |
| 16 | GND | Ground |
| 17 | GND | Ground |
| 18 | GND | Ground |
| 19 | GND | Ground |
| 20 | VEE | Negative Power Supply |
| 21 | VCC | Positive Power Supply |
| 22 | GND | Ground |
| 23 | GND | Ground |
| 24 | GND | Ground |
| 25 | GND | Ground |
| 26 | NC | No Connect |
| 27 | GND | Ground |
| 28 | INN | Negative Input |
| 29 | INP | Positive Input |
| 30 | GND | Ground |
| 31 | NC | No Connect |
| 32 | GND | Ground |

ABSOLUTE MAXIMUM RATINGS

| | |
|--|-----------------|
| V _{cc} | 0V to 6V |
| V _{ee} | -6V to 0V |
| Inputs (INP/N) | -1V to 1V |
| Outputs (OUTP/N) | -1V to 1V |
| θ_{JA} | TBD |
| Maximum Junction Temperature | 150°C |
| Operating Temperature Range | 0°C to +70°C |
| Storage Temperature Range | -40°C to +125°C |
| LEAD TEMPERATURE RANGE (SOLDERING 60 SEC) | TBD |

ORDERING INFORMATION

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The information contained in this document is based on preliminary product test results. Characteristic data and other specifications are subject to change without notice. Customers are advised to confirm information in this advanced datasheet prior to using this information or placing the order.

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