National Semiconductor

May 2003

LMV1012-07/ LMV1012-15/ LMV1012-25 Analog Pre-Amplified IC's for High Gain Microphones

General Description

The LMV1012 is an audio amplifier series for small form factor electret microphones. It is designed to replace the JFET amplifier currently being used. The LMV1012 series is ideally suited for applications requiring high signal integrity in the presence of ambient or RF noise, such as in cellular communications. The LMV1012 audio amplifiers are guaranteed to operate over a 2.2V to 5.0V supply voltage range with fixed gains of 7.8dB, 15.6dB and 23.8dB. The devices offer excellent gain accuracy and temperature stability as compared to a JFET microphone.

The LMV1012 series enables a two-pin electret microphone solution, which provides direct pin-to-pin compatibility with the existing JFET market.

The devices are offered in two space saving 4-bump micro SMD™ packages. The LMV1012TP-07, LMV1012TP-15, and LMV1012TP-25 are well suited for canister packages 1.8mm and thicker. The LMV1012UP-15 is ideal for canisters 1.3mm and thicker. These miniature packages are designed for electret condenser microphones (ECM) form factor.

Features

(Typical LMV1012-15, 2.2V supply, R_L = 2.2kΩ, C = 2.2µF, V_{IN} = 18mV_{PP}, unless otherwise specified)

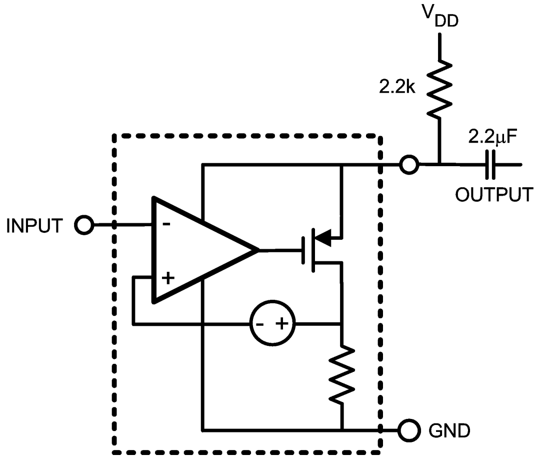
■ Supply voltage	2V - 5V
■ Supply current	<180µA
■ Signal to noise ratio (A-weighted)	60dB
■ Output voltage noise (A-weighted)	−89dBV
■ Total Harmonic Distortion	0.09%
■ Voltage gain	
— LMV1012-07	7.8dB
— LMV1012-15	15.6dB
— LMV1012-25	23.8dB
■ Temperature range	−40˚C to 85˚C

- Offered in 4-bump micro SMD packages:
  - 0.93 x 1.0 x 0.4mm
  - 0.93 x 1.0 x 0.5mm

Applications

- Cellular phones
- Headsets
- Mobile communications
- Automotive accessories
- PDAs
- Accessory microphone products

Schematic Diagram



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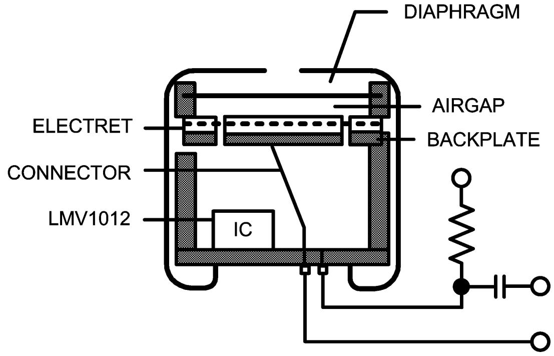
Built-In Gain Electret Microphone



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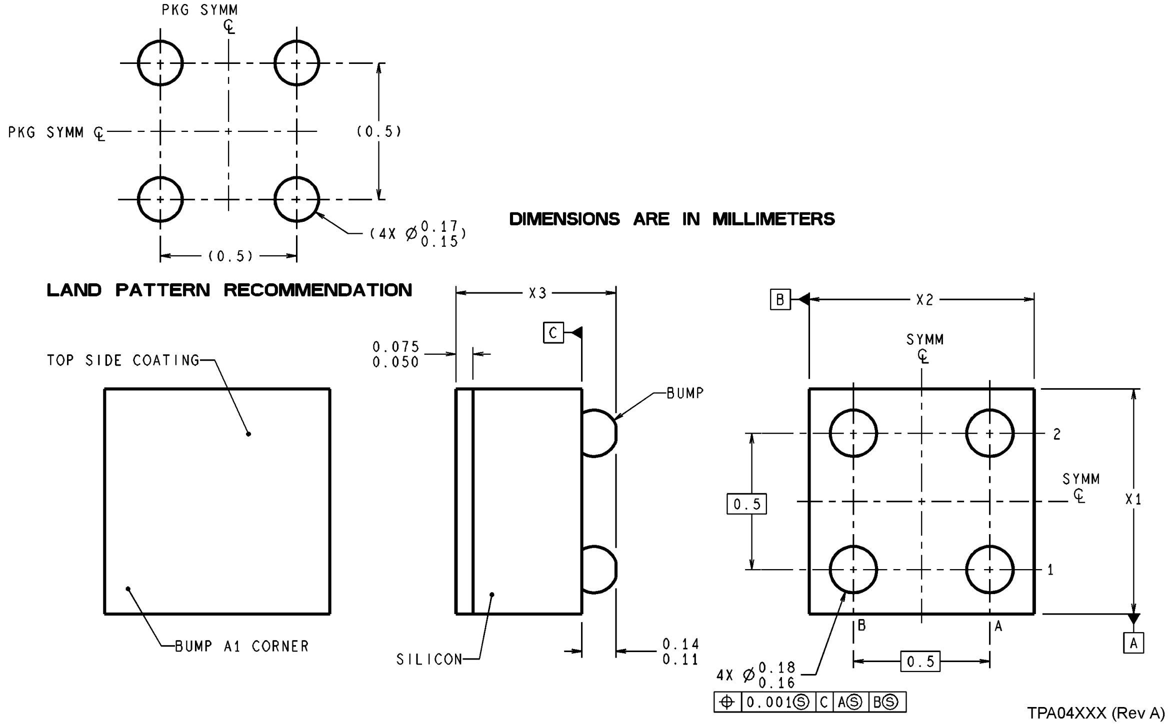
Physical Dimensions inches (millimeters) unless otherwise noted

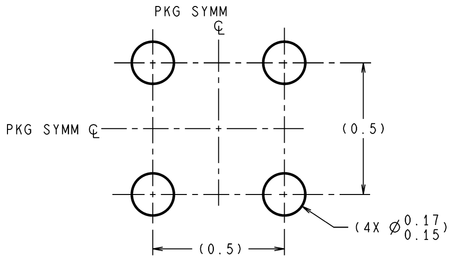


NOTE: UNLESS OTHERWISE SPECIFIED.

1. EPOXY COATING.
2. 63Sn/37Pb EUTECTIC BUMP.
3. RECOMMEND NON-SOLDER MASK DEFINED LANDING PAD.
4. PIN A1 IS ESTABLISHED BY LOWER LEFT CORNER WITH RESPECT TO TEXT ORIENTATION PINS ARE NUMBERED COUNTERCLOCKWISE.
5. XXX IN DRAWING NUMBER REPRESENTS PACKAGE SIZE VARIATION WHERE X1 IS PACKAGE WIDTH, X2 IS PACKAGE LENGTH AND X3 IS PACKAGE HEIGHT.
6. REFERENCE JEDEC REGISTRATION MO-211. VARIATION BC.

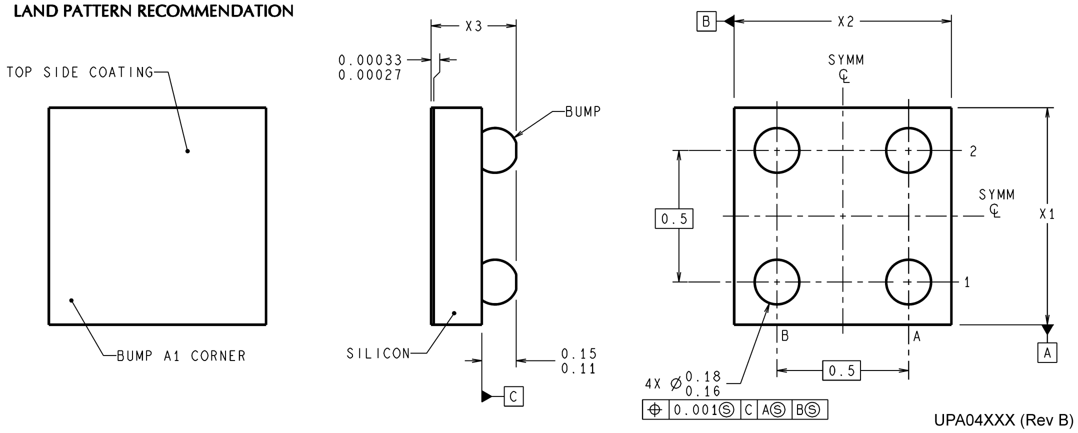
4-Bump Thin micro SMD
NS Package Number TPA04GKA
X_1 = 0.93mm X_2 = 1.006mm X_3 = 0.500mm

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



DIMENSIONS ARE IN MILLIMETERS

LAND PATTERN RECOMMENDATION



NOTE: UNLESS OTHERWISE SPECIFIED.

1. TITANIUM COATING.
2. FOR SOLDER BUMP COMPOSITION, SEE "SOLDER INFORMATION" IN THE PACKAGING SECTION OF THE NATIONAL SEMICONDUCTOR WEB PAGE (www.national.com).
3. RECOMMEND NON-SOLDER MASK DEFINED LANDING PAD.
4. PIN A1 IS ESTABLISHED BY LOWER LEFT CORNER WITH RESPECT TO TEXT ORIENTATION.
5. XXX IN DRAWING NUMBER REPRESENTS PACKAGE SIZE VARIATION WHERE X1 IS PACKAGE WIDTH, X2 IS PACKAGE LENGTH AND X3 IS PACKAGE HEIGHT.
6. REFERENCE JEDEC REGISTRATION MO-211. VARIATION CA.

4-Bump ULTRA-Thin micro SMD
NS Package Number UPA04GKA
X_1 = 0.93mm X_2 = 1.006mm X_3 = 0.400mm

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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