

L5 Actuator

Datasheet | Revision 1.4 | January 2019

Description

The L5 actuator is a wide-band voice coil actuator designed to deliver a high-definition haptic experience. It offers a rich and powerful vibrotactile effect with significant advantages over traditional ERM and LRA motors or also other technologies such as piezo or EAP.

The L5 actuator can be driven using standard audio signals from low-power audio amplifier ICs (see the Lofelt Wave Evaluation Kit for a reference design). This provides complete freedom for user experience designers to fully convey nuances and power of realistic haptic feedback. Within the recommended conditions, the actuator is capable of operating continuously for hours with no drop in performance – ideal for enhancing immersive experiences in gaming and VR/AR environments.

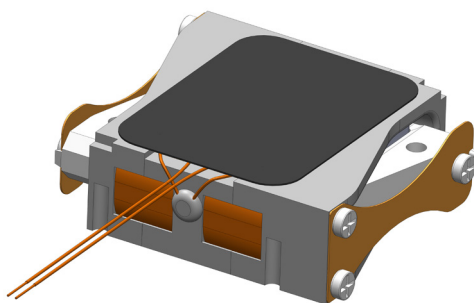
Additionally, the L5 actuator works in combination with the Lofelt Wave real-time firmware to provide optimal haptic performance with low integration cost.

Features

- High definition haptic voice coil actuator
- Wide-band response (min. 1 G) over key haptic sensitivity range of 45–250 Hz, with 30 g attached
- Max 4.3 G at 65 Hz resonance frequency, with 30 g attached
- Impedance: 8 Ω
- Completely silent operation
- Low profile 6.2 mm height package
- RoHS and REACH compliant
- Available at mass-production quantities

Applications

- Smartphones & tablets
- AR & VR devices
- Gaming controllers
- Automotive
- Headsets
- Input devices
- Tactile toys
- Wearables



Haptic, Electrical and Acoustic Characteristics

Measured in Lofelt Test Rig v1.2 with 30 g mass.

Maximal Voltage	1.4 Vrms at f0
Force	4.3 G +/-5% at f0
Resonance Frequency (f0)	65 Hz ± 5%
Frequency Range	Min. 0.5 G over 35 Hz - 1 kHz
Nominal Impedance	8 Ω at f0
Power Handling	Maximum: 320 mW
Current Consumption	Average at medium volume: 10 mA, bass music use-case Average at maximum volume: 57 mA, bass music use-case
Rub and Buzz Test	At 0.89 Vrms input, no audible noise between 50 Hz - 10 kHz while held in hand, 30 cm from ear

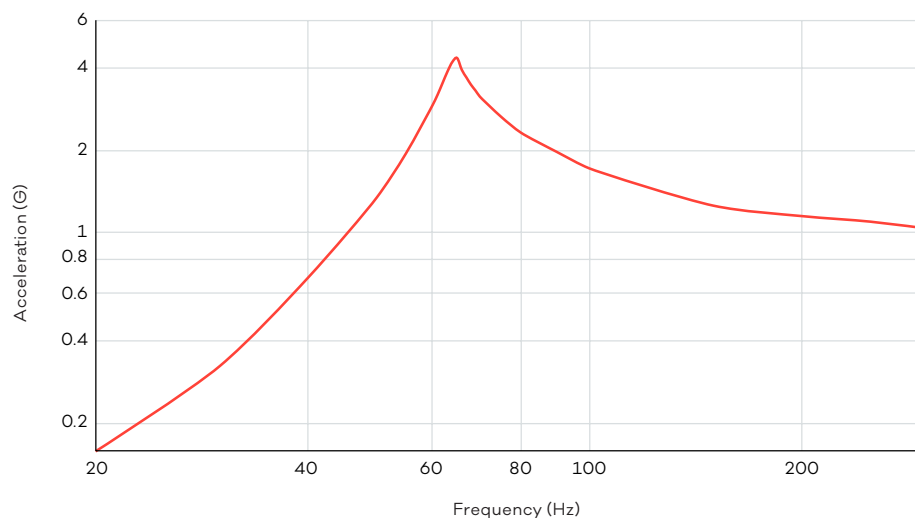
Note 1: For maximum performance use the calibrated Lofelt Wave DSP to drive the actuator. If not using the calibrated DSP, do not exceed nominal levels.

Note 2: Performance characteristics may vary depending on the attached mass and mounting method.

Acceleration Response

Measured in Lofelt Test Rig v1.2 suspended with 30 g attached mass.

Input: Sine wave at 1.4 Vrms (maximal).



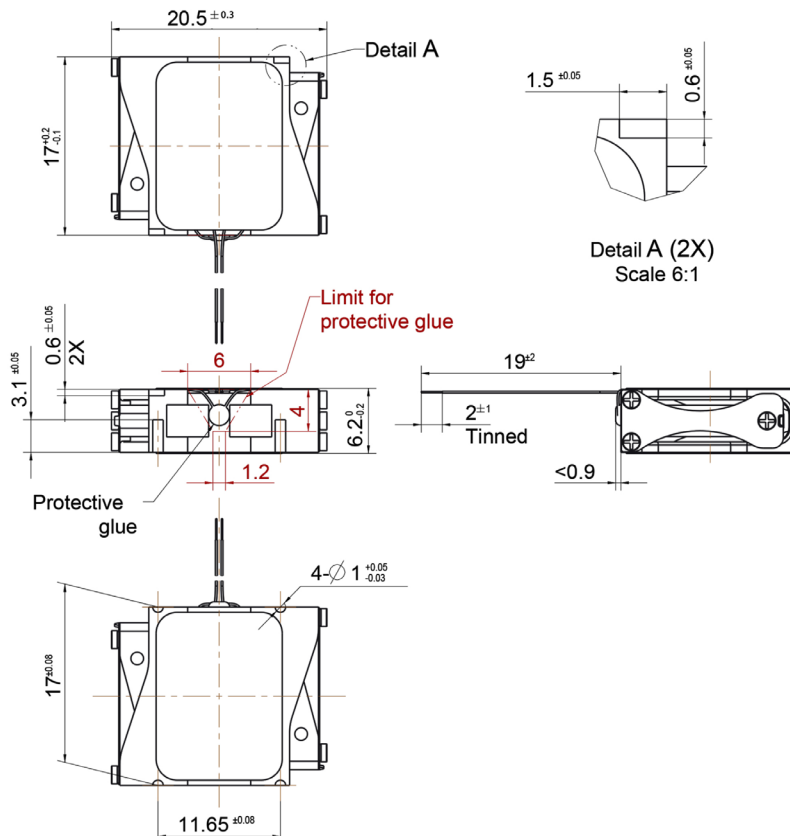
Operating Guidelines

- The L5 actuator can be driven by any audio amplifier as an 8 ohm load.
- The L5 actuator is designed for dynamic audio signals. Continuous high power sine waves at f_0 or lower may cause overheating, excessive current consumption and reduced actuator lifetime.
- Connecting Direct Current (DC) to the actuator may cause damage. Ensure the audio input is AC-coupled.
- Playing audio signals above 500 Hz may cause the signal to become audible. To keep silent operation ensure the audio input is low-pass filtered accordingly.
- For best results, we recommend driving the L5 actuator with the Lofelt Wave Evaluation Kit.

Physical Characteristics

Dimensions (WxDxH)	At rest: 17.0 x 20.5 x 6.2 mm Max displacement: 17.0 x 25.5 x 6.2 mm	
Weight	6 g +/- 0.5 g	
Operating Temperature	Min: -20°C	Max: 60°C
Storage Temperature	Min: -30°C	Max: 70°C

Dimensions



Further Information

Disclaimer

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Revision history

Revision 1.4

– Rub & Buzz update, formatting

Revision 1.3

– Updated technical names

Revision 1.2

– Updated for Lofelt Test Rig measurements

Revision 1.1

– Minor formatting

Revision 1.0

– Updated formatting

Revision 0.1

– Initial version