

LM49155

PRODUCT BRIEF **Boomer®** Audio Power Amplifier Series **Uplink Noise Suppression & Downlink SNR Enhancement Analog Audio Subsystem**

Check for Samples: [LM49155](#)

FEATURES

- Noise cancellation for uplink and downlink without DSP-type artifacts, distortions or delays
- Adapting AGC on ambient noise level & downlink signal strength for earpiece
- Downlink adjustable noise-reducing high pass filter

- E²S Class D Amplifier with ALC
- Ground Referenced Headphone Outputs with Advanced Click Pop Suppression
- Micro-power shutdown

APPLICATIONS

- Mobile Phones
- Portable Electronic Devices

DESCRIPTION

The LM49155 is a fully integrated audio subsystem designed for portable handheld applications such as cellular phones. The LM49155 combines a Noise Suppression microphone amplifier, a 1.35W mono class D amplifier with ALC, class AB earpiece driver with AGC, a high efficiency, stereo, ground referenced headphone amplifier with click pop suppression and I²C modes select and volume control.

The LM49155 features analog fully differential input, and differential output microphone amplifier designed to reduce background acoustic noise, while delivering superb speech clarity in voice communication applications. Downlink SNR enhancement with an advanced acoustic AGC technology to adjust output levels.

The LM49155 speaker amplifier features National's unique output limiter that provides both a no-clip feature and speaker protection. The E²S class D amplifier features a patented, ultra low EMI PWM architecture that significantly reduces RF emissions while preserving audio quality and efficiency. The headphone drivers feature National's ground referenced architecture that creates a ground-referenced output from a single, low-voltage supply.

The LM49155 is available in an ultra-small 36-bump micro SMD package (3.434mm x 3.459mm x 0.6mm).

Notice: This document is not a full datasheet. For more information regarding this product or to order samples please contact your local National Semiconductor sales office or visit <http://www.national.com/support/dir.html>



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Table 1. Key Specifications

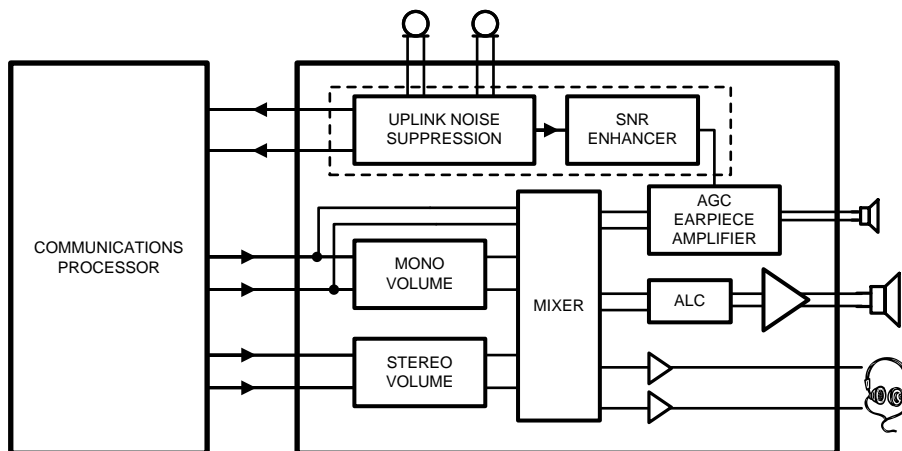
		VALUE	UNIT
Uplink Far Field Noise Suppression Electrical FFNS _E at f = 1kHz		34	dB (typ)
Downlink SNR Enhancement Earpiece Amplifier	Near-Field SNR Enhancement	6 to 18	dB (typ)
	Downlink SNR _{I_E}	16	
Class D Loudspeaker Amplifier R _L = 15μH+8Ω+15μH P _{OUT} , THD+N ≤ %, V _{DD} = 5.0V		1.35	W (typ)
Headphone Amplifier R _L = 32Ω P _{OUT} , THD+N ≤ %, HPV _{DD} = 1.8V		19	mW (typ)



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Simplified Block Diagram



Typical Application

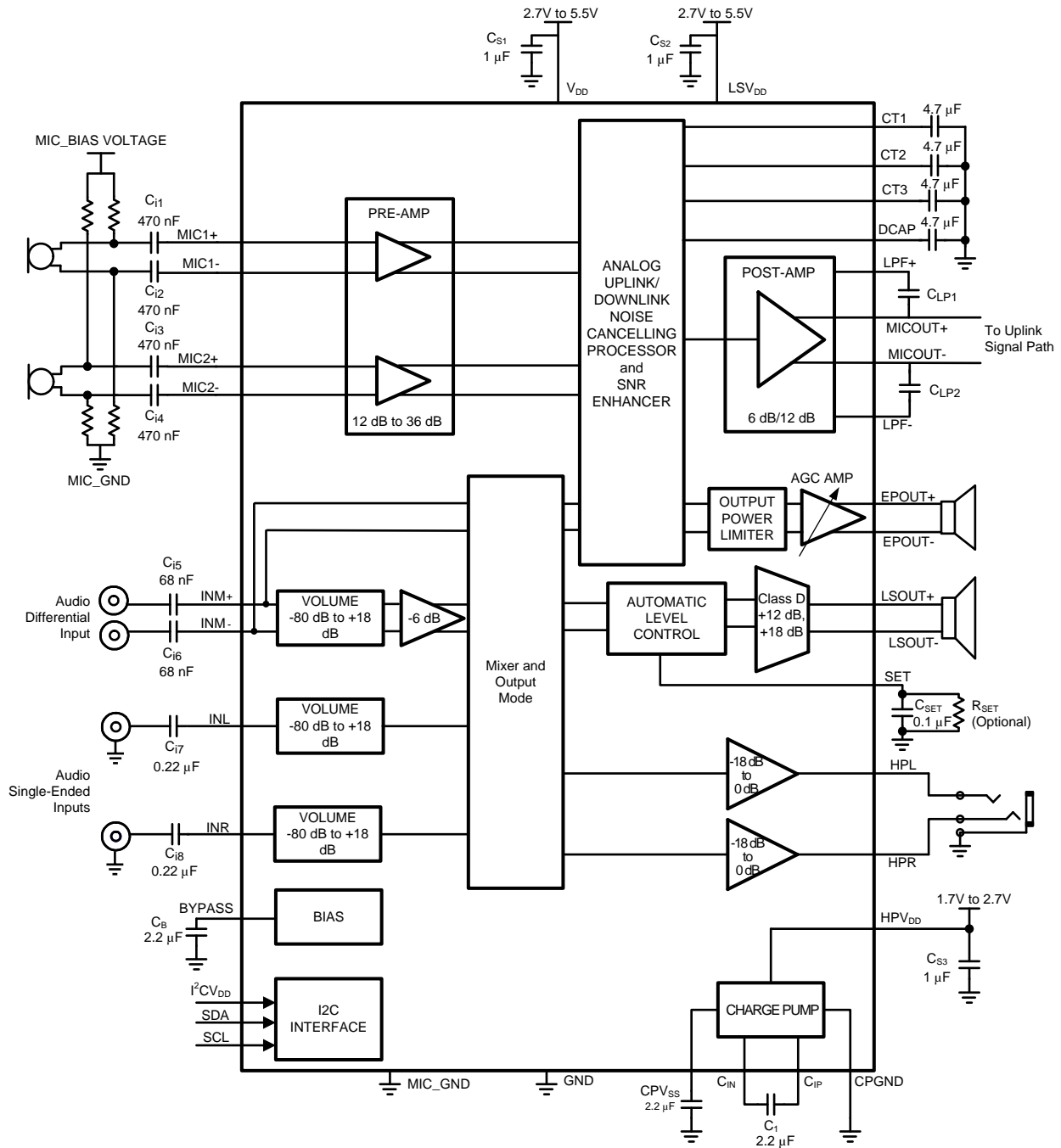


Figure 1. Typical Application Circuit

Connection Diagrams

TL Package
(3.434mm x 3.459mm x 0.6mm)

Top View

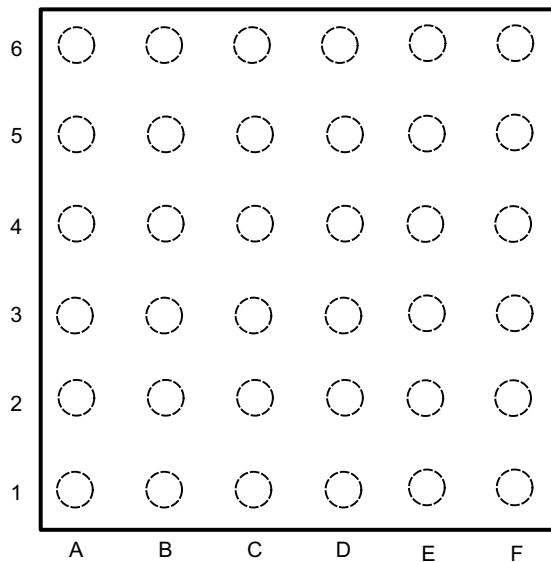


Figure 2. Top View (Bump Side Down)

36 Bump micro SMD Marking

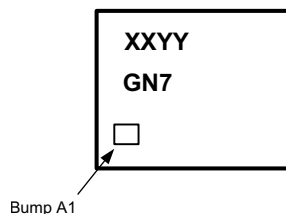


Figure 3. Top View
XX — Date Code
YY — Die Traceability
G — Boomer
N7 — LM49155TL

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
LM49155TL/NOPB	ACTIVE	DSBGA	YZR	36	250	RoHS & Green	SNAGCU	Level-1-260C-UNLIM		GN7	Samples
LM49155TLX/NOPB	ACTIVE	DSBGA	YZR	36	1000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM		GN7	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

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Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

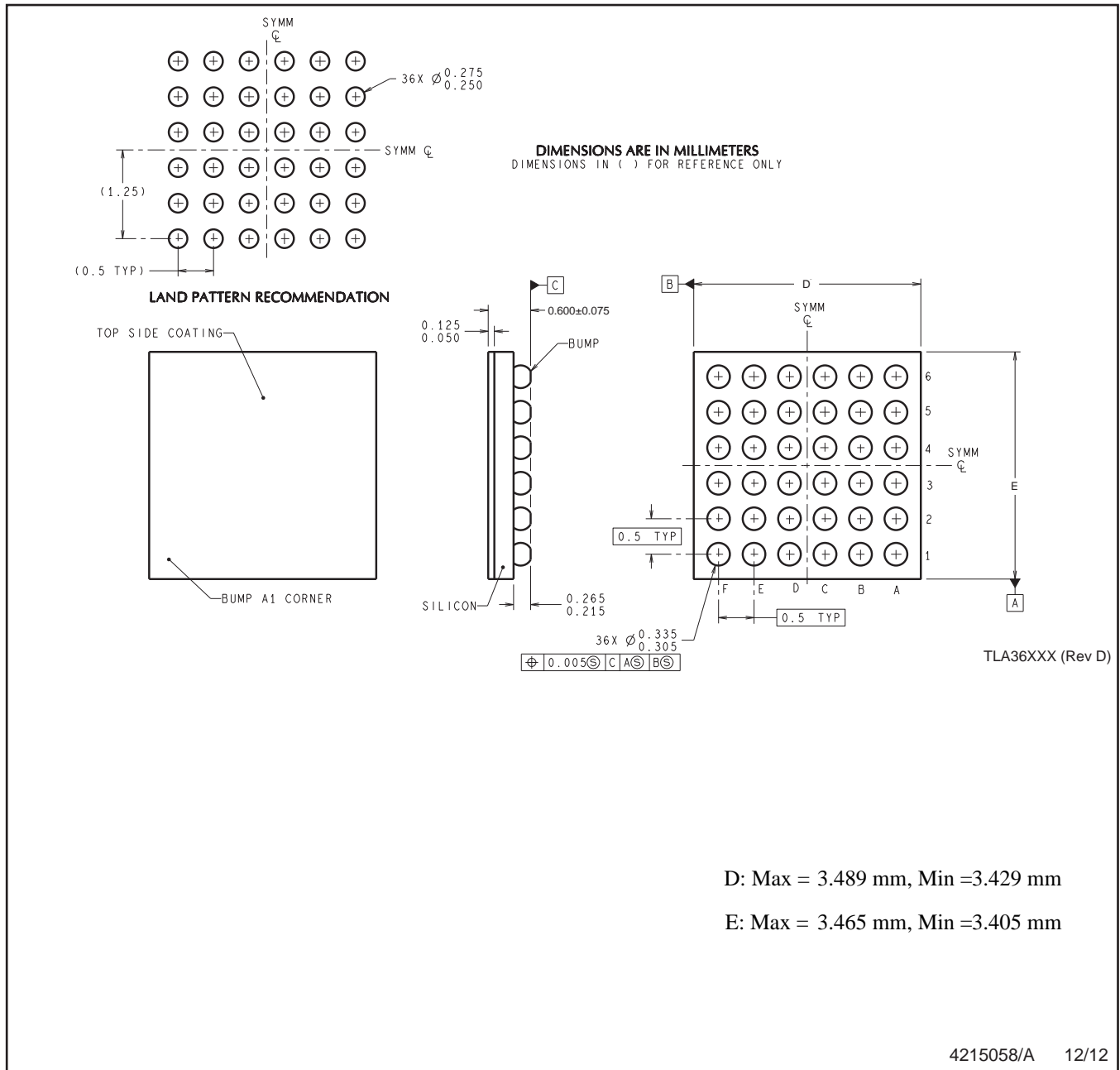
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LM49155TL/NOPB	DSBGA	YZR	36	250	178.0	12.4	3.63	3.63	0.76	8.0	12.0	Q1
LM49155TLX/NOPB	DSBGA	YZR	36	1000	178.0	12.4	3.63	3.63	0.76	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LM49155TL/NOPB	DSBGA	YZR	36	250	208.0	191.0	35.0
LM49155TLX/NOPB	DSBGA	YZR	36	1000	208.0	191.0	35.0

YZR0036



D: Max = 3.489 mm, Min = 3.429 mm

E: Max = 3.465 mm, Min = 3.405 mm

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
B. This drawing is subject to change without notice.

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