

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 SNRI _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)



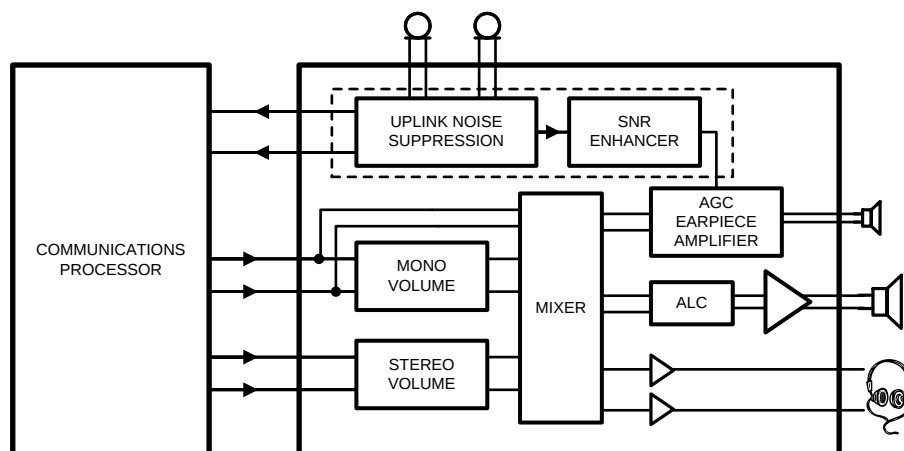
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Simplified Block Diagram



Typical Application

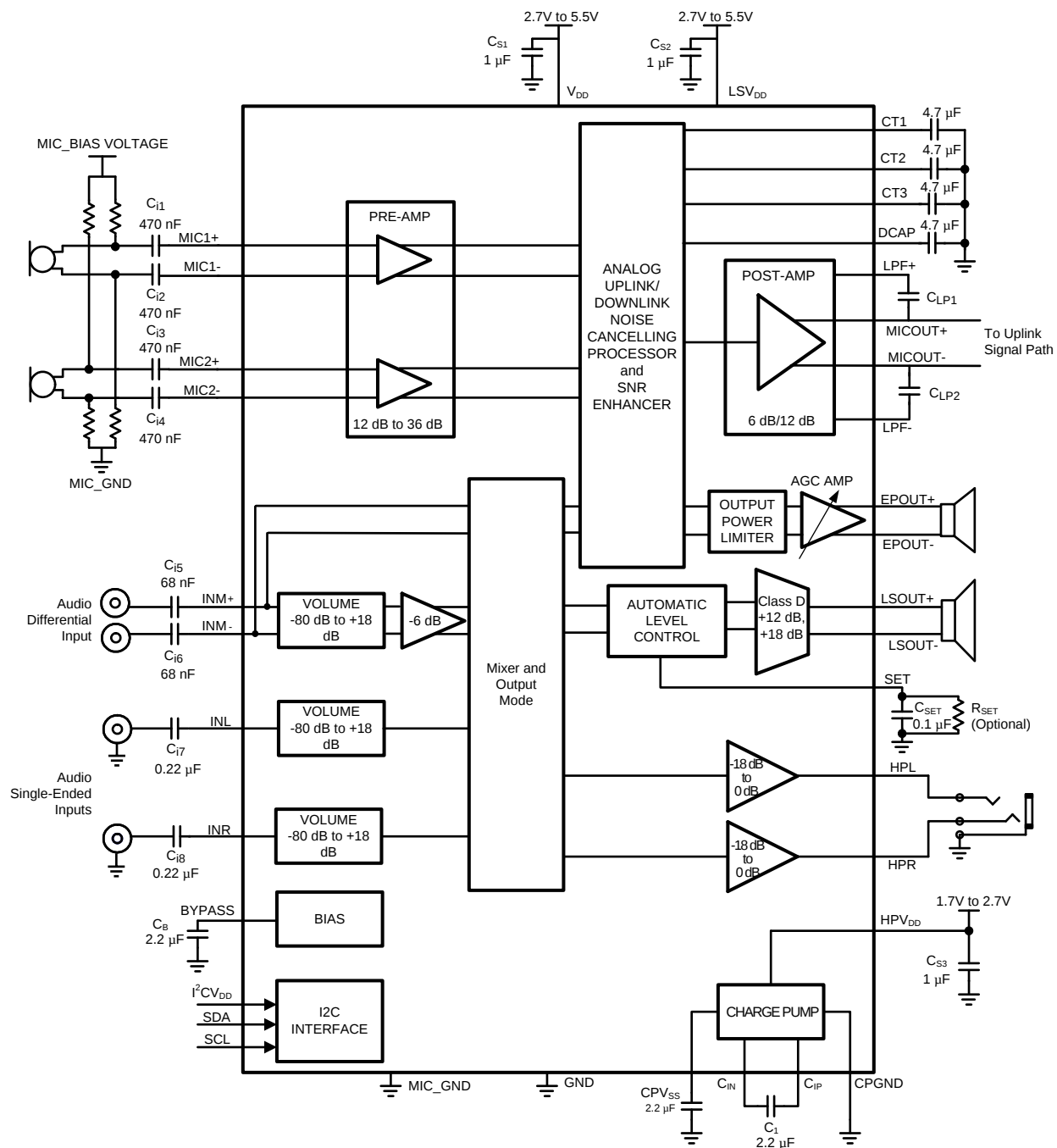


Figure 1. Typical Application Circuit

Connection Diagrams

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

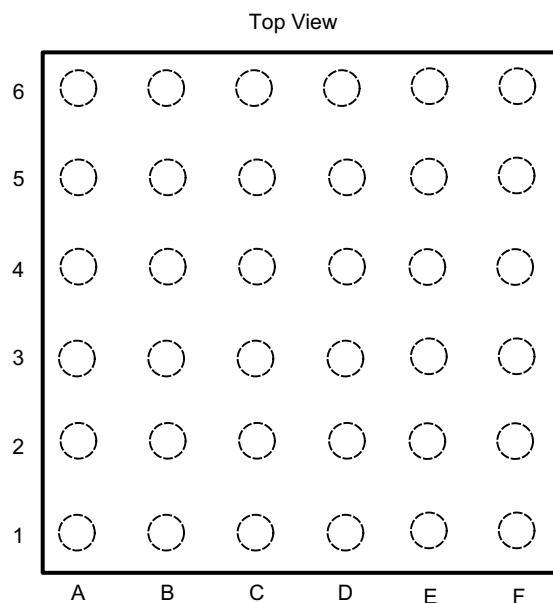


Figure 2. Top View (Bump Side Down)

36 Bump micro SMD Marking

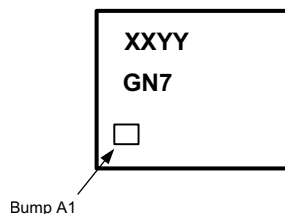


Figure 3. Top View
XX — Date Code
YY — Die Traceability
G — Boomer
N7 — LM49155TL

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
LM49155TL/NOPB	Active	Production	DSBGA (YZR) 36	250 SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-	GN7
LM49155TL/NOPB.A	Active	Production	DSBGA (YZR) 36	250 SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	See LM49155TL/NOPB	GN7
LM49155TLX/NOPB	Active	Production	DSBGA (YZR) 36	1000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-	GN7
LM49155TLX/NOPB.A	Active	Production	DSBGA (YZR) 36	1000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	See LM49155TLX/ NOPB	GN7

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts 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.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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TAPE AND REEL INFORMATION



*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	177.8	12.4	3.63	3.63	0.76	8.0	12.0	Q1
LM49155TLX/NOPB	DSBGA	YZR	36	1000	177.8	12.4	3.63	3.63	0.76	8.0	12.0	Q1

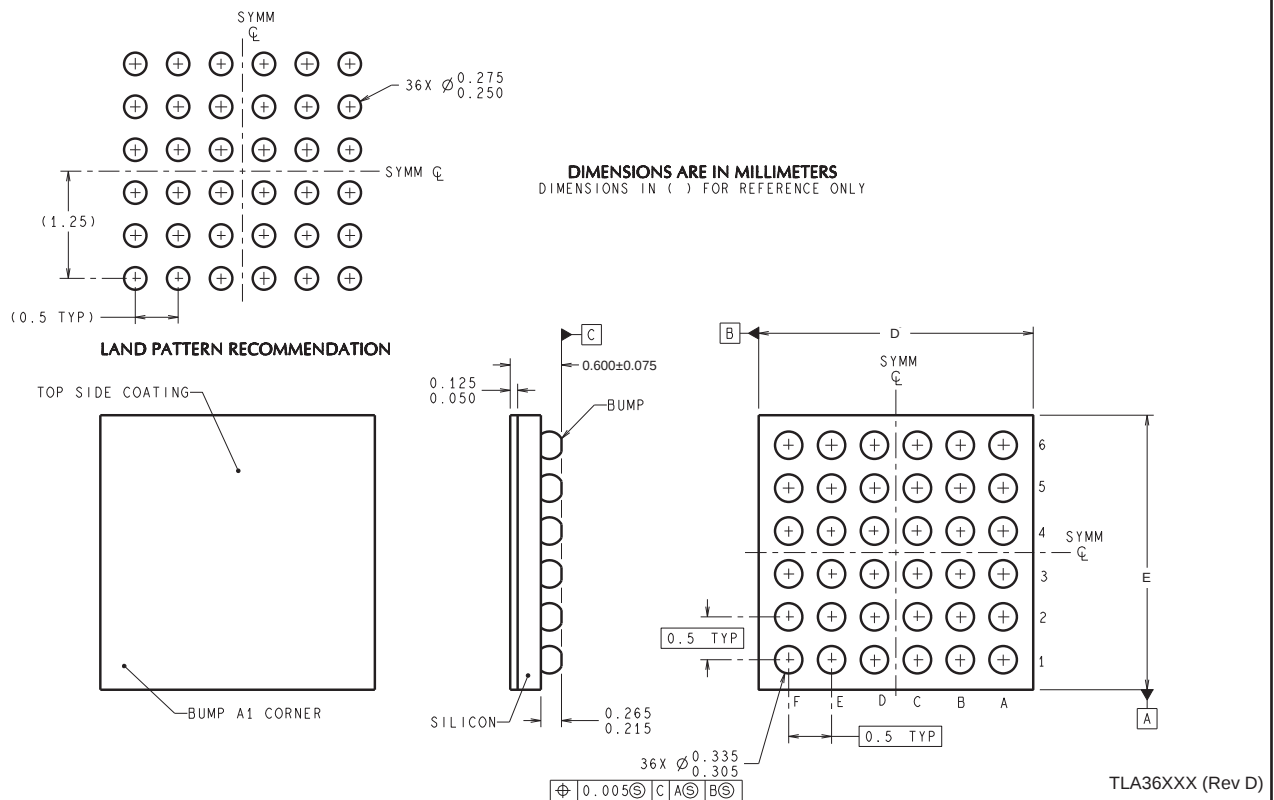
TAPE AND REEL BOX DIMENSIONS



*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

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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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