National Semiconductor

LM48512 PRODUCT BRIEF

Boomer® Audio Power Amplifier Series

PRELIMINARY
October 4, 2010

PowerWise® Boosted, Ultra Low-EMI, Mono, E²S Class D Audio Power Amplifier

General Description

Part of National's PowerWise family or products, the LM48512 delivers 1.8W into 8Ω, while consuming 14.5mA of quiescent current. The LM48512 also features National's Enhanced Emissions Suppression (E²S) system, a patented, ultra low EMI PWM architecture that significantly reduces RF emissions while preserving audio quality and efficiency. LM48512 improves battery life, reduces external component count, board area consumption, system cost, and simplifies design.

The LM48512 is designed to meet the demands of portable multimedia devices. The LM48512 features high efficiency compared to other boosted amplifiers and low EMI Class D amplifiers. The LM48512 is capable of driving an 8Ω speaker to 5.5V levels (1.8W) from a 3.6V supply while operating at 82% efficiency. Flexible power supply requirements allow operation from 2.3V to 5.5V. The E²S system features a patented edge rate control (ERC) architecture that further reduces emissions by minimizing the high frequency component of the device output, while maintaining high quality audio reproduction (THD+N = 0.03%) and high efficiency. A low power shutdown mode reduces supply current consumption to 0.04µA.

The LM48512 features a boost converter that will detect the battery voltage. The boost reduces the output voltage to the amplifier as the battery voltage decreases.

Superior click and pop suppression eliminates audible transients on power-up/down and during shutdown.

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

Key Specifications

- Efficiency at 3.6V, 800mW into 8Ω — 82% (typ)
- Quiescent Power Supply Current at 3.6V — 14.5mA
- Power Output at V_{DD} = 3.6V R_L = 8Ω, THD+N ≤ 1% — 1.8W (typ)
- Shutdown current — 0.04µA (typ)

Features

- E²S System Reduces EMI while Preserving Audio Quality and Efficiency
- Integrated Boost Converter
- Supply Voltage Level Detection on Boost Converter
- Low Power Shutdown Mode
- "Click and Pop" suppression

Applications

- Mobile phones
- Smart phones
- PDAs

Typical Application

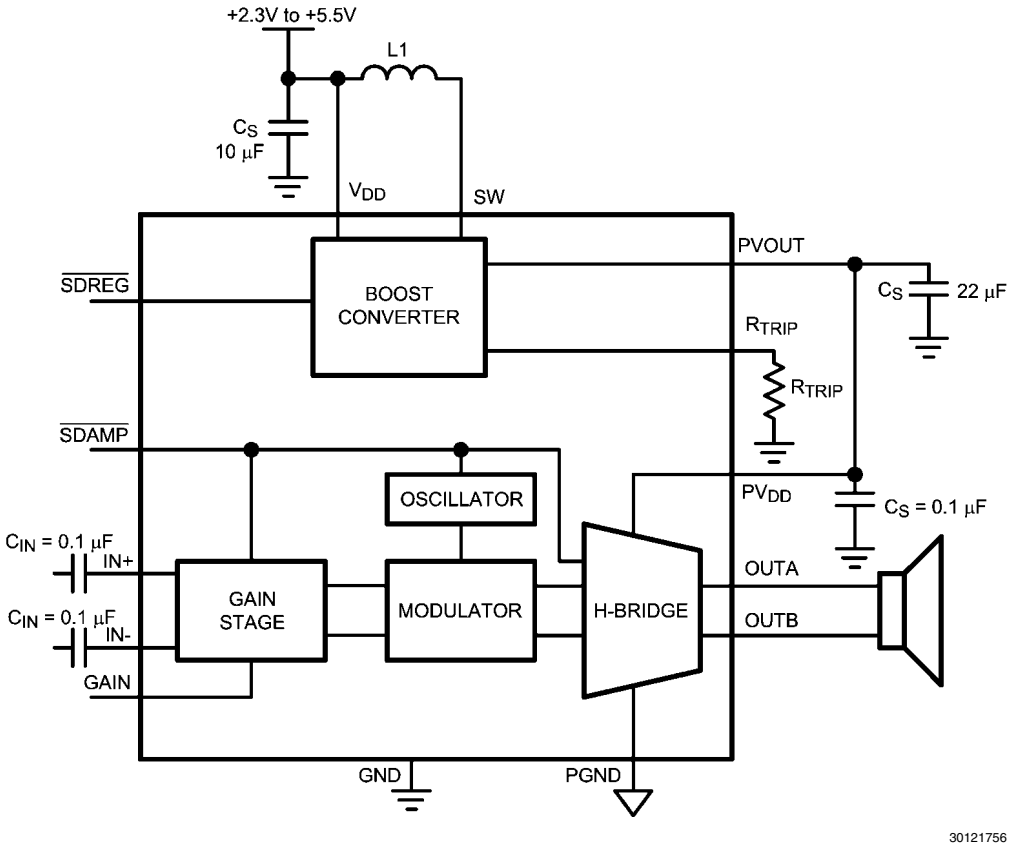
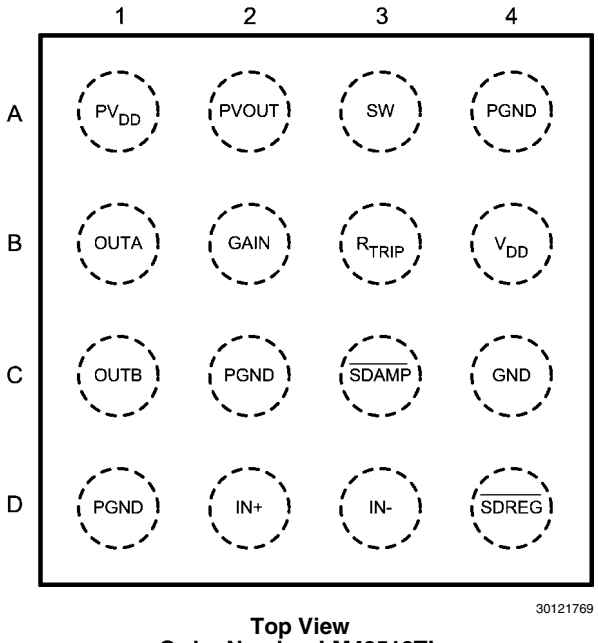


FIGURE 1. Typical Audio Amplifier Application Circuit

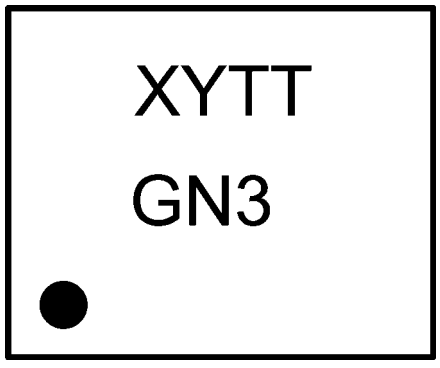
Connection Diagrams

TL Package
2.352mm x 2.403mm x 0.6mm



Top View
Order Number LM48512TL
See NS Package Number TLA16QSA

16 – Bump micro SMD Markings



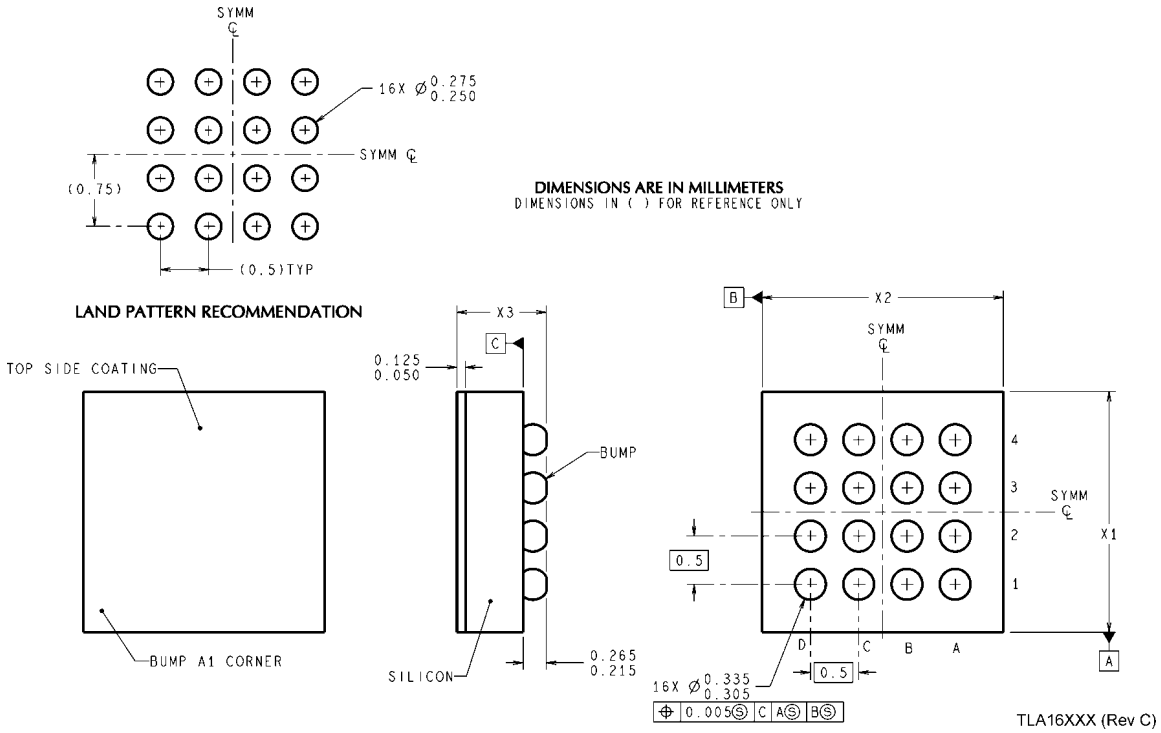
Top View
XY = Date Code
TT = Die Traceability
G = Boomer Family
N3 = LM48512TL

Pin Descriptions

TABLE 1.

PIN	NAME	DESCRIPTION
A1	PV_{DD}	Amplifier Power Supply Input. Connect to PVOUT.
A2	PVOUT	Boost Converter Output
A3	SW	Boost Converter Switching Node
A4	PGND	Boost Converter Power Ground
B1	OUTA	Non-Inverting Amplifier Output
B2	GAIN	Gain Select Input
B3	R_{TRIP}	Boost Supply Threshold Voltage Set Pin
B4	V_{DD}	Power Supply
C1	OUTB	Inverting Amplifier Output
C2, D1	PGND	Class D Power Ground
C3	$\overline{SDAMP}$	Active Low Amplifier Shutdown Input. Connect to V_{DD} for normal operation.
C4	GND	Ground
D2	IN+	Non-Inverting Amplifier Input
D3	IN-	Inverting Amplifier Input
D4	$\overline{SDREG}$	Active Low Boost Converter Shutdown Input. Connect to V_{DD} for normal operation.

Physical Dimensions inches (millimeters) unless otherwise noted



micro SMD
Order Number LM48512TL
NS Package Number TLA16QSA
X_1 = 2.352mm, X_2 = 2.403mm, X_3 = 0.6mm

Notes

Notes

For more National Semiconductor product information and proven design tools, visit the following Web sites at: www.national.com

Products		Design Support	
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LVDS	www.national.com/lvds	Packaging	www.national.com/packaging
Power Management	www.national.com/power	Green Compliance	www.national.com/quality/green
Switching Regulators	www.national.com/switchers	Distributors	www.national.com/contacts
LDOs	www.national.com/ldo	Quality and Reliability	www.national.com/quality
LED Lighting	www.national.com/led	Feedback/Support	www.national.com/feedback
Voltage References	www.national.com/vref	Design Made Easy	www.national.com/easy
PowerWise® Solutions	www.national.com/powerwise	Applications & Markets	www.national.com/solutions
Serial Digital Interface (SDI)	www.national.com/sdi	Mil/Aero	www.national.com/milaero
Temperature Sensors	www.national.com/tempsensors	SolarMagic™	www.national.com/solarmagic
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