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## TLC2252-DIE

www.ti.com

SLOS819 –JANUARY 2013

# ADVANCED LinCMOS™ RAIL-TO-RAIL VERY LOW-POWER OPERATIONAL AMPLIFIER

## FEATURES

- Output Swing Includes Both Supply Rails
- Low Noise
- Low Input Bias Current
- Fully Specified for Both Single-Supply and Split-Supply Operation
- Very Low Power
- Common-Mode Input Voltage Range Includes Negative Rail
- Low Input Offset Voltage
- Macromodel Included

## DESCRIPTION

The TLC2252 is a dual and quadruple operational amplifier from Texas Instruments. The device exhibits rail-to-rail output performance for increased dynamic range in single- or split-supply applications. The micropower operation makes it a good choice for battery-powered applications. The noise performance has been dramatically improved over previous generations of CMOS amplifiers.

The TLC2252 amplifier, exhibiting high input impedance and low noise, is excellent for small-signal conditioning for high-impedance sources, such as piezoelectric transducers. Because of the micropower dissipation levels, this device works well in hand-held monitoring and remote-sensing applications. In addition, the rail-to-rail output feature with single or split supplies makes this device a great choice when interfacing with analog-to-digital converters (ADCs).

## ORDERING INFORMATION<sup>(1)</sup>

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
TLC2252	TD	Bare die in waffle pack <sup>(2)</sup>	TLC2252TDA1	400
			TLC2252TDA2	10

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at [www.ti.com](http://www.ti.com).

(2) Processing is per the Texas Instruments commercial production baseline and is in compliance with the Texas Instruments Quality Control System in effect at the time of manufacture. Electrical screening consists of DC parametric and functional testing at room temperature only. Unless otherwise specified by Texas Instruments AC performance and performance over temperature is not warranted. Visual Inspection is performed in accordance with MIL-STD-883 Test Method 2010 Condition B at 75X minimum.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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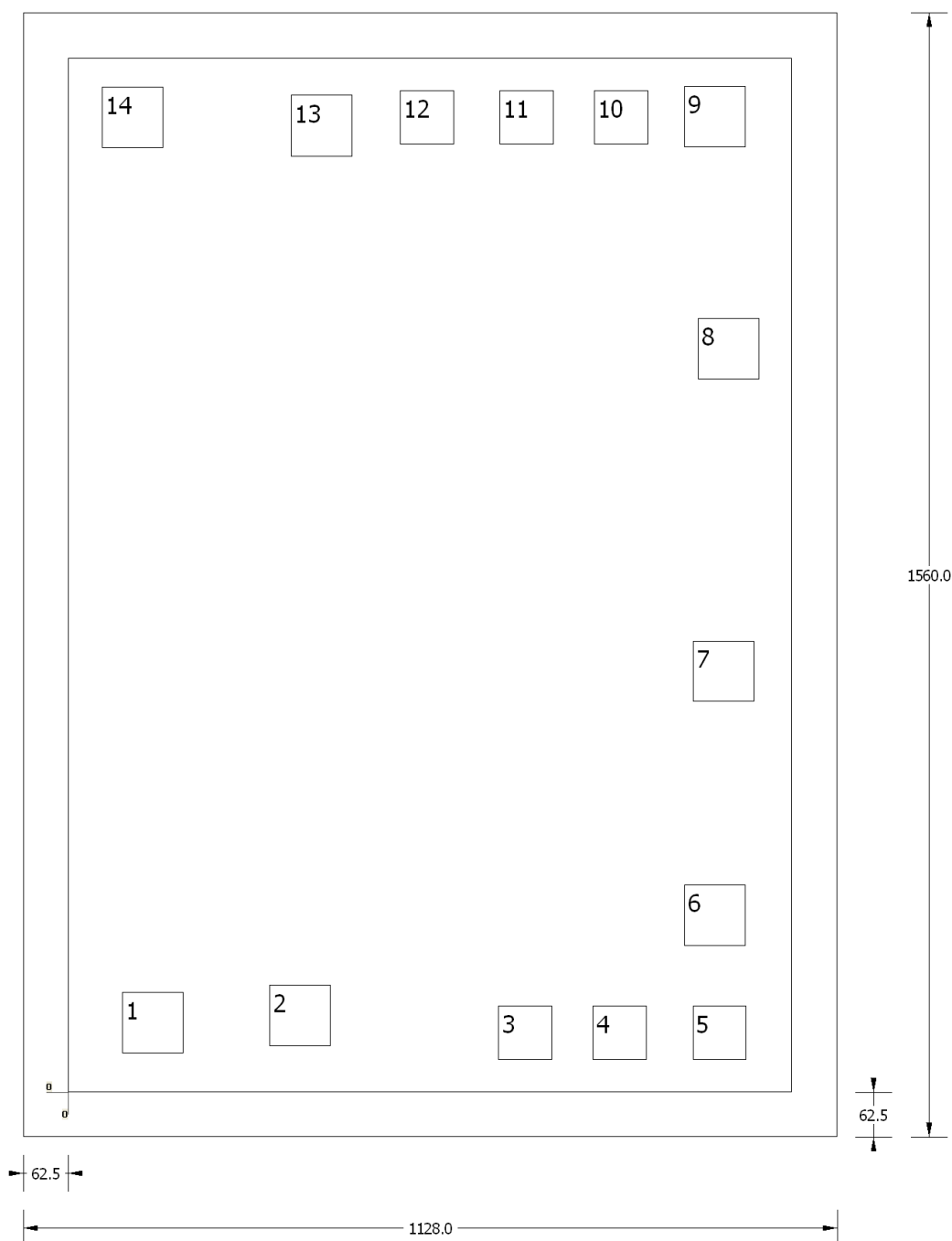


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
10.5 mils.	Silicon with backgrind	Floating	AlCuTiW	1540 nm



**Table 1. Bond Pad Coordinates in Microns**

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
1OUT	1	74.65	54	159.65	139
1IN–	2	278.7	63.95	363.7	148.95
N/C	3	596.15	45	671.15	120
N/C	4	727.35	45	802.35	120
N/C	5	865.5	45	940.5	120
1IN+	6	854.05	203	939.05	288
VDD–/GND	7	865.75	541.5	950.75	626.5
2IN+	8	873	988.7	958	1073.7
2IN–	9	854.05	1311	939.05	1396
N/C	10	729.45	1315	804.45	1390
N/C	11	598.25	1315	673.25	1390
N/C	12	460.1	1315	535.1	1390
2OUT	13	308.7	1298.5	393.7	1383.5
VDD+	14	46.8	1309.8	131.8	1394.8



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLC2252TDA1	ACTIVE			0	221	TBD	Call TI	N / A for Pkg Type	0 to 0		Samples
TLC2252TDA2	ACTIVE			0	10	TBD	Call TI	N / A for Pkg Type	0 to 0		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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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Datasheet of TLC2252TDA1 - IC OPAMP GP RRO DIE

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**PACKAGE OPTION ADDENDUM**

18-Mar-2015

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In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

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