

# WIDEBAND, LOW NOISE, LOW DISTORTION FULLY DIFFERENTIAL AMPLIFIER WITH RAIL-TO-RAIL OUTPUTS

 Check for Samples: [THS4520-DIE](#)

## FEATURES

- Fully Differential Architecture With Rail-to-Rail Outputs
- Centered Input Common-mode Range
- Power-Down Capability

## APPLICATIONS

- Data Acquisition Systems
- High Linearity ADC Amplifier
- Wireless Communication
- Test and Measurement
- Voice Processing Systems

## DESCRIPTION

The THS4520-DIE is a wideband, fully differential operational amplifier designed for data acquisition systems. It has very low noise and low harmonic distortion. The slew rate is ideal for data acquisition applications. It is designed for unity gain stability.

To allow for DC coupling to ADCs, its unique output common-mode control circuit maintains the output common-mode voltage from the set voltage. The common-mode set point defaults to mid-supply by internal circuitry, which may be over-driven from an external source.

The input and output are optimized for best performance with their common-mode voltages set to mid-supply.

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

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
THS4520	TD	Bare die in waffle pack <sup>(2)</sup>	THS4520TDA1	100
			THS4520TDA2	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.

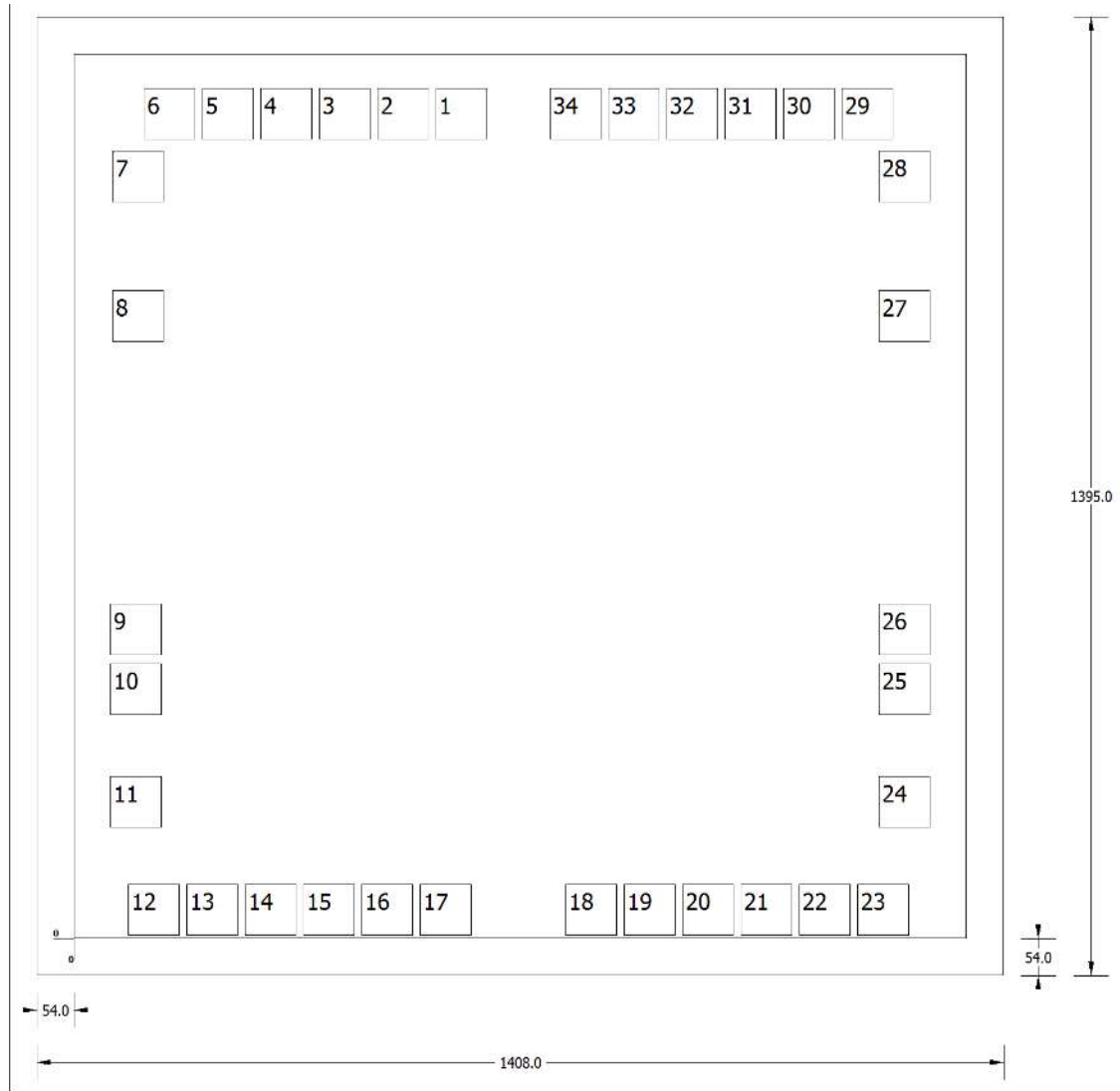


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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	AL5TiN	675 nm



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

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
VS-	1	526.6	1161.95	601.6	1236.95
VS-	2	441.6	1161.95	516.6	1236.95
VS-	3	356.6	1161.95	431.6	1236.95
VS-	4	271.6	1161.95	346.6	1236.95
VS-	5	186.6	1161.95	261.6	1236.95
VS-	6	101.6	1161.95	176.6	1236.95
N/C	7	55.75	1071.35	130.75	1146.35
VIN-	8	55.75	868.45	130.75	943.45
VOUT+	9	53.25	411.55	128.25	486.55
VOUT+	10	53.25	324.55	128.25	399.55
CM	11	53.25	161.05	128.25	236.05
VS+	12	78.65	4.45	153.65	79.45
VS+	13	163.65	4.45	238.65	79.45
VS+	14	248.65	4.45	323.65	79.45
VS+	15	333.65	4.45	408.65	79.45
VS+	16	418.65	4.45	493.65	79.45
VS+	17	503.65	4.45	578.65	79.45
VS+	18	715.85	4.45	790.85	79.45
VS+	19	800.85	4.45	875.85	79.45
VS+	20	885.85	4.45	960.85	79.45
VS+	21	970.85	4.45	1045.85	79.45
VS+	22	1055.85	4.45	1130.85	79.45
VS+	23	1140.85	4.45	1215.85	79.45
CM	24	1171.75	161.05	1246.75	236.05
VOUT-	25	1171.75	324.55	1246.75	399.55
VOUT-	26	1171.75	411.55	1246.75	486.55
VIN+	27	1171.75	868.45	1246.75	943.45
PD	28	1171.75	1071.35	1246.75	1146.35
VS-	29	1117.85	1161.95	1192.85	1236.95
VS-	30	1032.85	1161.95	1107.85	1236.95
VS-	31	947.85	1161.95	1022.85	1236.95
VS-	32	862.85	1161.95	937.85	1236.95
VS-	33	777.85	1161.95	852.85	1236.95
VS-	34	692.85	1161.95	767.85	1236.95

**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
THS4520TDA1	ACTIVE			0	100	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		<b>Samples</b>
THS4520TDA2	ACTIVE			0	10	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		<b>Samples</b>

(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".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**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.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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.



## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale (<https://www.ti.com/legal/termsofsale.html>) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2021, Texas Instruments Incorporated