



## LT1013-DIE Dual Precision Operational Amplifier

### 1 Features

- Single-Supply Operation
  - Input Voltage Range Extends to Ground
  - Output Swings to Ground While Sinking Current
- Low Supply Current
- Low Peak-to-Peak Noise Voltage
- Low Current Noise

### 2 Applications

- Battery-Powered Precision Instrumentation
- Instrumentation Amplifiers
- Thermocouple Amplifiers
- Multiple-Limit Threshold Detection
- Active Filters
- Multiple Gain Blocks

### 3 Description

The LT1013-DIE is a dual precision operational amplifier, featuring high gain, low supply current, low noise, and low-offset-voltage temperature coefficient.

#### Device Information<sup>(1)</sup>

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
LT1013	TD	Bare die in waffle pack <sup>(2)</sup>	LT1013TDJ1	100
			LT1013TDJ2	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.



# LT1013-DIE

SLOS881 –JULY 2014

[www.ti.com](http://www.ti.com)

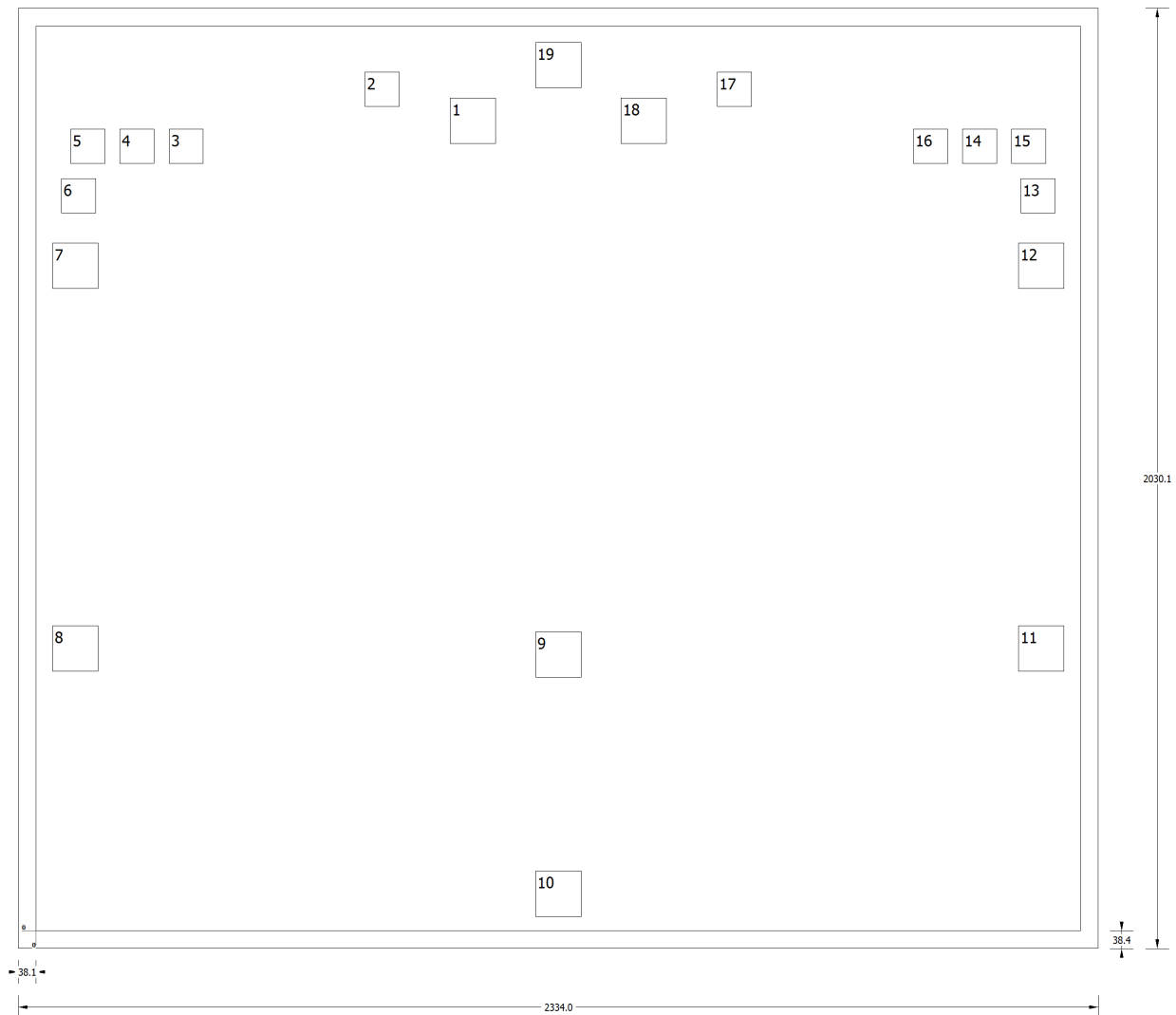


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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.

## 4 Bare Die Information

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
15 mils	Silicon with backgrind	Floating	TiW/AlCu2%	1627 nm



### Bond Pad Coordinates in Microns

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
1OUT	1	895.35	1699.26	994.41	1798.32
N/C	2	711.2	1779.27	786.13	1854.2
N/C	3	287.528	1655.826	362.458	1730.756
N/C	4	181.356	1655.826	256.286	1730.756
N/C	5	75.184	1655.826	150.114	1730.756
N/C	6	55.118	1548.892	130.048	1623.822
1IN–	7	35.56	1385.57	134.62	1484.63
1IN+	8	35.56	560.07	134.62	659.13
N/C	9	1079.5	547.37	1178.56	646.43
V <sub>CC</sub> –	10	1079.5	30.48	1178.56	129.54
2IN+	11	2123.44	560.07	2222.5	659.13
2IN–	12	2123.44	1385.57	2222.5	1484.63
N/C	13	2128.012	1548.892	2202.942	1623.822
N/C	14	2001.774	1655.826	2076.704	1730.756
N/C	15	2107.946	1655.826	2182.876	1730.756
N/C	16	1895.602	1655.826	1970.532	1730.756
N/C	17	1471.93	1779.27	1546.86	1854.2
2OUT	18	1263.65	1699.26	1362.71	1798.32
V <sub>CC</sub> +	19	1079.5	1818.64	1178.56	1917.7

## 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
LT1013TDJ1	LIFEBUY			8	100	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		
LT1013TDJ2	LIFEBUY			0	10	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		

(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.

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