



## OPA846-DIE Wideband, Low-Noise, Voltage-Feedback Operational Amplifier

### 1 Features

- High Bandwidth
- Low-Input Voltage Noise
- Very Low Distortion
- High-Slew Rate
- High DC Accuracy
- Low-Supply Current
- High-Gain Bandwidth Product

### 2 Applications

- High-Dynamic Range ADC Preamps
- Low-Noise, Wideband, Transimpedance Amplifiers
- Wideband, High-Gain Amplifiers
- Low-Noise Differential Receivers
- VDSL Line Receivers
- Ultrasound Channel Amplifiers
- Security Sensor Front Ends

### 3 Description

The OPA846-DIE combines very-high-gain bandwidth and large signal performance with very-low-input voltage noise, while dissipating a low-supply current. The classical differential input stage, along with two stages of forward gain and a high-power output stage, combine to make the OPA846-DIE an exceptionally low-distortion amplifier with excellent DC accuracy and output drive. The voltage-feedback architecture allows all standard op amp applications to be implemented with very high performance.

The combination of low-input voltage and current noise, along with gain bandwidth, make the OPA846 an ideal amplifier for wideband transimpedance stages.

A new external compensation technique can be used to give a very flat frequency response below the minimum stable gain for the OPA846-DIE, further improving its already exceptional distortion performance.

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

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
OPA846	TD	Bare die in waffle pack <sup>(2)</sup>	OPA846TDB1	300
			OPA846TDB2	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.

### 4 Revision History

#### Changes from Original (December 2013) to Revision A

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- |  |   |
|--|---|
| • Added designator to diagram in <i>Bare Die Information</i> section .....                             | 2 |
| • Added note after diagram in <i>Bare Die Information</i> section regarding added designator .....     | 2 |
| • Changed description for pad number 5 and 6 in the <i>Bond Pad Coordinates in Microns</i> table ..... | 2 |



## OPA846-DIE

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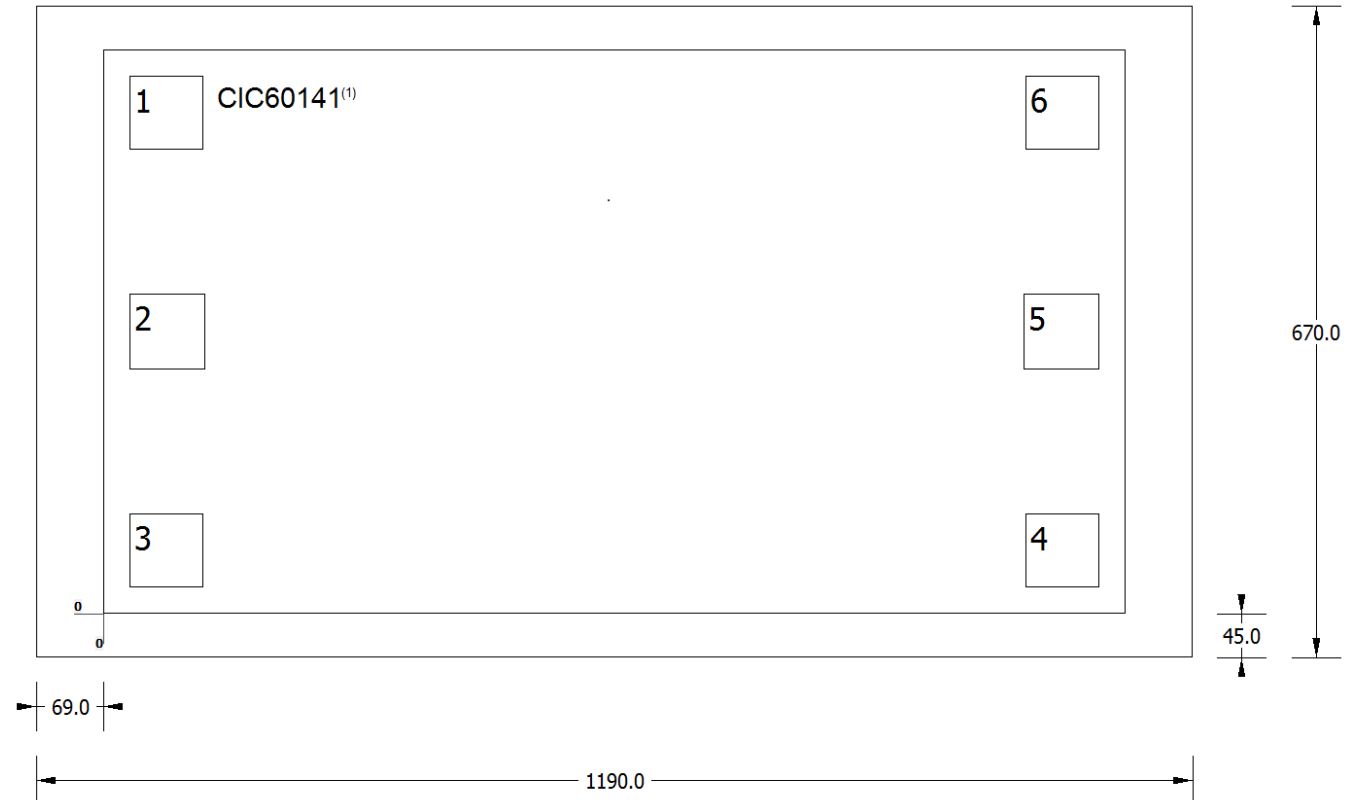


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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.

## 5 Bare Die Information

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
10.5 mils.	Silicon with backgrind	Floating	Ti/Alcu (0.5%)/TiW	1010 nm



(1) Designator "CIC60140" may appear on die.

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

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
N/C	1	27	477	103	553
Inverting Input	2	27	251	105	329
Noninverting Input	3	27	27	103	103
Output	4	949	27	1025	103
–Vs	5	947	251	1025	329
+Vs	6	949	477	1025	553

## 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
OPA846TDB1	LIFEBUY			0	300	RoHS & Green	Call TI	N / A for Pkg Type	25 to 25		
OPA846TDB2	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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