

# AMC60304 4-Channel Optical Monitor and Controller With High-Current Output DACs and Multichannel ADC

## 1 Features

- Four 12-bit current output DACs (IDACs)
  - 200-mA full-scale output range
- Multichannel, 12-bit, 1-MSPS SAR ADC
  - Four external inputs: 2.5-V and 5-V input ranges
  - Four IDAC voltage monitor channels
  - Programmable sequencer
  - Programmable out-of-range alarms
- Internal 2.5-V reference
- Supply and temperature fault alarms
- SPI and I<sup>2</sup>C interfaces: 1.7-V to 3.6-V operation
  - SPI: 4-wire interface
  - I<sup>2</sup>C: Four target addresses
- Specified temperature range: –40°C to +125°C

## 2 Applications

- [Optical module](#)
- [Intra-dc interconnect \(metro\)](#)

## 3 Description

The AMC60304 is a highly integrated, low-power analog monitor and controller optimized for high-current outputs. The device includes four 12-bit current output digital-to-analog converters (IDACs), a 12-bit, 1-MSPS analog-to-digital converter (ADC),

supply and temperature alarm monitors, and a high-precision internal reference.

The AMC60304 IDACs support a full-scale output range of 200 mA with very-low power dissipation. These IDACs eliminate the need for external components to provide an accurate current bias.

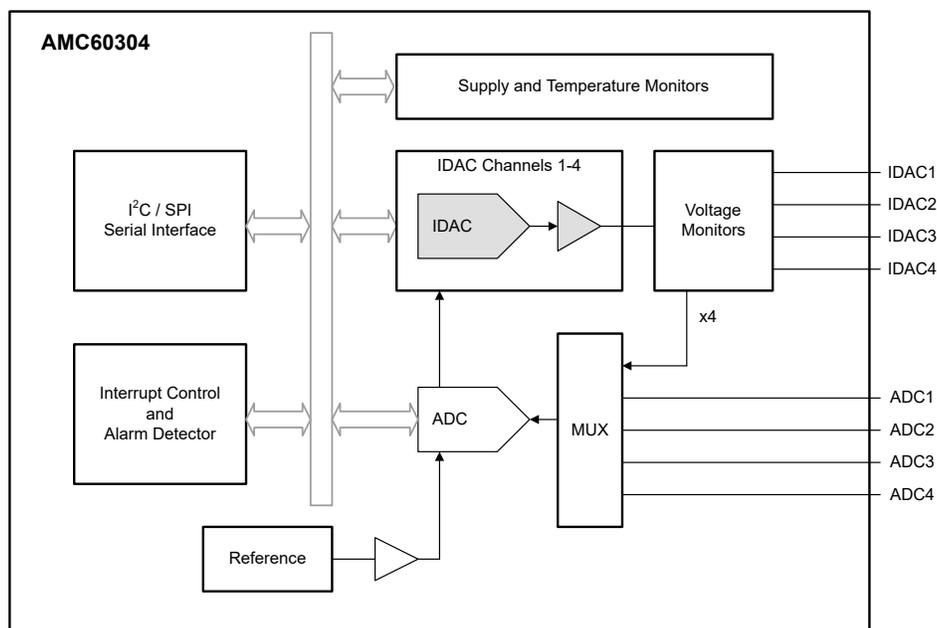
The AMC60304 also includes four input pins that are multiplexed to the ADC and incorporate a low-latency window comparator. These features make this device an excellent choice for received signal strength indicator (RSSI) and loss-of-signal (LOS) detection. The ADC is also capable of measuring the voltage at the IDAC pins, thus enabling these outputs to be monitored.

The AMC60304 low power, high integration, very small size, and wide operating temperature range make this device an excellent choice as an all-in-one control circuit for optical modules.

### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	BODY SIZE (NOM)
AMC60304	DSBGA (36)	2.56 mm × 2.56 mm

(1) For all available packages, see the package option addendum at the end of the data sheet.



**Simplified Schematic**



## 4 Device and Documentation Support

### 4.1 Documentation Support

---

#### Note

TI is transitioning to use more inclusive terminology. Some language may be different than what you would expect to see for certain technology areas.

---

#### 4.1.1 Related Documentation

For related documentation, see the following: [AMC60304EVM user's guide](#)

### 4.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](#). Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 4.3 Support Resources

TI E2E™ [support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

### 4.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

### 4.5 Electrostatic Discharge Caution



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.

### 4.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">AMC60304YBHR</a>	Active	Production	DSBGA (YBH)   36	3000   LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC60304
AMC60304YBHR.A	Active	Production	DSBGA (YBH)   36	3000   LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC60304
<a href="#">AMC60304YBHT</a>	Active	Production	DSBGA (YBH)   36	250   SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC60304
AMC60304YBHT.A	Active	Production	DSBGA (YBH)   36	250   SMALL T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC60304

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

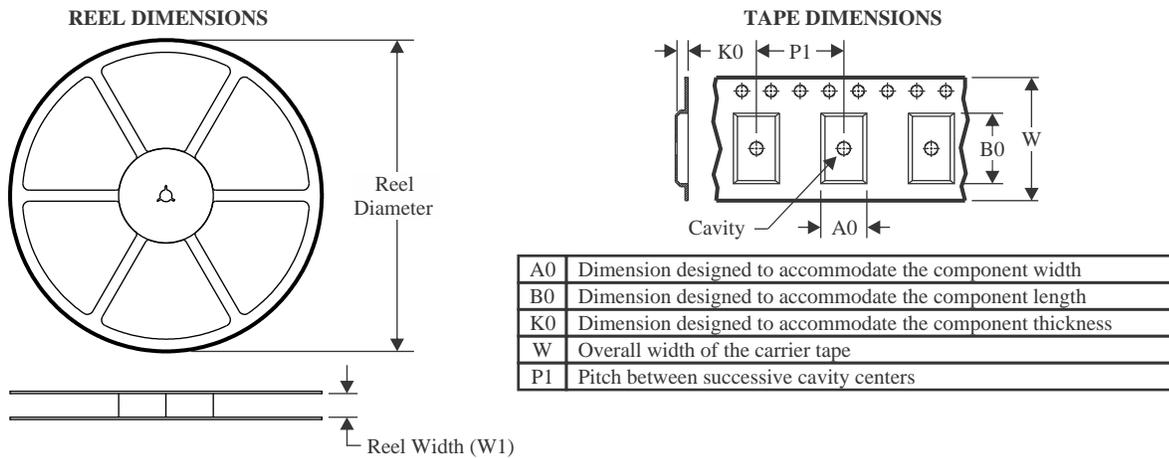
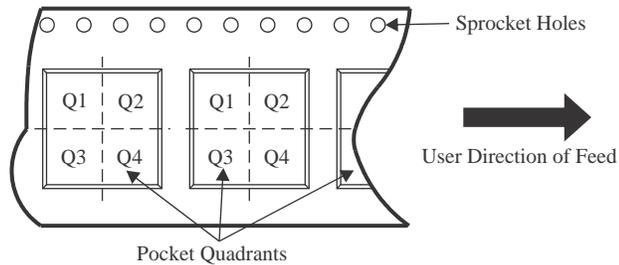
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

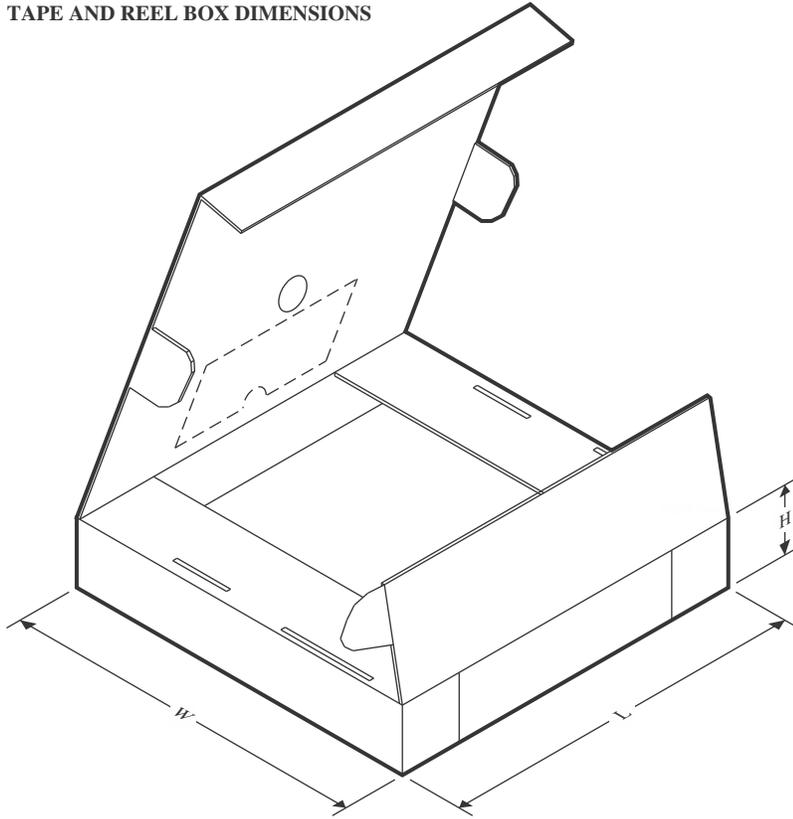
**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. 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.

**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

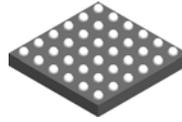
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
AMC60304YBHR	DSBGA	YBH	36	3000	180.0	8.4	2.71	2.71	0.6	4.0	8.0	Q1
AMC60304YBHT	DSBGA	YBH	36	250	180.0	8.4	2.71	2.71	0.6	4.0	8.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
AMC60304YBHR	DSBGA	YBH	36	3000	182.0	182.0	20.0
AMC60304YBHT	DSBGA	YBH	36	250	182.0	182.0	20.0

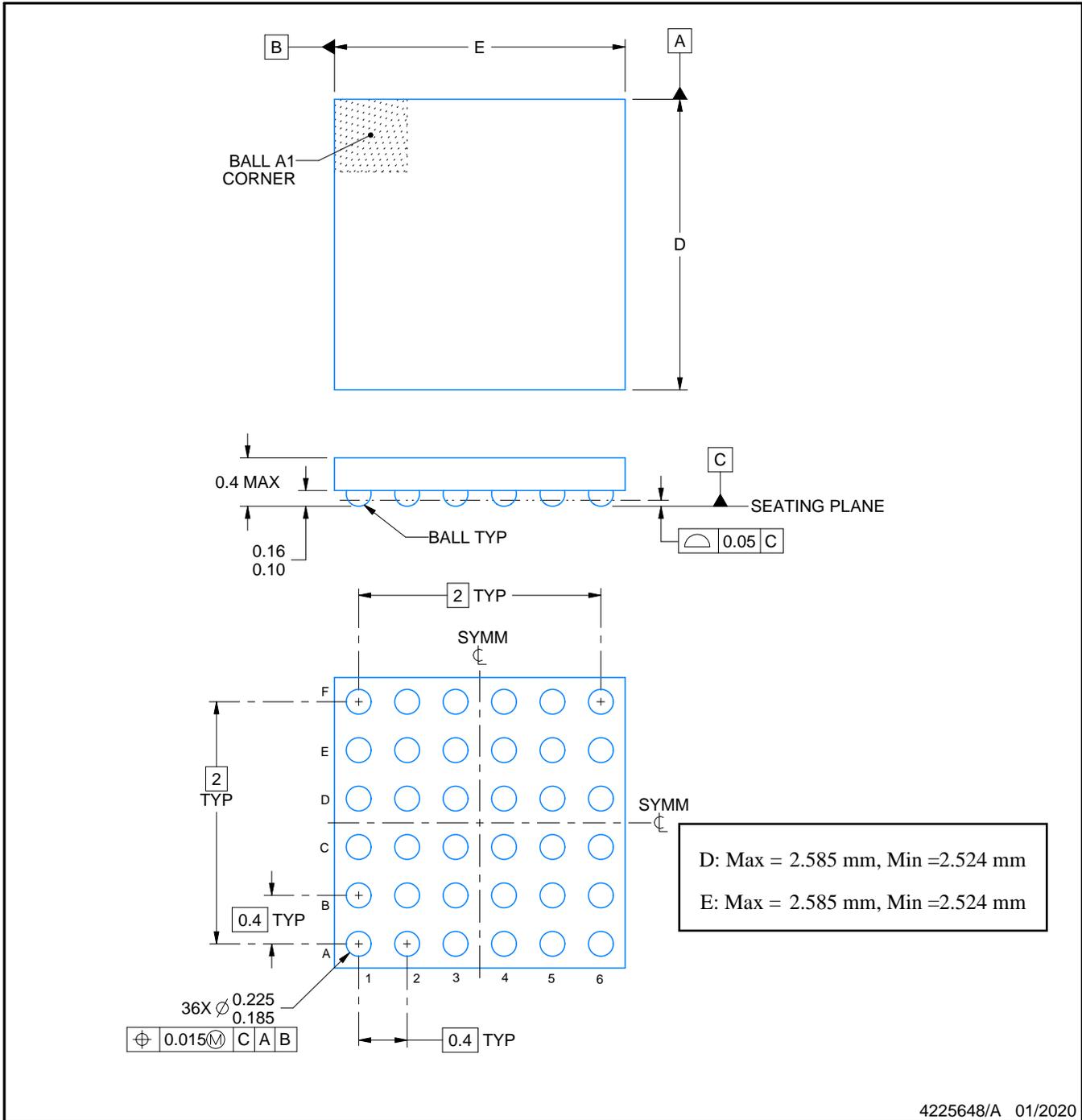
YBH0036



# PACKAGE OUTLINE

## DSBGA - 0.4 mm max height

DIE SIZE BALL GRID ARRAY



NOTES:

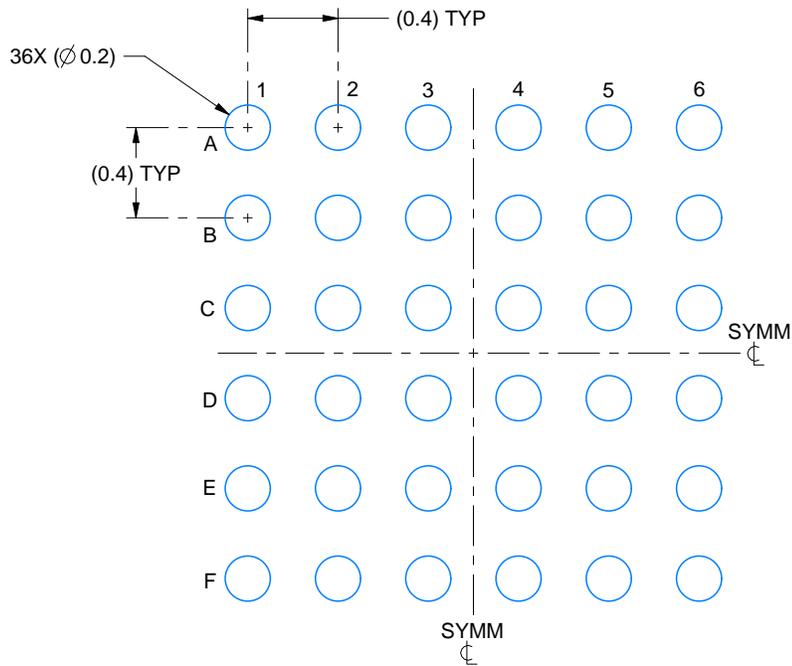
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# EXAMPLE BOARD LAYOUT

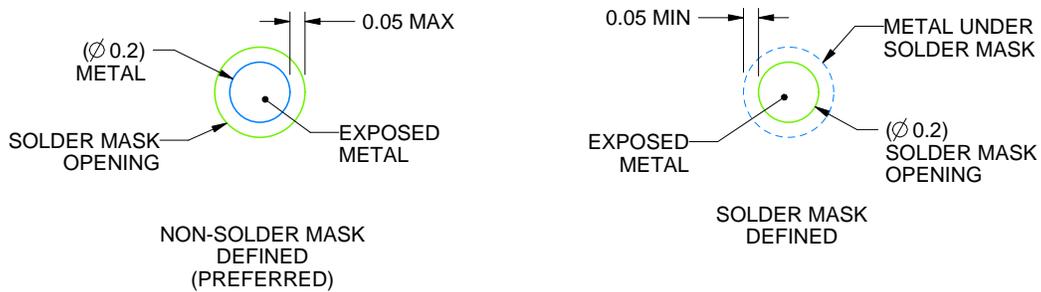
YBH0036

DSBGA - 0.4 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 30X



SOLDER MASK DETAILS  
NOT TO SCALE

4225648/A 01/2020

NOTES: (continued)

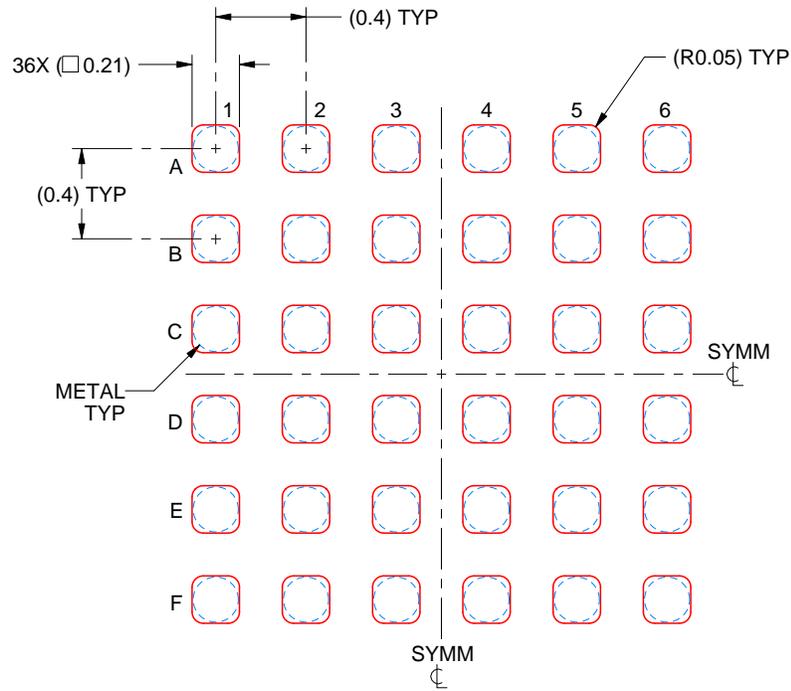
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. See Texas Instruments Literature No. SNVA009 ([www.ti.com/lit/snva009](http://www.ti.com/lit/snva009)).

# EXAMPLE STENCIL DESIGN

YBH0036

DSBGA - 0.4 mm max height

DIE SIZE BALL GRID ARRAY



SOLDER PASTE EXAMPLE  
BASED ON 0.075 mm THICK STENCIL  
SCALE: 30X

4225648/A 01/2020

NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), 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, regulatory 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](#) 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.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265

Copyright © 2025, Texas Instruments Incorporated