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
- Suppy and temperature fault alarms
- SPI and I^2C interfaces: 1.7-V to 3.6-V operation
  - SPI: 4-wire interface
  - I^2C: 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.

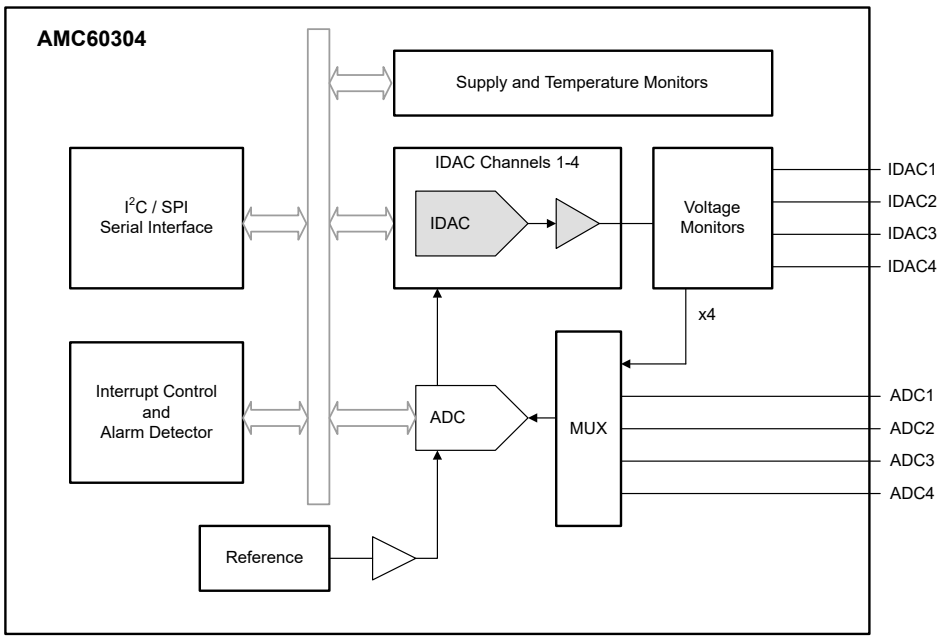
The AMC60304 also includes four input pins that are multiplexed to the ADC and incorporate a low-latency window comparator. These features make this device an excellent choice for received signal strength indicator (RSSI) and loss-of-signal (LOS) detection. The ADC is also capable of measuring the voltage 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(1)	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)
AMC60304YBHR	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
AMC60304YBHT	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.

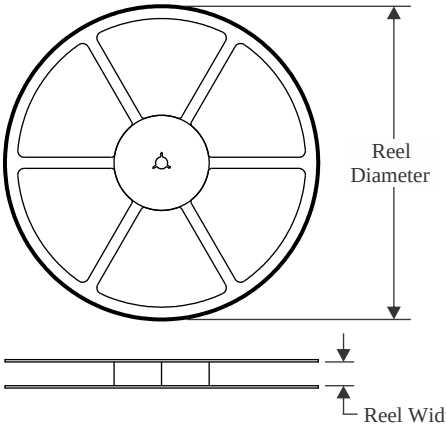
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will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

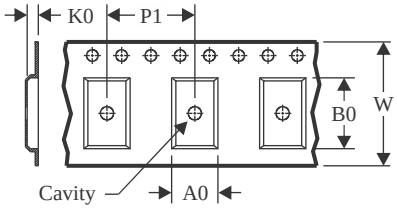
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

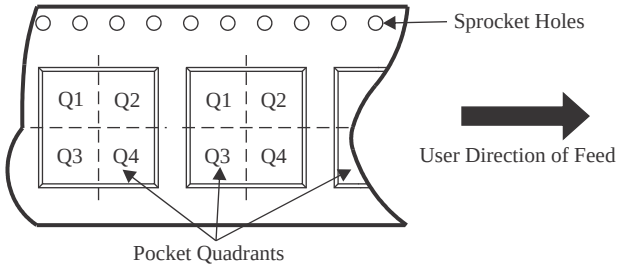


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



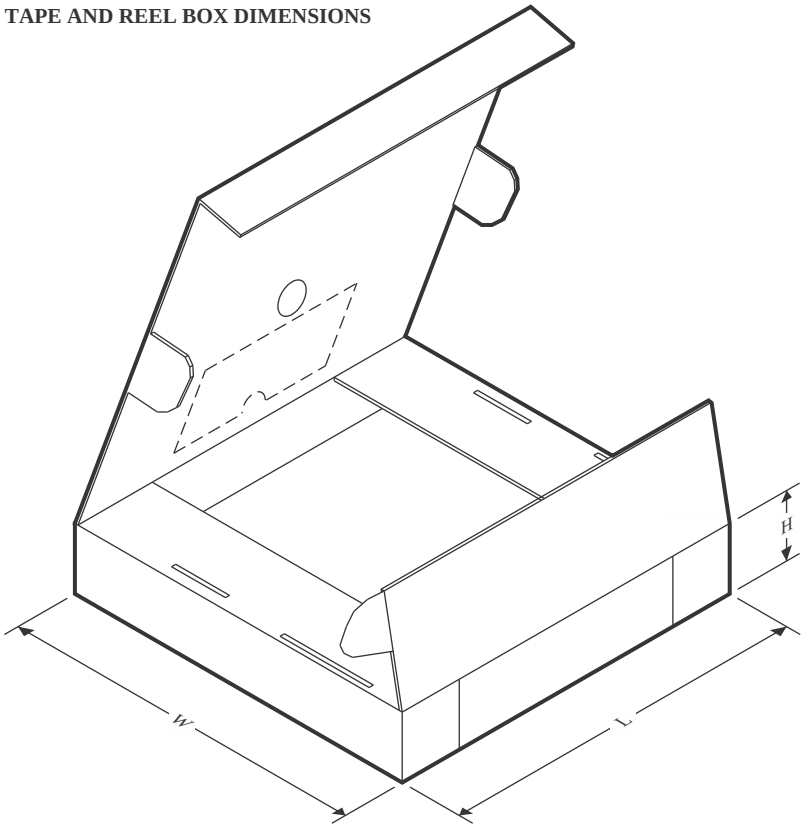
*All dimensions are nominal

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

PACKAGE MATERIALS INFORMATION

7-Feb-2025

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

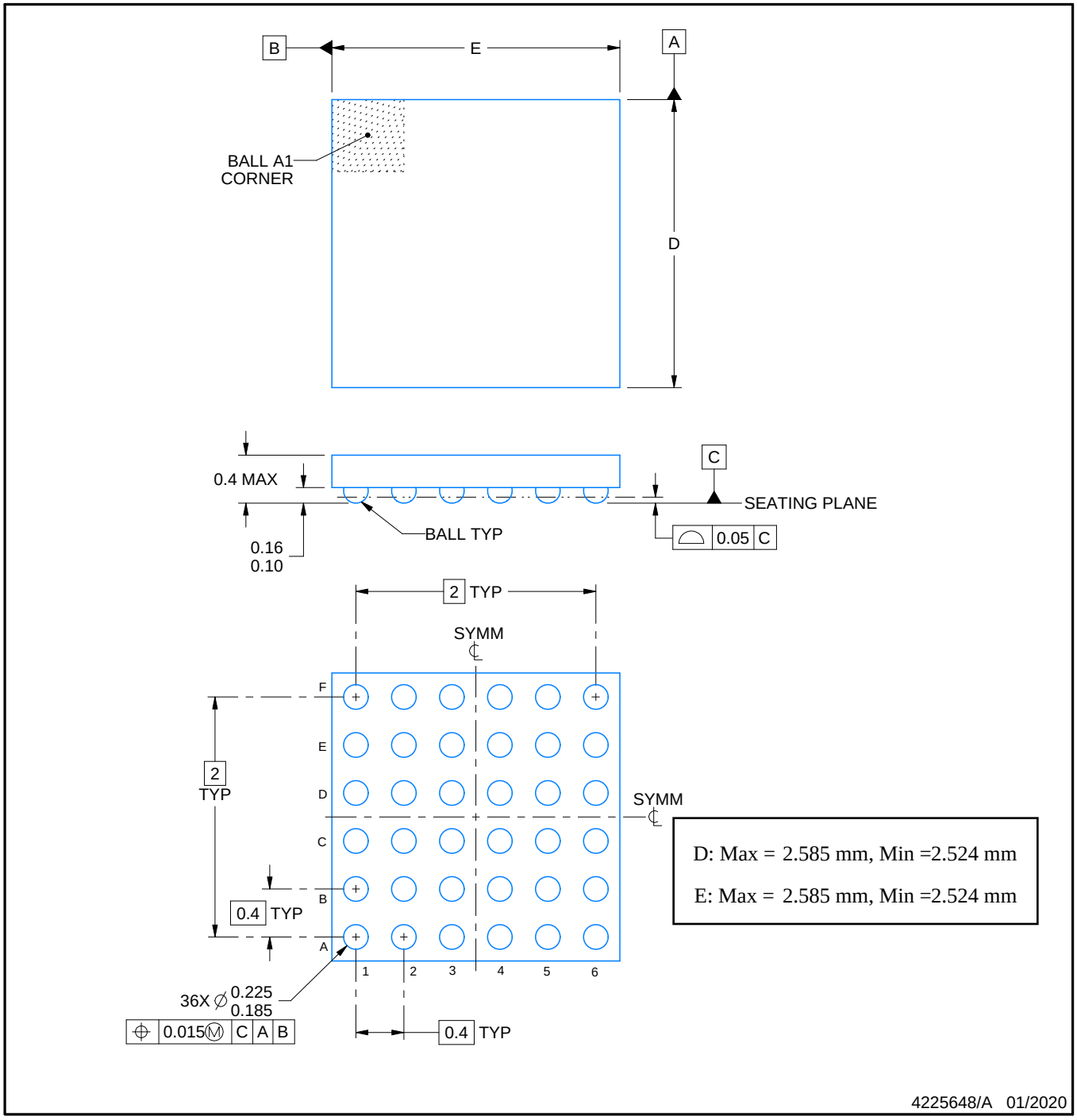
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
AMC60304YBHR	DSBGA	YBH	36	3000	182.0	182.0	20.0
AMC60304YBHT	DSBGA	YBH	36	250	182.0	182.0	20.0

YBH0036

PACKAGE OUTLINE

DSBGA - 0.4 mm max height

DIE SIZE BALL GRID ARRAY



NOTES:

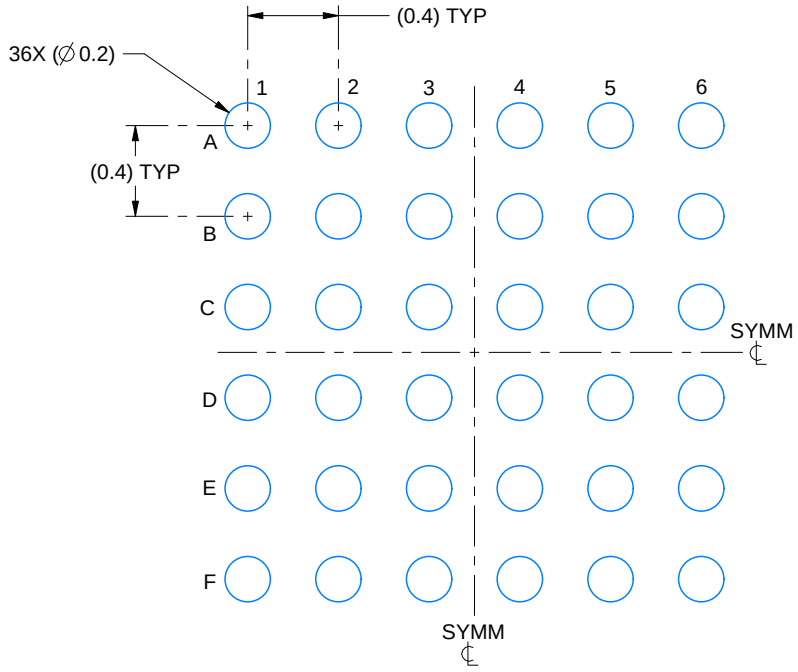
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

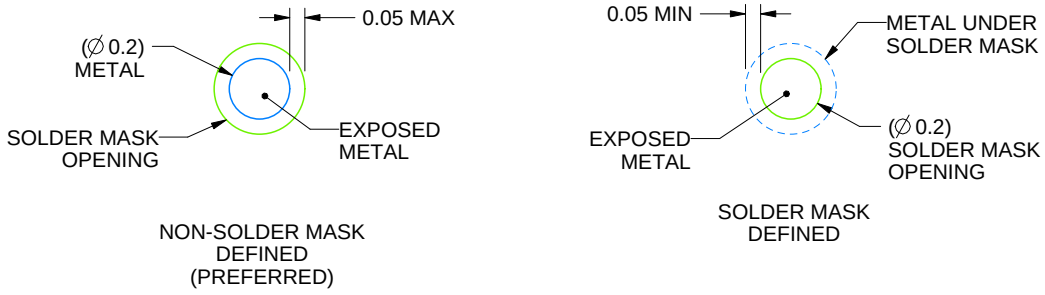
YBH0036

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

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NOTES: (continued)

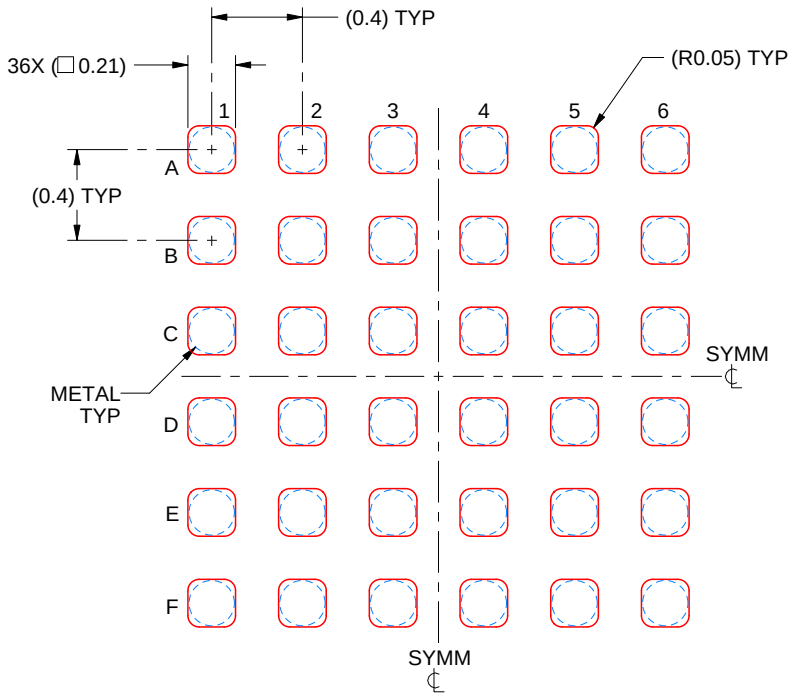
3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints.
   See Texas Instruments Literature No. SNVA009 (www.ti.com/lit/snva009).

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

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NOTES: (continued)

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