

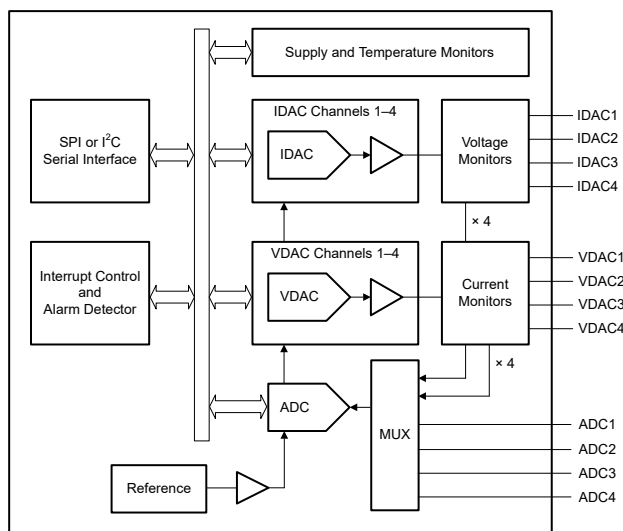
AMC6V704 4-Channel Optical Monitor and Controller With Current and Voltage Output DACs and Multichannel ADC

1 Features

- Four 12-bit current output DACs (IDACs)
 - 200mA full-scale output range
 - Low supply headroom: 300mV at 200mA
- Four 12-bit voltage output DACs (VDACs)
 - Selectable full-scale output ranges: –5V, –2.5V, +2.5V and +5V
 - High-current drive capability: ± 50 mA
- Multichannel, 12-bit, 1MSPS SAR ADC
 - Four external inputs: 2.5V and 5V ranges
 - Four IDAC voltage monitor channels
 - Four VDAC current monitor channels
 - Programmable sequencer
 - Programmable out-of-range alarms
- Internal 2.5V reference
- Supply and temperature fault alarms
- SPI and I²C interfaces: 1.7V to 3.6V operation
 - SPI: 4-wire interface
 - I²C: Four target addresses
- Specified temperature range: –40°C to +125°C

2 Applications

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



Simplified Schematic

3 Description

The AMC6V704 is a highly integrated, low-power analog monitor and controller for optical-transceiver applications.

The AMC6V704 includes four, 12-bit current-output digital-to-analog converters (IDACs) and four, 12-bit voltage-output DACs (VDACs) with programmable output ranges. The device also includes a 12-bit, 1MSPS analog-to-digital converter (ADC) used for external and internal signal monitoring, supply and temperature alarm monitors, and a high-precision internal reference.

The AMC6V704 VDACs support both positive and negative output-range operation and are capable of sourcing and sinking up to 50mA, making them an excellent choice for biasing optical modulators. Additionally, the AMC6V704 IDACs support a full-scale output range of 200mA with very-low power dissipation. The IDACs eliminate the need for external components to bias laser diodes. In combination, the AMC6V704 four VDACs and four IDACs enable accurate biasing of electro-absorption modulated lasers.

The AMC6V704 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, as well as the current sourced or sunk by the VDACs, thus enabling these outputs to be monitored.

The AMC6V704 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.

Package Information

PART NUMBER	PACKAGE ⁽¹⁾	PACKAGE SIZE ⁽²⁾
AMC6V704	YBH (DSBGA, 36)	2.555mm × 2.555mm

(1) For more information, see [Section 6](#).

(2) The package size (length × width) is a nominal value and includes pins, where applicable.



4 Device and Documentation Support

4.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* 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.

4.2 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.

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4.3 Trademarks

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4.4 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.

4.5 Glossary

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

5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
August 2024	*	Initial Release

6 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)
AMC6V704YBHR	Active	Production	DSBGA (YBH) 36	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC6V704
AMC6V704YBHR.A	Active	Production	DSBGA (YBH) 36	3000 LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 125	AMC6V704

⁽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.

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TAPE AND REEL INFORMATION



*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
AMC6V704YBHR	DSBGA	YBH	36	3000	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)
AMC6V704YBHR	DSBGA	YBH	36	3000	182.0	182.0	20.0

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

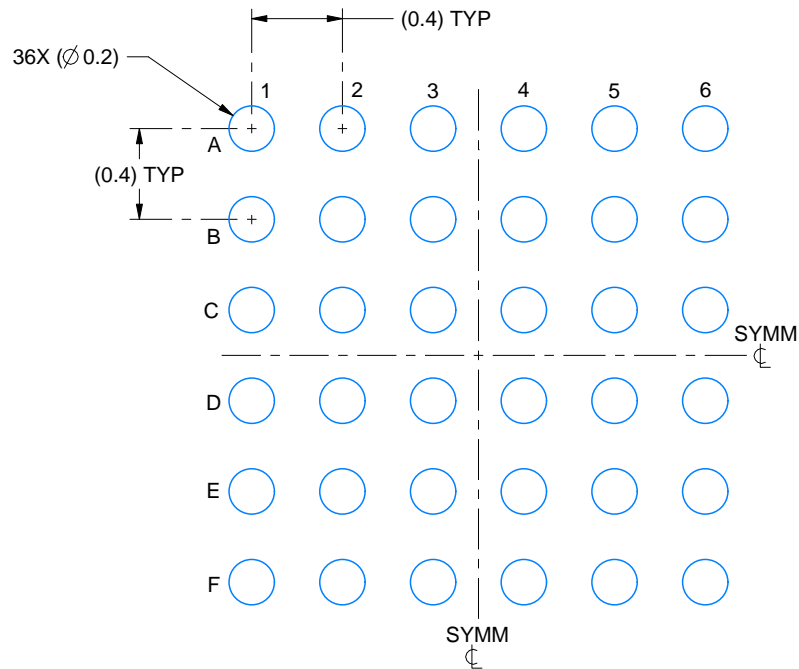
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

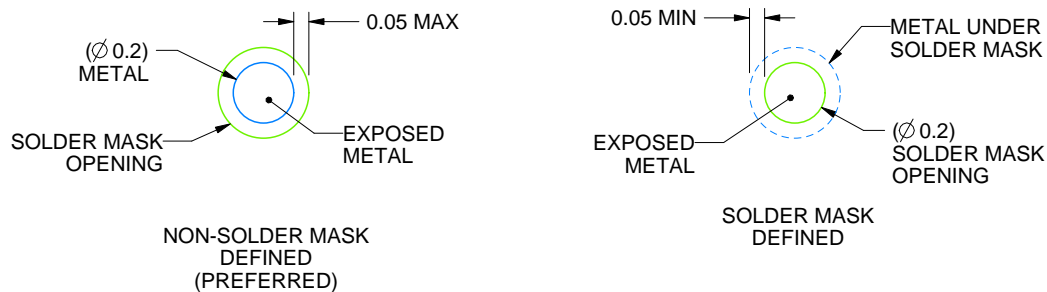
YBH0036

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)

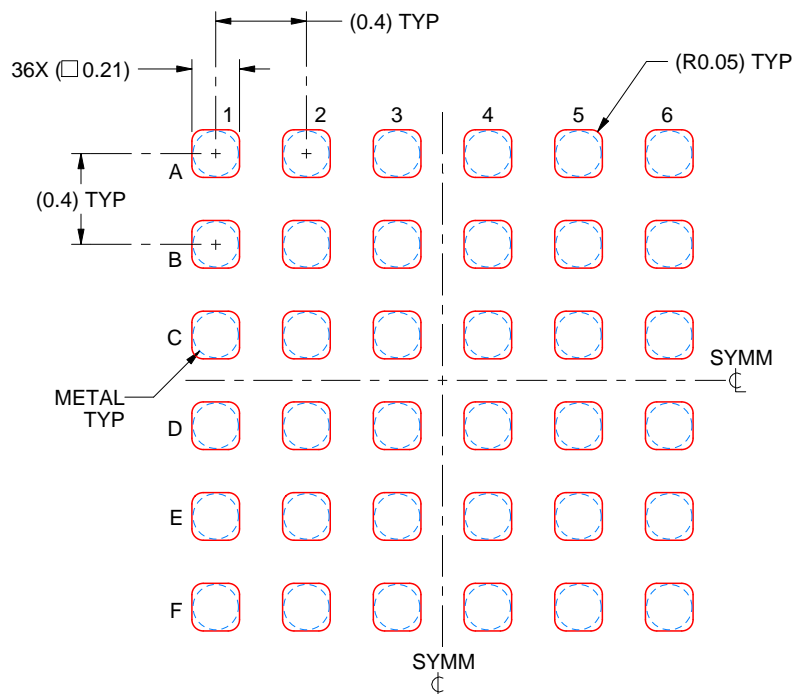
3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints.
See Texas Instruments Literature No. SNVA009 (www.ti.com/lit/snva009).

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.

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