

# AMC60704 4-Channel Optical Monitor and Controller

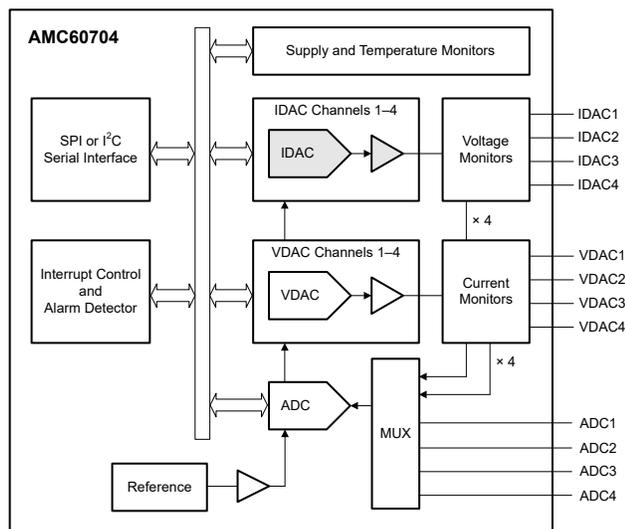
## With Current and Voltage Output DACs and Multichannel ADC

### 1 Features

- Four 12-bit current output DACs (IDACs)
  - 200-mA full-scale output range
  - Low supply headroom: 300 mV at 200 mA
- Four 12-bit voltage output DACs (VDACs)
  - Selectable full-scale output ranges: –5 V, –2.5 V, +2.5 V and +5 V
  - High-current drive capability:  $\pm 50$  mA
- Multichannel, 12-bit, 1-MSPS SAR ADC
  - Four external inputs: 2.5-V and 5-V ranges
  - Four IDAC voltage monitor channels
  - Four VDAC current 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 \(metro\)](#)



**Simplified Schematic**

### 3 Description

The AMC60704 is a highly integrated, low-power analog monitor and controller optimized for electro-absorption modulated laser (EML) applications.

The AMC60704 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, 1-MSPS analog-to-digital converter (ADC) used for external and internal signal monitoring, supply and temperature alarm monitors, and a high-precision internal reference.

The AMC60704 VDACS support both positive and negative output-range operation and are capable of sourcing and sinking up to 50 mA, making them an excellent choice for biasing optical modulators. Additionally, the AMC60704 IDACs support a full-scale output range of 200 mA with very-low power dissipation. The IDACs eliminate the need for external components to bias laser diodes. In combination, the AMC60704 four VDACS and four IDACs enable accurate biasing of up to four EMLs.

The AMC60704 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 being sourced or sunk by the VDACS, thus enabling these outputs to be monitored.

The AMC60704 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 <sup>(1)</sup>	BODY SIZE (NOM)
AMC60704	YBH (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.



## 4 Device and Documentation Support

### 4.1 Documentation Support

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#### 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.

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### 4.2 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 *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.

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### 4.4 Trademarks

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### 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 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
AMC60704YBHR	ACTIVE	DSBGA	YBH	36	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 105	AMC60704	Samples

(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.

**OBSELETE:** 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.

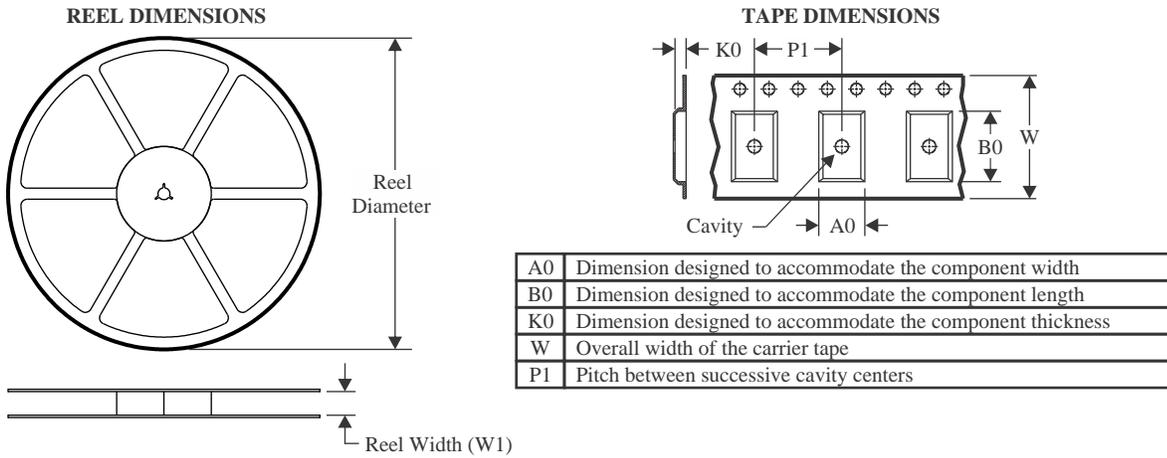
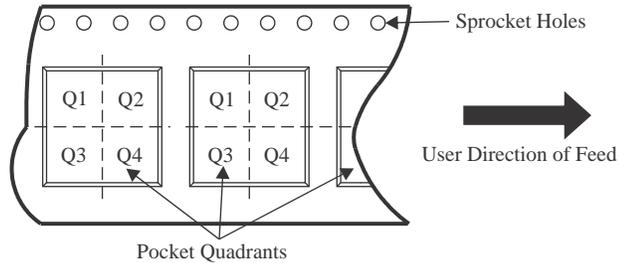
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

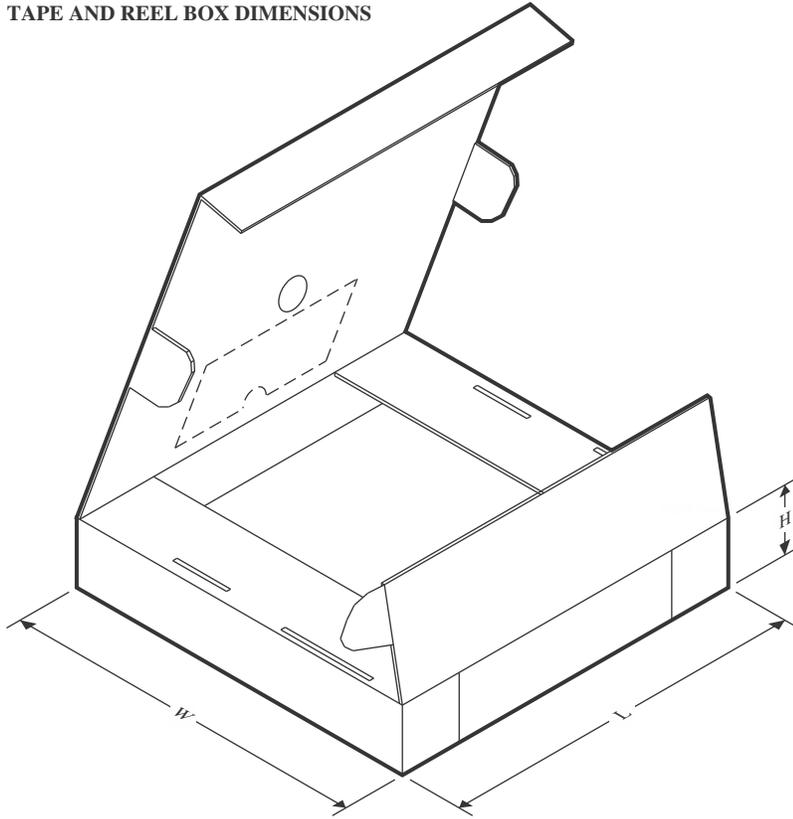
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**TAPE AND REEL INFORMATION**

**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
AMC60704YBHR	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)
AMC60704YBHR	DSBGA	YBH	36	3000	182.0	182.0	20.0

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