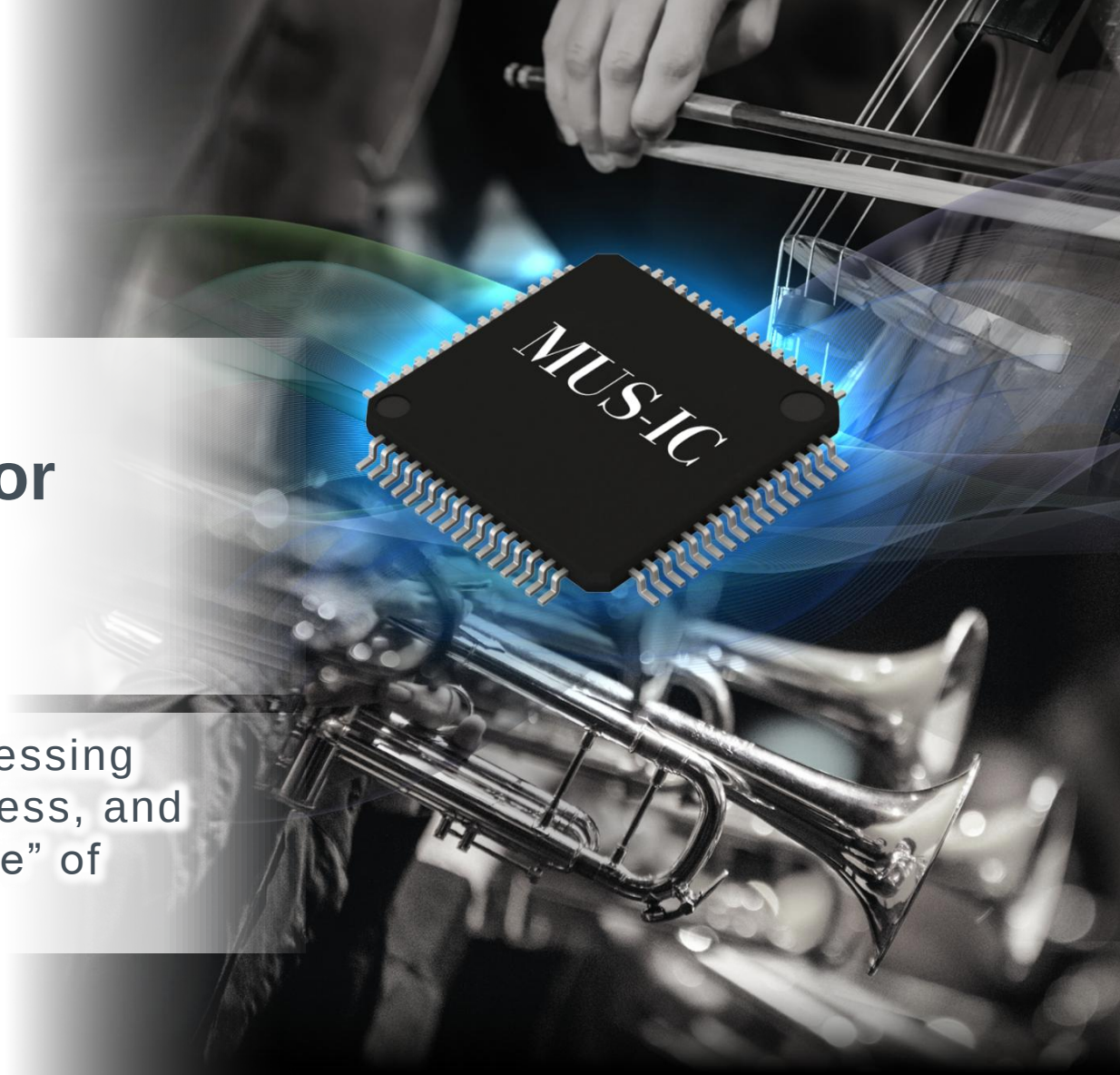
ROHM SEMICONDUCTOR

Electronics for the Future

ROHM's 2nd Generation MUS-IC™ Series Audio DAC Chip for Hi-Res Audio Playback with Exclusive HD Monaural Mode



Delivers an authentic listening experience by expressing the three elements of spatial reverberation, quietness, and dynamic range while preserving the natural "texture" of musical instruments

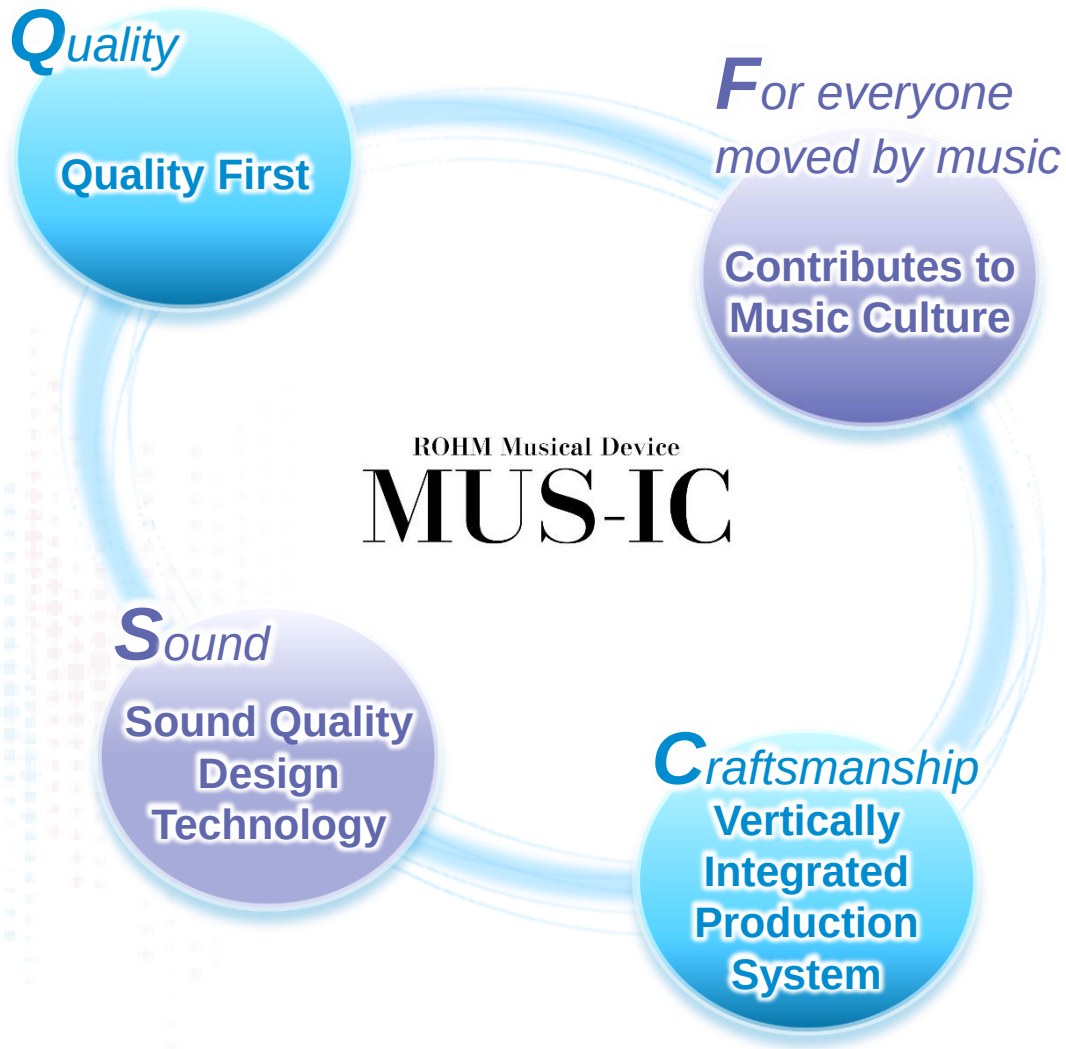
January 22, 2025
ROHM Co., Ltd.
Marketing Communications Dept.

* MUS-IC™ is a registered trademark of ROHM Co., Ltd.
* HD (High Definition) Monaural Mode: ROHM's proprietary digital signal processing technology that improves bit (amplitude) resolution.
* This document is current as of the date of publication. Subject to change without notice.

ROHM's High-end Audio Device Brand: ROHM Musical Device "MUS-IC™"

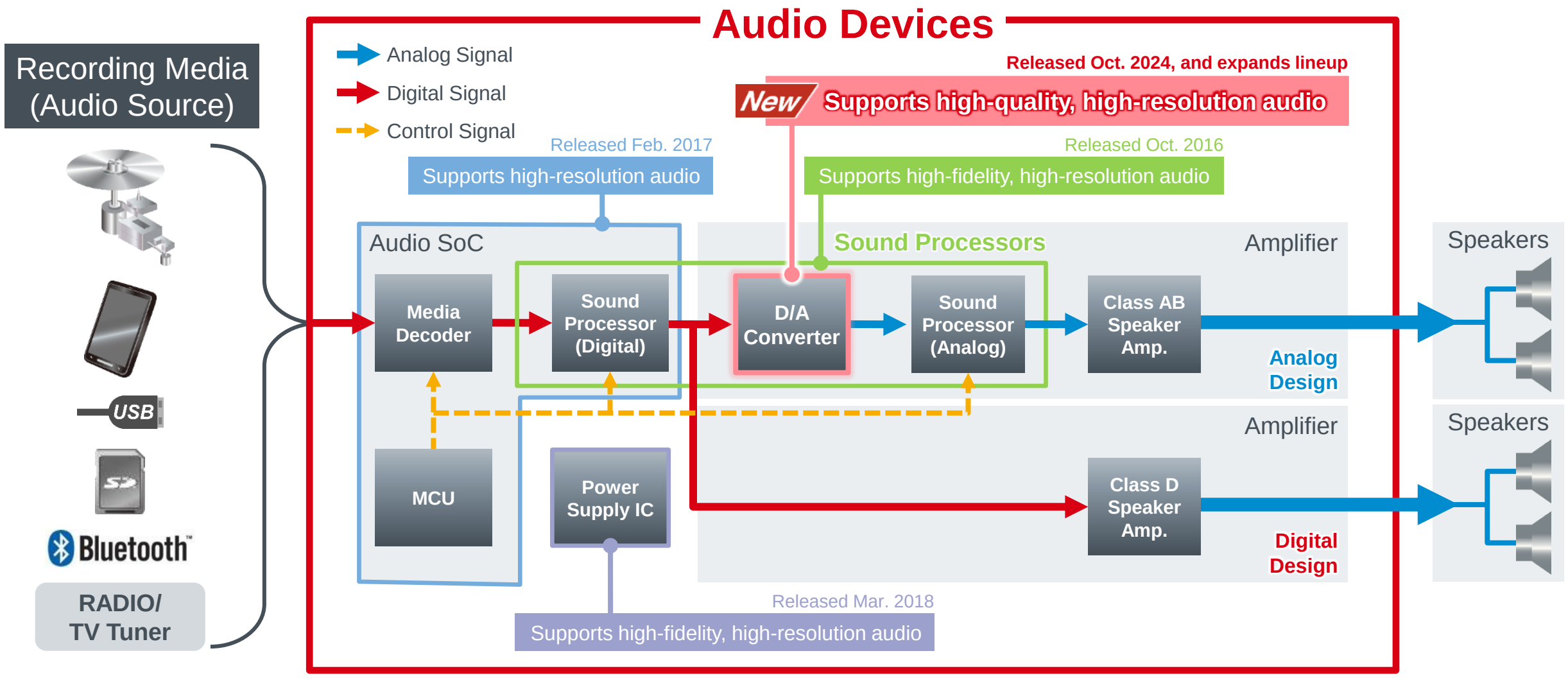
ROHM Musical Device
MUS-IC

Created by combining the **"Sound Quality Design Technology"** with ROHM's corporate mission of **"Quality First"**, **"Vertically Integrated Production System"**, and **"Contribution to the Musical Culture"**, MUS-IC™ (official name: ROHM Musical Device "MUS-IC™") is an audio device brand that represents the ultimate IC solutions developed by ROHM's team of experienced and dedicated engineers.



For more information, please visit ROHM's Musical Device 'MUS-IC™' web page
https://micro.rohm.com/en/mus-ic/

High-fidelity Audio Equipment and ROHM's Approach



ROHM is developing a variety of products for high-fidelity audio equipment that support high-resolution audio playback

MUS-IC™ Lineup

MUS-IC™ page

Key Feature The dedicated page features not only the product lineup but also articles and more

MUS-IC Information (rohm.com) >

Posted Article AV Watch: Kyoto/Japan-Based ROHM Develops a High-Fidelity MUS-IC DAC Chip and Sister Device

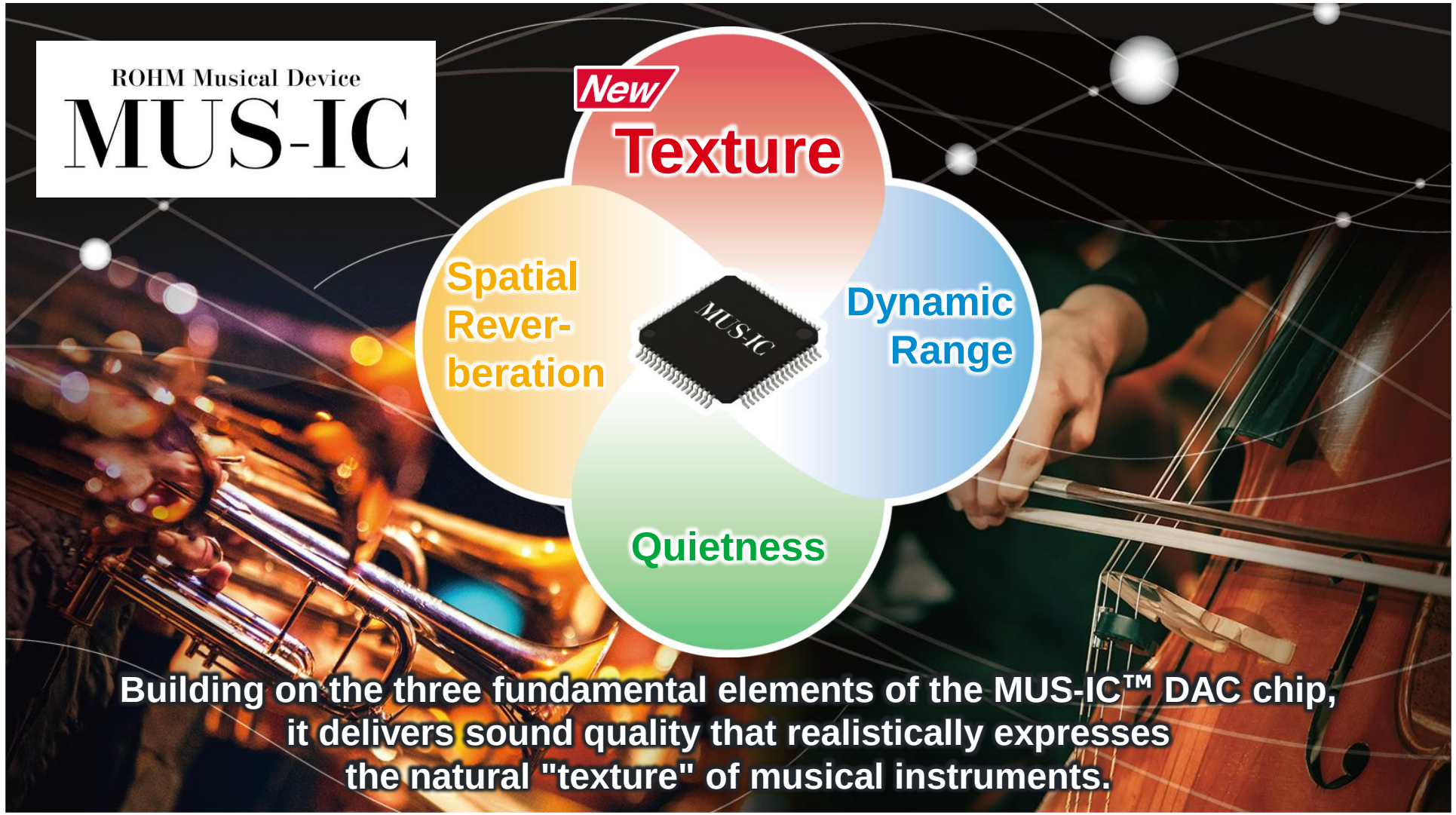
Article covering the adoption of the **1st Generation BD34301EKV** in Luxman's flagship SACD/CD player D-10X.

BD34302EKV MUS-IC™ Series 2nd Generation 32-bit Audio DAC Chip Video

https://api01-platform.stream.co.jp/apiservice/plt3/NDc3%23MjMyOA%3d%3d%23500%232d0%230%233FE2F8D9E400%23MDoyOjc6YTpmOzEwOzEwOzEw%23

BD34302EKV MUS-IC™ Series 2nd Generation 32-bit Audio DAC Chip Development Concept

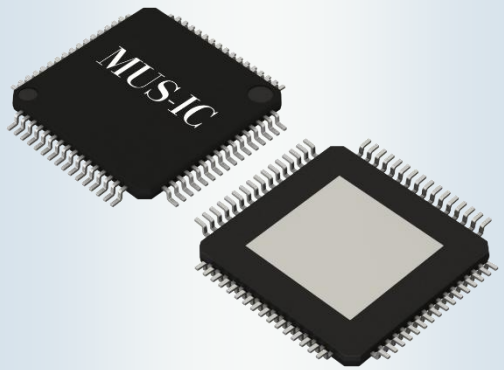
Pursuing rich musicality that expresses the performer's musical worldview



2nd Generation BD34302EKV Overview

Features

- 32-bit DAC IC for flagship models
- THD+N: -117dB* (THD: -127dB*)
- SN Ratio: 130dB
- Sampling Frequency: up to 1,536kHz
- Current Output Modes:
  Stereo / Monaural /
  HD (High Definition) Monaural
- Evaluation board
  “BD34302EKV-EVK-001” available



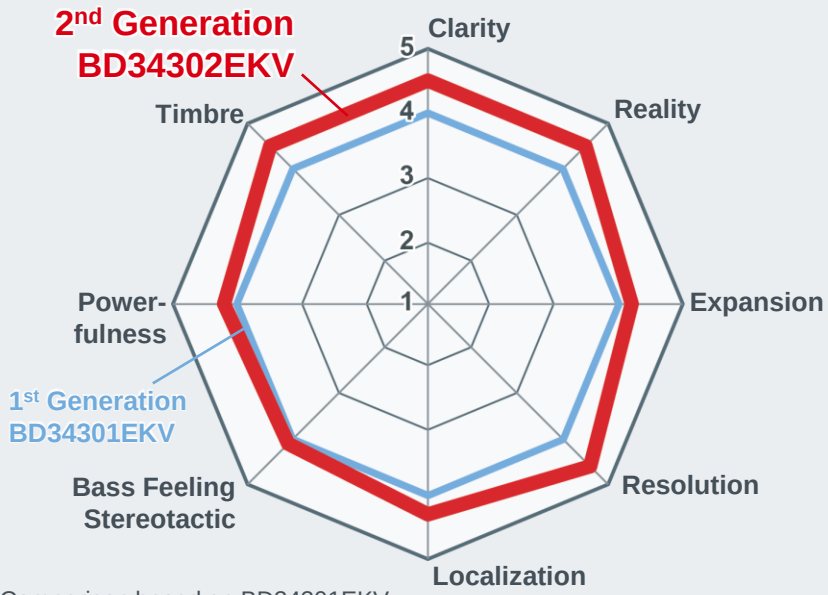
BD34302EKV

HTQFP64BV Package

12.0mm×12.0mm×1.0mm

(64pin, 0.5mm pitch)

Sound Quality Chart for the 2nd Generation BD34302EKV



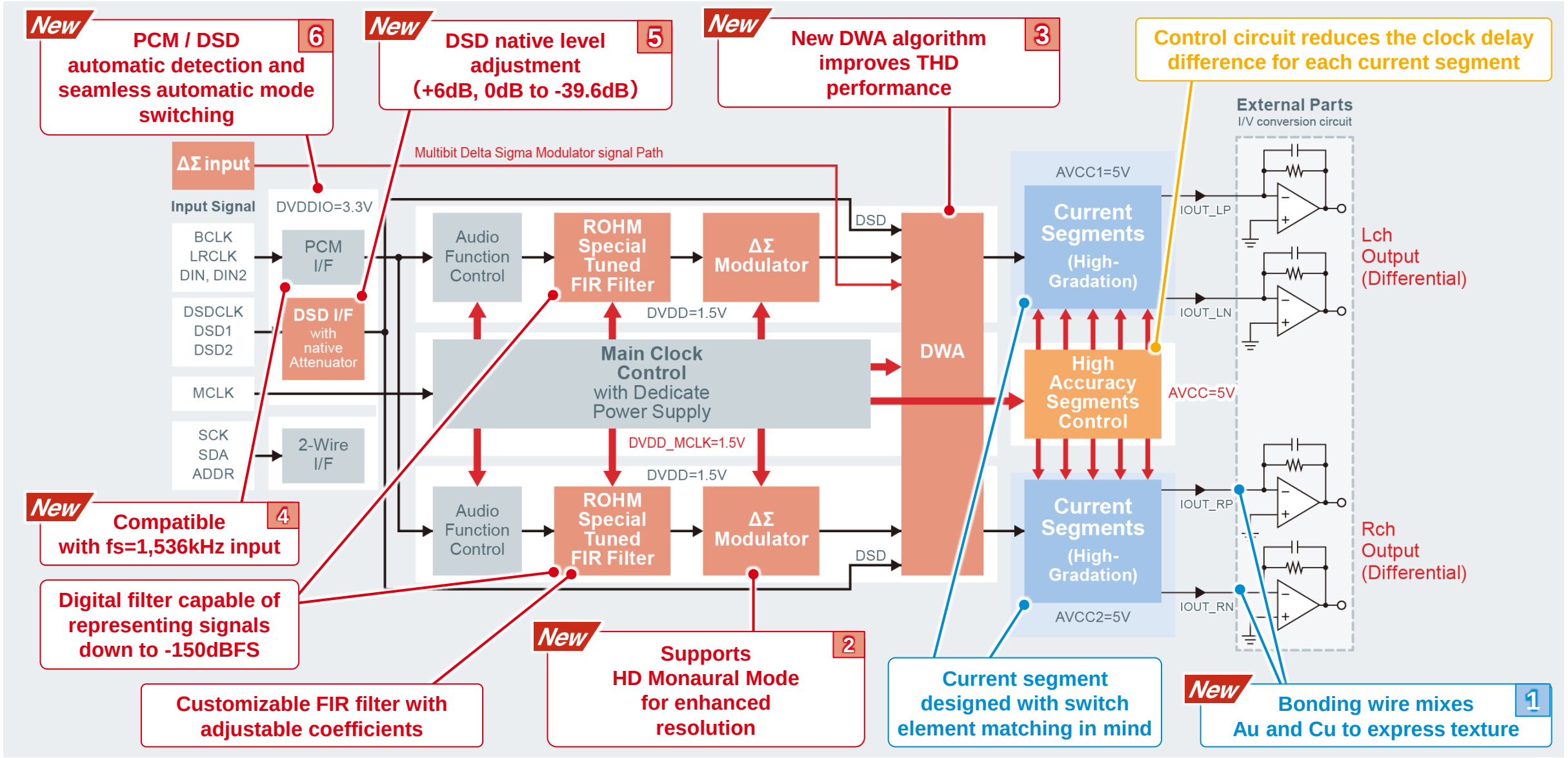
*Comparison based on BD34301EKV

MUS-IC™ DAC Chip Lineup

Part No.	No. of Outputs [ch]	Resolution [bit]	Sampling Frequency [kHz]	THD+N (Typ.) [dB]	S/N Ratio (Typ.) [dB]	DSD Clock [MHz]	Digital Filters	Package (Size [mm])
New BD34302EKV	2	32	32 to 1,536	-117*	130	2.8, 5.6, 11.2, 22.5	Preset, Custom, External	HTQFP64BV (12.0×12.0×1.0)
BD34301EKV			32 to 768	-115				

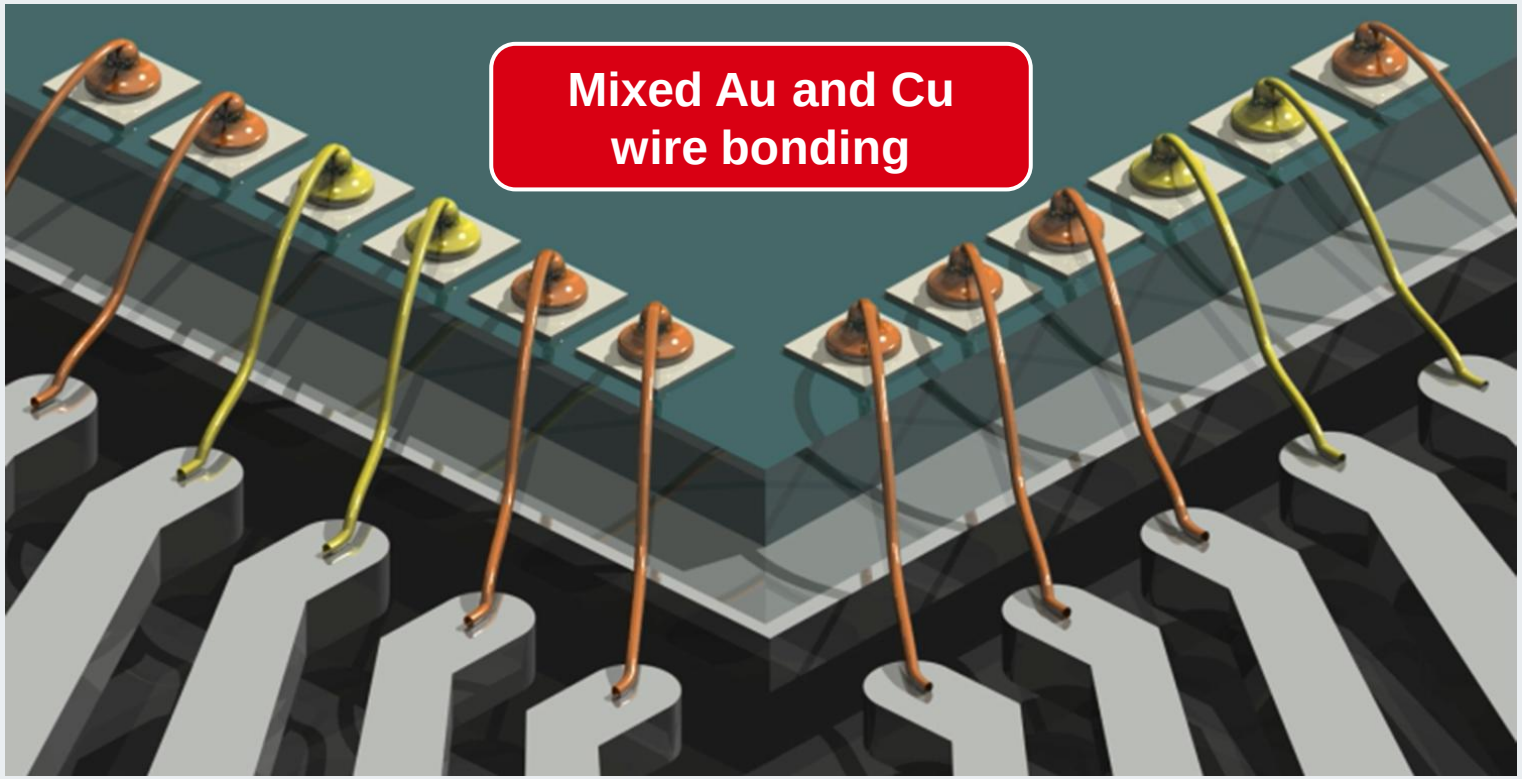
*When using the new DWA algorithm

Block Diagram and Features of the 32-bit Audio DAC Chip BD34302EKV



1 New BD34302EKV Technology: Composite Bonding

Craftsmanship that expresses **“texture”**



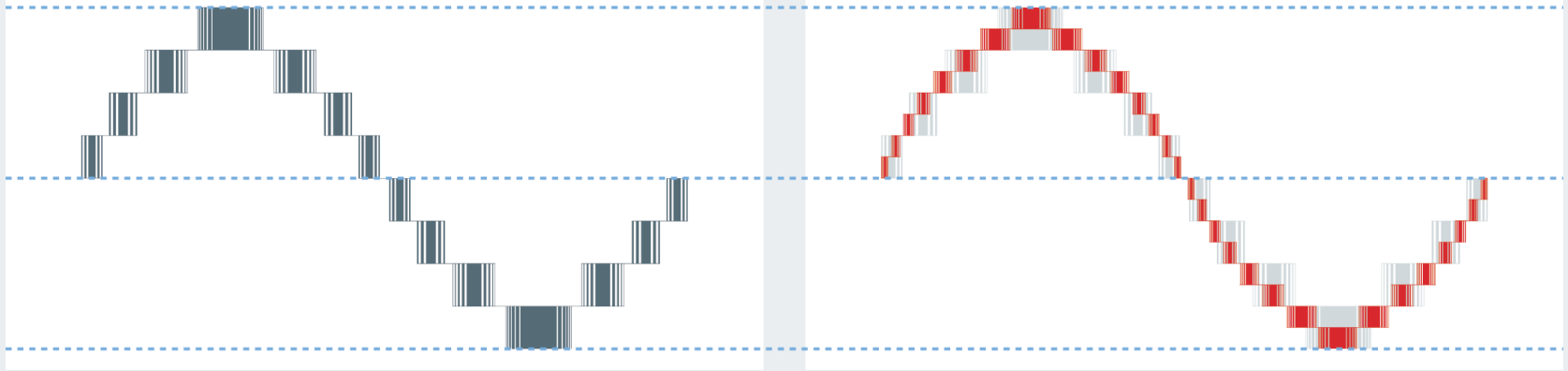
The material of the wires connecting the chip to the lead frame affects sound quality

- Bonding wire materials (Au, Cu) were selected for each terminal
- The optimal solution that realistically expresses the original texture of instruments was adopted through listening trials

2 New Feature of the BD34302EKV: HD (High Definition) Monaural Mode*1

The new output mode aimed at
more natural and smoother D/A conversion

Waveform of Standard Monaural Mode	Waveform of "BD34302EKV" HD Monaural Mode
Conventional Technology	New Technology



Achieves a smoother sound by increasing the resolution over conventional technology

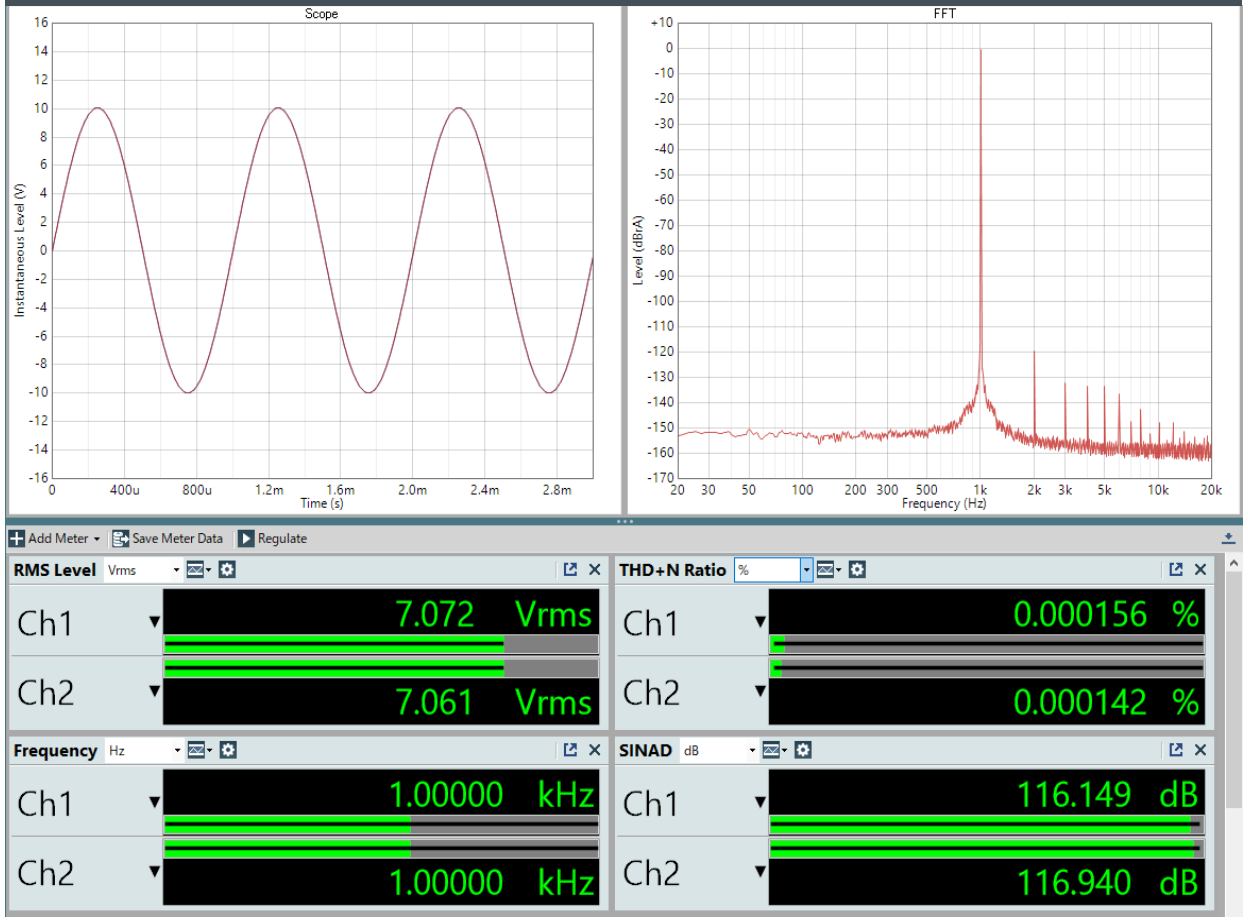
*1: Monaural Mode is a setting where the same signal is input to both stereo channels, and their outputs are combined to double the signal level.

3 BD34302EKV Audio Characteristics Measurement

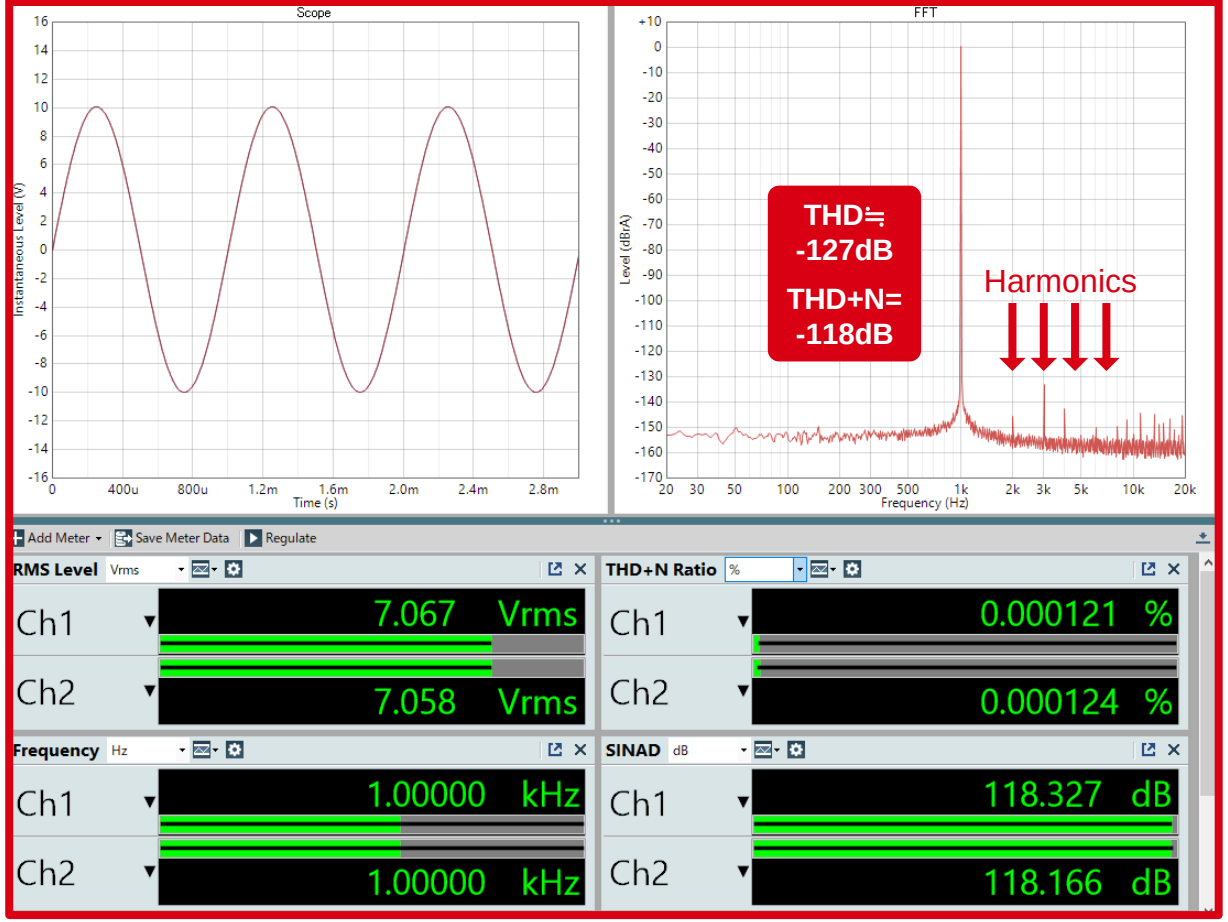
THD+N Measurement Comparison in Reference Settings

*Input=I2S, 1kHz(SIN), 0dBFS, fs=44.1kHz, BAL output, BW=AES17

BD34301EKV DWA setting (DWA Algorithm 68h=00h)



BD34302EKV NEW DWA design (DWA Algorithm 68h=02h)



The new DWA design reduces harmonics to achieve clearer-quality sound

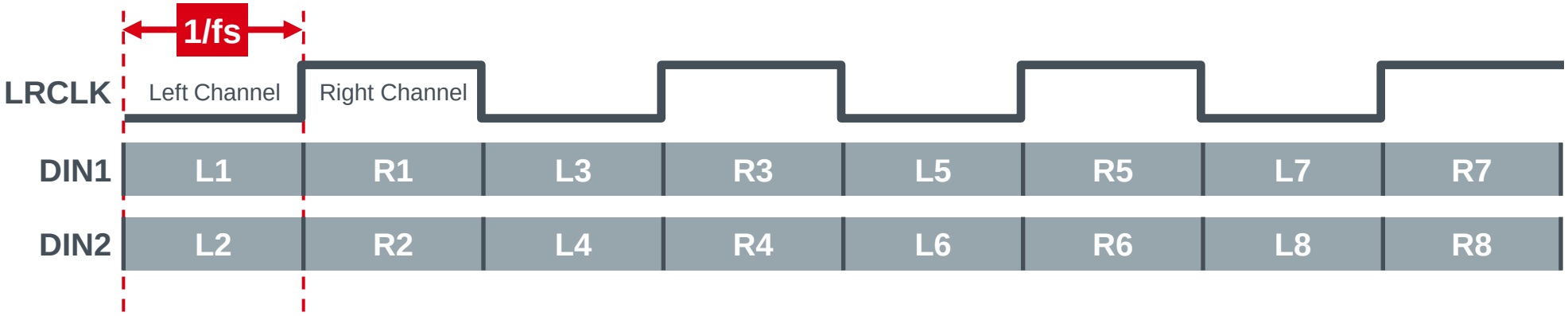
* DWA (Data Weighted Averaging): Technology that improves audio characteristics by balancing mismatches between elements when operating multiple switching components for analog conversion.

4 New Feature of the BD34302EKV: PCM 1536kHz Support

Supports data transfer at fs=1536kHz - twice the conventional rate
Transfers high-precision calculation data from customer DSPs directly to the DAC chip

BCLK/LRCLK can be transmitted at the same transfer rate as conventional 768kHz

= Reducing clock frequency suppresses digital noise, contributing to improved sound quality*

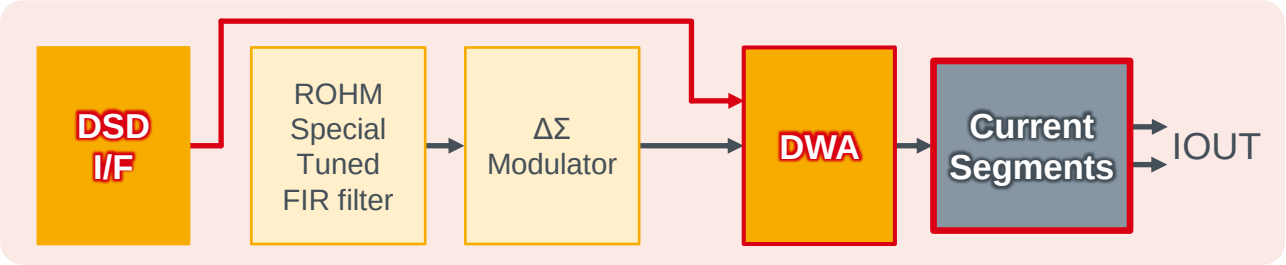


*Reduces high-frequency noise by suppressing noise generated when transferring 1536kHz high-precision data at 768kHz

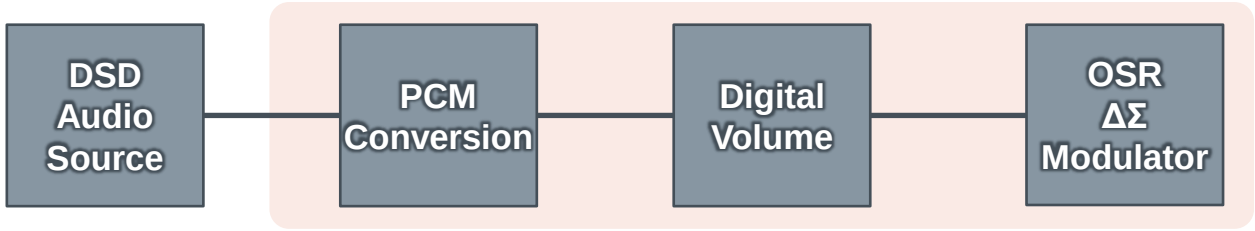
5 New Feature of the BD34302EKV: Native DSD Volume Control

Supports volume adjustment of DSD audio sources

BD34302EKV DSD Signal Path



Common Method for Adjusting the Volume of DSD Data



Data conversion occurs at each process, resulting in unintended playback

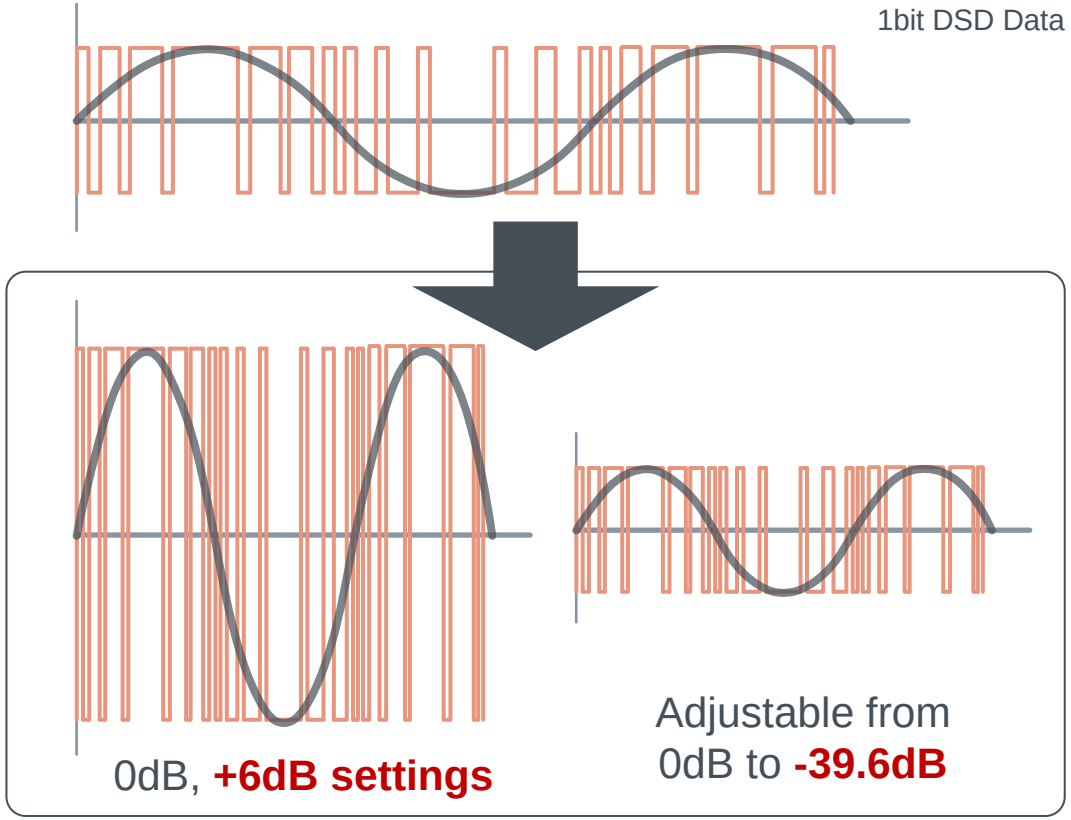
Advantages of BD34302EKV

1. **Native DSD*1** volume adjustment is possible without PCM conversion
   → Maintains DSD native sound quality even at low volumes
2. Achieves PCM-equivalent amplitude by setting the full-scale level to +6dB*2

*1: Faithfully outputs sound source data (1-bit) without processing

*2: SACDs using the DSD format define 0dB as 50% modulation, meaning that the amplitude of many DSD audio sources is half that of PCM

Adjusts the full-scale level without changing the DSD source

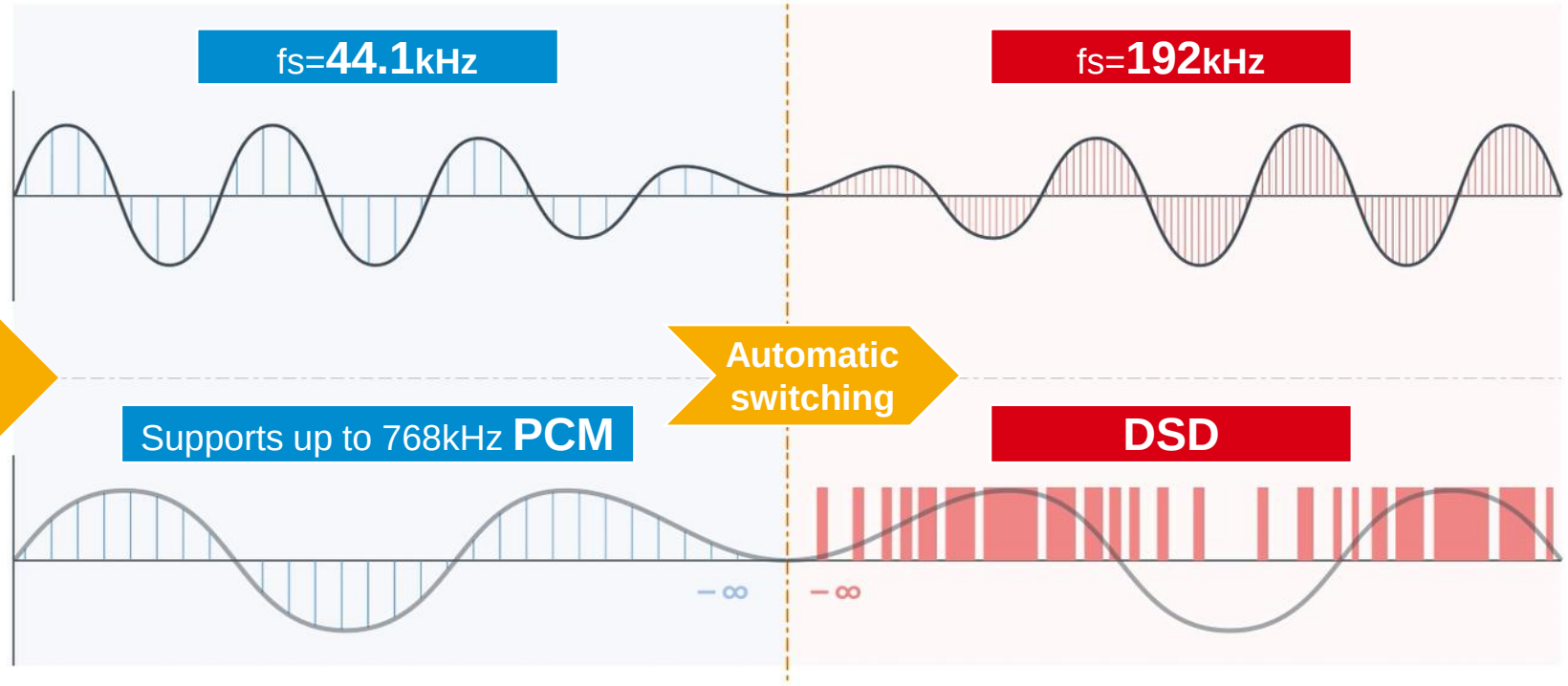


Maintaining DSD data during volume adjustment enables playback in the original DSD format

6 New Feature of the BD34302EKV: PCM / DSD Auto Mode Switching

Integrates Various Automatic Switching Features to Reduce Software Design Efforts

Automatically switches according to the input signal



Other items supported by automatic switching

- PCM oversampling
- ΔΣ oversampling
- Clock setting (frequency division)
- HPC mode and DSD level, DSD filter

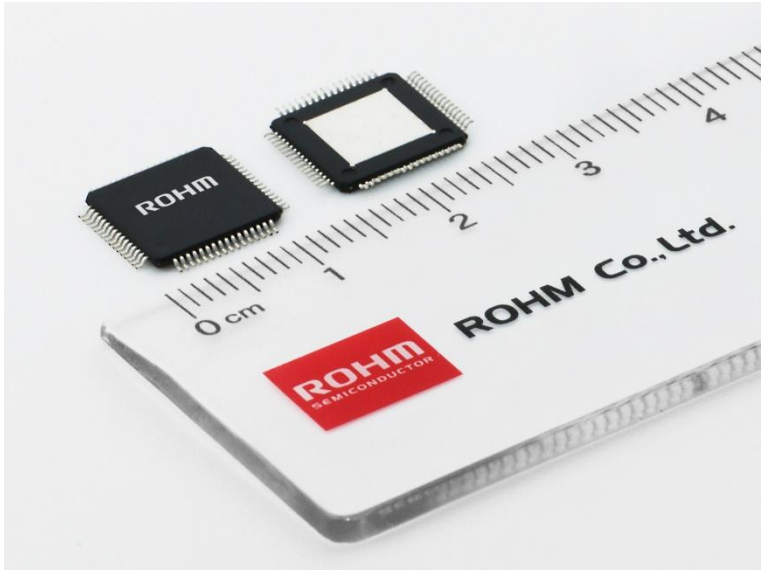
Sales Information “BD34302EKV”

Information on the BD34302EKV is offered
to promote widespread consideration and adoption.

- Supporting documents required for evaluation are available on ROHM’s website:
  https://www.rohm.com/products/audio-video/audio-converters/audio-dacs/bd34302ekv-product

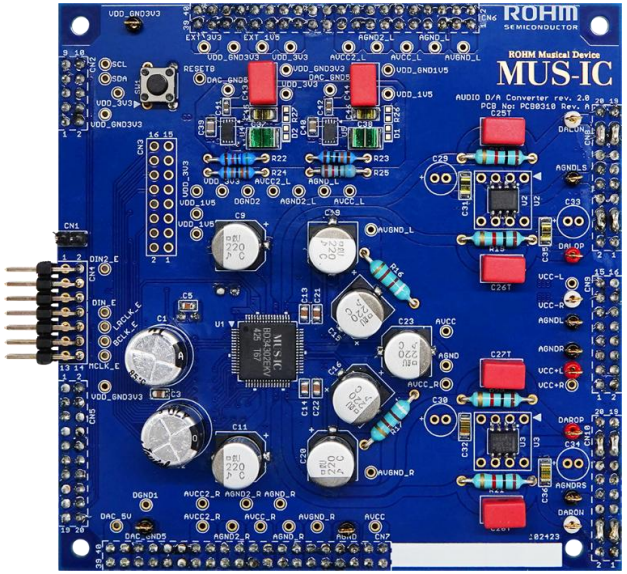
DAC Chip Sale

Part No. BD34302EKV
Sales Launch Date: October 2024
Reference Price: $80.0/unit. (excluding tax)



Evaluation Board Sale

Part No. BD34302EKV-EVK-001
Sales Launch Date: October 2024
Reference Price: $220.0/unit. (excluding tax)



Available from Digi-Key™ and Mouser™

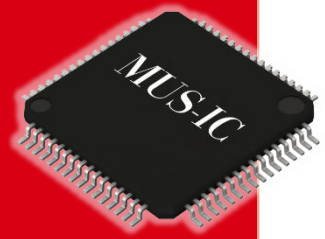
New Product
Click here to purchase the
BD34302EKV

Evaluation Board
Click here to purchase the
BD34302EKV-EVK-001

The BD34302EKV 32-bit audio DAC offers support for your next design

32-bit Audio DAC Chip Development Roadmap

MUS-IC™ Flagship Models



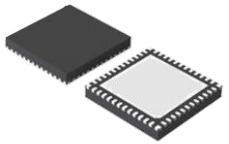
New **BD34302EKV**

THD+N：-117dB*

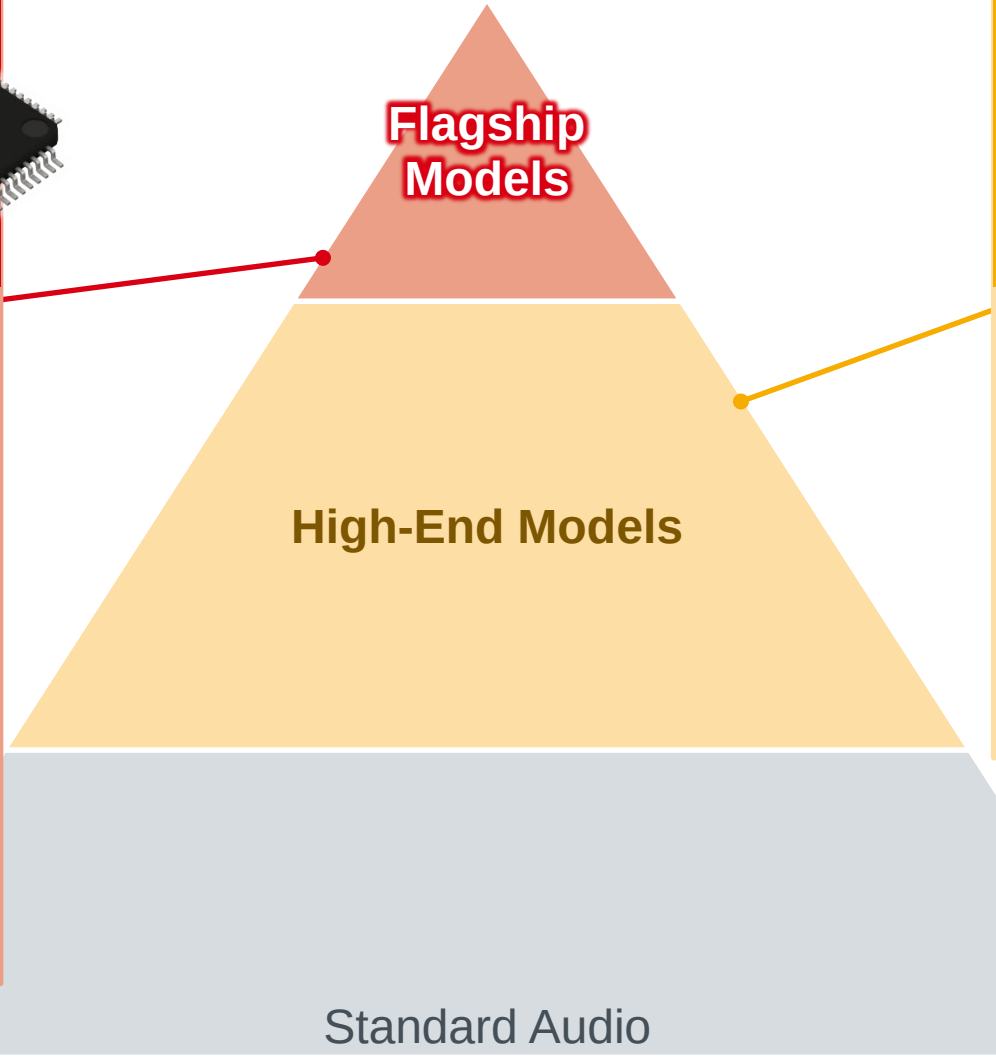
*When using the new DWA algorithm

BD34301EKV

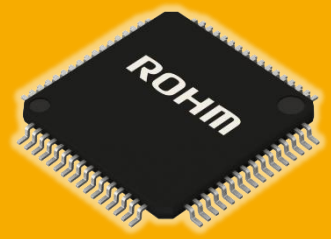
THD+N: -115dB



Compact QFN package types are also under development

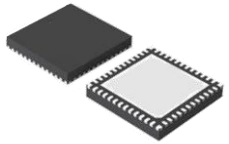


High-End Model



BD34352EKV

THD+N：-112dB



Compact QFN package types are also under development

THD+N：-100dB

Going forward, ROHM will continue to develop high-quality 32-bit audio DAC chips

Electronics for the Future

Notes

- The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products").
- If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.
- Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.
- The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products.
- ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties.
- ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.
- If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.
- The content specified in this document is correct as of January 2025.