

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RA*-A0015A/E	Rev.	1.00
Title	RA4M3 Group, RA6M4 Group, AD conversion time for interleaving enhancement		Information Category	Technical Notification		
Applicable Product	RA4M3 Group RA6M4 Group	Lot No.	Reference Document	RA4M3 Group User's Manual Hardware Rev.1.20 RA6M4 Group User's Manual Hardware Rev.1.10		
		All				

AD conversion time for interleaving is enhanced from 0.22 $\mu$ s to 0.2 $\mu$ s. Examples are shown below.

-before

## (1) Features

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### ■ Analog

- 12-bit A/D Converter (ADC12) × 2
- 12-bit D/A Converter (DAC12) × 2
- Temperature Sensor (TSN)

## (2) Electric characteristics

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Table A/D conversion characteristics for interleaving

Conditions: PCLKADC = 1 to 50 MHz

Parameter			Min	Typ	Max	Unit	Test conditions
High-precision high-speed channels (AN000 & AN100, AN001 & AN101, AN002 & AN102)	Conversion time*1 (operation at PCLKADC = 50 MHz)	Max. = 400 $\Omega$	0.22	—	—	$\mu$ s	Sampling in 9 states VCC = AVCC0 = 3.0 to 3.6 V 3.0 V $\leq$ VREFH0 $\leq$ AVCC0
	Offset error		—	$\pm 1.0$	$\pm 2.5$	LSB	—
	Full-scale error		—	$\pm 1.0$	$\pm 2.5$	LSB	—
	Absolute accuracy		—	$\pm 2.0$	$\pm 4.5$	LSB	—
	DNL differential nonlinearity error		—	$\pm 0.5$	$\pm 4.5$	LSB	—
	INL integral nonlinearity error		—	$\pm 1.0$	$\pm 4.5$	LSB	—

-after

(1) Features

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■ Analog

- 12-bit A/D Converter (ADC12) × 2
  - - 5Msps at interleaving
- 12-bit D/A Converter (DAC12) × 2
- Temperature Sensor (TSN)

(2) Electric characteristics

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Table A/D conversion characteristics for interleaving

**Table 50.41 A/D conversion characteristics for interleaving (2 of 2)**

Conditions: PCLKADC = 1 to 50 MHz

Parameter			Min	Typ	Max	Unit	Test conditions
High-precision high-speed channels (AN000 & AN100, AN001 & AN101, AN002 & AN102))	Conversion time*1 (operation at PCLKADC = 50 MHz)	Max. = 400 Ω	0.2	—	—	μs	Sampling in 7 states VCC = AVCC0 = 3.0 to 3.6 V 3.0 V ≤ VREFH0 ≤ AVCC0
	Offset error		—	±1.0	±2.5	LSB	—
	Full-scale error		—	±1.0	±2.5	LSB	—
	Absolute accuracy		—	±2.0	±4.5	LSB	—
	DNL differential nonlinearity error		—	±0.5	±4.5	LSB	—
	INL integral nonlinearity error		—	±1.0	±4.5	LSB	—