RENESAS
BIG IDEAS FOR EVERY SPACE

CMOS AND BI-POLAR OPERATIONAL AMPLIFIERS

Achieve maximum signal integrity in low and high voltage operating systems

General-purpose solutions with full dynamic output, high slew rate and low input offset voltage

Full dynamic range

Dynamic range is critical in low voltage conditions. The rail-to rail feature, combined with 40 µA power consumption of the READ2303/4303 Op Amp is a perfect fit for single supply 5 Volt applications.

High speed for superior signal integrity

A higher slew rate can reduce output distortion preventing loss of bits in the data stream at high frequency levels. Use our 8 V / µs slew rate feature in equipment designs with rapidly changing sensor values such as DC motors, and actuator designs.

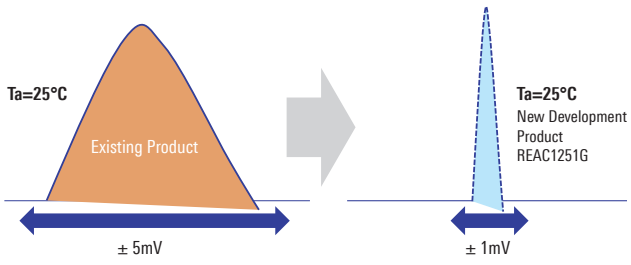
High voltage bipolar features

- Wide range high voltage to handle input signals up to 32 Volts
- High slew rate up to 7 V/µS for lower signal distortion
- Dual and Quad channel
- Small footprint TSSOP and MSOP; save up to 65% board space with small footprint packages'

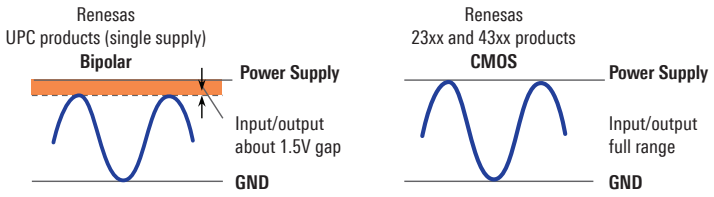
CMOS op amp features

- Low voltage operation 1.8 V to 5.5 V
- Rail-to-rail I/O for maximum dynamic range
- Low current consumption 40 µA/channel
- Slew rate as high as 8 V / us
- Dual and Quad channel
- Small footprint TSSOP and MSOP; save up to 65% board space

Bipolar Offset voltage as low as 1 mV



CMOS products have full dynamic range



	Bipolar Op-Amp	CMOS Op-AMP
Input offset voltage	µV~mV order	mV order
Input bias current	uA~nA order	pA~fA order
power consumption	Less than CMOS	Low power consumption
Power supply voltage / (withstand voltage)	Wide range of power supply voltage High withstand voltage possible (36V)	Existing products: low voltage(6.5V) Developng products: High coltage(36V)
Input / output range	Power supply voltage -1.5 to GND (Single power supply)	Dynamic range Power supply voltage to GND Available in full range

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Applications

- AC servo motor control with industrial network
- Large power BLDC ceiling fan with PFC
- HMI solution board with high-end 32-bit MCU
- Smart remote controller
- Air conditioner (low-end) / air conditioner (high-end)
- Ultra-low power wearable with BLE 5.1

Accelerate the product development cycle

Take advantage of these engineering-vetted designs using Embedded Processing, Analog, Power, and Connectivity blocks from Renesas to accelerate your product development cycle. Go to **https://www.renesas.com/tw/en/winning-combinations**

Winning combinations using READ23xx/43xx CMOS and µPC high voltage bipolar solutions

- Wearable devices with the RE01 32-bit MCU
- Ultra-low power wearable devices with Bluetooth low energy 5.1
- AC drive/ GP inverter solution
- Smart remote controller
- Energy harvest remote control
- IoT router
- Induction heating cooker
- High-end electric fan with BLDC
- Refrigerator compressor digital inverter
- AC servo motor control with industrial network
- Smart kitchen appliance HMI

Bipolar High Voltage Products

	Product	Channels	Supply Voltage minimum (V)	Supply Voltage maximum (V)	Offset Voltage VIO typical (mV)	Offset Voltage VIO maximum (mV)	Slew Rate SR typical (V/ms)	Icc Supply current typical (mA)	Packages
HIGH SLEW RATE	UPC842	2	3	32	±2	±5	7	4.5	TSSOP, SOP
	UPC844	4	3	32	±2	±5	7	9	TSSOP, SOP
LOW POWER	UPC451	4	3	30	±2	±7	(0.3)	2	TSSOP, SOP
	UPC1251	2	3	30	±2	±7	(0.3)	1.2	MSOP, TSSOP, SOP
	REAC1251	2	3	30	±0.2	±1	(0.3)	1.4	MSOP, TSSOP, SOP

CMOS Low Voltage Products

	Product	Channel	Supply Voltage minimum (V)	Supply Voltage maximum (V)	Offset Voltage VIO minimum (mV)	Slew Rate SR typical (V/ms)	I/O Rail-to-Rail	Channel Supply Current IDD typical (mA/channel)	Packages
HIGH SLEW RATE	READ2304	2	2.5	5.5	±6	8	Yes	0.75	MSOP, TSSOP
	READ4304	4	2.5	5.5	±6	8	Yes	0.75	TSSOP
LOW POWER	READ2303	2	1.8	5.5	±6	0.35	Yes	0.04	MSOP, TSSOP
	READ4303	4	1.8	5.5	±6	0.35	Yes	0.04	TSSOP

To request samples, download documentation or learn more visit **renesas.com/general-purpose-op-amps**

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