

DOLPHIN
DESIGN

**IP SOLUTIONS
CATALOG**

2024



SCAN TO CATALOG



BAT IPs: Amplifying Audio Excellence

For over 30 years, Dolphin Design is leading Audio premium IPs, catering to diverse applications including TWS, Smart speakers, Wearables, IoT, Automotive, and more. Our BAT IP family offers seamless configurability and assembly for high-fidelity, low-power audio devices, ensuring faster time-to-market with robust and advanced IPs.

Mixed signal Voice & Audio IP platform											
							55nm	40nm	28nm	22nm	12nm
		Power supply	SNR	THD+N	Input noise	Power consumption					
ΔΣ 24-bit ADC(*)	Voice/audio ADC - Performance	1.8 V +/- 10%	107 dB	-98 dB	3.1 μVrms	Full perf. mode: 250 μA Low power mode: 125 μA				✓	✓
	Voice/audio ADC - Mainstream+	1.8 V +/- 10%	104.5 dB	- 75 dB	2.6 μVrms	Full perf. mode: 550 μA Low power mode: 150 μA				✓	✓
		1.8 V to 3.3 V	109 dB	- 75 dB	2.6 μVrms	Full perf. mode: 550 μA Low power mode: 150 μA		O		O	
	Voice/audio ADC - Mainstream	1.8 V +/- 10%	101 dB	- 80 dB	3.8 μVrms	Full perf. mode: 550 μA Low power mode: 170 μA				✓	✓
		1.8 V to 3.3 V	106 dB	- 80 dB	3.8 μVrms	Full perf. mode: 550 μA Low power mode: 140 μA		✓		✓	
	Voice/audio ADC - Legacy	2.7 V to 3.63 V	90 dB	- 90 dB	7.7 μVrms	Full perf. mode: 1.7 mA	✓	✓			
		1.8 V +/- 10%	85 dB	- 80 dB	8 μVrms	Full perf. mode: 1.7 mA			✓	✓	

O = roadmap / under development

ΣΔ 24-bit DAC (*)	(*) provided stand-alone or as part of CODEC configuration	Power supply	SNR	THD+N	Output noise	Power consumption					
	Audio DAC + class-D amp. - performance	1.8 V +/- 10%	115 dB	- 95 dB	1.78 μVrms	915 μA without load 1.055 mA at 0.1 mW				O	✓
	Audio DAC + class-AB amp. - Mainstream	1.8 V +/- 10%	115 dB	- 90 dB	1.9 μVrms	1,175 μA without load 3.4 mA at 0.1 mW				✓	
		1.8 V to 3.3 V	120 dB	- 90 dB	1.9 μVrms	1,175 μA without load 3.4 mA at 0.1 mW				✓	
	Audio DAC + class-AB amp. - Legacy	2.97 V to 3.63 V	100 dB	- 90 dB	6 μVrms	2,200 μA without load	✓	✓			

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Smart audio IP platform										
VUI		Input signal	Output signal	Main clock	Power consumption	55nm	40nm	28nm	22nm	12nm
	Voice Activity Detection WhisperTrigger	Analog microphone	IRQ upon voice detection	32 kHz RC or 32 kHz crystal	13 μW @ 40 & 22nm	✓	✓		✓	
		Digital microphone	IRQ upon voice detection	From 6 MHz to 13 MHz	25 μW @ 40 nm	✓	✓	✓	✓	✓
	Audio neuromorphic front end (aMFCC) WhisperExtractor	Analog microphone	MFCC data IRQ upon voice detection	32 kHz RC or 32 kHz crystal	7 μW @ 22 nm		O		✓	✓

O = roadmap / under development

Digital Audio IP platform										
Digital audio		SNR	THD+N	Main clock	Number of channels	Phase alignment	PLL less filters	Low latency filters	Asynchronous interface	
	PDM to PCM converter Digital microphone input	117 dB	- 110 dB	12 or 11 MHz or 19.2 MHz 12.288 MHz or 11.2896 MHz	From 1 to 8	✓	✓	✓	✓	
	Digital audio DAC PWM	110 dB	- 95 dB	12 or 11 MHz or 19.2 MHz 12.288 MHz or 11.2896 MHz	From 1 to 8	✓	✓	✓	✓	
	Asynchronous Sample Rate Converter ASRC	114 dB	- 114 dB	24 or 26 MHz or 24.576 MHz	From 2 to 8	✓	✓	✓	✓	

Phase alignment: Ensure 0° phase mismatch between channels for accurate beamforming.

PLL-less: Use standard clock available in your system and save an audio PLL.

Low latency filters: Enable μs latency for applications like ANC or RNC.

Asynchronous interface: Enable to control your audio codec as asynchronous slave.

Power Metering Single and Tri-phase IP								
		Power supply	Class	Range	Output data rate	Power and Computation Engine (PCE)	130nm	40nm
ΣΔ 24-bit DAC	Legacy Series	2.8 V to 5.5 V	0,1	Up to 7000	4 ksps	Yes	✓	
	Mainstream Series	2.8 v to 3.3 V	0,1	Up to 7000	4, 8, 16, 32ksps	Yes		✓

SPIDER IPs: State-of-the art solution for Power Management

As a three-decade leader in Power Management IP, we've tailored solutions to fit your exact design needs, saving you time and resources while accelerating your time-to-market and boosting design productivity.

Power management IP platform										
	V _{IN} (V)	V _{OUT} (V)	I _{OUT}	I _q (μA)	180nm	55nm	40nm	22nm	12nm	
DC/DC Buck	SIMO DC/DC Single Input Multiple Outputs	[1.8 - 5.5]	[0.5 - 3.5]	Up to 400 mA	0.64 to 1.5 μA				✓	○
	DC/DC - Low Quiescent (LQ)	[1.62 - 5.5]	[0.5 - 3.3]	100 mA - 1 A	0.35 to 0.37 μA			✓	✓	○
		[1.62 - 3.63]	[0.5 - 2.5]		0.29 to 0.37 μA			✓	✓	
	DC/DC - Mainstream	[1.9 - 5.5]	[0.5 - 3.3]	100 mA - 1 A	80 to 100 μA				✓	
		[2.7 - 5.5]	[0.55 - 3.3]		130 to 187 μA			✓		
	DC/DC - Legacy	[1.62 - 3.63]	[0.6 - 3.3]	100 mA - 1 A	75 to 100 μA	✓	✓	✓	✓	
		[1.9 - 4.4]	[0.6 - 3.3]	100 mA - 700 mA	70 to 125 μA	✓	✓			
	Combo DC/DC Mainstream DC/DC + LQ LDO	[1.9 - 5.5]	[0.5 - 3.3]	100 mA - 1 A	(sleep) = 0.25 to 0.6 μA (active) = 100 to 130 μA				✓	
		[2.7 - 5.5]	[0.55 - 3.3]		(sleep) = 0.37 μA (active) = 155 μA			✓		
		[1.62 - 3.63]	[0.55 - 3.3]	100 mA - 700 mA	(sleep) = 0.14 to 0.37 μA (active) = 75 to 100 μA	✓	✓	✓	✓	
LDO	LDO - High Performances (HP) Fast transient response High PSRR	[1.8 - 5.5]	[0.5 - 3.3]	100 mA - 500 mA	25 to 65 μA			✓	✓	○
		[2.7 - 5.5]	[0.55 - 3.3]		40 to 125 μA	✓		✓		
		[1.44 - 1.98]	[0.6 - 1.2]		40 μA				✓	
		[1.62 - 3.63]	[0.6 - 2.5]		23 to 200 μA		✓	✓	✓	
	LDO - Low Quiescent (LQ)	[2.7 - 5.5]	[0.55 - 3.3]	up to 1 mA	0.37 μA			✓		
		[1.9 - 4.4]	[0.55 - 3.3]	up to 1 mA	0.075 to 0.17 μA	✓	✓			
		[1.62 - 3.63]	[0.5 - 3.3]	up to 2 mA	0.14 to 0.37 μA	✓	✓	✓	✓	○
	LDO - Capacitor Less (CL)	[0.72 - 1.8]	[0.5 - 0.9]	up to 50 mA	7.5 to 12 μA				✓	○
	Combo LDO HP LDO + LQ LDO	[2.7 - 5.5]	[0.5 - 2.5]	100 mA - 500 mA	(sleep) = 0.37 μA (active) = 40 μA			✓		
		[1.62 - 3.63]	[0.55 - 2.5]		(sleep) = 0.14 to 0.16 μA (active) = 45 to 75 μA		✓		✓	
Oscillators	32 kHz XTAL	[0.72 - 0.99]	Freq = 32.768 kHz		I _q = 97 to 165 nA - CL = 4 to 12.5 pF Accuracy = ±50 ppm				✓	✓
		[0.81 - 1.21]			I _q = 50 to 120 nA // CL = 4 to 7 pF Accuracy = ±50 ppm		✓	✓		
	32 kHz RC	[0.72 - 0.88]			I _q = 400 nA // Accuracy (full V & T ranges): ±500 ppm @ 3σ (10 sec max)				○	
		[0.54 - 0.99]			I _q = 55 to 70 nA Accuracy (after trimming) = ±1.5%				✓	○
		[0.495 - 1.21]			I _q = 70 to 420 nA Accuracy (after trimming) = ±1.5%		✓	✓		
Monitors	POR-BOR	[1.62 - 3.63]	Monitored (V) = [0-AVD]		13 to 15 μA (continuous operation) < 150 nA (burst operation) < 100 nA (BOR disabled)		✓	✓	○	
		[1.44 - 1.98]			16 μA (continuous operation) <150 nA (burst operation) < 100 nA (BOR disabled)			✓		
PMU	RTC (RTL IP)	Core voltage			Accuracy: -2.1 to 1.6 ppm Nominal freq: 32.768 kHz	✓	✓	✓	✓	○
	Adaptative Body Bias (ABB)							✓		
	Configurable Power Controller				GUI-based power controller configurator (RTL & C-drivers)	✓	✓	✓	✓	○
					GUI-based UPF backbone generator	✓	✓	✓	✓	○

○ = Roadmap

DOLPHIN DESIGN EMPOWERS YOUR CREATIVITY

Dolphin Design is a leading provider of semiconductor IP solutions, specializing in IP design targeting markets such as Automotive, Industrial, Personal electronics and IoT.

Dolphin Design's cutting-edge technology IPs in Power management, High-quality Audio, Power metering and Design Safety/robustness, allows their thousand customers and partners to accelerate design cycles, fosters faster time-to-market and builds products/solutions that address the challenges of any industries and support a more sustainable world.

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