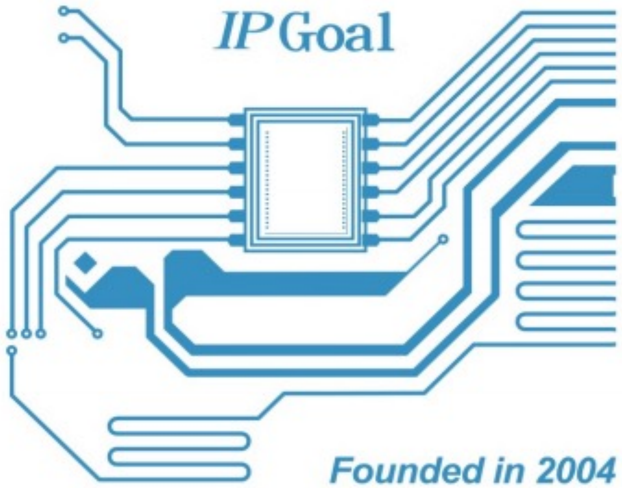


企業概要

IPGoal Microelectronics (Sichuan) Co., Ltd.（四川和芯微電子股份有限公司）は、2004年に設立された、独自の知的財産（IP）と持続的なイノベーション能力を持つIC設計企業です。中国における主要なIPベンダーおよび設計サービス企業の一つとして、SoC設計の経験とIPカスタマイズの専門知識を活かし、世界中の産業界にサービスを提供しています。

- **設立**: 2004年
- **規模**: 従業員数は100名を超え、その80%以上が専門の技術開発（R&D）スタッフです。
- **実績**: 8カテゴリー、100種類以上のIP製品を独自に開発し、市場に投入しています。
- **知的財産**: 400件以上の特許を申請しており、そのうち85件は米国特許です。2018年の四川省特許革新企業トップ100において上位にランクインしました 。

コア技術

IPGoalの核となる技術は、高速シリアルインターフェース、オーディオコーデック、および高速AD-DAコンバータです。

1. 高速インターフェース (SerDes)
- **最大速度**: 12.5Gbpsに達します。
- **対応規格**: USB 3.0、SATA、PCIe、RapidIOなどの主要規格をカバーしています。

2. オーディオコーデック (Audio Codec)
- **精度**: 16ビットから24ビットの高精度・高解像度オーディオ変換を提供します。

3. 高速AD-DAコンバータ
- **ADC性能**: ビット幅10bit/12bit、サンプリングレート最大200MHzを実現しています。

プロセスおよび製造

同社は主要なファウンドリと協力し、幅広いプロセスノードで実績を築いています。
- **対応プロセス**: 40nm / 55nm / 65nm / 90nm / 0.13μm / 0.18μm
- **信頼性**: 量産実証済み（Mass-production proven）またはシリコン実証済み（Silicon proven）のIPを提供します 。
- **カスタマイズ**: 標準IPの提供に加え、顧客の要望に合わせたIPカスタマイズサービスも行っています 。

ターンキー設計サービス

自社開発の高品質なIPプールと豊富なSoC設計経験、そして強力な業界パートナーシップを背景に、ワンストップの**ターンキー設計サービス**を展開しています。
- **提供価値**: カスタマイズされた最適なチップレベルのソリューションを提供します 。
- **顧客メリット**:
    - コストの最適化
    - 製品化までの期間（Time-to-Market）の短縮
    - 開発リスクの低減
    - 市場価値の最大化

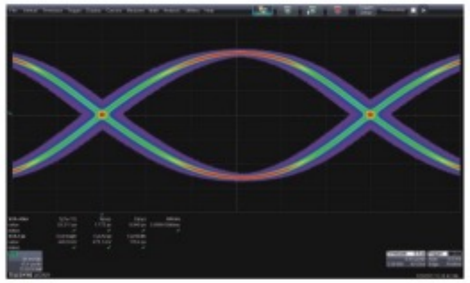
IP List

Category	IP Type	Description
High Speed Interface (SerDes)	USB3.0 PHY	5G USB3.0 PHY
	SATA PHY	1.5G/3G/6G SATA I/II/III PHY
	PCIe PHY	2.5G/5G/8G PCIe Gen1/Gen2/Gen3 PHY
	MIPI PHY	80M ~ 1.5G D-PHY and 1.25G ~ 6G M-PHY
	Rapid IO PHY	1.25G/2.5G/3.125G/5G/6.25G Rapid IO
High Speed IO	LVDS IO	750MHz/1.5Gbps LVDS Transceiver
	DDRII/DDRIII IO	1066Mbps DDRII/1600Mbps DDRIII IO
	NV-DDRII IO	400Mbps NV-DDRII IO
Universal Interface (USB2.0 & USB1.1)	USB2.0 PHY	USB2.0 OTG/Host/Device PHY
		USB2.0 Device PHY (Crystal-Free)
	USB1.1 PHY	USB1.1 Host/Device PHY
		USB1.1 Device PHY (Crystal-Free)
	USB2.0 HUB PHY	USB2.0 Hub PHY,1 Upstream and 4 Downstream Ports
Data Converter ADC & DAC	Audio Codec	16bit/18bit/20bit/24bit Stereo/Mono Audio Codec
	Audio ADC	16bit/18bit/20bit/24bit Audio ADC
	Audio DAC	16bit/18bit/20bit/24bit Audio DAC
	SAR ADC	8bit ~ 14bit 200Ksps ~ 2Msps SAR ADC
		8bit ~ 10bit 40Msps ~ 100Msps SAR ADC
	Pipeline ADC	10bit ~ 12bit 40Msps ~ 200Msps Pipeline ADC
	Video DAC	10bit ~ 12bit 50Msps ~ 250Msps Video DAC
CLOCK	PLL	Input 32KHz, Output Up to 48MHz
		Input 4MHz ~ 100MHz, Output Up to 1.25GHz
		Input 1MHz ~ 100MHz, Output Up to 1.25GHz Fraction PLL
	DLL	133MHz ~ 533MHz, 16 ~ 20 Phase Output
	RC Oscillator	15KHz ~ 12MHz Output Clock
	Crystal Oscillator	32.768KHz/12MHz,Ultra Low Power Consumption
PMU	LDO	Input 3.6V ~ 5.5V, Output 3.3V /1.8V /1.5V /1.2V /0.9V
		Input 2.0V ~ 5.5V, Output 2.5V /1.8V /1.5V /1.2V /0.9V
		Input 2.0V ~ 3.6V, Output 2.5V /1.8V /1.5V /1.2V /0.9V
	DC/DC	Input 3.0V ~ 3.6V, Output 1.8V /1.2V
	POR/BOD	Trigger Point 0.45V ~ 2.8V
Others	Amplifier	Ultra Low Noise Amplifier
		Class AB Power Amplifier
		Class D Power Amplifier
	Sensor	Low Power Temperature Sensor, ± 1℃ from -40℃ ~ +125℃
		Low Power Measurement Bridge Sensor, 16bit/18bit/20bit/24bit
		Capacitance Sensor
		Voltage Detector

High Speed Interface

SerDes

IPGoal's SerDes IPs support data rate from 1.25Gbps ~ 12.5Gbps. Featured with high performance and low power consumption, these IPs target for various high speed interface applications, including USB3.0, SATA, PCIe, MIPI, Rapid IO and more. These IPs are silicon proved and certificated. The sample chips are available for FPGA verifications. User-friendly design kit and technical support team help customers integrate them into their SoC easily and smoothly.



Key Features

- X1, X2 ,X4 lanes
- Crystal oscillator and differential reference clock source
- 25MHz ~ 100MHz reference clock range
- Support Data rate from 1.25Gbps ~ 12.5Gbps
- Programmable transmit amplitude and de-emphasis
- Implemented receiver equalization to compensate channel loss, crosstalk and ISI
- Embedded low jitter Phase-Lock-Loop
- Support spread-spectrum clocking generation and receiving
- Support low speed transition such as Beacon, LFPS & OOB
- No external component
- Independent channel power down option
- Support Built-in Self Test of PRBS and BDAT

IP Description	Type	Data Rate	Process (nm)					
			40	55	65	110	130	180
U3PHY	USB3.0 PHY (Crystal)	5Gbps	★	★	★	★	☆	
U3PHYNC	USB3.0 PHY (Crystal free)	5Gbps	☆	☆	★	★	☆	
SATA2	SATA II PHY	1.5/3Gbps	☆	★	★			
SATA3	SATA III PHY	1.5/3/6Gbps	★	★	★			
PCIE1	PCIE Gen1 PHY	2.5Gbps	★	☆	☆	★	★	
PCIE2X1	PCIE Gen2 PHY (1 Lane)	5Gbps	★	★	★			
PCIE2X2	PCIE Gen2 PHY (2 Lane)	5Gbps(10Gbps)	★	★	★			
PCIE2X4	PCIE Gen2 PHY (4 Lane)	5Gbps(20Gbps)	★	★	★			
PCIE3X4	PCIE Gen3 PHY (4 Lane)	8Gbps(32Gbps)	☆	★				
RPIO	Rapid IO PHY	Up to 6.25Gbps	★	★	☆			
MIPID	MIPI D-PHY	80Mbps ~ 1.5Gbps	☆	★	☆			
MIPIM	MIPI M-PHY	1.25Gbps ~ 6Gbps	☆	★	☆			

★: Silicon Proven

☆: Design Ready

High Speed I/O

■ LVDS IO

IPGoal provides LVDS IPs which can be operated up to 1.5Gbps. These IPs are highlighted with low power consumption and high receiver sensitivity. They can also be customized according to specific demands.

■ Key Features

- Support operating rate up to 750MHz/1.5Gbps
- Compatible with the ANSI/TIA/EIA-644-A LVDS standard
- Programmable output drive strength
- Support internal or external voltage reference
- Support internal or external reference resistance

■ DDR II IO

IPGoal's DDR II IO IP is for the application of DDR2 SDRAM interface, i.e., the double data rate synchronous dynamic random-access memory interface.

■ Key Features

- Support operating data rate up to 533MHz/1066Mbps
- Support ONFI3.2 interface NV-DDR2-533Mbps, NV-DDR-250Mbps, SDR applications
- Support SSTL_18 and SSTL_2 operating modes
- Programmable on-die terminal
- Programmable output drive strength

IP Description	Type	Data Rate	Process (nm)					
			40	55	65	110	130	180
LVDS10	LVDS IO	750MHz 1.5Gbps	★	★	★	★		
SSTL18	DDR II IO	1066Mbps	★	★	☆	★	★	
SSTLNV18	NV DDR II IO	1066Mbps	★	★	☆	★	★	

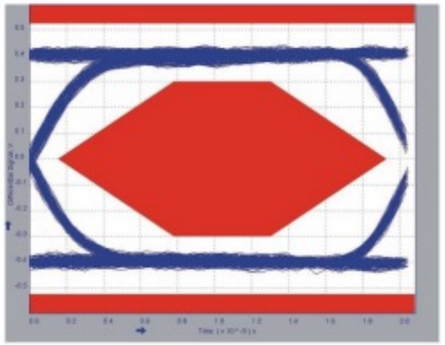
★: Silicon Proven

☆: Design Ready

Universal Interface

■ USB2.0 & USB1.1 PHY

IPGoal provides a complete solution to USB2.0 physical layer with the UTMI interface, including Device, Host, OTG and Hub, and its crystal free version is for cost sensitive applications. IPGoal also provides USB 1.1 PHY IP, crystal and crystal-free for low speed applications.



■ Key Features

- Support internal reference clock or external 12MHz crystal reference clock
- Compliant with UTMI Specification Version 1.0
- Compliant with USB2.0 and USB1.1 specification
- Support USB-IF Certification
- Support HS(480Mbps)/FS(12Mbps)/LS(1.5Mbps) modes
- 16-bit, 30MHz or 8-bit, 60MHz parallel interface
- All required terminations, including 1.5K ohm pull-up on DP, are internal to chip
- Serializing and De-serializing for transmitting and receiving data stream
- USB Data Recovery and Clock Recovery on receiving
- SYNC field and EOP detection on receive packets
- SYNC field and EOP generation on transmit packets
- Integrated Bit Stuffing and De-stuffing
- NRZI encoding and decoding
- 8-bit unidirectional Data Bus with handshake pins for 8-bit interface
- 16-bit bi-directional Data Bus with handshake pins for 16-bit interface
- Analog-BIST test mode
- Support detection of USB reset, suspend and resume signaling
- Low power consumption and small die size

IP Description	USB Type	Application	Oscillator	Process (nm)					
				40	55	65	110	130	180
UBT6800/7800	USB2.0	Device	Crystal	☆	★	★	★	★	★
UBT6900	USB2.0	Host	Crystal	☆	☆	☆	☆	★	★
UBT6920/7920	USB2.0	OTG	Crystal	★	★	★	★	★	★
UBT8800	USB2.0	Device	Crystal free	★	★	★	★	★	★
UBT8900	USB2.0	OTG	Crystal free	★	★	★	☆	☆	☆
UBT6100	USB1.1	Device	Crystal	★	★	★	★	★	★
UBT8100	USB1.1	Device	Crystal free	★	★	★	★	★	★

★: Silicon Proven

☆: Design Ready

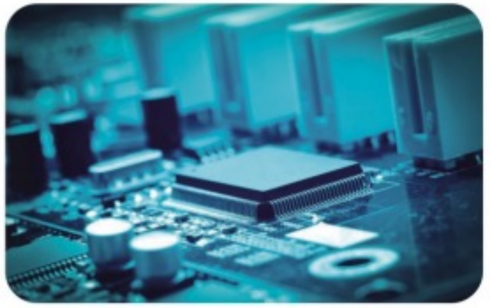
Data Converter

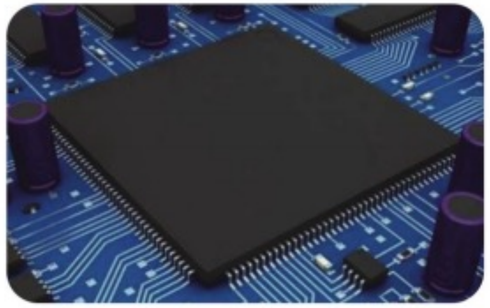
■ SAR ADC

IPGoal's SAR ADC IPs provide a series of high performance ADCs with resolution range from 8bit to 14bit. They support both single and differential end input signal and have a high common-mode rejection ratio. These SAR ADC IPs can be widely adopted in various types of applications. The customization is available as required.

■ Key Features

- Fully single ended input & differential input
- Digital power off protection
- Programmable internal voltage reference
- Single/dual power supply capability
- I2C/SPI control bus (optional)
- Support multi-channel input
- Support continuous and discontinuous conversion mode
- Support comparator mode
- Low power consumption and small die size





IP Description	Bit Width (bit)	Sampling Rate (sps)	ENOB (bit)	Process (nm)					
				40	55	65	110	130	180
SAD2014	14	200K	12.0 ~ 12.8	☆	★	★	★	★	★
SAD2M12	12	2M	10.5 ~ 11.3	★	★	★	★	★	★
SAD1M12	12	1M	10.5 ~ 11.3	★	★	★	★	★	★
SAD2012	12	200K	10.8 ~ 11.3	★	★	★	★	★	★
SAD100M10	10	100M	9.0 ~ 9.6	☆	★	★	☆		
SAD40M10	10	40M	9.0 ~ 9.6	☆	☆	☆	★	★	★
SAD2M10	10	2M	9.2 ~ 9.8	★	★	★	★	★	★
SAD1M10	10	1M	9.2 ~ 9.8	★	★	★	☆	☆	☆
SAD2010	10	200K	9.2 ~ 9.8	★	★	★	★	★	★
SAD100M08	8	100M	7.2 ~ 7.8	☆	★	★	☆	☆	
SAD40M08	8	40M	7.3 ~ 7.8	☆	☆	☆	★	★	★

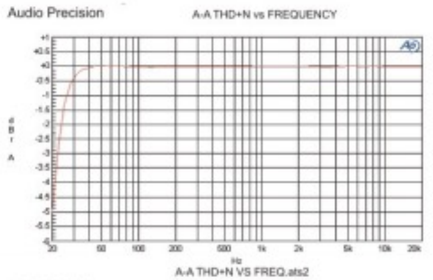
★: Silicon Proven

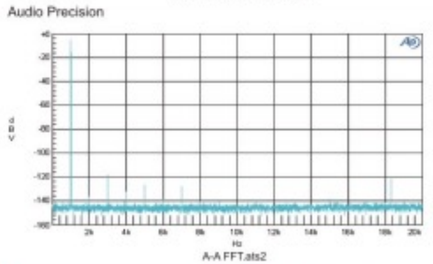
☆: Design Ready

Data Converter

■ Audio CODEC

IPGoal's CODEC IPs support 16bit ~ 24bit bandwidth, 8KHz ~ 96KHz sample rate with low power consumption and small die size. For different applications, IPGoal provides Coder (ADC) module or Decoder (DAC) module. The IPs can also be customized according to customer's demands.





■ Key Features

- Programmable master mode and slave mode
- Support 256Fs /384Fs /12M /24M mode (can be customized based on customer's demands)
- Programmable gain control for DAC and ADC
- Programmable AGC / Noise Gate in record (ADC) path
- Support Cap or Cap-less couple mode, more than 8Ω load resistance
- Support input mode:
  - Differential MIC Mode,
  - Pseudo differential MIC Mode,
  - Single-ended MIC Mode,
  - Pseudo differential Line Mode,
  - Single-ended Line Mode,
  - Single-ended MIC and Line Mode
- Low-noise bias supplied for electret microphones
- ADC Programmable high pass filter (wind noise reduction)
- I2C/SPI control bus
- I2S audio serial data bus
- Programmable power control
- Digital power off protection
- Pop and click suppression
- Low power consumption and small die size

IP Description	Bit Width (bit)	Sampling Rate (sps)	SNR (dB)		Process (nm)					
			DAC	ADC	40	55	65	110	130	180
DCD Series (ADC / DAC)	16	8K ~ 96K	94 ~ 96	92 ~ 95	★	★	★	★	★	★
	18	8K ~ 96K	96 ~ 99	92 ~ 95	★	★	★	★	★	★
	20 ~ 24	8K ~ 96K	96 ~ 106	92 ~ 100	★	★	★	★	★	★
DEC Series (DAC)	16	8K ~ 96K	94 ~ 96		★	★	★	★	★	★
	18	8K ~ 96K	96 ~ 99		★	★	★	★	★	★
	20 ~ 24	8K ~ 96K	96 ~ 106		★	★	★	★	★	★
AAD Series (ADC)	16	8K ~ 96K		92 ~ 95	★	★	★	★	★	★
	18	8K ~ 96K		92 ~ 95	★	★	★	★	★	★
	20 ~ 24	8K ~ 96K		92 ~ 100	★	★	★	★	★	★

★: Silicon Proven

☆: Design Ready

Data Converter

■ Other DAC & ADC

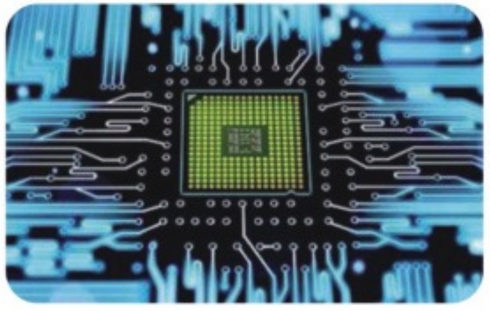
For high-speed applications, IPGoal provides 10bit ~ 12bit 200Msps DAC and Pipeline ADC. For high linearity applications, IPGoal provides 10bit~12bit Resistor String DAC.

■ Key Features

Current-Steering DAC
- Support multiple channels
- On-chip reference voltage

Pipeline ADC
- Support single or IQ input
- Low power consumption and small die size

Resistor String DAC
- High linearity
- Low power consumption and small die size



IP Description	Bit Width (bit)	Update Rate (sps)	ENOB (bit)	Process (nm)					
				40	55	65	110	130	180
Current-Steering DAC									
VDAC12	12	200M	10.2 ~ 10.8	★	★	★	★	★	★
VDAC10	10	200M	9.0 ~ 9.5	★	★	★	★	★	★
Pipeline ADC									
PAD200M12	12	200M	10.2 ~ 11.1	☆	★	★			
PAD200M10	10	200M	9.3 ~ 9.6	☆	★	★			
Resistor string DAC									
RDAC12	12	1M	10.4 ~ 10.8	★	★	★	★	★	★
RDAC10	10	1M	9.2 ~ 9.6	★	★	★	★	★	★

★: Silicon Proven

☆: Design Ready

CLOCK

■ PLL & DLL

IPGoal provides integer-N PLL and fractional-N PLL with output frequency range from 12MHz to 12.5GHz. According to specific demands, these PLL IPs can be customized with features such as low power, low noise and small die size.

IPGoal also provides DLL with output range from 100MHz to 333MHz.

■ Key Features

- High reliability and adjustability
- Low noise, 1.5ps rms @ 6.25GHz
- High-precision for fractional-N PLL(with 50 ppm output frequency variation)
- Programmable frequency division ratio
- Ultra low power consumption
- Small die size

IP Description	Type	Output Frequency (Hz)	Process (nm)					
			40	55	65	110	130	180
PLL50M	Integer-N	12M ~ 100M	★	★	★	★	★	★
PLL120M	Integer-N	80M ~ 160M	★	★	★	★	★	★
PLL200M	Integer-N	100M ~ 300M	★	★	★	★	★	★
PLL500M	Integer-N	300M ~ 800M	★	★	★	★	★	
PLL1G	Integer-N	500M ~ 1.2G	★	★	★	★	★	★
PLL6G	Integer-N	1.25G ~ 8.0G	★	★	★			
PLL10G	Integer-N	2.5G ~ 12.5G	★	★				
PLLF12M	Fraction	11.25M ~ 12.75M	★	★	★	★	★	★
PLLF48M	Fraction	45M ~ 54M	★	★	★	★	★	★
PLL200M	Fraction	180M ~ 220M	★	★	★	★	★	
PLL500M	Fraction	450M ~ 550M	★	★	★	★		
PLL6G	Fraction	2.5G ~ 8.0G	★	★	★			
PLL10G	Fraction	2.5G ~ 12.5G	★	★				
DLL106	N/16	100M ~ 333M	☆	★	★	★	★	★
DLL300	N/20	100M ~ 333M	☆	★	★	★	★	★

★: Silicon Proven

☆: Design Ready

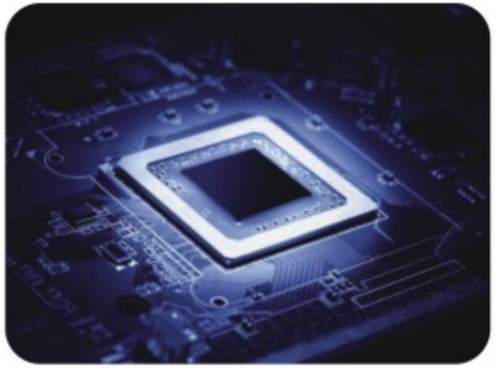
CLOCK

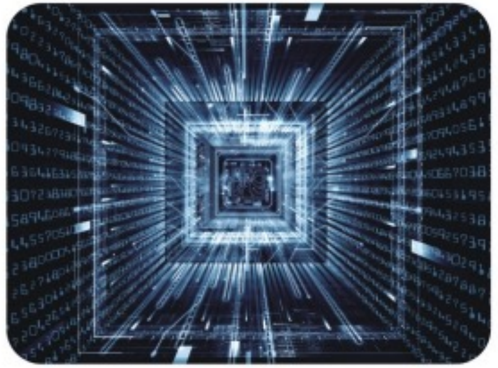
■ RC Oscillator

IPGoal's RC Oscillator serial IPs provide on-chip oscillator solutions with low power consumption, low temperature sensitivity and high output accuracy.

■ Key Features

- Low temperature coefficient, ±0.5%
- Ultra-low power consumption(lower than 100nA @ 32kHz)
- Wide adjustment range and trimming accuracy
- High power supply rejection
- Low jitter
- Small die size





IP Description	Output Frequency (Hz)	Temperature Coefficient		Process (nm)					
		-20℃~85℃	-40℃~125℃	40	55	65	110	130	180
RTC32	32K±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC1M	1M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC2M	2M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC4M	4M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC8M	8M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC12M	12M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC24M	24M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC36M	36M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC48M	48M±0.5%	±0.5%	±1%	★	★	★	★	★	★
RCOSC300M	300M±0.5%	----	----	☆	★	★	★	★	☆

★: Silicon Proven

☆: Design Ready

PMU

■ LDO

IPGoal provides 1.2V/1.5V/1.8V/2.5V/3.3V output LDO with or without external capacitor (LDOC or LDONC series) and LDO supporting multiple levels of output voltages (PMB series). Also, LDO with specific features, such as ultra low power consumption, low noise, high PSRR, etc, can be customized according to customer's demands.

■ Key Features

- High PSRR and low noise
- Low voltage drop
- Low temperature coefficient
- Thermal, over-current, over-voltage protection
- Fast transient response
- High precision, output voltage accuracy can reach ±1% after trimming
- Ultra low power consumption and small die size

IP Description	Output Voltage (V)	Output Current (mA)	Quiescent Current (μA)	Power Supply (V)	Process (nm)					
					40	55	65	110	130	180
LDOC (with external capacitor)	3.3±10%	250	10	3.6 ~ 5.0	☆	★	★	★	★	★
	2.5±10%	10	<1	3.0 ~ 3.6	★	★	☆	★	★	☆
	1.8±10%	10	<1	2.5 ~ 3.6	☆	★	★			★
	1.8±10%	200	10	2.0 ~ 3.6	☆	★	★	★	★	★
	1.5±10%	200	10	2.0 ~ 3.6					★	
	1.2±10%	10	<1	2.0 ~ 3.6	☆	★	★	★	★	
	1.2±10%	200	10	2.0 ~ 3.6	☆	★	★	★	★	
	0.9±10%	10	<1	1.7 ~ 3.6	★					
	0.9±10%	100	10	1.7 ~ 3.6	★					
LDONC (no capacitance)	3.3±10%	250	15	3.6 ~ 5.0	☆	☆	☆	★	★	★
	1.8±10%	150	10	2.5 ~ 3.6	☆	★	★	★	★	★
	1.5±10%	150	10	2.5 ~ 3.6					★	
	1.2±10%	2	<0.5	2.0 ~ 3.6	☆	★	★	★	★	
	1.2±10%	10	<1	2.0 ~ 3.6	☆	★	★	★	★	
	1.2±10%	200	10	2.0 ~ 3.6	☆	★	★	★	★	
	0.9±10%	2	<0.5	1.7 ~ 3.6	★					
	0.9±10%	10	<1	1.7 ~ 3.6	★					
	0.9±10%	100	10	1.7 ~ 3.6	★					
PMB Series	3.3/1.8±10%	200/50	15	3.6 ~ 5.0		★	★			★
	3.3/1.2±10%	200/50	15	3.6 ~ 5.0		★	★	★	★	
	3.3/1.5±10%	200/50	15	3.6 ~ 5.0					★	

★: Silicon Proven

☆: Design Ready

PMU

■ POR & BOD

IPGoal provides POR (Power-On Reset) & BOD (Brown-Out Detector) IPs with high-precision trigger point voltage, ranged from 0.45V to 2.8V. Also, they can be customized according to specific demands.

■ Key Features

- Low standby current
- Programmable trigger point voltage
- Low temperature coefficient
- Ultra low power consumption and small die size

IP Description	Trigger Point (V)	Hysteresis Voltage (mV)	Reset Delay (μs)	Power Supply (V)	Process (nm)					
					40	55	65	110	130	180
POR33	1.0 ~ 2.5	100 ~ 200	10 ~ 500	3.3±10%	★	★	★	★	★	★
POR18	0.5 ~ 1.6	50 ~ 100	10 ~ 500	1.8±10%	★	★	★	☆	☆	★
POR12	0.45 ~ 1.0	50 ~ 100	10 ~ 500	1.2±10%		★	★	★	★	☆
POR09	0.45 ~ 0.7	50 ~ 100	10 ~ 500	0.9±10%	★					
BOD33	1.40 ~ 2.8	----	----	3.3±10%	★	★	★	★	★	★

★: Silicon Proven

☆: Design Ready

Others

■ AMP

IPGoal provides a series of power amplifiers featured by low noise, high efficiency and low power consumption for customer's choice. They can also be customized according to specific demands.

■ Sensors

IPGoal provides various types of sensors for measuring temperature, weight, deformation, pressure, voltage, etc. Each type of sensors has several specifications for customer's choice. They can also be customized according to specific demands.

IP Description	Type	Characteristic	Process (nm)					
			40	55	65	110	130	180
AMPLN	Low Noise Amplifier	<10nV/√Hz @ 1KHz <2fA/√Hz @ 1KHz	★	★	★	★	★	★
AMPAB	Class AB Amplifier	R_{LOAD}≥8Ω,THD>120dB	★	★	★	★	★	★
AMPD	Class D Amplifier	R_{LOAD}≥2Ω, Low EMI	★	★	★	★	★	★
TS	Temperature Sensor	± 1℃ from -40℃ ~ 125℃	☆	☆	☆	★	★	★
		±1.5℃ from -40℃ ~ 125℃	★	★	★	★	★	★
		±2.5℃ from -40℃ ~ 125℃	☆	★	★	★	★	★
BS	Measurement Bridge Sensor	Date rate: 10sps/80sps/2Ksps, 16bit/18bit/20bit/24bit ENOB:15bit~22bit	☆	★	☆	★	★	★
CS	Capacitor Sensor	10bit/12bit	☆	☆	☆	★	★	★
VD	Voltage Detector	4bit ~ 10bit	★	★	★	★	★	★

★: Silicon Proven

☆: Design Ready