Gamma
радиокомпоненты

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新唐科技

Знакомство с ARM микроконтроллерами NUVOTON

Микросхема записи- воспроизведения звука с микроконтроллером ARM Cortex™-M0

ISD9361

- **Core**

ARM® Cortex™-M0 core runs up to 98.304MHz. One 24-bit System tick timer for operating system support. Supports a variety of low power sleep and power down modes. Single-cycle 32-bit hardware multiplier.

NVIC (Nested Vector Interrupt Controller) for 32 interrupt inputs, each with 4-levels of priority. Serial Wire Debug (SWD) support with 2 watchpoints/4 breakpoints.

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- **Power Management**

Wide operating voltage range from 2.4V to 5.5V.

Power management Unit (PMU) providing four levels of power control.

Deep Power Down (DPD) mode with sub micro-amp leakage (<1pA).

Wakeup from Deep Power Down via dedicated WAKEUP pin or timed operation from internal low power 16KHz oscillator.

Standby mode with limited RAM retention and RTC operation (<10pA). Wakeup from Standby can be from any GPIO interrupt, RTC or BOD. Sleep mode with minimal dynamic power consumption. 3V LDO for operation of external 3V devices such as serial flash.

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- **Flash EPROM Memory**

68/100/145K bytes Flash EPROM for program code and data storage. Pre-fetch and mini-cache for near zero-wait state memory access. 4KB of flash can be configured as boot sector for ISP loader.

Support In-system program (ISP) and In-circuit program (ICP) application code update 1K byte page erase for flash

Configurable boundary to delineate code and data flash.

Support 2 wire In-circuit Programming (ICP) update from SWD ICE interface

- **SRAM Memory**

16K bytes embedded SRAM.

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- **Clock Control**

One high speed and two low speed oscillators providing flexible selection for different applications. No external components necessary.

Built-in trimmable oscillator with range of 16-50MHz. Factory trimmed within 1% to settings of 98.304MHz. User trimmable with in-built frequency measurement block (OSCFM) using reference clock of 32kHz crystal or external reference source.

Ultra-low power (<1uA) 16kHz oscillator for watchdog and wakeup from power-down or sleep operation.

External 32kHz crystal input for RTC function and low power system operation.

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- **GPIO**

Four I/O modes:

Quasi bi-direction

Push-Pull output

Open-Drain output

Input only with high impendence TTL/Schmitt trigger input selectable.

I/O pin can be configured as interrupt source with edge/level setting. Switchable pull-up.

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- **Audio Analog to Digital converter**

Sigma Delta ADC with configurable decimation filter and 16 bit output. 90dB Signal-to-Noise (SNR) performance.

Programmable gain amplifier with 32 steps from -12 to 35.25dB in 0.75dB steps. Boost gain stage of 26dB, giving maximum total gain of 61dB. Input selectable from dedicated MIC pins or analog enabled GPIO. Programmable biquad filter to support multiple sample rates from 8-32kHz. DMA support for minimal CPU intervention.

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- **Differential Audio PWM Output (DPWM)**

Direct connection of speaker 1W drive capability into 8Q load.
High efficiency 88%

Configurable up-sampling to support sample rates from 8-32kHz.
DMA support for minimal CPU intervention.

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- **Timers**

Two timers with 8-bit pre-scaler and 24-bit resolution. Counter auto reload.

- **Watch Dog Timer**

Default ON/OFF by configuration setting Multiple clock sources

8 selectable time out period from micro seconds to seconds (depending on clock source) WDT can wake up sleep.

Interrupt or reset selectable on watchdog time-out.

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- **RTC**

Real Time Clock counter (second, minute, hour) and calendar counter (day, month, year)

Alarm registers (second, minute, hour, day, month, year)

Selectable 12-hour or 24-hour mode

Automatic leap year recognition

Time tick and alarm interrupts.

Device wake up function.

Supports software compensation of crystal frequency by compensation register (FCR)

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- **PWM/Capture**

Six 16-bit PWM generators provide six single ended PWM outputs or three complementary paired PWM outputs.

The PWM generator equipped with a clock source selector, a clock divider, an 8-bit pre-scaler and Dead-Zone generator for complementary paired PWM. PWM interrupt synchronous to PWM period.

16-bit digital Capture timers (shared with PWM timers) provide rising/falling capture inputs. Support Capture interrupt

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- **UART**

UART ports with flow control (TX, RX, CTS and RTS) ч 8-byte FIFO. Support IrDA (SIR) and LIN function

Programmable baud-rate generator up to 1/16 of system clock.

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- **SPI**

SPI clock up to 24MHz.

SPI data rate in Quad mode up to 98Mbps.

Support MICROWIRE/SPI master/slave mode (SSP)

Full duplex synchronous serial data transfer

Variable length of transfer data from 1 to 4 bytes.

MSB or LSB first data transfer

2 slave/device select lines when used in master mode.

Hardware CRC calculation module available for CRC calculation of data stream. DMA support for burst transfers. Dual/Quad SPI support.

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- **I2C**

Master/Slave up to 1 Mbit/s

Bidirectional data transfer between masters and slaves Multi-master bus (no central master).

Arbitration between simultaneously transmitting masters without corruption of serial data on the bus

Serial clock synchronization allows devices with different bit rates to communicate via one serial bus.

Serial clock synchronization can be used as a handshake mechanism to suspend and resume serial transfer.

Programmable clock allowing versatile rate control. I2C-bus controller supports multiple address recognition.

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- **I2S**

Interface with external audio CODEC

Operate as either master or slave

Capable of handling 8, 16, 24 and 32 bit word sizes

Mono and stereo audio data supported

I^2S and MSB justified data format supported

Two 8 word FIFO data buffers are provided, one for transmit and one for receive Generates interrupt requests when buffer levels cross a programmable boundary Supports DMA requests, for transmit and receive

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- **Brown-out detector**

With 16 levels: 2.3V, 2,4V, 2.6V, 2.7V, 2.8V, 3.0V, 3.2V, 3.3V, 3.4V, 3.6V, 3.8V, 3.9V, 4.0V, 4.1V, 4.4V, 4.8V.

Supports time-multiplex operation to minimize power consumption Supports Brownout Interrupt and Reset option

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- **Built in Low Dropout Voltage Regulator (LDO)**

Capable of delivering 30mA load current.

Configurable for output voltage of 1.8V, 2.4V, 3.0V and 3.3V

Eight GPIO (GPIOA<7:0>) operate from LDO voltage domain allowing direct interface to, for example, 3V SPI Flash.

Can be bypassed and voltage domain supplied directly from system power.

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- **Additional Features**

Over temperature alarm. Can generate interrupt if device exceeds safe operating temperature.

Temperature proportional voltage source which can be routed to ADC for temperature

measurements.

Digital Microphone interface.

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- **Operating Temperature: -40C~85C**

- **Package:**

All Green package (RoHS) LQFP 64-pin

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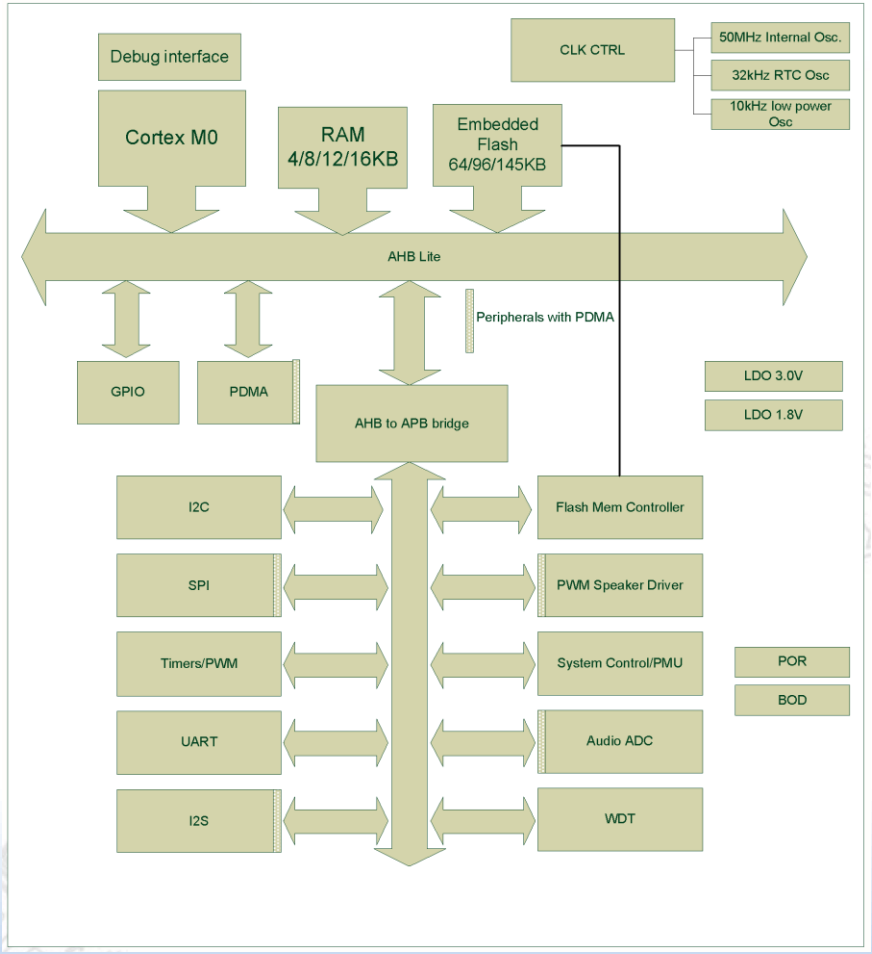

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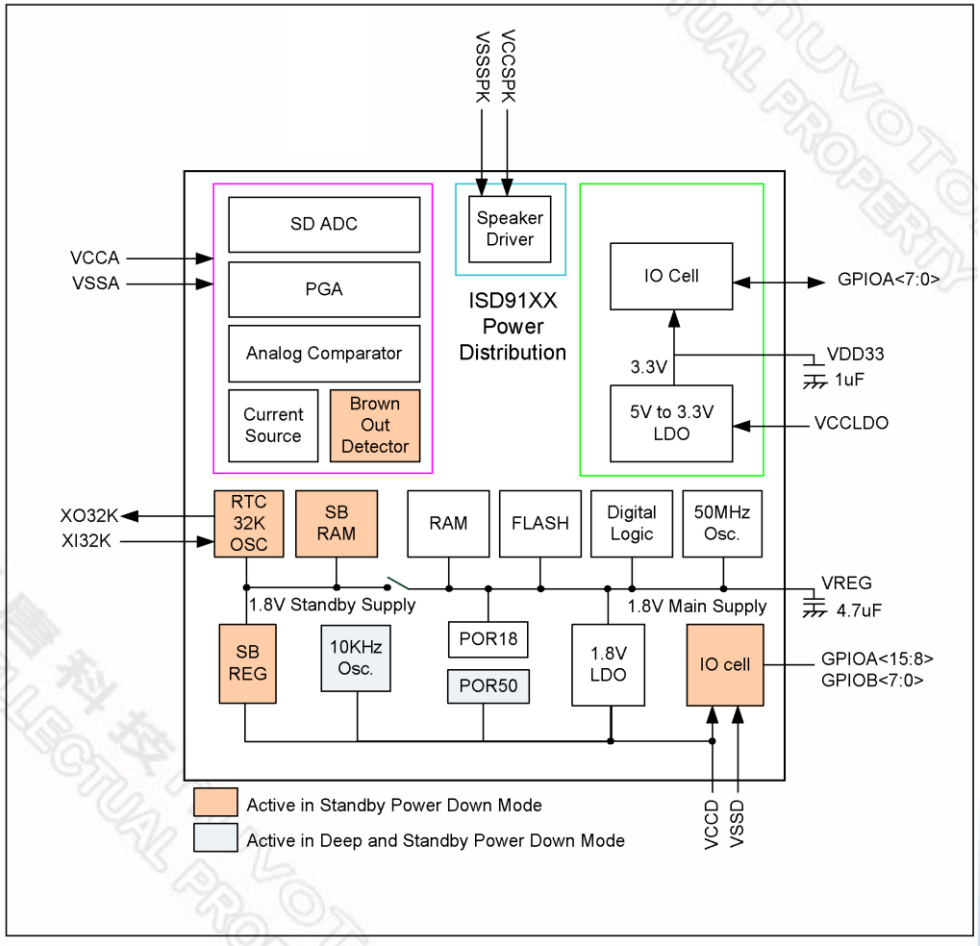

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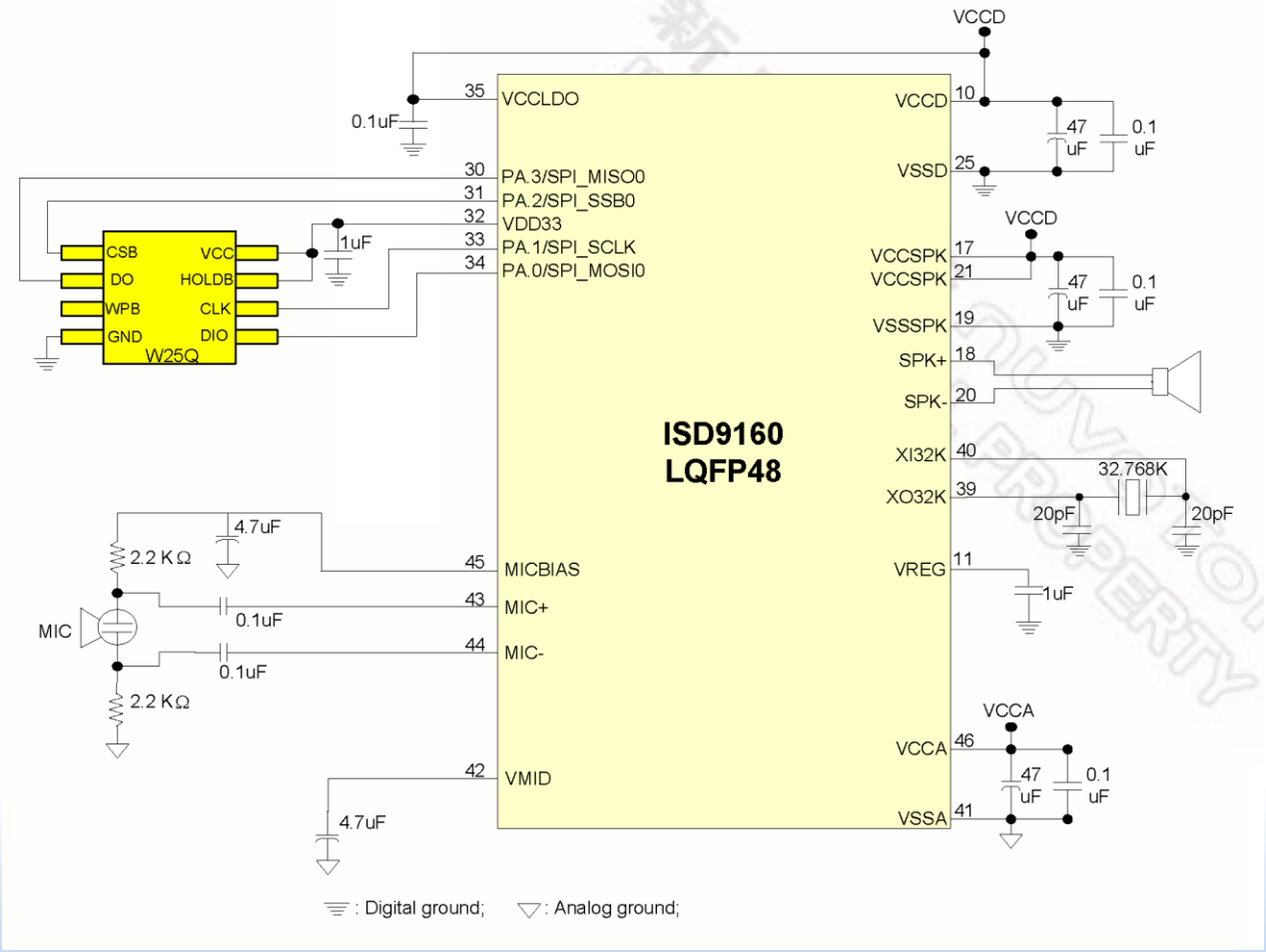

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