NTAG SmartSensor

NHS31xx Power modes

SECURE CONNECTIONS
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PUBLIC

Power modes

Active mode

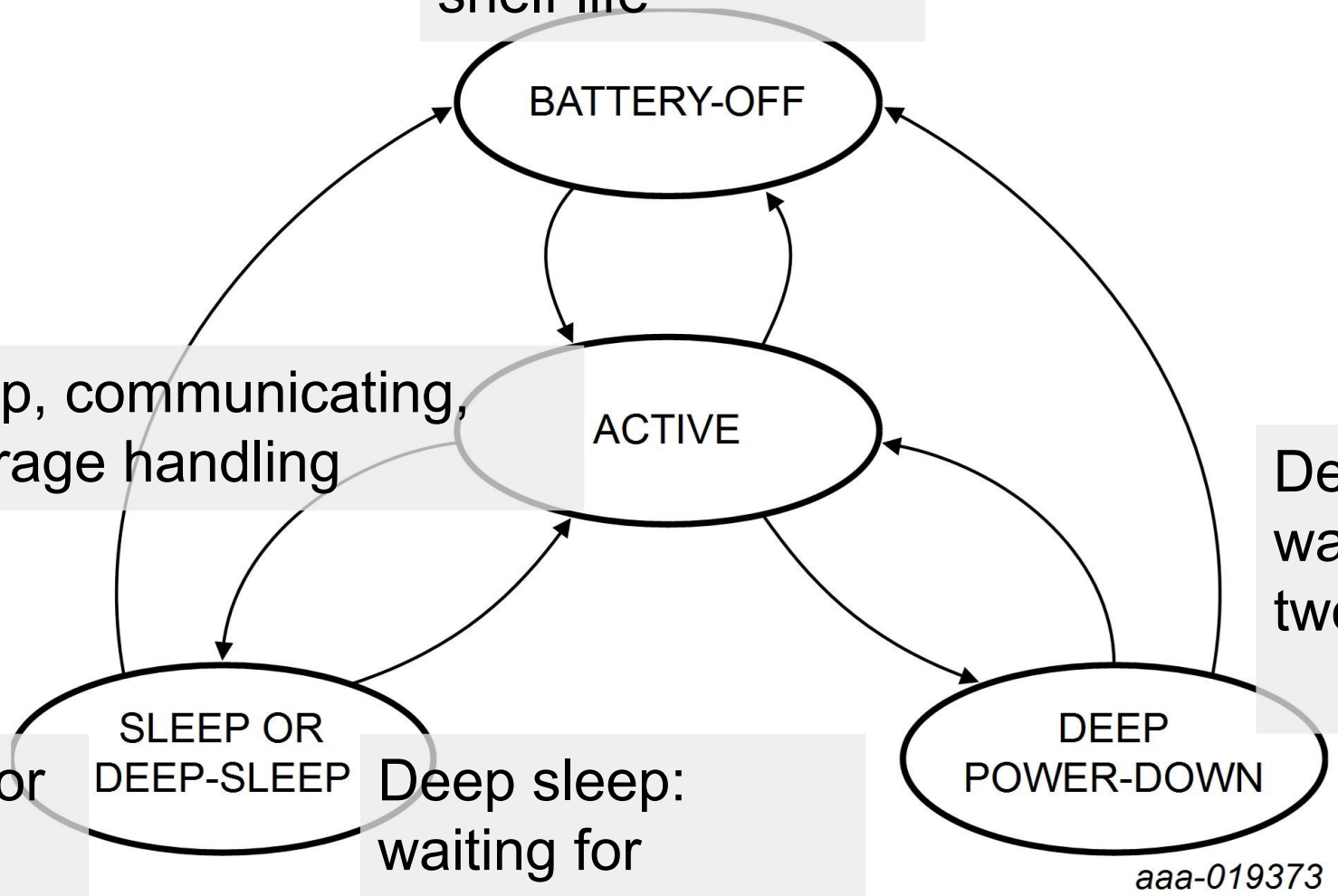
- IC is running and all features are available.
- Power and clocks to selected peripherals can be gated.

Four low power modes

- Further reduces current consumption.
- *Sleep*, *Deep sleep*, *Deep power down*, *Power-off*.

Typical usage Transitions

Power off:
shelf life



Active: setting up, communicating, interpreting, storage handling

Deep power down: wait time between two cycles

Sleep: waiting for for sensor measurement completion

Deep sleep: waiting for communication timeout

Overview 1 / 3

Active

- The system clock clocks the ARM Cortex-M0+ core and memories
- The system clock, or a dedicated peripheral clock, clocks the peripherals
- Initial mode after reset

Power-off

- All clocks are stopped
- No memory is retained
- Battery is disconnected
- Only power consumption left is in the battery switch circuitry itself
- Initial mode after physically attaching the battery

Overview 2 / 3

Sleep

- The ARM Cortex-M0+ core system clock is not clocked
- Full memory retention
- Peripheral functions continue operation
- Automatically left on any interrupt enabled by the NVIC

Deep sleep

- Sleep
- Analog peripherals and EEPROM are powered off

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Deep power down

- Analog domain is completely powered off
- Digital domain is almost completely powered off
  RTC remains powered and continues operation
- No memory retention except for a few status registers
- Always-on domain remains powered
- Only a few wake-up possibilities

Wake-up possibilities

From … to Active	PIO	GP Timer	RTC	WAKEUP pin	NFC	RESETN pin
Sleep / Deep sleep	Continue	Continue	Continue	Continue	Continue	Reset
Deep power down	✗	✗	Reset	Reset	Reset	Reset
Power-off	✗	✗	✗	✗	Reset	Reset

- Continue: typically 15-20 cycles.
- Reset: typically 2.8 msec. Dependent on BSS and DATA initialization.

HW block availability

	ARM	flash	SRAM	registers	special PMU registers	EEPROM	GP Timer	RTC	sensors	NFC	debug
Active	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sleep	not clocked	not clocked	retained	retained	retained	unaltered	✓	✓	unaltered	✓	SWD active
Deep sleep	not clocked	not clocked	retained	retained	retained	✗	✓	✓	✗	✓	SWD active
Deep power down	✗	✗	✗	✗	retained	✗	✗	✓	✗	✓ Wakeup	✗
Power-off	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓ Wakeup	✗

Current consumption

In *Active* mode, running at 0.5MHz

- Estimated static current: 66 µA
- Estimated dynamic current: 90 µA

In *Deep power down* mode

- 3 µA @3V
- 2 µA @2V

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