Dual Interface, Contact and Contactless FLASH Based Smart Card Integrated Circuit

Contact Interface
- Voltage Supply Class A, B: 3V to 5.0V ± 10%
- ISO 7816-3 compliant electrical interface
- ISO 7816-3 compliant reset and response T=0 and T=1
- > 3 kV ESD Protection HBM

Contact less Interface
- RF Field from 1.5 A/m to 7.5 A/m
- ISO 14443 Type A / Type B (106kbs – 847 kbps)
- Coils > 3 kV ESD Protection HBM

CPU
- Software compatible CMOS 80X51 industry standard
- Accelerated architecture
- Up to 30 MHz internal CPU clock
- Far pointers extended address space support

Low Power Modes
- Selectable Idle and Stop modes
- NVM update operation with CPU in Idle mode
- IO Transmission and Reception with CPU in Idle mode
- Max Idle current / Clock stopped: 100 uA

Security
- Hardware DES/3DES supporting ECB/CBC/MAC modes
- Hardware Random Number Generator(FIPS140-2 tested)
- Unique identification number – 4,7 or 10 Bytes according to ISO14443-3
- Secure contact, contactless NVM Manager

DMA
- Fast memories/peripheral transfers independent of CPU
- CRC, DES, COMPARE operations over transferred data

Peripherals
- 2 x Universal 8/16 bits Timers/Counters
- CRC16 Module ISO3309 and ISO13239 compatible

Memory Control
- General Purpose Non Volatile Memory (GPNVM)
- Secure Memory Management Mechanism
- Memory management HW logical to physical (LOG2PHY)
- Fast Byte programming
- GPNVM Page Smart Erase mechanism

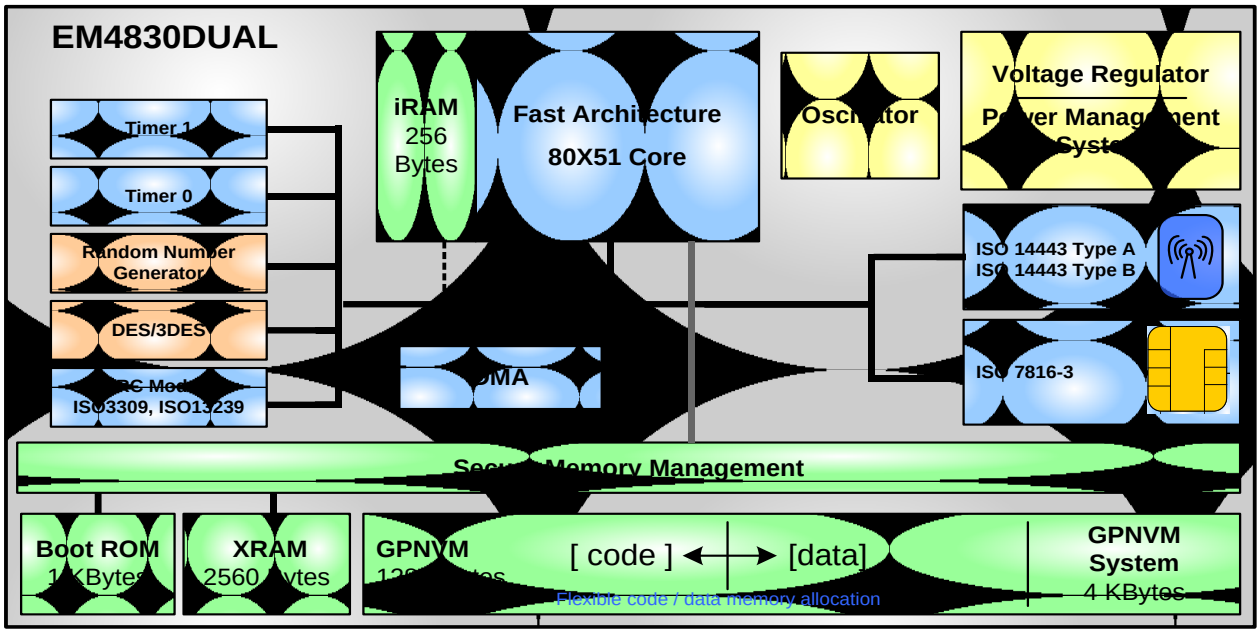
Memories
- BootROM 1 kB
- IRAM 256 B
- XRAM 2560 B
- GPNVM FLASH User 128 kB + 4kB System Area
- GPNVM FLASH Attribute memory 1056 B
- 15 year data retention GPNVM
- GPNVM Endurance > 100 K cycles

Chip Forms
- 8” Wafer sawn or unsawn
- SO8 plastic package

Typical Application:
- Public transportation
- Access control, ticketing, Loyalty programs.

Parameters
- Resonant capacitor 14pF
- Temperature range -40°C to + 85°C

Development tools
- Development tools fully integrated within Keil uVision3/4
- EMX4830 emulator
- ISO14443-3/4 Type A&B Low Level Library



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Introduction
EM4830DUAL integrated circuit is designed specifically for multi application cards in transportation and ticketing. It offers dual multiprotocol interfaces to support the largest range of applications, thus combining contact and contact-less interface technologies.

The FLASH based architecture offers a very high degree of flexibility. A solution based on EM4830DUAL can be rapidly and safely deployed in the field offering a fast time to market. The need to support the emerging multifunction and dual interface cards requires that the device can download an application under software control and run it when the device is in the field embedded in a plastic card. This application can be in the form of a script to be executed by an interpreter or as raw binary code directly executed by the processor.

Compatibility with the industry standard 8051 micro-controller guarantees the maximum availability of qualified software. The hardware implementation of the core is a modern design not relying on microcode, with an increase of up to 4 times that of a standard 8051's clocks per instruction.

GPNVM Memory
A simple and secure memory protection mechanism is relying on a flexible border between code and data space.

GPNVM User offers best fit for code data partitioning with flexible allocation only limited by the total amount of GPNVM.

GPNVM Attrib offers 2 free additional bytes per page which allow for storing a page CRC or page related attributes such as Logical Address, indicator of cycling etc or erase/write protection for every page.

GPNVM System is area with an extended protection mechanism and typically hosts the device boot loader, NVM Manager, as well as some device related parameters such as Unique ID + logistics information. NVM Manager is erasable for augmented security.

ISO14443 Interface
Powerful multiprotocol RF interface, software configurable can support ISO14443 A, B standards. This high speed interface sustains data transfer rates up to 848kbps.

Serial interface
EM4830DUAL offers a serial interface compliant with the ISO7816-3 and featuring a high speed baud rate faster then 8 clk/etu.

EM4830DUAL supports both T=0 and T=1 protocols as well as direct and inverse conventions.

DMA

The DMA block significantly improves the performance for large memory operations. DMA is up to 8 times faster than CPU in memory transfers. It can also be used to transfer data from/to peripherals in parallel with CPU operation or in low power mode when CPU is in IDLE state.

The DMA supports several operations in parallel over transferred data to be even more efficient.

- CRC checksum
- DES encryption/decryption
- Fill memory, compare memory places

DES/3DES
Symmetric encryption / decryption algorithm can be achieved using DES and Triple DES on chip HW Accelerator. This engine could be used as well in EBC, CBC and MAC modes.

Random Number Generator
The on chip random number generator is tested according to FIPS140-2 . This allows for using random numbers beyond just randomizing transmissions or generating keys.

UID size
The device supports up to 10 byte of Unique Identifier as it is defined in ISO14443 Type A.

ISO14443-3/-4 Type A&B support
EM4830DUAL is delivered with Low Level Library which supports all transport layers of ISO14443 in Type A and Type B. The library functions allow easy and fast porting of customer software to the EM4830DUAL device.

Operating System
Please, contact your sales distributor for details about Operating Systems supported by EM4830DUAL.

Development tools
Powerful development tools fully integrated into Keil uVision3/4 environment provide an efficient and user friendly development platform. An emulator EMX4830 with RF extension allows fast and efficient development and debugging directly in the customer application

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