32-bit RISC-V microcontroller for uninterruptible power supply IRL1218FI

General description

Microcontroller for uninterruptible power supply (UPS) with 32-bit RISC-V core @180 MHz clock, CLIC interrupt controller, 640Kbyte FLASH program memory (ECC-Protected), 128Kbyte RAM (ECC-Protected) and BOOT OTP 16 Kbyte. The peripherals include USB 2.0 (MAC+PHY) standard 4xUART, 2xSPI, 2xCAN-FD, 2xI2C, 1xQSPI, 1xLIN interfaces, 3x32-bit Timers, 4xEnhanced CAP, 1xEnhanced QEP, 10-channel 3x12-bit SAR ADC (3 MSPS), 8xWindowed Comparators with 12-Bit Digital-to-Analog Converter (DAC) References, 2x12-Bit Buffered DAC Outputs

Features

- Clock rate* up to 180 MHz
- Hardware-supported CAN-FD interface
- USB 2.0 High-speed
- 3x 10-channel 12-bit ADC 3MSPS
- 2x12-Bit Buffered DAC
- 8xCMPSS
- Supply voltage range 1.8÷3.6V
- Operating temperature range -40...85^{0}C
- ESD protection class 2A

General description

Core:

- 32-bit RISC-V core with RV32IAMFDCN_B_P, scalar cryptography and XGOST commands set; L1 8Kbyte data cache and 8Kbyte program cache

Memory:

- Embedded FLASH program memory of 640Kbyte (ECC-Protected)
- Embedded 128Kbyte RAM (ECC-Protected)
- BOOT OTP 16 Kbyte

Clock and power supply:

- External power supply 1.8 to 3.6V
- 1.2 V embedded voltage regulator for core power supply
- Internal power control
- HSI RC oscillator 8 MHz
- LSI RC oscillator 32 kHz
- HSE0 oscillator 2 to 16 MHz
- HSE1 oscillator 25* MHz
- Embedded PLL clock multiplier for core

Low-power mode:

- 3 separate power domains which can be independently clock-gated or switched off:
- D1: CPU, Flash, RAM, DMA
- D2: communication peripherals and timers
- D3: reset/clock control/power management

Analog modules:

- 3 x 12-bit SAR ADC (up to 10 channels, 3 MSPS) with amplitude of measured signals 0 to 3.6V
- USB 2.0 high-speed transceiver
- 8xWindowed Comparators with 12-Bit Digital-to-Analog Converter (DAC) References
- 2 x12-Bit Buffered DAC Outputs

Peripherals:

- DMA controller (Peripheral-Memory, Memory-Memory)
- 2 CAN-FD controllers
- 3x 32-bit timer/counters with PWM and event logging functions
- USB controller with Device and Host functions
- 4xUART, 2xSPI, 2xI2C master, 1xQSPI, 1xLIN controllers
- 4xEnhanced Capture (eCAP) Modules, Enhanced Quadrature Encoder Pulse (eQEP) module

Debug mode:

- JTAG