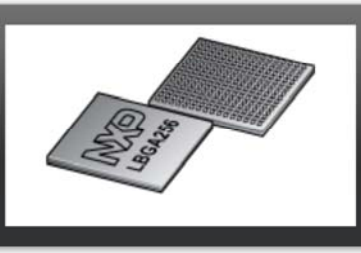

LPC4370FET256

32-bit ARM Cortex-M4 + 2 x M0 MCU; 282 kB SRAM; Ethernet;two HS USBs; 80 Msps 12-bit ADC; configurable peripherals

The LPC4370 are ARM Cortex-M4 based microcontrollers for embedded applications which include an ARM Cortex-M0 coprocessor and an ARM Cortex-M0 subsystem for managing peripherals, 282 kB of SRAM, advanced configurable peripherals such as the State Configurable Timer (SCT) and the Serial General Purpose I/O (SGPIO) interface, two High-speed USB controllers, Ethernet, LCD, an external memory controller, and multiple digital and analog peripherals including a high-speed 12-bit ADC. The LPC4370 operate at CPU frequencies of up to 204 MHz.

The ARM Cortex-M4 is a next generation 32-bit core that offers system enhancements such as low power consumption, enhanced debug features, and a high level of support block integration. The ARM Cortex-M4 CPU incorporates a 3-stage pipeline, uses a Harvard architecture with separate local instruction and data buses as well as a third bus for peripherals, and includes an internal prefetch unit that supports speculative branching. The ARM Cortex-M4 supports single-cycle digital signal processing and SIMD instructions. A hardware floating-point processor is integrated in the core.

The LPC4370 include an application ARM Cortex-M0 coprocessor and a second ARM Cortex-M0 subsystem for managing the SGPIO and SPI peripherals. The ARM Cortex-M0 core is an energy-efficient and easy-to-use 32-bit core which is code- and tool-compatible with the Cortex-M4 core. Both Cortex-M0 cores offer up to 204 MHz performance with a simple instruction set and reduced code size.

Features and benefits

- Main Cortex-M4 processor
  - ARM Cortex-M4 processor, running at frequencies of up to 204 MHz.
  - ARM Cortex-M4 built-in Memory Protection Unit (MPU) supporting eight regions.
  - ARM Cortex-M4 built-in Nested Vectored Interrupt Controller (NVIC).
  - Hardware floating-point unit.
  - Non-maskable Interrupt (NMI) input.
  - JTAG and Serial Wire Debug (SWD), serial trace, eight breakpoints, and four watch points.
  - Enhanced Trace Module (ETM) and Enhanced Trace Buffer (ETB) support.
  - System tick timer.
- Cortex-M0 coprocessor
  - ARM Cortex-M0 coprocessor capable of off-loading the main ARM Cortex-M4 processor.
  - Running at frequencies of up to 204 MHz.
  - JTAG and built-in NVIC.
- Cortex-M0 subsystem
  - ARM Cortex-M0 processor controlling the SPI and SGPIO peripherals residing on a separate AHB multilayer matrix with direct access to 2 kB + 16 kB of SRAM.
  - Running at frequencies of up to 204 MHz.
  - Connected via a core-to-core bridge to the main AHB multilayer matrix and the main ARM Cortex-M4 processor.
  - JTAG and built-in NVIC.
- On-chip memory
  - 264 kB SRAM for code and data use on the main AHB multilayer matrix plus 18 kB of SRAM on the Cortex-M0 subsystem.
  - Multiple SRAM blocks with separate bus access. Two SRAM blocks can be powered down individually.
  - 64 kB ROM containing boot code and on-chip software drivers.
  - 64 bit general-purpose One-Time Programmable (OTP) memory.
- Configurable digital peripherals
  - Serial GPIO (SGPIO) interface.
  - State Configurable Timer (SCT) subsystem on AHB.
  - Global Input Multiplexer Array (GIMA) allows to cross-connect multiple inputs and outputs to event driven peripherals like the timers, SCT, and ADC0/1.
- Serial interfaces

- Quad SPI Flash Interface (SPIFI) with four lanes and up to 52 MB per second.
- 10/100T Ethernet MAC with RMII and MII interfaces and DMA support for high throughput at low CPU load. Support for IEEE 1588 time stamping/advanced time stamping (IEEE 1588-2008 v2).
- One High-speed USB 2.0 Host/Device/OTG interface with DMA support and on-chip high-speed PHY.
- One High-speed USB 2.0 Host/Device interface with DMA support, on-chip full-speed PHY and ULPI interface to external high-speed PHY.
- USB interface electrical test software included in ROM USB stack.
- One 550 UART with DMA support and full modem interface.
- Three 550 USARTs with DMA and synchronous mode support and a smart card interface conforming to ISO7816 specification. One USART with IrDA interface.
- Two C_CAN 2.0B controllers with one channel each. Use of C_CAN controller excludes operation of all other peripherals connected to the same bus bridge.
- Two SSP controllers with FIFO and multi-protocol support. Both SSPs with DMA support.
- One SPI controller.
- One Fast-mode Plus I²C-bus interface with monitor mode and with open-drain I/O pins conforming to the full I²C-bus specification. Supports data rates of up to 1 Mbit/s.
- One standard I²C-bus interface with monitor mode and with standard I/O pins.
- Two I²S interfaces, each with DMA support and with one input and one output.

- Digital peripherals
  - External Memory Controller (EMC) supporting external SRAM, ROM, NOR flash, and SDRAM devices.
  - LCD controller with DMA support and a programmable display resolution of up to 1024 H x 768 V. Supports monochrome and color STN panels and TFT color panels; supports 1/2/4/8 bpp Color Look-Up Table (CLUT) and 16/24-bit direct pixel mapping.
  - Secure Digital Input Output (SD/MMC) card interface.
  - Eight-channel General-Purpose DMA (GPDMA) controller can access all memories on the AHB and all DMA-capable AHB slaves.
  - 164 General-Purpose Input/Output (GPIO) pins with configurable pull-up/pull-down resistors and open-drain mode.
  - GPIO registers are located on the AHB for fast access. GPIO ports have DMA support.
  - Up to eight GPIO pins can be selected from all GPIO pins as edge and level sensitive interrupt sources.
  - Two GPIO group interrupt modules enable an interrupt based on a programmable pattern of input states of a group of GPIO pins.
  - Four general-purpose timer/counters with capture and match capabilities.
  - One motor control Pulse Width Modulator (PWM) for three-phase motor control.
  - One Quadrature Encoder Interface (QEI).
  - Repetitive Interrupt timer (RI timer).
  - Windowed watchdog timer (WWDT).
  - Ultra-low power Real-Time Clock (RTC) on separate power domain with 256 bytes of battery powered backup registers.
  - Alarm timer; can be battery powered.
- Analog peripherals
  - One 10-bit DAC with DMA support and a data conversion rate of 400 kSamples/s. LBGA256 package only.
  - Two 8-channel, 10-bit ADCs (ADC0/1) with DMA support and a data conversion rate of 400 kSamples/s for a total of 16 independent channels. The 10-bit ADCs are only available on the LBGA256 package.
  - One 6-channel, 12-bit high-speed ADC (ADCHS) with DMA support and a data conversion rate of 80 MSamples/s.
- Unique ID for each device.
- Clock generation unit
  - Crystal oscillator with an operating range of 1 MHz to 25 MHz.
  - 12 MHz Internal RC (IRC) oscillator trimmed to 1 % accuracy over temperature and voltage.
  - Ultra-low power Real-Time Clock (RTC) crystal oscillator.
  - Three PLLs allow CPU operation up to the maximum CPU rate without the need for a high-frequency crystal. The second PLL is dedicated to the High-speed USB, the third PLL can be used as audio PLL.
  - Clock output.
- Power
  - Single 3.3 V (2.2 V to 3.6 V) power supply with on-chip DC-to-DC converter for the core supply and the RTC power domain.
  - RTC power domain can be powered separately by a 3 V battery supply.
  - Four reduced power modes: Sleep, Deep-sleep, Power-down, and Deep power-down.
  - Processor wake-up from Sleep mode via wake-up interrupts from various peripherals.
  - Wake-up from Deep-sleep, Power-down, and Deep power-down modes via external interrupts and interrupts generated by battery powered blocks in the RTC power domain.
  - Brownout detect with four separate thresholds for interrupt and forced reset.
  - Power-On Reset (POR).
  - Available as LBGA256 and TFBGA100 packages.

Applications

- Motor control
- Power management
- White goods
- RFID readers
- Embedded audio applications
- Industrial automation
- e-metering

Series LPC ConnectTurbo
LPC ConnectTurbo: Fastest Cortex-M microcontrollers

Series LPC4300
LPC4300

Parametric search all Cortex-M4

Parametrics of this product

Symbol	Parameter	Conditions	Min	Typ/Nom	Max	Unit
f_{max}	maximum frequency				204	MHz
T_j	junction temperature		-40		85	°C
T_{stg}	storage temperature		-65		150	°C
Timers						
N_{peri}	number of peripherals	TIM; N_{bit} = 32 bit		4		
N_{peri}	number of peripherals	WDT		1		
N_{peri}	number of peripherals	RTC		1		
N_{peri}	number of peripherals	TIM; System tick timer		1		
N_{peri}	number of peripherals	PWM		1		
Serial interfaces						
N_{peri}	number of peripherals	IrDA; one USART with IrDA interface		1		
N_{peri}	number of peripherals	CAN; $f_{bit} \leq 1$ Mbit/s		2		
N_{peri}	number of peripherals	ETH; $f_{bit} \leq 100$ Mbit/s		1		
N_{peri}	number of peripherals	I²S		2		
N_{peri}	number of peripherals	SPI		1		
N_{peri}	number of peripherals	SPIFI; $f_{bit} \leq 40$ Mbit/s		4		
N_{peri}	number of peripherals	USB; high-speed		1		
N_{peri}	number of peripherals	I²C		2		
N_{peri}	number of peripherals	UART		4		
Other peripherals						
N_{io}	number of I/O terminals			164		
N_{peri}	number of peripherals	QEI		1		
N_{peri}	number of peripherals	EMI		1		
N_{peri}	number of peripherals	GLCDC		1		
N_{peri}	number of peripherals	SDMMC		1		
Memory						
$N_{byte(on-chip)}$	on-chip memory	BOOT ROM		64		kB

Symbol	Parameter	Conditions	Min	Typ/Nom	Max	Unit
$N_{byte(on-chip)}$	on-chip memory	RAM		282		kB
Analog						
N_{peri}	number of peripherals	DAC; N_{bit} = 10 bit		1		
N_{peri}	number of peripherals	ADC channels; N_{bit} = 10 bit		8		

Similar products

- **Series** LPC ConnectTurbo
- **Series** LPC4300
- **Parametric search** all Cortex-M4
- **Parametrics** series

Package

Type number	Package	Outline version	Reflow-/Wave soldering	Packing	Product status	Marking	Orderable part number, (Ordering code (12NC))
LPC4370FET256	 LBGA256 (SOT740-2)	sot740-2_po		Tray Dry Pack, Bakeable, Single	Development	Standard Marking	LPC4370FET256E (9352 994 62551)

Quality, reliability & chemical content

Type number	Orderable part number	Chemical content	RoHS / RHF	Leadfree conversion date	EFR	IFR (FIT)	MTBF (hour)	MSL	MSL LF
LPC4370FET256	LPC4370FET256E	LPC4370FET256	EU/CN RoHs COMPLIANT Pb D	Always Pb-free				NA	3

Quality and reliability disclaimer

Documentation for this product

Download all documentation (zip)

File name	Title	Type	Format	Date
AN11318	How to implement the PMBus software stack	Application note	zip	2013-07-22
AN11351	Implementing a UART using SGPIO on LPC4300	Application note	zip	2013-07-22
AN11343	SGPIO camera module design using LPC4300	Application note	zip	2013-07-22
eagleparts_LPC43xx	eagleparts_LPC43xx EDA model	EDA model	zip	2013-07-09
LPC18XX_43XX_SCH	LPC18XX_43XX_SCH Orcad Symbols	EDA model	zip	2013-07-09
TN00007	Connecting a USB power switch to the LPC18xx / LPC43xx	Technical note	pdf	2013-03-06
sot740-2_po	plastic low profile ball grid array package; 256 balls; body 17 x 17 x 1 mm	Outline drawing	pdf	2005-08-03

Ordering & availability

Type number	Ordering code (12NC)	Orderable part number	Region	Distributor	In stock	Order quantity	Inventory date	Buy online	Samples
LPC4370FET256	9352 994 62551	LPC4370FET256E							not available

Sample

Sample orders normally take 2-4 days for delivery.
If you do not have a direct account with NXP our network of global and regional distributors is available and equipped to support you with NXP samples. As a NXP customer you also have the option to order samples via our sales organisation.

Models

File name	Title	Type	Format	Date
eagleparts_LPC43xx	eagleparts_LPC43xx EDA model	EDA model	zip	2013-07-09
LPC18XX_43XX_SCH	LPC18XX_43XX_SCH Orcad Symbols	EDA model	zip	2013-07-09

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- Find answers in our technical support site.

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