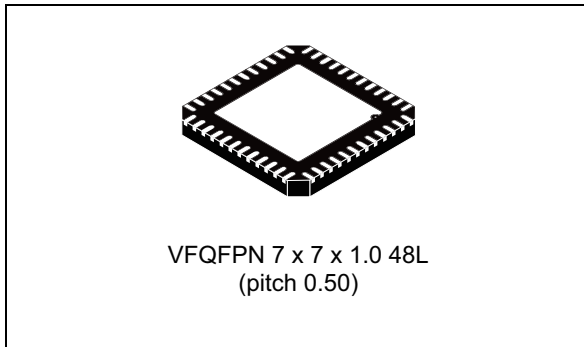


METERS AND MORE compliant power line communication system-on-chip

Data brief



Features

- METERS AND MORE protocol stack compliant power line communication system-on-chip
- High-performing, configurable DSP core for flexible PHY layer processing
 - Very robust B-PSK modulation with convolutional coding and Viterbi decoding compliant with METERS AND MORE specifications with 4.8 kbps baud rate
 - Optional high speed modes with Q-PSK and 8-PSK modulations for increased baud rates up to 28.8 kbps
 - Optional dual channel operation mode
 - Optional peak noise avoidance algorithm mode
 - Signal to noise ratio channel estimation
- 8-bit protocol engine embedding turnkey METERS AND MORE compliant data link layer
- Up to 57.6 kbps host controller UART interface
- Embedded AES-128 encryption engine for data authentication and confidentiality services
- Fully integrated analog front-end
 - ADC and DAC
 - Digital transmission level control
 - PGA with automatic gain control
 - High sensitivity receiver

- Fully integrated single-ended power amplifier for line driving
 - Up to 1 A RMS 14 V p-p output
 - Configurable active filtering topology
 - Very high linearity
 - Embedded temperature sensor
 - Current control feature
- 8 to 18 V power amplifier supply
- 3.3 V or 5 V digital I/O supply
- Embedded zero crossing detection for line phase recognition
- Suitable for CENELEC EN50065, ARIB and FCC part 15 compliant applications
- Communication carrier frequency programmable up to 250 kHz
- VFQFPN48 7 x 7 exposed pad package
- -40 °C to +85 °C temperature range

Applications

- METERS AND MORE compliant “Advanced Metering Infrastructures” (AMI)
- Sub-metering and smart grid applications
- Command and control networks

Description

The STarGRID[®] SoC ST75MM device is a flexible power line communication system-on-chip combining a high performing PHY processor and a protocol controller core implementing the turnkey METERS AND MORE protocol along with the fully integrated “Analog Front-End” (AFE) and line driver in a single chip, for future-proof, compact and cost effective advanced metering infrastructure solutions.

1 Device overview

Based on ST industrial STarGRID[®] SoC platform, the ST75MM device offers a “turnkey” power line communication solution compliant with METERS AND MORE protocol stack (see [Section 4: Reference on page 6](#)), enabling field-proven, bidirectional data transfer for “Advanced Metering Infrastructures” (AMI).

METERS AND MORE protocol meets functionality, security and communication requirements defined by the “OPEN meter” project.

METERS AND MORE protocol has been conceived and massively proven to ensure best communication efficiency, robustness and security in real field conditions, thanks to following main protocol functionalities:

- Very short message exchanges, optimized for low data rate powerline communications
- Robust narrowband BPSK modulation with powerful correction coding allowing stable point to point communication link at 4800 baud rate even in harsh noisy conditions
- Dynamic optimization of communication paths for end-to-end reliable communication in real variable conditions
- Support of high level of encryption and authentication by the use of state-of-the-art 128-bit AES algorithm
- Automatic network configuration and management for plug and play systems
- Smart retransmission management for communication robustness and bandwidth maximization

According to a simplified ISO/OSI protocol architecture, METERS AND MORE protocol specifies the physical layer (PHY), the data link layer and the application layer, including METERS AND MORE specific metering data model.

Optionally, METERS AND MORE can support other metering application layers and related data models through dedicated convergence layers defined by the association, such as for example the DLMS/COSEM application layer (IEC 62056).

In order to provide a turnkey communication system, while assuring highest application flexibility, the ST75MM embeds METERS AND MORE PHY and data link layers, leaving application layer and metering data model being managed by the external host controller,

Made using a multipower technology with state of the art VLSI CMOS lithography, the ST75MM is based on dual digital core architecture (a PHY processor engine and a protocol controller core) to guarantee outstanding communication performance.

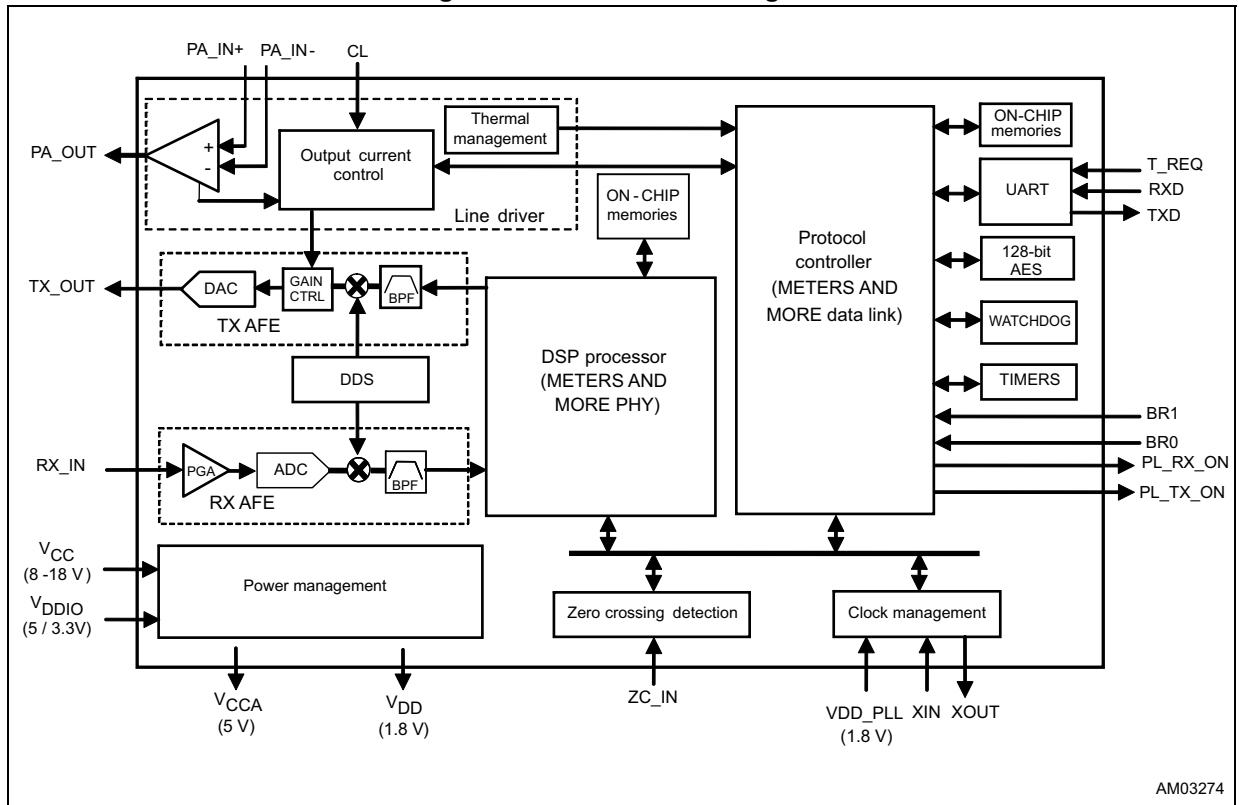
An HW 128-bit AES encryption block with customizable key management is available on chip when secure communication is requested.

The on-chip analog front-end featuring analog to digital and digital to analog conversion, automatic gain control plus the integrated power amplifier delivering up to 1 A RMS output current makes the ST75MM a unique system-on-chip for power line communication.

Line coupling network design is also very simplified leading to a very low cost BOM.

Safe and performing operations are guaranteed while keeping power consumption and signal distortion levels very low, thus making the ST75MM an ideal METERS AND MORE platform for the most stringent application requirements and regulatory compliance.

Figure 1. ST75MM block diagram



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

The ST75MM device is hosted in a 48-pin thermally enhanced “Very thin Fine pitch Quad Flat Package No lead” (VFQFPN) with exposed pad, which allows the device dissipating the heat that is generated by the operation of the two linear regulators and the Power Amplifier.

A mechanical drawing of the VFQFPN48 package is included in [Figure 2](#).

Figure 2. VFQFPN48 (7 x 7 x 1.0 mm) package outline

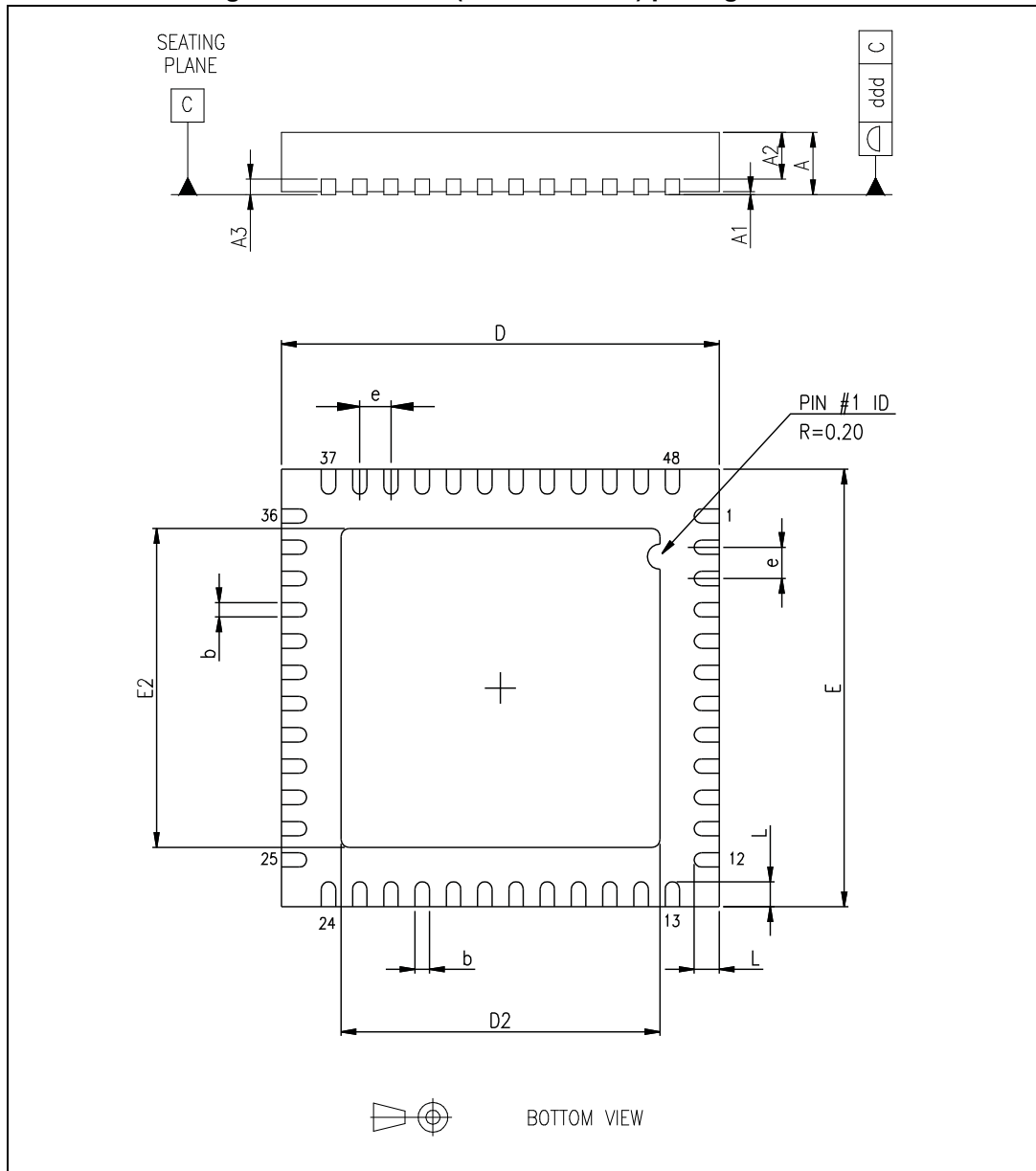


Table 1. VFQFPN48 (7 x 7 x 1.0 mm) package mechanical data

Symbol	Dimensions (mm)		
	Min.	Typ.	Max.
A	0.80	0.90	1.00
A1		0.02	0.05
A2		0.65	1.00
A3		0.25	
B	0.18	0.23	0.30
D	6.85	7.00	7.15
D2	4.95	5.10	5.25
E	6.85	7.00	7.15
E2	4.95	5.10	5.25
e	0.45	0.50	0.55
L	0.30	0.40	0.50
ddd		0.08	

3 Order codes

Table 2. Ordering information

Order codes	Package	Packing
ST75MM	VFQFPN48	Tube
ST75MMTR	VFQFPN48	Tape and reel

4 Reference

“PLC lower layers on B-PSK for the Meters and More suite” - v. 1.0.

5 Revision history

Table 3. Document revision history

Date	Revision	Changes
19-Jun-2013	1	Initial release.

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