



PRIME compliant Power Line Communications SoC

SUMMARY DATASHEET

Features

- Core
 - ADD8051C3A enhanced 8051 core
 - Speedups up to x5 vs. standard 8051 microcontroller
- Modem
 - Power Line Carrier Modem for 50 and 60 Hz mains
 - 97-carrier OFDM PRIME compliant
 - Baud rate Selectable: 21400 to 128600 bps
 - Differential BPSK, QPSK, 8-PSK modulations
- Memories
 - 32Kbytes on-chip SRAM
 - Up to 256Kbytes external SRAM
- In-circuit serial flash programming
- Auto boot-loading program from serial flash
- Automatic Gain Control and signal amplitude tracking
- Embedded on-chip DMAs
- Automatic code encryption during boot loading
- Media Access Control
 - Viterbi decoding and CRC PRIME compliant
 - 128-bit AES encryption
 - Channel sensing and collision pre-detection
- Peripherals
 - Two 2-wire UARTs
 - Two SPI. SPI to serial flash and External RTC. Buffered SPI to external metering IC
 - Programmable Watchdog
 - Up to 14 I/O lines
- Package
 - 120-lead LQFP, 14 x 14 mm, pitch 0.4 mm
 - Pb-free and RoHS compliant
- Typical Applications
 - Automated Meter Reading (AMR) & Advanced Meter Management (AMM)
 - Street lighting
 - Home Automation

Description

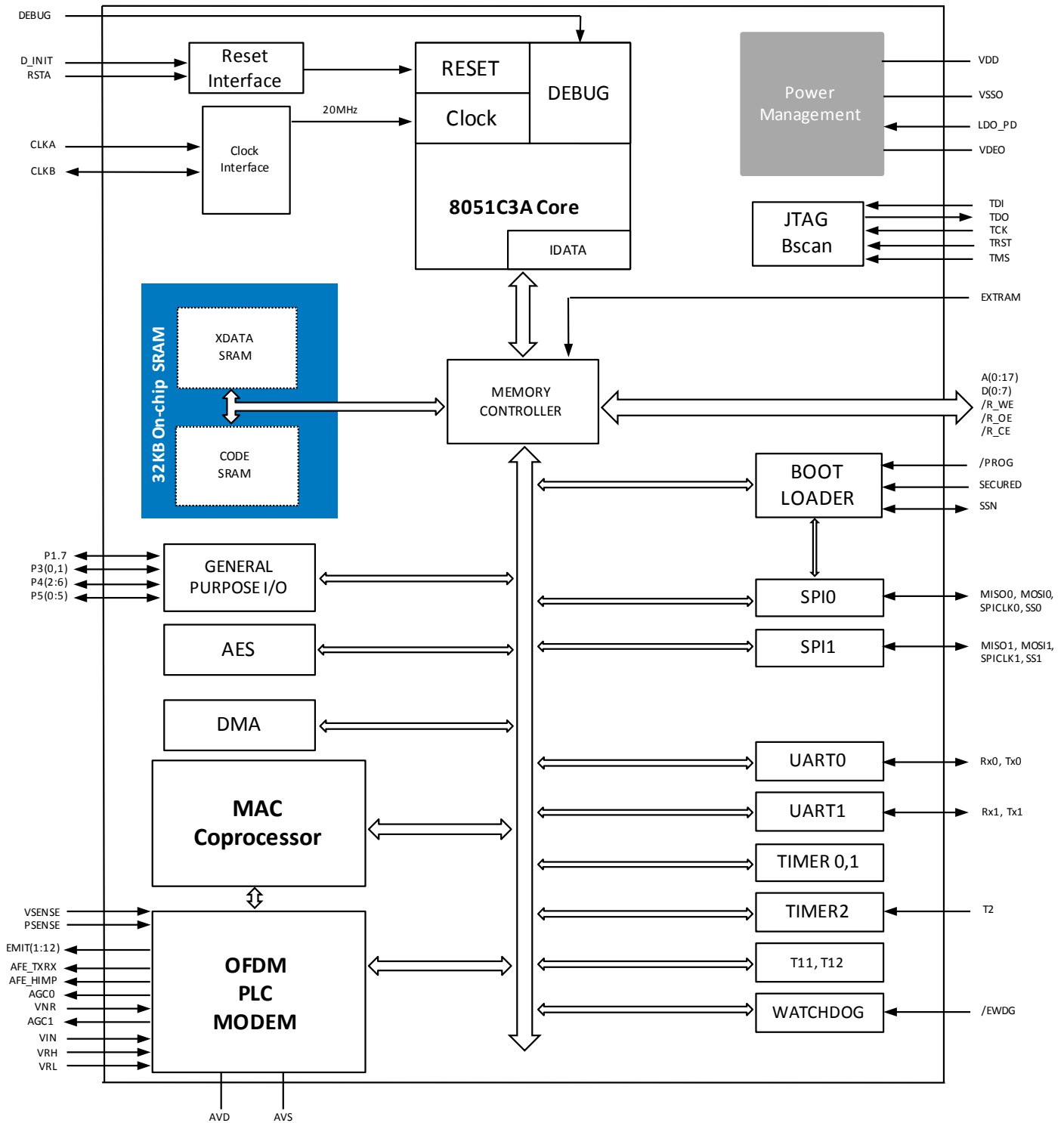
The ATPL210 is a Power Line Communications System on Chip, which implements a full PRIME compliant PLC modem. It includes an enhanced 8051 microcontroller (IP core ADD8051C3A), a Medium Access Controller (MAC) (IP core ADD1221) and a Modem circuit (IP core ADD1321) for power line medium using OFDM modulation compatible with PRIME specifications.

ATPL210 is oriented to high performance & robust AMR systems. The ATPL210 is designed to be used by meter manufacturers to provide a low cost and compact solution for AMR & AMM systems using narrow band power line communications.

This device has been developed to reduce CPU computational load in PLC systems running PRIME protocols. ATPL210 includes all necessary resources to be used as main controller in metering applications, and allows an external device to communicate according to PLC PRIME specifications.

1. Block Diagram

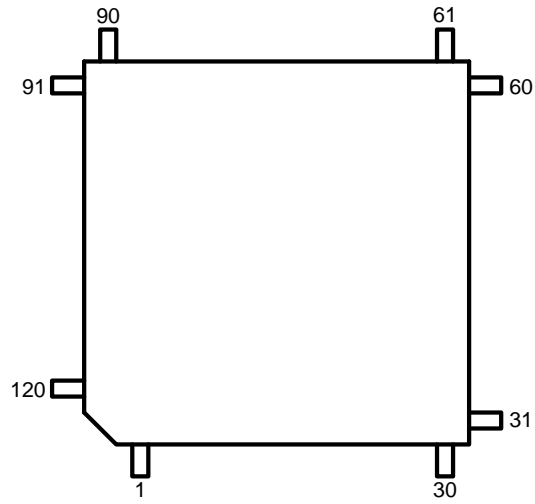
Figure 1-1. ATPL210A 120-pin Block Diagram



2. Package and Pinout

2.1 120-Lead LQFP Package Outline

Figure 2-1. Orientation of the 120-Lead Package



2.2 120-Lead LQFP Pinout

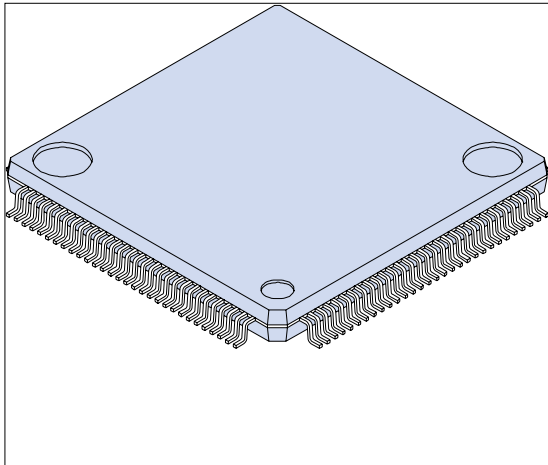
Table 2-1. ATPL210A 120-Lead LQFP pinout

| | | | | | | | |
|----|------------|----|--------------|----|---------|-----|--------------|
| 1 | A17 | 31 | P4.4/MOSI1 | 61 | TDI | 91 | P5.4/RxD1 |
| 2 | A9 | 32 | P4.3/SPICLK1 | 62 | TMS | 92 | P5.5/TxD1 |
| 3 | GND | 33 | P4.2/SS1 | 63 | TDO | 93 | NC |
| 4 | VCC | 34 | P3.0/RxD0 | 64 | GND | 94 | P4.6/T2/AGC1 |
| 5 | /R_WE | 35 | P3.1/TxD0 | 65 | GND | 95 | AGC0 |
| 6 | D4 | 36 | VCC | 66 | VCC | 96 | GND |
| 7 | D3 | 37 | GND | 67 | TRST | 97 | VCC |
| 8 | D5 | 38 | EMIT.1 | 68 | TCK | 98 | AVS2 |
| 9 | D2 | 39 | EMIT.2 | 69 | RSTA | 99 | AVD2 |
| 10 | D6 | 40 | EMIT.3 | 70 | D_INIT | 100 | AVS1 |
| 11 | D1 | 41 | EMIT.4 | 71 | GND | 101 | AVD1 |
| 12 | D7 | 42 | VCC | 72 | VCC | 102 | VRH |
| 13 | D0 | 43 | GND | 73 | GND | 103 | VIN |
| 14 | VCC | 44 | EMIT.5 | 74 | VDD | 104 | VRL |
| 15 | GND | 45 | EMIT.6 | 75 | LDO_PD | 105 | GND |
| 16 | VDD | 46 | EMIT.7 | 76 | VSS0 | 106 | VCC |
| 17 | /R_OE | 47 | EMIT.8 | 77 | VDE0 | 107 | P5.0/SS0 |
| 18 | /R_CE | 48 | VCC | 78 | VDE0 | 108 | P5.3/MISO0 |
| 19 | A8 | 49 | GND | 79 | GND | 109 | P5.2/MOSI0 |
| 20 | A0 | 50 | EMIT.9 | 80 | GND | 110 | P5.1/SPICLK0 |
| 21 | A7 | 51 | EMIT.10 | 81 | VCC | 111 | P1.7/SSN |
| 22 | A1 | 52 | EMIT.11 | 82 | CLKEA | 112 | A13 |
| 23 | A6 | 53 | EMIT.12 | 83 | GND | 113 | A14 |
| 24 | A2 | 54 | VCC | 84 | CLKEB | 114 | GND |
| 25 | A5 | 55 | GND | 85 | VCC | 115 | VCC |
| 26 | GND | 56 | AFE_HIMP | 86 | /EWDG | 116 | A12 |
| 27 | VCC | 57 | AFE_TXRX | 87 | DEBUG | 117 | A15 |
| 28 | A3 | 58 | VSENSE | 88 | EXTRAM | 118 | A11 |
| 29 | A4 | 59 | PSENSE | 89 | /PROG | 119 | A16 |
| 30 | P4.5/MISO1 | 60 | VNR | 90 | SECURED | 120 | A10 |

3. Mechanical Characteristics

Figure 3-1. 120-lead LQFP Package Mechanical Drawing

120-pin plastic LQFP



Lead pitch 0.40 mm

Package width · package length 14.0 mm · 14.0 mm

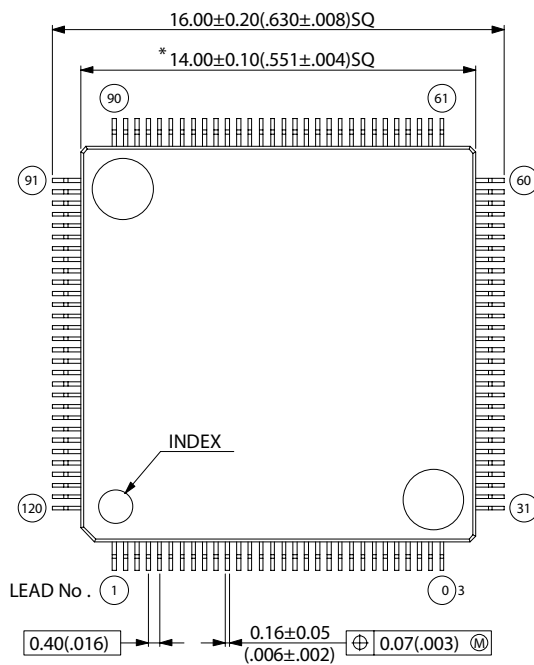
Lead shape Gullwing

Sealing method Plastic mold

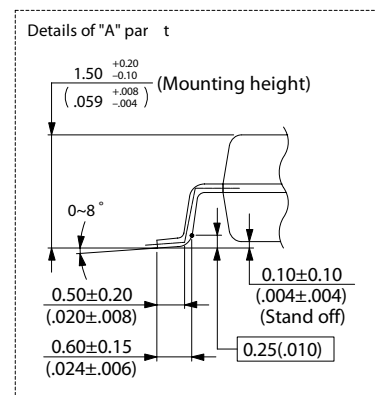
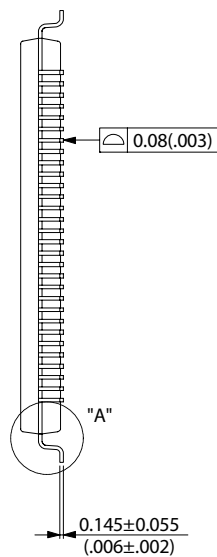
Mounting height 1.70 mm MAX

Code (Reference) P-LFQFP120-14 · 14-0.4 0

120-pin plastic LQFP



Note 1) * : These dimensions do not include resin protrusion.
 Note 2) Pins width and pins thickness include plating thickness.
 Note 3) Pins width do not include tie bar cutting remainder.



Dimensions in mm (inches).
 Note: The values in parentheses are reference values.

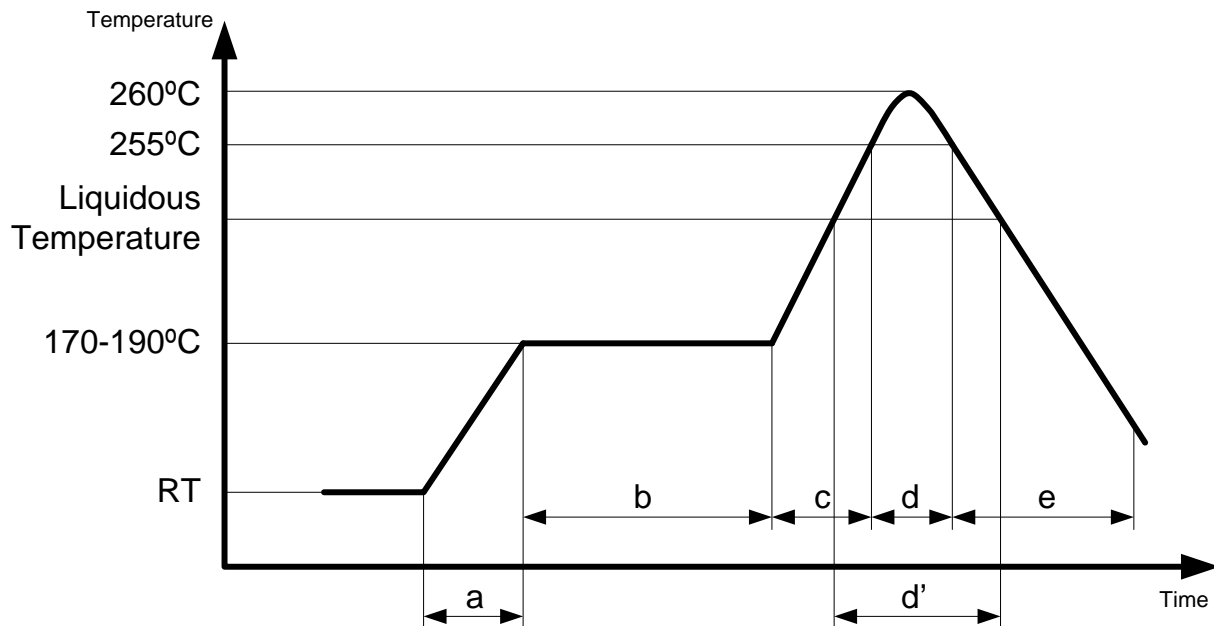
4. Recommended mounting conditions

4.1 Conditions of Standard Reflow

Table 4-1. Conditions of standard Reflow

| Items | Contents | |
|----------------------|--|---|
| Method | IR(Infrared Reflow)/Convection | |
| Times | 2 | |
| Floor Life | Before unpacking | Please use within 2 years after production |
| | From unpacking to second reflow | Within 8 days |
| | In case over period of floor life | Baking with 125°C +/- 3°C for 24hrs +2hrs/-0hrs is required. Then please use within 8 days. (please remember baking is up to 2 times) |
| Floor Life Condition | Between 5°C and 30°C and also below 70%RH required. (It is preferred lower humidity in the required temp range.) | |

Figure 4-1. Temperature Profile

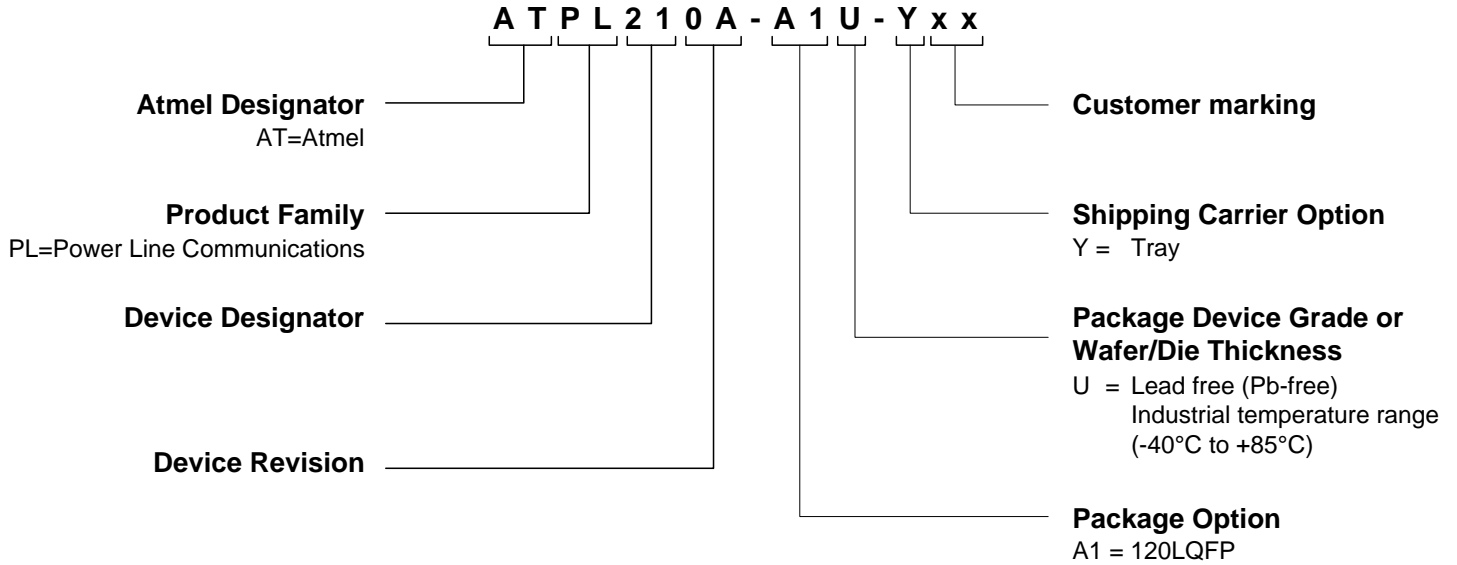


- Note:
- H rank: 260°C Max
 - a: Average ramp-up rate: 1°C/s to 4°C/s
 - b: Preheat & Soak: 170°C to 190°C, 60s to 180s
 - c: Average ramp-up rate: 1°C/s to 4°C
 - d: Peak temperature: 260°C Max, up to 255°C within 10s
 - d': Liquidous temperature: Up to 230°C within 40s or
Up to 225°C within 60s or
Up to 220°C within 80s
 - e: Cooling: Natural cooling or forced cooling

5. Ordering Information

Table 5-1. Atmel ATPL210A Ordering Codes

| Atmel Ordering Code | Package | Package Type | Temperature Range |
|---------------------|----------|--------------|---------------------------|
| ATPL210A-A1U-Y | 120 LQFP | Pb-Free | Industrial (-40°C to 85°) |



6. Revision History

| Doc. Rev. | Date | Comments |
|-----------|------------|-----------------|
| 1.00 | 30/03/2012 | Initial release |



Enabling Unlimited Possibilities™

Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131
USA

Tel: (+1)(408) 441-0311

Fax: (+1)(408) 487-2600

www.atmel.com

Atmel Asia Limited

Unit 01-5 & 16, 19F
BEA Tower, Millennium City 5
418 Kwun Tong Road

Kwun Tong, Kowloon

HONG KONG

Tel: (+852) 2245-6100

Fax: (+852) 2722-1369

Atmel Munich GmbH

Business Campus
Parkring 4
D-85748 Garching b. Munich

GERMANY

Tel: (+49) 89-31970-0

Fax: (+49) 89-3194621

Atmel Japan G.K.

16F Shin-Osaki Kangyo Building
1-6-4 Osaki
Shinagawa-ku, Tokyo 141-0032

JAPAN

Tel: (+81)(3) 6417-0300

Fax: (+81)(3) 6417-0370

© 2012 Atmel Corporation. All rights reserved. / Rev.: Product Description

Atmel®, logo and combinations thereof, and others are registered trademarks or trademarks of Atmel Corporation or its subsidiaries. Other terms and product names may be trademarks of others.

Disclaimer: The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. EXCEPT AS SET FORTH IN THE ATMEL TERMS AND CONDITIONS OF SALES LOCATED ON THE ATMEL WEBSITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS AND PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and products descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive applications. Atmel products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru