Atmel ATPL220A

PRIME compliant Power Line Communications Modem

SUMMARY DATASHEET

Features

- 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
- Memory
  - 32Kbytes on-chip SRAM
- Automatic Gain Control and signal amplitude tracking
- Embedded on-chip DMAs
- Media Access Control
  - Viterbi decoding and CRC PRIME compliant
  - 128-bit AES encryption
  - Channel sensing and collision pre-detection
- 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

ATLP220A is a PRIME (Powerline-Related Intelligent Metering Evolution) compliant ASIC specifically designed for PLC Base Nodes implementation. Systems using this ASIC support both mono-phase and multi-phase PLC injection. Mono-phase injection is achieved by means of a single ATLP220A ASIC, whereas several ATLP220A can be combined to achieve multi-phase injection based on Atmel MIMO technology.

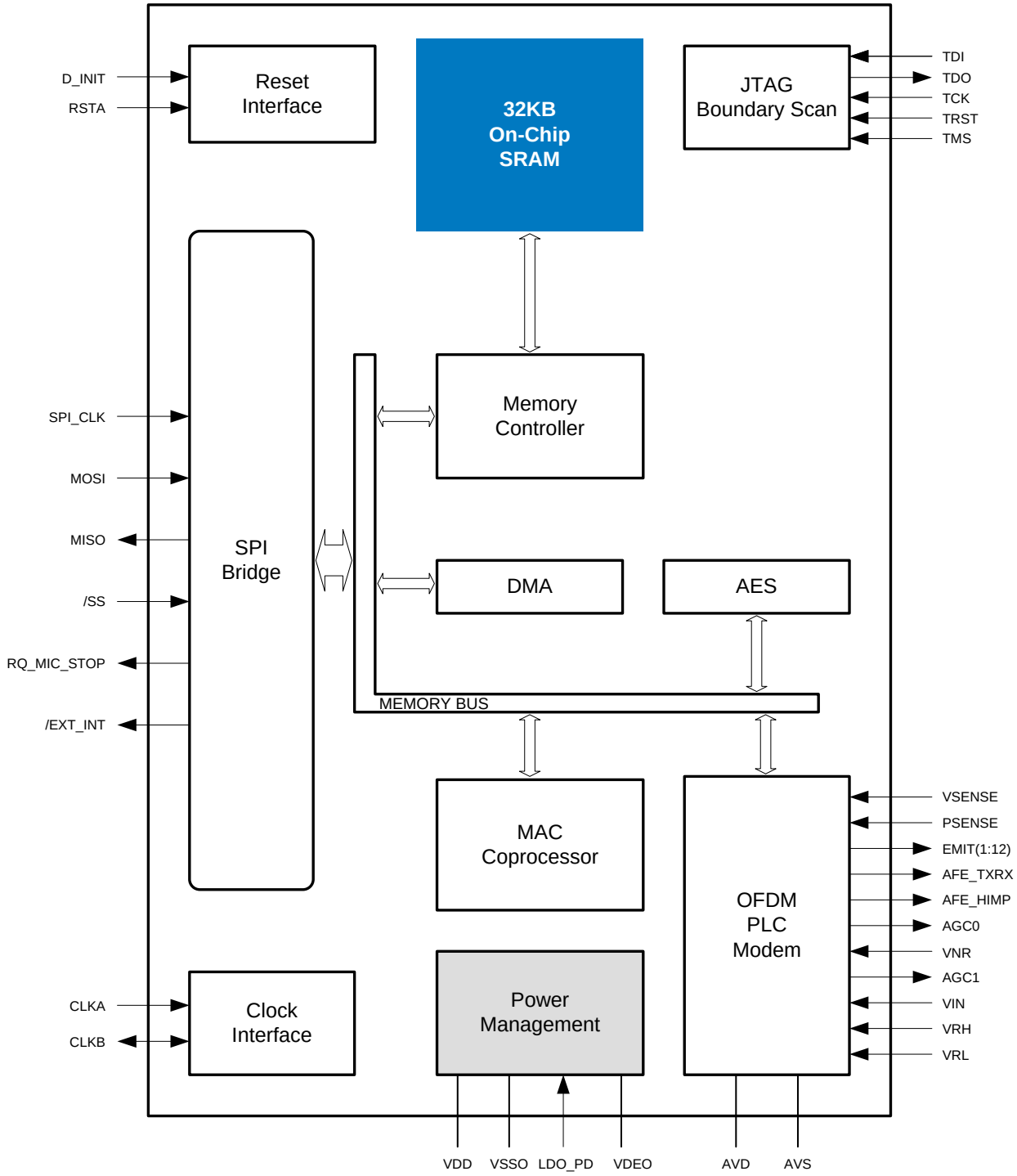
The combination of multi-phase injection and Atmel MIMO technology increases PRIME Base Nodes performance, resulting in outstanding robustness and network coverage.

ATLP220A has been conceived to be easily managed by an external microcontroller by means of an SPI interface. The external microcontroller implements Base Node upper layers (as specified in PRIME) while ATLP220A carries out PHY layer functionalities.

Line Coupling front end design is extremely simplified, bringing off a very low cost bill of materials.

1. Block Diagram

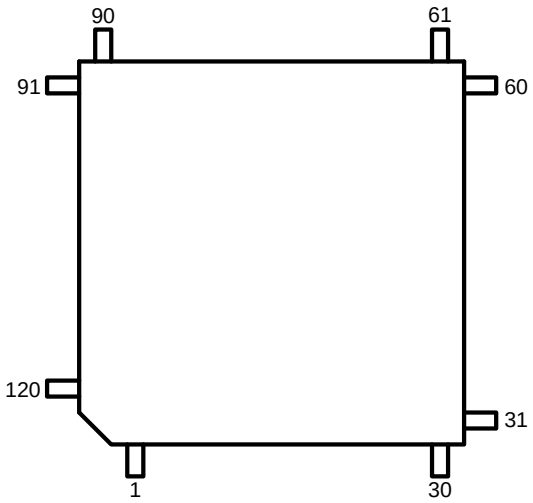
Figure 1-1. ATPL220A 120-pin Block Diagram



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

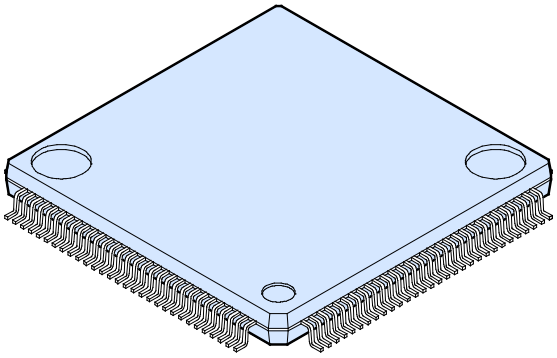
Table 2-1. ATPL220A 120-Lead LQFP pinout

1	NC	31	MOSI	61	TDI	91	NC
2	NC	32	SPICLK	62	TMS	92	NC
3	GND	33	/SS	63	TDO	93	GND
4	VCC	34	RQ_MIC_STOP	64	GND	94	AGC1
5	NC	35	/EXT_INT	65	GND	95	AGC0
6	NC	36	VCC	66	VCC	96	GND
7	NC	37	GND	67	TRST	97	VCC
8	NC	38	EMIT.1	68	TCK	98	AVS2
9	NC	39	EMIT.2	69	RSTA	99	AVD2
10	NC	40	EMIT.3	70	D_INIT	100	AVS1
11	NC	41	EMIT.4	71	GND	101	AVD1
12	NC	42	VCC	72	VCC	102	VRH
13	NC	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	NC	47	EMIT.8	77	VDE0	107	NC
18	NC	48	VCC	78	VDE0	108	NC
19	NC	49	GND	79	GND	109	NC
20	NC	50	EMIT.9	80	GND	110	NC
21	NC	51	EMIT.10	81	VCC	111	NC
22	NC	52	EMIT.11	82	CLKEA	112	NC
23	NC	53	EMIT.12	83	GND	113	NC
24	NC	54	VCC	84	CLKEB	114	GND
25	NC	55	GND	85	VCC	115	VCC
26	GND	56	AFE_HIMP	86	NC	116	NC
27	VCC	57	AFE_TXRX	87	NC	117	NC
28	NC	58	VSENSE	88	NC	118	NC
29	NC	59	PSENSE	89	NC	119	NC
30	MISO	60	VNR	90	NC	120	NC

3. Mechanical Characteristics

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

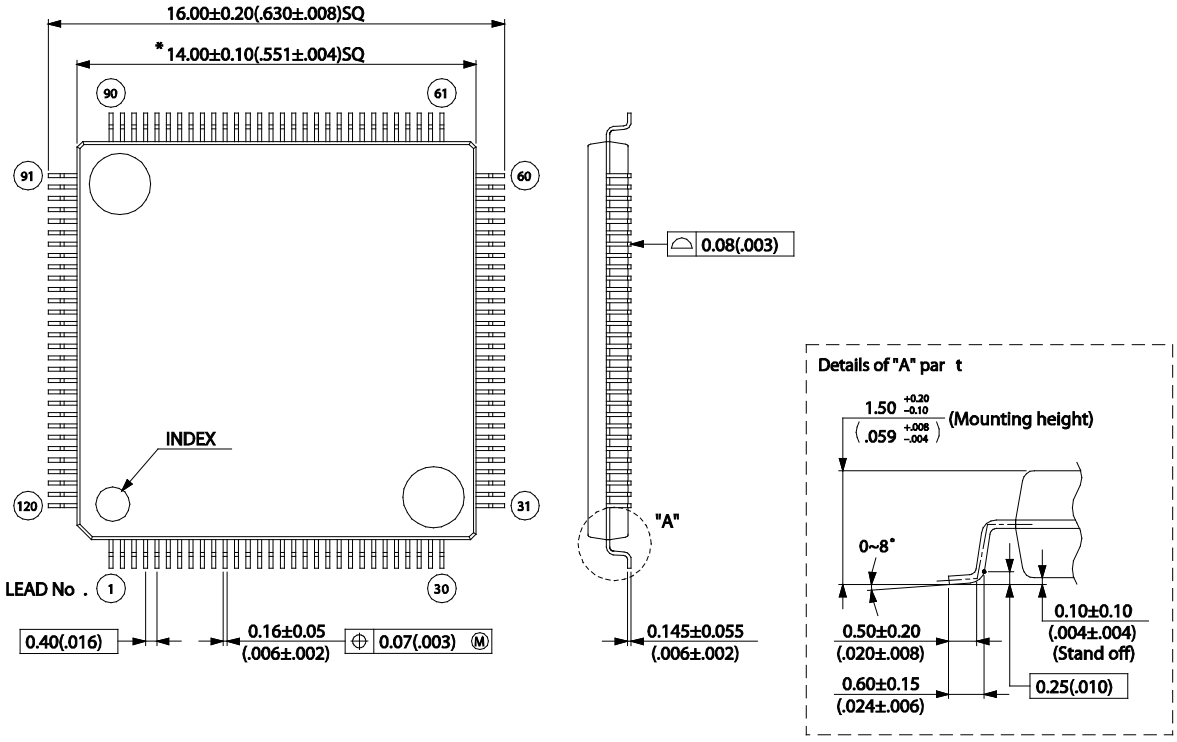
120-pin plastic LQFP



Lead pitch	0.40 mm
Pa ckage width × package length	14.0 mm × 14.0 mm
Lead shape	Gullwing
Sealing method	Plastic mold
Mounting height	1.70 mm MAX
Code (Ref erence)	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.

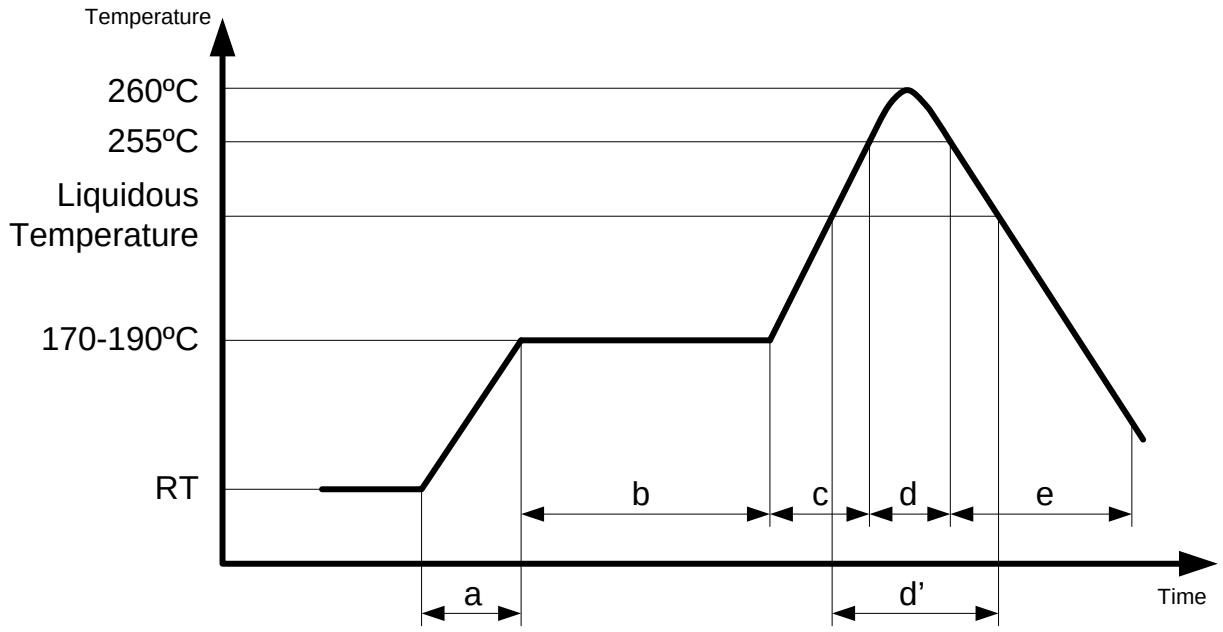
4. Recommended mounting conditions

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 125ºC +/- 3ºC for 24hrs +2hrs/-0hrs is required. Then please use within 8 days. (please remember baking is up to 2 times)
Floor Life Condition	Between 5ºC and 30ºC and also below 70%RH required. (It is preferred lower humidity in the required temp range.)	

Figure 4-1. Temperature Profile



Note: H rank: 260ºC Max

a: Average ramp-up rate: 1ºC/s to 4ºC/s

b: Preheat & Soak: 170ºC to 190ºC, 60s to 180s

c: Average ramp-up rate: 1ºC/s to 4ºC

d: Peak temperature: 260ºC Max, up to 255ºC within 10s

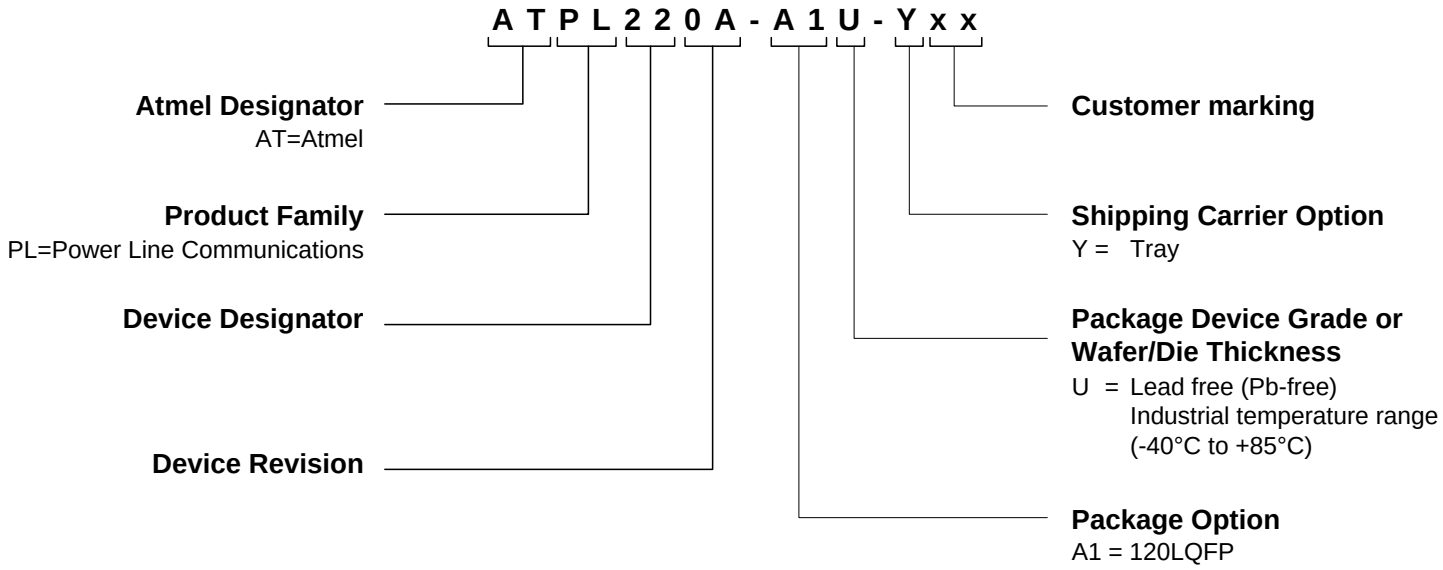
d': Liquidous temperature: Up to 230ºC within 40s or
Up to 225ºC within 60s or
Up to 220ºC within 80s

e: Cooling: Natural cooling or forced cooling

5. Ordering Information

Table 5-1. Atmel ATPL220A Ordering Codes

Atmel Ordering Code	Package	Package Type	Temperature Range
ATPL220A-A1U-Y	120 LQFP	Pb-Free	Industrial (-40ºC to 85º)



6. Revision History

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



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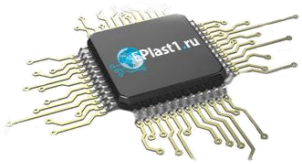
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