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*Technologies for Tomorrow*

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## Prolific PL8331

The PL8331 series of ultralow power mixed-signal processors consist of several devices featuring different sets of peripherals targeted for energy meter applications. They integrate analog front end and fixed function DSP solution with an enhanced 8052 MCU core, RTC and LCD driver in a single part. The measurement core includes active, reactive, apparent energy calculations, voltage, current RMS, and frequency measurements. This information can be used as energy billing and any necessary application. Also included is a built-in 16-bit timer, LCD segment drive capability and hardware multiplier.

The PL8331 integrates three PGAs with gain settings from 1x to 32x. Three 24-bit sigma-deltas A/D converters guarantee precision in captured data and enough needed resolution.

The microprocessor functionality includes a single-cycle 8052 core, a real-time clock, 2UARTs, and an SPI, I<sup>2</sup>C and JTAG interface. It reduces the program memory size requirement and makes it easy to integrate complicated designs.

The programming is very easy and supports different (= multiple) ways. (SPI or JTAG)

No external voltage is needed for programming.



## PL8331

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Power Meter Solutions – Product series



## MICROPROCESSOR FEATURES

- 8052-based core
- Single-cycle 8MIPS (Peak)
- 32.768 kHz external crystal with built in PLL
- Accurate RTC for time-of-use functions
- H/W watchdog timer (WDT)
- External interrupt sources
- SPI / I<sup>2</sup>C interface for EEPROM
- IrDa/UART/IR I/F for AMR
- Flash security
- 16-Bit timer
- Wake-up from I/O, temperature change, or UART
- 64kB flash memory, 2k bytes RAM
- Supply voltage supervisor/monitor with built in SAR ADC
- Serial on board programming/debugging



## ENERGY MEASUREMENT FEATURES

- Exceeds IEC62053 / ANSI C12.20 standards
- Digital signal processing (DSP) provide high accuracy active (Watt), reactive (VAR), and apparent energy (VA) measurement
- < 0.1% Error on active energy over a Dynamic Range of 2000 to 1 @25°C
- Line voltage and frequency measurements
- Phase compensation

## GENERAL FEATURES

- Wide supply voltage range: 2.4V to 5V
- Ultralow power consumption
- Normal mode:
- Total: 2.2mA @ 3V
- Sleep Mode: 3uA
- RTC only: 1.1uA
- Multi mode power saving function
- Internal switch between regulated and battery inputs
- Compatible with CTs, resistive shunts and Rogowski Coil sensors
- Digital temperature compensation
- Wake-up from standby mode in less than 5us
- Reference: 1.2V (20ppm/°C)
- Operation temperature range: -40°C to +85°C
- 64-LQFP(7x7) package



## ADC FEATURES

- Three second-order, 24-bit, delta-sigma Analog-to-Digital Converters
- Three differential input PGA front ADC (Gain=1,2,4,8,16,24,32)
- 10 bit SAR ADC with temperature sensor

## LCD FEATURES

- Up to 4x25 segment



Prolific	
Description	PL8331-64pin
Application	1p2w multi-function
<b>MCU</b>	
Core	R8051XC
Flash Size	64K
RAM Size	2K+256
MIPS(Max)	8.192
<b>LCD</b>	
COM	4
SEG	25
Bias	1/3
<b>Programming Interface</b>	JTAG/SPI
<b>I/O Interface</b>	(UART/IR/IrDa)x1
<b>Energy Measurements</b>	
Active power energy -1	√
Active power energy -2	√
Irms-2	√
Power factor -1	√
Power factor -2	√
<b>Measurement Accuracy</b>	
dynamic range	2000:1
PGA	1x/2x/4x/8x/16x/24x/32x
<b>Power Dissipation</b>	
Total (mA)	< 2.5
Sleep(uA) -- VDDBAT@3V	< 4
RTC(uA) -- RTCBAT	< 1.2
LCD display only in sleep	< 20
<b>Anti-tampering</b>	
Resistor/Capacitor/Diod	√
35KVA tampering detection	√
<b>Others</b>	
RTC Compensation	0.5ppm
RTC	√
H/W Calendar	√
H/W PWM output	√
IR carrier frequency (Hz)	30~50K
Internal OSC (anti-fail)	√
Floating point to BCD	√

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