STLUX385

Digital controller for lighting and power supply applications with 6 programmable PWM generators, 96 MHz PLL, DALI

Datasheet – preliminary data

Features

- Core
  - Max f_{CPU}: 16 MHz
  - Advanced STM8 core with Harvard architecture and 3-stage pipeline
  - Extended instruction set
- Memories
  - Flash and EEPROM with read while write (RWW) and error correction code (ECC) capability
  - Program memory: 32 Kbytes Flash; data retention 15 years at 85 °C after 10 kcycles at 25 °C
  - Data memory: 1 Kbyte true data EEPROM; data retention: 15 years at 85 °C after 100 kcycles at 85 °C
  - RAM: 2 Kbytes
- Clock management
  - Low power crystal resonator oscillator with external clock input
  - Internal, user-trimmable 16 MHz RC and low power 153.6 KHz RC oscillators
  - Internal 96 MHz PLL
  - Clock security system with clock monitor
- Interrupt management
  - Nested interrupt controller with 32 interrupt vectors
  - Three interrupt priority levels
  - Up to 12 external interrupt request lines on 2 vectors
  - Programmable NMI interrupt sources
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TSSOP38

- Analog comparators
  - 4 analog comparators with internal programmable reference voltage generated by 4 internal programmable 4-bit DACs
  - 1 analog comparator with additional external reference voltage
  - Comparator cycle time: 50 ns max
  - Repetitive conversion
- I/Os
  - 12 I/Os multifunction signals
  - Highly robust I/O design, immune against current injection
- Operating temperature
  - 25 °C to 105 °C

Description

The STLUX385 is a new STMicroelectronics low power 8-bit microcontroller with special peripherals tailored for lighting and power supply applications.

1 Introduction

The core of the STLUX385 is the enhanced STM8 MCU, providing increased power processing while maintaining the advantages of the CISC architecture, a 24-bit linear addressing mode, 8-bit data bus and an optimized architecture for low power applications.

The microcontroller includes an in-circuit debug module with a hardware interface (SWIM single wire) which allows non-intrusive application debugging and ultra-fast Flash programming code.

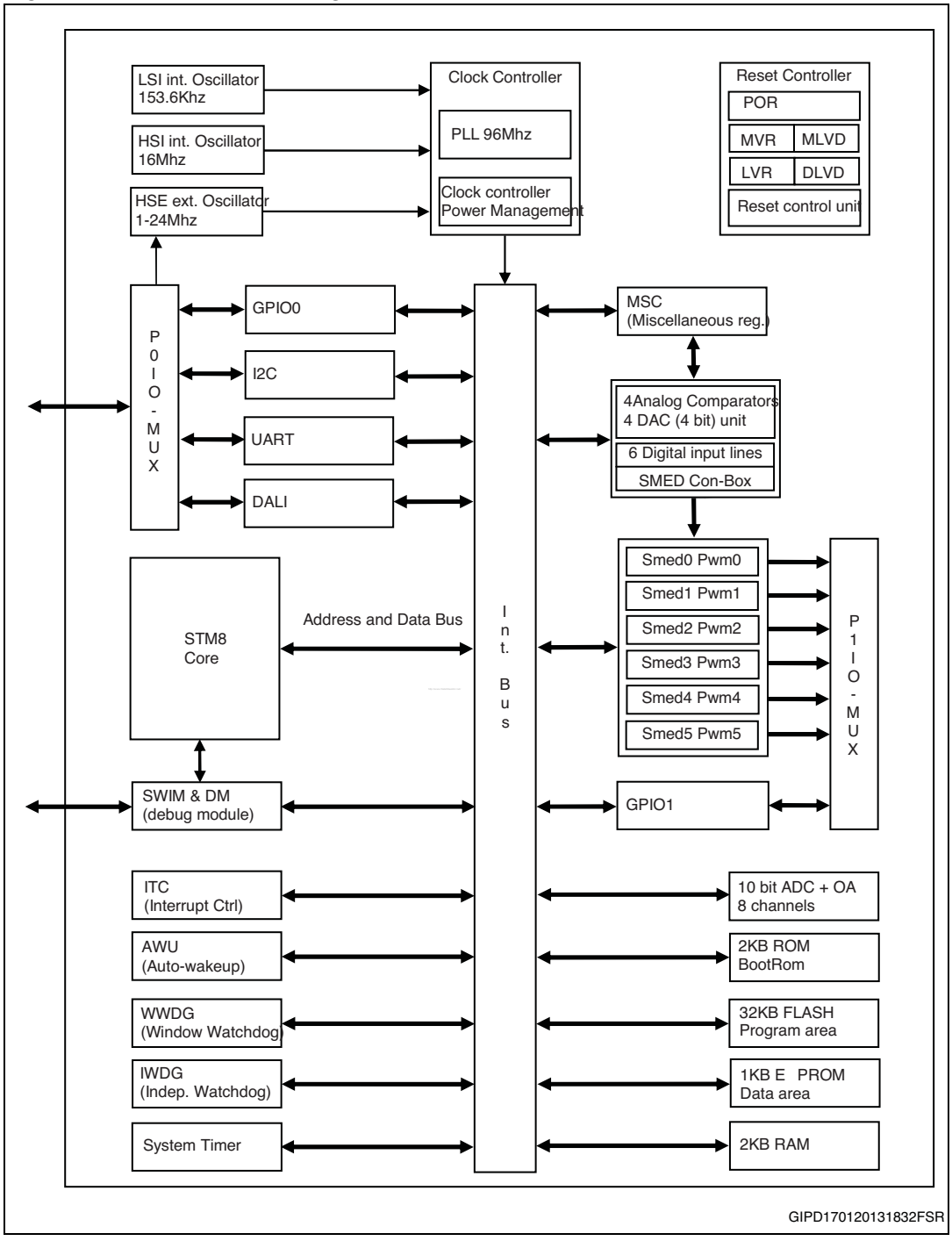
The device has an embedded low power, low voltage, single voltage 32 Kbytes of non volatile program memory and true 1 Kbyte RWW data EEPROM with Error Correction Code (ECC).

The STLUX385 microcontroller provides the following benefits:

- Very high reliability and memory endurance
  - More than 15 years of operating life time
  - More than 15 years of data retention for program and Data Memory after cycling
- Flexible peripherals to form a powerful engine capable of driving all types of switch mode converters. It covers the topologies in the field of lighting and power management starting from simple buck converters for LED driving, boost for power factor correction, half-bridge resonant converters for dimmable fluorescent tube lamp ballasts, up to full bridge control in HID lamp ballasts
  - Fast analog comparators (50 ns max propagation delay)
  - 96 MHz PLL for high output signal resolution
  - Six independent SMED (state machine - event driven) units - programmable signal generators
  - Programmable connection box to interconnect SMEDs and other peripherals into complex timer blocks
  - 10-bit, 8 multiplexed channels ADC with operational amplifier to extend resolution to 12-bit
  - DALI hardware communication cell

2 Block diagram

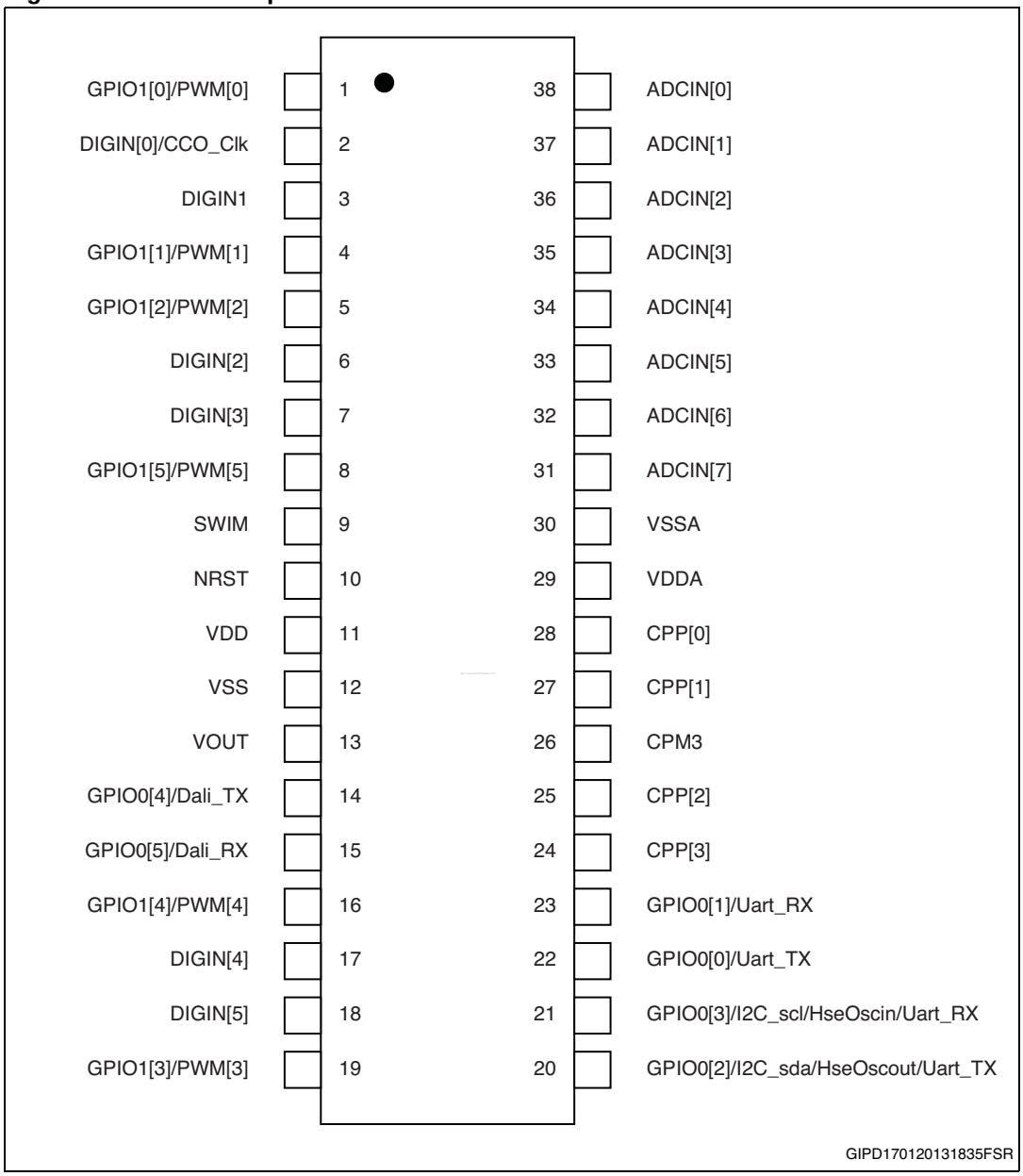
Figure 1. Internal block diagram



3 Pinout and pin description

3.1 Pinout

Figure 2. TSSOP38 pinout



3.2 Pin description

Table 1. Pin description

Pin number	Type	Pin name	Main function	Alternate function 1	Alternate function 2	Alternate function 3
1	I/O	GPIO1[0]/PWM[0]	SMED PWM channel 0	General purpose I/O 10	-	-
2	I/O	DIGIN[0]/CCO_clk	Digital input 0	Configurable clock output signal (CCO)	-	-
3	I	DIGIN[1]	Digital input 1	-	-	-
4	I/O	GPIO1[1]/PWM[1]	SMED PWM channel 1	General purpose I/O 11	-	-
5	I/O	GPIO1[2]/PWM[2]	SMED PWM channel 2	General purpose I/O 12	-	-
6	I	DIGIN[2]	Digital input 2	-	-	-
7	I	DIGIN[3]	Digital input 3	-	-	-
8	I/O	GPIO1[5]/PWM[5]	SMED PWM channel 5	General purpose I/O 15	-	-
9	I/O	SWIM	SWIM data interface	-	-	-
10	I/O	NRST	Reset	-	-	-
11	PS	VDD	Digital and I/O power supply	-	-	-
12	PS	VSS	Digital and I/O ground	-	-	-
13	PS	VOUT	1.8 V regulator capacitor	-	-	-
14	I/O	GPIO0[4]/Dali_tx	General purpose I/O 04	DALI data transmit	-	-
15	I/O	GPIO0[5]/Dali_rx	General purpose I/O 05	DALI data receive	-	-
16	I/O	GPIO1[4]/PWM[4]	SMED PWM channel 4	General purpose I/O 14	-	-
17	I	DIGIN[4]	Digital input 4	-	-	-
18	I	DIGIN[5]	Digital input 5	-	-	-
19	I/O	GPIO1[3]/PWM[3]	SMED PWM channel 3	General purpose I/O 13	-	-
20	I/O	GPIO0[2]/I2C_sda/ HseOscout/Uart_tx	General purpose I/O 02	I^2C data	Output crystal oscillator signal	UART data transmit

Table 1. Pin description (continued)

Pin number	Type	Pin name	Main function	Alternate function 1	Alternate function 2	Alternate function 3
21	I/O	GPIO0[3]/I2C_scl/ HseOscin/Uart_rx	General purpose I/O 03	I^2C clock	Input crystal oscillator signal / input frequency signal	UART data receive
22	I/O	GPIO0[0]/Uart_tx	General purpose I/O 00	UART data transmit	-	-
23	I/O	GPIO0[1]/Uart_rx	General purpose I/O 01	UART data receive	-	-
24	I	CPP[3]	Positive analog comparator input 3	-	-	-
25	I	CPP[2]	Positive analog comparator input 2	-	-	-
26	I	CPM3	Negative analog comparator input 3	-	-	-
27	I	CPP[1]	Positive analog comparator input 1	-	-	-
28	I	CPP[0]	Positive analog comparator input 0	-	-	-
29	PS	VDDA	Analog power supply	-	-	-
30	PS	VSSA	Analog ground	-	-	-
31	I	ADCIN[7]	Analog input 7	-	-	-
32	I	ADCIN[6]	Analog input 6	-	-	-
33	I	ADCIN[5]	Analog input 5	-	-	-
34	I	ADCIN[4]	Analog input 4	-	-	-
35	I	ADCIN[3]	Analog input 3	-	-	-
36	I	ADCIN[2]	Analog input 2	-	-	-
37	I	ADCIN[1]	Analog input 1	-	-	-
38	I	ADCIN[0]	Analog input 0	-	-	-

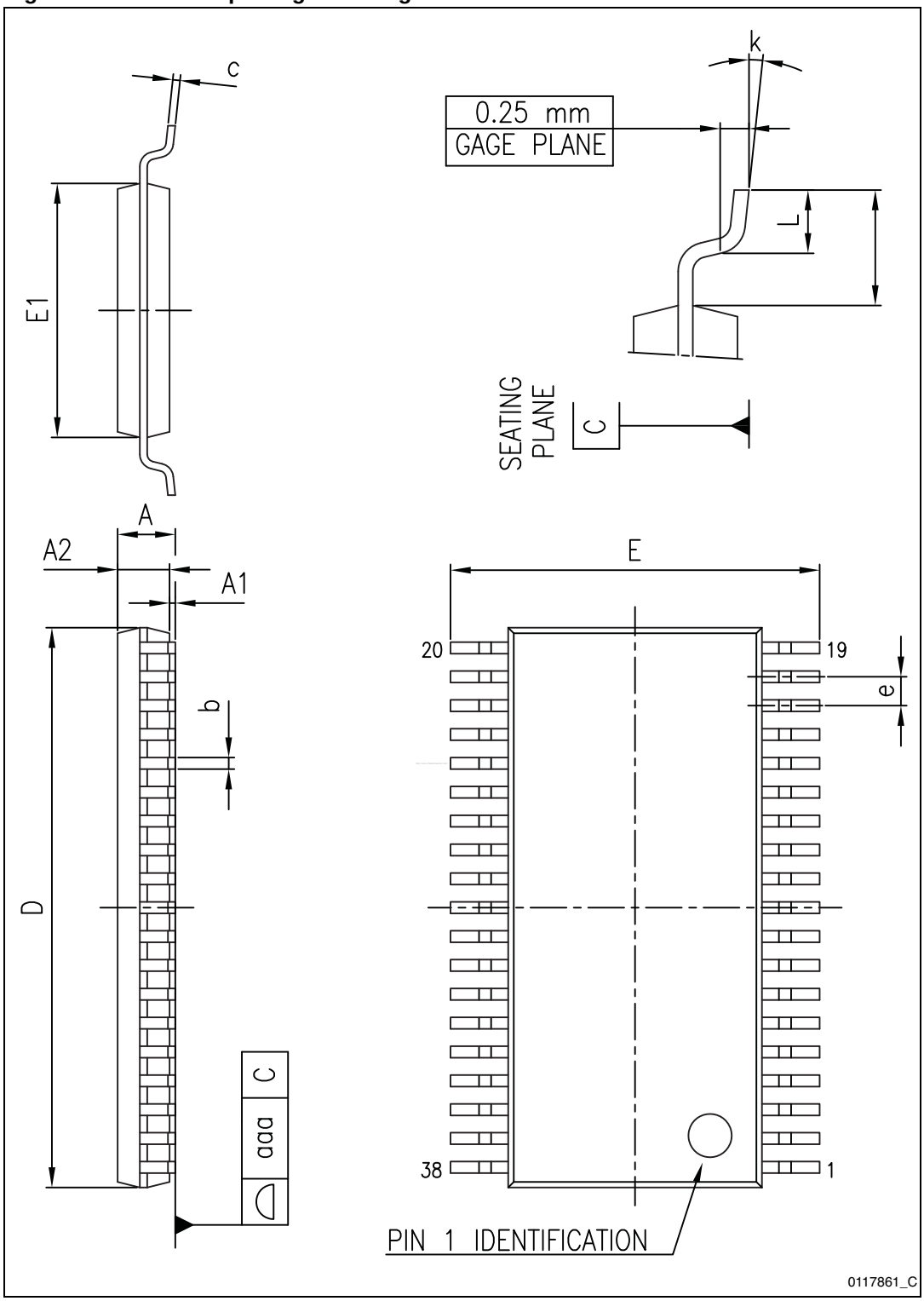
4 Package mechanical data

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.

Table 2. TSSOP38 mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
A			1.20
A1	0.05		0.15
A2	0.80	1.00	1.05
b	0.17		0.27
c	0.09		0.20
D	9.60	9.70	9.80
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e		0.50	
L	0.45	0.60	0.75
L1		1.00	
k	0		8
aaa			0.10

Figure 3. TSSOP8 package drawing



5 Revision history

Table 3. Document revision history

Date	Revision	Changes
18-Jan-2013	1	Initial release.

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