

Automotive PSoC™ 4: PSoC™ 4000S family

Based on Arm® Cortex®-M0+ CPU

General description

Features

Automotive PSoC™ 4: PSoC™ 4000S family
Based on Arm® Cortex®-M0+ CPU



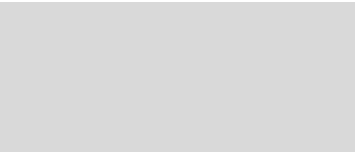
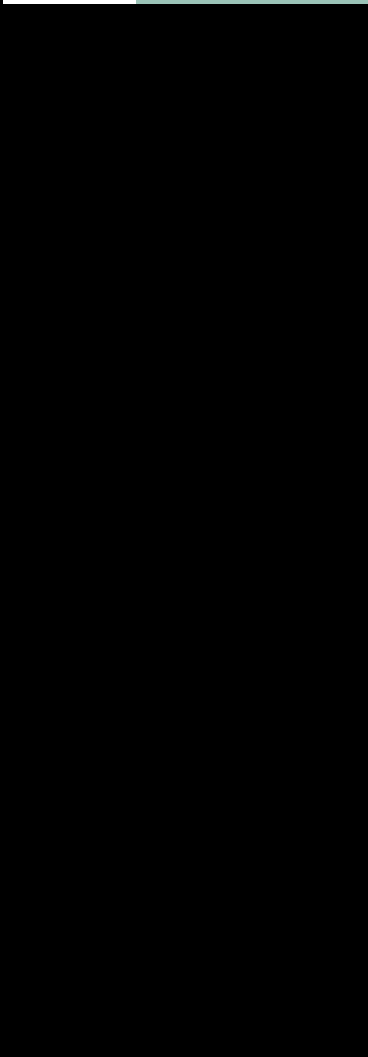
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Block diagram



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1 Functional definition

1.1 CPU and memory subsystem

1.1.1 CPU

1.1.2 Flash

1.1.3 SRAM

1.1.4 SROM

1.2 System resources

1.2.1 Power system

Power

1.2.2 Clock system

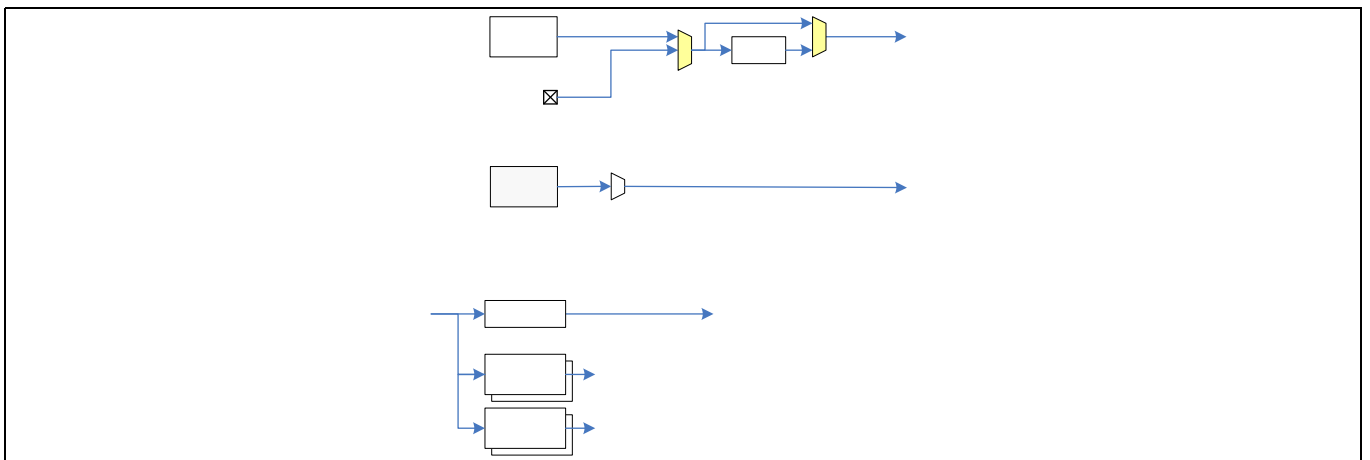


Figure 1 PSoC™ 4000S MCU Clocking architecture

1.2.3 IMO clock source

1.2.4 ILO clock source

1.2.5 Watch Crystal Oscillator (WCO)

1.2.6 Watchdog timer

1.2.7 Reset

1.5 Fixed function digital blocks

1.5.1 Timer/Counter/PWM (TCPWM) Block

1.5.2 Serial Communication Block (SCB)

I²C Mode

UART Mode

SPI Mode

LIN slave mode:

1.6 GPIO

1.7 Special function peripherals

1.7.1 CAPSENSE™

1.7.2 LCD segment drive

Descriptions of the pin functions are as follows:

VDDD

VDDA

VSSD, VSSA

VCCD

VDD:

VSS:

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3.2 Mode 2: 1.8 V \pm 5% external supply

Figure 3

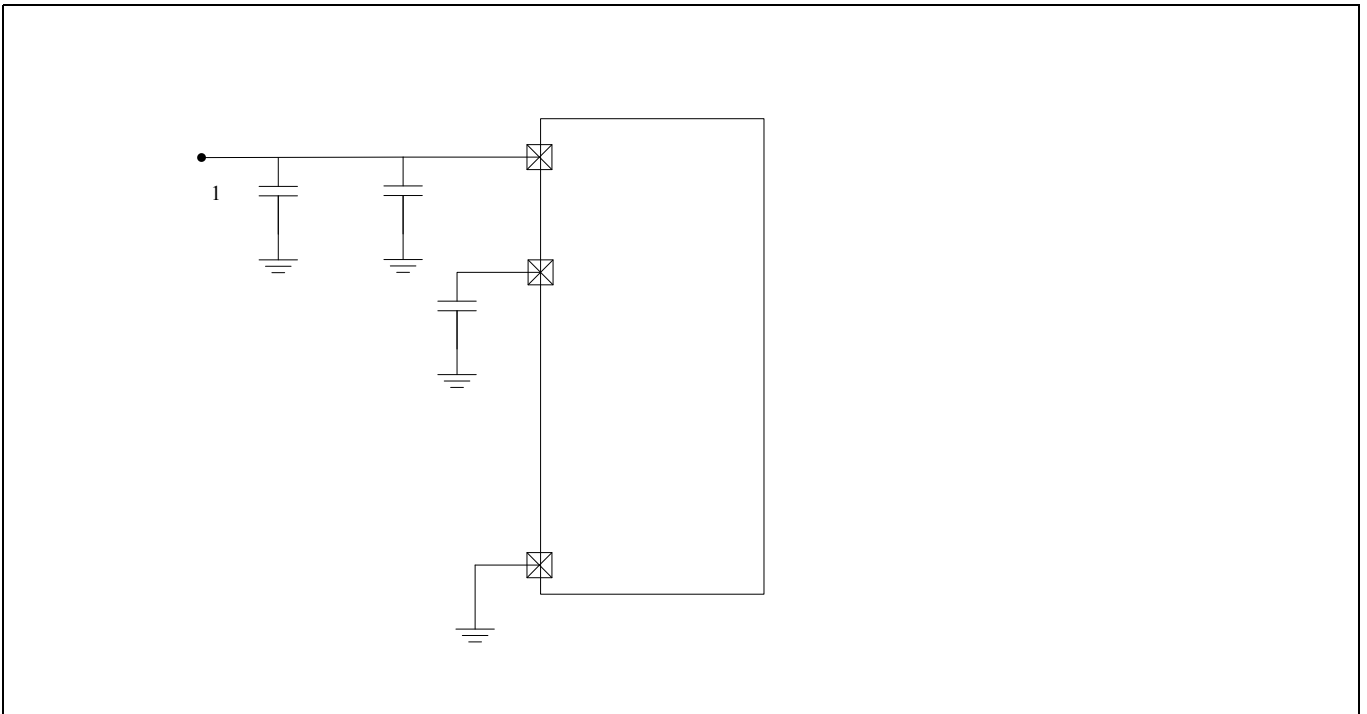


Figure 3 External supply range from 1.8 V to 5.5 V with internal regulator active

4 Development support

[PSoC™ 4 MCU](#)

4.1 Documentation

Software user guide

Component datasheets

Application notes

Technical reference manual

[PSoC™ 4 MCU](#) .

4.2 Online

4.3 Tools

[PSoC™ Creator](#)

Table 6 GPIO AC specifications

Spec ID#	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
			≤	≤			
			≤	≤			
			≤	≤			
			≤	≤			
			≤	≤			

5.2.2 XRES

Table 7 XRES DC specifications

Spec ID#	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
----------	-----------	-------------	-----	-----	-----	------	--------------------

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Table 11 CSD and IDAC specifications *(continued)*

Spec ID#	Parameter	Description	Min	Typ	Max	Unit	Details /conditions

5.4 Digital peripherals

Table 16 SPI DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Table 17 SPI AC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Table 18 UART DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Table 19 UART AC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Note

Table 20 LCD Direct Drive DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
							×
							×
							×

Table 21 LCD Direct Drive AC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

5.5 Memory

Table 22 Flash DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

Table 23 Flash AC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
		≤					
		≤					
		≤					
		>					

Notes

5.6 System resources

5.6.1 Power-on reset (POR)

Table 24 Power-on reset (PRES)

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

Table 25 Brown-out detect (BOD) for V_{CCD}

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

5.6.2 SWD Interface

Table 26 SWD Interface specifications

Spec ID	Parameter	Description	Min
---------	-----------	-------------	-----

5.6.3 Internal Main Oscillator

Table 27 IMO DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Units	Details/conditions
---------	-----------	-------------	-----	-----	-----	-------	--------------------

Table 28 IMO AC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

5.6.4 Internal Low-Speed Oscillator

Table 29 ILO DC specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions
---------	-----------	-------------	-----	-----	-----	------	--------------------

Table 32 External clock specifications

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Table 33 Block specs

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details/conditions

Table 34 Smart I/O Pass-through time (Delay in Bypass Mode)

Spec ID	Parameter	Description	Min	Typ	Max	Unit	Details /conditions

Note

7 Packaging

Table 36

Table 36 Package list

Spec ID	Package	Description	Package drawing

Table 37 Package thermal characteristics

Parameter	Description	Package	Conditions	Min	Typ	Max	Unit
	θ						
	θ						
	θ						
	θ						

Table 38 Solder reflow peak temperature

Package	Maximum peak temperature	Maximum time at peak temperature

Table 39 Package moisture sensitivity level (MSL), IPC/JEDEC J-STD-020

Package	MSL

7.1 Package diagrams

SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	—	—	0.60	
A1	0.00	—	0.05	
b	0.18	0.25	0.30	
D	4.00 BSC			
E	4.00 BSC			
E2				
L				
e	0.50 BSC			
λ				

Figure 4 24-pin QFN package outline (PG-VQFN-24)

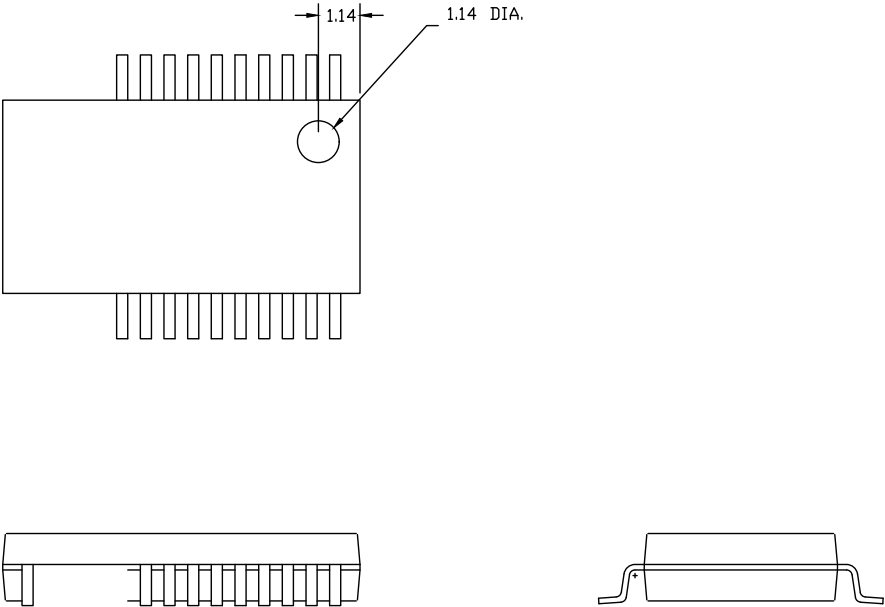


Figure 5 **28-pin SSOP package outline (PG-SSOP-28)**



Table 40 **Acronyms used in this document** *(continued)*

Acronym	Description

9 Document conventions

9.1 Units of measure

Table 41 Units of measure

Symbol	Unit of measure
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Ω

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Edition 2023-09-05

Published by

Infineon Technologies AG

81726 Munich, Germany

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