



**Discover our broad
portfolio of EEPROMs
in WLCSP packages**





Presentation overview

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ST EEPROM Extended portfolio

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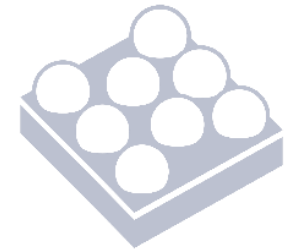
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EEPROM WLCSP key features





ST EEPROM Industrial portfolio

Serial EEPROM

2 Kb → 4 Mb

I²C, SPI, Microwire
85°C, 105°C

SO8N, TSSOP, DFN8, DFN5, **WLCSP**, Bare die



Page EEPROM

8 Mb → 32 Mb

SPI QUAD
85°C, 105°C

SO8N, DFN8, **WLCSP**, Bare die



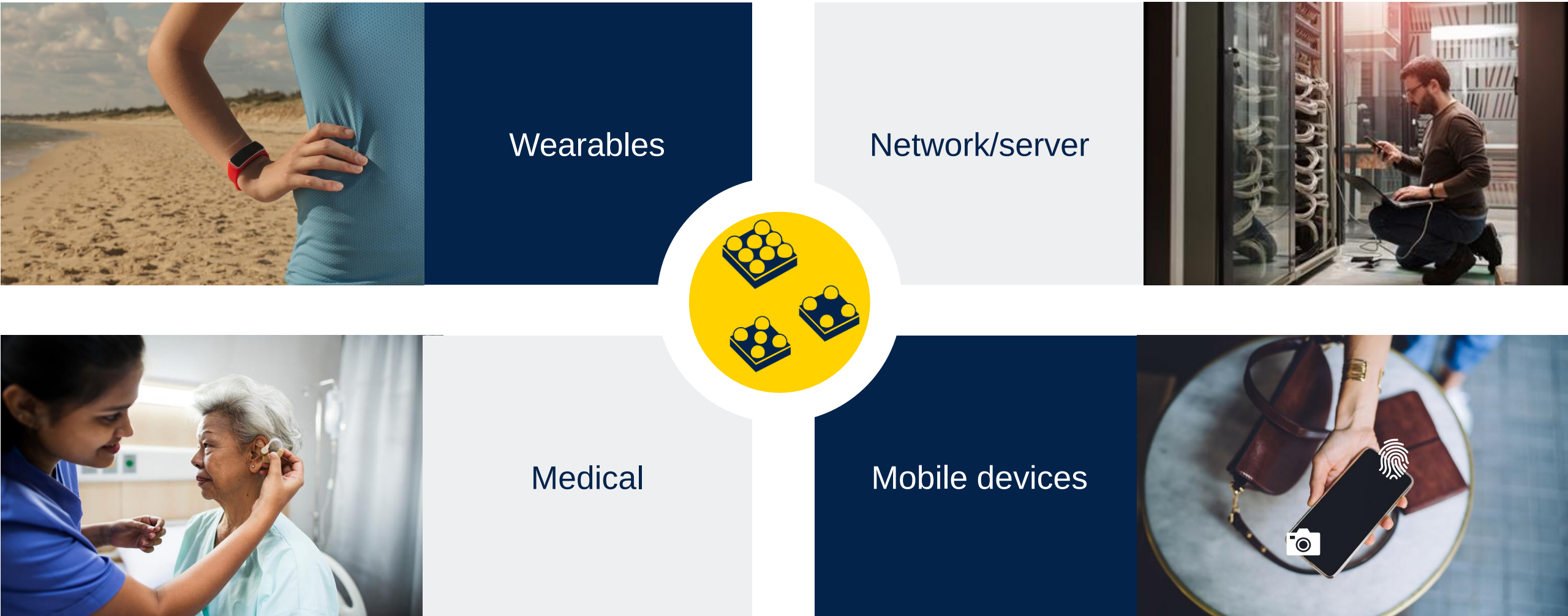
UID EEPROM

32 Kb → 2 Mb

I²C
85°C

SO8N, **WLCSP on-demand**

Market & application segments using WLCSP



EEPROM WLCSP advantages

WLCSP: Situations & advantages

Increased component density

SMT (Surface Mount Technology) enables more components to be densely installed on a PCB (Printed Circuit Board), enhancing the circuit board's density and performance.

Reduced PCB size

Smaller size of SMT components allows for the design of smaller PCBs, which contributes to improved lightweight and portability.



Improved electrical performance

Solder ball offers low resistance and low inductance in soldered connections, enhancing the stability of signal transmission and power delivery.



The key advantages

- The die to PCB inductance is minimized
- Reduced package size
- Enhanced thermal conduction characteristics

EEPROM WLCSP advantages

Features	Benefits
Available for I ² C and SPI From 8 Kbits to 4 Mbits	Fits all standard buses All density requirements
Profile from 0.60, down to 0.30 mm	Adapted to thinnest modules
8 Kbit in 0.3 mg, 128 Kbit in 0.4 mg	Be light!
Minimum pitch: 0.4 mm Minimum ball diameter: 0.16 mm T&R packing	Compatible with surface mounting technology No underfill required
ECOPACK2 [®]	Compliant with RoHS and halogen free

EEPROM WLCSP portfolio



EEPROM WLCSP Portfolio

Package	Features	Memory Density										
I²C 4-ball 	Pins : Vcc, Vss, SDA, SCL	8Kbit	16Kbit			64Kbit						
I²C 4-ball 	Pins : Vcc, Vss, SDA, SCL, Software Write Protect Configurable Device Address					64Kbit	128Kbit	256Kbit	512Kbit	1Mbit		
I²C 4-ball 	Pins : Vcc, Vss, SDA, SCL, Software Write Protect Configurable Device Address With Vdd I/O 1.2V	8Kbit 1.2V I/O						256Kbit 1.2V I/O	512Kbit* 1.2V I/O	1Mbit* 1.2V I/O	2Mbit* 1.2V I/O	1.2 V I/O
I²C 5-ball 	Pins : Vcc, Vss, SDA, SCL, /WC Software Write Protect Configurable Device Address Hardware Write Protect					64Kbit				1Mbit	2Mbit	
I²C 8-ball 	Pins : Vcc, Vss, SDA, SCL, /WC, E0-E1-E2 Hardware Write Protect					64Kbit	128Kbit	256Kbit	512Kbit	1Mbit	2Mbit	
SPI 8-ball 	Pins : Vcc, Vss, /S, /W, Q, /hold, C, D Hardware Write Protect					64Kbit	128Kbit	256Kbit	512Kbit	1Mbit	2Mbit	4Mbit

Legend:

New generation

* On-demand

1.2 V I/O



4-ball WLCSP portfolio

 I ² C 4-ball compatible	Same pin assignment 16-Kbit with OTP row <i>From 0.5 mm²</i>	8-Kbit	8-Kbit 1.2 V I/O	16-Kbit - No write protection	64-Kbit
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 I ² C 4-ball SWP & CDA	Software write protect Configurable device address + same pin assignment from 64- to 256-Kbit <i>From 0.6 mm²</i>	64-Kbit	128-Kbit	256-Kbit	256-Kbit 1.2 V I/O	512-Kbit 1.2 V I/O	1-Mbit 1.2 V I/O
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WLCSP series	PN	Mem density	Features	HWP	Dimension (Max X/Y) (mm)	Profile (max) (mm)	Ball size (typ)(mm)	Min pitch (mm)	BSC	Status
4-ball *I/O compatible 1.2 V	M24C08-FCT6TP/T	8-Kbit	Fixed address	No	Contact ST sales office	0.33	0.185	0.4x0.4	No	Production
	M24C08-GCT6TP/T*					0.30	0.185	0.4x0.4	No	Production
	M24C16-DFCU6TP/K	16-Kbit	Fixed address	No		0.33	0.185	0.4x0.4	Yes	Production
4-ball SWP & CDA	M24C64X-FCU6T/TF	64-Kbit	CDA + SWP 1/1	No		0.33	0.185	0.4x0.4	Yes	Production
	M24128X-FCU6T/TF	128-Kbit	CDA + SWP 1/1	No		0.33	0.185	0.4x0.5	Yes	Production
	M24256X-FCU6T/VF	256-Kbit	CDA + SWP 4/4	No		0.295	0.185	0.4x0.5	Yes	Production
	M24512X-FCU6T/VF	256-Kbit	CDA + SWP 4/4	No		0.295	0.185	0.4x0.5	Yes	Production Q3-2025
4-ball SWP & CDS I/O compatible 1.2 V	M24256X-GCU6T/VF	256-Kbit	CDA + SWP 4/4	No		0.295	0.185	0.4x0.5	Yes	Production
	M24512X-GCU6T/VF	512-Kbit	CDA + SWP 4/4	No		0.295	0.185	0.4x0.5	Yes	On demand
	M24M01X-GCU6T/VF	1024-Kbit	CDA + SWP 4/4	No		0.295	0.185	0.8x0.5	Yes	Production Q3-2025





5-ball WLCSP portfolio

	I ² C 5-ball HWP	Software write protect 1.25 mm ²	64-Kbit
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WLCSP series	PN	Mem density	Features	HWP	Dimension (mm ²)	Profile (max) (mm)	Ball size (typ)(mm)	Min pitch (mm)	BSC	Status
5-ball with WC	M24C64-FCS6TP/K	64-Kbit	HWP	Yes	1.25 mm ²	0.635	0.270	0.35x0.7	No	Production

	I ² C 5-ball WC, SWP, CDA, Id Page	Software write protect Configurable device address Identification page 256 bytes From 1.7 mm ²	1-Mbit	2-Mbit
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WLCSP series	PN	Mem density	Features	HWP	Dimension (Max X/Y) (mm)	Profile (max) (mm)	Ball size (typ)(mm)	Min pitch (mm)	BSC	Status
5-ball with WC SWP, CDA, Id Page	M24M01E-FCS6T/VF	1024-Kbit	CDA+SWP	Yes	Contact ST sales office	0.55	0.210	0.5x0.8	Yes	Production
	M24M02E-FCS6T/VF	2048-Kbit	CDA+SWP	Yes		0.55	0.270	0.5x0.8	Yes	Production



Legend:

New generation



8-ball WLCSP portfolio

	I ² C & SPI compatible HWP 8 balls	Hardware write protect <i>From 1 mm²</i>							
			64-Kbit	128-Kbit	256-Kbit	512-Kbit	1-Mbit	2-Mbit	4-Mbit

WLCSP	Part number	Memory density	Dimension (max X/Y) (mm)	Profile (max) (mm)	Ball size (typ) (mm)	Pinout compatibility	Bump number
 HWP 8 balls	I ² C bus						
	M24C64-DFCT6TP/K	64-Kbit	Contact ST sales office	0.330	0.16	-	8
	M24128-DFCS6TP/K	128-Kbit		0.580	0.27	M24256	8
	M24256-DFCS6TP/K	256-Kbit		0.580	0.27	M24128	8
	M24512-DFCS6TP/K	512-Kbit		0.580	0.27	M24M01	8
	M24M01-DFCS6TP/K	1-Mbit		0.580	0.27	M24512	8
	M24M02-DRCS6TP/K	2-Mbit		0.580	0.27	-	8
	SPI bus						
	M95640-DFCT6TP/K	64-Kbit	Contact ST sales office	0.330	0.16	-	8
	M95128-DFCS6TP/K	128-Kbit		0.580	0.27	M95256	8
	M95256-DFCS6TP/K	256-Kbit		0.580	0.27	M95128	8
	M95512-DFCS6TP/K	512-Kbit		0.580	0.27	M95M01	8
	M95M01-DFCS6TP/K	1-Mbit		0.580	0.27	M95512	8
	M95M02-DRCS6TP/K	2-Mbit		0.580	0.27	-	8
	M95M04-DRCS6TPVF	4-Mbit			0.580	0.27	-



Page EEPROM WLCSP Portfolio

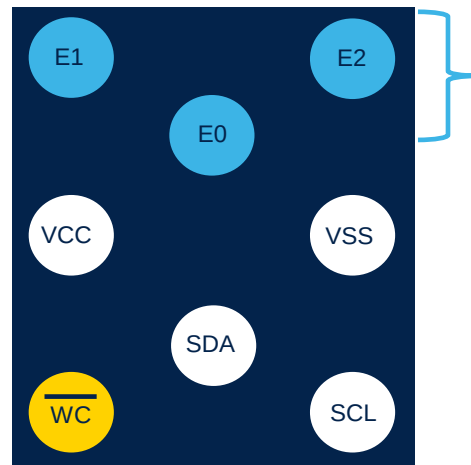
	SPI compatible HWP 8 balls	Software write protect <i>From 1.7 mm²</i>				8-Mbit	16-Mbit	32-Mbit

WLCSP	Part number	Memory density	Dimension (max X/Y) (mm)	Profile (max) (mm)	Ball size (typ) (mm)	Pinout compatibility	Bump number
HWP 8 balls	SPI Bus						
	M95P08-IXCST/EF	8-Mbit	Contact ST sales office	0.355	0.268	-	8
	M95P16-IXMNT/E	16-Mbit		0.355	0.268	-	8
	M95P32-IXCST/EF	32-Mbit		0.355	0.268	-	8

CDA - Evolving from hardware to software management

CDA - Evolving from hardware to software management

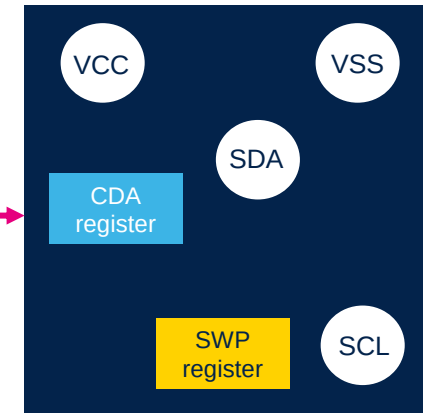
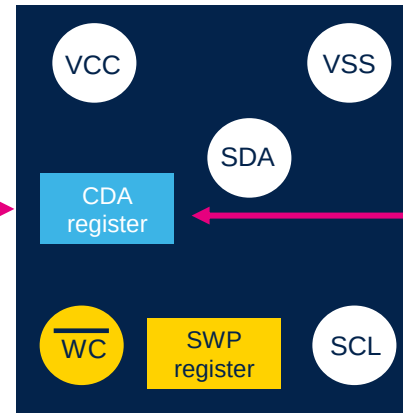
F8H technology
8 Balls WLCSP



Hardware Management

WC : Write control
E0, E1, E2 : Responder address
SDA : Serial Data
SCL : Clock
VCC : Supply voltage
VSS : Ground

F9V technology
5 Balls WLCSP **4 Balls WLCSP**



Software Management : CDA, SWP

CDA : Configurable Device Address
SWP : Software Write Protection (in addition to WC)

Check out technical notes available

- [TN1495 : How to use Software Write Protection register](#)
- [TN1508 : Use of the configurable device address register](#)

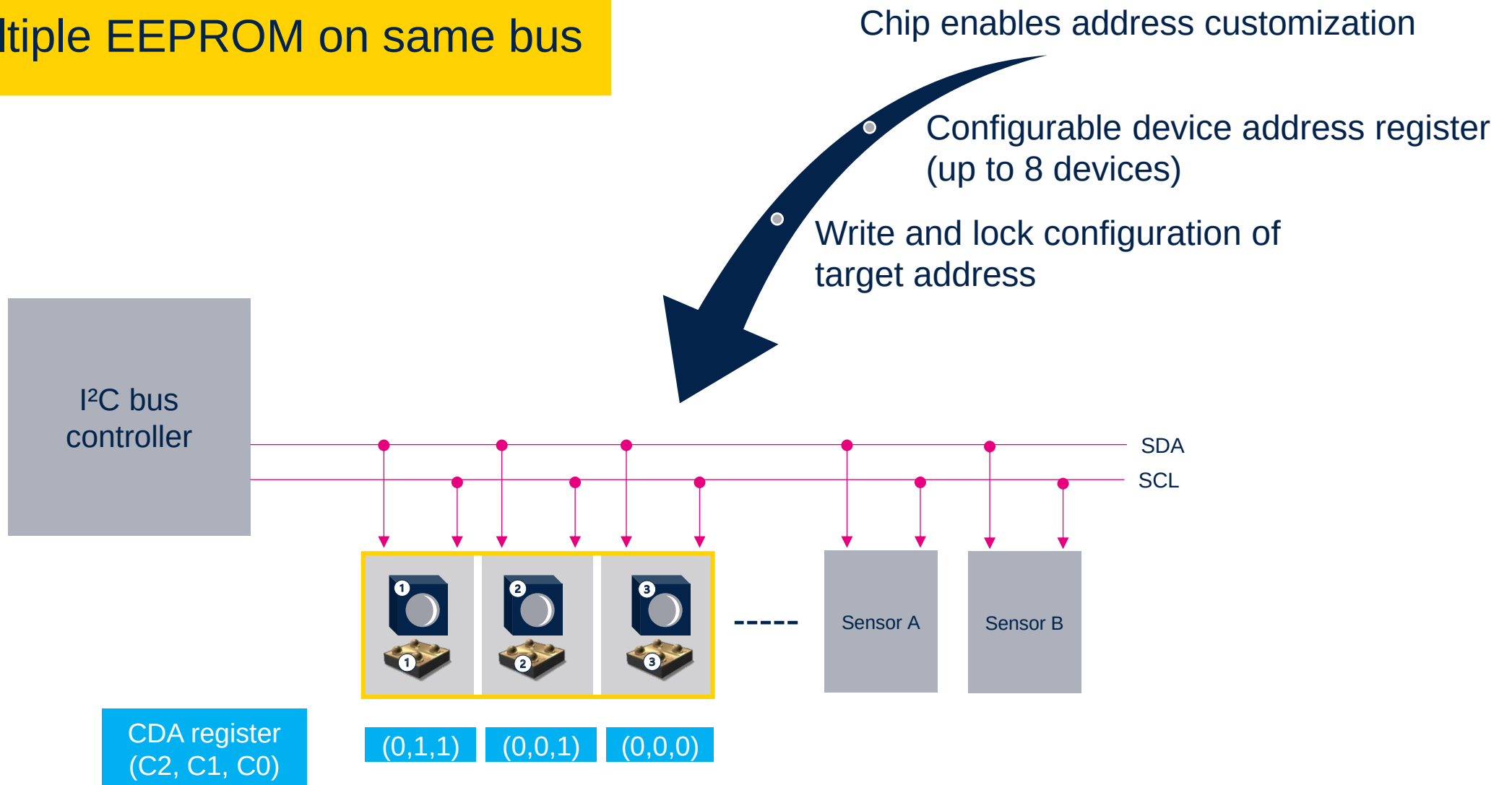


EEPROM WLCSP key features



Configurable device address (CDA)

Multiple EEPROM on same bus

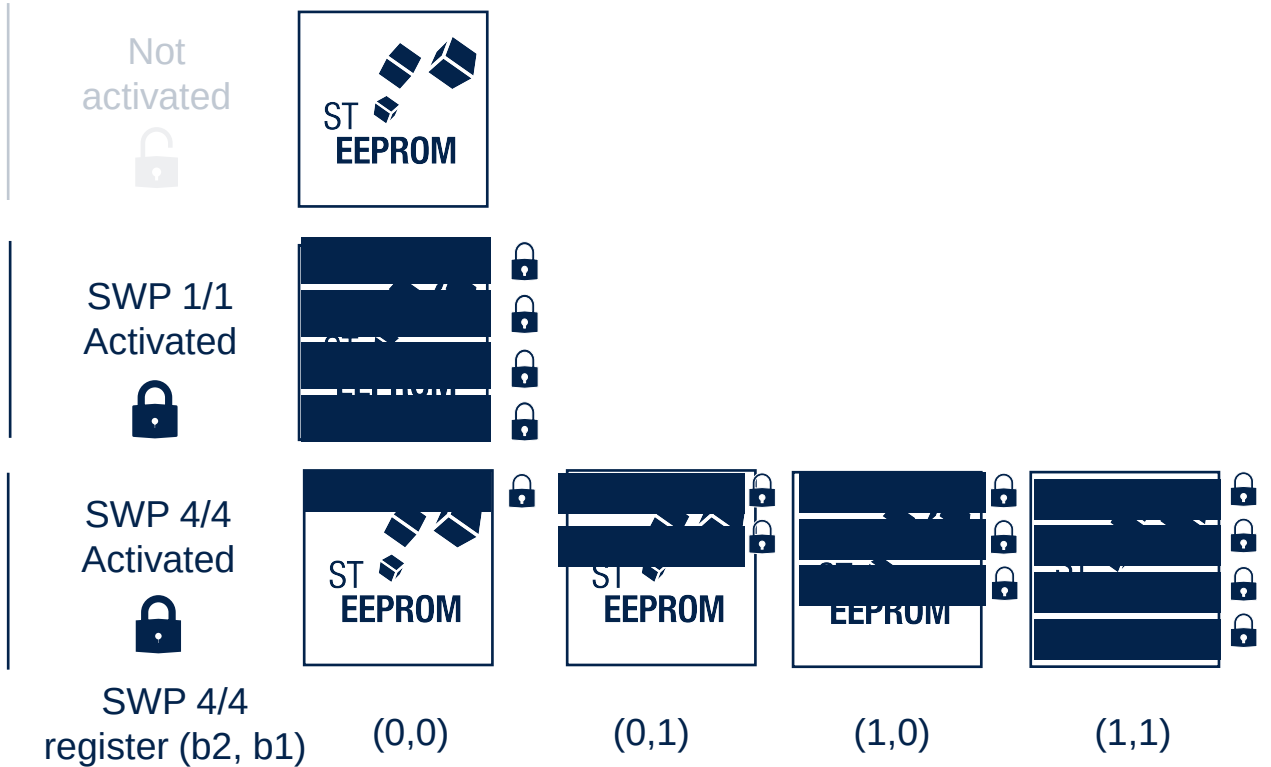




Software write protection

Flexible software protection

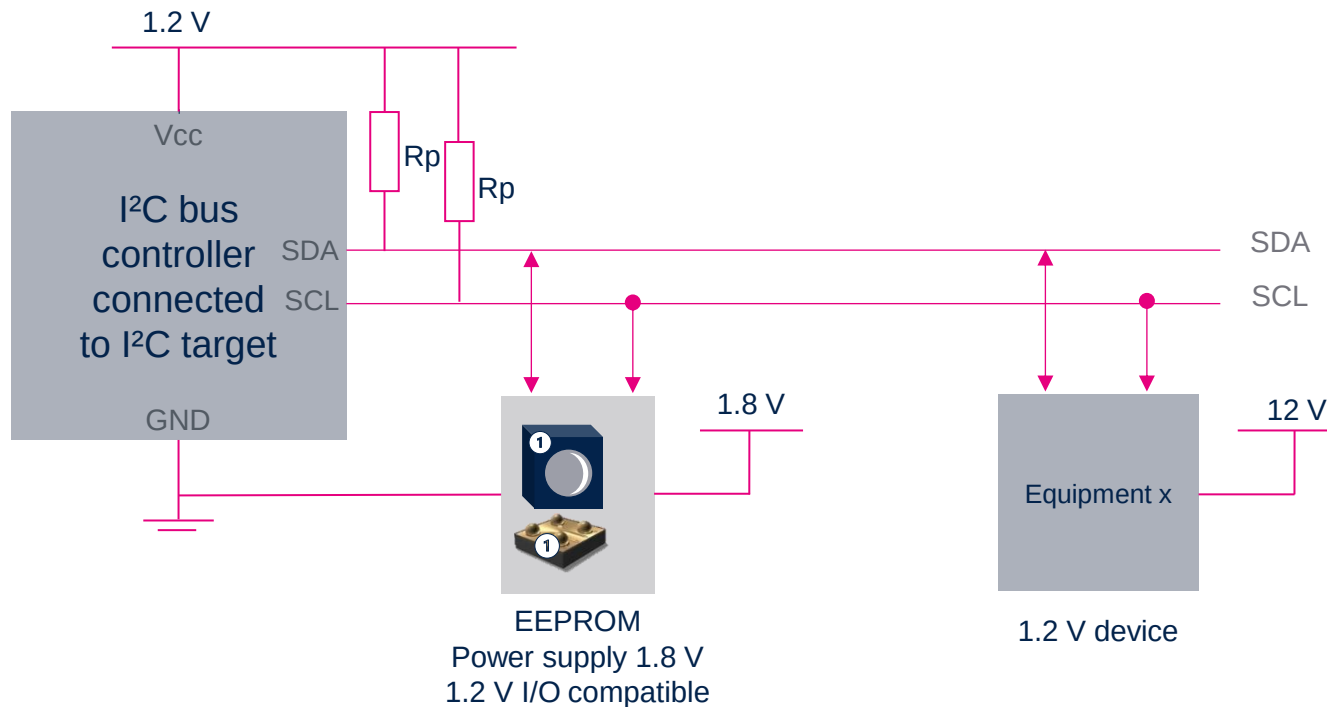
WLCSP series	PN	Mem density	SWP configuration
4-ball Compatible *I/O compatible 1.2 V	M24C08-FCT6TP/T	8-Kbit	SWP 1/1
	M24C08-GCT6TP/T*		
	M24C08-GCT8TP/T		
4-ball SWP & CDA	M24C64X-FCU6T/TF	64-Kbit	SWP 1/1
	M24C64X-FCP6T/TF	64-Kbit	SWP 1/1
	M24128X-FCU6T/TF	128-Kbit	SWP 1/1
	M24256X-FCU6T/VF	256-Kbit	SWP 4/4
4-ball SWP & CDA I/O compatible 1.2 V	M24256X-GCU6T/VF	256-Kbit	SWP 4/4





EEPROM 1.2 V I/O compatible bus

EEPROM 1.8 V supply compatible with I²C bus at 1.2 V



- ST EEPROM features 1.2 V I/O
- Enables direct plug-in on 1.2 V Bus
- No additional components
- Saves level shifter component to adapt I/O levels
- Same ST EEPROM plug-in on 1.8 V or 1.2 V bus

Our technology starts with You



Find out more at www.st.com/eeeprom

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