

Serial EEPROM Standard & SPD series



life.augmented

Introduction to Standard Serial EEPROM

Lifecycle

4 million cycles per byte
Over 100 million cycles per device



Storage

Up to 4Mb

More parameters make your application smarter



Lockable page
Protect your sensitive data



Serial EEPROM is the most flexible type of non-volatile memory suited for management of mixed data such as small boot code, user parameter and intensive datalog.

For the past 16 years, ST's standard serial EEPROM has been ranked #1 (IHS Markit 2020) thanks to continuous innovation and high product performance. For over 30 years our experts have developed the most advanced EEPROM technologies. Latest in-house 110nm technology extends portfolio to a complete range of density from 1 Kbit to 4 Mbits. Today ST guarantees high cycling performance with 4 million Erase/Write cycles per byte and 200 years of data retention.

Three industry standard serial buses are supported: I²C, SPI as well as legacy Microwire.

ST supports market mainstreams with SO8N, TSSOP and DFN8 packages. Most demanding application can rely on extended range up to 105°C.

Market trend for very small footprints is served with DFN5 (UFDFPN5) package (60% smaller than DFN8 2x3 mm), WLCSP 8 balls and ultrathin WLCSP 4 balls package with a thickness below 0.3 mm. For System in Package (SiP), ST delivers on demand bare die products in wafer form.

Ordering Information

M24 **256** **E** **-D** **R** **MN** **6** **T** **P** **/K**

Family

M24	I ² C Serial Bus
M95	SPI Serial Bus
M34	ASSP SPD
M93C	MICROWIRE Serial Bus
M93S	MICROWIRE Serial Bus + software write protect

Package

MN	SO8N
DW	TSSOP8
MC	DFN8 2x3
MH	DFN5 1.4x1.7
CS	WLCSP
CT	Thin WLCSP
CU	Ultrathin WLCSP

Temperature range (°C)

5	-20 to 85
6	-40 to 85
8	-40 to 105
9	0 to 95

Optional

P, G Legacy digit for RoHS

Process

K	F8H
A	F8L
S	F6
T	F8H+
TF	F8H+, Back side coating
V	F9V
VF	F9V, Back side coating

Density

	I ² C	SPI	MICROWIRE	SPD
1 Kbit	C01	010	46	E02
2 Kbit	C02	020	56	E04
4 Kbit	C04	040	66	
8 Kbit	C08	080	76	
16 Kbit	C16	160	86	
32 Kbit	C32	320		
64 Kbit	C64	640		
128 Kbit	128	128		
256 Kbit	256	256		
512 Kbit	512	512		
1 Mbit	M01	M01		
2 Mbit	M02	M02		
4 Mbit	M04	M04		

Voltage range (V)

X	1.6 to 5.5
F	1.7 to 5.5 and 1.6 under conditions
R	1.8 to 5.5
W	2.5 to 5.5

Packing

T	Tape & Reel
Blank	Tube

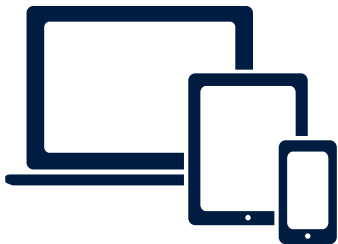
New F9V (110nm) product options

E	Hardware write protect, Configurable Device address
X	Software Write Protect, Configurable Device address

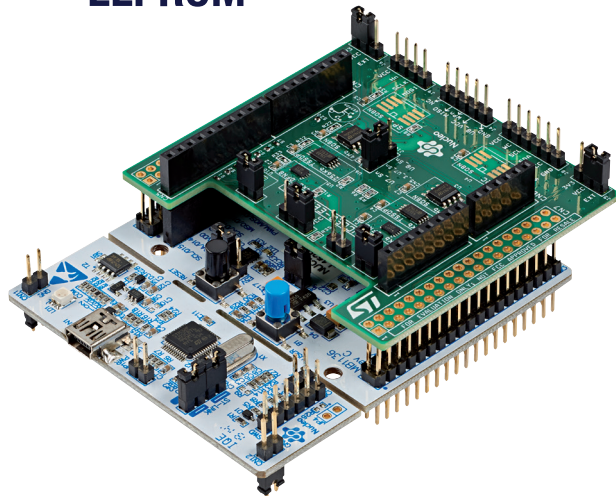
Notes:
Not all combinations are available
For bare die ordering information, please contact your nearest ST Sales Office.

An embedded lockable page to store sensitive parameters is also available. Thanks to a specific set of instructions (read/write/lock) data sets such as traceability, serial numbers or UIDs can be loaded and safely protected.

For easy product selection, download our ST-EEPROM-Finder APP










EEPROM



Visit st.com to discover our X-Nucleo-EEPROMA2 shield for fast prototyping.

Package options

Name	Package	Overall width (max)	Overall length (max)	Overall height (max)	Pitch	Weight (mg)	Number of pins/balls	Comments
S08N		5	6.2	1.75	1.27	80	8	
TSSOP8		3.1	6.6	1.2	0.65	34	8	
DFN8		2.1	3.1	0.6	0.5	16	8	Leadless package other names UFDFPN8, MLP8
DFN5		1.8	1.5	0.6	0.4	7	5	Leadless package other names UFDFPN5, MLP5
WLCSP		1.736	1.168	0.6	0.4	1.24	5	Wafer Level Chip Scale Package. XY dimension example for 1Mbit
Ultrathin WLCSP 4 balls		0.727	1.001	0.33	0.4	0.4	4	XY dimension example for 256 Kbit
Bare Die							8	Dimensions, pitch and weight are die dependent

All dimensions in mm

Serial EEPROM Portfolio

I2C - INDUSTRIAL +85 °C

Temperature range from -40 to + 85°C. 5.5 V max supply voltage

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz)	Package options					BARE DIE	Specific features
				S08N	TSSOP8	DFN8	DFN5	WLCSP		
M24C01-R	1	1.8	0.4	•	•					-
M24C02-F	2	1.7	0.4	•	•	•	•			-
M24C04-F	4	1.7	0.4	•	•	•	•			-
M24C08-F	8	1.7	0.4	•	•	•	•	•		-
M24C16-F	16	1.7	0.4	•	•	•	•		•	-
M24C16-DFCU ⁽¹⁾	16	1.7	1					•		Lockable Identification Page
M24C32-F	32	1.6	1	•	•	•	•	•	•	Chip enable address 000 for WLCSP and UDFPN5
M24C32-DF	32	1.7	1	•	•	•				Lockable Identification Page
M24C64-F	64	1.6	1	•	•	•	•	•		Chip enable address 000 for WLCSP and UDFPN5
M24C64-DF	64	1.7	1	•	•	•		•		Lockable Identification Page
M24C64X-FCU	64	1.6	1					•		Software write protection - configurable device address
M24128-BF	128	1.6	1			•	•		•	-
M24128-DF	128	1.7	1	•	•	•		•		Lockable Identification Page

I2C - INDUSTRIAL +85 °C

Temperature range from -40 to + 85°C. 5.5 V max supply voltage

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz)	Package options					BARE DIE	Specific features
				S08N	TSSOP8	DFN8	DFN5	WLCSP		
M24128X-FCU	128	1.6	1					•		Software write protection - configurable device address
M24256-BF	256	1.7	1		•	•			•	-
M24256-DF	256	1.7	1	•	•	•		•		Lockable Identification Page
M24256X-F ⁽²⁾	256	1.6	1					•	•	Lockable Identification page Software write protection Configurable device address
M24256E-F	256	1.6	1	January 2022						Lockable Identification Page Hardware write protection Configurable device address
M24512-DF	512	1.7	1	•	•	•		•	•	Lockable Identification Page
M24M01-DF	1024	1.7	1	•	•			•	•	Lockable Identification Page
M24M02-DR	2048	1.8	1	•				•	•	Lockable Identification Page

Notes: 1. no hardware, nor software write protect, 2. Maximum supply voltage is 3.6V

SPI - INDUSTRIAL +85 °C

All products are qualified from -40 to 85 °C. Supply voltage max is 5.5 V

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz) *	Package options					Specific features
				S08N	TSSOP8	DFN8	WLCSP	BARE DIE	
M95010-R	1	1.8	20	•	•				-
M95020-R	2	1.8	20	•	•	•			-
M95040-DF	4	1.7	20	•	•	•			Lockable Identification Page
M95080-DF	8	1.7	20	•	•	•			Lockable Identification Page
M95160-DF	16	1.7	20	•	•	•		•	Lockable Identification Page
M95320-DF	32	1.7	20	•	•	•			Lockable Identification Page
M95640-DF	64	1.7	20	•	•	•	•		Lockable Identification Page
M95128-DF	128	1.7	20	•	•	•	•		Lockable Identification Page
M95256-DF	256	1.7	20	•	•	•	•	•	Lockable Identification Page
M95512-DF	512	1.7	16	•	•	•	•	•	Lockable Identification Page
M95M01-DF	1024	1.7	16	•	•		•		Lockable Identification Page
M95M02-DR	2048	1.8	5	•			•		Lockable Identification Page
M95M04-DR	4096	1.8	10	•	•		•		Lockable Identification Page

MICROWIRE - INDUSTRIAL +85 °C

All products are qualified from -40 to 85 °C. Supply voltage max is 5.5 V

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz)	Package options			Specific features
				S08N	TSSOP8	DFN8	
M93C46-W	1	2.5	2	•	•		-
M93S46-W	1	2.5	2	•			Programmable Block Protection
M93C56-R	2	1.8	2	•	•		-
M93C56-W	2	2.5	2	•	•		-
M93S56-W	2	2.5	2	•			Programmable Block Protection
M93C66-R	4	1.8	2			•	-
M93C66-W	4	2.5	2	•	•		-
M93S66-W	4	2.5	2	•			Programmable Block Protection
M93C76-R	8	1.8	2		•		-
M93C76-W	8	2.5	2	•			-
M93C86-R	16	1.8	2			•	-
M93C86-W	16	2.5	2	•	•		-

I2C - INDUSTRIAL PLUS +105 °C

All products are qualified from -40 to 105 °C. Supply voltage max is 5.5 V

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz)	Write time max (ms)	Package options			Specific features
					S08N	TSSOP8	DFN8	
M24C02-DRE	2	1.7	1	4	•	•	Lockable Identification Page	
M24C04-DRE	4	1.7	1	4	•	•	Lockable Identification Page	
M24C08-DRE	8	1.7	1	4	•	•	Lockable Identification Page	
M24C16-DRE	16	1.7	1	4	•	•	Lockable Identification Page	
M24C32-DRE	32	1.7	1	4	•	•	Lockable Identification Page	
M24C64-DRE	64	1.7	1	4	•	•	Lockable Identification Page	
M24128-DRE	128	1.7	1	4	•	•	Lockable Identification Page	
M24256-DRE	256	1.7	1	4	•	•	Lockable Identification Page	
M24512-DRE	512	1.7	1	4	•	•	Lockable Identification Page	

SPI - INDUSTRIAL PLUS +105 °C

All products are qualified from -40 to 105 °C. Supply voltage max is 5.5 V

Root part number	Storage capacity (Kbit)	Supply voltage min (V)	Clock frequency max (MHz) *	Write time max (ms)	Package options			Specific features
					S08N	TSSOP8	DFN8	
M95040-DRE	4	1.7	20	4	•	•	Lockable Identification Page	
M95080-DRE	8	1.7	20	4	•	•	Lockable Identification Page	
M95160-DRE	16	1.7	20	4	•	•	Lockable Identification Page	
M95320-DRE	32	1.7	20	4	•	•	Lockable Identification Page	
M95640-DRE	64	1.7	20	4	•	•	Lockable Identification Page	
M95128-DRE	128	1.7	20	4	•	•	Lockable Identification Page	
M95256-DRE	256	1.7	20	4	•	•	Lockable Identification Page	
M95512-DRE	512	1.7	16	4	•	•	Lockable Identification Page	

SPD EEPROM

The M34E02-F has been designed specifically for use in DRAM dual interline memory module (DIMM) with serial presence detect (SPD). All the information concerning the DDR1, DDR2 or DDR3 configuration of the DRAM module (such as its access speed, size and organization) can be kept write-protected in the first half of the memory.

Further to Jedec requirements, M34E04 devices offer 4-Kbit serial EEPROM organized as 4 lockable blocks of 128 bytes each (512 bytes of total memory).

M34E04 devices were specifically designed for use in DDR4 DRAM dual interline memory module (DIMM) with Serial Presence Detect. All the information concerning the DRAM module configuration (such as its access speed, size, organization) can be kept write-protected in one or more memory blocks. M34E04 devices are compliant with JEDEC EE1004 and compatible with previous M34E02-F device thanks to page selection commands.

Serial interface	Part number	Storage capacity (kbit)	Supply voltage min (V)	Clock frequency max (MHz)	Temperature range (°C)	Package options			Specific features
						S08N	TSSOP8	DFN8	
I2C	M34E02-F	2	1.7	1	-40, +85		•	•	Data lock for lower 128 byte block
I2C	M34E04	4	1.7	1	0, +95			•	Data lock by block of 128 bytes
I2C	M34E04B	4	1.7	1	0, +95			•	Data lock by block of 128 bytes - No hardware write control



Check out more information on our website at www.st.com/spdeeprom