

# Serial EEPROM – the number one choice for automotive applications

Selection guide



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**STMicroelectronics'** serial EEPROMs are the most flexible non-volatile memories for parameter storage because they can be written at byte level.

ST offers optimum solutions for all design requirements with the best portfolio in terms of densities, interfaces, low pin count and cost-effective packages.

ST is the leading EEPROM supplier to the automotive electronics industry. For many years, our commitment to the automotive market has provided innovative EEPROM solutions with outstanding support, service and quality. Thanks to an extensive EEPROM product portfolio, including bare die devices, ST is able to address all types of automotive applications including car audio and multimedia, body electronics, chassis and safety, and powertrain. To meet the standards of service and support demanded by the industry, ST introduced a specific automotive grade in 1998.

Bus type/application	Microwire® bus	I <sup>2</sup> C bus	SPI bus
Chassis (ABS, ESP, EPAS)	1-16 Kbit		4-256 Kbit
Safety/airbag	1-16 Kbit		4-256 Kbit
Powertrain (engine management/transmission)	2-16 Kbit		4-256 Kbit
Car audio/navigation		1-256 Kbit	8-256 Kbit
Driver information/odometer	1-16 Kbit	1-16 Kbit	1-16 Kbit
Car body/comfort	1-16 Kbit		1-256 Kbit

## Automotive grade to meet excellence in quality and service

Quality in the automotive industry cannot be just good – it must be outstanding. With its automotive grade, ST is committed to excellence in quality, and works to achieve the 0 part per million @ 0 km target. The pillar of this automotive grade is the HRCF (High Reliability Certified Flow), aimed at performing a drastic test screening with strong focus on early failure screening:

- Characterization and qualification as per HEC-Q100
- All products are 100% tested with HRCF (including statistical bin limit and part average testing)
- Specific automotive traceability is ensured from wafer launch to delivery
- Wafer and product safety stocks are established to ensure continuous delivery support
- Change management is designed specifically to meet automotive requirements (timing, reliability and so on)
- Automotive grade products are identified with range 3 in ordering information (M95080-MN3TP/S)

### Automotive EEPROM strategy: committed to excellence

- Broad ranging automotive grade portfolio
- Strong focus on quality and screening
- Robust technologies
- Best-in-class manufacturing and service

## Serial EEPROM, I<sup>2</sup>C bus

Size	Ref	Description	Automotive grade			
			SO8N Package	TSSOP8 Package	-40 to +125°C Bare die	-40 to +150°C Bare die
2 Kb	M24C02-W	2 Kb (x 8), 400 kHz, 5 ms write time	•	•	•	•
4 Kb	M24C04-W	4 Kb (x 8), 400 kHz, 5 ms write time	•	•	•	•
8 Kb	M24C08-W	8 Kb (x 8), 400 kHz, 5 ms write time	•			
16 Kb	M24C16-W	16 Kb (x 8), 400 kHz, 5 ms write time	•	•	•	•
32 Kb	M24C32-W	32 Kb (x 8), 400 kHz, 5 ms write time	•			
64 Kb	M24C64-W	64 Kb (x 8), 400 kHz, 5 ms write time	•			
128 Kb	M24128-W	128 Kb (x 8), 400 kHz, 5 ms write time	•			
256 Kb	M24256-W	256 Kb (x 8), 400 kHz, 5 ms write time	•			

2-wire interface.

Voltage range: W = 2.5 to 5.5 V.

## Serial EEPROM, SPI bus

Size	Ref	Description	Automotive grade			
			SO8N Package	TSSOP8 Package	-40 to +125°C Bare die	-40 to +150°C Bare die
1 Kb	M95010	1 Kb (x 8), 5 MHz, 5 ms write time	•			
2 Kb	M95020	2 Kb (x 8), 5 MHz, 5 ms write time	•			
4 Kb	M95040	4 Kb (x 8), 5 MHz, 5 ms write time	•			
4 Kb	M95040-W	4 Kb (x 8), 5 MHz, 5 ms write time	•	•		
8 Kb	M95080	8 Kb (x 8), 5 MHz, 5 ms write time	•		•	•
8 Kb	M95080-W	8 Kb (x 8), 5 MHz, 5 ms write time	•	•	•	•
16 Kb	M95160	16 Kb (x 8), 5 MHz, 5 ms write time	•		•	•
16 Kb	M95160-W	16 Kb (x 8), 5 MHz, 5 ms write time	•	•	•	•
32 Kb	M95320	32 Kb (x 8), 5 MHz, 5 ms write time	•		•	•
32 Kb	M95320-W	32 Kb (x 8), 5 MHz, 5 ms write time	•	•		
64 Kb	M95640	64 Kb (x 8), 5 MHz, 5 ms write time	•			
64 Kb	M95640-W	64 Kb (x 8), 5 MHz, 5 ms write time	•	•	•	•
128 Kb	M95128	128 Kb (x 8), 5 MHz, 5 ms write time	•			
128 Kb	M95128-W	128 Kb (x 8), 5 MHz, 5 ms write time	•	•		
256 Kb	M95256	256 Kb (x 8), 5 MHz, 5 ms write time	•			
256 Kb	M95256-W	256 Kb (x 8), 5 MHz, 5 ms write time	•	•		

4-wire interface, very fast transfer and programming.

Block write protection and status register.

Voltage range: blank = 4.5 to 5.5 V, W = 2.5 to 5.5 V.

# Serial EEPROM, Microwire bus

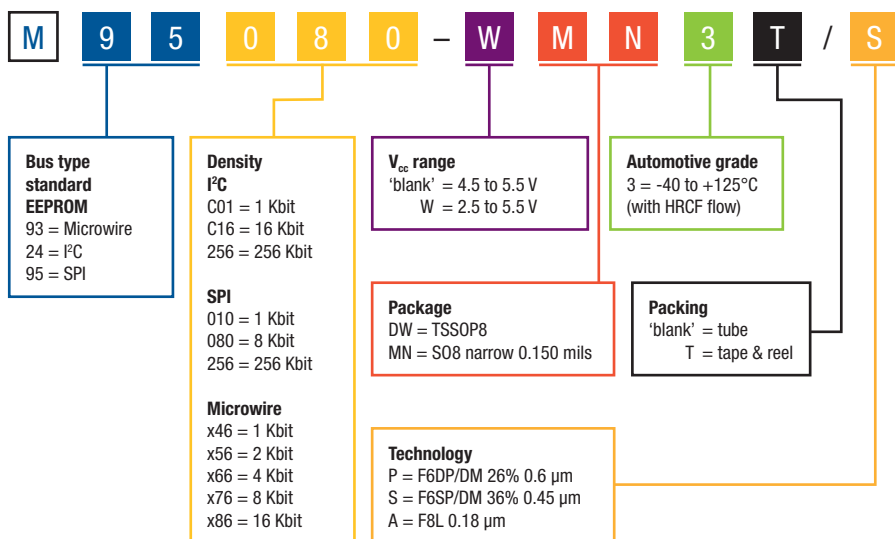
Size	Ref	Description	Automotive grade			
			S08N Package	TSSOP8 Package	-40 to +125°C Bare die	-40 to +150°C Bare die
1 Kb	M93C46	1 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
1 Kb	M93C46-W	1 Kb (x 8/x 16), 2 MHz, 5 ms write time	•	•		
1 Kb	M93S46	1 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
1 Kb	M93S46-W	1 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
2 Kb	M93C56	2 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
2 Kb	M93C56-W	2 Kb (x 8/x 16), 2 MHz, 5 ms write time	•	•		
2 Kb	M93S56	2 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
2 Kb	M93S56-W	2 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
4 Kb	M93C66	4 Kb (x 8/x 16), 2 MHz, 5 ms write time	•		•	•
4 Kb	M93C66-W	4 Kb (x 8/x 16), 2 MHz, 5 ms write time	•	•		
4 Kb	M93S66	4 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
4 Kb	M93S66-W	4 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
8 Kb	M93C76	8 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
8 Kb	M93C76-W	8 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
16 Kb	M93C86	16 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			
16 Kb	M93C86-W	16 Kb (x 8/x 16), 2 MHz, 5 ms write time	•			

Voltage range: blank: 4.5 to 5.5 V, W: 2.5 to 5.5 V.

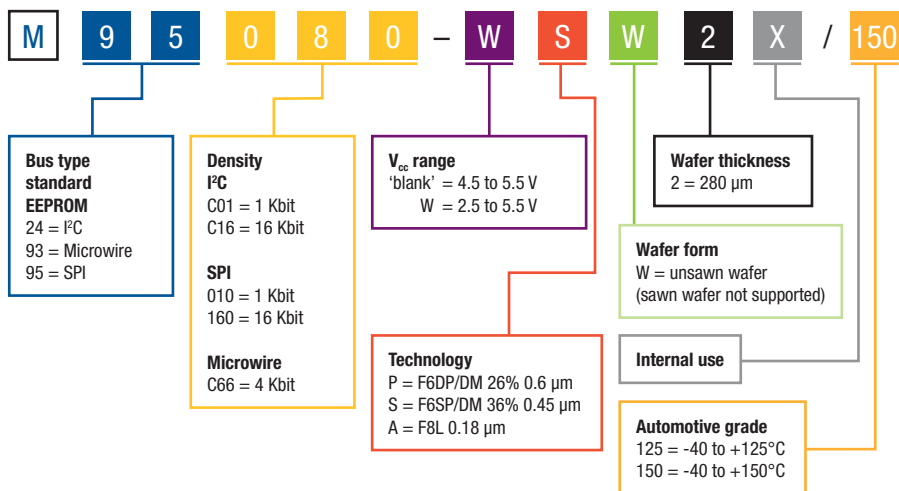
4-wire interface, fast transfer and programming.

Block write protection for M93S series.

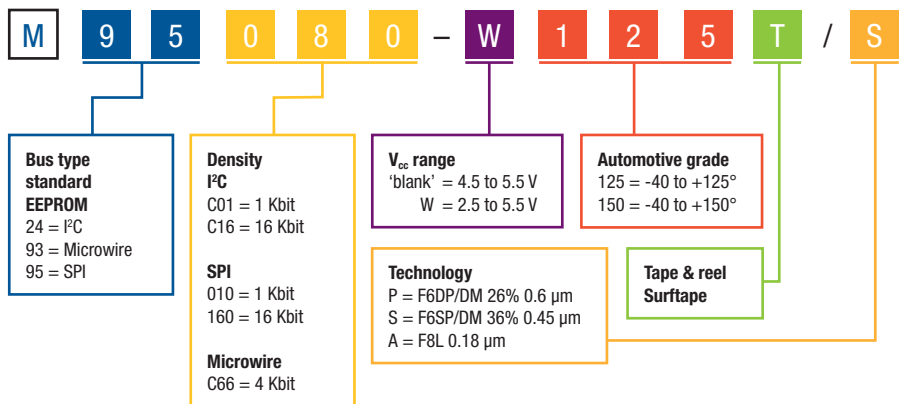
## Automotive serial EEPROM part numbering scheme




## Bare die part numbering scheme – wafer form



## Bare die part numbering scheme – tape and reel (surftape)

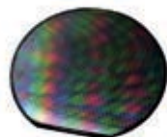


# Packaging options

			
Max. value (mm)	SO8N	TSSOP8	Die size
Body width	4.0	4.5	approx. >2
Body length	5.0	3.1	approx. >1 to 2
Total height	1.75	1.2	280 μm
Pitch	1.27	0.65	N/A

## Wafer form

- Wafer diameter: 8 inches (200 mm)
- Wafer thickness: 280 μm
- Wafers are shipped unsawn and boxed (collective packing)



*Wafer*



*Collective packing*

## Surftape and reel

- Reel diameter: 7 inches (175 mm)
- Die are packed in tape and reel with surftape, 2500 die per reel



*Tape and reel*



*Detail of tape and reel*



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