MICROCHIP

25AA080A/B, 25LC080A/B

8K SPI Bus Serial EEPROM

Device Selection Table

Part Number	Vcc Range	Page Size	Temp. Ranges	Packages
25LC080A	2.5-5.5V	16 Byte	I, E	P, SN, ST, MS
25AA080A	1.8-5.5V	16 Byte	I	P, SN, ST, MS
25LC080B	2.5-5.5V	32 Byte	I, E	P, SN, ST, MS
25AA080B	1.8-5.5V	32 Byte	I	P, SN, ST, MS

Features

- Max. clock 10 MHz
- Low-power CMOS technology
- 1024 x 8-bit organization
- 16 byte page ('A' version devices)
- 32 byte page ('B' version devices)
- Write cycle time: 5 ms max.
- Self-timed ERASE and WRITE cycles
- Block write protection
  - Protect none, 1/4, 1/2 or all of array
- Built-in write protection
  - Power-on/off data protection circuitry
  - Write enable latch
  - Write-protect pin
- Sequential read
- High reliability
  - Endurance: 1,000,000 erase/write cycles
  - Data retention: > 200 years
  - ESD protection: > 4000V
- Pb-free and RoHS compliant
- Temperature ranges supported;
  - Industrial (I):   -40°C to +85°C
  - Automotive (E):   -40°C to +125°C

Pin Function Table

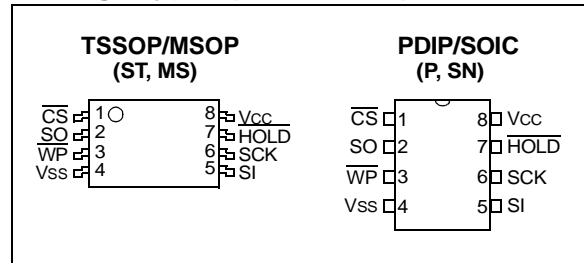| Name	Function
$\overline{CS}$	Chip Select Input
SO	Serial Data Output
$\overline{WP}$	Write-Protect
Vss	Ground
SI	Serial Data Input
SCK	Serial Clock Input
$\overline{HOLD}$	Hold Input
Vcc	Supply Voltage

Description

The Microchip Technology Inc. 25AA080A/B, 25LC080A/B (25XX080A/B[*]) are 8 Kbit Serial Electrically Erasable PROMs. The memory is accessed via a simple Serial Peripheral Interface (SPI) compatible serial bus. The bus signals required are a clock input (SCK) plus separate data in (SI) and data out (SO) lines. Access to the device is controlled through a Chip Select ($\overline{CS}$) input.

Communication to the device can be paused via the hold pin ($\overline{HOLD}$). While the device is paused, transitions on its inputs will be ignored, with the exception of chip select, allowing the host to service higher priority interrupts.

The 25XX080A/B is available in standard packages including 8-lead PDIP and SOIC, and advanced packaging including 8-lead MSOP, and 8-lead TSSOP. All packages are Pb-free and RoHS compliant.

Package Types (not to scale)

TSSOP/MSOP (ST, MS)

$\overline{CS}$ — 1	8 — Vcc
SO — 2	7 — $\overline{HOLD}$
$\overline{WP}$ — 3	6 — SCK
Vss — 4	5 — SI

PDIP/SOIC (P, SN)

$\overline{CS}$ — 1	8 — Vcc
SO — 2	7 — $\overline{HOLD}$
$\overline{WP}$ — 3	6 — SCK
Vss — 4	5 — SI

*25XX080A/B is used in this document as a generic part number for the 25AA080A/B, 25LC080A/B.

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings [†]

V_{CC}..7.0V

All inputs and outputs w.r.t. V_{SS} .... -0.6V to V_{CC} +1.0V

Storage temperature ....-65°C to 150°C

Ambient temperature under bias ....-65°C to 125°C

ESD protection on all pins ....4 kV

> † NOTICE**:** Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for an extended period of time may affect device reliability.

TABLE 1-1: DC CHARACTERISTICS

DC CHARACTERISTICS			Industrial (I): T_{AMB} = -40°C to +85°C V_{CC} = 1.8V to 5.5V Automotive (E): T_{AMB} = -40°C to +125°C V_{CC} = 2.5V to 5.5V				
Param. No.	Sym.	Characteristic	Min.	Max.	Units	Test Conditions	
D001	V_{IH1}	High-level input voltage	2.0	V_{CC} +1	V	$V_{CC} \geq 2.7V$ **(Note)**	
D002	V_{IH2}		0.7 V_{CC}	V_{CC} +1	V	$V_{CC} < 2.7V$ **(Note)**	
D003	V_{IL1}	Low-level input voltage	-0.3	0.8	V	$V_{CC} \geq 2.7V$ **(Note)**	
D004	V_{IL2}		-0.3	0.2 V_{CC}	V	$V_{CC} < 2.7V$ **(Note)**	
D005	V_{OL}	Low-level output voltage	—	0.4	V	I_{OL} = 2.1 mA	
D006	V_{OL}		—	0.2	V	I_{OL} = 1.0 mA, $V_{CC} < 2.5V$	
D007	V_{OH}	High-level output voltage	V_{CC} -0.5	—	V	I_{OH} = -400 µA	
D008	I_{LI}	Input leakage current		±1	µA	$\overline{CS}$ = V_{CC}, V_{IN} = V_{SS} TO V_{CC}	
D009	I_{LO}	Output leakage current		±1	µA	$\overline{CS}$ = V_{CC}, V_{OUT} = V_{SS} TO V_{CC}	
D010	C_{INT}	Internal Capacitance (all inputs and outputs)	—	7	pF	T_{AMB} = 25°C, CLK = 1.0 MHz, V_{CC} = 5.0V **(Note)**	
D011	I_{CC} Read	Operating Current	— —	6 2.5	mA mA	V_{CC} = 5.5V; F_{CLK} = 10.0 MHz; SO = Open V_{CC} = 2.5V; F_{CLK} = 5.0 MHz; SO = Open	
D012	I_{CC} Write		— —	3	mA	V_{CC} = 5.5V	
D013	I_{CCS}	Standby Current	— —	5 1	µA µA	$\overline{CS}$ = V_{CC} = 5.5V, Inputs tied to V_{CC} or V_{SS}, T_{AMB} = -40°C TO +125°C $\overline{CS}$ = V_{CC} = 2.5V, Inputs tied to V_{CC} or V_{SS}, T_{AMB} = -40°C TO +85°C	

Note: This parameter is periodically sampled and not 100% tested.

TABLE 1-2:   AC CHARACTERISTICS

AC CHARACTERISTICS			Industrial (I): T$_{AMB}$ = -40°C to +85°C V$_{CC}$ = 1.8V to 5.5V Automotive (E): T$_{AMB}$ = -40°C to +125°C V$_{CC}$ = 2.5V to 5.5V			
Param. No.	Sym.	Characteristic	Min.	Max.	Units	Test Conditions
1	F$_{CLK}$	Clock Frequency	— — —	10 5 3	MHz MHz MHz	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
2	T$_{CSS}$	$\overline{CS}$ Setup Time	50 100 150	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
3	T$_{CSH}$	$\overline{CS}$ Hold Time	100 200 250	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
4	T$_{CSD}$	$\overline{CS}$ Disable Time	50	—	ns	—
5	T$_{su}$	Data Setup Time	10 20 30	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
6	T$_{HD}$	Data Hold Time	20 40 50	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
7	T$_R$	CLK Rise Time	—	500	ns	**(Note 1)**
8	T$_F$	CLK Fall Time	—	500	ns	**(Note 1)**
9	T$_{HI}$	Clock High Time	50 100 150	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
10	T$_{LO}$	Clock Low Time	50 100 150	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
11	T$_{CLD}$	Clock Delay Time	50	—	ns	—
12	T$_{CLE}$	Clock Enable Time	50	—	ns	—
13	T$_V$	Output Valid from Clock Low	— — —	50 100 160	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V
14	T$_{HO}$	Output Hold Time	0	—	ns	(Note 1)
15	T$_{DIS}$	Output Disable Time	— — —	40 80 160	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V **(Note 1)** 2.5V ≤ V$_{CC}$ < 4.5V **(Note 1)** 1.8V ≤ V$_{CC}$ < 2.5V **(Note 1)**
16	T$_{HS}$	$\overline{HOLD}$ Setup Time	20 40 80	— — —	ns ns ns	4.5V ≤ V$_{CC}$ ≤ 5.5V 2.5V ≤ V$_{CC}$ < 4.5V 1.8V ≤ V$_{CC}$ < 2.5V

Note 1: This parameter is periodically sampled and not 100% tested.

   2: This parameter is not tested but ensured by characterization. For endurance estimates in a specific application, please consult the Total Endurance™ Model which can be obtained from our web site:

   3: T$_{WC}$ begins on the rising edge of $\overline{CS}$ after a valid write sequence and ends when the internal write cycle is complete.

25XX080A/B

TABLE 1-2: AC CHARACTERISTICS (CONTINUED)

Param. No.	Sym.	Characteristic	Min.	Max.	Units	Test Conditions
— **AC CHARACTERISTICS**			Industrial (I): TAMB = -40°C to +85°C VCC = 1.8V to 5.5V Automotive (E): TAMB = -40°C to +125°C VCC = 2.5V to 5.5V			
17	THH	HOLD Hold Time	20	—	ns	4.5V ≤ VCC ≤ 5.5V
			40	—	ns	2.5V ≤ VCC < 4.5V
			80	—	ns	1.8V ≤ VCC < 2.5V
18	THZ	HOLD Low to Output High-Z	30	—	ns	4.5V ≤ VCC ≤ 5.5V **(Note 1)**
			60	—	ns	2.5V ≤ VCC < 4.5V **(Note 1)**
			160	—	ns	1.8V ≤ VCC < 2.5V **(Note 1)**
19	THV	HOLD High to Output Valid	30	—	ns	4.5V ≤ VCC ≤ 5.5V
			60	—	ns	2.5V ≤ VCC < 4.5V
			160	—	ns	1.8V ≤ VCC < 2.5V
20	TWC	Internal Write Cycle Time	—	5	ms	**(Note 3)**
21	—	Endurance	1,000,000	—	E/W Cycles	**(Note 2)**

Note 1: This parameter is periodically sampled and not 100% tested.

2: This parameter is not tested but ensured by characterization. For endurance estimates in a specific application, please consult the Total Endurance™ Model which can be obtained from our web site:

3: TWC begins on the rising edge of CS after a valid write sequence and ends when the internal write cycle is complete.

TABLE 1-3: AC TEST CONDITIONS

AC Waveform:	
VLO = 0.2V	—
VHI = VCC - 0.2V	**(Note 1)**
VHI = 4.0V	**(Note 2)**
Timing Measurement Reference Level	
Input	0.5 VCC
Output	0.5 VCC

Note 1: For VCC ≤ 4.0V

2: For VCC > 4.0V

25XX080A/B

8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]
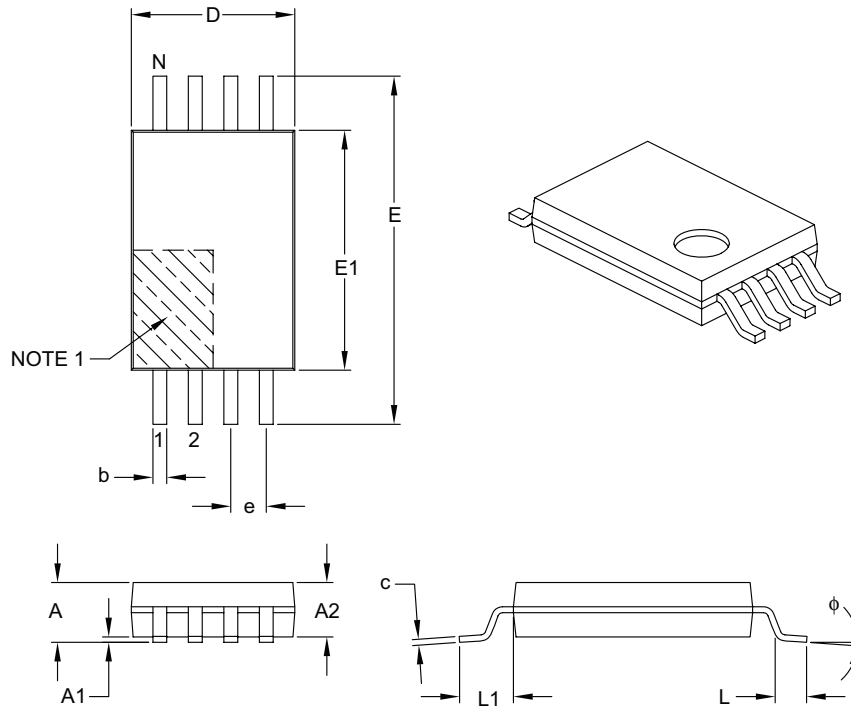
	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	–	0.15
Overall Width	E		6.40 BSC	
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	2.90	3.00	3.10
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Foot Angle	φ	0°	–	8°
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.19	–	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-086B

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

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PART NO.         X    –    X      /XX

  Device     Tape & Reel   Temp Range  Package
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Device: 25AA080A   8 Kbit, 1.8V, 16 Byte Page SPI Serial EEPROM
                   25AA080B   8 Kbit, 1.8V, 32 Byte Page SPI Serial EEPROM
                   25LC080A   8 Kbit, 2.5V, 16 Byte Page SPI Serial EEPROM
                   25LC080B   8 Kbit, 2.5V, 32 Byte Page SPI Serial EEPROM

Tape & Reel: Blank   =   Standard packaging
                   T   =   Tape and Reel

Temperature   I   =   -40°C to+85°C
Range: E   =   -40°C to+125°C

Package: MS   =   Plastic MSOP (Micro Small Outline), 8-lead
                   P   =   Plastic DIP (300 mil body), 8-lead
                   SN   =   Plastic SOIC (3.90 mm body), 8-lead
                   ST   =   TSSOP, 8-lead

Examples:

a) 25AA080A-I/MS = 8 Kbit, 16-byte page, 1.8V
    Serial EEPROM, Industrial temp., MSOP
    package

b) 25AA080AT-I/SN = 8 Kbit, 16-byte page, 1.8V
    Serial EEPROM, Industrial temp., Tape & Reel,
    SOIC package

c) 25LC080BT-I/SN = 8 Kbit, 32-byte page, 2.5V
    Serial EEPROM, Industrial temp., Tape & Reel,
    SOIC package

d) 25LC080BT-I/ST = 8 Kbit, 32-byte page, 2.5V
    Serial EEPROM, Industrial temp., Tape & Reel,
    TSSOP package