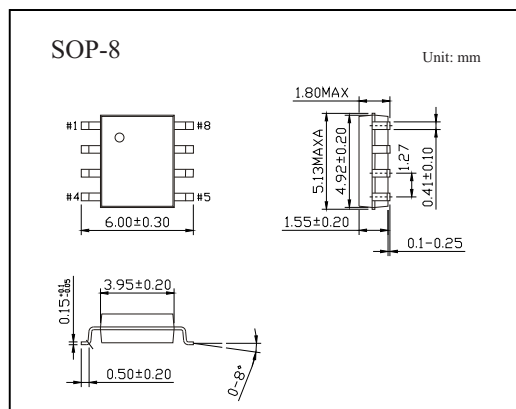


Two-wire Serial EEPROM

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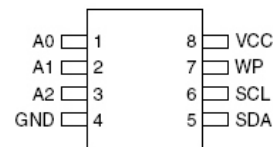
■ Features

- Low-voltage and Standard-voltage Operation
 - 2.7 ($V_{CC} = 2.7V$ to $5.5V$)
 - 1.8 ($V_{CC} = 1.8V$ to $5.5V$)
- Two-wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V) and 400 kHz (2.7V, 5V) Compatibility
- Write Protect Pin for Hardware Data Protection

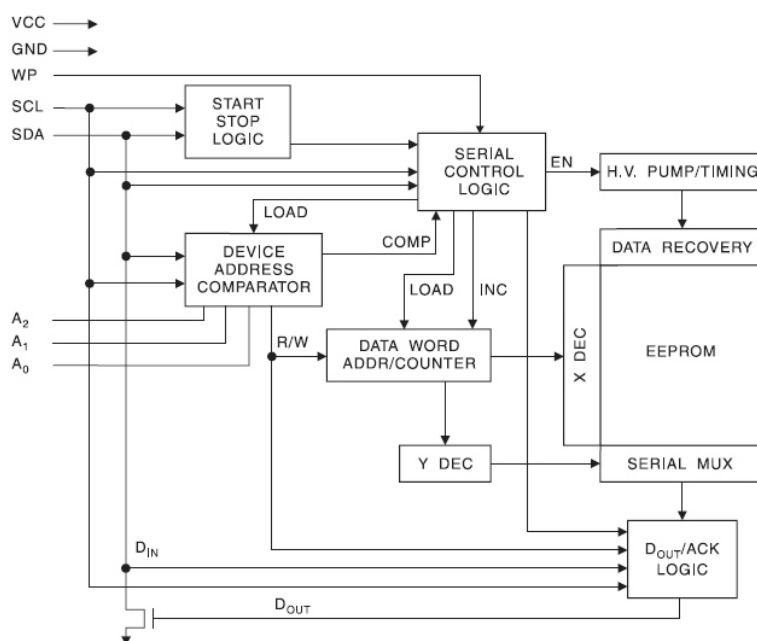


■ Absolute Maximum Ratings

Parameter	Rating	Unit
Operating Temperature	-55 to +125	
Storage Temperature	-65 to +150	
Voltage on Any Pin with Respect to Ground	-1.0 to +7.0	V
Maximum Operating Voltage	6.25	V
DC Output Current	5	mA



■ Block Diagram



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■ Pin Capacitance

Applicable over recommended operating range from $T_A = 25$ $f = 1.0 \text{ MHz}$, $V_{CC} = +1.8\text{V}$.

Parameter	Symbol	Testconditions	Max	Unit
Input/Output Capacitance (SDA)	$C_{I/O}$	$V_{I/O} = 0\text{V}$	8	pF
Input Capacitance (A_0, A_1, A_2, SCL)	C_{IN}	$V_{IN} = 0\text{V}$	6	pF

■ DC Characteristics

Applicable over recommended operating range from :

$T_A = -40$ to $+85$, $V_{CC} = +1.8\text{V}$ to $+5.5\text{V}$ (unless otherwise noted).

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC1}		1.8		5.5	V
Supply Voltage	V_{CC2}		2.7		5.5	V
Supply Voltage	V_{CC3}		4.5		5.5	V
Supply Current $V_{CC} = 5.0\text{V}$	I_{CC}	READ at 100 kHz		0.4	1.0	mA
Supply Current $V_{CC} = 5.0\text{V}$	I_{CC}	WRITE at 100 kHz		2.0	3.0	mA
Standby Current $V_{CC} = 1.8\text{V}$	I_{SB1}	$V_{IN} = V_{CC}$ or V_{SS}		0.6	3.0	μA
Standby Current $V_{CC} = 2.5\text{V}$	I_{SB2}	$V_{IN} = V_{CC}$ or V_{SS}		1.4	4.0	μA
Standby Current $V_{CC} = 2.7\text{V}$	I_{SB3}	$V_{IN} = V_{CC}$ or V_{SS}		1.6	4.0	μA
Standby Current $V_{CC} = 5.0\text{V}$	I_{SB4}	$V_{IN} = V_{CC}$ or V_{SS}		8.0	18.0	μA
Input Leakage Current	I_{LI}	$V_{IN} = V_{CC}$ or V_{SS}		0.10	3.0	μA
Output Leakage Current	I_{LO}	$V_{OUT} = V_{CC}$ or V_{SS}		0.05	3.0	μA
Input Low Level*1	V_{IL}		-0.6		$V_{CC} \times 0.3$	V
Input High Level*1	V_{IH}		$V_{CC} \times 0.7$		$V_{CC} + 0.5$	V
Output Low Level $V_{CC} = 3.0\text{V}$	V_{OL2}	$I_{OL} = 2.1 \text{ mA}$			0.4	V
Output Low Level $V_{CC} = 1.8\text{V}$	V_{OL1}	$I_{OL} = 0.15 \text{ mA}$			0.2	V

*1. V_{IL} min and V_{IH} max are reference only and are not tested.

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■ AC Characteristics

Applicable over recommended operating range from $T_{AI} = -40$ to $+85$, $V_{CC} = +1.8V$ to $+5.5V$, $V_{CC} = +2.7V$ to $+5.5V$,

$CL = 1$ TTL Gate and 100 pF (unless otherwise noted)

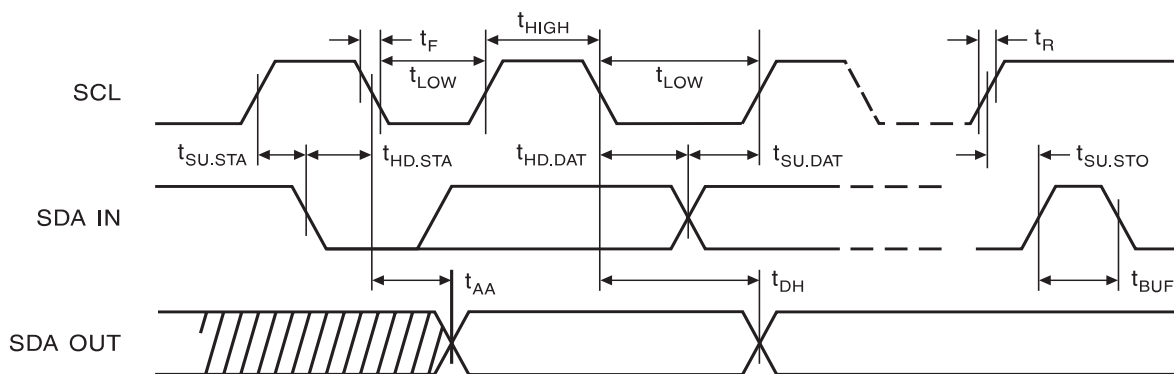
Parameter	Symbol	1.8-V		2.7, 5.0-V		Units
		Min	Max	Min	Max	
Clock Frequency, SCL	fSCL		100		400	kHz
Clock Pulse Width Low	tLOW	4.7		1.2		μs
Clock Pulse Width High	tHIGH	4.0		0.6		μs
Noise Suppression Time*1	ti		100		50	ns
Clock Low to Data Out Valid	tAA	0.1	4.5	0.1	0.9	μs
Time the bus must be free before a new transmission can start*1	tBUF	4.7		1.2		μs
Start Hold Time	tHD.STA	4.0		0.6		μs
Start Setup Time	tSU.STA	4.7		0.6		μs
Data In Hold Time	tHD.DAT	0		0		μs
Data In Setup Time	tSU.DAT	200		100		ns
Inputs Rise Time*1	tR		1.0		0.3	μs
Inputs Fall Time*1	tF		300		300	ns
Stop Setup Time	tSU.STO	4.7		0.6		μs
Data Out Hold Time	tDH	100		50		ns
Write Cycle Time	tWR		5		5	ms
5.0V, 25°, Byte Mode	Endurance*1	1M		1M		Write Cycles

*1. This parameter is characterized.

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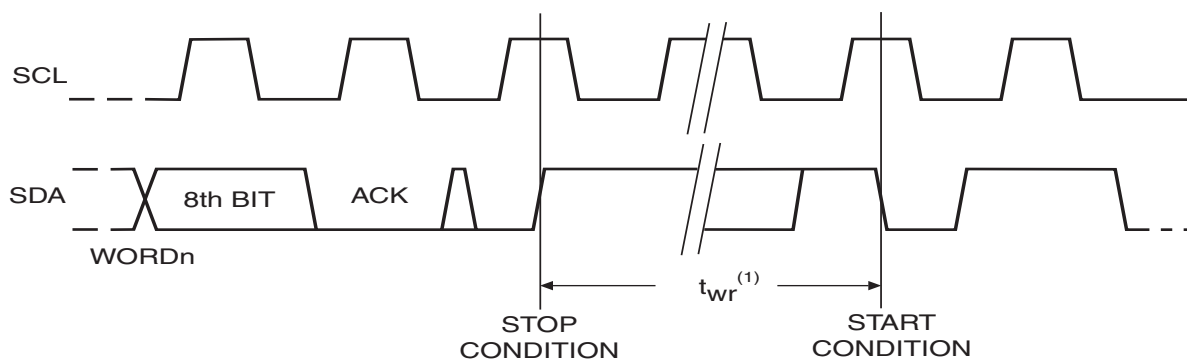
Bus Timing

Figure 1. SCL: Serial Clock, SDA: Serial Data I/O



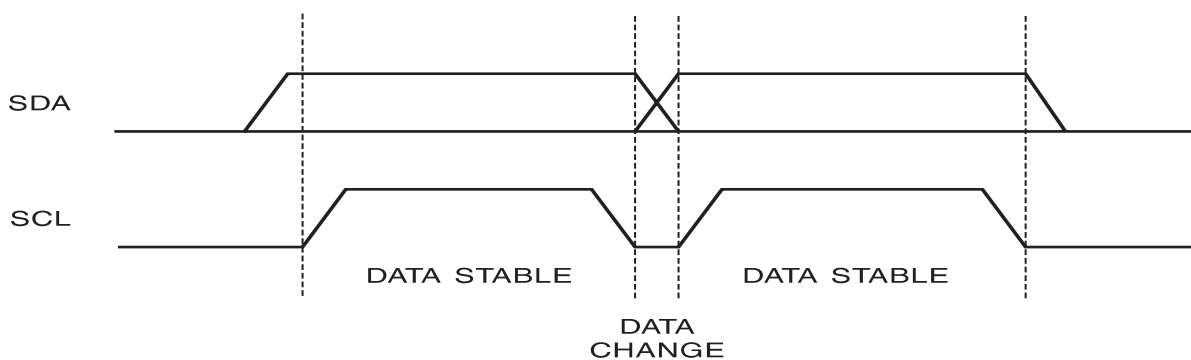
Write Cycle Timing

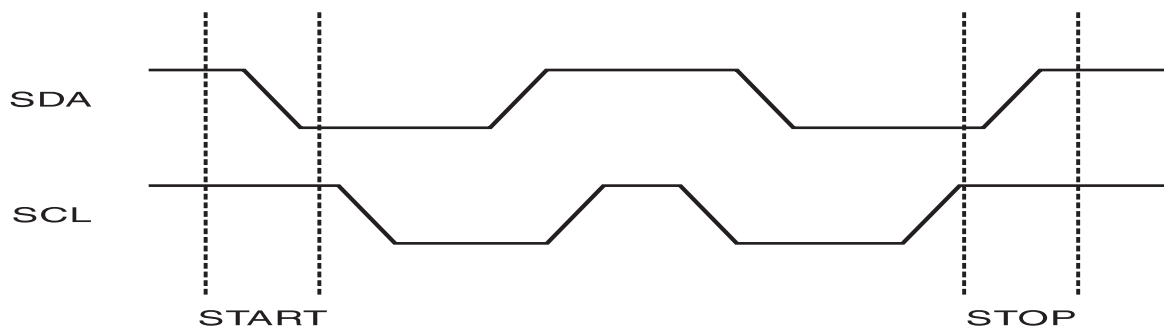
Figure 2. SCL: Serial Clock, SDA: Serial Data I/O



Note: 1. The write cycle time t_{WR} is the time from a valid stop condition of a write sequence to the end of the internal clear/write cycle.

Figure 3. Data Validity



AT24C01A/02N/04N/08AN/16AN**Figure 4.** Start and Stop Definition**Figure 5.** Output Acknowledge