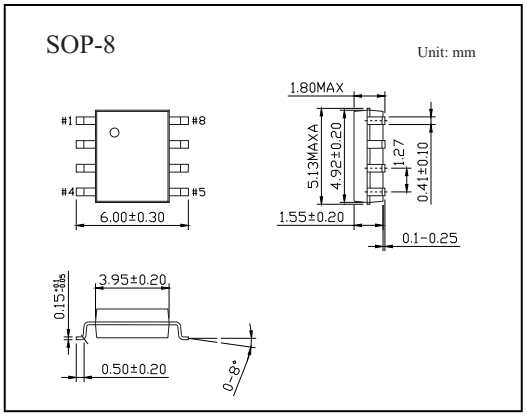
Two-wire Serial EEPROM

AT24C01A/02N/04N/08AN/16AN

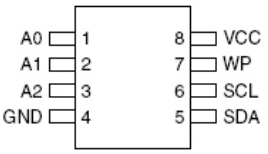
■ Features

- 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

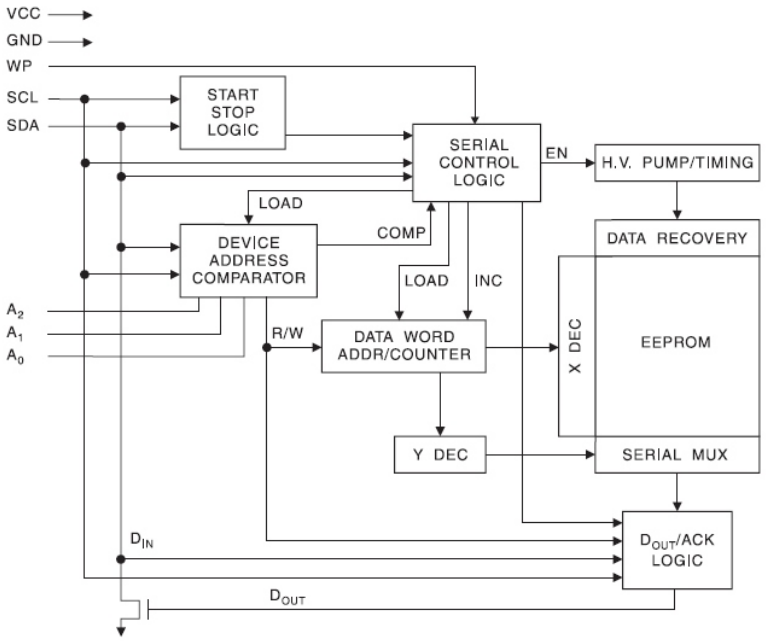


■ Absolute Maximum Ratings

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°C f = 1.0 MHz, V_{CC} = +1.8V.

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

■ DC Characteri stics

Applicable over recommended operating range from :

TA = -40°C to +85°C, VCC = +1.8V to +5.5V (unless otherwise noted).

Parameter	Symbol	Testconditons	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} = 5.0V	I_{CC}	READ at 100 kHz		0.4	1.0	mA
Supply Current V_{CC} = 5.0V	I_{CC}	WRITE at 100 kHz		2.0	3.0	mA
Standby Current V_{CC} = 1.8V	I_{SB1}	V_{IN} = V_{CC} or V_{SS}		0.6	3.0	µA
Standby Current V_{CC} = 2.5V	I_{SB2}	V_{IN} = V_{CC} or V_{SS}		1.4	4.0	µA
Standby Current V_{CC} = 2.7V	I_{SB3}	V_{IN} = V_{CC} or V_{SS}		1.6	4.0	µA
Standby Current V_{CC} = 5.0V	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} x 0.3	V
Input High Level*1	V_{IH}		V_{CC} x 0.7		V_{CC} + 0.5	V
Output Low Level V_{CC} = 3.0V	V_{OL2}	I_{OL} = 2.1 mA			0.4	V
Output Low Level V_{CC} = 1.8V	V_{OL1}	I_{OL} = 0.15 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°C to +85°C, 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	f_{SCL}		100		400	kHz
Clock Pulse Width Low	t_{LOW}	4.7		1.2		μs
Clock Pulse Width High	t_{HIGH}	4.0		0.6		μs
Noise Suppression Time*1	t_I		100		50	ns
Clock Low to Data Out Valid	t_{AA}	0.1	4.5	0.1	0.9	μs
Time the bus must be free before a new transmission can start*1	t_{BUF}	4.7		1.2		μs
Start Hold Time	$t_{HD.STA}$	4.0		0.6		μs
Start Setup Time	$t_{SU.STA}$	4.7		0.6		μs
Data In Hold Time	$t_{HD.DAT}$	0		0		μs
Data In Setup Time	$t_{SU.DAT}$	200		100		ns
Inputs Rise Time*1	t_R		1.0		0.3	μs
Inputs Fall Time*1	t_F		300		300	ns
Stop Setup Time	$t_{SU.STO}$	4.7		0.6		μs
Data Out Hold Time	t_{DH}	100		50		ns
Write Cycle Time	t_{WR}		5		5	ms
5.0V, 25°C, Byte Mode	Endurance*1	1M		1M		Write Cycles

*1. This parameter is characterized.

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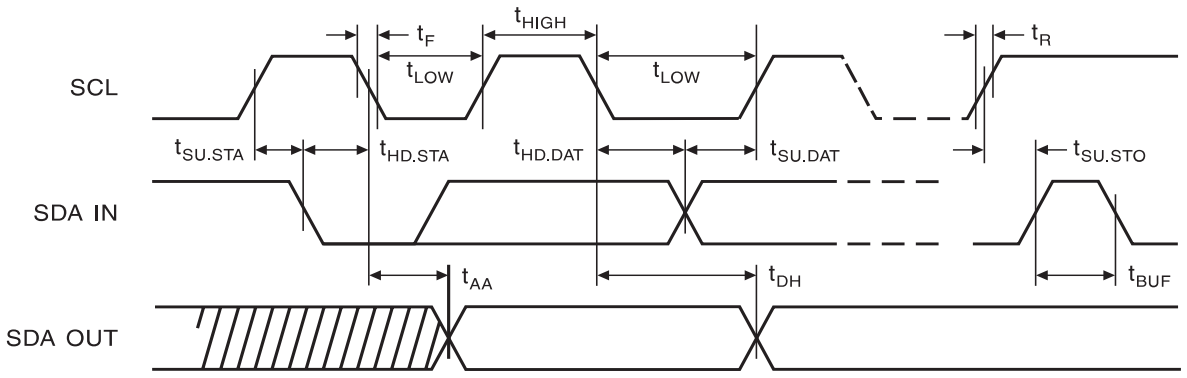
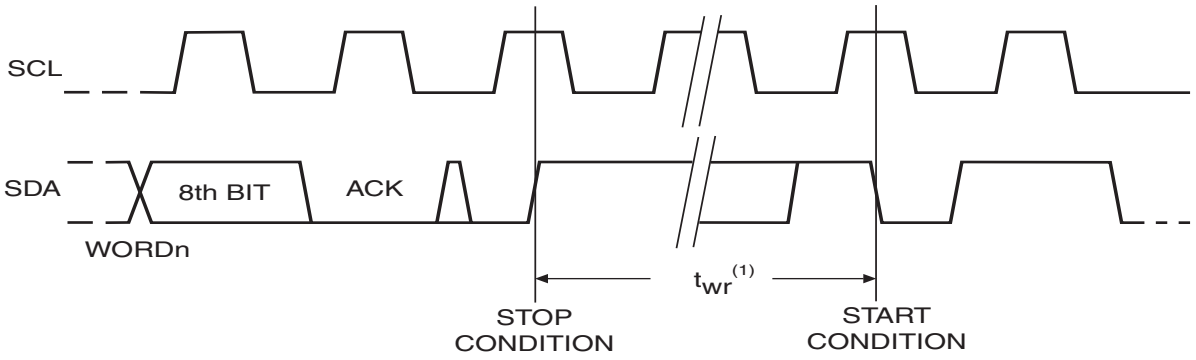
Bus Timing

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

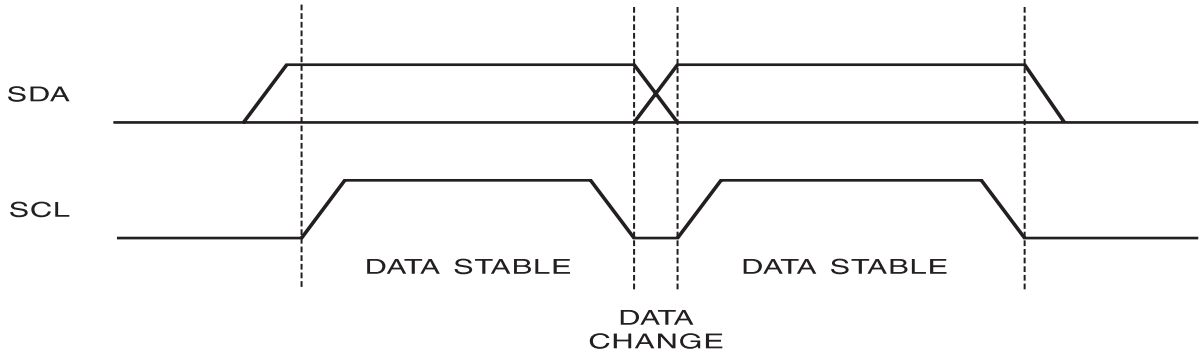


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Figure 4. Start and Stop Definition

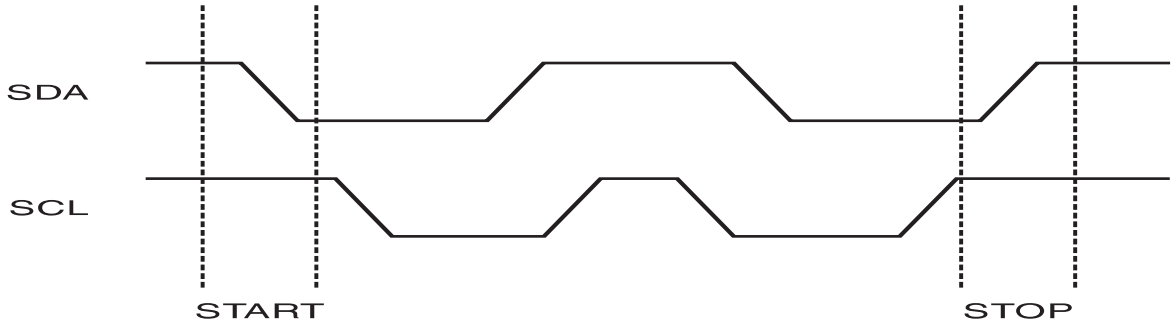

Figure 5. Output Acknowledge