

## Two-wire Serial EEPROM

### AT24C01A/02/04

#### Features

Low-voltage and Standard-voltage Operation

-2.7 (V<sub>CC</sub> = 2.7V to 5.5V)

-1.8 (V<sub>CC</sub> = 1.8V to 5.5V)

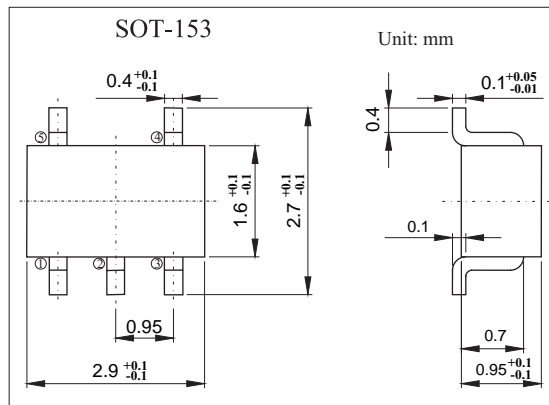
Two-wire Serial Interface

Schmitt Trigger, Filtered Inputs for Noise Suppression

Bidirectional Data Transfer Protocol

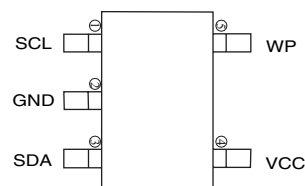
100 kHz (1.8V) and 400 kHz (2.7V, 5V) Compatibility

Write Protect Pin for Hardware Data Protection

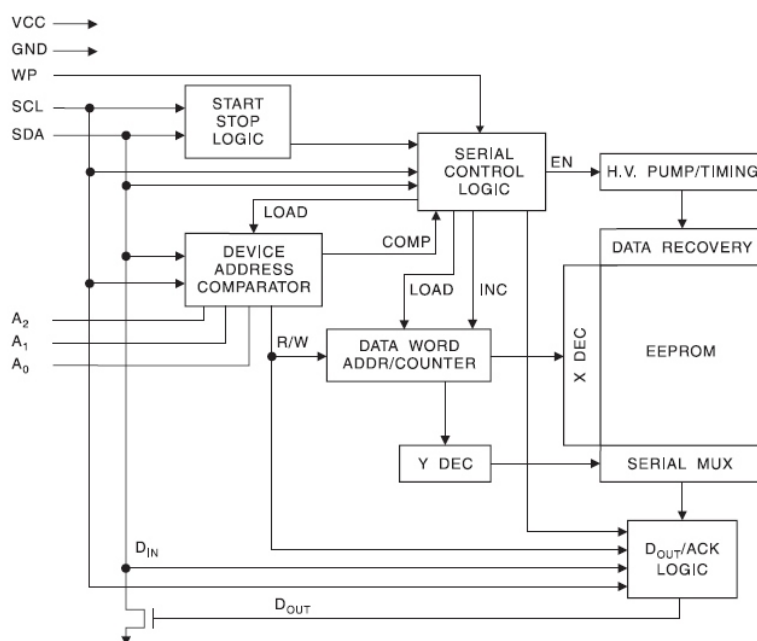


#### Absolute Maximum Ratings

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 MHz,  $V_{CC} = +1.8V$ .

Parameter	Symbol	Testconditions	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 Characteristics

Applicable over recommended operating range from :

$T_A = -40$  to  $+85$  ,  $V_{CC} = +1.8V$  to  $+5.5V$  (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 $V_{CC} = 5.0V$	$I_{CC}$	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	$\mu A$
Standby Current $V_{CC} = 2.5V$	$I_{SB2}$	$V_{IN} = V_{CC}$ or $V_{SS}$		1.4	4.0	$\mu A$
Standby Current $V_{CC} = 2.7V$	$I_{SB3}$	$V_{IN} = V_{CC}$ or $V_{SS}$		1.6	4.0	$\mu A$
Standby Current $V_{CC} = 5.0V$	$I_{SB4}$	$V_{IN} = V_{CC}$ or $V_{SS}$		8.0	18.0	$\mu A$
Input Leakage Current	$I_{LI}$	$V_{IN} = V_{CC}$ or $V_{SS}$		0.10	3.0	$\mu A$
Output Leakage Current	$I_{LO}$	$V_{OUT} = V_{CC}$ or $V_{SS}$		0.05	3.0	$\mu A$
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 $V_{CC} = 3.0V$	$V_{OL2}$	$I_{OL} = 2.1$ 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  $T_{AI} = -40$  to  $+85$ ,  $V_{CC} = +1.8V$  to  $+5.5V$ ,  $V_{CC} = +2.7V$  to  $+5.5V$ ,

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

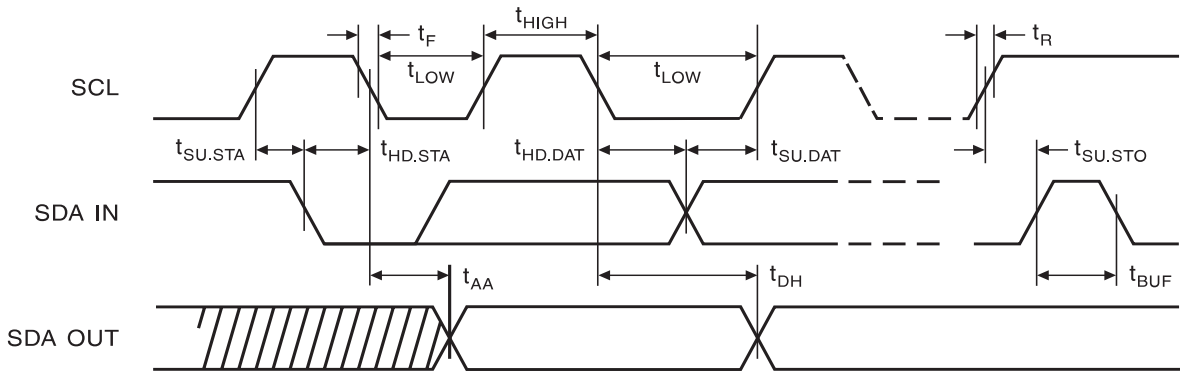
Parameter	Symbol	1.8-V		2.7, 5.0-V		Units
		Min	Max	Min	Max	
Clock Frequency, SCL	fSCL		100		400	kHz
Clock Pulse Width Low	tLOW	4.7		1.2		$\mu s$
Clock Pulse Width High	tHIGH	4.0		0.6		$\mu s$
Noise Suppression Time*1	tI		100		50	ns
Clock Low to Data Out Valid	tAA	0.1	4.5	0.1	0.9	$\mu s$
Time the bus must be free before a new transmission can start*1	tBUF	4.7		1.2		$\mu s$
Start Hold Time	tHD.STA	4.0		0.6		$\mu s$
Start Setup Time	tSU.STA	4.7		0.6		$\mu s$
Data In Hold Time	tHD.DAT	0		0		$\mu s$
Data In Setup Time	tSU.DAT	200		100		ns
Inputs Rise Time*1	tR		1.0		0.3	$\mu s$
Inputs Fall Time*1	tF		300		300	ns
Stop Setup Time	tSU.STO	4.7		0.6		$\mu s$
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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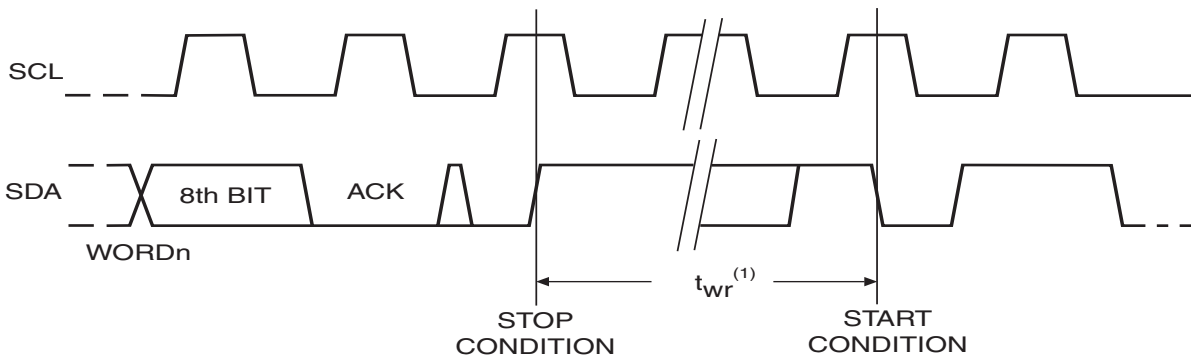
### Bus Timing

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



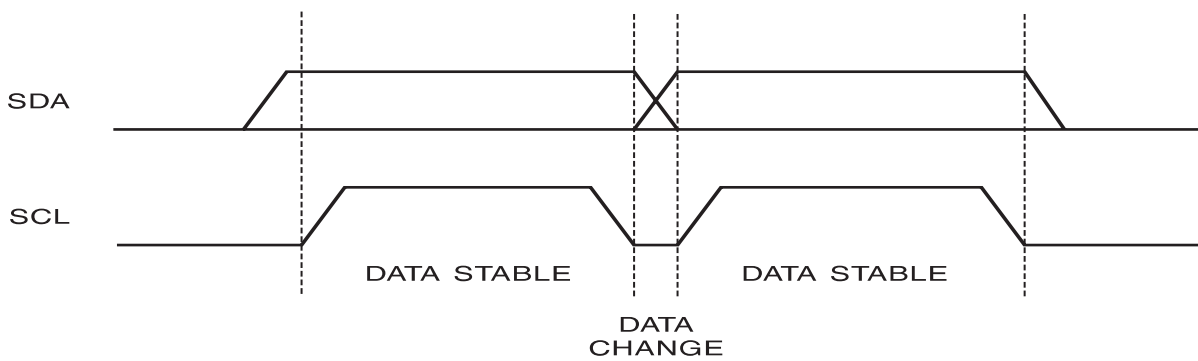
### Write Cycle Timing

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



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Figure 4. Start and Stop Definition

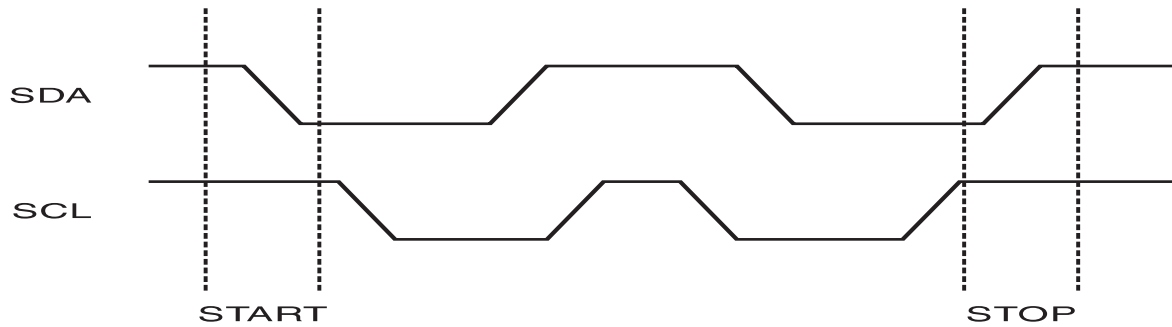


Figure 5. Output Acknowledge

