

HIGH SPEED CMOS LOGIC IC ELM7SH126xA

http://www.elm-tech.com

■ General description

ELM7SH126xA is bus buffer with 3-STATE output, which is suitable for battery-operated devices because of its low voltage and ultra high speed operation. The low power consumption contributes to longer battery life, which allows long time operation of devices. The internal circuit which provides high noise immunity and stable output is composed of 3 stages, including buffered output.

■ Features

- Same electrical characteristic and high speed operation as 74VHC series
- Low consumption current : $I_{dd}=1.0\mu\text{A}(\text{Max.})(T_{op}=25^{\circ}\text{C})$
- Wide power voltage range : 2.0V to 5.5V
- Wide input voltage range : $V_{ih}=5.5\text{V}(\text{Max.})(V_{dd}=0 \text{ to } 5.5\text{V})$
- High speed : $T_{pd}=3.8\text{ns}(\text{Typ.})(V_{dd}=5.0\text{V})$
- Small package : SOT-25, SC-70-5(SOT-353)
- Same function and pin configuration as ELM7SxxB

■ Application

- Cell phones
- Digital cameras
- Portable electrical appliances like PDA, etc.
- Computers and peripherals
- Digital electrical appliances like LCD TV sets, DVD recorders/players, STB, etc.
- Modification inside print board, adjustment of timing, solution to noise
- Power voltage change from 5V to 3V

■ Selection guide

ELM7SH126xAEL

Symbol		
a	Function	126: Bus buffer
b	Package	M: SOT-25 T : SC-70-5(SOT-353)
c	Product version	A
d	Taping direction	EL: Refer to PKG file

ELM7SH 126 x A EL
 $\begin{matrix} \uparrow & \uparrow & \uparrow & \uparrow \\ a & b & c & d \end{matrix}$

■ Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Power supply voltage	V _{dd}	-0.5 to +6.0	V
Input voltage	V _{in}	-0.5 to +6.0	V
Output voltage	V _{out}	-0.5 to V _{dd} +0.5	V
Input protection diode current	I _{ik}	-20	mA
Output parasitic diode current	I _{ok}	±20	mA
Output current	I _{out}	±25	mA
VDD/GND current	I _{dd} , I _{gnd}	±50	mA
Power dissipation	P _d	150	mW
Storage temperature	T _{stg}	-65 to +150	°C

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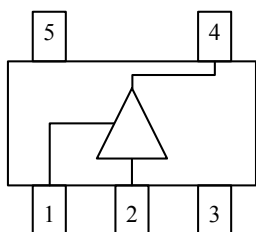
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■Suggested operating condition

Parameter	Symbol	Limit		Unit
Power voltage	Vdd	2.0 to 5.5		V
Input voltage	Vin	0 to 5.5		V
Output voltage	Vout	0 to Vdd		V
Operating temperature	Top	-40 to +85		°C
High-input down-time	tr, tf	Vdd=3.3±0.3V	0 to 200	ns
		Vdd=5.0±0.5V	0 to 100	

■Pin configuration

TOP VIEW



Pin No.	Pin name
1	OE
2	INY
3	GND
4	OUTX
5	VDD

■Truth Table

Input		Output
OE	INY	OUTX
High	High	High
High	Low	Low
Low	High	Hi-Z
Low	Low	Hi-Z

■DC electrical characteristics

Parameter	Sym.	Vdd	Top=25°C			Top=-40 to +85°C		Unit	Condition	
			Min.	Typ.	Max.	Min.	Max.			
Input voltage	Vih	2.0	1.50			1.50		V		
		3.0	2.10			2.10				
		5.5	3.85			3.85				
	Vil	2.0			0.50		0.50	V		
		3.0			0.90		0.90			
		5.5			1.65		1.65			
Output voltage	Voh	2.0	1.90	2.00		1.90	V	Vin=Vih	Ioh=-50µA	
		3.0	2.90	3.00		2.90			Ioh=-4mA	
		4.5	4.40	4.50		4.40			Ioh=-8mA	
		3.0	2.58			2.48				
		4.5	3.94			3.80				
	Vol	2.0			0.10		0.10	V	Vin=Vih or Vil	Iol=50µA
		3.0			0.10		0.10			Iol=4mA
		4.5			0.10		0.10			Iol=8mA
		3.0			0.36		0.44			
		4.5			0.36		0.44			
3-state output off-state current	Loz	5.5			±0.25		±2.5	µA	Vin=Vih or Vil Vout=Vdd or GND	
Input current	Iin	0 to 5.5			±0.1		±1.0	µA	Vin=5.5V or GND	
Static current	Idd	5.5			1.0		10.0	µA	Vin=Vdd or GND	

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■ AC electrical characteristics

If not specified, Input : $t_r=t_f=3ns$

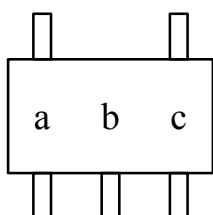
Parameter	Sym.	Vdd(V)	CL (pF)	Top=25°C			Top=-40 to +85°C		Unit	Condi.
				Min.	Typ.	Max.	Min.	Max.		
Propagation delay-time	tPLH	3.3±0.3	15.0		5.6	8.0	1.0	9.5	ns	
	tPHL				5.6	8.0	1.0	9.5		
	tPLH	3.3±0.3	50.0		8.1	11.5	1.0	13.0		
	tPHL				8.1	11.5	1.0	13.0		
	tPLH	5.0±0.5	15.0		3.8	5.5	1.0	6.5		
	tPHL				3.8	5.5	1.0	6.5		
	tPLH	5.0±0.5	50.0		5.3	7.5	1.0	8.5		
	tPHL				5.3	7.5	1.0	8.5		
Output enable time	tPZH	3.3±0.3	15.0		5.4	8.0	1.0	9.5	ns	
	tPZL				5.4	8.0	1.0	9.5		
	tPZH	3.3±0.3	50.0		7.9	11.5	1.0	13.0		
	tPZL				7.9	11.5	1.0	13.0		
	tPZH	5.0±0.5	15.0		3.6	5.1	1.0	6.0		
	tPZL				3.6	5.1	1.0	6.0		
	tPZH	5.0±0.5	50.0		5.1	7.1	1.0	8.0		
	tPZL				5.1	7.1	1.0	8.0		
Output disable time	tPLZ	3.3±0.3	15.0		7.0	9.7	1.0	11.5	ns	
	tPHZ				7.0	9.7	1.0	11.5		
	tPLZ	3.3±0.3	50.0		9.5	13.2	1.0	15.0		
	tPHZ				9.5	13.2	1.0	15.0		
	tPLZ	5.0±0.5	15.0		4.6	6.8	1.0	8.0		
	tPHZ				4.6	6.8	1.0	8.0		
	tPLZ	5.0±0.5	50.0		6.1	8.8	1.0	10.0		
	tPHZ				6.1	8.8	1.0	10.0		
Input capacity	Cin				4	10		10	pF	
Output capacity	Cout				6				pF	
Equivalent inner capacity	Cpd				14				pF	*

* Cpd is IC's inner equivalent capacity which is calculated from non-loaded operating current consumption referred to test circuit.

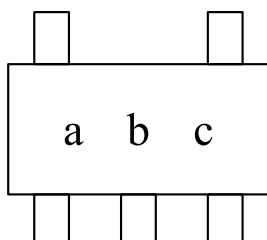
Averaged operating current consumption at non load is calculated as following formula: $I_{dd(opr)} = C_{pd} \cdot V_{dd} \cdot f_{in} + I_{dd}$

■ Marking

SC-70-5



SOT-25

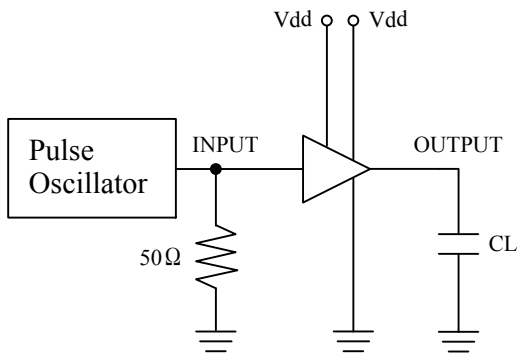


No.	Mark	Content
a	F	ELM7SH series
b	C	ELM7SH126xA
c	A to Z (except I, O, X)	Lot No.

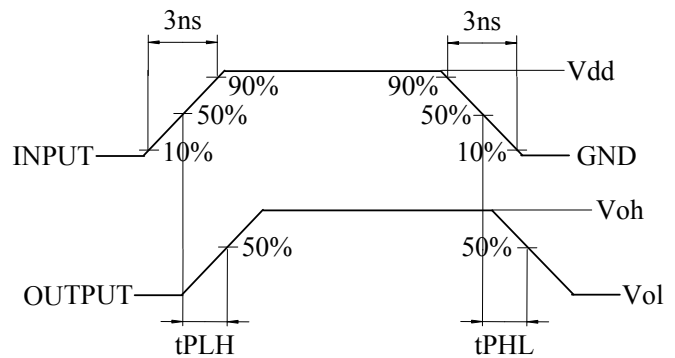
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■ Test circuit : tPLH/tPHL

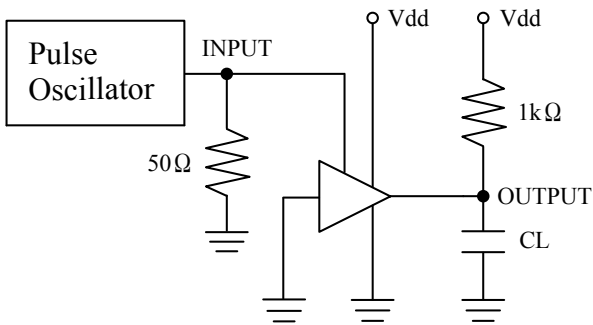


■ Measured wave pattern : tPLH/tPHL

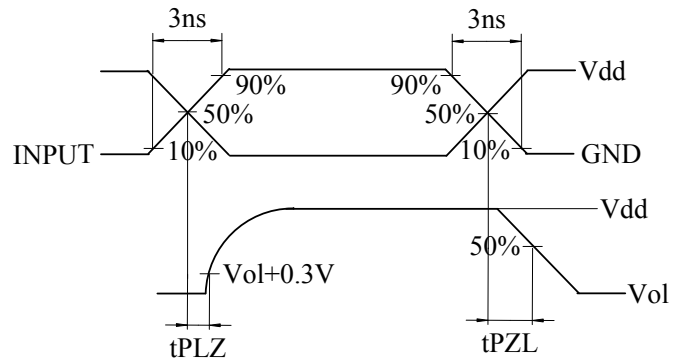


* Output should be opened when measuring current consumption.

■ Test circuit : tPLZ/tPZL

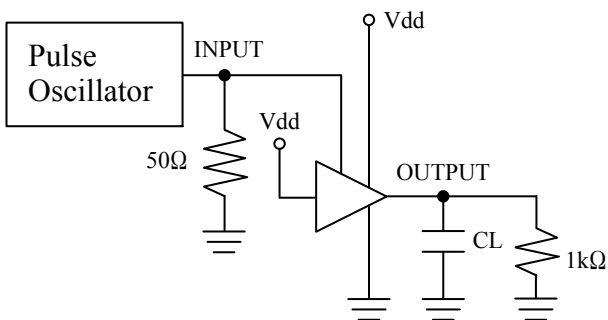


■ Measured wave pattern : tPLZ/tPZL

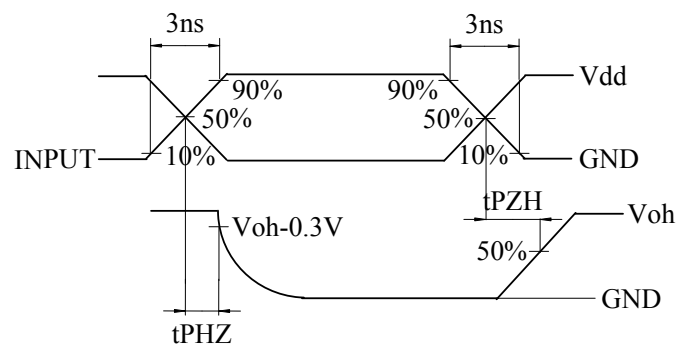


* Output should be opened when measuring current consumption.

■ Test circuit : tPHZ/tPZH



■ Measured wave pattern : tPHZ/tPZH



* Output should be opened when measuring current consumption.