

HIGH SPEED CMOS LOGIC IC ELM7SH125xA

<https://www.elm-tech.com>

■General description

ELM7SH125xA 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. All input pins have an input tolerant circuit configuration. In other words, there is no diode on the positive side (forward from input to Vdd), so it ensures that 0 to 5.5 V can be applied to the input pins without regard to the supply voltage.

■Features

- Same electrical characteristic and high speed operation as 74VHC series
- Low consumption current : $I_{dd}=1.0\mu A$ (Max.)(Top=25°C)
- Wide power voltage range : 1.65V to 5.5V
- Wide input voltage range : $V_{ih}=5.5V$ (Max.)($V_{dd}=0$ to 5.5V)
- High speed : $T_{pd}=3.8ns$ (Typ.)($V_{dd}=5.0V$)
- Small package : SOT-25, SC-70-5(SOT-353)
- Same function and pin configuration as ELM7SxB

■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 (Input tolerant)

■Selection guide

ELM7SH125xAEL

Symbol	Function	125: Bus buffer
a	Function	125: 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 125 x A EL
↑ ↑ ↑ ↑
a b c d

■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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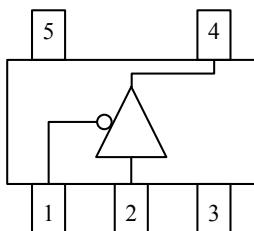
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■Suggested operating condition

Parameter	Symbol	Limit		Unit
Power voltage	Vdd	1.65 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=1.8±0.15V	0 to 300	ns
		Vdd=2.5±0.2V	0 to 200	
		Vdd=3.3±0.3V	0 to 200	
		Vdd=5.0±0.5V	0 to 100	

■Pin configuration

TOP VIEW



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

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

■DC electrical characteristics

Parameter	Sym.	Vdd	Top=25°C		Top=-40 to +85°C		Unit	Condition
			Min.	Max.	Min.	Max.		
Input voltage	Vih	1.65	1.23	-	1.23	-	V	
		2.0	1.50	-	1.50	-		
		3.0	2.10	-	2.10	-		
		5.5	3.85	-	3.85	-		
	Vil	1.65	-	0.42	-	0.42	V	
		2.0	-	0.50	-	0.50		
		3.0	-	0.90	-	0.90		
		5.5	-	1.65	-	1.65		
Output voltage	Voh	1.65	1.55	-	1.55	-	V	Vin=Vih or Vil Ioh=-50μA
		2.0	1.90	-	1.90	-		
		3.0	2.90	-	2.90	-		
		4.5	4.40	-	4.40	-		
		3.0	2.58	-	2.48	-		
		4.5	3.94	-	3.80	-		
	Vol	1.65	-	0.10	-	0.10	V	Vin=Vil Iol=50μA
		2.0	-	0.10	-	0.10		
		3.0	-	0.10	-	0.10		
		4.5	-	0.10	-	0.10		
		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 : tr=tf=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	1.8 ± 0.15	15	-	13.5	23.5	1.0	26.0	ns	
	tPHL			-	13.5	23.5	1.0	26.0		
	tPLH	1.8 ± 0.15	50	-	19.0	33.0	1.0	36.0		
	tPHL			-	19.0	33.0	1.0	36.0		
	tPLH	2.5 ± 0.2	15	-	6.8	13.0	1.0	15.5		
	tPHL			-	6.8	13.0	1.0	15.5		
	tPLH	2.5 ± 0.2	50	-	8.7	16.5	1.0	18.5		
	tPHL			-	8.7	16.5	1.0	18.5		
	tPLH	3.3±0.3	15	-	5.6	8.0	1.0	9.5		
	tPHL			-	5.6	8.0	1.0	9.5		
	tPLH	3.3±0.3	50	-	8.1	11.5	1.0	13.0		
	tPHL			-	8.1	11.5	1.0	13.0		
	tPLH	5.0±0.5	15	-	3.8	5.5	1.0	6.5		
	tPHL			-	3.8	5.5	1.0	6.5		
	tPLH	5.0±0.5	50	-	5.3	7.5	1.0	8.5		
	tPHL			-	5.3	7.5	1.0	8.5		
Output enable time	tZH	1.8 ± 0.15	15	-	13.7	26.5	1.0	29.0	ns	
	tZL			-	13.7	26.5	1.0	29.0		
	tZH	1.8 ± 0.15	50	-	20.5	36.0	1.0	38.0		
	tZL			-	20.5	36.0	1.0	38.0		
	tZH	2.5 ± 0.2	15	-	7.0	13.0	1.0	15.5		
	tZL			-	7.0	13.0	1.0	15.5		
	tZH	2.5 ± 0.2	50	-	8.8	16.5	1.0	18.5		
	tZL			-	8.8	16.5	1.0	18.5		
	tZH	3.3±0.3	15	-	5.4	8.0	1.0	9.5		
	tZL			-	5.4	8.0	1.0	9.5		
	tZH	3.3±0.3	50	-	7.9	11.5	1.0	13.0		
	tZL			-	7.9	11.5	1.0	13.0		
	tZH	5.0±0.5	15	-	3.6	5.1	1.0	6.0		
	tZL			-	3.6	5.1	1.0	6.0		
	tZH	5.0±0.5	50	-	5.1	7.1	1.0	8.0		
	tZL			-	5.1	7.1	1.0	8.0		

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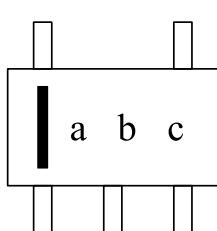
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Parameter	Sym.	Vdd(V)	CL (pF)	Top=25°C			Top=-40 to +85°C		Unit	Condi.
				Min.	Typ.	Max.	Min.	Max.		
Output disable time	tHZ	1.8 ± 0.15	15	-	8.3	20.0	1.0	22.5	ns	
	tLZ			-	8.3	20.0	1.0	22.5		
	tHZ	1.8 ± 0.15	50	-	13.0	29.5	1.0	32.0		
	tLZ			-	13.0	29.5	1.0	32.0		
	tHZ	2.5 ± 0.2	15	-	5.1	14.7	1.0	17.0		
	tLZ			-	5.1	14.7	1.0	17.0		
	tHZ	2.5 ± 0.2	50	-	7.3	18.2	1.0	20.5		
	tLZ			-	7.3	18.2	1.0	20.5		
	tHZ	3.3±0.3	15	-	7.0	9.7	1.0	11.5		
	tLZ			-	7.0	9.7	1.0	11.5		
	tHZ	3.3±0.3	50	-	9.5	13.2	1.0	15.0		
	tLZ			-	9.5	13.2	1.0	15.0		
	tHZ	5.0±0.5	15	-	4.6	6.8	1.0	8.0		
	tLZ			-	4.6	6.8	1.0	8.0		
	tHZ	5.0±0.5	50	-	6.1	8.8	1.0	10.0		
	tLZ			-	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	*

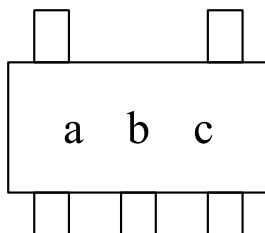
* Cpd is IC's inner equivalent capacity which is calculated from non-loaded operating current consumption referred to test circuit.
Averaged operating current consumption at non load is calculated as following formula: $I_{dd(\text{opr})} = C_{pd} \cdot V_{dd} \cdot f_{in} + I_{dd}$

■Marking

SC-70-5



SOT-25

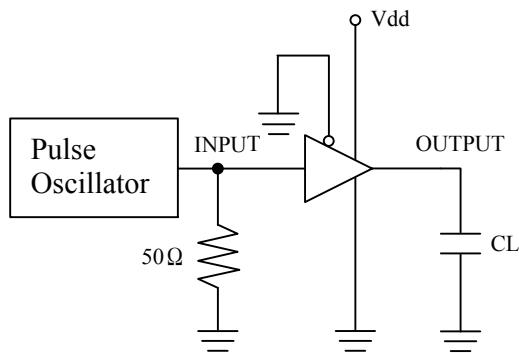


No.	Mark	Content
a	F	ELM7SH series
b	B	ELM7SH125xA
c	A to Z (except I, O, X)	Lot No.

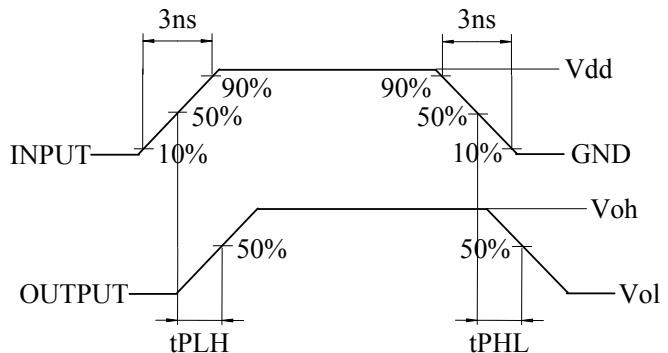
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■Test circuit : tPLH/tPHL

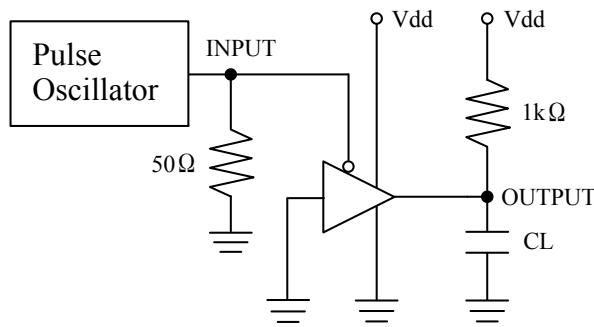


■Measured wave pattern : tPLH/tPHL

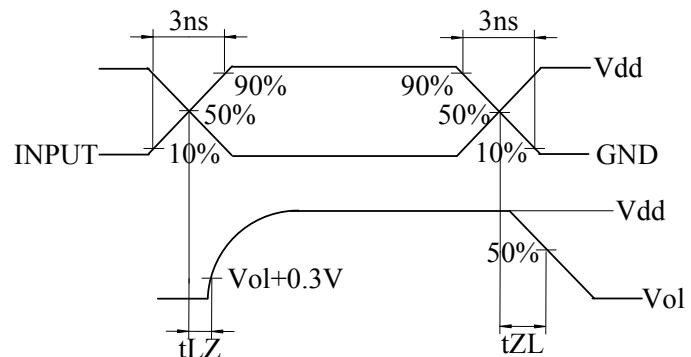


* Output should be opened when measuring current consumption.

■Test circuit : tLZ/tZL

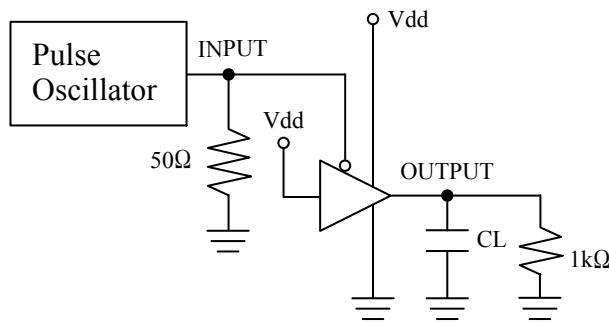


■Measured wave pattern : tLZ/tZL

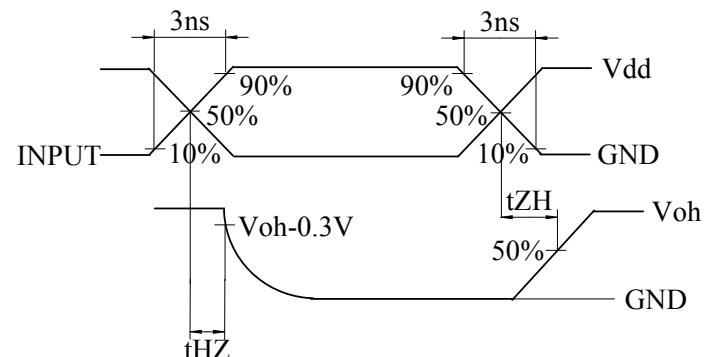


* Output should be opened when measuring current consumption.

■Test circuit : tHZ/tZH



■Measured wave pattern : tHZ/tZH



* Output should be opened when measuring current consumption.