CMOS LOGIC IC ELM7S02B 2-input NOR gate

■General description

 ELM7S02B is CMOS 2-input NOR gate IC. It realizes high speed operation similar to LS-TTL with lower power consumption by CMOS features. The inner circuit structure of 3-stage logic gate obtains wider noise immunity and constant output.

■Features

· Same electrical characteristic as 74HC series (output current is around 1/2 of 74HC series)
· Low consumption current   : Idd=1.0μA(Max.)(Top=25℃)
· Wide power voltage range   : 2.0V～6.0V
· High speed   : Tpd=5ns(Typ.)(Vdd=5.0V)
· Symmetrical output impedance   : | Ioh |=Iol=2mA (Min.)(Vdd=4.5V)
· Small package   : SOT-25

■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

■Selection guide

ELM7S02B-EL

Symbol		
a	Function	02 : 2-input NOR gate
b	Product version	B
c	Taping direction	EL : Refer to PKG file

ELM7S $\underline{0\ 2}$ B – $\underline{EL}$
　　　　↑　　↑　　　↑
　　　　a　　b　　　c

■Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Power supply voltage	Vdd	−0.5～+7.0	V
Input voltage	Vin	−0.5～Vdd+0.5	V
Output voltage	Vout	−0.5～Vdd+0.5	V
Input protection diode current	Iik	±20	mA
Output parasitic diode current	Iok	±20	mA
Output current	Iout	±25	mA
VDD/GND current	Idd, Ignd	±25	mA
Power dissipation	Pd	200	mW
Storage temperature	Tstg	−65～+150	℃

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■Suggested operating condition

Parameter	Symbol	Limit		Unit
Power voltage	Vdd	2.0～6.0		V
Input voltage	Vin	0～Vdd		V
Output voltage	Vout	0～Vdd		V
Operating temperature	Top	−40～+85		℃
High-input down-time	tr, tf	Vdd=2.0V	0～1000	ns
		Vdd=4.5V	0～500	
		Vdd=6.0V	0～400	

■Pin configuration

SOT-25 (TOP VIEW)
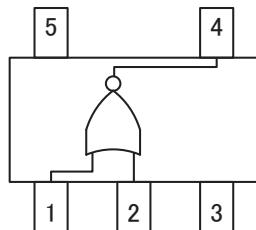
Pin No.	Pin name
1	INB
2	INA
3	GND
4	OUTX
5	VDD

Input		Output
INA	INB	OUTX
Low	Low	High
Low	High	Low
High	Low	Low
High	High	Low

■AC electrical characteristics

CL=15pF, tr=tf=6ns, Vdd=5V

Parameter	Sym.	Top=25℃			Unit	Condition
		Min.	Typ.	Max.		
Output transition time	tTLH		4	10	ns	Refer to test circuit
	tTHL		3	10		
Propagation delay-time	tPLH		5	15	ns	Refer to test circuit
	tPHL		5	15		

CL=50pF, tr=tf=6ns

Parameter	Sym.	Vdd	Top=25℃			Top=−40～+85℃		Unit	Condition
			Min.	Typ.	Max.	Min.	Max.		
Output transition time	tTLH	2.0		21	125		155	ns	Refer to test circuit
		4.5		8	25		31		
		6.0		7	21		26		
	tTHL	2.0		16	125		155	ns	
		4.5		7	25		31		
		6.0		6	21		26		
Propagation delay-time	tPLH	2.0		19	100		125	ns	Refer to test circuit
		4.5		8	20		25		
		6.0		7	17		21		
	tPHL	2.0		17	100		125	ns	
		4.5		7	20		25		
		6.0		6	17		21		
Input capacity	Cin			5	10		10	pF	
Equivalent inner capacity	Cpd			10				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: Idd(opr)=Cpd・Vdd・fin+Idd

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■DC electrical characteristics

Parameter	Sym.	Vdd	Top=25℃ Min.	Top=25℃ Typ.	Top=25℃ Max.	Top=−40～+85℃ Min.	Top=−40～+85℃ Max.	Unit	Condition	
Input voltage	Vih	2.0	1.50			1.50		V		
		4.5	3.15			3.15				
		6.0	4.20			4.20				
	Vil	2.0			0.50		0.50	V		
		4.5			1.35		1.35			
		6.0			1.80		1.80			
Output voltage	Voh	2.0	1.90	2.00		1.90		V	Vin=Vil	Ioh=−20μA
		4.5	4.40	4.50		4.40				
		6.0	5.90	6.00		5.90				
		4.5	4.18	4.35		4.13				Ioh=−2mA
		6.0	5.68	5.83		5.63				Ioh=−2.6mA
	Vol	2.0		0.00	0.10		0.10	V	Vin= Vih or Vil	Iol=20μA
		4.5		0.00	0.10		0.10			
		6.0		0.00	0.10		0.10			
		4.5		0.12	0.26		0.33			Iol=2mA
		6.0		0.13	0.26		0.33			Iol=2.6mA
Input current	Iin	6.0	−0.1		0.1	−1.0	1.0	μA	Vin=Vdd or GND	
Static current	Idd	6.0			1.0		10.0	μA	Vin=Vdd or GND	

■Test circuit
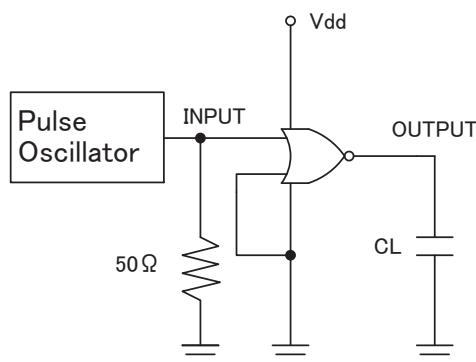
＊ Output should be opened when measuring current consumption.

■Measured wave pattern
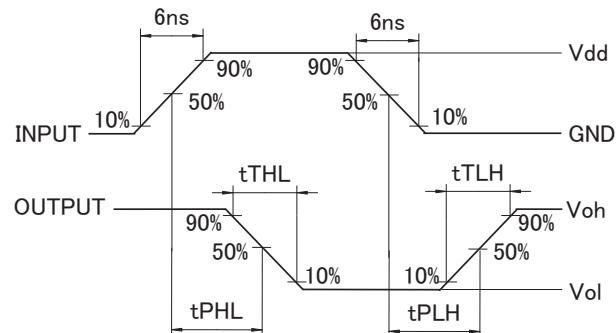
■Marking

SOT-25
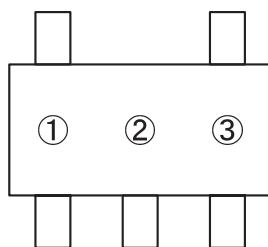
No.	Mark	Content
①	E	ELM7S series
②	3	ELM7S02B
③	A～Z (except I, O, X)	Lot No.

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