HIGH SPEED CMOS LOGIC IC ELM7SHU04xB Unbuffer Inverter

■General description

ELM7SHU04xB is CMOS unbuffer inverter 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 longtime operation of devices. The internal circuit which is 1-stage unbuffer type can be used for crystal oscillation.

■Features

- Same electrical characteristic and high speed operation as 74VHC series
- Low consumption current : Idd=1.0μA(Max.)(Top=25°C)
- Wide power voltage range : 2.0V to 5.5V
- Wide input voltage range : Vih=5.5V(Max.)(Vdd=0 to 5.5V)
- High speed : Tpd=2ns(Typ.)(Vdd=5.0V)
- 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

ELM7SHU04xB-EL

Symbol		
a	Function	U04: Unbuffer Inverter
b	Package	M: SOT-25 T: SC-70-5(SOT-353)
c	Product version	B
d	Taping direction	EL: Refer to PKG file

ELM7SH U04 x B - EL
↑ ↑ ↑ ↑
a b c d

■Maximum absolute ratings

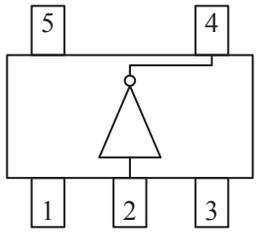
Parameter	Symbol	Limit	Unit
Power supply voltage	Vdd	-0.5 to +6.0	V
Input voltage	Vin	-0.5 to +6.0	V
Output voltage	Vout	-0.5 to Vdd+0.5	V
Input protection diode current	Iik	-20	mA
Output parasitic diode current	Iok	±20	mA
Output current	Iout	±25	mA
VDD/GND current	Idd, Ignd	±50	mA
Power dissipation	Pd	150	mW
Storage temperature	Tstg	-65 to +150	°C

■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	NC
2	INY
3	GND
4	OUTX
5	VDD

Input	Output
INY	OUTX
Low	High
High	Low

■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	1.70			1.70		V		
		3.0	2.40			2.40				
		5.5	4.40			4.40				
	Vil	2.0			0.30		0.30	V		
		3.0			0.60		0.60			
		5.5			1.10		1.10			
Output voltage	Voh	2.0	1.80	2.00		1.80		V	Vin=Vil	Ioh=-50μA
		3.0	2.70	3.00		2.70				
		4.5	4.00	4.50		4.00				
		3.0	2.58			2.48			Vin=GND	Ioh=-4mA
		4.5	3.94			3.80				Ioh=-8mA
	Vol	2.0			0.20		0.20	V	Vin=Vih	Iol=50μA
		3.0			0.30		0.30			
		4.5			0.50		0.50			
		3.0			0.36		0.44		Vin=Vdd	Iol=4mA
		4.5			0.36		0.44			Iol=8mA
Input current	Iin	5.5	-0.1		0.1	-1.0	1.0	μA	Vin=Vdd or GND	
Static current	Idd	5.5			1.0		10.0	μA	Vin=Vdd or GND	

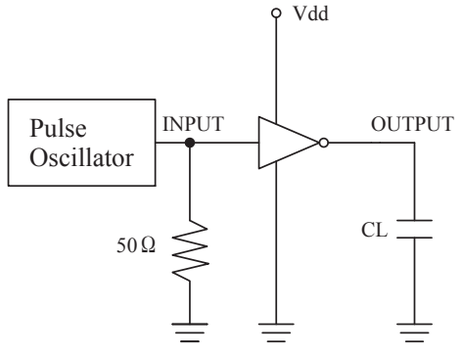
■AC electrical characteristics

tr=tf=3ns

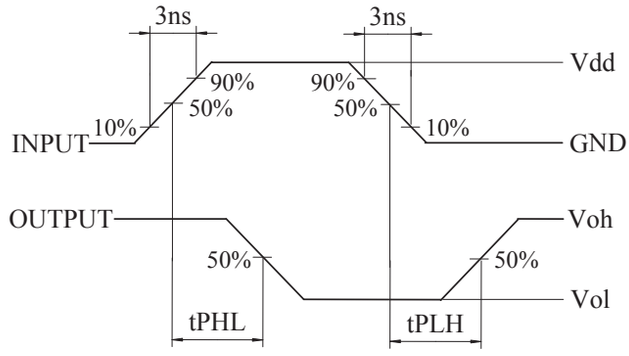
Parameter	Sym.	Vdd	CL	Top=25°C			Top=-40 to +85°C		Unit	Condition
				Min.	Typ.	Max.	Min.	Max.		
Propagation delay-time	tPLH	3.3±0.3	15		2.8	8.9	1.0	10.5	ns	Refer to test circuit
	tPHL				2.7	8.9	1.0	10.5		
	tPLH	3.3±0.3	50		4.5	11.4	1.0	13.0		
	tPHL				4.2	11.4	1.0	13.0		
	tPLH	5.0±0.5	15		2.4	5.5	1.0	6.5		
	tPHL				2.2	5.5	1.0	6.5		
	tPLH	5.0±0.5	50		3.6	7.0	1.0	8.0		
	tPHL				3.5	7.0	1.0	8.0		
Input capacity	Cin	5.0			2.0	10.0		10.0	pF	Vin=Vdd or GND
Equivalent inner capacity	Cpd				16.0				pF	f=1MHz

∗ 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

■Test circuit



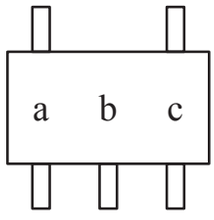
■Measured wave pattern



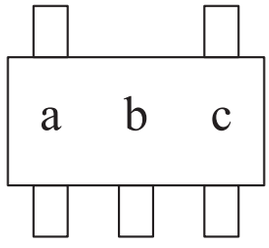
∗ Output should be opened when measuring current consumption.

■Marking

SC-70-5



SOT-25



No.	Mark	Content
a	F	ELM7SH series
b	6	ELM7SHU04xB
c	A to Z (except I, O, X)	Lot No.