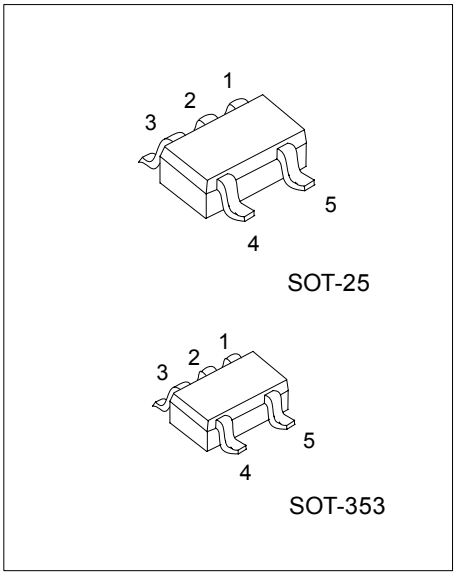
U7SH02

CMOS IC

2-INPUT NOR GATE



*Pb-free plating product number: U7SH02L

■ DESCRIPTION

The U7SH02 is a 2-input NOR gate, it provides the function $Y=\overline{A+B}$
This device has power-down protective circuit, preventing device destruction when it is powered down.

■ FEATURES

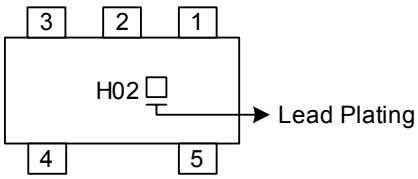
* Operation voltage range: 2~5.5V
* Low power dissipation: I_{CC}=2μA(Max)
* High speed: tpd=3.8ns(Typ)
* High noise immunity
* Power down protection

■ ORDERING INFORMATION

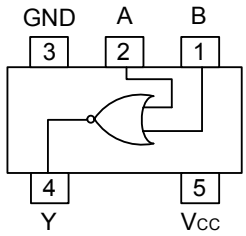
Order Number		Package	Packing
Normal	Lead Free Plating		
U7SH02-AF5-R	U7SH02L-AF5-R	SOT-25	Tape Reel
U7SH02-AL5-R	U7SH02L-AL5-R	SOT-353	Tape Reel

U7SH02L-AF5-R (1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel (2) AF5: SOT-25, AL5: SOT-353 (3) L: Lead Free Plating, Blank: Pb/Sn

■ MARKING



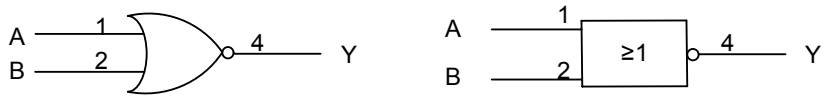
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5~7	V
Input Voltage	V_{IN}	-0.5~7	V
Output Voltage	V_{OUT}	-0.5~V_{CC}+0.5	V
Input Clamp Current	I_{IK}	-20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Power Dissipation	P_D	200	mW
Storage Temperature	T_{STG}	-65 ~ +150	℃

Note 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=3.3+0.3V			100	ns/V
		V_{CC}=5.0+0.5V			20	
Operating Temperature	T_A		-40		85	℃

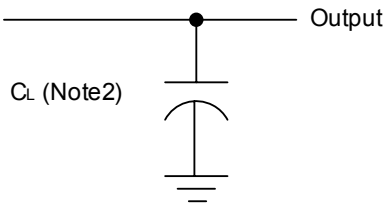
■ STATIC CHARACTERISTICS (Ta=25 ℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5			V
		V_{CC}=3.0V	2.1			
		V_{CC}=5.5V	3.85			
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V			0.5	V
		V_{CC}=3.0V			0.9	
		V_{CC}=5.5V			1.65	
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-50μA	1.9	2.0		V
		V_{CC}=3.0V, I_{OH}=-50μA	2.9	3.0		
		V_{CC}=4.5V, I_{OH}=-50μA	4.4	4.5		
		V_{CC}=3.0V, I_{OH}=-4mA	2.58			
		V_{CC}=4.5V, I_{OH}=-8mA	3.94			
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=50μA			0.1	V
		V_{CC}=3.0V, I_{OL}=50μA			0.1	
		V_{CC}=4.5V, I_{OL}=50μA			0.1	
		V_{CC}=3.0V, I_{OH}=4mA			0.36	
		V_{CC}=4.5V, I_{OH}=8mA			0.36	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0V~ 5.5V, V_{IN}=V_{CC} or GND			±0.1	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			2	μA
Input Capacitance	C_{IN}	V_{CC}=5V, V_{IN}=V_{CC} or GND		4	10	pF

■ DYNAMIC CHARACTERISTICS (Ta=25 °C, Input: t_R, t_F=3ns)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output(Y)	t_{PLH}	V_{CC} =3.3V±0.3V, C_L=15 pF		5.5	7.9	ns
	t_{PHL}			5.5	7.9	
	t_{PLH}	V_{CC} =3.3V±0.3V, C_L=50 pF		8.0	11.4	
	t_{PHL}			8.0	11.4	
Propagation delay from input (A or B) to output(Y)	t_{PLH}	V_{CC}= 5V±0.5V, C_L=15 pF		3.8	5.5	ns
	t_{PHL}			3.8	5.5	
	t_{PLH}	V_{CC}= 5V±0.5V, C_L=50 pF		5.3	10	
	t_{PHL}			5.3	10	
OPERATING CHARACTERISTICS						
Power Dissipation Capacitance	Cpd	No load		15		pF

■ TEST CIRCUIT AND WAVEFORM



Note 2: C_L includes probe and jig capacitance.