

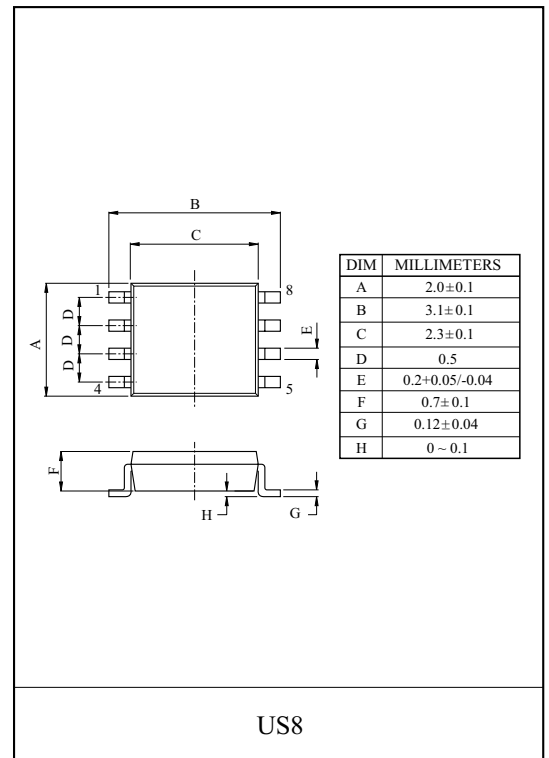
SCHMITT INVERTER

FEATURES

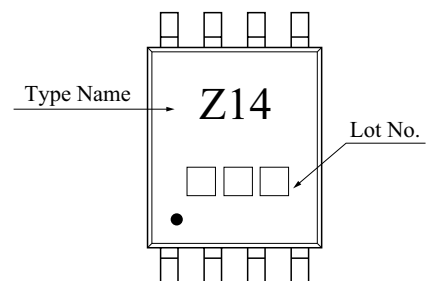
- High output drive : $\pm 24\text{mA}(\text{min.}) @ V_{CC}=3\text{V}$.
- Super high speed operation : $t_{pd} 3.2\text{ns}(\text{typ.}) @ V_{CC}=5\text{V}, 50\text{pF}$.
- Operation voltage range : $V_{CC(\text{opr})}=1.65\sim 5.5\text{V}$.
- Power down protection is provided on all inputs and outputs.

MAXIMUM RATINGS (Ta=25 °C)

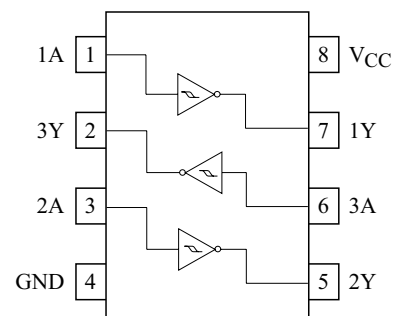
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	-0.5~7	V
DC Input Voltage	V_{IN}	-0.5~ $V_{CC}+0.5$	V
DC Output Voltage	V_{OUT}	-0.5~ $V_{CC}+0.5$	V
Input Diode Current	I_{IK}	-50	mA
Output Diode Current	I_{OK}	-50	mA
DC Output Current	I_{OUT}	± 50	mA
DC V_{CC} /ground Current	I_{CC}	± 50	mA
Power Dissipation	P_D	200	mW
Storage Temperature Range	T_{stg}	-65 ~ 150	°C
Lead Temperature (10s)	T_L	260	°C



MARKING



PIN CONNECTION(TOP VIEW)

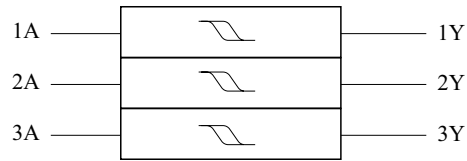


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Truth Table

A	Y
L	H
H	L

Logic Diagram



Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	1.65~5.5	V
		1.5~5.5 (Note1)	
Input Voltage	V_{IN}	0~5.5	V
Output Voltage	V_{OUT}	0~5.5 (Note2)	V
		0~ V_{CC} (Note3)	
Operating Temperature	T_{opr}	-40~85	°C
Input Rise and Fall Time	d_i/d_v	0~20 ($V_{CC}=1.8V \pm 0.15V,$ 2.5V $\pm 0.2V$)	ns/V
		0~10 ($V_{CC}=3.3V \pm 0.3V$)	
		0~5 ($V_{CC}=5.5V \pm 0.5V$)	

Note1 : Data retention only.

Note2 : $V_{CC}=0V$.

Note3 : High or low state

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ELECTRICAL CHARACTERISTICS

DC Characteristics

CHARACTERISTIC	SYMBOL	TEST CONDITION		Ta=25 °C			Ta=-40~85 °C		UNIT							
				V _{CC} (V)	MIN.	TYP.	MAX.	MIN.		MAX.						
Positive Threshold Voltage	V _P	-		1.65	0.6	-	1.4	0.6	1.4	V						
				1.8	0.7	-	1.5	0.7	1.5							
				2.3	1.0	-	1.8	1.0	1.8							
				3.0	1.3	-	2.2	1.3	2.2							
				4.5	1.9	-	3.1	1.9	3.1							
				5.5	2.2	-	3.6	2.2	3.6							
Negative Threshold Voltage	V _N	-		1.65	0.2	0.5	0.8	0.2	0.8	V						
				1.8	0.25	0.56	0.9	0.25	0.9							
				2.3	0.40	0.75	1.15	0.40	1.15							
				3.0	0.6	0.98	1.5	0.6	1.5							
				4.5	1.0	1.42	2.0	1.0	2.0							
				5.5	1.2	1.68	2.3	1.2	2.3							
Hysteresis Voltage	V _H	-		1.65	0.1	0.48	0.9	0.1	0.9	V						
				1.8	0.15	0.51	1.0	0.15	1.0							
				2.3	0.25	0.62	1.1	0.25	1.1							
				3.0	0.4	0.76	1.2	0.4	1.2							
				4.5	0.6	1.01	1.5	0.6	1.5							
				5.5	0.7	1.20	1.7	0.7	1.7							
Output Voltage	High Level	V _{OH}	V _{IN} =V _{IL}	I _{OH} =-100 μA	1.65	1.55	1.65	-	1.55	-	V					
					1.8	1.7	1.8	-	1.7	-						
					2.3	2.2	2.3	-	2.2	-						
					3.0	2.9	3.0	-	2.9	-						
					4.5	4.4	4.5	-	4.4	-						
					Low Level	V _{OL}	V _{IN} =V _{IH}	I _{OL} =100 μA	1.65	-		0.0	0.1	-	0.1	V
									1.8	-		0.0	0.1	-	0.1	
									2.3	-		0.0	0.1	-	0.1	
									3.0	-		0.0	0.1	-	0.1	
	4.5	-	0.0	0.1					-	0.1						
	High Level	V _{OH}	V _{IN} =V _{IL}	I _{OH} =-4mA					1.65	1.29	1.52	-	1.29	-	V	
					I _{OH} =-8mA	2.3	1.9	2.14	-	1.9	-					
					I _{OH} =-16mA	3.0	2.4	2.75	-	2.4	-					
					I _{OH} =-24mA	3.0	2.3	2.62	-	2.3	-					
					I _{OH} =-32mA	4.5	3.8	4.13	-	3.8	-					
	Low Level	V _{OL}	V _{IN} =V _{IH}	I _{OL} =4mA	1.65	-	0.08	0.24	-	0.24	V					
					I _{OL} =8mA	2.3	-	0.10	0.3	-		0.3				
					I _{OL} =16mA	3.0	-	0.16	0.4	-		0.4				
I _{OL} =24mA					3.0	-	0.24	0.55	-	0.55						
I _{OL} =32mA					4.5	-	0.25	0.55	-	0.55						
Input Leakage Current	I _{IN}	V _{IN} =5.5V or GND	0~5.5	-	-	±0.1	-	±10	μA							
Power Off Leakage Current	I _{OFF}	V _{IN} or V _{OUT} =5.5V	0.0	-	-	1	-	10	μA							
Quiescent Supply Current	I _{CC}	V _{IN} =5.5V or GND	1.65~5.5	-	-	1.0	-	10	μA							

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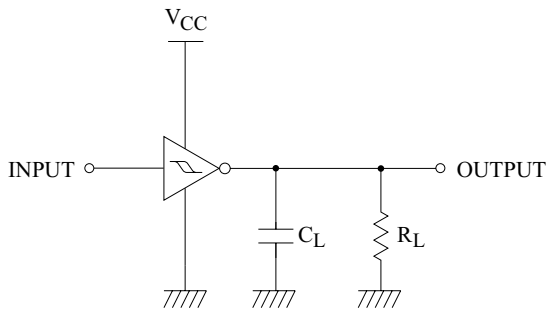
ELECTRICAL CHARACTERISTICS

AC Characteristics

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta=25 °C			Ta=-40~85 °C		UNIT	
			V _{CC} (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Propagation Delay	t _{PLH} t _{PHL}	C _L =15pF, R _L =1MΩ	1.65	2.5	7.6	13.1	2.5	14.5	ns
			1.8	2.5	6.3	10.9	2.5	12	
			2.5±0.2	1.8	4.3	7.4	1.8	8.1	
			3.3±0.3	1.5	3.3	5.0	1.5	5.5	
Propagation Delay	t _{PLH} t _{PHL}	C _L =50pF, R _L =500Ω	3.3±0.3	1.8	4.0	6.0	1.8	6.6	ns
			5.0±0.5	1.2	3.2	4.9	1.2	5.4	
Input Capacitance	C _{IN}	-	0	-	2.5	-	-	-	pF
Power Dissipation Capacitance	C _{PD}	(Note)	3.3	-	11	-	-	-	pF
			5.5	-	12.5	-	-	-	

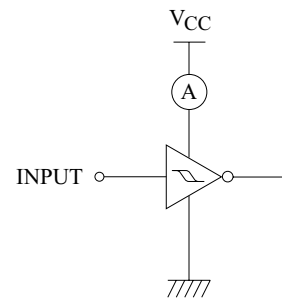
Note : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. (See Figure2.) C_{PD} is related to I_{CCD} dynamic operating current by the expression : I_{CCD(opr)}=C_{PD} · V_{CC} · f_{IN}+(I_{CC}static)

AC Loading and Waveforms



C_L includes load and stray capacitance
Input PRR=1.0MHz ; t_w=500ns

FIGURE 1. AC Test Circuit



Input=AC Waveform ; t_r=t_f=1.8ns
PRR=variable ; Duty Cycle=50%

FIGURE 2. I_{CCD} Test Circuit

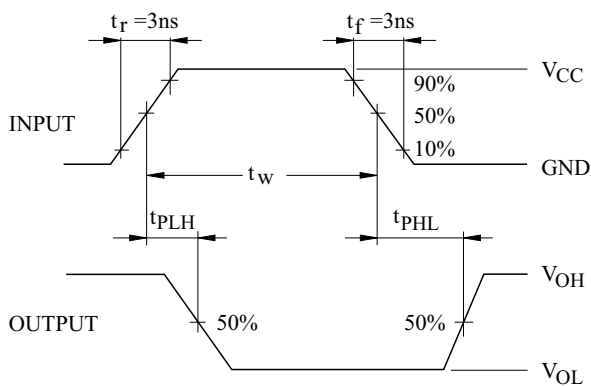


FIGURE 3. AC Waveforms